

Final Report

Impacts of the Victorian Training Guarantee on VET Enrolments, Course Choice and Completion

Felix Leung, Duncan McVicar, Cain Polidano, and Rong Zhang
Melbourne Institute of Applied Economic and Social Research

Acknowledgements

This research was commissioned by the Australian Government Department of Education, Employment and Workplace Relations (DEEWR) under the Social Policy Research Services Agreement (2010–12) with the Melbourne Institute of Applied Economic and Social Research. The research uses data from the Vocational Education and Training Provider Collection database kindly made available to us by the National Centre for Vocational Education Research (NCVER), and we would like to thank Stuart Varney in particular for his help in this regard. The views expressed in this report are those of the authors alone and do not represent those of DEEWR, NCVER or the Melbourne Institute.

February 2013



MELBOURNE INSTITUTE[®]
of Applied Economic and Social Research

Table of Contents

Table of Contents	2
Executive Summary	3
1. Introduction	10
2. The Victorian VET reforms in context	13
2.1 National Reforms	13
2.2 The Victorian VET reforms	16
2.3 Movements towards Demand-driven Models in Other States	17
3. Conceptual Framework	18
4. Existing Estimates	21
4.1 International evidence	22
5. Data and Methods.....	24
6. Results and Discussion.....	30
6.1 Impacts on Participation, Composition of Student Body, and Choice of Provider.....	30
6.2 Impacts on Course Choice.....	34
6.3 Impacts on Course Completion	45
7. Conclusions	50
Appendix A: Additional Tables	53
Appendix B: Using NSW to Estimate Counterfactuals for Victoria.....	66
Appendix C: Additional Data Details	71
References	74

Executive Summary

This study estimates impacts of the Victorian Training Guarantee (VTG) reforms that were implemented in the Victorian VET sector between 2009 and 2011.

Nationally, market-based reform to make the VET sector more responsive to changing skill demands is seen as key to maintaining Australia's competitiveness and enhancing labour market participation, as outlined in the Australian Government's *National Agreement for Skills and Workforce Development*. Replacing the existing supply-driven training system, where the number and type of publicly-funded VET places is set by government, with a more demand-driven system where the number and type of VET places provided more closely reflects student demand, is seen as an important step along this path.

Victoria is the first Australian state to embrace such market-driven reforms. As such, the estimated early impacts from the reforms in Victoria presented in this report provide important information which, looking forward, can potentially guide both the ongoing reform process in Victoria and similar reform processes in other states.

The VTG gives eligible individuals an entitlement to a publicly-funded place in VET, which they may use to select their course of choice with either a public or private provider. In this respect it is essentially a voucher for VET. The extent to which this leads to improved outcomes relative to the pre-reform VET system is, however, uncertain. On the one hand, allowing private providers to enter the market is likely to increase the supply of VET places which may boost enrolments. Also, greater freedom of choice may improve the match between student preferences and course offerings leading to a greater attachment to study and better course and employment outcomes. Further, greater contestability may motivate providers to innovate and improve the quality of training. On the other hand, giving students more freedom to choose may lead to poorer outcomes if they choose courses that have high consumption values but poor labour market prospects.

In this study, we examine the impacts of the VTG on enrolments, on the responsiveness of enrolments to employer demands (measured by proportion of enrolments that are in courses related to occupations on skills shortage lists), and on course completion. The analysis is

focussed on young people aged 15-19 years because this is when a large part of engagement in VET occurs, because this age group faced the most extensive reforms, and because the limited labour market experience of this age group makes them the group most likely to face an information deficit in choosing appropriate courses in the new training market.

This is not the first report to examine impacts of the VTG. But, in addition to our particular focus on the 15-19 year old age group, this study builds on the earlier reports of Skills Victoria (2012) and the Essential Services Commission (2011) in two important ways. First, this study separately identifies the impacts of the VTG reforms from the impacts of other changes that occurred at the same time, such as the rollout of national entitlements that made publicly-funded places in VET more accessible both in Victoria and elsewhere. Previous studies only present changes in enrolments in 2010 and 2011, relative to the pre-reform base year of 2008, within Victoria – an approach which does not isolate the effects of the VTG reforms from the effects of other changes that occurred between 2008 and 2011. The second novel contribution of this study is to examine the effects of the VTG on a range of completion measures, commonly used as measures of performance of the training system.

To isolate the effect of the VTG from other contemporaneous labour market and policy changes this report compares changes in outcomes in Victoria over the reform period to changes in outcomes in New South Wales (NSW) over the same period. In other words, NSW is used to generate counterfactual outcomes that represent our best estimate as to what would have happened in Victoria had the VTG not been introduced. This kind of approach is called difference-in-differences and it is a widely used method for evaluating impacts of policy changes in the absence of experimental data.

Impacts on enrolments

Overall, total enrolments for the 15-19 year old age group in Victoria increased from 58,430 in 2008 to 71,615 in 2010, and further to 80,045 in 2011, which represents a 37% increase between 2008 and 2011. In contrast, in NSW there was little growth in enrolments over the same period, and we therefore estimate that the VTG led to 36.5 percentage points of this overall 37% growth in enrolments in Victoria between 2008 and 2011.¹ The percentage point

¹ Discrepancies in the rates of enrolment growth between Victoria and NSW cannot be explained by differences in growth in population among the 15-19 age cohort over this period. ABS data (Population by Age and Sex, cat.

increases in enrolments as a result of the VTG were greater for females compared to males, greater for 18-19 year olds compared to 15-17 year olds, greater for the Australian-born compared to foreign-born and greater for those with a prior post-school qualification compared to those without a prior post-school qualification. Impacts of the VTG have also been greater on enrolments in certificate I/II and certificate III/IV (leading to additional growth of 44 percentage points and 42 percentage points respectively) than on enrolments in Diploma level courses and above (additional growth of just 19 percentage points).

The VTG had smaller impacts on enrolments for two key equity groups, leading to an increase in enrolment growth of 20 percentage points for students with a disability and a fall in enrolment growth of 1 percentage point for Indigenous students. One possible explanation is that there are barriers to education for young people in these equity groups that limit their capacity to participate in education, and which cannot be surmounted by greater freedom of course choice alone.

Course enrolment increases for 15-19 year olds associated with the VTG are likely to have stemmed from the increased supply of places following the opening of the market to private providers and from higher student demand associated with the greater freedom for students to enrol in their preferred course. In fact, of the 21,615 extra enrolments for 15-19 year olds between 2008 and 2011 in Victoria, 19,636 were with private providers and the remainder were with Adult and Community Education (ACE) providers. TAFE enrolments for this age group remained unchanged during this period.

Impacts on demand responsiveness

The VTG has improved the responsiveness of course enrolments to employer demands, as measured by the proportion of students who enrol in courses that are associated with jobs on state-based or national skills shortage lists. The magnitude of the estimated improvement in demand response depends on whether the national or state based shortage lists are used. Using the national skill shortage list, we estimate that between 2008 and 2011 the VTG led to a 2 percentage point increase in the proportion of enrolments that were in courses related to a skill

no. 3235.0) from 2008 and 2011 shows a 1 percent fall in the cohort population in Victoria and a 2 percent fall in NSW.

shortage. Using state lists, the equivalent effect is an 11 or 13 percentage point increase, depending on the particular definition of skill shortage used.

A possible explanation for the positive effect on demand responsiveness of training is that by removing supply caps and giving students freedom to choose, students have better access to courses associated with skill shortages. Note, however, that our analysis suggests that the impact of the reforms on the labour-market responsiveness of private and TAFE providers have been different. Specifically, the reforms are estimated to have *increased* the proportion of enrolments that were in skill shortage areas by 7 percentage points in TAFE, but to have *decreased* the proportion of enrolments that were in skill shortage areas by 23 percentage points with private providers. The greater impact of the VTG on the responsiveness of enrolments in TAFE to skill demands may be because they have a competitive advantage in the provision of courses related to skill shortage occupations. More specifically, because many skill shortages have persisted over time, there is a history of government support for programs and infrastructure in these areas, which gives TAFEs an advantage. In contrast, the negative impact in the private sector likely reflects the expansion of private provision of publicly-funded VET places, previously limited to apprenticeships, into other types of courses.

Impacts on course completion

The reforms have had a modest but statistically significant positive effect on the chances of course completion. Overall, we estimate that the reforms have increased course completion rates by around 3 percentage points. Estimates using module completion give similar results. Analysis suggests that the main channel through which this effect is transmitted is changes in practices, especially among private providers, in response to greater contestability. While the VTG is estimated to improve the completion rates of both public and private providers, controlling for differences in student characteristics, field of study and course level, the effect on private completion rates is much higher than for public providers.

In all likelihood the change in practices reflect improvements in the quality of training among existing providers and/or better quality training from new private entrants. However, we cannot rule out the possibility that all or some of the effect is a result of increased strategic behaviour, such as under-reporting of non-completion, undertaken to gain a competitive

advantage. Given that completion rates may be used by students to measure course quality when making course decisions, there is a clear motivation for providers to focus on improving completion rates.

Implications

Despite the use of more sophisticated estimation methods here, overall our findings are broadly consistent with those from Skills Victoria (2012), at least where we have research questions in common. In general, the message is positive: demand-driven reforms have been effective in increasing demand for VET, which has been largely met through increased supply from private providers.² The message of this report is also broadly positive where we go beyond the earlier analysis of Skills Victoria (2012). Specifically, removing caps for publicly-funded places and giving students greater freedom of choice has increased responsiveness to labour market demands as measured by the proportion of enrolments that are in courses linked to skills-shortage occupations. It has also led to increased completion rates. The message for other states is that there are benefits to be had from introducing similar market-driven reforms in the VET sector.

For the most part we have examined *average* impacts on the VTG, rather than impacts on students with particular characteristics. Where we have looked at more disaggregate impacts, we show that the positive impacts of the VTG have not spread equally across all groups of students, with key equity group members not sharing in the enrolment growth to the same extent as others. Understanding why these equity groups do not experience the same increase in enrolment is important. One possible explanation is that equity group members were previously given priority access, so have less to gain under the post-VTG entitlement system. Alternatively, equity group members may face additional barriers to accessing and assessing course information relative to other students, leading to greater uncertainty regarding the costs and benefits of enrolment which may in turn make enrolments less responsive to these VET reforms. They may also face additional learning costs, as might providers enrolling students from equity groups, which again might make equity group enrolments less responsive to these VET reforms.

² Of course this growth in publicly-subsidised enrolments has also had short run budgetary implications for the Victorian government.

The positive impacts of the VTG have also not been spread equally across provider types, with private providers experiencing increased enrolments and completion rates and the TAFE sector experiencing no increase in enrolments and little change in completion rates. The TAFE sector, because of its historical legacy, faces particular cost challenges in moving to a funding model based on student enrolments. These include cost disadvantages associated with a high proportion of permanently employed staff and a culture of delivering community service rather than returning a profit. If the community services provided by TAFEs are to remain under a funding model based on student enrolments, these services may need to be funded separately by government. There is also an important role for government in providing reliable and meaningful information on provider quality to students. Providing meaningful information means producing measures that are clearly linked to quality, such as course completion and employment outcomes, and that also account for differences in circumstances of the provider's students, such as differences in motivation for study at enrolment. This is important to help potential students gauge which providers are best placed to meet their needs and to help put measures of provider quality into perspective. This will require boosting the existing Student Outcome Survey to include student information on enrolment and also longer-term outcomes.

Another policy challenge may stem from the fact that the VTG has led to large increases in enrolments in courses that are unlikely to reflect labour demand in addition to increases in enrolments in courses more closely aligned with labour market needs. For example, of the 87% increase in enrolments in courses relating to Sports and Personal Service Workers jobs in Victoria between 2008 and 2011 we can explain 80 percentage points by the introduction of the VTG. An obvious response must be to ensure that students have access to good information on expected course outcomes. The launch of My Skills in October 2012, which reports information on average employment rates and wage information by field of study and course level, may help to improve the level of information available to students in this respect, which may in turn help to better align student choices with employer needs. Better alignment of enrolments and skill needs (and constraint of government spending) may also be achieved through varying subsidy levels, which was the motivation behind the Victorian government's 2012 *Refocussing Vocational Training in Victoria* reforms (DEECD 2012). However, when determining appropriate subsidy levels, governments should be mindful of the private and public benefits from particular VET courses. Being on a skill shortage list is unlikely to be a good indicator, in isolation, of the public benefit from a course. It follows that skewing public

subsidies towards areas reported as being in skills shortage may not necessarily be welfare enhancing.

1. Introduction

Australia faces a number of skills-related challenges, namely skills shortages, sluggish productivity growth and low rates of labour market participation combined with an ageing workforce. As outlined in Australian Government policy documents (*Skilling Australia for the Future* and the *National Agreement for Skills and Workforce Development*) a key initiative to address these challenges is reforming the vocational education and training (VET) sector to make it more responsive to changing skill demands. The *National Agreement for Skills and Workforce Development* also contains ambitious targets for increasing VET completion rates.

Victoria has led the way with reforms aimed at moving to a student demand-driven model for VET. Prior to July 2009, public funding for VET was allocated directly to VET providers on a block grant basis, in part based on historical enrolments and skills forecasts. In practice this meant a cap on the overall number of publicly funded places, with a report published by the Victorian Government (2008) claiming that “approximately 27,000 students missed out on a TAFE place across Australia last year”. There may also have been course ‘mismatch’ in terms of the types of publicly-funded courses available and the types of courses students wanted to enrol for. Between July 2009 and January 2011 Victoria has (incrementally³) moved to a new model where funding follows the student, with no overall cap, and where providers must compete to attract students and therefore funding.⁴ Similar reforms have been recently introduced in South Australia (from July 2012) and we can expect other states to follow in the near future. Note that, faced with budget restrictions, the Victorian government has subsequently (in 2012) revised course subsidy levels, with the stated aim of better reflecting the public benefit and skills demands under the *Refocussing Vocational Training in Victoria* reforms (DEECD 2012). Analysis in this report is for the period predating the 2012 reforms.

Early indications are that the number of VET enrolments and the number of VET providers have both increased in Victoria and that course choice patterns have changed following the

³ According to the *Victorian Training Guarantee, Student Eligibility Guide* the first phase of the scheme was the introduction of new demand-driven eligibility criteria for subsidised places in limited types of courses – Diplomas and above from July 2009. In the second phase (January 2010), demand-driven eligibility criteria are extended to students who qualify for a publicly funded place under the COAG Youth Compact initiative – 15-19 year olds who do not have a year 12 certificate or equivalent. For others aged 15-19, the old eligibility criteria for a subsidised place apply (first-come first-served). It’s not until January 2011 that the entitlement to a subsidised place is available to all students under 20.

⁴ See Victorian Government (2008) for further details of the reform package.

reforms (Skills Victoria, 2012). We don't know, however, whether course choices have changed in such a way as to better fit the needs of employers. Neither do we know whether VET outcomes have improved following the reforms.

The purpose of this study is to provide early analysis on the impacts of the Victorian reforms for those aged under 20 years in Victoria, all of whom are now covered by the *Victorian Training Guarantee* (VTG) that provides an entitlement to a government-subsidised training place for a VET course of their choosing. Impacts examined include on enrolments, on student course choices and whether or not they are likely to lessen or heighten prevailing skill shortages, and on course completion. Course completion rates are a commonly used measure of the effectiveness and efficiency of VET training (Mark and Karmel 2010), with completion generally associated with better post-study outcomes (Karmel and Fieger, 2012).⁵ Timely evidence on these issues can provide important information for policy makers, VET providers and employers both in Victoria (e.g. to provide evidence to support fine tuning of the implementation of the reforms) and across Australia (e.g. to provide evidence to support the design of reforms for other states).

The specific research questions addressed in this report are:

1. (a) What impact have the reforms had on the number of people less than 20 years of age participating in vocational education? (b) What impact have the reforms had on the composition of under 20s entering VET (in terms of their characteristics)? (c) How have the reforms affected the choice of provider?
2. (a) How have the reforms affected the types and levels of courses that people less than 20 years are enrolling in? (b) Are the changes in the courses undertaken likely to alleviate or exacerbate the skills challenges facing Australia?
3. How have the reforms impacted on completion rates of those less than 20 enrolling in VET in Victoria?

To answer these questions we draw on economic theory, existing empirical evidence, and our own empirical analysis of unit-record data for all those aged under 20 enrolling in publicly-

⁵ Impacts on post-training outcomes, such as employment rates and wages will be addressed in a future Melbourne Institute study.

funded VET courses in 2008 (pre-reform) and 2010 and 2011 (post-reform). This is the first study to examine the impacts of the reforms against a defined counterfactual, i.e. what we estimate would have happened in the absence of the reforms (for which we exploit data for New South Wales (NSW)). It is also the first study to explicitly examine the link between the reform impact on course choices and reported skills shortages in the labour market, and the first study to examine how the reforms have impacted on completion rates.

