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Productivity Commission

Impacts of COAG Reforms:
Business Regulation and VET

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

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Terms of reference

Impacts and benefits of COAG reforms

Productivity Commission Act 1998

I, Nick Sherry, Assistant Treasurer, pursuant of Parts 2 and 3 of the *Productivity Commission Act 1998* hereby request that the Productivity Commission undertake reporting on the impacts and benefits of COAG reforms.

Purpose of the study

The Council of Australian Governments (COAG) is committed to addressing the challenges of boosting productivity, increasing workforce participation and mobility and delivering better services for the community. This reform agenda will also contribute to the goals of improving social inclusion, closing the gap on Indigenous disadvantage and improving environmental sustainability.

At its March 2008 meeting, COAG agreed that, to assist the COAG Reform Council in its role of helping to enhance accountability and promote reform, and monitoring the progress of the COAG reform agenda, the Productivity Commission (the Commission) would be requested to report to COAG on the economic impacts and benefits of COAG's agreed reform agenda every two to three years. In doing so, the Commission should be guided by COAG reform objectives and goals identified in the Intergovernmental Agreement on Federal Financial Relations, COAG communiqués and related documents, particularly as they relate to addressing the challenges stated above.

The reporting will cover, as appropriate, the realised and prospective economic impacts and benefits of the different reform streams, including regulation, infrastructure and human capital issues of workforce productivity and participation. Each report to COAG will give priority to informing governments of the nature of reform impacts and benefits and the time scale over which benefits are likely to accrue, given COAG's reform framework and implementation plans. Where information about specific reform impacts or initiatives is limited, the Commission's reporting would produce broad or 'outer envelope' estimates of the potential benefits and costs of reform.

The reporting program should enable governments to have up-to-date information with which to evaluate what has been achieved through the reform agenda and provide an assessment of potential future gains.

Scope of reports

Each report should cover reform developments, impacts and benefits in each COAG reform area. At the commencement of each reporting cycle, the Assistant Treasurer will provide directions concerning particular reporting priorities to be addressed within this broad framework. Without limiting the scope of matters to be considered, determination of reporting priorities could take into account:

- the fiscal impact of reform on each level of government
- the availability of new material on COAG's reform agenda or implementation plans
- the implementation of a significant body of reform over a sufficient period to enable a meaningful review of the likely impacts and benefits of that reform

- any emerging concern about the potential impacts or benefits of a reform.

The Commission's reports to COAG should provide information on:

- the economic impacts and benefits of reform and outcome objectives, including estimates of the economy-wide, regional and distributional effects of change
- assessments, where practicable, of whether Australia's reform potential is being achieved and the opportunities for improvement. The analysis should recognise the different nature of sectoral productivity-based and human capital reforms and the likely time paths over which benefits are likely to accrue.

In preparation for its inaugural full report, the Commission should also provide a 'framework' report to COAG outlining its proposed approach to reporting on the impacts and benefits of COAG's reform agenda.

Methodology

The Commission will develop and maintain analytical frameworks appropriate for the quantification of the impacts and benefits of reform, and the provision to government and the community of assessments of the economy-wide, regional and distributional effects of COAG's reform agenda. The frameworks should be transparent, and subject to independent assessment. As far as practicable, the frameworks should be made available for wider use.

The Commission should provide an explanation of the methodology and assumptions used in its analysis. The Commission should also provide guidance concerning the sensitivity of results to the assumptions used and bring to COAG's attention informational limitations and weaknesses in approaches to reform evaluation. The scope for improvement should be identified.

Consultation and timing

In the course of preparing each report, the Commission should consult the COAG Reform Council, relevant Ministerial Councils, any relevant COAG working groups, Commonwealth Ministers, State and Territory Treasurers and more widely, as appropriate. While these consultations would inform the Commission's assessment, responsibility for the final report would rest with the Productivity Commission.

The Commission's framework report should be submitted to COAG by 31 December 2010. The Commission will then complete full reports at 2-3 year intervals dated from 1 January 2009, in accordance with directions for individual reports from the Assistant Treasurer.

Final reports will be submitted by the Productivity Commission to the Assistant Treasurer for conveyance to COAG. The Assistant Treasurer will advise the Commission of the timing for individual reports. The reports will be published.

Nick Sherry
Assistant Treasurer
[Received 18 June 2010]

Letter of direction

Dear Mr Banks

I am writing to you regarding priorities to be addressed in the Productivity Commission's first report on the Impacts and Benefits of COAG Reforms. I apologise for delay in providing these directions to you.

In December 2010, I received the Commission's framework report, which proposed that the first substantive report include a detailed analysis of the impacts of reform in the competition and regulation stream and the human capital stream.

For the first report, I agree that the Commission should examine areas of COAG's competition and regulation stream likely to have realised or prospective impacts. The COAG Reform Council assessed the progress of the deregulation and competition reforms as at 30 September 2010 in its National Partnership Agreement to Deliver a Seamless National Economy: Performance Report for 2009-10. I consider that the Commission's report should focus on the 14 completed deregulation reforms (pending COAG's agreement to the completion of the food reform), the Personal Property Securities and Occupational Health and Safety reforms which are scheduled to be operational by 1 January 2012, and the National Construction Code reform which is substantially complete (see Attachment A for a numbered list of these all of these reforms).

Taking into account the longer term nature of the implementation of many of the competition reforms, I agree with the Commission's proposal that these be considered in more depth in the second or later reports. I also consider that the remaining deregulation reforms should also be examined at this time.

Under the human capital stream, I endorse the Commission's proposal that the impact of education and training reforms be examined in detail in its first report. I ask that the Commission focus on the impacts of reforms to vocational education and training on productivity and workforce participation. Initiatives that support young people and disadvantaged groups in making a successful transition from school to further education, training or employment should also be examined by the Commission as part of this analysis.

I note that the Commission does not propose to provide an estimate of the realised and prospective economic impacts and benefits of all the different reform streams. While I appreciate the rationale for not doing so in this first report, this is an area that I would appreciate greater focus on in future reports.

The terms of reference that were provided in June 2010 asked the Commission to report to COAG on this matter by 31 December 2011. However, in view of the delays in providing these directions, I have extended the time for the Commission to provide COAG with its report from 31 December 2011 to the end of March 2012, with a discussion draft to be provided in December 2011.

This letter has been copied to the Prime Minister, the Deputy Prime Minister and Treasurer, the Minister for Finance and Deregulation, the Minister for Tertiary Education and the Minister for School Education.

Yours sincerely

BILL SHORTEN
[Received 22 August 2011]

Attachment A — Reforms to be focused on

14 completed deregulation reforms

- Health workforce (Deregulation reform stream 5 in the CRC report)
- Trade measurement (Reform stream 6)
- Trustee corporations (Reform stream 10)
- Standard business reporting (Reform stream 19)
- Wine labelling (Reform stream 25)
- Rail safety (Reform stream 19)
- Australian consumer law (Reform stream 8)
- Product safety (Reform stream 9)
- Phase 1 of Consumer credit (includes 3 separate reforms; reform streams 11, 12 and 13)
- Payroll tax (Reform stream 3)
- Development assessment (Reform stream 4)
- Food (Reform stream 20)

2 reforms scheduled to be operational by 1 January 2012

- Personal Property Securities (Reform stream 18)
- Occupational Health and Safety (Reform stream 1)

1 reform that is substantially complete

- National Construction Code (Reform stream 15)

Extension Letter

Mr Gary Banks AO
Chairman
Productivity Commission
PO Box 1428
Canberra City ACT 2601

Dear Mr Banks

Thank you for your letter dated 15 March 2012, seeking an extension to the reporting date for the Productivity Commission study Impacts of COAG reforms: Business Regulation and VET.

I note that further time is needed to enable consideration of late submissions and finalise detailed modelling of reform outcomes.

Accordingly, I agree to your request to extend the reporting date for the study from 31 March to 30 April 2012.

I have copied this letter to the Prime Minister.

I look forward to receiving the report in due course.

Yours sincerely

DAVID BRADBURY
[Received 23 March 2012]

Contents

Preface

The Commission's report into the *Impacts of COAG Reforms: Business Regulation and VET* comprises three volumes:

- The first volume contains the Overview of the entire report, along with an introduction and three chapters which provide details on the economic context in which the reforms will play out, and the Commission's preliminary assessment of the overall impacts of the regulation and vocational education and training reforms examined, respectively.
- The second volume contains chapters which assess the impacts of the 17 Seamless National Economy business regulation reforms examined.
- This volume contains chapters which assess the impacts of the vocational education and training reforms examined.

All three volumes are available on the Commission's website via the study page (www.pc.gov.au/projects/study/coag-reporting)

The Commission will also be publishing a supplement to the report which will contain details of the economy-wide modelling used in the study.

Acknowledgments

The Productivity Commission expresses its gratitude to all those who contributed to this report.

The report uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey and data from the Longitudinal Surveys of Australian Youth (LSAY) Program. The HILDA project was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA), and is managed by the Melbourne Institute of Applied Economic and Social Research (the Melbourne Institute). The findings and views reported in this report, however, are those of the author and should not be attributed to either FaHCSIA or the Melbourne Institute. LSAY is managed and funded by the Australian Government Department of Education, Employment and Workplace Relations (DEEWR), with support from state and territory governments.

This study was oversighted by Commissioner Patricia Scott. She was supported by a study team located in Melbourne.

Abbreviations and explanations

Abbreviations

ABS	Australian Bureau of Statistics
ACPET	Australian Council for Private Education and Training
ALLS	Adult Literacy and Life Skills Survey
ASQA	Australian Skills Quality Authority
AQF	Australian Qualifications Framework
ASSDA	Australian Social Science Data Archives
BOTE	Back of the Envelope
COAG	Council of Australian Governments
CoPS	Centre of Policy Studies
CGE	Computable General Equilibrium
DEEWR	Department of Education, Employment and Workplace Relations
DEST	Department of Education, Science and Training
DFEEST	Department of Further Education, Employment, Science and Technology
DHS	Department of Human Services
ELMO	Education and Labour Market Outcomes
ESC	Essential Services Commission
GDP	Gross Domestic Product
GSP	Gross State Product
GST	Goods and Services Tax
HILDA	Household Income and Labour Dynamics in Australia
IBSA	Innovation and Business Skills Australia
ICLs	Income Contingent Loans
IGA	Intergovernmental Agreement on Federal Financial Relations

LFS	Labour Force Survey
LLN	Language, Literacy and Numeracy
LLNP	Language, Literacy and Numeracy Program
LSAY	Longitudinal Surveys of Australian Youth
MMRF	Monash Multi-Regional Forecasting
NAPLAN	National Assessment Program — Literacy and Numeracy
NASWD	National Agreement for Skills and Workforce Development
NBN	National Broadband Network
NCP	National Competition Policy
NCVER	National Centre for Vocational Education Research
NEA	National Education Agreement
NES	Non-English Speaking
NFSS	National Foundation Skills Strategy for Adults
NPAPAT	National Partnership Agreement on Pre-Apprenticeship Training
NPAPPP	National Partnership Agreement on Productivity Places Program
NPASR	National Partnership Agreement on Skills Reform
NPATPSTP	National Partnership Agreement on Training Places for Single and Teenage Parents
NPAYAT	National Partnership Agreement on Youth Attainment and Transitions
NRA	National Reform Agenda
NWDF	National Workforce Development Fund
OECD	Organisation for Economic Cooperation and Development
PC	Productivity Commission
PPP	Productivity Places Program
PISA	Programme for International Student Assessment
RTO	Registered Training Organisation
SAL	Survey of Aspects of Literacy
SET	Survey of Education and Training

TAFE	Technical and Further Education
VET	Vocational Education and Training
WELL	Workplace English Language and Literacy

Explanations

Billion	The convention used for a billion is a thousand million (10^9).

OVERVIEW

Key points

- Vocational education and training reforms are aimed at improving the overall quality of the workforce and encouraging higher workforce participation, through increased VET provision and greater flexibility in courses offered.
  - Attainment of the COAG 2020 targets has the potential to raise GDP by two per cent.
  - It would also assist in achieving COAG's broader social inclusion goals.
- Increased effort by governments will be required for the full potential of the COAG agenda to be realised.
- A number of areas offer opportunities for even better outcomes. In particular:
  - initiatives to increase VET completion rates
  - ensuring VET reforms are sequenced so that the building blocks are in place for the successful transition to more contestable markets including,
    - strengthening quality control through cost-effective independent validation and auditing of training organisations' assessment practices
    - making information available to students on the costs of training, quality and labour market outcomes for individual training organisations
  - greater autonomy and capacity for TAFEs to compete with other providers
  - tying payments to outcomes.

Overview

What the Commission was asked to do

The Australian Government — following a request from the Council of Australian Governments (COAG) — asked the Productivity Commission to report on the economic impacts and benefits of COAG's vocational education and training (VET) reform agenda and initiatives that support successful transitions from school.

In undertaking its assessment, the Commission was asked to:

- report on the economy-wide, regional and distributional effects of reforms
- take into account the costs incurred by governments in implementing reforms
- comment on the time paths over which the effects of reform are likely to accrue
- provide guidance on the sensitivity of estimated results to the assumptions used
- draw attention to information gaps that limit approaches to reform evaluation
- assess, where practicable, whether Australia's reform potential is being achieved and the opportunities for improvement.

The Commission has made many assumptions in estimating the impacts of COAG's VET reform agenda. These are outlined in this overview and detailed in this volume. Sensitivity analysis undertaken indicates that those assumptions are critical. When the assumptions change, so do estimated changes in employment, productivity and broader economic activity, often quite markedly. The results, therefore, should be regarded as only broadly indicative of the possible impacts of policy initiatives assessed. The estimates and analysis are intended to advance understanding of the scale of effects that might occur. The estimates presented are not forecasts of the economic or fiscal impacts of the reforms. Rather, they reflect the impacts of VET policy initiatives in isolation from any other influence, including in isolation from initiatives in other parts of the education system.

Consistent with the terms of reference, the results are presented relative to a baseline to isolate the effect of the initiatives modelled relative to the outcomes that would have occurred with the previous policy settings and with the demographic momentum, which means that the education of the population is assumed to be increasing independently of the COAG policy initiatives under scrutiny.

Although some results are expressed in terms of percentage changes relative to the baseline, others are expressed in terms of real values and are discounted to account for the long term effects of the initial expenditures (box 1).

Box 1 Effects of discounting

When economic flows occur over a long period, it is appropriate to discount them to account for the preference for the present. The discount rate reflects the trade-off between present and future consumption (or savings). The analysis in this report is in real terms, that is, it abstracts from the effects of inflation, and prices and wages are assumed to be measured in terms of 2012 dollars.

The choice of a discount rate is complex. It depends, among other considerations, on whether the flows being discounted measure private or social, real, or nominal values. In this report, all values are expressed in real terms and both private and social values are discounted. For simplicity, a six per cent, real discount rate is applied to all values, and all values are discounted to 2012.

The effect of discounting is illustrated with a simple example in which costs of studying (monetary and foregone income while studying) are assumed to amount to $20 000 in the first year and additional returns due to studying (the premium) are $10 000 per year over 40 years. A discount rate of 6 per cent is applied in table A.

Table A **Illustrative example of the effect of discounting on a simplified private benefit calculation**

Discount rate: 6 per cent, real

	undiscounted	*discounted*
	$	$
Initial costs	20 000	20 000
Gross returns	400 000	150 000
Net returns	380 000	130 463

The COAG VET reform agenda

COAG VET reforms are given effect through the *National Agreement for Skills and Workforce Development* (NASWD), and supporting national partnership agreements, such as the *National Partnership on Skills Reform* (NPASR), which was released on 13 April 2012. The NASWD sets out four outcomes and two broad targets for the VET reform agenda (box 2). The scope of the Commission's assessment of the impacts of the COAG VET reform agenda is defined by policy initiatives that support progress towards these outcomes and targets.