2. The Victorian VET reforms in context

This section includes a detailed description of recent reforms to the VET sector at the national level (which by implication impact on both Victoria and NSW) and reforms specific to Victoria associated with the VTG. These are summarised in Table 1. Arrangements in NSW during the period of analysis are used in this study to represent a counterfactual to the VTG, the outcomes from which are used to isolate the impacts of the VTG.⁶ Many of the reforms listed affect the 15-19 age group, either exclusively or as part of the wider 15+ age group. But we also list reforms over the same period affecting other age groups. Similarly, although we are interested here in VET courses at Certificate level I and above, we also list reforms that impact on Foundation-level course entitlements.

2.1 National Reforms

Traditionally, the VET system in Australia could be categorised as a supply-side model where publicly-subsidised VET places were allocated directly to selected (mostly public) VET providers, largely via block grants based on historical enrolments and centralised forecasts. Under this system, unless they have an exemption, students in subsidised places pay a fee that is based on an hourly rate, but with a maximum overall fee chargeable in a given year.⁷ Contestability between providers was limited to the national *User Choice* program (introduced in 1998), where eligible employers and apprentices/trainees were given the freedom to choose their own Registered Training Organisation (RTO). In 2009, 14 percent of publicly-funded student enrolments at the national level were with private providers (Productivity Commission, 2011).

In early 2008, however, concerns over waning productivity growth, increased global competition and the impacts of demographic changes on labour force participation prompted the Commonwealth of Australian Governments (COAG) to agree on a new human capital reform agenda (Productivity Commission, 2012). One result of this was the *National Agreement for Skills and Workforce Development (NASWD)* announced in November 2008, which set out the broad objective to move to a ‘demand-driven’ model of VET provision with

⁶ Refer to Appendix B for a discussion on the use of NSW as a counterfactual.

⁷ Course fee exemptions and concessions are determined by the individual states. Generally speaking, those eligible for fee exemptions/concessions are low income earners and other disadvantaged members of the community.

the objective of making the VET system more responsive to changing labour market needs in order to maintain Australia's competitiveness.

As part of *NASWD*, national education targets were also set:

- doubling the number of qualification completions at diploma and advanced diploma levels by 2020; and
- halving the proportion of Australians of working age without a certificate II qualification or higher by 2020.

A further national target – to increase the proportion of young Australians aged 20-24 who have attained a Year 12 or equivalent to 90% by 2015 – was introduced under the National Partnership on Youth Attainment and Transitions agreement.

In addition, new entitlements to training were introduced under the *National Partnership Agreement on Productivity Places Program (NPAPPP)*, the *Compact with Young Australians* and the *Compact with Retrenched Workers*.

NPAPPP commenced on 1 July 2009 (concluding June 2012) and involved a commitment from the state governments to deliver an extra 400,000 additional training places for qualifications of national priority, defined by current skill shortages and emerging skill needs. Around 133,000 places were allocated to job seekers and 270,000 to existing workers, with the Australian Government meeting the full cost of job seeker places and state governments and employers sharing the cost of worker places (60% employer, 40% state government). Note that *NPAPPP* doesn't move the VET system away from a supply-driven model with an overall cap on places; rather it increases the number of subsidised places that governments are willing to fund for qualifications deemed to be of national priority.

The *Compact with Young Australians* was introduced in April 2009 to encourage participation in education among young people, partly in response to the view that young people had been disproportionately affected by the GFC. A key measure was an entitlement to a government-subsidised education or training place for those aged 15 to 24 years. For those aged 20 to 24 years with a Year 12 qualification or equivalent, the entitlement is for a course

that leads to a higher qualification than they currently hold. There is no such restriction for 15-19 year olds.

Table 1: Changes to Eligibility for Publicly-Subsidised VET Courses in Victoria and New South Wales, 2007-2011

	Jurisdiction	Age eligibility	Course eligibility	Provided by	Allocation to students
Pre-reform arrangements					
<i>Jan 2007 - Dec 2008</i>					
Guaranteed Place in TAFE (from Jan 2007 to June 2009)	Victoria only	16-19 without Year 12 or equiv.	All courses	Public RTOs	Student entitlement ^a
Other Government Supported Training (to June 2009)	Victoria & NSW	15 and over	Set number of places in set courses at set institutes ^b	Public RTOs	First-come first-served
Post-reform					
<i>Jan - Dec 2009</i>					
Skills for Growth / Productivity Places Program (July 2009 to June 2012) ^c	Victoria & NSW	15 and over	National priority list ^d	Public and private RTOs ^e	Student entitlement ^a
Victorian Training Guarantee Diploma Entitlement (from July 2009)	Victoria only	15 and over	Diploma and Advanced Diploma	Public and private RTOs ^e	Student entitlement ^a
Compact with Young Australians (from July 2009)	Victoria & NSW	15-19	All courses	Public RTOs	Student entitlement ^a
<i>Jan - Dec 2010</i>					
Compact with Young Australians (from Jan 2010)	Victoria & NSW	20-24	Higher than existing qual.	Public and private RTOs ^e	Student entitlement ^a
Compact with Retrenched Workers (from Jan 2010 to Dec 2011)	Victoria & NSW	25 and over	Higher than existing qual.	Public and private RTOs ^e	Student entitlement ^a
<i>Jan - Dec 2011</i>					
Victorian Training Guarantee Foundation Skills Entitlement (from Jan 2011)	Victoria only	15 and over	Foundation skill courses	Public and private RTOs ^e	Student entitlement ^a
Victorian Training Guarantee up-skilling entitlement (from Jan 2011)	Victoria only	25 and over	Higher than existing qual.	Public and private RTOs ^e	Student entitlement ^a

Notes: ^aSubject to entry requirements and course availability. ^bThe decision on the types and numbers of courses to publicly fund at different institutions was based on skill need priorities, as decided by Skills Victoria/NSW Government, and past allocations. ^cNational Partnership Agreement on Productivity Places (NPAPP) were delivered to 15-30 year olds in Victoria under the program name Skills for Growth. ^dThis is based on national priority industries, occupations and qualifications in areas of current skill shortages and emerging skill needs. ^ePrivate providers must be registered to provide publicly funded courses ^fAn Australian Government entitlement to a government subsidised place for retrenched workers to attain a higher than existing qualification.

For 15 to 19 year olds the entitlement commenced July 1 2009 and for 20 to 24 year olds, January 1 2010. So the Compact with Young Australians, because it introduces an entitlement

to a subsidised place for new groups of students, represents a major step away from a supply-driven model with an overall cap. It does not, however, necessarily remove centrally-determined restrictions on the number of subsidised places governments are willing to fund at the provider-course level. In other words, the guaranteed place may not be at a provider or in a course of your choosing.

The *Compact with Retrenched* workers, introduced by January 2010, gives those aged 25 years and over who had lost their jobs during the GFC access to government-subsidised training that counts towards a higher level qualification.

2.2 The Victorian VET reforms

In addition to these national-level reforms, Victoria has introduced a number of additional reforms – here collectively labelled the VTG – aimed at moving further and faster towards a more demand-driven VET system. The VTG, phased in between July 2009 and January 2011, is essentially an extended entitlement scheme with accompanying reforms to promote contestability and competition.

The extra entitlements under the VTG do not (directly) affect entitlements for the 15-19 year old age group for courses at Certificate Level I or above (over and above what is made available under the Australian Government's *Compact with Young Australians*). Rather they consist of extra entitlements for those aged 25 and above and for Foundation Skill courses.

What the VTG does give the 15-19 year old age group, however, is greater choice among courses and providers, and this is the key aspect of the reforms for our purposes here. Specifically, the entitlements under the VTG give students the freedom to choose their preferred course with their preferred provider, *public or private*. The offer of a place is subject to providers' own capacity constraints, but is not subject to government restrictions on the distribution of subsidies at the provider-course level, and there is no overall cap.⁸ As part of the VTG, Victoria has also given providers of publicly-subsidised courses greater flexibility

⁸ Private providers can compete for publicly provided courses as long as they have signed a service contract with Skills Victoria. As part of their contract, private providers have to register in Victoria, must demonstrate that they have a capacity to provide quality training through satisfactory registration audit records and mandatory publication of all audit reports and comply with AVETMISS reporting standards.

to compete on price. Providers are free to set an hourly fee, although the fee cannot exceed a maximum hourly rate and the maximum annual fee for the course level.⁹ The maximum fee rates have also been set to try to reflect the relative private benefits from completing a given course level, e.g. with Diploma-level courses attracting relatively higher maximum fees than prior to the reforms.¹⁰

2.3 Movements towards Demand-driven Models in Other States

In July 2012 South Australia introduced a similar entitlement scheme, but with more limited criteria around which courses will be fully subsidised. At the time of writing, other states had indicated a movement towards similar entitlement schemes. NSW had released a discussion document 'Smart and Skilled: Making New South Wales Number One' in September 2011 outlining the possibility of adopting a broad-based entitlement like Victoria. In a discussion paper by Skills Queensland, titled 'Queensland Training Entitlement Model Discussion Paper', released in September 2011, Queensland committed to a broad-based entitlement model, but the detail and timing are yet to be finalised. Western Australia is currently in the process of developing a discussion paper on the introduction of an entitlement scheme (Shean 2012). Similarly, Tasmania is in the process of conducting a review of governance, funding and operational arrangements of public providers of VET in Tasmania

⁹ There are also *minimum* course and hourly fee rates.

¹⁰ Under its 2012 reforms, spelt out in *Refocussing Vocational Training in Victoria* (DEECD 2012), the maximum fee cap has been removed, but the overall course fee cap remains.

3. Conceptual Framework

The number of students enrolled in VET, or in a particular VET course, reflects the interaction of the demand for the VET course with the supply of places on the VET course. This is true both before and after the reforms, but the reforms can be thought of as shifting the balance between supply and demand in driving overall enrolment rates and patterns of course choice. The fact that students get greater course and provider choice is likely to reduce the course ‘mismatch’ in terms of the types of publicly-funded courses available and the types of courses students want to enrol for, which may strengthen the impact of the reforms on overall enrolment (Research Question 1a).

It is also likely that the composition of enrolments has changed as a result of the removal of supply constraints (Research Question 1b). For example, under the ‘old’ system, places were essentially allocated on a first-come first-served basis. Those who lost out were therefore likely to be those who left it later to apply for a course place, and/or those who were less flexible in terms of provider and/or course type. These factors may be correlated with characteristics such as reporting a disability (which in some cases may restrict the types of courses that are demanded, and may disproportionately increase costs of enrolling at more distant providers), location (likely to restrict the number of providers that are plausibly accessible), and prior education (those with weaker preferences for education may be less likely to apply early).¹¹

Further, the VTG reforms have also removed remaining restrictions on the entry of private VET providers into the Victorian VET market. The likely consequence of this is an increase in the overall supply of places over and above that which would have occurred as a result of the newly-introduced entitlements alone (Research Question 1a), together with an increase in the share of enrolments that are with private providers (Research Question 1c).

Now consider the demand-side choice – the student’s decision to enrol in a VET course – in more detail. The decision to enrol in VET (or in a particular VET course) can be thought of as a human capital investment decision (see Becker, 1962), where the prospective student

¹¹ Note, however, that 16-19 year olds without Year 12 or equivalent were entitled to a publicly-funded VET place in Victoria even prior to the VTG reforms. To the extent that Indigenous status or having a disability are correlated with Year 12 completion, this may off-set any impact of the VTG on such groups.

weighs up the (present value of the) expected benefits of studying the course (e.g. higher expected future earnings, enjoyment of the course as a consumption good) and the expected costs of studying the course (e.g. course fees, expected earnings foregone during study, mental strain). If the expected benefits outweigh the expected costs then the student enrolls in the course, and not otherwise. In a demand-driven regime course choices should therefore better reflect student preferences and student expectations about labour market returns to different courses than would be the case in a supply-driven system (Research Question 2a). Among other things, these may be affected by any compositional changes in the student body that are themselves driven by the reforms (e.g. if the reforms disproportionately increase enrolments among female students).

Critical to the decision-making process of any given student is the information that he or she has available on expected labour market returns to different VET courses. Here we assume that the most informed students are likely to base enrolment decisions in part on *current* returns to VET courses.¹² The labour market returns to a particular qualification are governed by the interaction of demand for workers with that qualification and the supply of workers with that qualification. Other things being equal, qualifications that are linked to occupations that are currently subject to skills shortages are therefore likely to have higher current labour market returns than other qualifications (because employers have to compete to attract scarce workers). Informed students can therefore be expected to take this into account in their enrolment decisions, thereby increasing student demand for VET courses linked to skills-shortage occupations and *vice-versa*.

In the demand-driven post-reform system there is (at least in principle) no constraint on the extent to which the system can respond to such market pressures. In contrast, in the pre-reform supply-driven model course places were capped, although current and projected skills-shortages were (at least in principle) taken into account by Government when allocating funding to providers.¹³ On the other hand, not all students may be well informed about current labour market returns to different VET courses (e.g. they may rely solely on anecdotal

¹² To some extent this can be thought of as *naive* or *myopic* because the future returns to a particular qualification are governed by the *future* interaction of demand for workers with that qualification and the supply of workers with that qualification rather than the *current* interaction of demand and supply. A fully rational student would therefore form expectations of the returns to a particular VET course that took account of the likely movements in supply and demand in the meantime. Ryoo and Rosen (2004), however, provide evidence that is consistent with students forming expectations in this myopic manner.

¹³ Even entitlements under the NPAPP can be thought of as being in centrally-determined places (provider-courses).

evidence from friends and family), and students may also place more weight on other factors such as their expected enjoyment of the course as a consumption good than would Government.¹⁴ It is therefore unclear whether the reforms will have increased or decreased the proportion of enrolments that are in skills-shortage courses (Research Question 2b).

Now turn to Research Question 3. As before we can think of the completion decision in a human capital framework, where the enrolled student weighs up the likely costs and benefits of completion and completes if the benefits outweigh the costs.¹⁵ For students who enrol on a course with the prior intention of completing, a subsequent decision to non-complete may reflect new information (e.g. on the quality of teaching, the fit between the course content and the student's interests) or some change in circumstances (e.g. a job offer, a health shock). Similarly, students who enrol with no clear intention of completing may change their minds given new information or some change in circumstances.

In such a framework, the reforms may impact on completion rates through a number of mechanisms. First, linking public funding to enrolments increases competition (or contestability) for students, which assuming students use measures of quality to make choices, should motivate improvements to training quality and completion rates. However, if providers expect completion rates to be used by students as a measure of quality, it may also motivate practices that improve completion rates, but not necessarily the quality of training, e.g. under-reporting of non-completion or inducements to complete. Second, the expansion of the market share of private providers may affect completion if there are pre-reform differences in completion rates between private and public providers. These differences may stem from a number of sources, including differences in the incentives to retain students, the modes of training and training practices, ease of accessing training and student support and facilities. Third, because students are better able to choose courses that reflect their preferences in the post-reform regime, they are less likely to non-complete on grounds of poor fit. Fourth, compositional changes in the student body driven by the reforms are likely to impact on completion rates, but in an uncertain direction.

¹⁴ Compositional changes in the student body may also impact on the relative weights placed on labour market returns and consumption benefits from VET.

¹⁵ For recent studies of the labour market returns to course completion, given course enrolment, see Herault et al. (2010) and Karmel and Fieger (2012).

4. Existing Estimates

The current reforms in Victoria are not the first moves towards a more responsive system and a greater role for competition in VET in Australia. A good overview of earlier reforms – introducing competitive tendering between providers for public funds, allowing entry of private providers and aspects of ‘user choice’ for apprenticeships and traineeships – is given by OECD (2008).¹⁶ The same OECD report also makes explicit recommendations for VET reforms in Australia very much along the lines of those recently implemented in Victoria, including an entitlement for students to pursue VET qualifications without charge up to the level normally attained at the end of schooling (Certificate II or III) and that students entitled to funding should be able to choose VET providers.

In terms of the current set of reforms, although it is still early days, a number of reports have already been published that provide descriptive information on how enrolments and course choice patterns have changed in Victoria pre and post-reform. Skills Victoria publishes regular reports which provide such information, including the recent Skills Victoria (2012), which gives insight into the outcomes from the first year of the fully implemented VTG (phase 3). The Skills Victoria reports report the changes in key enrolment indicators, such as enrolments by qualification level, funding source, associated ANZSCO course occupation, enrolments in skill shortage areas and enrolments by equity group. In all of the Skills Victoria estimates so far, the changes are in 2010 and 2011 enrolments relative to a pre-reform base year of 2008.

Generally speaking, the results from the Skills Victoria (2012) report are positive. Comparing 2011 outcomes to pre-reform outcomes (2008), they show that overall enrolments are up by 38% with a corresponding increase of 21% in student numbers (some students enrol on more than one course), with similar patterns of growth across age categories. Accounting for much of the growth is a large increase in private provision of publicly-subsidised places from 14% of the total in 2008 to 40% in 2011. The report also shows bigger increases in enrolments in higher level courses, especially certificates III and IV, and also makes claims that the system

¹⁶ Anderson (2005) suggests these earlier reforms had both positive and negative impacts on outcomes. For example, on the plus side he suggests they led to increased choice and more responsiveness to medium/large employers; on the minus side he suggests they led to increased transaction costs, less responsiveness to smaller employers and perhaps reduced quality of provision.

is more responsive to employer needs, as measured by the increases in numbers of enrolments in courses related to skill shortage occupations.¹⁷ Results presented in the report indicate positive results for disadvantaged learners, with 28%, 43% and 68% increases in enrolments estimated among Indigenous, disabled and culturally and linguistically diverse individuals respectively. These gains may be partly attributed to the greater access to Foundation courses (from 2011) afforded under the VTG (Essential Services Commission 2011).

While such measures are informative of changes that have occurred since the reforms were introduced, they may not reflect the impacts of the reforms per se because the changes will also pick up the effects of other contemporaneous factors that may have affected outcomes. In particular, changes in enrolments in Victoria may combine the effects from the greater availability of publicly-funded courses through the various Australian Government entitlements (see Table 1) with the effects of the VTG. To isolate the effects of the reforms from such factors, counterfactual outcomes need to be derived that reflect the likely outcomes in the absence of the reforms, against which post-reform outcomes can be compared. Therefore, we build on Skills Victoria (2012) analysis by defining a counterfactual against which to isolate the effects of the VTG as well as analysing impacts on course completion.

4.1 International evidence

Wider international evidence on the impacts of market-based reforms draws mainly on reforms in secondary schooling, encompassing studies of competition between mainstream publicly funded schools, between faith schools and mainstream schools or between private schools and publicly funded schools. The evidence from this wider literature is somewhat mixed – the impact of competition can depend on the nature of the market – but many studies find positive impacts (McMillan 2004; Kranton 2003).¹⁸

Other potentially relevant international reforms include those in health services markets, e.g. where patients have been given much more freedom to select between public and private

¹⁷ However, increases in *numbers* of enrolments in skill shortage areas does not necessarily mean that the system is more responsive to skill demands because it does not control for differences in overall access to publicly-funded courses. The *proportion* of enrolments in skill shortage areas is a preferable measure.

¹⁸ For example see Card et al. (2010) for a US study finding positive impacts of competition. See Allen and Vignoles (2009) for a UK study finding no relationship between competition and outcomes. Hanushek and Woessmann (2011) provides a review.

hospitals to receive publicly-funded treatment. Again the impacts of such reforms appear to have been mixed, but there is evidence to suggest that outcomes depend in part upon the provision of information. For example, where it is difficult to measure the quality associated with the service (whether health or education), competition may lead to greater competition on price rather than quality, resulting in a 'commoditisation process' (Propper et al. 2004).

5. Data and Methods

5.1 Methods

The approach taken by Skills Victoria (2012) and its predecessors is to examine changes in enrolments, course choice patterns and other outcomes in Victoria in post-reform years (2010 and 2011) relative to a pre-reform base year (2008). We use data for the same post-reform years – reflecting the step-by-step introduction of the reforms between July 2009 and January 2011 – and the same base year here. We also provide some descriptive analysis along these lines, i.e. comparing outcomes in Victoria in the post-reform years to those in Victoria in 2008.

Changes in outcomes over time in Victoria, however, could be due to the VTG reforms but they could also be driven by a whole host of other factors, e.g. continuing background trends in enrolments, cyclical movements in the economy, or contemporaneous policy changes in other parts of the education system or labour market. Changes in Victoria are also likely to be driven at least in part by the national-level changes to the VET sector, e.g. associated with the NPAPPP and the Compact with Young Australians. To isolate the impact of the Victoria-specific VTG reforms from these other factors we need to measure the changes in outcomes in Victoria against a defined counterfactual, i.e. what would have happened in Victoria had the specific VTG reforms *not* been introduced. A common approach to this kind of evaluation problem, in the absence of true experimental data, is the *difference-in-differences* approach (see Blundell and Costa-Dias, 2008). This is the approach we adopt here.

Difference-in-differences, as the name suggests, compares changes in outcomes pre-reform to post-reform for those covered by the ‘treatment’ (in this case Victoria), with changes in outcomes over the same period for some (otherwise similar) comparison group *not* covered by the treatment. Under a standard set of assumptions¹⁹, the changes over time for the comparison group provide the counterfactual (i.e. they capture the effects of all the other

¹⁹ A key assumption for the difference-in-differences method is the *parallel trends assumption*, i.e. that outcomes for the treatment group and the comparison group would have been following the same trends over time in the absence of the reforms. The standard way to test this assumption is to examine trends in the two groups *prior* to the reforms. If prior trends are not parallel, then we may incorrectly attribute changes in outcomes for the treatment group relative to the comparison group driven by a continuation of these diverging trends to the policy reform.

changes that have been going on in the VET sector and the wider economy), and subtracting these changes from the changes observed for the treatment group provides us with the estimated impact of the reforms, i.e. the *treatment effect*. In this case we compare changes in outcomes in Victoria with changes in outcomes in NSW, i.e. we use data from NSW to construct the counterfactual. Appendix B provides evidence in support of the suitability of NSW for this purpose.

The difference-in-differences approach can be applied in a number of different ways and with varying degrees of sophistication. At its most simple, the difference-in-differences approach can be used to compare changes in *aggregate* outcomes in Victoria and NSW (e.g. total number of enrolments, proportion of enrolled students that are female, proportion of students studying at Cert I/II level, proportion of students studying a skills shortage course), with the difference in the differences of these aggregate outcomes giving an estimate of the treatment effect. This type of unconditional²⁰ difference-in-differences estimator at the aggregate level is given by the following equation, where Y denotes the outcome of interest (e.g. enrolments):

$$\textit{Treatment Effect on } Y = (Y_{Vic,post-reform} - Y_{Vic,pre-reform}) - (Y_{NSW,post-reform} - Y_{NSW,pre-reform}) \quad (1)$$

We use this simple approach to address Research Question 1, Research Question 2a, and to provide a first pass at Research Questions 2b and 3 (see below).

The difference-in-differences approach can also be used in a multivariate regression framework to examine reform impacts at the *individual level*, controlling for differences in the observable characteristics of individuals and controlling for any other differences between the pre-reform and post-reform periods (common to Victoria and NSW) and differences between Victoria and NSW (common to the pre-reform and post-reform periods). In this case, the difference-in-differences regression approach takes the following form:

$$y_i = \alpha + \beta X_i + \gamma Vic_i + \lambda Post_i + \delta Vic * Post_i + u_i, \quad (2)$$

²⁰ So called because it is not conditioned on (i.e. it does not *control for*) any other observable (or unobservable) factors.

where y_i denotes the outcome of interest for individual i , Vic_i is a binary (dummy) variable taking the value 1 if the individual's VET was in Victoria and 0 otherwise, $Post_i$ is a dummy taking the value 1 if the individual entered VET post-reform and 0 otherwise, and X_i is a set of control variables at the individual and provider level. The parameter δ gives the estimated impact of the reforms on the outcome (in this case called the *average treatment effect on the treated*).

In this report, the different outcome variables for which we estimate equation (2) are all binary, so we estimate linear probability models. We use this approach to address Research Questions 2b and 3, and given the greater degree of control offered by the regression approach these are our preferred estimates.²¹

5.2 Data

This project draws on two sources of data. First and foremost, we use individual-level and aggregate-level data on the population of VET students aged 15-19 enrolled in VET courses, from a number of entry cohorts, drawn from the VET Provider Collection (VETPC) data held by NCVER. These are administrative data collated annually covering all students enrolled in publicly-funded VET across Australia. They include details on field of study and level of course, student characteristics, and some limited provider characteristics. The data have also been matched across years to generate indicators of course (and module) completion (given that it takes longer than one year to complete some courses), and it is these matched data that we will use to address Research Question 3. The VETPC is a little-used but potentially very powerful data source for research purposes.

Specifically, we use data from those aged 15-19 years (at the time of enrolment) who enter VET courses at Certificate Level 1 or above in 2008, 2010, and 2011, in Victoria and in New South Wales (NSW). Information on courses enrolled in include course start date, the course level, the course field of education (at the 4-digit level), and the closest-fitting occupation at

²¹ The two sets of estimates are interpretable in slightly different ways. Estimates from the multivariate regression difference-in-differences approach give the probability that an individual *with a given set of characteristics* enrolls in a skills-shortage course, or completes. In other words, in contrast to the unconditional difference-in-differences estimate we generate from the aggregate data, the conditional difference-in-differences estimates control for changes in the composition of the student body in Victoria relative to NSW, which might themselves drive some part of any change in course choices and/or completions.

the 6-digit ANZSCO level (see Karmel et al., 2008). (The latter allows us to match courses with reported skills shortages at the 6-digit ANZSCO level.) Information on the characteristics of individuals includes gender, age, whether they report a disability, an Indigenous indicator, highest year of schooling, whether they have any prior post-school qualification, and location. We also have information on provider type and provider location.

For much of our analysis we use data on all 15-19 year olds enrolled in VET (including publicly-funded, fee-for-service, international students, and apprentices and trainees). Table 2 presents summary statistics for these variables for the 2008, 2010 and 2011 enrolment cohorts, separately for Victoria and NSW. Because the reforms are mostly expected to affect publicly-funded students, however, we also present separate analysis restricted to publicly-funded 15-19 year olds enrolled in VET (separate tables are presented in Appendix A). Table A2 presents summary statistics for this more specific group.

Further details of the variables used in the analysis are presented in Appendix C. But it is worth taking some time here to discuss our measures of completion (and who they can be defined for). We have VETPC data for our enrolment cohorts, including information on whether they have completed their course, up until 31 December 2011. We can therefore track 2008 entrants for a minimum of three years (someone entering on 31 December 2008) and a maximum of four years (someone entering on 1 January 2008). We can only track 2010 entrants, however, for a minimum of one year and a maximum of two years. We are even more limited in our ability to track 2011 entrants (for a maximum of one year). When examining completion we therefore restrict our attention to the 2008 enrolment cohort (pre-reform) and the 2010 cohort (post-reform). Further, to ensure that we are comparing outcomes over a similar period of time for both the pre and post-reform cohorts, and for all individuals within each cohort, we restrict attention to those enrolling on a VET course between 1 January and 30 June of the given year, and we then observe whether they complete within 18 months of enrolment.

Specifically, we define a *course completion within 18 months* variable as follows: 1 if course is completed within 18 months of enrolment; and 0 otherwise. By this measure, non-completion combines those who have already dropped out of the course without completing,

and those who are still enrolled in the course but are yet to complete.²² We also estimate impacts on completion using two alternative measures — course dropout and module completion. Course dropout is defined as follows: 1 if the individual did not complete their course and ended their last module within 18 months of enrolment; and 0 otherwise. By this measure, the non drop-out category combines course completers and those still enrolled but yet to complete at 18 months after commencing study. Rates of dropout and completion are contentious measures of training quality because, as discussed in Mark and Karmel (2010), many people enrol in VET courses only to attain a specific set of skills (commonly known as module completers) and not to attain a qualification. Hence, a more appropriate measure of training quality may be module completion rates. In this study, module completion is identified for each module enrolment, which means multiple measures per individual per course, and is defined as: 1 if the module is completed within 18 months of module enrolment; and 0 otherwise. We discuss reform impacts on all three measures in what follows.

The second source of data used in this project is the DEEWR Skills Shortages Lists at national and state levels. These lists provide an assessment at the 6-digit ANZSCO level of occupations that are subject to skills shortages. At the national level, 6-digit occupations are essentially recorded as in skills shortage or not.²³ National skills shortage lists are available for every year back to 1986. In contrast, at the state level skills shortages are reported in six classes: (overall) shortage, shortage in metropolitan areas, shortage in regional areas, some recruitment difficulty (overall), recruitment difficulty in metropolitan areas, recruitment difficulty in regional areas. From these categories, we derive four (binary) indicators as follows (running from skills shortages most narrowly defined to skills shortages most broadly defined): course with overall skills shortage in the state, course with some skills shortage in the state (either metropolitan or regional), course with overall recruitment difficulties in the state, course with some (either metropolitan or regional) recruitment difficulties in the state. State-level skills-shortage lists are (now) published every six months, but prior to 2010 they were published less regularly.

²² For the 2008 cohort, 95% of Cert I/II courses that are completed within four years are completed within 18 months. The equivalent figures for Cert III/IV and Diploma or above are 59% (90% excluding apprentices and trainees) and 57% respectively.

²³ A very few occupations are described as experiencing skills shortages but only for some specialism within the 6-digit occupation. We treat these as if they applied to the whole 6-digit occupation.

The Skills Shortages Lists drawn up by DEEWR are themselves mainly based on the Survey of Employers who Have Recently Advertised (SERA), but they also draw on a broad array of other qualitative and quantitative information. Each list refers to information collected at some stage over the previous 12 months. For further details see www.deewr.gov.au/skillshortages.

Given our assumption that students use the most recently available information on skills shortages in the current labour market to influence their course enrolment choices, we use Skills Shortages Lists based on data collected over the year prior to enrolment. In other words, we use national Skills Shortage Lists for 2007, 2009, and 2010 (for the 2008, 2010 and 2011 enrolment cohorts respectively). The closest fit at the state-level with our enrolment cohorts are the Skills Shortage Lists for Victoria and NSW published in May 2008, June 2010, and December 2010. These state-level lists also combine skills shortages based on information reported at the state level with skills shortages based on information reported at the national level, with variation over time (and states) in the degree to which the lists are based on state-level/national information. There may also be differences in the extent of coverage of these state-level lists between states and over time.²⁴ For this reason, together with the looser fit in terms of timing of the state-level lists' publication relative to the national-level lists' publication, our preferred skills shortage variable is based on the national-level lists. We do, however, also examine sensitivity to using the skills shortage variables defined on the state-level lists.

²⁴ Such differences could potentially bias the relevant analysis, although we find quite similar changes in the numbers of skill shortage occupations reported between the two states over our period of analysis.

6. Results and Discussion

In this section we present results from our analyses of VTG impacts on overall enrolments by student and provider characteristics (6.1), impacts on course choice (6.2) and impacts on course completion (6.3).

6.1 Impacts on Participation, Composition of Student Body, and Choice of Provider

The number of enrolments of 15-19 year olds in Victoria and NSW before and after the VTG are presented in Table 2. Overall, total enrolments for the 15-19 year old age group in Victoria increased from 58,430 in 2008 to 71,615 in 2010, and further to 80,045 in 2011. Consistent with the ubiquitous eligibility for publicly-funded places for 15-19 year olds, the growth in enrolment numbers in Victoria mirrors the growth in the number of publicly-funded enrolments. From 2008, when there were 49,643 publicly-funded enrolments in Victoria, publicly-funded enrolments increased to 63,079 in 2010 and 74,209 in 2011 (Table A2 in Appendix A).

Table 2: Enrolments by State in Pre and Post Reform Years, 15-19 Year Olds

	Victoria			New South Wales		
	2008	2010	2011	2008	2010	2011
Total number of enrolments	58,430	71,615	80,045	54,440	58,903	54,691
Males	32,988	41,576	43,805	29,076	31,780	29,729
Females	25,433	29,925	36,200	25,342	27,097	24,948
Aged 15-17 years	21,247	22,217	23,148	22,331	23,199	20,750
Aged 18-19 years	37,183	49,398	56,897	32,109	35,704	33,941
Indigenous	1,248	1,581	1,488	3,705	4,820	4,451
With a disability	4,131	4,998	6,186	3,409	4,271	4,409
Born outside Australia	6,981	8,211	8,508	5,822	6,000	5,476
TAFE ^a	48,222	52,574	48,294	44,875	50,451	46,884
ACE	4,107	4,857	6,020	3,086	3,272	2,728
Private provider	6,101	14,184	25,731	6,479	5,180	5,079
With Year 12	28,373	35,148	40,948	25,237	26,546	25,334
With less than Year 12	25,888	34,398	37,431	28,768	31,972	29,089
With prior post-school qualification	6,627	11,411	12,513	8,817	11,093	10,306
Without prior post-school qualification	47,505	57,297	65,851	44,939	47,195	43,885

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ^aTAFE includes TAFE institutes and VET provided through universities.

There was a dramatic increase in the number of enrolments with private providers in Victoria (up from 6,101 in 2008 to 25,731 in 2011), with enrolments in TAFE unchanged between 2008 and 2011. Enrolments also increased over the period for all sub-groups in Victoria, although not to the same degree. The smallest increases were for those aged 15-17 years (up from 21,247 in 2008 to 23,148 in 2011), Indigenous (up from 1,248 in 2008 to 1,488 in 2011), and enrolments in TAFEs (up from 48,222 in 2008 to just 48,294 in 2011).