States and Territories were at different points in the process of developing and implementing VET policy reforms in 2009, when they committed to pursuing the outcomes and targets set out in the main agreement giving effect to VET reforms — the NASWD. The NASWD emphasised the importance of making the VET systems more contestable and client driven.

Box 2 NASWD outcomes and targets

The 2009 NASWD defined four outcomes and two targets to be reached by 2020. In the more recent 2012 NASWD, COAG reiterates its commitment to the 2020 targets, noting that they are 'ambitious', 'long-term' and 'aspirational'.

Outcomes

The working age population has gaps in foundation skills reduced to enable effective educational, labour market and social participation.

The working age population has the depth and breadth of skills and capabilities required for the 21st century labour market.

The supply of skills provided by the national training system responds to meet changing labour market demand.

Skills are used effectively to increase labour market efficiency, productivity, innovation and ensure increased utilisation of human capital.

Targets

Halve the proportion of Australians without qualifications at Certificate III level or above by 2020 (from 47.1 per cent of 20-64 year-olds to 23.6 per cent).

Double the number of higher level (Diploma and Advanced Diploma) qualification completions by 2020.

Progress towards an entitlement based system with greater contestability varies across the jurisdictions. At this stage, only Victoria has introduced an entitlement system within a contestable market, although South Australia will transition to its own version of this arrangement from July 2012.

On 13 April 2012, COAG agreed to the NPASR, with the following key elements:

- introducing a national training entitlement for a government-subsidised training place to at least the first Certificate III qualification for working age Australians without qualifications;
- income-contingent loans for government-subsidised Diploma and Advanced Diploma students for students undertaking higher level qualifications, thereby reducing their upfront costs of study;

- developing and piloting independent validation of training provider assessments and implementing strategies which enable TAFEs to operate effectively in an environment of greater competition;
- a new *My Skills* website to improve access for students and employers to information about training options, training providers and provider quality; and
- supporting around 375 000 additional students over five years to complete their qualifications, and improving training enrolments and completions in high-level skills and among key groups of disadvantaged students, including Indigenous Australians. (COAG 2012)

The latest agreements are silent about what might occur between 2017 and 2020, the year of the COAG targets.

The Commission's approach

The Commission has been asked to estimate:

- realised gains — where reforms have been implemented and impacts are already accruing
- prospective gains — where reforms have been implemented (for example, legislated) but impacts are yet to occur
- potential gains — where reforms have yet to be implemented, *or* where there is scope for further reform to deliver additional benefits.

In estimating the impacts of the COAG VET reform agenda, the Commission has not assessed all policy initiatives affecting the VET sector, but has focussed on specific initiatives associated with the key COAG VET agreements.

The following policy initiatives are accounted for in the scope of this project:

- The introduction of a market-based system in Victoria from mid-2009. Estimates of the *realised* impacts of this initiative are based on increases in government-funded training activity over the period 2009–2011, relative to a baseline of 2008 activity. *Prospective* effects reflect qualification completions post-2011, by government-funded students who commenced their study between 2009 and 31 December 2012 — when the current policy statement will expire. The policy initiatives are associated with an additional 93 000 students aged 15 to 64 per year, on average, undertaking government-funded VET in Victoria (from a base of 284 000 in 2008).
- The *National Partnership Agreement on Productivity Places Program* (NPAPPP), implemented by States and Territories except Victoria from July 2009. As the Agreement will conclude on 30 June 2012, the Commission has treated all of the

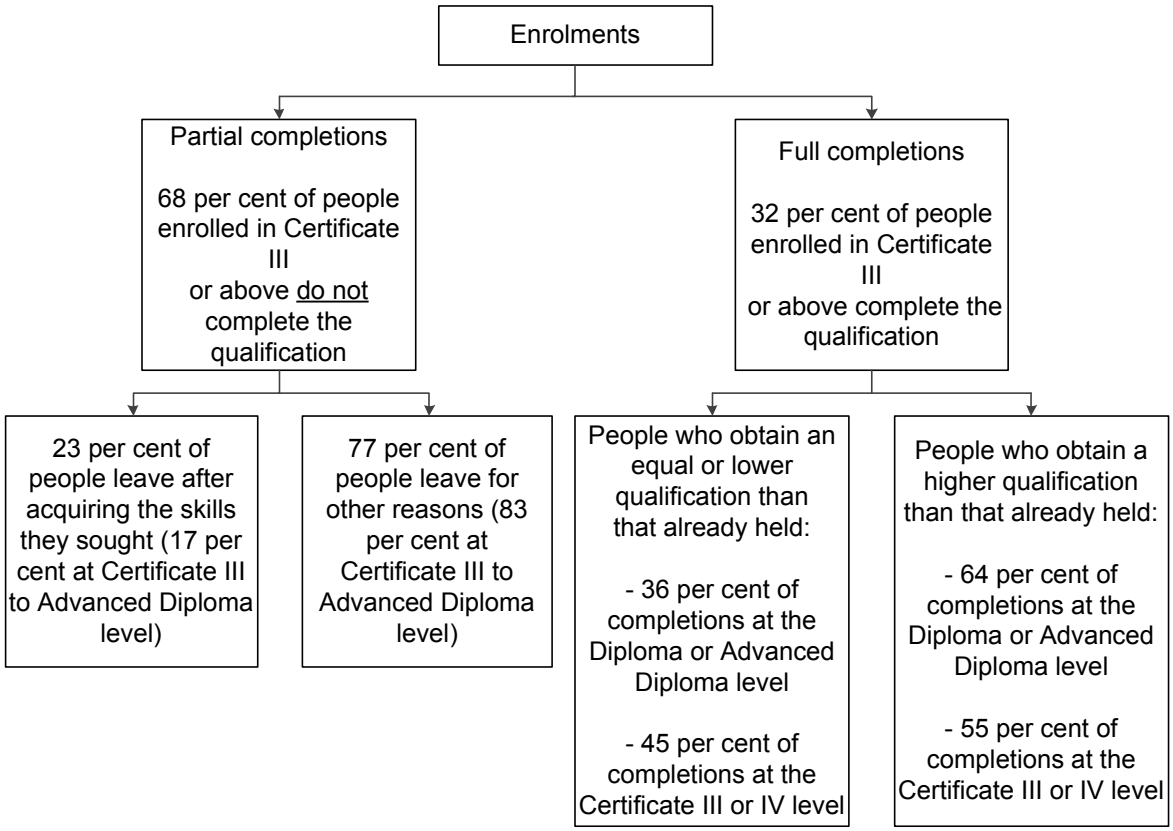
effects of the NPAPPP as *realised*. An additional 129 000 government-funded students per year, on average, are estimated to have studied in the publicly-funded VET sector as a consequence of the NPAPPP (from a base of 701 000 per annum in the pre-reform period — 2005 to 2007).

- Implementation by South Australia of a market-based system. Given the 1 July 2012 scheduled commencement date for this initiative, and steps already undertaken to implement related changes to the South Australian training system, the effects of this reform effort are deemed to be *prospective*. The increase in the number of government-funded VET students attributable to this initiative is estimated to be 22 000 per year, on average (relative to a base case of 95 000 government-funded students aged 15 to 64 in 2009). Effects of increased government-funded training effort in South Australia as part of the NPAPPP are included in the assessment of the national initiative.
- *Potential* reform effects. Given uncertainty about the timing and progress of the reforms, estimates of potential impacts assume the achievement of the COAG targets set out in the original NASWD and recently reiterated by COAG. While COAG has characterised these as aspirational, it has also recommitted to them. This approach is consistent with COAG's terms of reference for this study: that where information about specific reform initiatives is limited, the Commission's reporting would produce broad or 'outer envelope' estimates of the potential benefits and costs of reform.
- *Realised* and *prospective* effects of an expansion in the Australian Government-funded Language, Literacy and Numeracy Program (LLNP) have also been assessed. In relation to *potential*, the Commission has modelled the effects of achieving the National Foundation Skills Strategy for Adults target announced by COAG's Standing Council on Tertiary Education, Skills and Employment in November 2011, that by 2022, two thirds of working age Australians will have literacy and numeracy skills at Level 3 or above.

What VET outcomes are in scope?

People enrolling in a course can follow a number of outcome paths: the completion of a qualification at a higher level than they currently have; a new qualification at the same or lower level than what they currently have (what the Commission refers to as reskilling), and not completing the course. The prevalence of these three types of outcomes from the VET sector is summarised in figure 1.

Figure 1 **Prevalence of full and partial completions and reskilling**



The first COAG target, to halve the proportion of Australians without qualifications at Certificate III level or above by 2020 is used as a progress measure in the 2009 NASWD (p. 6) and as a performance indicator in the 2012 NASWD (section 20). As a result, the Commission has focused on the impacts of qualification attainment at Certificate III and above. In addition, it has considered qualifications at a level higher than that already obtained,[1] but clearly, there can be gains when people acquire competencies and skill sets, even if they do not obtain a qualification (a partial completion). Similarly, there can be gains from acquiring a new qualification at the same level or below (reskilling).

The Commission has used scenarios to illustrate the possible effects of partial completions and reskilling. Given the paucity of data relating to these training outcomes, the quality of these estimates is lower than for full completions at a level

[1] The Victorian and South Australian reforms include some form of this feature. In addition there are data limitations for estimating the effects of other outcomes. Employment and wage premium estimates are typically derived only with reference to the highest qualification that an individual has gained. Few studies have estimated premiums for partial qualification completion, or qualification attainment at or below the highest level already achieved. Further research in this area would strengthen the analysis of the potential benefits of such outcomes.

higher than already held. That said, reasonable assumptions based on available data were made to produce orders of magnitude of the possible effects of these training outcomes on the variables of interest.

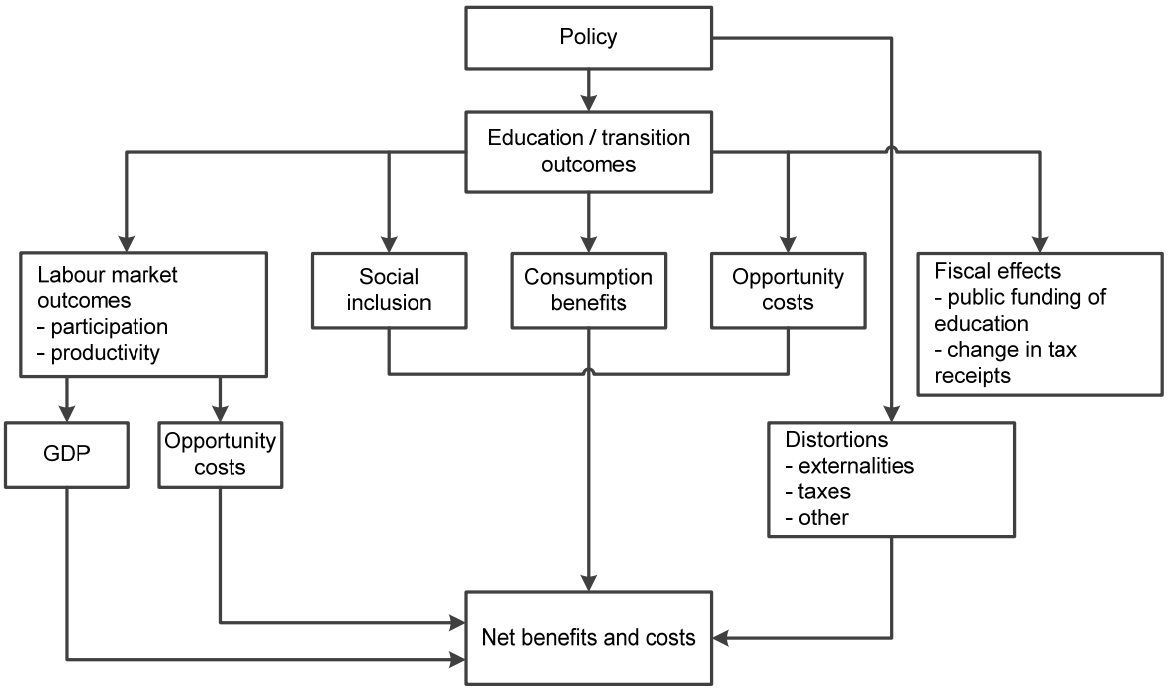
Brief conceptual framework

The conceptual framework is detailed in chapter 2. The VET policies that are being implemented as part of the COAG reform agenda lead to changes in engagement in education and training (figure 2). Consequent changes in VET and transitions outcomes influence labour market activity, including workforce participation and productivity, and social inclusion. These effects of policy change are sources of benefits, since they tend to increase people's wellbeing. An increase in employment or productivity increases incomes and material wellbeing, while people generally benefit from participating in their communities.

Education and training also lead to non-pecuniary benefits, for example, job satisfaction, and opportunity costs to students. The latter include the value of earnings and leisure foregone while spending time studying.

Public funding of education and training has implications for government budgets, while changes in workforce participation and productivity also impact on government tax receipts and transfer payments. Fiscal effects of this type sit outside the benefit–cost framework because they are transfers that do not result in any aggregate benefits or any resource costs, aside from any costs associated with the tax/transfer system itself. If someone pays an additional $100 in tax, that person has $100 less and the government (or, perhaps more correctly, the beneficiaries of government spending), has an additional $100. There is a positive fiscal effect from the government's perspective, but not from a benefit–cost perspective — the cost to the taxpayer is equal to the benefit to the beneficiaries of government spending.

Figure 2 **Conceptual framework for the Commission's quantitative analysis of VET reforms**



Some intuition

In choosing between education options, individuals compare the benefits and costs of each option, choosing the option which yields the highest net benefit. For an individual who elects to complete a Certificate III/IV, the net benefit of that option exceeds the net benefits of all other options. By funding part of the qualification, the government influences the private cost of education and thereby choices. The initial funding of the qualification and any taxes collected on the additional income that results from a higher qualification affect government net expenditure.

For an individual who pursues a Certificate III/IV, the private cost is composed of $1 758 in fees and $15 660 in foregone earnings (estimated as $18/hour, the wage imputed to a young person with a Year 11 qualification). Ignoring the effect of ability on wages, the estimated benefit is an increase in the hourly wage from $21/hour (the wage imputed to a person aged 25 and over with a Year 11 qualification) to $25.47. This translates to an (undiscounted) increase in lifetime earnings of $324 632 ($140 664 discounted (6 per cent, real)). or about $7 700 per year, over 42 years.

The government's contribution is about $5,333 and the (undiscounted) change in net government taxation revenue is about $123 000 over 42 years ($53 452, discounted (6 per cent, real)).

Assessment of reform impacts

Increases in employment and productivity are important because of their potential to raise GDP per capita and yield net social benefits. Given that the policy focus on employment and productivity reflects their contribution to these broader economic indicators, the Commission has adopted the Treasury's 3Ps framework in this study. This framework decomposes GDP per capita into contributions labelled population, participation and productivity. In this framework, the concept of participation reflects employment among people aged 15 to 64, not the definition typically used in labour market statistics. The concept of an employment rate is, therefore, used in this analysis in place of participation.

Productivity is measured in terms of GDP per hour worked. Changes in this measure as a result of a policy initiative therefore reflect contributions from people already in employment, and from those who gain work. The contribution to the national indicator of labour productivity from up-skilling by people already in employment is unambiguously positive. To the extent that people entering employment are less productive than the average person already in work, such an addition to the workforce can reduce the average productivity index. This is not to say that bringing people into employment who would otherwise not have worked is a bad thing. It is simply a reflection of the limitations of labour productivity as a measure of the benefits of a policy initiative. For this reason, the Commission uses the concepts of GDP (a measure of economic activity) and net social benefit (a measure of community welfare) as indicators of the impacts of the COAG reform agenda.

In each assessment, the Commission has estimated the effects of the initiatives modelled over and above what might otherwise have eventuated — the baseline. This baseline includes what could be expected to occur given the VET policy settings in existence before the original NASWD and what is known about changes in other parts of the education system. Individual initiatives of the States and Territories outside the COAG process are not captured by the COAG estimates, but are captured implicitly in the baseline (see chapter 1). The baseline also includes an 'autonomous' increase in qualifications in the population, as older generations with lower qualification achievements retire and younger cohorts with higher rates of qualification achievement join the workforce. It also accounts for the effects of migration.

Estimated impacts of qualifications higher than already held

The low completion rates mentioned above are reflected in the estimated effects of the realised and prospective reforms on student and qualifications numbers relative to the baseline (table 1).

Table 1 **Summary of qualification attainments at higher level than already held**

	Vic realised	*Vic prospective*	*SA*	*NPAPPP*
Student/places	170 900[a]	153 900[a]	60 000[b]	387 000[a]
Estimated qualifications				
Total				
Dip. / Ad. Dip.	3 665	12 313	2 366	21 637
Certs III / IV	21 403	33 488	9 013	95 313

[a] Students. [b] Places.

Source: Appendix C.

Table 2 shows the estimated impact of each of the reforms. Importantly the reforms already realised, and in prospect contribute to the total estimated gains from the reforms. The column marked 'potential estimates' shows what has to be achieved in addition to those gains identified as realised and prospective for COAG to meet its 2020 target. The last column shows the gain from achieving the COAG target of halving the proportion of Australians aged 20 to 64 without qualifications at Certificate III level or above between 2009 and 2020.

The 2020 targets for qualification attainment in the working-age population are ambitious. The estimated potential gains that would result from achieving those targets are relatively large, reflecting both the substantial increase in places and completions required and, relative to the other VET scenarios modelled, the longer timeframe over which training effort is higher.

Table 2 **Overview of results, 'higher qualification' scenarios**

		Victorian realised	*Victorian prospective*	*SA prospective*	*NPAPPP realised*	*Potential*	**Total gain from achieving 2020 target**
Increased highest qualification[a]							
Cert. III to Ad. Dip.	no.	25 000	46 000	11 000	117 000	1 091 000	**1 290 000**
Employment and productivity							
Change in employ.[b]	%	0.02	0.03	0.01	0.11	0.88	**1.04**
Change in productivity[c]	%	0.01	0.02	0.00	0.04	0.29	**0.35**
GDP	%	0.03	0.04	0.01	0.20	1.67	**1.95**
Private and net social benefit[d]							
Payments to labour	$m	2 063	3 481	999	9 536	92 020	**108 099**
Net social benefit	$m	1 113	1 830	504	5 039	48 809	**57 295**

[a] Estimates rounded to the nearest thousand. [b] Change in employment relative to the baseline expressed as a percentage of the Australian working-age population. [c] Change in productivity of the Australian workforce, relative to the baseline. [d] Present value of changes over the graduates' working lives.

Source: Productivity Commission estimates.

Relative to the baseline (in which 32.5 per cent of the population aged 20 to 64 do not have at least a Certificate III qualification in 2020), the increases in the profile of qualification attainment associated with attainment of the COAG VET targets by 2020 are projected to raise:

- the number of completions by about 1.29 million over the period 2010 to 2020
- employment by 1.04 per cent by 2020
- labour productivity by 0.35 per cent
- GDP by 1.95 per cent.

These results (table 2) are substantially revised from those provided in the Discussion Draft, reflecting higher completion rates for South Australia and NPAPPP, correction of a number of errors, the application of a smaller discount for ability bias, and the discounting of future benefits (at 6 per cent, real). The Commission's revised analysis in these respects benefited from feedback received on the Discussion Draft, including at a modelling workshop.

The longer term impacts of achieving the 2020 targets over the working life of the persons achieving the higher level qualifications serve to increase labour income by more than $108 billion in 2012 dollars, over the period 2010 (when the first graduates are assumed to enter the workforce) to 2062 (when the last 2020 graduates are assumed to retire, assuming a 42 year working life for young learners).

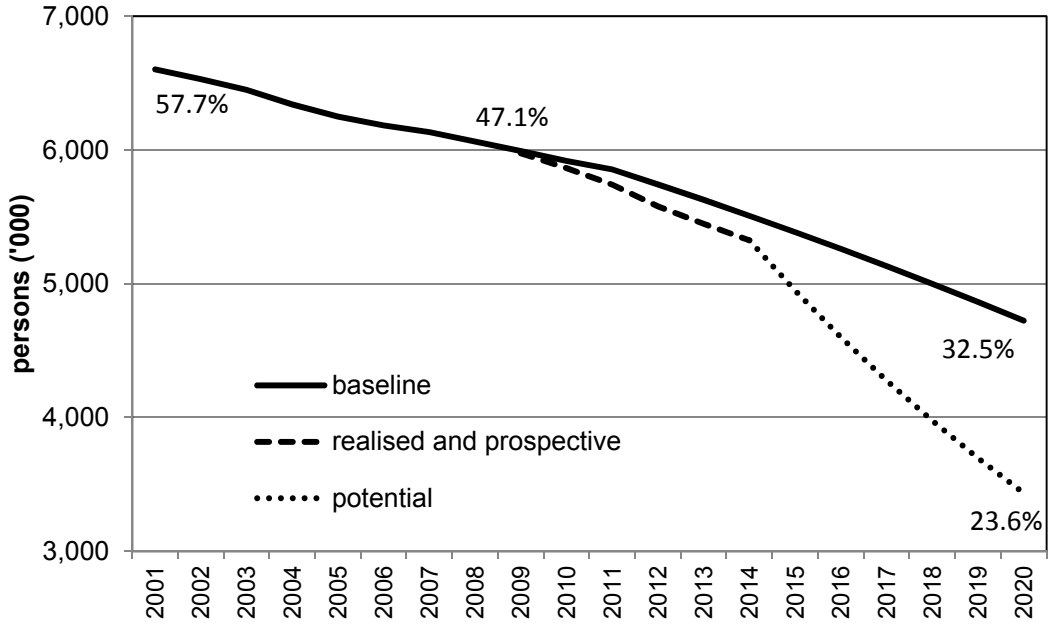
The initiatives are projected to produce discounted net social benefits of $57 billion over the period 2010 to 2062. These benefits are likely to be understated, given that they do not account for externalities and other potential gains (see below).

The potential scenario, which is defined as the effort to be made beyond the life of the policy statements that are accounted for in the realised and prospective scenarios contributes more than 80 per cent of the projected results.

Figure 3 illustrates the relationship between the baseline numbers and proportions of 20–64 year-olds without at least a Certificate III.

- With a continuation of pre-reform policy settings, the COAG Reform Council projected the proportion of 20 to 64 year olds without a Certificate III or higher qualification to fall to 32.5 per cent in 2020 (equivalent to 9.8 million *with* a Certificate III or above, assuming 14.4 million 20–64 year olds in 2020). This is the baseline against which the effects of attaining the targets is measured.
- Realised and prospective increases in training activity to date are estimated to have produced almost 200 000 higher level completions.
- The COAG target of only 23.6 per cent of 20 to 64 year olds without at least a Certificate III level qualification is equivalent to 11.1 million *with* a Certificate III or above by 2020.

Figure 3 **Proportion and numbers of 20–64 year olds without a Certificate III or above, 2001–2020, baseline and estimates[a,b]**



a The baseline is based on an extrapolation of the trend in the reduction of the proportion from 2001 to 2009, as in CRC (2011) and on ABS Series B population projections. **b** The percentages represent the proportion of 20–64 year olds in the population without a Certificate III or above.

Sources: Productivity Commission estimates based on CRC (2011) and ABS (2011), Series B.

These results are comparable with those of other recent studies of VET reforms (see appendix A).

Other gains

The initiatives considered in this report can be expected to also increase the numbers of partial completions and of completions at or below the level of qualification already held. A more effective VET sector will also benefit the economy and in turn improve the functioning of the labour market with a better and faster matching of skills to vacancies.

Partial completions

The latest survey indicates that 23 per cent of students who finish without completing their qualification of enrolment nominate having acquired the skills needed for their work, or attainment of their training goals, as their main reason for leaving early.

Qualification at or below current level

With the exception of the language, literacy and numeracy (LLN) analysis, the focus of the reform agenda is on Certificate III to Advanced Diploma attainment. In Victoria in 2010, for example, 36 per cent of government-funded enrolments were at a level lower than Certificate III.

The 'higher qualification' scenario only assesses the economic impacts of qualifications that increase an individual's level of attainment. This is consistent with the Victorian entitlement, where access to a government-funded place at Certificate III level and above is constrained (with limited exceptions) to a higher qualification than the one a person currently holds. The South Australian Government has adopted a more flexible approach, allowing a person with a qualification equal to their current course to be eligible for a government-funded place.

Of course, completing a lower qualification might maintain or improve a graduate's productivity and employment prospects. As the South Australian Government has noted, career changers may need to start at a lower qualification than that already held. Even when people are not changing career, they may need refresher or extra courses because of regulatory requirements.

Nationally, over one-third of Diploma and Advanced Diploma graduates in 2009 had previously completed a qualification at or above that level. The corresponding figure for Certificate III and IV students was 45 per cent.

While evidence on the relationship between up-skilling and labour market outcomes is not conclusive, presumably individuals perceive a benefit in this form of VET activity, or they would not be prompted to invest time, money and effort in it. Intuitively, reskilling could be expected to assist individuals in retaining employment or enhance their employment prospects. This hypothesis is borne out in data collected on training motivations by the National Centre for Vocational Education Research (NCVER 2010, 2011c). The most frequently nominated motivations for reskilling by mature learners are that 'It was a requirement of my job' and 'I wanted extra skills for my job'.

Scenarios for partial completions and reskilling

This analysis is limited to mature learners, who constitute the majority of the VET students in these categories.

Partial completions represent about 32 per cent of completions at a level higher than already held. The Commission assumed in this scenario that part completers benefit from 50 per cent of the gains that are available to completers; the benefits therefore add up to about 15 per cent of those obtained from the 'higher qualification' scenario (table 3).

Those completing a qualification at the same or lower level as the one previously held represent more than three quarters of completions at a level higher than the one already held. These graduates are assumed to benefit from a 6 per cent addition to the wage premium attached to their original qualification and 75 per cent of the employment premium (in recognition of the potentially large employment effect that reskilling can have). There is therefore a strong employment effect, and economic benefits are estimated to be in the order of 50 per cent of the benefits from the potential 'higher completion' scenario for mature learners.

Table 3 **Potential effects of qualification completions at higher level than held, partial completions and reskilling scenarios, mature learners, by 2020**
Potential scenario

	Unit	*Higher than held*	*Part completions*[a]	*Same or lower qualification*
Increased completions/partial completions[b]				
Cert. III to Ad. Dip	no.	731 000	237 000	570 000
Employment and productivity				
Change in employment[c]	%	0.69	0.11	0.46
Change in productivity[d]	%	0.27	0.04	0.14
Private and net social benefit[e]				
Payments to labour	$m	67 793	10 499	38 645
Net social benefit	$m	41 655	6 466	20 314

[a] Assuming 50 per cent of the premiums from full completions. [b] Estimates rounded to the nearest thousand. [c] Change in employment relative to the baseline expressed as a percentage of the Australian working-age population. [d] Change in productivity of the Australian workforce, relative to the baseline. [e] Present value of the change for the cohort over their working lives (assumed to be 18 years for mature learners).

Source: Productivity Commission estimates.

Gains from improving literacy and numeracy

Estimated changes in employment and productivity stemming from realised and prospective changes in LLN skills in the working-age population are very small, reflecting the small number of additional places under the policy initiatives modelled. The Australian Government has committed funding for an additional 43 570 places in the Language, Literacy and Numeracy Program over four years from 2010-11. When completions and the effectiveness of the program are taken into account, the

Commission estimates that about 13 700 people aged 25 to 64 achieve a skill improvement sufficiently large to move them up a skill level.

Potential reform impacts could be much larger, but achieving these outcomes would require commensurately larger effort to address LLN skill gaps.

Given the extent of surveyed LLN skill gaps in the population, and the positive productivity gains associated with LLN skill improvements, it would suggest that significant improvements in skills are achievable if sufficient resources are directed to this task.

In terms of potential impacts, the Commission has modelled a 6 percentage point increase in the proportion of people at skill level 3 by 2022. Achievement of this National Foundation Skills Strategy (NFSS) target implies declines in the proportions of people at both levels 1 and 2. Some of those affected by initiatives introduced in response to the target will only progress from level 1 to 2. The Commission's estimates include the effects of this skill acquisition. The New Zealand experience, in achieving a 7 percentage point improvement in adult reading literacy between 1996 and 2006, suggests that an improvement of the magnitude targeted under the NFSS is feasible.

If these improvements were achieved, the Commission estimates a 0.16 per cent increase in employment for men and a 1.03 per cent rise for women could ensue. Average productivity of men could rise by about 0.82 per cent and by 0.91 for women. An increase in GDP of 0.7 per cent is estimated as a consequence of these changes.

Social inclusion also benefits

Adult literacy, and participation in the labour market, are two indicators of social inclusion. Estimated improvements in these measures as a consequence of the COAG VET reform agenda indicate the scope for assessed policy initiatives to improve social inclusion.

But the assumptions matter

While all the reform scenarios modelled are estimated to have positive economic impacts, and to result in net social benefits, the point estimates presented must be interpreted with caution. Sensitivity analysis was conducted by varying a number of key parameters. It shows that small changes in the assumptions can change the results markedly (see appendices D and E).

An improved VET sector and labour market

The Commission anticipates that, over time, there would be a gain in moving from a regulated and supply driven system to a demand driven contestable market, provided quality is maintained. In fact, with improved information to prospective students and employers, and stronger auditing and validation of course outcomes, improved quality should result over time. And there could be cost savings at constant quality. For illustrative purposes, assuming a 2 per cent improvement in the efficiency of delivering services in the publicly-funded VET sector (estimated to be about $7.5 billion in size), this would be equivalent to about $150 million in 2010 dollars.

A more efficient and flexible VET sector would be expected to also improve the functioning of the labour market (through faster retraining and better matching of people to vacancies).

The Commission's analysis of youth transitions

In this study, the notion of a successful transition is considered from the perspective of COAG's goals for the reform agenda: increases in workforce participation, productivity and social inclusion. A successful transition, therefore, is deemed to occur when a young person reaches an 'end point' consistent with a high probability of employment and social inclusion later in life. The Commission has assumed that a person's employment status in the period before he or she turns 25 is a reasonable predictor of his or her future outcomes. Successful transitions, therefore, are defined with reference to a person's employment status in the period before they turn 25. Some people who are not employed at this point in their lives are either studying or engaged in child rearing. Their transition outcome is unclear, and they are not included in the Commission's assessments of the prevalence and characteristics of successful transitions.