These figures are broadly in line with those presented by Skills Victoria (2012) for the 15-19 year old age group despite the fact that their estimates are not limited to Certificate levels I and above. Skills Victoria (2012) estimate an overall increase in government-funded and TAFE fee-for-service enrolments of 41% between 2008 and 2011, and an increase in government-funded enrolments of 46%. Consistent with the estimates above, the Skills Victoria (2012) report also shows that much of the growth in enrolments in Victoria between 2008 and 2011 has been due to a huge increase in publicly-funded enrolments with private providers (310% between 2008 and 2011). Although Skills Victoria (2012) does not report group-specific enrolment figures separately by age groups or provider type, they do report overall enrolments by equity group. In particular, Skills Victoria (2012) report a 28% increase in publicly-funded Indigenous enrolments in Victoria between 2008 and 2011, a 43% increase in publicly-funded enrolments for those with a disability, and a 68% increase in publicly-funded enrolments for those from culturally and linguistically diverse backgrounds (CALD).²⁵ These figures are close to the corresponding increases reported in this report (Table A.2 in Appendix A), namely a 20% increase in Indigenous enrolments, a 55% increase in enrolments for students with a disability and a 69% increase in enrolments for people born outside of Australia.

If we are to unpick the part of these enrolment changes in Victoria that may be the result of Victoria-specific reforms (the VTG) from the part that may be due to other changes including national-level VET reforms; however, then we have to consider what might have happened in Victoria in the absence of the VTG reforms. For this purpose, Tables 2 and A2 (Appendix A) also report similar enrolment figures for NSW. Overall, enrolments (overall and government-funded only) for this age group were flat in NSW over the 2008-2011 period (a small increase of around 8% between 2008 and 2010 was reversed between 2010 and 2011). This is also the

²⁵ Skills Victoria (2012) does not report separate enrolment figures for foreign-born students.

case for most of the sub-groups considered, although there are small increases in the numbers of Indigenous and disabled student enrolments. Notably, there is no increase in the number of enrolments with private providers in NSW. Therefore, the VET sector in NSW, and by implication in Victoria had the VTG not have been introduced, appears to have been very much *steady-as-she-goes* over this period, at least in terms of enrolments.

Unconditional difference-in-differences estimates of VTG impacts on enrolments, using data from Table 2, are presented in Table 3 (Table A3 in Appendix A similarly draws on the data in Table A2 to provide equivalent estimates restricted to publicly-funded enrolments only). Table 3 therefore presents our estimates of the impacts of the VTG net of the other national-level reforms and other changes, i.e. the treatment effect on enrolments. To account for differences in scale between Victoria and NSW, these difference-in-differences estimates are presented as percentage point differences in enrolment growth first between 2008 and 2010 and then between 2008 and 2011. That is, they show the percentage differences in enrolment growth between Victoria and NSW over a two or three year period of analysis.

Table 3: Unconditional Difference-in-Differences Estimates of VTG Impacts on Enrolments in Victoria, 15-19 Year Olds

	2010-2008 Difference-in-Difference	2011-2008 Difference-in-Difference
	ppt.	ppt.
Total number of enrolments	14.4	36.5
Males	16.7	30.5
Females	10.7	43.9
Aged 15-17 years	0.7	16.0
Aged 18-19 years	21.7	47.3
Indigenous	-3.4	-0.9
With a disability	-4.3	20.4
Born outside Australia	14.6	27.8
TAFE	-3.4	-4.3
ACE	12.2	58.2
Private provider	152.5	343.4
With Year 12	18.7	43.9
With less than Year 12	21.7	43.5
With prior post-school qualification	46.4	71.9
Without prior post-school qualification	15.6	41.0

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ^aTAFE includes TAFE institutes and VET provided through universities.

These estimates suggest that the VTG in Victoria has led to a 36.5 percentage point increase in enrolment growth (50 percentage point higher for publicly-funded enrolments) between 2008 and 2011 compared to what we estimate would have happened had the VTG not been introduced. For both all enrolments and publicly-funded enrolments, the VTG effect appears to have been stronger for females compared to males, for 18-19 year olds compared to 15-17 year olds, for the Australian-born, and for those with a prior post-school qualification compared to those without.²⁶

Note that because enrolment growth in NSW has been flat over the period of analysis, the added value of the difference-in-differences approach over a simple before and after comparison within Victoria (e.g. as adopted by Skills Victoria) is small in this case. Where the difference-in-differences approach does seem to be important, however, is in enrolments for Indigenous students and students with disabilities. Because the background trends in enrolments for these groups – as indicated by NSW – are increasing, the difference-in-differences estimates make it particularly clear that the VTG has had a less than proportional impact on enrolments for these two groups. In particular, the suggestion is that the VTG has actually led to a small *decrease* in enrolments overall among Indigenous students. For those with a disability, there is a small decrease in enrolment growth associated with the VTG between 2008 and 2010. Between 2008 and 2011 however, this is reversed, with the VTG being associated with a 20.4 percentage point increase in enrolment growth. The 20.4 percentage point increase in enrolment growth between 2008 and 2011 is substantially less than the overall 36.5 percentage point increase for the 15-19 age group. It appears that the VTG may have not boosted access to training for these key equity groups to the same degree as it has for those who are not part of an equity group.²⁷

²⁶ Note that because we express these unconditional difference-in-differences as the difference in percentage growth rates, the difference-in-differences estimate for the overall group is not a weighted average of the difference-in-differences estimates for its component sub-groups.

²⁷ Skills Victoria (2012) draws no particular conclusions regarding the relative impact of the VTG on these groups (although they report enrolment trends within Victoria for these groups, as discussed above). Skills Victoria (2011), however, which compares enrolments in 2008Q1 and 2011Q1, could be interpreted as giving the impression that the reforms have been beneficial in terms of enrolments for both Indigenous students and students with a disability. Our results would lead us to question such a conclusion for Indigenous students, at least for 15-19 year old age group.

6.2 Impacts on Course Choice

The VTG may have impacts on both the level and the type of course chosen. Consider first the effect on course level enrolments. Table 4 shows enrolments for Victoria and NSW pre and post-VTG by course level (the corresponding table for levels of publicly-funded courses is Table A4 in Appendix A). For 15-19 year olds there has been an increase in enrolments (all and publicly-funded) in Victoria at both Cert I/II level and Cert III/IV level, but not at the level of Diploma and above. Diploma courses are typically completed after lower level courses and hence are less commonly taken by 15-19 year olds. The figures reported in Skills Victoria (2012) – not limited to 15-19 year olds – suggest larger increases at the Cert III/IV levels than at the Cert I/II levels, consistent with an additional impact of the up-skilling requirements for those aged 20 or older. By contrast in NSW, enrolments at the Cert I/II and Cert III/IV levels have been essentially flat, with a slight fall in enrolments at the level of Diploma and above.

Table 4: Enrolments by Course Level, by State, Pre and Post Reform Years, 15-19 Year Olds

	Victoria			New South Wales		
	2008	2010	2011	2008	2010	2011
Cert I/II	20,267	25,728	30,225	14,277	17,625	15,088
Cert III/IV	27,309	35,190	39,437	34,100	35,989	34,973
Diploma and above	10,854	10,697	10,383	6,063	5,289	4,630

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Publicly funded is defined as enrolments supported by Commonwealth and State general purpose recurrent funding; Commonwealth specific purpose program funding; state specific purpose program funding.

There is also evidence of changes in the types of courses chosen. The ANZSCO (at 1 and 2 digit) occupation classification most closely associated with a course enrolment is presented in Table 5 for Victoria and NSW, before and after the reforms. In terms of aggregate enrolments, the biggest increase in Victoria has been in courses related to jobs in Community and Personal Services, where overall enrolments have increased by 72% in Victoria between 2008 and 2011 (corresponding to an increase from 10,337 to 17,772 enrolments over this period). Most of the increase in enrolments in this occupation grouping are in publicly-funded places (Table A5 in Appendix A). Within this grouping, Sports and Personal Service Workers (Table 5), have accounted for just under half of the growth (around 2,600 of the 7,000 extra enrolments), which has attracted much media attention (see for example, John Ross (2012),

Collision Course of Learning, The Australian (May 16)). Less attention has been paid to growth in enrolments in other Community and Personal Services related occupations, such as Carers and Aides, where there has been a more than doubling in the number of enrolments among 15-19 year olds between 2008 and 2011 (corresponding to an increase from 1,650 enrolments in 2008 to 3,308 in 2011).

The second largest increase in enrolment numbers between 2008 and 2011 in Victoria for 15-19 year-olds was in general training, or courses that are not associated with training for one specific ANZSCO classification. The number of general course enrolments increased by around 90% from 5,274 in 2008 to 9,971 in 2011. Also of note is the 13% increase in courses related to Technicians and Trade Workers, due mainly to a trebling in the number of enrolments in courses related to jobs in Electrotechnology and Telecommunications between 2008 and 2011 in Victoria. Comparable Skills Victoria (2012) estimates at ANZSCO 1-digit level show similar increases for Technicians and Trade Workers (19%) and Community and Personal Services (57%).

An important question that arises from the observed changes in choice of course type observed in Table 5 is whether the changes are more in line with skill demands than before. In Table 6 we present the proportion of enrolments by 15-19 year olds that are in courses that are associated with jobs that are on the national shortage list, before and after implementation of the VTG. What is apparent is that since 2008, there has been a reduction in the proportion of enrolments in courses related to jobs on the skills shortage list in both Victoria and in NSW, especially between 2008 and 2010. This is true also for the proportion enrolled in publicly-funded courses associated with a job in shortage, although the extent of the fall is smaller, mainly because the change is from a lower base reflecting the greater proportion of fee-for-service enrolments that are in areas of skill shortage (Table A6 in Appendix A). The reduction in the proportions enrolled in courses associated with skill shortage jobs is likely due to a reduction in the number of national skill shortage occupations following the global financial crisis from 103 6-digit occupations in 2008 (from the 2007 skills-shortage list) to 64 in 2010 (from the 2009 skills-shortage list) and 62 in 2011 (from the 2010 skills-shortage list).

Table 5: Enrolments by Course ANZSCO, by State, Pre and Post Reform Years, 15-19**Year Olds**

	Victoria			New South Wales		
	2008	2010	2011	2008	2010	2011
Managers	5,087	3,823	3,995	3,239	2,353	2,001
Chief Executives, General Managers and Legislators	1	-	-	-	-	-
Farmers and Farm Managers	345	335	422	151	276	288
Specialist Managers	2,592	1,590	1,608	1,852	1,096	952
Hospitality, Retail and Service Managers	2,149	1,898	1,965	1,236	981	761
Professionals	5,816	5,225	4,853	3,189	3,007	2,695
Arts and Media Professionals	1,081	1,077	1,179	681	870	714
Business, Human Resource and Marketing Professionals	2,041	1,618	1,253	1,339	1,156	1,076
Design, Engineering, Science and Transport Professionals	1,494	1,273	1,522	737	719	655
Education Professionals	369	698	326	32	43	38
Health Professionals	35	34	9	-	-	-
ICT Professionals	573	272	65	398	215	188
Legal, Social and Welfare Professionals	223	253	499	2	4	24
Technicians and Trades Workers	16,224	21,763	18,325	18,345	18,836	18,211
Engineering, ICT and Science Technicians	2,400	2,936	2,674	2,940	3,454	3,297
Automotive and Engineering Trades Workers	3,039	3,421	2,223	4,070	3,454	3,605
Construction Trades Workers	5,166	6,948	5,312	3,748	3,972	3,604
Electrotechnology and Telecommunications Trades Workers	702	2,284	2,054	2,154	2,176	2,127
Food Trades Workers	1,491	1,518	1,302	1,539	1,596	1,482
Skilled Animal and Horticultural Workers	855	1,042	1,016	1,300	1,510	1,506
Other Technicians and Trades Workers	2,571	3,614	3,744	2,594	2,674	2,590
Community and Personal Service Workers	10,337	14,669	17,772	8,861	10,091	9,838
Health and Welfare Support Workers	1,080	1,463	1,748	858	1,025	1,022
Carers and Aides	1,650	2,657	3,308	2,803	3,517	3,424
Hospitality Workers	4,436	5,044	5,946	2,409	2,440	2,442
Protective Service Workers	141	681	1,111	56	52	28
Sports and Personal Service Workers	3,030	4,824	5,659	2,735	3,057	2,922
Clerical and Administrative Workers	7,354	8,538	12,543	7,948	8,977	8,063
Sales Workers	3,045	4,141	5,398	3,956	3,280	2,976
Machinery Operators and Drivers	883	1,772	1,872	451	472	427
Labourers	4,404	6,033	5,285	3,182	4,853	4,282
Occupational non-specific - General education	5,274	5,617	9,971	3,468	2,960	2,155
Non-industry specific training	6	34	31	1,801	4,074	4,043

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ^aTAFE includes TAFE institutes and VET provided through universities.

This pattern is consistent across the various groups aged 15-19, except for females, where the percentage enrolled in national skill shortage jobs has remained relatively stable. This is likely to reflect the concentration of impacts on from the downturn on young males, especially those in jobs associated with construction (Wright et al. 2009).

In contrast, estimates based on data reported in Skills Victoria (2012), show no change in the proportion of *all* publicly-funded enrolments (irrespective of age) in courses related to a skill shortage between 2008 and 2011.²⁸ The discrepancy between our estimates and Skills Victoria estimates is likely to be because the shrinkage in the job shortage list associated with the global financial crisis was greater in jobs that are typically filled by young workers, especially in construction.

Table 6: Proportion of Enrolments that are in Skills-shortage Courses, by State, Pre and Post Reform Years, 15-19 Year Olds

	Victoria			New South Wales		
	2008	2010	2011	2008	2010	2011
	%	%	%	%	%	%
Total	21	9	12	28	11	18
Males	28	6	11	40	8	19
Females	12	14	13	15	15	16
Aged 15-17 years	25	9	15	33	11	20
Aged 18-19 years	18	9	11	25	11	16
Indigenous	8	5	7	16	7	11
With a disability	14	7	11	22	10	16
Born outside Australia	14	6	9	22	8	11
TAFE ^a	22	9	14	32	11	18
ACE	8	11	9	14	12	13
Private provider	24	11	8	9	10	16
With Year 12	16	8	10	24	11	15
With less than Year 12	28	10	14	32	12	20
With prior post-school qualification	18	10	13	17	10	13
Without prior post-school qualification	22	9	12	31	12	19

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ^aTAFE includes TAFE institutes and VET provided through universities. Skills-shortage courses are courses whose 6-digit ANZSCOs match those listed as being in shortage in the national skills shortage lists for the year prior to the enrolment year.

²⁸ Using enrolments in publicly funded courses from Skills Victoria (2012) (Table 3.1) and enrolments in shortage occupations (Table 3.8), we estimate that 22% of publicly funded enrolments were related to shortage occupations in 2008 and 23% in 2011.

The fact that the introduction of the VTG coincided with the impacts of the global financial crisis underlines the importance of using outcomes from another state as a counterfactual to isolate the effect of the VTG on the chances of enrolling in a course related to a skill shortage from the effects of the GFC. This analysis is presented below.

The unconditional difference-in-difference estimates corresponding to the enrolment changes reported in Tables 4 to 6 are presented below in Tables 7 to 9. The unconditional difference-in-difference estimates suggest that the VTG has led to larger increases in total enrolments (and publicly-funded enrolments, see Table A7) at the Cert I-IV levels than at the Diploma and above level for 15-19 year olds. Results presented in Table 8 suggest that the VTG has had notable effects on the type of course enrolments for the 15-19 age group. Some of the largest percentage point increases in course type enrolments related to the VTG between 2008 and 2011 are in Protective Services (over 700 percentage point increase in growth), Electrotechnology and Telecommunications Trades (around 200 percentage point increase in growth) and in general training (127 percentage point increase in growth). There have also been declines in enrolments in some types of courses associated with the VTG. In particular, there is a reduction estimated in enrolments in courses associated with professional jobs between 2008 and 2011 (although we can discount the apparent impact on courses related to Legal, Social and Welfare Professions because it is driven by such small numbers of enrolments in NSW). Overall the estimated changes in total enrolments by course type are generally in-line with those for publicly-funded course enrolments (Table A8).

Table 7: Unconditional Difference-in-Differences Estimates of VTG Impacts on Enrolments by Course Level in Victoria, 15-19 Year Olds

	2010-2008 Difference-in-Difference	2011-2008 Difference-in-Difference
	ppt.	ppt.
Cert I/II	3.5	43.5
Cert III/IV	23.3	41.9
Diploma and above	11.3	19.3

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Publicly funded is defined as enrolments supported by Commonwealth and State general purpose recurrent funding; Commonwealth specific purpose program funding; state specific purpose program funding.