COAG initiatives that aim to improve transitions tend to focus on people in the early stages of the transition process. It will be some years before the impacts of this effort are visible in measures of successful transitions. The Commission has, therefore, focused on identifying the incidence of, and characteristics associated with, successful transitions.

When employment, of any type, in four of the preceding seven months before someone turns 25 is used as the identifying criterion, 7 per cent of the cohort that turned 25 in 2008 is deemed not to have made a successful transition. Under the more restrictive criterion of any employment in all seven months, 13 per cent of the

cohort is found not to have made a successful transition. Characteristics like higher measured ability and educational attainment are associated with successful transition.

Young people classified as having made a successful transition under this definition differed significantly from their peers who had not, in a number of ways. They are less likely to have no post-school qualification, slightly more likely to have a university educated mother and much less likely to have a disability (table 4).

Table 4 **Selected characteristics of young people who do, and do not, make a successful transition, per cent of cohort[a]**

	Success	*Failure*
No post-school qualification	30.8	41.7
Bachelor degree or higher qualification	32.9	24.9
High measured ability at age 15	25.5	17.5
Mother's education — University	22.1	16.3
Disability	1.6	8.8

a All differences between success and failure are significant at the 95 per cent level, except for mother's education for which the difference is significant at the 90 per cent level.

Source: Productivity Commission estimates.

The incidence of unsuccessful transitions underscores the importance of policy activity in this area. Using either identifying criterion, a significant proportion of young people reach the age of 25 with relatively poor prospects for economic and social engagement.

Achieving effective VET reform

There are several areas with potential to improve VET reform efforts.

The information available to prospective students could be improved. Although many websites provide information about course content, data on post-completion employment rates by course and provider are not available. It is also difficult to compare the prices of courses on offer from different providers. The *MySkills* website, to be fully operational in 2015-16, has the potential to improve information availability. However, valid and reliable data on employment outcomes at a provider and course level are not currently collected, and it is unclear if these will be included in the labour market information available on *MySkills.*

Concerns about the quality of VET delivery have emerged in recent Commission reports on aged care, early childhood development, and the VET workforce (box 3). The Victorian Essential Services Commission also raised concerns in a report

published in September 2011. While the national VET regulator arrangements will address a number of points of weakness, independent auditing and validation could substantially strengthen quality controls and public assurance in the VET system. In that regard the Commission notes the NPASR commitment to developing and piloting independent validation represents a first step down this important path. Cost effective independent auditing and validation would represent a substantial reform.

Box 3 Recent Productivity Commission conclusions on the quality of delivery in the VET sector

In a study of the VET workforce, the Commission reported that:

> … concerns about the quality of delivery by some providers [of the Certificate IV in Training and Assessment] were well founded … (VETAB 2008, cited in PC 2011a, p. 259)

The study into the provision of aged care services concluded that:

> While the delivery of many training courses is of high quality, there are some registered training organisations that are not delivering accredited courses to the standard required … (PC 2011b, p. 347)

Most recently, the study on the early childhood development workforce found that:

> Study participants report that the quality of ECEC [early childhood education and care] training … is highly variable. While there are examples of excellence, concerns about poor quality training from [registered training organisations] are widespread. (PC 2011c, p. 203)

As discussed above, completion rates in VET are currently low. The greater availability of income-contingent loans and payments to providers on completions (with quality checks) would be expected to increase completions. Some level of non-completion is consistent with optimal training decisions by individuals. For example, if a highly skilled worker only needs a unit or two of training, it could be wasteful of his or her time and resources, and public funds, for them to complete a full qualification. However, a significant proportion of those who do not complete (about 60 per cent) report that they leave because of a change in their circumstances; for example, job loss or change, ill health, a change in plans or time pressures. Given the positive association between qualification attainment and labour market outcomes, initiatives to support learners at risk of non-completion would enhance the effectiveness of VET reforms. The South Australian Government has a number of initiatives including a pilot program, Learner Support Services, to improve completion rates. The NASWD commits COAG to 'strengthening the capacity of public and private providers [...] to support people in training'. This is supported in the NPASR.

Once an individual has a higher–level qualification, further skills might efficiently be gained by undertaking specific modules only. The design and analysis of VET reform effort would be assisted by the collection and analysis of data on completions of skill sets. As some types of partial qualification completion are likely to deliver positive outcomes to students, future reform efforts could include progress measures relating to this VET activity.

Finally, a successful move to a more competitive system requires a number of 'building blocks', including:

- regulatory systems that can identify and respond to poor performance
- mechanisms for timely information collection and data analysis
- provision of adequate information about employment outcomes to potential VET clients
- governance arrangements that allow public providers greater autonomy and capacity to compete with other providers

Systems to pay providers on outcomes achieved, including progressive payments (for example, on module completions) rather than input measures, might also need to be developed.

1 Introduction

For over two decades to the mid-2000s, Australian governments pursued wide-ranging reforms that contributed to the productivity, competitiveness and flexibility of our economy.

National Competition Policy (NCP), agreed to by the Council of Australian Governments (COAG) in April 1995, was a key element of that reform program, and delivered substantial benefits to the Australian community (PC 2005).

In 2005, COAG concluded that:

> While the benefits of NCP reforms are significant, gains from a broader economic reform agenda have the capacity to deliver much more to the community. (COAG 2005, p. 4)

At that time, the challenges of demographic change and intensifying global competition were of particular concern. Responding to those challenges, COAG agreed in February 2006 to pursue a new reform agenda encompassing three streams — human capital, competition and regulatory reform. In a study of the potential benefits of this agenda, the Commission concluded that the proposed reform directions for infrastructure and regulatory burdens could increase gross domestic product (GDP) by nearly 2 per cent (PC 2006). Human capital reforms, through improvements in workforce participation and productivity, were projected to deliver even larger gains, albeit over a longer time horizon.

COAG agreed to the details of the new reform agenda in March 2008. Higher workforce participation, productivity and mobility, and improvements in the quality of public services are key objectives. The agenda also seeks to contribute to the broader goals of improving social inclusion, closing the gap on Indigenous disadvantage and environmental sustainability.

With details about individual reforms, their costs and implementation plans now becoming available, assessments can be made of actual reforms and the extent to which Australia is reaching its reform potential.

1.1 Request to the Commission

The Australian Government — following a request from COAG — has asked the Commission to report every two to three years on the economic impacts and benefits of COAG's reform agenda. This work is to provide governments with up-to-date information about what has been achieved, and an assessment of potential future gains. Terms of reference are provided in the preliminary section of this report. In preparation for its inaugural report, the Commission was asked to provide a broad 'framework' report to COAG, outlining its proposed approach. This was published in December 2010 (PC 2010).

The Commission's analysis complements the work of the COAG Reform Council. While the COAG Reform Council measures progress against the reform agenda, the Commission's role is to assess the impacts of that progress — and potential future reforms — on the Australian community.

For its first full report, the Australian Government directed the Commission to focus on the impacts of two reform areas:

- the 'seamless national economy' deregulation priorities
- vocational education and training (VET) reforms and initiatives that support successful transitions from school.

The letter of direction for this work is provided in the preliminary section of this report. More information about the study is available from the Commission's website.[1]

This report presents the Commission's analysis of the impacts of VET reforms and youth transitions initiatives. Analysis of the seamless national economy deregulation priorities has been published in a companion volume to this report, and an overview of the two pieces of work is also available.

1.2 What the Commission was asked to do

In undertaking its assessment of the impacts of COAG reforms, the Commission was asked to:

- report on the economy-wide, regional and distributional effects of reforms (box 1.1)
- take into account the costs incurred by governments in implementing the reforms

1 www.pc.gov.au/projects/study/coag-reporting

- comment on the time paths over which the effects of reforms are likely to accrue
- provide guidance on the sensitivity of estimated results to the assumptions used
- draw attention to information gaps that limit approaches to reform evaluation
- assess, where practicable, whether Australia's reform potential is being achieved and the opportunities for improvement.

Box 1.1 **Definitions of key concepts**

Estimates of changes in national economic activity, employment and income capture the **economy-wide effects** of reforms. **Regional effects** are captured in State and Territory level estimates of these indicators. The **distributional effects** of reforms are estimated, where appropriate, through impacts on different population subgroups and occupations.

Reform impacts are classified into three broad groups:

- *realised* — where reforms have been implemented and impacts are accruing
- *prospective* — where reforms have been implemented, but impacts are yet to accrue
- *potential* — where reforms have yet to be implemented, or where there is scope for further reform to deliver additional benefits.

Conduct of the study

In keeping with the *Productivity Commission Act 1998* (Cwlth), the Commission conducted this study using open, transparent and public processes, and with an overarching concern for the wellbeing of the Australian community as a whole.

Members of the study team met with a range of individuals and organisations with an interest in matters contained in the terms of reference and letter of direction, including industry bodies, unions, researchers and Australian, State and Territory government officials. Roundtable discussions and modelling workshops were held with invited stakeholders in Melbourne and Canberra to further inform the analysis. A background paper setting out the Commission's task and key information needs relating to VET reforms and youth transitions initiatives was published on the Commission's website, and in December 2011, a discussion draft presenting preliminary research results was released.

Written submissions with content relating to VET were used in the analysis.

1.3 The Commission's approach to youth transitions

The letter of direction refers to 'successful transitions', but does not define the concept. Nor is there a universally accepted definition in the extensive literature on youth transitions. Most studies examine transitions from education (of all levels) to work, and tend to adopt a very broad definition of success — regular employment within a given period after leaving education.

In this study, 'success' is considered from the perspective of COAG's goals for the reform agenda — increased workforce participation and social inclusion. A successful transition, therefore, occurs when a young person reaches an 'end point' consistent with a high probability of employment and social inclusion later in life. This definition implies that a successful transition might take time and involve a number of different activities. In this study, therefore, it is assumed that the youth transitions window closes when a person turns 25. The majority of young people will have made a successful transition well before that point. But for those who have not, it is assumed that they are much more likely to experience adverse labour market and social outcomes over the rest of their lives.

COAG initiatives that aim to improve transitions tend to focus on people in the early stages of the transition process. For example, the *School, Business and Community Partnerships Program* aims to improve community and business engagement with schools. It will be some years before the impacts of this effort are visible in changes in the proportions of young people who can be deemed at age 25 to have made a successful transition.

Because reform impacts will take so long to emerge, the Commission has focused on identifying the incidence of, and characteristics associated with, successful transitions.

1.4 The COAG reform agenda — VET and transitions

Not all VET policies are in scope

Development of VET policy is the domain of many different agencies. State and Territory government VET agendas are set out in policy statements — for example, the *Tasmanian Skills Strategy 2008–15*. Australian Government VET initiatives take many forms including, for example, the establishment of the National Standards Council. In this study, the Commission has been asked to report on the

impacts of COAG VET reforms. The reform agenda accounts for only a subset of total VET policy activity.

In all of the analysis presented, the Commission's focus is on 'additionality' — what impacts might the reform agenda have had, or could potentially have, over and above what might otherwise have eventuated (the baseline). Any policy that is assumed to occur independently of the reforms under scrutiny is included in the baseline. This includes, for example, any:

- policies that predate the agreements relevant to the study
- policies developed after those agreements, but likely to have been adopted anyway[2]
- policies in other parts of the education system that might impact on the VET reforms under scrutiny (such as policy changes flowing from reforms in higher education).

What is the COAG VET reform agenda?

The guiding framework for the agenda is provided by the *Intergovernmental Agreement on Federal Financial Relations* (IGA) (CRC 2011).

Within the IGA, the main COAG agreement giving effect to VET reforms is the *National Agreement for Skills and Workforce Development* (NASWD). Four national partnership agreements are also particularly relevant:

- *National Partnership Agreement on Productivity Places Program* (NPAPPP)
- *National Partnership Agreement on Pre-Apprenticeship Training* (NPAPAT)
- *National Partnership Agreement on Youth Attainment and Transitions* (NPAYAT)
- *National Partnership Agreement on Training Places for Single and Teenage Parents* (NPATPSTP).

On 13 April 2012, COAG released a revised NASWD[3] which includes a recommitment to the quantitative targets. It also refers to a new *National Partnership Agreement on Skills Reform* (NPASR), which defines 'structural reforms and other actions carried out under this Agreement [that] are directed to achieving the reform

2 South Australia's current policy statement, *Skills for All*, postdates the agreements and includes many initiatives of this type. Examples include investment in VET infrastructure, partnerships with industry and improved information and tools for users of the training system.

3 The original NASWD is dated 2008, was revised in 2009, and once again in April 2012.

directions agreed under the *National Agreement for Skills and Workforce Development* (NASWD)' (p 3).

All these agreements define the scope of the Commission's focus in this study. In addition to these agreements, COAG has agreed to a range of VET-related initiatives since March 2008 including:

- work by the Australian Apprentices Taskforce (established in April 2009)
- the *Compact with Retrenched Workers* (July 2009)
- introduction of a Unique National Student Identifier (December 2009)
- initiatives to strengthen the apprenticeship system (December 2009)
- the *Green Skills Agreement* (December 2009)
- the *National International Student Strategy* (April 2010).

Although these initiatives are VET-related and might have important economic effects, they have been negotiated outside the COAG VET reform agenda, and fall outside the IGA. The Commission has, therefore, excluded them from its analysis.

Two initiatives have been concluded as a consequence of the NASWD:

- establishment of the National VET Regulator (December 2009)
- amendments to the Australian Quality Training Framework (December 2009).

While these do not affect the level of training activity, they potentially impact on the quality of additional effort under the COAG VET reform agenda, and are referenced in the study in that context. In particular, scenarios representing an improvement and a reduction in quality are presented (chapter 3).

Transitions initiatives primarily are given effect through the NEA, and the NPAYAT (box 1.2). The Commission's approach to initiatives supporting successful transitions is described in section 1.3. Progress towards the NEA target relating to Year 12 or equivalent attainment has not been modelled in this study (box 1.2).

In estimating the realised and prospective impacts of the reform agenda, the Commission has focused on publicly announced policy initiatives designed to support progress towards the outcomes and targets set out in the key COAG agreements, and that have been negotiated through COAG prior to April 2012 in the context of the VET reform agenda. Therefore, any budget measures that support that progress, and for which details are publicly available, are within scope.

In particular, in assessing the impacts of potential reforms in the area of language, literacy and numeracy, the Commission has referenced the *National Foundation Skills Strategy for Adults* (NFSS) — development of which was flagged in the 2010-11 Budget. The strategy 'will form the framework for future national foundation skills work in the context of the National Agreement on Skills and Workforce Development' (DEEWR nda, p. 1). As of April 2012, the strategy had not been launched. However, in November 2011, the COAG Standing Council on Tertiary Education, Skills and Employment announced that the strategy included a target that two thirds of working-age Australians will have literacy and numeracy skills at Level 3 or above by 2022. This target has been adopted in estimating the potential effects of language, literacy and numeracy (LLN) skill development.

Box 1.2 COAG initiatives relating to youth

Transitions initiatives

Supporting successful transitions is one element of the NPAYAT. The agreement transferred responsibility for youth, career and transitions programs from the Commonwealth to the States and Territories. Initiatives were streamlined into four elements:

- maximising engagement, attainment and successful transitions — encompassing reforms in the areas of multiple learning pathways, career development and mentoring
- school business community partnership brokers — to improve community and business engagement with schools and registered training organisations
- youth connections — involving the provision of tailored case management and support to help youth at risk reconnect with education and training
- national career development — funding for projects and resources relevant to career development.

Year 12 or equivalent attainment

The NEA includes the target to lift the Year 12 or equivalent attainment rate to 90 per cent by 2020.

Under the NPAYAT, that target was brought forward to 2015. Equivalence was defined as a Year 12 Certificate, an equivalent qualification, such as the Certificate of General Education for Adults (Certificate II level or above) or an Australian Qualifications Framework (AQF) Certificate II or higher qualification.

As this target was established within the NEA, and relates to Year 12 or equivalent attainment, it is best considered as part of an analysis of schools reforms. It has not been included within the scope of this study.

Source: COAG (2008d, 2009).

Budget measures that have not been negotiated through COAG, including the National Workforce Development Fund (NWDF), and apprenticeship and traineeship initiatives are not part of the scope of this study. One exception to this definition of scope is made. Realised and prospective effects of a budgeted expansion in the Language, Literacy and Numeracy Program (LLNP), and the Workplace English Language and Literacy (WELL) program are assessed in conjunction with increases in Victorian and South Australian LLN activity.[4] It is noted that the Australian Government has flagged a possible expansion of the NWDF if agreement to the skills reform proposals within the new national VET partnership is not reached at COAG (PM&C 2012). To the extent that this occurs, the NWDF might form part of the scope of future analysis of the impacts of the COAG VET reform agenda.

Emerging reform directions associated with the negotiation of the revised NASWD and the *National Partnership on Vocational Education and Training*, have not been considered in the context of realised and prospective reform impacts, but are relevant in the context of the Commission's analysis of potential reform impacts based on the 2020 targets.

Effects of the COAG agreements on the study's scope

Outcomes and targets set out in the COAG agreements particularly relevant to VET have further refined the scope of the Commission's analysis.

The NASWD sets out four outcomes:

- Gaps in the foundation skills of the working-age population are reduced to enable effective educational, labour market and social participation.
- The working-age population has the depth and breadth of skills and capabilities required for the 21st century labour market.
- The supply of skills provided by the national training system responds to changing labour market demand.
- Skills are used effectively to increase labour market efficiency, productivity and innovation, and ensure increased utilisation of human capital (COAG 2008b).

Two broad targets for the VET reform agenda contained in the NASWD are:

4 The Commission did not have data on additional LLN effort in Victoria and South Australia when much of the initial modelling for this project was undertaken. Expansions in the LLNP and WELL program were modelled as an illustration of the effects of extra effort in this area. That analysis has been retained.

- to halve the proportion of Australians without qualifications at Certificate III level or above by 2020
- to double the number of higher level (Diploma and Advanced Diploma) qualification completions by 2020 (COAG 2008b).

In addition to the focus on higher-level VET in these targets, COAG established the proportion of 20–64 year olds who do not have qualifications at or above a Certificate III as the progress measure for the second NASWD target. The Commission has, therefore, focused primarily on the economic impacts of VET at Certificate III to Advanced Diploma level.

The impacts of attainment of lower-level qualifications are included in the Commission's assessment, to the extent that those qualifications:

- are associated with LLN skill acquisition
- act as a pathway to higher-level qualification completions.

While the targets and progress measures in the NASWD are cast in terms of qualifications and graduates, the agreement is about skills — which can be obtained through completion of only part of a qualification. Furthermore, while the targets suggest a focus on increasing levels of qualification attainment, many people reskill, or gain complementary skills, in the VET sector by studying at a level at or below their previous highest qualification.

There is very little empirical evidence about the effects of this type of activity on labour market outcomes (chapter 2). Much more is known about the outcomes for people who increase their level of qualification attainment. This study has therefore included some scenarios on the effects of reskilling activity. Estimates of the possible effects of partial completions and qualification attainment at or below the level of a person's previous highest qualification are also presented. Given the paucity of data relating to these training outcomes, the quality of these estimates is lower than those for full completions that involve increases in attainment.

1.5 Key policy initiatives assessed

In summary, this study focuses on policy initiatives implemented as a consequence of the COAG VET reform agenda that translate into, and shape the nature of, additional VET activity over the baseline. The following measures are assumed to represent the key policy initiatives attributable to that agenda:

- increased VET activity due to the NPAPPP

- increased activity under the entitlement model with greater contestability adopted in Victoria
- increased places, together with an entitlement model with greater contestability to be introduced in South Australia
- development of the NFSS.

All of these measures have been assessed. Two relatively small partnership agreements have not (box 1.3).

To illustrate the effects of LLN effort, additional places in the LLNP and the WELL program have also been modelled.

Furthermore, the potential effects of future COAG VET reform are assessed through a scenario based on achievement of the COAG targets relating to attainment at or above a Certificate III level and higher level qualification completions.

Box 1.3 COAG VET agreements not assessed in this study

Efforts under the NPAPAT and NPATPSTP are not separately assessed. These are relatively small scale initiatives. The NPAPAT, which ran until 30 June 2011, involved expenditure of $20 million. The NPATPSTP, agreed in early 2012 and with effect from March 2012, involves expenditure of $80 million. It has a narrow focus — places are targeted to single and teenage parents in receipt of Parenting Payment. Places are being made available at a Certificate II to Advanced Diploma level. To the extent that the agreement results in increased attainment, its effects are captured in the assessment of the potential effects of the COAG VET reform agenda.

1.6 Related Commission publications

This report is one of many by the Commission relating to COAG reforms and human capital. In addition to those mentioned above, Commission research has included analysis of: workforce participation (Abhayaratna and Lattimore 2006, Cai 2010, Gilfillan and Andrews 2010, Lattimore 2007); the effects of education on labour force participation (Laplagne, Glover and Shomos 2007); the links between education and health and labour productivity (Forbes, Barker and Turner 2010); and the relationship between literacy and numeracy skills and labour market outcomes (Shomos 2010). In addition, the Commission in 2011 published a study of the VET workforce (PC 2011a).

1.7 Structure of the report

The remainder of this report presents:

- a detailed description of the framework and methodology adopted in assessing the impacts of COAG's VET reforms and youth transitions initiatives (chapter 2) — this framework builds on the one published by the Commission in 2010 (PC 2010)
- a summary of the Commission's estimates of the impacts of COAG VET reforms and the characteristics of successful transitions (chapter 3), based on more detailed analyses presented in supporting appendices
- discussion of whether Australia's reform potential is being met and opportunities for improvement (chapter 4)
- supporting appendices.

2 Assessment framework for the COAG VET reforms

The Australian Government asked the Commission to report on the economic impacts and benefits of the Council of Australian Governments' (COAG) Vocational Education and Training (VET) reform agenda. In particular, the Commission was asked to focus on the impacts on workforce participation and productivity, and to consider initiatives that support young people and disadvantaged groups in making a successful transition from school. Improvements in social inclusion are also an objective of the COAG reform agenda of particular relevance to this study.

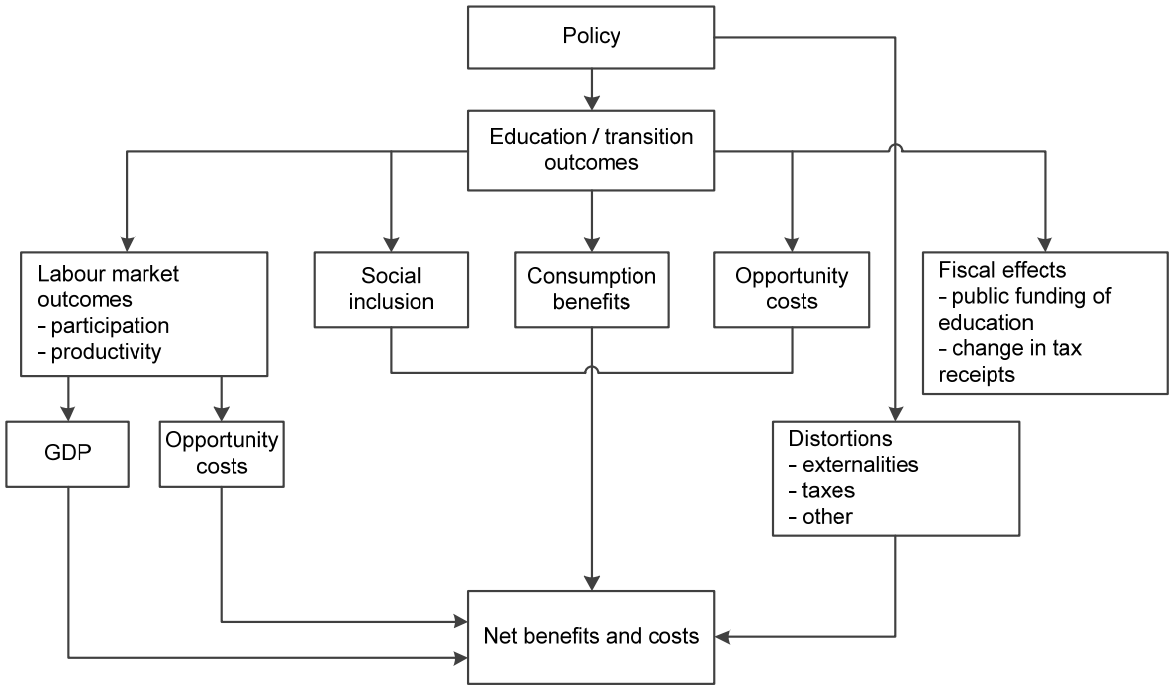
In December 2010, the Commission published a broad analytical framework for evaluating the impacts of the reforms (PC 2010). This chapter builds on that framework, and presents an approach for analysing the impacts of COAG reforms that relate to human capital. Discussion opens with a description of the conceptual framework underlying the analysis (section 2.1). Potential distortions in the VET sector are then described (section 2.2), key concepts are defined (section 2.3) and the modelling approaches are summarised (section 2.4). Explanation of two key features of the Commission's approach concludes the chapter (section 2.5).

2.1 The conceptual framework

The VET policies that are being planned or implemented as part of the COAG reform agenda lead to changes in engagement in education and training (figure 2.1). Consequent changes in VET and transitions outcomes influence labour market activity, including workforce participation and productivity, and social inclusion. These effects of policy change are sources of benefits, since they tend to increase people's wellbeing. An increase in employment or productivity increases incomes and material wellbeing, while people generally benefit from participating in their communities.

Education and training also lead to non-pecuniary benefits (for example, job satisfaction) and opportunity costs to students. The latter include the value of earnings and leisure foregone whilst studying.

Figure 2.1 **Conceptual framework for the Commission's quantitative analysis**



Public funding of education and training has implications for government budgets, while changes in workforce participation and productivity also impact on government tax receipts and transfer payments. Fiscal effects of this type sit outside the benefit–cost framework because they are transfers that do not result in any aggregate benefits or any resource costs, aside from any costs associated with the tax/transfer system itself. If someone pays an additional $100 in tax, that person has $100 less and the government (or, perhaps more correctly, the beneficiaries of government spending), has an additional $100. There is a positive fiscal effect from the government's perspective, but not from a benefit–cost perspective — the cost to the taxpayer is equal to the benefit to the beneficiaries of government spending. This makes the value judgement that an additional dollar to one person should be treated the same as an additional dollar to another. This value judgement is also implicit in the Commission's definition of net social benefit, which similarly abstracts from distributional effects.

The high level of non-completion in the VET sector, discussed in section 2.5, raises the question of how the costs of VET attainment should be measured. Two options, and the approach adopted in this study, are described in box 2.1.

Box 2.1 What is the cost of VET completions?

As discussed further in section 2.5, students enrolling in VET courses can achieve one of three outcomes:

- completion of a qualification
- a partial completion
- leaving the course without completing any modules or units of study.

In 2010, the VET sector — including public and private providers — received funding of over $7.6 billion, including nearly $5.9 billion in government funds and $1.7 billion in fees for services and student fees (NCVER 2011a).

Full completion rates are low (see appendix C) — though there is evidence that they have might have increased (due to a higher completion rate in the *National Partnership Agreement for Productivity Places Program*). That said, partial completions are not wasted. Although some might result from someone abandoning their intended course of study, many also result from the acquisition of a specific skill set (the explicit goal of many mature learners enrolling in VET).

It is difficult to choose what costs to put against the benefits of each type of training activity. One option is to focus on costs per student. Based on ABS data, the Commission has estimated the total cost of a Diploma at $13 152, split almost equally between public and private costs. The private cost of a Certificate III or IV was estimated at $1758, while the public cost is estimated at $5333 — resulting in a total cost of $7091 (appendix C). In the absence of specific information on partial completions, we use two scenarios that assume 25 and 50 per cent of the costs and benefits of a full completion.

An alternative would be to examine the cost per student contact hour of VET delivery. In 2010, government funded VET activity totalled 388.4 million hours, at a cost to government of $14.69 per student contact hour (SCRGSP 2012). The Commission has estimated that students will need to spend 870 hours to complete a Certificate, or 1740 hours to achieve a Diploma. Estimating the cost of a partial completion would require information or assumptions on the private costs of VET and the number of hours spent in acquiring the specific skill set that students were interested in.

Changes in labour market outcomes translate into the economic and social benefits of a policy. Some economic analysis reports changes in gross domestic product (GDP) as an indicator of the benefits of a policy initiative. The Commission's estimation of benefits goes beyond changes in GDP, and attempts to take account of all relevant benefits and costs. That said, data and other limitations mean that not all benefits and costs can be estimated.

Why look beyond GDP? GDP is a measure of economic activity — it does not consider the value of non-market activities, such as leisure and caring for family members. GDP is an incomplete measure of income, and is not a measure of

material wellbeing. To see the implications of excluding non-market activities from benefit calculations, consider the following example. Suppose a policy causes people to move into paid employment where they produce $30 an hour worth of goods and services. Suppose also, that the value of their non-market activities, which must be given up to work, is $20 an hour. In this case, GDP increases by $30 an hour, but the net social benefit is only $10 an hour.

Changes in total earnings (hours worked multiplied by wages) as a result of the labour market impacts of a new policy are used to estimate changes in GDP. The effects of new levels of labour market engagement on people's non-market activities, or the opportunity costs of paid work, also need to enter calculations of net social benefits. These might include, for example, the value of leisure forgone or carer responsibilities transferred to market-based service providers.

Finally, the value of distortions ameliorated or introduced along with the introduction of a policy need to be taken into account. Distortions potentially relevant to the VET sector are discussed in more detail in section 2.2.

The net social benefits of a policy initiative are derived by comparing all of its benefits and costs. Quantifying the possible net social benefits associated with a policy initiative is an important exercise. It is the change in net social benefits that is the most appropriate indicator of the benefits of an initiative.

2.2 Potential distortions in the VET market

As with all markets, the VET sector is affected by distortions that provide a rationale for government intervention, such as the COAG VET reforms. Distortions can arise from market failures, or previous government interventions. They can be caused by factors at work in the market of interest, or distortions in related markets, especially labour and product markets. In the case of VET, distortions in other education markets have the potential to create distortions. There are many possible distortions. Some might exacerbate, and some reverse, the effects of others. Assessing an intervention requires taking into account the combined effects of all distortions.

Distortions to be considered in the VET sector include those that might arise from: externalities; incomplete information; public provision; and taxes and subsidies.

Externalities

The existence of positive externalities, or public benefits, is one of the most commonly cited rationales for government intervention in VET. Potential sources of externalities from education and training are manifold. In its study of the VET workforce (PC 2011a), examples of the public benefits attributed to education identified by the Commission included:

- benefits to third parties stemming from investments in education that accelerate rates of innovation, the development of basic knowledge capabilities and diffusion of new ideas among firms and others. The conditions under which these spillovers occur, and their policy ramifications, are more fully discussed by the Commission in its 2007 report on public support for science and innovation
- community health benefits stemming from increased knowledge of beneficial or harmful activities. For example, benefits that accrue to external parties by learning behaviour that limits the spread of communicable diseases
- benefits relating to social cohesion and unity
- support to the functioning of a democracy and
- lower levels of criminal activity.