Table 8: Unconditional Difference-in-Differences Estimates of VTG Impacts on Enrolments by Course ANZSCO in Victoria, 15-19 Year Olds

	2010-2008 Difference-in-Difference	2011-2008 Difference-in-Difference
	ppt.	ppt.
<i>Managers</i>	2.5	16.8
Chief Executives, General Managers and Legislators	-	-
Farmers and Farm Managers	-85.7	-68.4
Specialist Managers	2.2	10.6
Hospitality, Retail and Service Managers	9.0	29.9
<i>Professionals</i>	-4.5	-1.1
Arts and Media Professionals	-28.1	4.2
Business, Human Resource and Marketing Professionals	-7.1	-19.0
Design, Engineering, Science and Transport Professionals	-12.4	13.0
Education Professionals	54.8	-30.4
Health Professionals	-	-
ICT Professionals	-6.6	-35.9
Legal, Social and Welfare Professionals	-86.5	-976.2
<i>Technicians and Trades Workers</i>	31.5	13.7
Engineering, ICT and Science Technicians	4.9	-0.7
Automotive and Engineering Trades Workers	27.7	-15.4
Construction Trades Workers	28.5	6.7
Electrotechnology and Telecommunications Trades Workers	224.3	193.8
Food Trades Workers	-1.9	-9.0
Skilled Animal and Horticultural Workers	5.7	3.0
Other Technicians and Trades Workers	37.5	45.8
<i>Community and Personal Service Workers</i>	28.0	60.9
Health and Welfare Support Workers	16.0	42.7
Carers and Aides	35.6	78.3
Hospitality Workers	12.4	32.7
Protective Service Workers	390.1	737.9
Sports and Personal Service Workers	47.4	79.9
<i>Clerical and Administrative Workers</i>	3.2	69.1
<i>Sales Workers</i>	53.1	102.0
<i>Machinery Operators and Drivers</i>	96.0	117.3
<i>Labourers</i>	-15.5	-14.6
<i>Occupational non-specific - General education</i>	21.2	126.9
<i>Non-industry specific training</i>	340.5	292.2

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ^aTAFE includes TAFE institutes and VET provided through universities.

The impacts of the VTG on course choice appear to suggest a small increase in the responsiveness of course enrolments to employer needs. Aggregate estimates presented in

Table 9 show that the VTG is associated with an increase in the proportion of enrolments that are in courses linked to skill shortage occupations of around 2 percentage points between 2008 and 2011 for 15-19 year olds (see Table A9 for results for publicly-funded course choices). While the overall effect appears to be small, we can see from Table 9 that the estimated effect varies by gender, with choices of young males appearing more responsive than choices of young females.

Table 9: Unconditional Difference-in-Differences Estimates of VTG Impacts on Proportion of Enrolments that are in Skills-shortage Courses in Victoria, 15-19 Year Olds

	2010-2008 Difference-in-Difference	2011-2008 Difference-in-Difference
	ppt.	ppt.
Total	5.6	1.9
Males	9.4	4.2
Females	2.9	0.6
Aged 15-17 years	6.5	3.2
Aged 18-19 years	4.5	1.3
Indigenous	5.5	3.1
With a disability	5.7	3.0
Born outside Australia	7.0	6.2
TAFE	7.9	6.9
ACE	5.6	3.3
Private provider	-13.5	-23.0
With Year 12	5.7	3.1
With less than Year 12	2.8	-1.0
With prior post-school qualification	-2.0	-1.6
Without prior post-school qualification	6.4	1.9

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ^aTAFE includes TAFE institutes and VET provided through universities. Skills-shortage courses are courses whose 6-digit ANZSCOs match those listed as being in shortage in the national skills shortage lists for the year prior to the enrolment year.

Underlying the small overall improvement in responsiveness to employers' needs is a divergence in impacts between enrolments at public (TAFE and ACE) and at private providers. Overall, there has been a 7 percentage point and a 3 percentage point increase in the chance of enrolling in a course related to a skills-shortage job at TAFE and ACE providers respectively. In contrast, there has been a 23 percentage point reduction in the chance of enrolling in a course related to skills-shortage job at private providers. The discrepancy in responsiveness between the two sectors is likely driven by the contrasting histories of the two sectors. Traditionally, VET in Australia has been supply-driven, with enrolments determined to a large degree by public funding directed to courses in TAFE that were considered of

national importance, which was determined by, among other things, national skill shortages. To the extent that many of these skill shortages have persisted over-time, TAFEs have developed capacity to provide training in these fields and hence may have a natural competitive advantage in these areas at least in the short-run. A greater degree of choice associated with the VTG (compared to NSW) allows TAFEs to more fully exploit any such advantage in these areas. In contrast, private provision of publicly-funded courses was largely limited to apprenticeships and traineeships prior to the VTG. Post-VTG, however, private providers are offering a much wider range of courses, many of which appear to be in areas unrelated to skills-shortages.

Although a useful starting point, the unconditional difference-in-difference estimates do not control for changes in the composition of the student body, which may confound our estimates of the impact on the reforms on the responsiveness of enrolments to employer needs. Even where such compositional changes are themselves the result of the VTG, controlling for them in a multivariate regression framework – conditional difference-in-differences – allows us to examine the impact of the VTG on course choices for a *given individual*. Because this allows us to isolate course-choice effects from other enrolment effects, the conditional difference-in-difference estimates are our preferred estimates.

Conditional difference-in-difference estimates of the impacts of the VTG on the chance of 15-19 year olds enrolling in a national skill-shortage course are presented in Table 10 (accompanying results for publicly-funded courses only are similar and are presented in Table A10). The coefficients are interpretable as the percentage point change in the chance of enrolling in a course related to a skill-shortage job for a given level of an explanatory variable, relative to a reference level, of the same variable. For explanatory variables with only two categories, the reference category is the alternative to the category listed. To demonstrate, the coefficient for the explanatory variable male for the 2008 and 2011 enrolment cohorts is 0.086, which means that relative to females, males are around 9 percentage points more likely than females to enrol in a course related to a skills-shortage in either 2008 or 2011. For age at enrolment and school attainment the reference levels are aged 15 and Year 10 or less, respectively. Before discussing the estimated impacts of the reforms, it is worth noting that those from two key equity groups — Indigenous students and students with a disability — are less likely to enrol in a course related to a skill-shortage area than those who are not members of these groups, other things being equal.

Table 10: Conditional Difference-in-Differences Estimates of VTG Impacts on Probability of Enrolment in a National Skills-shortage Course, 15-19 Year Olds, (Robust Standard Errors)

	2010-2008 Difference-in-Difference	2011-2008 Difference-in-Difference
Victoria	-0.074*** (0.002)	-0.075*** (0.003)
Post-reform	-0.172*** (0.001)	-0.107*** (0.001)
Vic*post-reform	0.048*** (0.001)	0.015*** (0.002)
Male	0.045 (0.030)	0.086** (0.040)
Aged 16 years	0.077*** (0.002)	0.098*** (0.009)
Aged 17 years	0.076*** (0.015)	0.090*** (0.013)
Aged 18 years	0.062*** (0.006)	0.067*** (0.001)
Aged 19 years	0.053*** (0.015)	0.052*** (0.007)
Indigenous	-0.098*** (0.000)	-0.114*** (0.001)
With a disability	-0.049*** (0.005)	-0.053*** (0.001)
Born outside Australia	-0.049*** (0.004)	-0.054*** (0.012)
With Year 11	0.022** (0.011)	0.024 (0.015)
With Year 12	-0.040*** (0.010)	-0.049*** (0.002)
With prior post-school qualification	-0.035 (0.028)	-0.039 (0.041)
R ²	0.062	0.056
Number of observations	225034	230449

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Skills-shortage courses are courses whose 6-digit ANZSCOs match those listed as being in shortage in the national skills shortage lists for the year prior to the enrolment year. Reference categories for age and schooling level are 15 years and less than Year 11 respectively. Note that because we are now estimating treatment effects at the individual level, and because we treat the individuals for whom we can run this regression as a sample of the wider population enrolled (or potentially enrolled) in VET in Victoria, the estimated impacts come along with standard errors. These allow us to make inferences about how sure we are that the relationships in the population are non-zero (known as statistical significance). Specifically, ***, **, and * denote statistical significance at the 99%, 95% and 90% levels respectively.

The impact of the VTG is captured in the conditional difference-in-difference by the estimated interaction term between Victoria and the post-reform period. This represents the percentage point difference in the chances of enrolling in a skill-shortage course post-reform in Victoria compared to NSW, controlling for pre-existing differences between Victoria and NSW and other observable factors. From Table 10, we can conclude that between 2008 and 2010 there is an estimated 4.8 percentage point higher chance of enrolling in a skill-shortage course related to the VTG and between 2008 and 2011 there is a 1.5 percentage point improvement. Thus, controlling for changes in student characteristics has little impact on the estimates presented in Table 9. Results for publicly-funded enrolments only are much the same (Table A10).

Note, however, that the national skills-shortage lists, upon which results in Tables 9 and 10 are based, will not capture differences in employer demands across states. Therefore, it may be more apt to use state level measures of skills-shortage (although the state level lists suffer from other problems, as discussed in Section 5). We therefore repeat the conditional difference-in-difference estimation using state skill-shortage measures to explore the sensitivity of our results to the particular skills shortage data used. Unlike the national skill-shortage measures that are binary (either the occupation is in shortage or not), state measures are based on 6 categories of shortage: state-wide shortage, shortage in metropolitan areas only, shortage in regional area only, recruitment difficulty, recruitment difficulty in regional areas and recruitment difficulty in metropolitan areas. To collapse this information into a binary outcome of shortage (or not), to maintain consistency with the national statistics, we derived a broad and a narrow binary measure of skill shortage. For the broad definition, a course is associated with a job shortage if its 6-digit ANZSCO occupation is classified as being in any one of the 6 state-based shortage categories. For the narrow definition, a course is associated with a skill shortage if its 6-digit occupation code is classified as being a state-wide shortage.

Conditional difference-in-difference estimates based on state-level shortage information (Table 11), present a rather different picture to those based on national information (Table 10). Estimates based on state-level skill-shortage information suggest that the VTG has made enrolments much more responsive to employer demands. Between 2008 and 2011, it is estimated that the VTG has increased the chance of enrolling in a skill shortage area by between 11 and 13 percentage points, depending on the definition of skill shortage used

(Table A11 shows that estimates for publicly-funded courses are slightly smaller in magnitude).

Table 11: Conditional Difference-in-Differences Regression Estimates of VTG Impacts on Probability of Enrolment in a State Skills-shortage Course, 15-19 Year Olds, 2011-2008, (Robust Standard Errors)

	Narrow definition of shortage	Broad definition of shortage
Victoria	-0.090*** (0.000)	-0.106*** (0.001)
Post-reform	-0.130*** (0.000)	-0.209*** (0.001)
Vic*post-reform	0.109** (0.001)	0.132*** (0.001)
Male	0.100*** (0.017)	0.108*** (0.025)
Aged 16 years	0.053*** (0.006)	0.075*** (0.008)
Aged 17 years	0.046*** (0.005)	0.070*** (0.011)
Aged 18 years	0.026*** (0.002)	0.049*** (0.005)
Aged 19 years	0.022*** (0.002)	0.041*** (0.008)
Indigenous	-0.068*** (0.002)	-0.085*** (0.001)
With a disability	-0.033*** (0.006)	-0.043*** (0.006)
Born outside Australia	-0.021** (0.009)	-0.042*** (0.002)
With Year 11	0.026*** (0.011)	0.033** (0.016)
With Year 12	-0.016*** (0.001)	-0.026*** (0.002)
With prior post-school qualification	-0.017** (0.008)	-0.020 (0.023)
R ²	0.061	0.090
Number of observations	230449	230449

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Skills-shortage courses are courses whose 6-digit ANZSCOs match those listed as being in shortage in the national skills shortage lists for the year prior to the enrolment year. Reference categories for age and schooling level are 15 years and less than Year 11 respectively. ***, **, and * denote statistical significance at the 99%, 95% and 90% levels respectively.

Both sets of skills shortages data have advantages and disadvantages, as set out in Section 5, so it is not clear that one set of estimates should be preferred over another. Elsewhere in this report, we therefore report the range suggested by both sets of estimates.

6.3 Impacts on Course Completion

First consider completion defined as the attainment of a qualification within 18 months of commencing. Table 12 (and A12) gives the proportion of January-June enrolments in 2008 and 2010 for Victoria and NSW that lead to completion within 18 months, both overall and separately by sub-groups. The corresponding unconditional difference-in-difference estimates are also presented. What is apparent from Table 12 is that in the pre-reform period (2008), there are large differences in completion rates between Victoria and NSW. Across all courses, the completion rate among 15-19 year olds in Victoria is estimated to be around 15%, compared to 28% in NSW. Given that students 15-19 are less likely to complete training than older cohorts, these estimates are broadly consistent with those reported by the NSW Department of Education and Communities (2011) for all VET courses — 34% in NSW and 23% in Victoria. Also of note is the variation in completion rates across providers, with students enrolled with public providers (TAFE and ACE) less likely to complete than those enrolled with private providers.

These differences aside, we observe around a 3 percentage point increase in completion rates in Victoria between 2008 and 2010 and no corresponding change in NSW over the same time period. As a result, we estimate an unconditional difference-in-difference 3 percentage point increase in completion rates in Victoria associated with the introduction of the VTG for 15-19 year olds. The increase in completion rates associated with the VTG appears greater for females than males and is only apparent for 18-19 year olds (no significant effect is estimated for 15-17 year olds). We find that the VTG has had no effect on the completion rates of Indigenous students and students with a disability.

Also note the different effect of the VTG on course completion for private and TAFE providers. For private providers, the VTG is associated with a 13 percentage point increase in the rates of course completion; for TAFE providers, the VTG is associated with a 3 percentage point fall in course completion. This difference may reflect differences in the quality of training, but may also reflect differences in the impacts of the VTG on types of

course enrolments in private and TAFE providers and in the composition of students enrolling in private and TAFE providers. This is tested further using conditional difference-in-difference estimation.

Table 12: Unconditional Difference-in-Difference Estimates of the VTG (January-June enrolments 2008 and 2010) on Course Completion within 18 Months, 15-19 Year Olds

	Victoria		New South Wales		Difference-in-Difference
	2008	2010	2008	2010	
Total	15.3	18.8	27.9	28.4	3.0
Males	12.8	15.0	19.2	20.0	1.4
Females	18.7	23.9	37.8	38.2	4.8
Aged 15-17 years	13.6	14.5	21.3	22.9	-0.7
Aged 18-19 years	16.3	20.7	32.4	31.9	4.9
Indigenous	9.5	10.6	18.1	18.9	0.2
With a disability	12.6	15.3	23.6	27.1	-0.7
Born outside Australia	20.1	23.4	29.9	32.5	0.7
Cert I/II	18.6	20.7	32.0	29.5	4.6
Cert III/IV	15.3	19.1	26.5	27.1	3.2
Diploma or above	9.4	13.2	26.0	33.0	-3.2
TAFE ^a	13.0	12.3	24.1	26.7	-3.3
ACE	17.7	21.4	44.8	32.9	15.6
Private provider	32.1	41.8	45.6	42.0	13.3
With Year 12	17.0	22.0	35.6	36.6	4.0
With less than Year 12	13.4	15.7	21.2	21.5	2.0
With prior post-school qualification	18.3	23.0	41.9	42.8	3.8
Without prior post-school qualification	14.9	18.3	25.3	25.1	3.6

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ^aTAFE includes TAFE institutes and VET provided through universities.

The unconditional difference-in-difference effects may be considered to be the overall effect of the VTG on completion. Recall from the conceptual framework (section 3), that there may be four possible channels through which this effect may occur: through student compositional changes, improved matches between course enrolment and student preferences, growth in the proportion of training in private institutions and changes in practices from greater contestability. That part of the overall effect that is related to changes in provider practices, motivated by increased contestability, is particularly interesting from a policy perspective. This is the part that may reflect improvements in training quality, although we cannot entirely rule out the possibility of increased strategic behaviour, such as under-reporting of non-completion, undertaken to gain a competitive advantage.

To derive an estimate of how much of the overall effect on course completion is due to the effect of changes in provider practices related to greater contestability, we estimate a multivariate difference-in-difference model, controlling for effects of the VTG that may be transmitted through the other channels by adding variables on student characteristics, course field of study and level, and provider type (Table 13). From Table 13, we can conclude that changes in provider practices explain 1.8 percentage points of the overall 3 percentage point improvement in completion rates associated with the VTG. Further analysis, conducted by adding these control variables incrementally one and at a time in separate multivariate difference-in-difference models, suggests that most of the remaining unexplained effect of the VTG on completion occurs through expansion in the share of privately provided training which is estimated to have higher rates of completion. Higher completion rates among private providers may be due to pre-reform differences such as the share of training that takes place in the workplace as opposed to the classroom.

To test whether the effect of greater contestability on completion varies by provider type, and to test whether the apparent negative VTG impact on completion rates in TAFEs is driven by changes in student composition, we also re-estimated the model used to produce the results in Table 13 including additional interactive variables for the VTG effects (Victoria, Post-reform and Vic*post-reform) interacted with a binary indicator for provider type (public provider, i.e. TAFE and ACE). (This is intuitively equivalent to running the regression separately by provider type.) We find significant and positive VTG effects on completion for both private and public providers – note that when we control for changes in the characteristics of TAFE/ACE students and their course choices the negative overall VTG effect on completion in public providers disappears – but still much greater impacts for private providers. Whether any positive effect on private provider completion rate is due to changes within existing provider practice or due to different practices among new entrants is uncertain, although the latter seems more likely given the huge increase in the number of private providers in the market following the introduction of the VTG.

Estimates using alternative measures of completion — course completion and module completion — give similar results (Table 14), although the effect on course dropout is not significant after netting out the effects on course level and course provider.

Table 13: Difference-in-Differences Regression Estimates of VTG Impacts on Probability of Completion (January-June enrolments 2008 and 2010) within 18 Months, 15-19 Year Olds, (Robust Standard Errors)

	Coefficients
Victoria	-0.132*** (0.003)
Post-reform	-0.003 (0.003)
Vic*post-reform	0.018*** (0.004)
Male	-0.057*** (0.002)
<i>16 years</i>	0.006 (0.006)
<i>17 years</i>	-0.004 (0.006)
<i>18 years</i>	0.001 (0.006)
<i>19 years</i>	0.006 (0.006)
Indigenous	-0.091*** (0.005)
With a disability	-0.024*** (0.004)
Born outside Australia	0.003 (0.004)
<i>With Year 12</i>	0.109*** (0.003)
<i>With Year 11</i>	0.045*** (0.003)
With prior post-school qualification	0.140*** (0.003)
<i>Cert III/IV</i>	-0.085*** (0.004)
<i>Diploma or above</i>	-0.178*** (0.005)
<i>ACE</i>	0.114*** (0.006)
<i>Private provider</i>	0.179*** (0.004)
R ²	0.144
Number of observations	150,203

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). TAFE is the omitted provider type category, Cert I/II is the omitted course level category, less than Year 11 is the omitted schooling category, and age 15 is the omitted age category. Course ANZSCO dummies are also included. ***, **, and * denote statistical significance at the 99%, 95% and 90% levels respectively.

Table 14: Alternative Difference-in-Differences Regression Estimates of VTG Impacts on Probability of Completion (January-June enrolments 2008 and 2010) within 18 Months, 15-19 Year Olds, (Robust Standard Errors)

	Coefficients
<i>Course completion</i>	
Victoria	-0.132*** (0.003)
Post-reform	-0.003 (0.003)
Vic*post-reform	0.018*** (0.004)
<i>Course dropout</i>	
Victoria	0.145*** (0.004)
Post-reform	0.027*** (0.004)
Vic*post-reform	-0.004 (0.005)
<i>Module completion</i>	
Victoria	-0.014*** (0.002)
Post-reform	-0.024*** (0.002)
Vic*post-reform	0.034*** (0.003)

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ***, **, and * denote statistical significance at the 99%, 95% and 90% levels respectively.

7. Conclusions

As the first state to embrace market driven reforms, estimated early impacts from the recent VTG reforms in Victoria are important in shining a light on expected outcomes of similar reforms in other states. The broader reform process in Victoria is also ongoing, and the evidence presented here may help to contribute to the knowledge base guiding that reform process.

Specifically, this study builds on previous reports by Skills Victoria (2012) and the Essential Services Commission (2011) by focussing on the key 15-19 year old age group, by examining reform impacts on course completion, and by isolating the effects of the VTG reforms from other contemporaneous labour market and policy changes using a difference-in-difference approach. On the whole, however, where there is common ground in terms of research questions, our results are broadly in line with those of Skills Victoria (2012) and the Essential Services Commission (2011).

On average, we estimate large positive effects on education participation associated with the VTG for 15-19 year olds (a 36.5 percentage point contribution to growth in the number of enrolments between 2008 and 2011). By level of study, the impacts on certificate I/II and certificate III/IV enrolments were roughly equal and were higher than for Diploma and above level courses, which are usually taken after acquiring lower level qualifications. (It may therefore be too early to fully observe any impacts on Diploma level enrolments for this age cohort). The increased engagement in education among 15-19 year olds is likely to stem in part from higher student demand related to greater freedom of choice afforded students under the VTG.

Almost all of the extra demand for 15-19 year olds has been met by private providers, with enrolments in TAFEs remaining steady between 2008 and 2011. Further, the increase in enrolments has not been uniformly spread across groups of students with different characteristics. In particular, a possible policy concern is that increases in enrolments among two key equity groups – students with a disability and Indigenous students – did not occur to the same extent as the overall increase. For students with a disability the VTG increased enrolment growth by 20 percentage points. For Indigenous 15-19 year olds, there was no

estimated change in enrolments as a result of the VTG. There may be barriers to education for these groups that limit their capacity to participate in education, and which cannot be surmounted by greater freedom of course choice alone. Given that the public benefits from engaging disadvantaged groups may be high, understanding the root cause of the lower enrolment response should be an issue for further study.

On average, we show that there has been an improvement in the responsiveness of enrolments to employer demands as measured by the match between enrolments and areas of reported skills shortages in the labour market. This should help to alleviate problems of skill shortages to some extent. Depending on the method adopted and the definition of skill shortage used, it is estimated that the VTG has increased the rate of enrolment in courses related to a skill shortage by between 2 and 13 percentage points in 2011. A possible explanation for the positive effect on demand responsiveness of training is that by removing supply caps and giving students freedom to choose, students have better access to courses associated with skill shortages. Note, however, that the impacts of the reforms on private and TAFE provider responsiveness has been different in this respect, with reforms increasing the proportion of TAFE enrolments in skill shortage areas but decreasing the proportion of private provider enrolments in skill shortage areas. This most likely reflects historical differences between the two sectors.

We estimate modest positive effects of the VTG on the rates of course completion (around 3 percentage points). Using step-wise estimation techniques, we find that the two most important channels that explain this result are changes in the proportion of training delivered in private institutes and changes in practices motivated by greater contestability, especially changes in practices among private providers. Changes in practices may come about by modifications made by existing providers or by new practices introduced by new entrants to the training market. The most likely reason for this is improvements in the quality of provision. However, it may also be that these changes reflect diversion of effort towards increased completion rates and away from other aspects of quality. If providers believe that students will use completion rates as a measure of quality – and this is likely to be increasingly the case if completion rates are added to websites such as My Skills – then greater contestability under the VTG may increase the incentive to improve completion rates, but not necessarily other aspects of the quality of provision.

While we show that on average these reforms have had some impact in the desired direction, many policy issues remain, both for Victoria and for other state governments and for the Australian government. One key issue is ensuring the provision of sufficient, timely and reliable information to prospective students to allow them to make informed choices over courses and providers. The recently-launched My Skills website makes a start in this respect, but could go further. For example, My Skills does not yet enable students to compare *between providers* in terms of outcomes (suitably adjusted to reflect composition of enrolments). There are also a number of improvements that could be made to the underlying data collections on which My Skills is based, given sufficient support. Not only is post-training outcome data important, but so is completion information. There are a number of issues that limit the usefulness of current completion statistics from AVETMISS, including varying course durations, difficulty tracking students over multiple years of collection and varying motivations for enrolment. The use of a unique student identifier and information on reasons for enrolment at the time of enrolment may help to improve the quality of this data. Another critical issue looking forward is determining the subsidy levels paid for different courses to ensure that public resources are used in an efficient and equitable way. Prevailing skill demands are likely to play a role in this, but policy makers should be wary of over-emphasizing them, particularly given uncertainty over the quality of some of the skills shortage data currently available.

Appendix A: Additional Tables

Table A2: Enrolments by State in Pre and Post Reform Years, 15-19 Year Olds, Publicly Funded Only

	Victoria			New South Wales		
	2008	2010	2011	2008	2010	2011
Total number of enrolments	49,643	63,079	74,209	52,327	55,995	52,076
Males	28,571	36,430	40,006	27,783	29,933	28,090
Females	21,065	26,538	34,163	24,522	26,036	23,972
Aged 15-17 years	17,976	19,614	21,243	21,647	22,511	20,182
Aged 18-19 years	31,667	43,465	52,966	30,680	33,484	31,894
Indigenous	1,120	1,386	1,344	3,571	4,665	4,323
With a disability	3,744	4,504	5,808	3,343	4,199	4,303
Born outside Australia	4,293	6,016	7,267	5,016	4,843	4,566
TAFE ^a	40,215	44,901	43,131	42,778	47,678	44,334
ACE	3,538	4,132	5,388	3,072	3,182	2,717
Private provider	5,890	14,046	25,690	6,477	5,135	5,025
With Year 12	25,498	31,335	38,370	24,124	24,621	23,601
With less than Year 12	22,812	30,528	34,358	27,774	31,072	28,215
With prior post-school qualification	6,036	10,430	11,827	8,457	10,631	9,804
Without prior post-school qualification	42,139	50,672	60,893	43,196	44,840	41,783

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Publicly funded is defined as enrolments supported by Commonwealth and State general purpose recurrent funding; Commonwealth specific purpose program funding; state specific purpose program funding. ^aTAFE includes TAFE institutes and VET provided through universities.

Table A3: Unconditional Difference-in-Differences Estimates of VTG Impacts on Enrolments in Victoria, 15-19 Year Olds, Publicly Funded Only

	2010-2008 Difference-in-Difference	2011-2008 Difference-in-Difference
Total number of enrolments	20.1	50.0
Males	19.8	38.9
Females	19.8	64.4
Aged 15-17 years	5.1	24.9
Aged 18-19 years	28.1	63.3
Indigenous	-6.9	-1.1
With a disability	-5.3	26.4
Born outside Australia	43.6	78.2
TAFE	0.2	3.6
ACE	13.2	63.8
Private provider	159.2	358.6
With Year 12	20.8	52.7
With less than Year 12	21.9	49.0
With prior post-school qualification	47.1	80.0
Without prior post-school qualification	16.4	47.8

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Publicly funded is defined as enrolments supported by Commonwealth and State general purpose recurrent funding; Commonwealth specific purpose program funding; state specific purpose program funding. ^aTAFE includes TAFE institutes and VET provided through universities.

**Table A4: Enrolments by Course Level, by State, Pre and Post Reform Years, 15-19
Year Olds, Publicly Funded Only**

	Victoria			New South Wales		
	2008	2010	2011	2008	2010	2011
Cert I/II	11,773	14,598	19,323	8,992	11,825	10,250
Cert III/IV	7,441	10,549	15,329	11,168	13,398	13,025
Diploma and above	5,859	5,576	5,561	3,426	2,608	2,356

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Publicly funded is defined as enrolments supported by Commonwealth and State general purpose recurrent funding; Commonwealth specific purpose program funding; state specific purpose program funding.

**Table A5: Enrolments by Course ANZSCO, by State, Pre and Post Reform Years, 15-19
Year Olds, Publicly Funded Only**

	Victoria			New South Wales		
	2008	2010	2011	2008	2010	2011
<i>Managers</i>	4,111	3,436	3,757	3,016	2,135	1,869
Chief Executives, General Managers and Legislators	-	-	-	-	-	-
Farmers and Farm Managers	339	310	410	147	270	284
Specialist Managers	2,097	1,534	1,565	1,775	1,002	906
Hospitality, Retail and Service Managers	1,675	1,592	1,782	1,094	863	679
<i>Professionals</i>	5,160	4,471	4,456	3,036	2,836	2,518
Arts and Media Professionals	1,017	1,064	1,133	668	861	701
Business, Human Resource and Marketing Professionals	1,872	1,520	1,198	1,233	1,025	960
Design, Engineering, Science and Transport Professionals	1,392	1,137	1,436	718	703	641
Education Professionals	94	212	122	26	34	25
Health Professionals	26	34	9	-	-	-
ICT Professionals	544	256	64	390	210	171
Legal, Social and Welfare Professionals	215	248	494	1	3	20
<i>Technicians and Trades Workers</i>	15,071	20,282	17,286	17,706	18,243	17,658
Engineering, ICT and Science Technicians	2,133	2,734	2,527	2,847	3,289	3,143
Automotive and Engineering Trades Workers	2,814	3,242	2,105	3,946	3,327	3,479
Construction Trades Workers	4,968	6,423	4,968	3,632	3,943	3,537
Electrotechnology and Telecommunications Trades Workers	646	2,213	1,973	2,086	2,048	2,017
Food Trades Workers	1,361	1,253	1,180	1,426	1,533	1,451
Skilled Animal and Horticultural Workers	790	951	928	1,289	1,496	1,478
Other Technicians and Trades Workers	2,359	3,466	3,605	2,480	2,607	2,553
<i>Community and Personal Service Workers</i>	7,427	12,278	16,076	8,526	9,724	9,488
Health and Welfare Support Workers	904	1,329	1,544	809	972	941
Carers and Aides	1,398	2,407	3,184	2,737	3,443	3,338
Hospitality Workers	2,777	4,035	5,124	2,379	2,405	2,428
Protective Service Workers	126	664	1,106	30	32	28
Sports and Personal Service Workers	2,222	3,843	5,118	2,571	2,872	2,753
<i>Clerical and Administrative Workers</i>	6,206	7,935	12,194	7,865	8,767	7,837
<i>Sales Workers</i>	2,741	3,714	5,200	3,935	3,245	2,936
<i>Machinery Operators and Drivers</i>	685	1,685	1,755	433	461	413
<i>Labourers</i>	3,720	4,173	3,702	2,802	3,993	3,464
<i>Occupational non-specific - General education</i>	4,518	5,073	9,752	3,344	2,670	1,978
<i>Non-industry specific training</i>	4	32	31	1,664	3,921	3,915

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Publicly funded is defined as enrolments supported by Commonwealth and State general purpose recurrent funding; Commonwealth specific purpose program funding; state specific purpose program funding.

Table A6: Proportion of Enrolments that are in Skills-shortage Courses, by State, Pre and Post Reform Years, 15-19 Year Olds, Publicly Funded Only

	Victoria			New South Wales		
	2008	2010	2011	2008	2010	2011
	%	%	%	%	%	%
Total number of enrolments	11	7	9	12	6	8
Males	11	2	5	14	3	6
Females	10	14	12	10	9	10
Aged 15-17 years	11	6	9	11	6	7
Aged 18-19 years	11	8	8	13	7	8
Indigenous	4	4	5	9	5	7
With a disability	8	6	8	10	7	8
Born outside Australia	11	6	7	13	4	6
TAFE ^a	11	6	9	12	6	8
ACE	9	13	11	5	6	5
Private provider	9	11	6	14	17	16
With Year 12	10	8	9	13	7	9
With less than Year 12	12	7	9	11	6	7
With prior post-school qualification	10	9	11	10	7	9
Without prior post-school qualification	11	7	8	12	6	8

Notes: 15-19 year olds still in school are excluded. Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ^aTAFE includes TAFE institutes and VET provided through universities. Skills-shortage courses are courses whose 6-digit ANZSCOs match those listed as being in shortage in the national skills shortage lists for the year prior to the enrolment year. Publicly funded is defined as enrolments supported by Commonwealth and State general purpose recurrent funding; Commonwealth specific purpose program funding; state specific purpose program funding.

Table A7: Unconditional Difference-in-Differences Estimates of VTG Impacts on Enrolments by Course Level in Victoria, 15-19 Year Olds, Publicly Funded Only

	2010-2008 Difference-in-Difference	2011-2008 Difference-in-Difference
	ppt.	ppt.
Cert I/II	15.5	69.3
Cert III/IV	25.6	51.2
Diploma and above	17.5	27.3

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Publicly funded is defined as enrolments supported by Commonwealth and State general purpose recurrent funding; Commonwealth specific purpose program funding; state specific purpose program funding.

Table A8: Unconditional Difference-in-Differences Estimates of VTG Impacts on Enrolments by Course ANZSCO in Victoria, 15-19 Year Olds, Publicly Funded Only

	2010-2008 Difference-in-Difference	2011-2008 Difference-in-Difference
	ppt.	ppt.
<i>Managers</i>	12.8	29.4
Chief Executives, General Managers and Legislators	-	-
Farmers and Farm Managers	-92.2	-72.3
Specialist Managers	16.7	23.6
Hospitality, Retail and Service Managers	16.2	44.3
<i>Professionals</i>	-6.8	3.4
Arts and Media Professionals	-24.3	6.5
Business, Human Resource and Marketing Professionals	-1.9	-13.9
Design, Engineering, Science and Transport Professionals	-16.2	13.9
Education Professionals	94.8	33.6
Health Professionals	-	-
ICT Professionals	-6.8	-32.1
Legal, Social and Welfare Professionals	-184.7	-1770.2
<i>Technicians and Trades Workers</i>	31.5	15.0
Engineering, ICT and Science Technicians	12.7	8.1
Automotive and Engineering Trades Workers	30.9	-13.4
Construction Trades Workers	20.7	2.6
Electrotechnology and Telecommunications Trades Workers	244.4	208.7
Food Trades Workers	-15.4	-15.1
Skilled Animal and Horticultural Workers	4.3	2.8
Other Technicians and Trades Workers	41.8	49.9
<i>Community and Personal Service Workers</i>	51.3	105.2
Health and Welfare Support Workers	26.9	54.5
Carers and Aides	46.4	105.8
Hospitality Workers	44.2	82.5
Protective Service Workers	420.3	784.4
Sports and Personal Service Workers	61.2	123.3
<i>Clerical and Administrative Workers</i>	16.4	96.8
<i>Sales Workers</i>	53.0	115.1
<i>Machinery Operators and Drivers</i>	139.5	160.8
<i>Labourers</i>	-30.3	-24.1
<i>Occupational non-specific - General education</i>	32.4	156.7
<i>Non-industry specific training</i>	564.4	539.7

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Publicly funded is defined as enrolments supported by Commonwealth and State general purpose recurrent funding; Commonwealth specific purpose program funding; state specific purpose program funding.