The last four categories might be thought of as 'civic' benefits of education and training. These are typically linked to primary and secondary education, rather than participation in VET or higher education. However, to the extent that VET is able to remedy the foundation skill deficits of some learners and/or improve employment outcomes, it might also generate significant benefits of this type.

Empirical evidence on the size of education externalities is mixed. For example, Acemoglu and Angrist (2000) concluded that public benefits (such as enhanced innovation or cooperation) from compulsory schooling were modest. A one year increase in the average level of schooling in a community was associated with increases in average wages of between 1 and 3 per cent for individuals in that community. Private benefits, that is, the increase in wages for an individual who acquired an additional year of schooling, were much higher at 7 per cent.

On the other hand, Davies (2002) concluded that externalities might be as large as private benefits, although, taking into account the large standard errors on the estimates of externalities, he also noted that 'the empirical basis for the belief in large human capital externalities remains relatively weak' (p. 40).

Externalities are likely to exist in the VET market, but it is difficult to draw a conclusion on whether or not they are substantial and might justify government intervention. The Commission's estimates of the net social benefits of the COAG

VET reform agenda do not include a valuation for externalities (section 2.4 describes the factors that are accounted for in the net social benefit calculations included in this report).

Incomplete information

A failure by markets to provide the information that consumers require to make informed decisions is another rationale for government intervention.

As the Commission observed in its study of the VET workforce (PC 2011a), information problems exist in VET as in almost all markets. Students might have less information about the quality of courses than training providers do. VET training might also be an 'experience good' in that the quality can be difficult to establish until after at least enrolment and initial participation in the course (PC 2008).

For many products, poor choice related to incomplete information at first purchase can be rectified by choosing a different product next time. This can impose a future penalty on suppliers who do not conform to expectations (PC 2008). However, in contrast with many other goods and services, the potentially significant time and monetary cost in undertaking VET training can mean that there is significant harm done to the student from a poor choice.

Issues of this type can deter people from undertaking training, or lead to students undertaking courses that they would not take with more information about course quality and job outcomes. The Essential Services Commission (ESC) observed in a review of fees and funding in the Victorian VET sector:

> … a lack of transparency about the nature of the product being purchased (in this case training) hinders the ability of students, employers and government to make optimal decisions about what to buy and how much to pay. (ESC 2011a, p. 17)

Skills Victoria has been monitoring the responsiveness of Victoria's training market following the shift to a demand-driven system in that state. At the middle of 2011, the research concluded that:

> Early indicators show that more training is taking place in areas where skills needs are greatest … There is also evidence of a marked increase in training in a small number of occupations where graduates have previously reported their training had little or no vocational benefit. (Skills Victoria 2011b, pp. 5–6)

In relation to occupations with uncertain employment prospects, rapid growth in enrolments in courses related to fitness instructing was of particular concern. Skills

Victoria questioned whether the growth reflected increased demand for fitness instructors, or private providers' marketing campaigns.

'Myopia' is another information problem in VET, and in education more generally. The perception of students as myopic about future returns often springs from the fact that they must make decisions under considerable uncertainty. The value of education is uncertain since the benefits are long term, whereas the costs are short term and apparent. Uncertainty about the benefits can arise from:

- uncertainty about the length of one's life
- uncertainty about one's ability
- numerous other unforeseeable events, including employment opportunities, over the life cycle of the investment (Becker 1974).

Students might also lack information relating to the labour market, such as expected wages, both upon graduation and over their working life. Brunello, Lucifora and Winter-Ebmer (2004), for example, conclude that European university students' expectations of their wages post-graduation are significantly higher than actual pay-offs to university study.

Given the potential for incomplete information to adversely impact the decisions of prospective VET students, this might be a source of substantial distortion in the Australian VET sector.

Inefficiencies in public provision

The VET sector is characterised by considerable public provision.

Natural monopoly — a situation where production by more than one firm would be inefficient — provides one motivation for public provision.

Concerns that private providers will not take broader public interests into account are another reason for public provision.

Increasingly, however, governments have stepped back from public provision, for example, by privatising government-owned entities or permitting private provision of services. The issues that gave rise to public provision have been addressed through regulation and subsidies. This trend reflects concerns that the provision of services by government-owned entities tends to result in inefficiency.

In the case of VET, 'thin' markets present the potential for natural monopoly (a market failure). A relatively low level of demand may mean that it is not profitable

for a provider to operate in a certain geographic or subject specific area. Public ownership is one option, as is subsidisation of the costs of provision.

In the case of 'thick' markets, public production is arguably not justified. Potential efficiency gains lie in an expansion of competition, provided the quality of outcomes is protected. As competitive and high quality markets emerge over time there will be opportunity to wind back on government ownership of training providers.

Taxes and subsidies

In levying a tax on income earned, governments reduce the returns that individuals can expect to earn from investing in education and training. Therefore, the level of training undertaken is inefficient. The first best solution might be to remove the distortion imposed by income taxes, but taxes are a key mechanism through which governments address equity concerns. Subsidisation of training might be the second best solution to increase engagement in training.

2.3 Key concepts used in the Commission's analysis

With the release of the first intergenerational report in 2002 (Australian Government Treasury 2002), policy makers became particularly concerned about the slowing growth in GDP per capita projected to emerge as a consequence of demographic change. As then Treasury secretary Ken Henry noted in a speech given in May 2002 (Henry 2002):

> Policy responses to a slower rate of GDP growth are likely to focus on the '3Ps': Population, participation and productivity. Each of these provides fertile ground for substantial policy discussion and debate over the next 40 years. (p. 20)

COAG's focus on workforce participation and productivity reflects the contribution that they make to GDP per capita. This contribution is evident in a decomposition of GDP per capita developed by the Treasury — the 3Ps framework. GDP per capita, can be decomposed into three 'Ps' — population, participation and productivity, where:

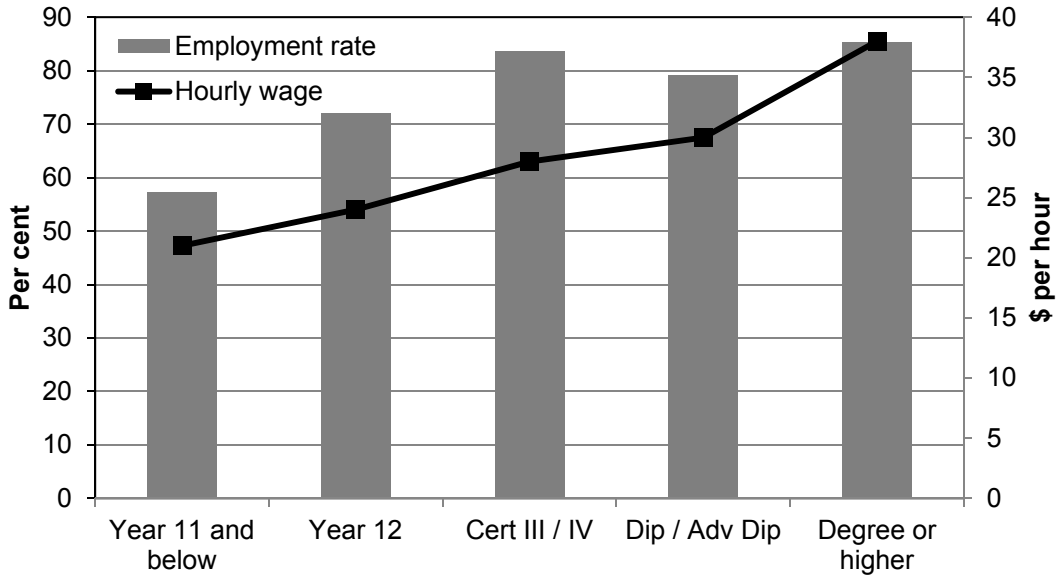
> Population is the proportion of the population that are of working age. Participation is the average number of hours worked by those of working age … [and] labour productivity [is] measured as GDP per hour worked ... (Davis and Rahman 2006, p. 1)

The association between qualification attainment and both participation and productivity (box 2.2) is one motivation for policy interest in education.

Box 2.2 Educational attainment, workforce participation and wages

A positive association between educational attainment and both workforce participation and wages (figure A) explain initiatives that aim to increase the qualifications profile of the working-age population. A similar association is found between language, literacy and numeracy skills (keeping education constant) and labour market outcomes. This relationship is discussed in chapter 3.

Figure A **The association between educational attainment and workforce participation and wages, 2009[a,b]**



a The Treasury concept of participation — average number of hours worked by those of working age — is more accurately represented by the employment rate than the participation rate, because the latter includes people who are unemployed. Productivity is proxied by the average hourly wages of employees. **b** Individuals whose highest level of education is a Certificate I or II are included in the Year 11 and below category.

Source: Productivity Commission estimates based on ABS (2010a).

Participation — really a measure of employment

The measure of participation used in the Australian Government Treasury's decomposition — average hours worked by those of working age — is not the same as that commonly used in labour force statistics (box 2.3). The Commission's measure is consistent with the Treasury's.

To analyse the effect of the COAG reform agenda on participation thus defined, the Commission has estimated the difference in average hours worked by the

working-age population in the baseline and policy scenarios. As the working-age population is the same in each scenario, this estimate reduces to the change in total hours worked. Assuming new entrants to employment work the same average hours as incumbents, the measure is an estimate of the change in employment attributable to the COAG reform agenda.

The Treasury measure is more accurately described as employment. In the remainder of the report, the term employment is used unless the concept being described is the traditional measure of participation.

Box 2.3 **Measures of participation**

The ABS defines the participation rate as:

> For any group, the labour force expressed as a percentage of the civilian population aged 15 years and over in the same group. (ABS 2011b, p. 38)

The labour force is defined to include both the employed and the unemployed — people who have actively looked for work in the preceding four weeks and are available for work, and people who are waiting to commence a job within four weeks.

In contrast, the concept of participation in the three Ps framework:

- excludes the unemployed
- is expressed relative to the working-age population.

In deriving changes in employment, the Commission has used estimates of the probability of employment associated with different qualification and language, literacy and numeracy (LLN) skill levels. The estimated changes in employment, therefore, reflect what might happen to employment levels, not what will. For example, the analysis predicts that a job seeker who achieved a Certificate III as a consequence of the *National Partnership Agreement for Productivity Places Program* will have a higher probability of employment across the remainder of their working life. The analysis does not predict whether or not they will be in employment at any one point in time.

Furthermore, this report abstracts from the demand for labour. In presenting estimates of changes in employment, it is assumed that the labour market absorbs people who enter as a consequence of the reform agenda. This may or may not happen. Estimates of changes in employment could instead be thought of as changes in labour supply.

Productivity — a flawed measure of the impact of a policy?

The nature of the productivity indicator means that the productivity effect attributable to a policy that raises educational attainment might be lower than expected. In the Commission's analysis, average hourly wages are used as a proxy for productivity. While this approach is common in the literature, it is not without weaknesses (box 2.4).

Box 2.4 Considerations in using wages as a proxy for productivity

Economic theory supports the use of wages as an indicator of productivity. Assuming that a firm seeks to maximise profit, it will employ workers up to the point where the cost of one more worker equals the increase in revenue anticipated from their labour. As a worker becomes more productive (produces more output per hour worked), a firm will be willing to pay more to employ them. Productivity and wages are closely linked. Human capital investments that increase a worker's productivity (like VET) are, therefore, likely to be reflected in an increase in his or her wages.

However, many assumptions are required for this theory to hold, including perfect information, mobility of labour, an absence of transaction costs and flexible wages. These will rarely all hold, reducing the strength of the relationship between wages and productivity. In the Australian case, the award system is a particularly important consideration in thinking about this relationship. Assuming that students attracted into VET as a consequence of policy initiatives are less able than those who preceded them (section 2.5), their productivity on graduation could also be assumed to be lower. However, in many sectors (including aged care and child care), VET graduates who enter employment are paid the same award wage, irrespective of their level of productivity. Over time, the lower productivity of some workers might be reflected in smaller over-award payments and bonuses, and slower rates of career progression. Employers might also alter their production technology — for example, by substituting capital for labour, or changing the nature (and pay) of job roles. The capacity for changes of that type, however, will vary markedly across sectors. Over time, a pool of less productive potential workers might contribute to changes in wage structures within awards.

As noted in Forbes, Barker and Turner (2010, p. 4):

> Over longer periods, where markets for goods and services are competitive, changes in wages and differences between the earnings of people with different human capital characteristics are likely to be a reasonable indicator of labour productivity.

In the short-run, it is possible that estimated increases in wages stemming from higher educational attainment, and therefore GDP, overstate the effects on productivity of that attainment. Furthermore, discounting of the effects of education on wages to take into account the diminishing marginal ability of VET graduates might lead to an understatement of the actual changes in GDP.

Empirical studies show that the average hourly wages of individuals who increase their level of qualification attainment are higher. To the extent that those individuals were already in employment, the productivity indicator increases. However, individuals who were unemployed and enter employment as a consequence of their attainment are likely to earn less than the average incumbent, assuming that the unemployed have less ability than those currently employed and that wages rates are flexible. This has the effect of reducing the productivity indicator, even though the individuals are better off. Output has increased, but productivity has declined. In effect, there are diminishing returns to VET training as the ability of each entrant is less than that of the previous entrant.

Furthermore, to the extent that a policy initiative leads to people choosing a lower level qualification than they would otherwise have undertaken, productivity will be lower than it would otherwise have been. For example, larger subsidies for VET Diplomas might induce someone who was planning on completing a Degree to switch to a Diploma. Degree attainment is associated with considerably higher average wages. That increase in productivity is foregone. (Qualification substitution of this type is not included in the Commission's modelling.)

A fall in productivity is only one part of the narrative of the effects of COAG VET reforms. A small productivity number, of itself, is not cause for concern. Estimates of the net social benefit of a policy initiative provide a much better estimate of the net benefit to the community of the reforms.

Summary of reporting measures

Key measures reported on in the assessment are summarised in table 2.1.