Table A9: Unconditional Difference-in-Differences Estimates of VTG Impacts on Proportion of Enrolments that are in Skills-shortage Courses in Victoria, 15-19 Year Olds, Publicly Funded Only

	2010-2008 Difference-in-Difference	2011-2008 Difference-in-Difference
Total number of enrolments	2.0	1.6
Males	2.0	2.9
Females	3.8	1.3
Aged 15-17 years	0.4	1.6
Aged 18-19 years	2.9	1.9
Indigenous	3.5	2.8
With a disability	1.6	1.5
Born outside Australia	3.5	2.6
TAFE	0.6	2.6
ACE	3.3	2.5
Private provider	-0.4	-5.2
With Year 12	3.6	2.5
With less than Year 12	0.1	0.5
With prior post-school qualification	19	2.1
Without prior post-school qualification	2.3	1.7

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ^aTAFE includes TAFE institutes and VET provided through universities. Skills-shortage courses are courses whose 6-digit ANZSCOs match those listed as being in shortage in the national skills shortage lists for the year prior to the enrolment year. Publicly funded is defined as enrolments supported by Commonwealth and State general purpose recurrent funding; Commonwealth specific purpose program funding; state specific purpose program funding.

Table A10: Difference-in-Differences Regression Estimates of VTG Impacts on Probability of Enrolment in a Skills-shortage Course, 15-19 Year Olds, Publicly Funded Only, (Robust Standard Errors)

	2010-2008 Difference-in-Difference	2011-2008 Difference-in-Difference
Victoria	-0.008*** (0.003)	-0.008*** (0.003)
Post-reform	-0.055*** (0.000)	-0.037*** (0.000)
Vic*post-reform	0.018*** (0.001)	0.014*** (0.001)
Male	-0.042 (0.027)	-0.024 (0.020)
Aged 16 years	0.032*** (0.003)	0.035*** (0.009)
Aged 17 years	0.036*** (0.001)	0.038*** (0.010)
Aged 18 years	0.039*** (0.004)	0.032 (0.019)
Aged 19 years	0.035*** (0.007)	0.025 (0.020)
Indigenous	-0.027** (0.011)	-0.029** (0.013)
With a disability	-0.010 (0.007)	-0.012 (0.007)
Born outside Australia	-0.012*** (0.002)	-0.008*** (0.001)
With Year 11	0.013 (0.011)	0.012 (0.013)
With Year 12	0.003 (0.008)	0.004 (0.005)
With prior post-school qualification	-0.001 (0.009)	0.005 (0.012)
R2	0.014	0.006
Number of observations	139761	150093

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Skills-shortage courses are courses whose 6-digit ANZSCOs match those listed as being in shortage in the national skills shortage lists for the year prior to the enrolment year. Reference categories for age and schooling level are 15 years and less than Year 11 respectively. ***, **, and * denote statistical significance at the 99%, 95% and 90% levels respectively.

Table A11: Conditional Difference-in-Differences Regression Estimates of VTG Impacts on Probability of Enrolment in a State Skills-shortage Course, 15-19 Year Olds, 2011-2008, Publicly-Funded Only, (Robust Standard Errors)

	Narrow definition of skill shortage	Broad definition of skill shortage
Victoria	-0.034*** (0.002)	-0.030*** (0.003)
Post-reform	-0.064*** (0.000)	-0.098*** (0.000)
Vic*post-reform	0.054*** (0.000)	0.061*** (0.001)
Male	0.014 (0.017)	-0.001 (0.024)
Aged 16 years	0.017*** (0.004)	0.029*** (0.005)
Aged 17 years	0.017** (0.008)	0.034*** (0.006)
Aged 18 years	0.014 (0.015)	0.029** (0.013)
Aged 19 years	0.012 (0.019)	0.028 (0.018)
Indigenous	-0.023*** (0.004)	-0.027*** (0.008)
With a disability	-0.012*** (0.001)	-0.014*** (0.001)
Born outside Australia	0.003 (0.005)	-0.006 (0.004)
With Year 11	0.008 (0.009)	0.014 (0.015)
With Year 12	0.009* (0.005)	0.003 (0.003)
With prior post-school qualification	0.005*** (0.000)	0.011 (0.009)
R ²	0.012	0.021
Number of observations	150093	150093

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). Skills-shortage courses are courses whose 6-digit ANZSCOs match those listed as being in shortage in the national skills shortage lists for the year prior to the enrolment year. Reference categories for age and schooling level are 15 years and less than Year 11 respectively. ***, **, and * denote statistical significance at the 99%, 95% and 90% levels respectively.

Table A12: Proportion of Enrolments Leading to Course Completion within 18 Months, by State, Pre and Post Reform Years, 15-19 Year Olds, Publicly Funded Only

	Victoria		New South Wales		Difference- in-Difference
	2008	2010	2008	2010	
Total	15.4	19.7	27.9	28.4	3.8
Males	12.6	15.8	19.1	19.8	2.5
Females	19.0	25.1	37.9	38.3	5.7
Aged 15-17 years	13.6	15.7	21.3	22.7	0.7
Aged 18-19 years	16.3	21.5	32.6	32.2	5.6
Indigenous	9.8	11.7	18.1	18.5	1.5
With a disability	12.5	15.7	23.8	27.3	-0.3
Born outside Australia	17.5	23.9	29.2	30.6	5.0
Cert I/II	20.0	23.6	32.1	30.0	5.7
Cert III/IV	14.9	19.1	26.4	26.8	3.8
Diploma or above	8.9	13.2	26.7	34.2	-3.2
TAFE ^a	12.7	12.4	24.0	26.7	-3.0
ACE	18.3	23.9	45.1	32.0	18.7
Private provider	31.6	41.9	45.6	42.3	13.6
With Year 12	17.3	22.8	35.9	37.4	4.0
With less than Year 12	13.5	16.6	21.1	21.4	2.8
With prior post-school qualification	18.3	23.6	42.0	42.8	4.5
Without prior post-school qualification	15.1	19.2	25.4	25.2	4.3

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ^aTAFE includes TAFE institutes and VET provided through universities.

**Table A13: Difference-in-Differences Regression Estimates of VTG Impacts on
Probability of Completion within 18 Months, 15-19 Year Olds, Publicly Funded Only,
(Robust Standard Errors)**

	Coefficients
Victoria	-0.129*** (0.003)
Post-reform	0.000 (0.003)
Vic*post-reform	0.018*** (0.004)
Male	-0.057*** (0.003)
Aged 16 years	0.010* (0.006)
Aged 17years	0.000 (0.006)
Aged 18 years	0.004 (0.006)
Aged 19 years	0.008 (0.006)
Indigenous	-0.099*** (0.005)
With a disability	-0.026*** (0.004)
Born outside Australia	-0.008* (0.004)
With Year 12	0.120*** (0.003)
With Year 11	0.049*** (0.003)
With prior post-school qualification	0.142*** (0.003)
Cert III/IV	-0.109*** (0.004)
Diploma or above	-0.203*** (0.005)
ACE	0.114*** (0.007)
Private provider	0.170*** (0.004)
Course ANZSCO dummies	Yes
R ²	0.154
Number of observations	138,959

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). TAFE is the omitted provider type category, Cert I/II is the omitted course level category, less than Year 11 is the omitted schooling level category and 15 years is the omitted age category. ***, **, and * denote statistical significance at the 99%, 95% and 90% levels respectively.

Table A14: Difference-in-Differences Regression Estimates of VTG Impacts on probability of completion outcome within 18 Months, 15-19 Year Olds, Average (Robust Standard Errors)

	Coefficients
<i>Course completion</i>	
Victoria	-0.129*** (0.003)
Post-reform	0.000 (0.003)
Vic*post-reform	0.018*** (0.004)
<i>Course dropout</i>	
Victoria	0.141*** (0.004)
Post-reform	0.025*** (0.004)
Vic*post-reform	-0.008 (0.005)
<i>Module completion</i>	
Victoria	-0.014*** (0.002)
Post-reform	-0.024*** (0.002)
Vic*post-reform	0.034*** (0.003)

Notes: Figures are for new course enrolments (i.e. excluding ongoing enrolments from earlier years). ***, **, and * denote statistical significance at the 99%, 95% and 90% levels respectively.

Appendix B: Using NSW to Estimate Counterfactuals for Victoria

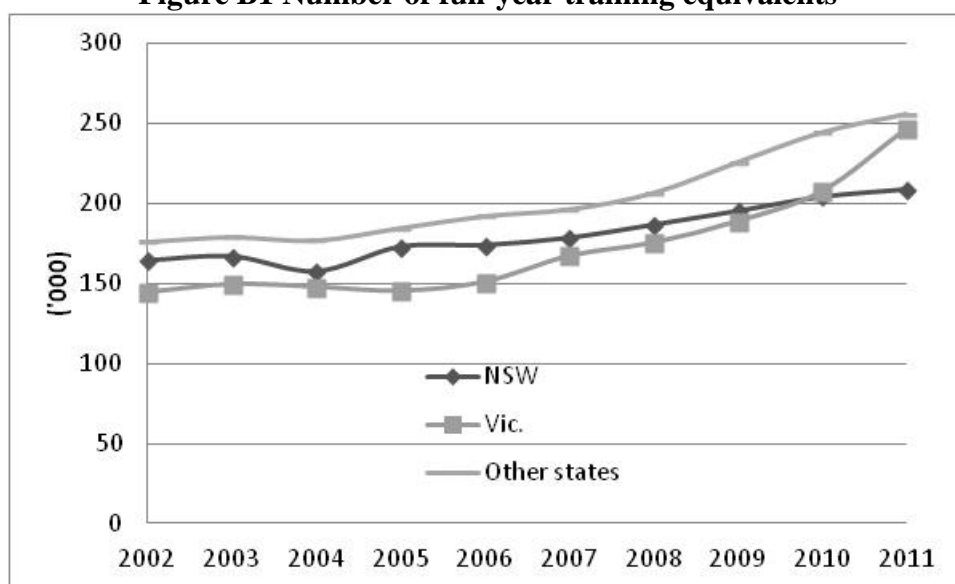
Our proposed difference-in-differences approach requires at least one comparison state for Victoria which can be used to estimate counterfactuals (what would have happened in Victoria had the reforms not been introduced). In principle, we could choose any state. But a good comparison state should be as similar as possible to the ‘treatment state’ (Victoria) in all respects other than the ‘treatment’ (the reforms) and its associated impacts, and should have been following similar trends in the outcomes of interest (e.g. enrolments, proportion of enrolments that are in skills shortage courses, completion rates) prior to the treatment.

At first glance, the most likely comparison state is NSW (on scale grounds alone). But how similar was NSW to Victoria prior to the reforms, and were the two states following similar trends prior to the reforms? (If prior trends are not parallel, then we may incorrectly attribute changes in outcomes for the treatment group relative to the comparison group driven by a continuation of these diverging trends to the policy reform.) Here we present some preliminary analysis of this prior trends question using publicly-available data drawn from VOCSTATS or reported by NCVER (2011a, 2011b). Note that this analysis is not specific to the 15-19 year old age group.

Figures B1 to B7 show trends – for Victoria, NSW, and all other states and territories combined – in the number of full-year training equivalent enrolments, the proportion of enrolments by broad field of study, and in course completion rates. The most important years in this case – the years where we are essentially looking for parallel lines for Victoria and NSW – are 2006 to 2008. From 2009 onwards (and particularly in 2010) we might expect to see divergence as result of the Victorian reforms. (Note that we are unable to examine prior trends in the proportion of enrolments that are in skills shortage courses because we do not have information on the nearest ANZSCOs for historical course enrolments.)

First consider the total number of enrolments, here measured by the number of full-year training equivalents (Figure B1). Trends in NSW appear to track those in Victoria quite closely until 2009/10. After this point they begin to diverge in a direction consistent with the impacts on enrolments that we discuss in the main body of the report.

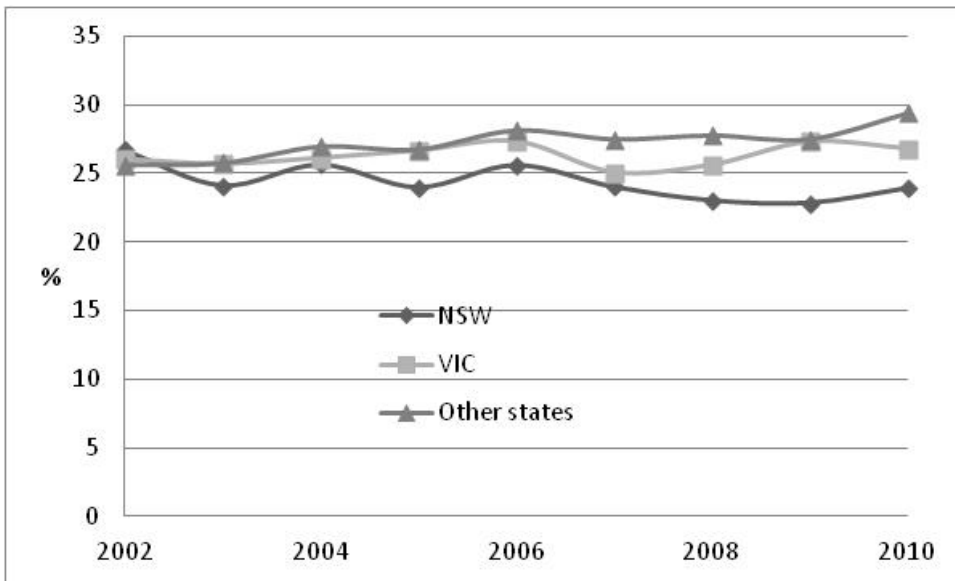
Figure B1 Number of full-year training equivalents



Source: NCVET (2011b, c). Measures the training activity undertaken by a student on a full-time basis for one year. Calculated based on *Hours of delivery* (720 hours = 1 FYTE). See <http://www.ncver.edu.au/files/VOCSTATSfields.pdf>.

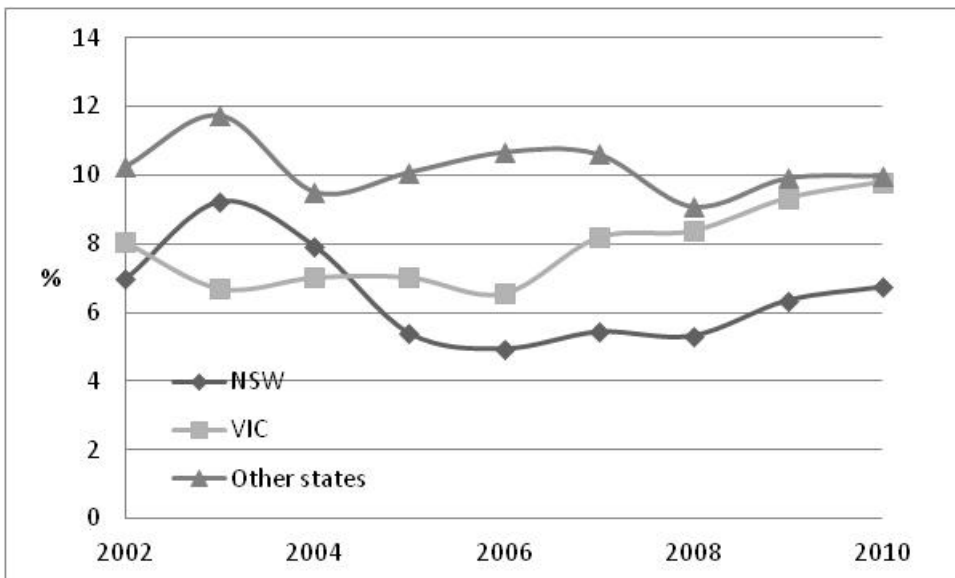
Second consider trends in enrolments by broad field of study (Figures B2-B6). In most cases – at least at this level of aggregation – NSW and Victoria appear to move reasonably in parallel in the years prior to the Victorian reforms. The exception to this is the proportion enrolled in Society, Culture and Creative Arts, where Victoria appears to be following a slight downward trend prior to the reforms and NSW appears to be following a slight upward trend. Although a multivariate regression approach (equation 3) may control for the underlying causes of these diverging trends (if they are observable), a simple unconditional difference-in-differences comparison of enrolments in this field of study could mistake a continuation of these trends for an impact of the Victorian reforms. As a result, it may be that the best we can do in this case (and in any similar cases) is to estimate either a minimum reform effect (a lower bound) or a maximum reform impact (an upper bound), depending on whether the relative change in outcomes post-reform is in the same direction as the diverging prior trends.

Figure B2 Proportion of enrolments in IT, Building and Engineering



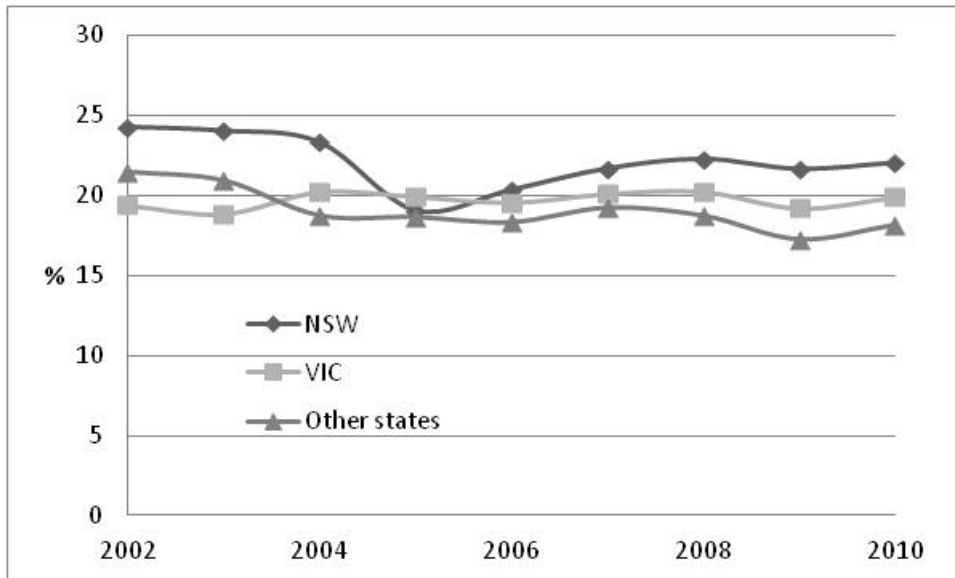
Source: VOCSTATS

Figure B3 Proportion of enrolments in Health and Education



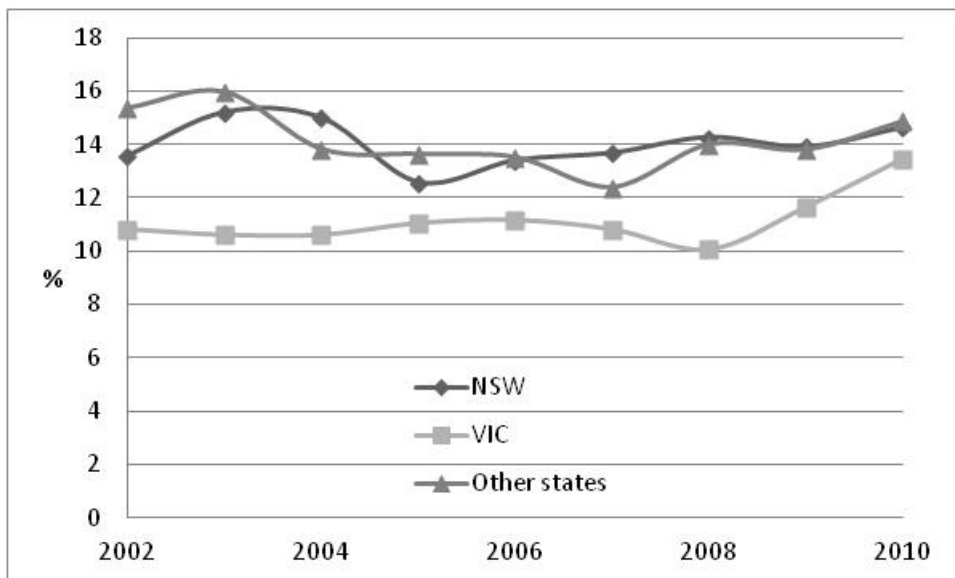
Source: VOCSTATS

Figure B4 Proportion of enrolments in Management and Commerce



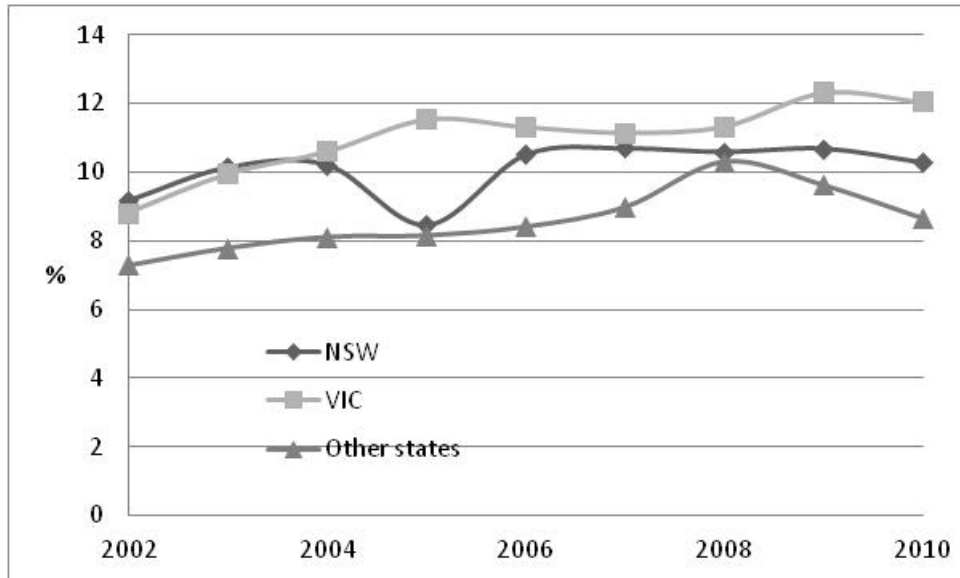
Source: VOCSTATS

Figure B5 Proportion of enrolments in Society, Culture and Creative Arts



Source: VOCSTATS

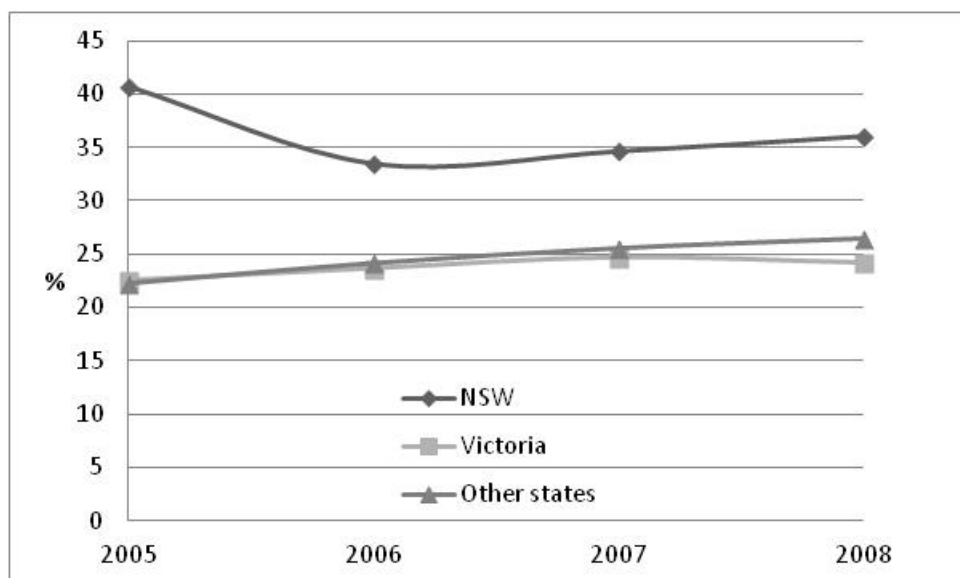
Figure B6 Proportion of enrolments in Food, Hospitality and Personal Services



Source: VOCSTATS

Finally, consider completion rates. Note that in this case we only have data for 2005-2008, and the definition of completion is not quite the same as ours (given our 18 month constraint). Nevertheless, the state-level prior trends for Victoria and NSW look as good as parallel over the 2006-2008 period.

Figure B7 Course completion rates, certificate I and above



Source: NCVET (2011a).

Appendix C: Additional Data Details

Here we define the variables used in the analyses presented in the text and provide notes on their construction where necessary. These variables are drawn or derived from the VET Provider Collection data unless otherwise specified.

For Tables 2 to 5, 8, 9 and 11; Tables A2 to A5, A8, A9, A11, A13, and A15

Variable	Description
Total number of enrolments	Include only new course enrolments in a particular year (i.e. excluding ongoing enrolments from earlier years). Enrolment year based on course start date.
Males	All males, excluding those whose gender not identified in the dataset
Females	All females, excluding those whose gender not identified in the dataset
Aged 15-17 years	Derived using date of birth and course start date. Include those aged between 15 and 17 as at course start date (i.e. $15 \leq \text{Enrolment age} < 18$).
Aged 18-19 years	Derived using date of birth and course start date. Include those aged between 18 and 19 as at course start date (i.e. $18 \leq \text{Enrolment age} < 20$).
Indigenous	Of Aboriginal and/or Torres Strait Islander origin.
With a disability	Based on original variable 'Disability Flag', which indicates whether an individual consider herself/himself to have a disability, impairment or long-term condition.
Born outside Australia	Whose country of birth is other than '1100'; '1101'; '1102'; and '1199' (respectively 'Australia (includes External Territories), nfd'; 'Australia'; 'Norfolk Island'; and 'Australian External Territories, nec'). For details, see <i>Standard Australian Classification of Countries</i> (SACC) ABS Catalogue No. 1269.0, 1998 (revision 2.03).
Cert I/II	Qualification or course level identified as Certificate I or Certificate II, based on the Australian Bureau of Statistics, <i>Australian Standard Classification of Education</i> (ASCED) ABS Catalogue No. 1272.0, 2001.
Cert III/IV	Qualification or course level identified as Certificate III or Certificate IV, based on the Australian Bureau of Statistics, <i>Australian Standard Classification of Education</i> (ASCED) ABS Catalogue No. 1272.0, 2001.
Diploma and above	Include courses at Diploma level and above (i.e. advanced diploma and associate degree level, bachelor degree level, graduate certificate level, and graduate diploma level), based on the Australian Bureau of Statistics, <i>Australian Standard Classification of Education</i> (ASCED) ABS Catalogue No. 1272.0, 2001.
TAFE	Include TAFE institutes and VET provided through universities.
ACE	VET provided by 'Community-based adult education provider'
Private provider	VET providers other than TAFE and ACE
With Year 12	Completed Year 12
With less than Year 12	Highest level of school completed less than Year 12 (including those

Variable	Description
	who did not go to school).
With prior post-school qualification	Those who completed any post-school qualifications (i.e. any certificate, diploma, advanced diploma or associate degree, bachelor degree or higher degree) before enrolment.
Without prior post-school qualification	Those who has NOT completed any post-school qualifications (i.e. any certificate, diploma, advanced diploma or associate degree, bachelor degree or higher degree) before enrolment.

For Tables 10, 12, A10, A12a, A12b, A14, A16, A17, and A18

Variable	Description
Victoria	=1 if training organisation/provider in Victoria =0 if training organisation/provider in New South Wales
Post-reform	=1 for enrolments in 2010 =0 for enrolments in 2008
Vic*post-reform	=1 for enrolments in Victoria in 2010 =0 otherwise
Male	=1 if male =0 if female
Aged 16 years	=1 if aged at least 16 but less than 17 as at enrolment date =0 otherwise
Aged 17 years	=1 if aged at least 17 but less than 18 as at enrolment date =0 otherwise
Aged 18 years	=1 if aged at least 18 but less than 19 as at enrolment date =0 otherwise
Aged 19 years	=1 if aged at least 19 but less than 20 as at enrolment date =0 otherwise
Indigenous	=1 if of Aboriginal/Torres Strait Islander origin =0 otherwise
With a disability	=1 if individual considers herself/himself to have a disability, impairment or long-term condition =0 otherwise
Born outside Australia	=1 if country of birth is other than '1100'; '1101'; '1102'; and '1199' (respectively 'Australia (includes External Territories), nfd'; 'Australia'; 'Norfolk Island'; and 'Australian External Territories, nec') =0 otherwise
With Year 12	=1 if highest level of school completed is Year12 =0 otherwise
With Year 11	=1 if highest level of school completed is Year 11 =0 otherwise
With prior post-school qualification	=1 if completed any post-school qualifications (i.e. any certificate, diploma, advanced diploma or associate degree, bachelor degree or higher degree) before enrolment =0 otherwise
Cert III/IV	=1 if qualification or course level identified as Certificate III or Certificate IV, based on the Australian Bureau of Statistics, <i>Australian Standard Classification of Education (ASCED)</i> ABS Catalogue No. 1272.0, 2001 =0 otherwise
Diploma or above	=1 if courses at Diploma level and above (i.e. advanced diploma and associate degree level, bachelor degree level, graduate certificate level,

Variable	Description
	and graduate diploma level), based on the Australian Bureau of Statistics, <i>Australian Standard Classification of Education (ASCED)</i> ABS Catalogue No. 1272.0, 2001 =0 otherwise
ACE	=1 if VET provided by 'Community-based adult education provider' =0 otherwise
Private provider	=1 if VET providers other than TAFE and ACE =0 otherwise
Course ANZSCO dummies	Based on course ANZSCO, at the 1-digit level, which identifies the type of occupation that may be expected of those undertaking the course. Include 7 dummy variables, one for each of Managers; Professionals; Technicians and trades workers; Community and personal service workers; Clerical and administrative workers; Sales workers; and Machinery operators and drivers (with Labourers as the omitted category).

References

Allen, R. and Vignoles, A. (2009). 'Can school competition improve standards? The case of faith schools in England.' Department of Quantitative Social Science Working paper 09-04, Institute of Education, University of London.

Anderson, D. (2005). 'Trading places: the impact and outcomes of market reform in vocational education and training.' Adelaide: NCVET.

Becker, G. (1962). 'Investment in Human Capital: A Theoretical Analysis.' *Journal of Political Economy*, vol. 70, pp. 9-49.

Blundell, R. and Costa Dias, M. (2008). 'Alternative approaches to evaluation in empirical microeconomics.' IZA Discussion Paper 3800, IZA, Bonn.

Card, D., Dolley, M.D. and Payne, A.A. (2010). 'School competition and efficiency with publicly funded Catholic schools.' *American Economic Journal: Applied Economics*, 2, 4, 150-76.

Department of Education and Early Childhood Development (DEECD) 2012, 'Refocusing Vocational Training in Victoria', DEECD, Melbourne.

Essential Services Commission (2011). *Vocational Education and Training Fee and Funding Review*, Essential Services Commission, Melbourne.

Karmel, T. & Fieger, P. (2012). 'The value of completion of a VET qualification.' NCVET, Adelaide.

Hanushek, E.A. and Woessmann, L. (2011). 'The economics of international differences in educational achievement,' in E.A. Hanushek, S. Machin and L.Woessmannn (eds.) *Handbook of Economics of Education Volume 3*, Amsterdam: Elsevier North-Holland.

Herault, N., Zakirova, R. and Buddelmeyer, H. (2010). 'The effect of VET completion on wages of young people.' NCVER, Adelaide.

Karmel, T., Mlotkowski, P. and Awodeyi, T. (2008). 'Is VET vocational? The relevance of training to the occupations of vocational education and training graduates.' NCVER, Adelaide.

Kranton, R. (2003). 'Competition and the Incentive to Produce High Quality.' *Economica*, 70, 385-04.

Mark, K. and Karmel, T. (2010) 'The likelihood of completion a VET qualification: A model-based approach.' NCVER, Adelaide.

McMillan, R. (2004). 'Competition, Incentives, and Public School Productivity.' *Journal of Public Economics*, 88, 1871-92.

NCVER (2011a). 'The likelihood of completing a VET qualification 2005-08.', National Centre for Vocational Education Research, Adelaide.

NCVER (2011b). 'Historical time series of vocational education and training in Australia from 1981.' National Centre for Vocational Education Research, Adelaide.

NCVER (2011c). 'Students and courses preliminary data.' National Centre for Vocational Education Research, Adelaide.

NSW Department of Education and Communities (2011). *Smart and Skilled: Making NSW Number One*. NSW Department of Education and Communities, Sydney.

OECD (2008). *Learning for Jobs: OECD Review of Vocational Education and Training in Australia*. OECD, Paris.

Productivity Commission (2011). *Vocational Education and Training Workforce*, Research Report, Canberra.

Productivity Commission (2012). *Impacts and Benefits of COAG Reforms*, Research Report, Canberra.

Propper, C., Burgess, S. and Green, K. (2004). "Does Competition between Hospitals Improve the Quality of Care? Hospital Death Rates and the NHS Internal Market," *Journal of Public Economics*, 88, 1247-72.

Ryoo, L. and Rosen, S. (2004). 'The engineering labor market.' *Journal of Political Economy*, 112, S110-S140.

Shean, R. (2012). 'An entitlement model that meets WA's needs.' *Training Matters*, March 2012, pp. 19.

Skills Victoria (2012). *Victoria's Training Market Quarterly Report: Full Year 2011*. Department of Education and Early Childhood Development, Melbourne.

Victorian Government (2008). 'Securing Our Future Economic Prosperity', Discussion paper on skills reform, Victorian Government, Melbourne.

Wright, S., Buchanan, J. Wilson, S., van Wanrooy, B. and Baldwin, S. (2009), *Australia at Work: In a Changing World*, Workplace Research Centre, University of Sydney, Sydney.