2.4 Estimation approaches

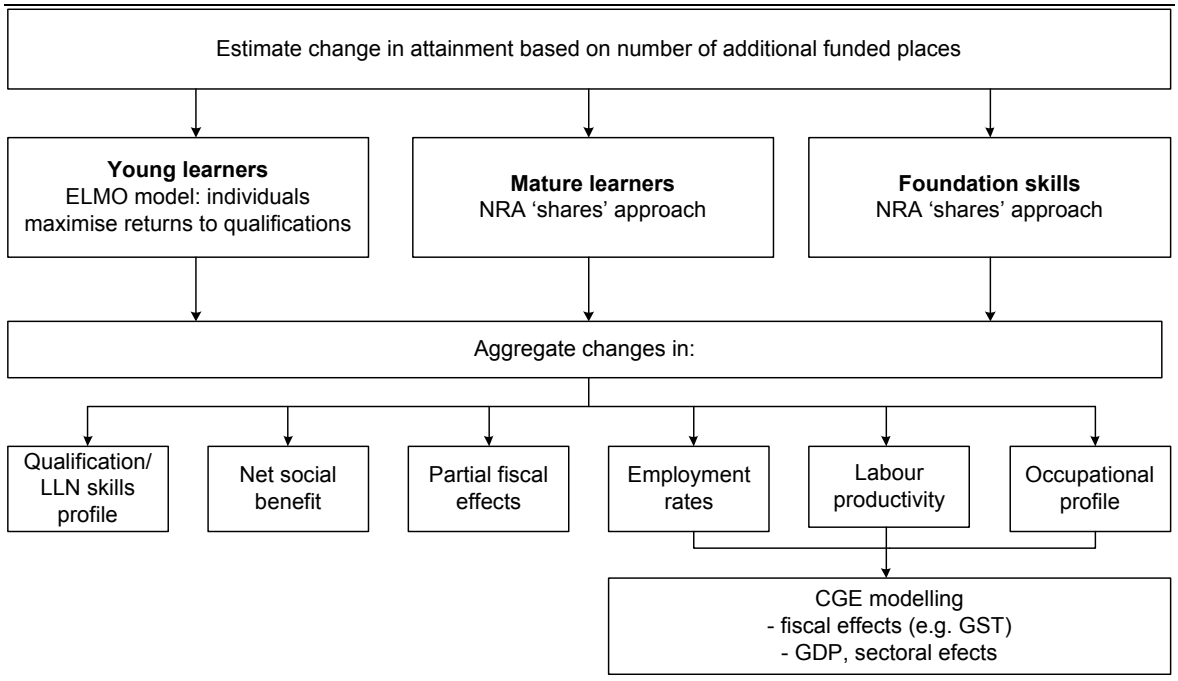
Different approaches have been developed by the Commission to estimate the reporting measures for: young people (15–24 year olds); mature learners (people aged 25–64); adults undertaking only foundation level training; and the analysis of youth transitions. The approaches (excluding transitions) are summarised in figure 2.2, and an overview of each is provided below. More detail is presented in supporting appendices.

Table 2.1 **Reporting measures**

Measure	*Definition*	*Indicator(s)*
Labour productivity	GDP per hour worked	Average hourly wages (assumes that workers are paid the value of their marginal product)
Employment	The number of people aged 15–64 in work	Total hours worked by those aged 15–64
Gross payments to labour	Value of additional labour income net of income foregone during studies	Productivity multiplied by participation multiplied by population as per the 3Ps framework
GDP	Value of economic activity[a]	Economy-wide effects on value of economic activity
Social inclusion	Ability to participate in society	Adult literacy and numeracy; employment
Net social benefit	Benefits of a policy initiative less associated costs	All relevant benefits less relevant costs associated with an initiative
Governments' fiscal positions	Government revenue and expenditure	Revenue and expenditure for the Australian, and State and Territory Governments[b]

[a] Excludes the value of non-market activities, for example, home production. [b] Only income taxes are included in these calculations, hence the indicator captures only partial fiscal effects.

Figure 2.2 **Approaches to estimating the effects of the COAG VET reform agenda**



A partial equilibrium model of education and careers decisions, the education and labour market outcomes (ELMO) model, was developed by the Commission to determine how young people's (15–24 year olds) education and work choices

change in response to new policy initiatives. The model then estimates the effects of changes in VET attainment on employment and productivity through shifts in employment and wages, respectively. The estimated fiscal and social effects of new initiatives, along with changes in GDP and net social benefits, are then derived. A description of the ELMO model is presented in appendix B.

Given data limitations, and potential differences in motivations between young people and older workers using VET services, the ELMO model has not been extended to the case of mature learners (people aged 25–64 years). For this group of learners, likely changes in VET attainment as a consequence of the reform agenda are estimated using information on their engagement in VET before the initiatives were introduced, and assumptions about how that is likely to have changed in the face of new initiatives. Effects on employment and productivity stemming from the assumed changes in the shares of people with different levels of educational attainment in the population aged 25–64 are then estimated. This approach is the same as that adopted by the Commission in its analysis of the potential effects of the national reform agenda (PC 2006) — labelled the NRA 'shares' approach in figure 2.3. Finally, other likely consequences of changes in mature learners' attainment, including GDP, fiscal and social inclusion effects are estimated. Results from this analysis are presented in appendix E.

Characteristics of the ELMO and the NRA shares approaches mean that they are likely to deliver different estimates of the effects of the COAG VET reform agenda (box 2.5).

Box 2.5 The implications of alternative modelling approaches

Because it accounts for the behaviour of agents, a well specified optimisation model (like ELMO), is likely to produce more accurate estimates than a fixed-coefficients framework (like the NRA 'shares' approach). In addition, an optimisation model like ELMO accounts for some of the non-linearities likely to be present in some of the relationships modelled, such as diminishing returns to education as additional students enter the system, or in responses to changes in incentives. In a fixed-coefficient framework, relationships between variables do not change as the levels of those variables change. With fixed coefficients it is assumed that there are constant returns to education as additional students enter the system and thus there will be larger calculated benefits than is the case with an optimisation model.

The preceding two approaches focus on the potential effects of changes in VET attainment measured as qualification completions. Analysis of reforms targeting changes in adults' LLN skills (foundation skills) requires a slightly different approach. First, possible changes in the shares of the population with different

levels of skill as a result of initiatives are estimated. Second, previously published Commission modelling (Shomos 2010) is used in estimating the changes in employment and productivity that might flow from induced shifts in adults' LLN skills. This step adopts the NRA 'shares' approach. Other possible impacts are then estimated. This analysis is discussed in detail in appendix F.

As discussed in chapter 1, the economic benefits of transitions policies are not assessed in this study. Instead, the transitions research identifies:

- the characteristics of those who make successful transitions
- some of the correlates of successful transitions that are likely to be influenced by policy
- transitions policies adopted to date as part of the COAG reform agenda.

Further discussion of this research is presented in appendix G.

Estimates of the direct effects of initiatives (changes in employment and productivity) contribute to calculation of the economy-wide, regional and distributional impacts of COAG's agenda. These calculations are done with a dynamic computable general equilibrium model — the Monash Multi-Regional Forecasting (MMRF) model. The modelled changes in occupational structure translate into changes in economic activity, either at the national (GDP) or state (GSP) level, depending on the initiative analysed. A description of this work is presented in appendix H.

When the costs and benefits that are not captured by GDP or GSP are taken into account, the result is the net social benefit of a policy. In calculating net social benefit, the Commission has taken into account the money cost of education, the value of non-market activity foregone when a person works or studies and the value of government revenue. The ELMO model also factors in a residual term that includes, for example, the non-monetary benefits that an individual might derive from study (appendix B). As noted above, the benefits and costs to the wider community (externalities) are not included in these calculations.

2.5 Two other features of the Commission's analysis

VET outcomes in addition to increased qualification attainments

As noted in chapter 1, the targets and progress measures in the *National Agreement for Skills and Workforce Development* (NASWD) are expressed in terms of

qualifications or graduates — implying a focus on full qualifications. However, the agreement is about skills, which can also be acquired by completing only part of a qualification. Furthermore, the targets imply a focus on increasing the level of qualification attainment in the population, but skills can be gained from VET at or below the level of a person's previous highest qualification. Both partial completions and attainment at or below an individuals' previous highest level are common in the VET sector.

An estimated 32.3 per cent of students who commence a VET qualification at or above a Certificate III level complete (NCVER 2011d). Of the remaining students, 9.4 per cent leave the sector without completing at least one module (pers. comm., NCVER, 20 March 2012).[1] Nearly 60 per cent of commencements, therefore, result in partial completions (figure 2.3).

Reasons given for not continuing training can be classified into two broad groups:

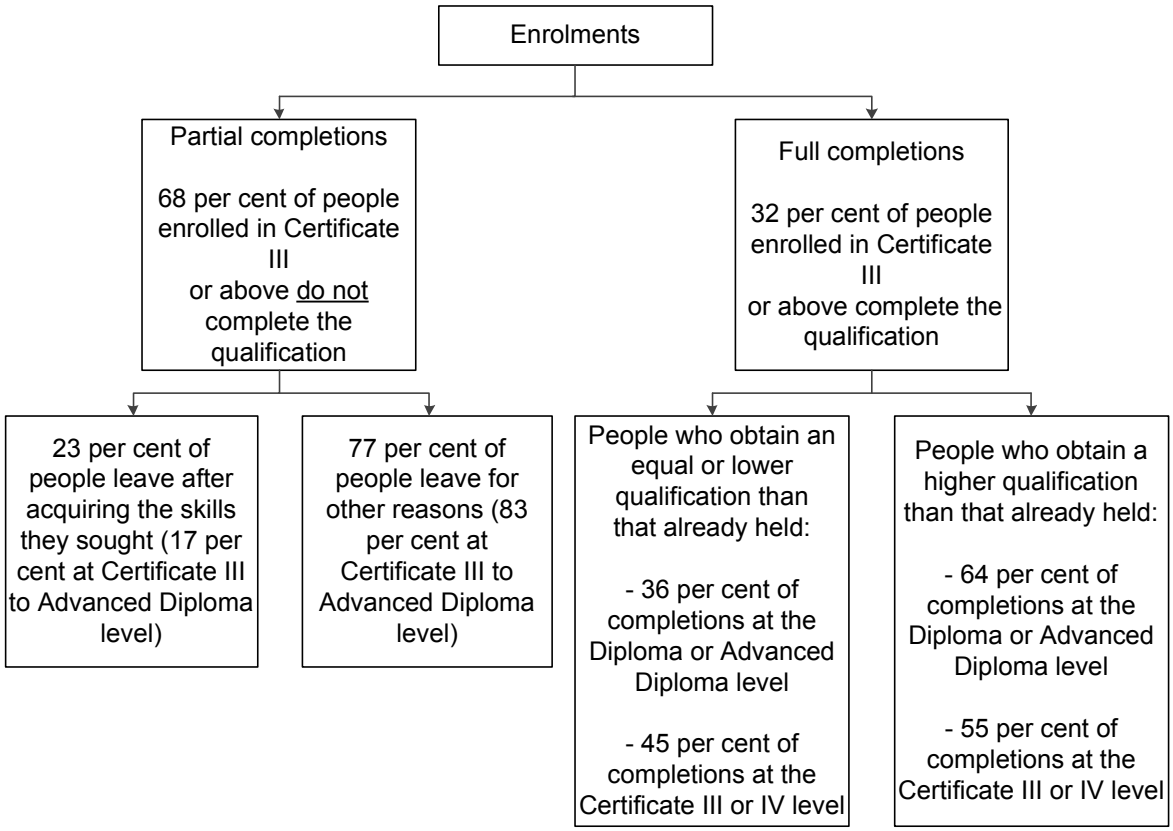
- a change in a student's circumstances (for example, he or she lost or changed their job, became unwell, changed their plans or found the time pressures associated with study to be too great). About 65 per cent of students studying at a Certificate III or above nominated this as their major reason for discontinuing study
- completion of as much training as a student needed to meet his or her goals. About 17 per cent of students who enrolled at a Certificate III or higher level nominated this reason for discontinuing their study (based on unpublished data from NCVER 2010).[2]

Of those who do complete, 36 per cent of Certificate III / IV and 45 per cent of Diploma / Advanced Diploma students do so at or below the level of their previous highest qualification.

1 The base in this calculation excludes those who were still continuing a module (95 000) and those who had engaged only in recognition of prior learning or current competence (40 000). It is assumed that the figure of 9.4 per cent does not vary by the level of qualification of enrolment.

2 Remaining survey respondents reported either that the training was not what they expected (7.5 per cent) or the timetable was not flexible enough (2.7 per cent), or did not provide more detail about their major reason for not completing.

Figure 2.3 **Incidence of full and partial completions and reskilling**



Reasons for undertaking a qualification at or below an individual's highest level of attainment include:

- reskilling, for example, because the skills an individual has previously acquired have become redundant
- career change, for example, a person who wants to move from working in retail to aged care
- acquisition of complementary skills, for example, a nurse who seeks management skills
- regulatory requirements, for example, legislative requirements that all child care workers hold at least a Certificate III in Child Care
- to support further study or personal interest motivations.

The majority of people who undertake VET at or below their highest previous level of attainment report motivations consistent with the first four reasons above.

Empirical evidence on labour market outcomes for people who do not complete at a higher level

Many data sources only report the highest qualification held by an individual, and information on other attainment, including partial completions, is not collected. Researchers have, therefore, tended to focus on the effects of the highest qualifications that individuals hold on labour market outcomes.

There is very little empirical evidence on the labour market effects of partial completions, and the existing research presents inconclusive results. In some cases, participation in VET without completing a qualification is found to have a positive effect on employment and productivity, while other studies find negative or nil effects. One reason for this might be the long list of factors affecting the employment and productivity outcomes for VET students, whether they complete or do not complete their qualification — age, gender, previous qualifications, employment status and prospects, the qualification chosen (level, field and potentially even the individual course provider) all affect outcomes.

Although people who undertake further VET studies or complete only part of a qualification are likely to be motivated by increases in their probability of employment and/or wages — the basis for human capital theory — the evidence for this in the Australian setting is scant. Looking at both young and mature learners, Ryan (2002) finds that partial completions have very limited effect on wages. However, as Ryan (p. 30) noted:

> It is conceivable that such short courses [i.e. study that does not lead to a formal qualification] may provide a positive return to individuals but that the effect may not show up in wage regression equations using the kind of data available here.

Studies focusing on mature learners suggest that there is little, if any advantage in additional VET studies. Thomson et al. (2005) look at VET students over 45 and find that incomplete qualifications have little impact on wages. Karmel and Nguyen (2006) find that while additional study is beneficial for individuals with low level qualifications, there are no benefits to partial completions for those holding a Certificate III or above. As some of the studies have noted these are perplexing results if we assume that people are rational and are only undertaking courses because it is expected to result in a private net benefit.

When considering young learners, VET studies are found to lead to more positive effects. Curtis (2008) reports that completing VET programs increases the likelihood of full-time employment and higher wages for some groups of young learners. However, Herault, Zakirova and Buddelmeyer (2011) conclude that

enrolling in a VET course leads to increased wages, even if students do not complete the course.

The available research has a number of limitations.

- Most studies do not differentiate between people who met their skills needs or training goals, and those who quit due to a host of other reasons, including job loss, ill health and time pressures.
- Some studies have very small sample sizes. For example, Herault, Zakirova and Buddelmeyer (2011) state that 'we cannot exclude the possibility that our sample is simply too small to estimate completion effects precisely' (p. 9).
- The data used in some studies were collected between 1995 and 1998 and reflects different VET policies than those currently affecting the system. TAFE Directors Australia point out that:

  > Unlike educational qualifications in school and higher education, VET qualifications are designed to ensure that with every module undertaken students acquire measurable additional skills at a standard acceptable in the workplace. Since 1992 Australian governments have made a huge investment in restructuring VET courses and qualifications to achieve this goal. (sub. DR-V12, p. 6)

Hence, the conclusions may not be fully applicable to the current set of initiatives.

Evidence on the effects of completion at or below the level of a person's previous highest qualification is also mixed.

Ryan (2002) finds that the group of reskillers contains 7.6 per cent of the male full-time labour force and 5 per cent of the female full-time labour force. Their additional qualification is found to have a positive effect of wages. In contrast, a later study (Karmel and Nguyen 2006) found that for those with a Certificate IV or above, there is no wage benefit in completing an additional VET qualification. Similarly, a review of research conducted in Australia and overseas on mature learners found labour market gains only when individuals completed a higher level qualification (Thomson et al. 2005). While evidence on the relationship between reskilling and labour market outcomes is not conclusive, presumably individuals perceive a benefit in this form of VET activity, or they would not be prompted to invest time, money and effort in it. Intuitively, reskilling could be expected to assist individual's in retaining employment or enhancing their employment prospects. This hypothesis is borne out in data collected on training motivations (NCVER 2010, 2011c). The most frequently nominated motivations for reskilling by mature learners are that 'It was a requirement of my job' and 'I wanted extra skills for my job' (see appendix E for more discussion of these data).

Attainment attributable to the COAG reform agenda

Estimates of changes in VET attainment attributable to the COAG reform agenda have been derived from data on changes in the number of students or additional places committed under the policy initiatives. The Commission has made a number of adjustments to these data to derive the associated increases in attainment, and to provide scenarios for partial completions and completion at the same or lower level.[3] These adjustments are detailed in appendix C.

The relationship between ability, educational attainment and labour market outcomes

Unmeasured ability potentially has two effects in the analysis presented in this study. To some extent, the estimated effect of VET attainment on employment and productivity reflects both the returns to individuals' ability, and the knowledge and skills acquired through study. As Leigh (2008) observed:

> Assuming that workers with higher cognitive skills earn higher wages regardless of their level of education, the observed correlation between education and income will reflect both education and cognitive ability. Of course, the relationship could also go the other way. For example, since the cost of schooling will be higher to those with better outside opportunities, it is possible that lower-ability people may be more likely to undertake formal education.

Empirically, researchers have concluded that some part of the returns to education actually reflect unmeasured ability. Results from Australian studies using data from natural experiments suggest that around 10 per cent of the returns to education are attributable to ability (Leigh 2008).[4] Larger results come from a study of the effects of LLN on labour market outcomes. The effect of a Diploma / Advanced Diploma or Certificate III / IV qualification on earnings fell 50 per cent for men and 25 per cent for women when controls for LLN were added to the equation (Shomos 2010).

In the discussion draft, raw estimates of wage and employment premiums were discounted by 24 per cent to account for this source of bias. Submissions on the

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3 Foundation skills attainment is treated separately. The derivation of estimates of attainment attributable to the COAG reform agenda are presented in appendix F.

4 Natural experiments are 'events, interventions or policies which are not under the control of the researchers, but are amenable to research which uses the variation in exposure that they generate to analyse their impact' (Craig et al. 2011, p. 4). 'The natural experiment approach considers the policy reform itself as an experiment and tries to find a naturally occurring comparison group that can mimic the properties of the control group in the properly designed experimental context' (Blundell and Costa Dias 2002, p. 3).

discussion draft and discussion at the April workshop questioned the plausibility of the 24 per cent discount on the basis that:

- new technologies are increasing the importance of qualifications and proven skill sets (for example, mechanical work, printing and fabrication)
- in some cases, qualifications act as a gateway for entry to employment, independent of natural talent
  - whereas in the recent past, more occupations involved immediate post-school entry with on-the-job training, increasingly, certified core competencies are required before commencing employment
- there is economic pressure for workers to reskill to retain employment or improve their promotional opportunities
- new qualifications and licensing requirements are creating pressure for people already in an occupation and new entrants to have recognised competencies (for example, aged care, nursing, financial planning, but also with regard to OH&S, the 'responsible serving of alcohol', knowledge of the requirement of the serving of hot food)
- the likelihood that by 2020 VET training qualifications and retraining competencies will be required in more areas of work.

The Australian Government Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE) observed that:

> there are some specific aspects to VET that need to be taken into account. In particular, as well as providing a signaller of ability, VET qualifications are often an entry requirement for employment in a particular profession or sector and provide specific competencies rather than general learning. These qualifications are therefore often critical to realising natural abilities. (sub. DR-V16, p. 1)

Natural talent is required, but increasingly it is the case that a qualification is a minimum requirement. Therefore wage premiums are likely to increasingly reflect qualifications and proven skill sets achieved.

On balance, in view of these arguments and the empirical material available, the Commission has adopted a more conservative approach than in the discussion draft, opting for a 10 per cent ability bias discount, which was used to reduce raw estimates of premiums. Better data and a more complex model would likely produce more accurate results.

Research has also shown that more able individuals earn more than their peers with similar qualifications. Heckman, Stixrud and Urzua (2006) estimate the effects of cognitive and non-cognitive ability on the wages of Americans by level of

education, holding constant other characteristics that influence a person's earnings. They show that wages rise as ability rises within cohorts of individuals with the same level of educational attainment. They also find that people with higher qualifications earn more than those with lower qualifications.

This relationship between ability and wages is reflected in the Commission's analysis, although it should be noted that the Australian wage system is unlikely to have the same degree of flexibility as in the US. The analysis assumes that the completion of a VET qualification increases the productivity of an individual. However, someone who undertakes a qualification as a consequence of a policy initiative is assumed to have lower ability than a person who opts to acquire the qualification in the absence of the initiative. The newly qualified individual's productivity (as represented by his or her wages over their remaining working life)[5] is therefore assumed to be lower than the average for the educational cohort that they join. However, the effect on aggregate productivity can still be positive, as the number of people with higher qualifications increases (box 2.6).

If an individual's education choices have been constrained, for example, by social disadvantage, mores or access to education, his or her qualification attainment might not be consistent with his or her ability. To the extent that this is the case, the corresponding productivity discounts included in the Commission's analysis could be smaller, zero or even replaced by a productivity 'premium'. (These discounts are described further in appendix C.)

It is also possible that, in some instances, attainment of a qualification simply certifies an individual's existing skills, and does not imply an improvement in his or her productivity. This could be the case, for example, in occupations where a regulatory change means that all workers, including those with a long tenure in the occupation, are required to gain a qualification.

5 Assumed to be 42 years for young learners and 18 years for mature learners.

Box 2.6 The relationship between ability and productivity, by education level

When a person increases their attainment from Year 12 to Certificate III/IV, for example, the Commission's modelling assumes that he or she is at the higher ability end of the cohort that completes a Year 12 qualification and at the lower ability end of the cohort that completes a Certificate III/IV. This means that, as he or she leaves the Year 12 cohort, the productivity of that group declines. When he or she joins the Certificate III/IV cohort, their productivity is less than the average and the productivity of the new Certificate III/IV group declines. However, despite a reduction in the average productivity of both groups, there is an increase in aggregate productivity.

The following example illustrates this point (table A). Suppose there are three people, X, Y and Z, who work full time. In the baseline, the highest level of educational attainment of X and Y is Year 12, and Z, Certificate III/IV. Their productivities are shown in table A. A policy initiative moves Y from Year 12 to Certificate III/IV. The productivity (as indicated by the wage) of Y increases from $15 to $18 per hour, while the productivities of X and Z are unchanged. The average productivities of both education groups fall, while aggregate productivity increases from $15 to $16 per hour. This apparent inconsistency is caused by the difference in productivity of person Y relative to the average in each group.

Table A **Hypothetical effect of increased education on productivity at different levels, $ per hour**

	Initial education outcomes	*Higher education outcomes*
Individual productivity		
X	10	10
Y	15	18
Z	20	20
Education cohort productivity		
Year 12	12.5 (avg. X and Y)	10 (X)
Certificate III/IV	20 (Z)	19 (avg. Y and Z)
Aggregate productivity	15 (avg. X, Y and Z)	16 (avg. X, Y and Z)

3 Impacts of COAG reforms

This chapter summarises the results from the Commission's assessment of the impacts of the Council of Australian Governments' (COAG) Vocational Education and Training (VET) reform agenda drawn from:

- 'higher qualification' scenarios for the Victorian, *National Partnership Agreement on Productivity Places Program* (NPAPPP) and South Australian policy initiatives, and an 'Australia potential' scenario in which it is assumed that the COAG VET targets set out in the 2009 *National Agreement for Skills and Workforce Development* (NASWD) for attainment at or above a Certificate III level are achieved. These scenarios model the impacts of individuals increasing their level of qualification attainment to a Certificate III to Advanced Diploma level
- 'partial completion' and 'reskilling' scenarios, complementary to the Australia potential scenario. These capture the potential impacts of partial completions and reskilling activity that are consistent with the potential scenario. Given the lack of data and evidence on this activity, discussed in chapter 2, and the more speculative nature of these results, they are presented separately to other results from the Australia potential scenario
- a 'foundation skills' scenario which reflects improvements in the language, literacy and numeracy (LLN) abilities of the working-age population.

Discussion of the importance of the assumptions underlying the modelling, related research and key themes from the results precedes presentation of the results.

3.1 The importance of assumptions

The Commission has made many assumptions in undertaking this assessment, detailed in appendix C. Sensitivity analysis of the estimates indicates that those assumptions are critical (appendices D and E). When the assumptions change, so do estimated changes in employment, productivity and broader economic activity, often quite markedly.

A particularly strong assumption is that the effects of policy initiatives have small enough impacts on prices, including on wages (aside from the modelled productivity impacts), that these impacts can be ignored for the purpose of this

analysis. Increases in the supply of workers in different occupational labour markets are assumed, therefore, not to reduce wages. For larger changes, such as those in the potential scenario, this is consistent with assuming that the relevant demand curve is flat over the relevant range. It is also consistent with assuming that the demand for workers with VET skills is increasing as their supply grows.

Consistent with the terms of reference, the results are presented relative to a baseline to isolate the effect of the initiatives modelled relative to the outcomes that would have occurred with the previous policy settings and with the demographic momentum. This means that the education of the population is assumed to be increasing independently of the COAG policy initiatives under scrutiny.

Given the many assumptions underlying the point estimates presented in this chapter, the results should be regarded as only broadly indicative of the possible impacts of policy initiatives assessed. The estimates and analysis are intended to advance understanding of the scale of the impacts of the initiatives under consideration. The estimates are not forecasts of the economic or fiscal impacts of the reforms. Rather, they reflect the impacts of VET policy initiatives in isolation from any other influence, including in isolation from initiatives in other parts of the education system.

From discussion draft to final report

The process of consultation has led the Commission to reconsider some of the assumptions made in the context of the discussion draft.[1] As a result of reviewing its processes, feedback on the discussion draft from various study participants in the form of submissions and discussion at the April 2012 workshop the Commission has:

- expanded the scope of the study to include the potential effects of partial completions and of completions at or below the qualification level already held
- reviewed its assumptions and modified the magnitudes of some parameters
- corrected some errors
- benchmarked results against projections described by Skills Australia (Bullock, P., Chair, Skills Australia, Canberra, pers. comm., 14 February 2012) as well as against estimates in KPMG Econtech (2010b). This benchmarking is presented

1 Released in December 2011.

in appendix A. The estimates in this report are comparable with those in the other reports included in this analysis

- modified the presentation of results to make it easier to understand the main effects.

Changes since the discussion draft are explained in various parts of this report. The following have had the largest influence on results:

- a decrease in the factor used to discount for ability bias inherent in econometric estimates. Econometric results typically overstate the wage and employment premiums from obtaining a qualification by attributing to the qualification an effect that relates to the individual's inherent ability. The discount factor was decreased from 24 per cent in the discussion draft to 10 per cent in the Commission's final analysis — this increased estimates of productivity especially, as well as all other results that depend on this variable (for example, gross payments to labour, net social benefits and gross domestic product (GDP)), relative to the discussion draft
- discounting of dollar values by 6 per cent, real — this decreased the magnitude of reported gross payments to labour and net social benefits, relative to the discussion draft. The order of magnitude of the effect of discounting over long periods is illustrated in box 3.1
- an increase in assumed completion rates, which increased the effects for the South Australian and NPAPPP scenarios.

Box 3.1 **Effects of discounting over long periods**

When economic flows occur over a long period, it is appropriate to discount them to account for the preference for the present. The discount rate reflects the trade-off between present and future consumption (or savings). The analysis in this report is in real terms, that is, it abstracts from the effects of inflation, and prices and wages are assumed to be measured in terms of 2011 dollars.

The choice of a discount rate is complex. It depends, among other considerations, on whether the flows being discounted measure private or social, real, or nominal values. In this report, all values are expressed in real terms and both private and social values are discounted. For simplicity, a 6 per cent real discount rate is applied to all values, and all values are discounted to 2012.

The effect of discounting is illustrated with a simple example in which costs of studying (monetary and foregone income while studying) are assumed to amount to $20 000 in the first year and additional returns due to studying (the premium) are $10 000 per year over 40 years. A discount rate of 6 per cent is applied in table A.

Table A **Illustrative example of the effect of discounting on a simplified private benefit calculation**

Discount rate: 6 per cent, real

	undiscounted	*discounted*
	$	$
Initial costs	20 000	20 000
Gross returns	400 000	150 463
Net returns	380 000	130 463

3.2 Results of previous research

The Commission has not located another study that assesses the effects of the Victorian, South Australian and NPAPPP policy initiatives along with attainment of the COAG VET targets, but four reports are relevant:

- *Potential benefits of the National Reform Agenda* (PC 2006)
- *Economic modelling of skills demand* (Access Economics 2009)
- *Mid-term Review of the National Partnership Agreement for the Productivity Places Program* (ACG 2010b)
- *Measuring the Impact of the Productivity Agenda* (KPMG Econtech 2010b).

The Commission evaluated the benefits potentially available from the National Reform Agenda (NRA) (PC 2006) — preliminary COAG thinking about a new

reform initiative. That analysis had a wider scope than the current study — the combined effects of four indicative outcomes capturing COAG's goals in the area of education and training were estimated. Three of these focused on children and young people. The fourth is particularly relevant to the current VET reform agenda — 'an increase in the proportion of adult workers who have the skills and qualifications needed to enjoy active and productive working lives' (COAG 2006, p. 7).

In the NRA report, the Commission projected that improvements in educational attainment over and above baseline levels by Australians aged 25–64 could result in an increase in participation of 0.22 percentage points by 2030, and a productivity increase of 0.43 per cent. However, that work has a number of characteristics that limit comparability with this study. Key among these are that, in PC (2006):

- effects are assumed to emerge over a longer period — to 2030
- in the absence of information on policy initiatives, an outer-envelope approach to estimating potential effects was adopted, in which it was assumed that all policies were applied with maximum effectiveness, and that effects across different parts of the education system cumulated
- Degrees, which are associated with larger participation and productivity effects than VET qualifications, were included, contributing to larger increases in attainment
- the possibility that people obtaining qualifications as a consequence of the reforms might have had lower unobserved ability than those projected to obtain a qualification in the baseline was not taken into account.[2]

Skills Australia released modelling by Access Economics of future skills demand in Australia (Access Economics 2009). In the course of that work, Access Economics concluded that attainment of the COAG target of halving the proportion of people aged 20–64 without a qualification at the Certificate III level or above by 2020 could lead to an increase in the workforce participation rate to 68.3 per cent. This represents an increase of around 3 percentage points on the level in June 2009 (65.4 per cent (ABS 2009b)). When this analysis is benchmarked against the Commission's research there are no major differences between the Commission's results and those put forward by Skills Australia (appendix A).

In November 2010, the Allen Consulting Group (ACG 2010b) completed a mid-term review of the NPAPPP. ACG concluded that the agreement had not been

[2] Although the marginal ability effect was noted, it was not quantified because of lack of information and of a model to account for it.

in force long enough to support an evaluation of the employment and productivity effects of the initiative.

KPMG Econtech (2010b) analysed the potential impacts of COAG reforms on labour force participation, productivity and the Australian economy from 2010 to 2070. The report complements and extends the analysis in PC (2006), and devotes a section to VET reform. The analysis was set up in terms of the additional numbers of 25–34 year olds with a Certificate III or higher qualification required to achieve the target of halving the proportion of the 20–64 year old population without a Certificate III or higher qualification. The authors observe that '… people already expected to obtain a Certificate III–Advanced Diploma or equivalent education will be unaffected by the reforms to raise the share of people with Certificate III–Advanced Diplomas' (p. 25). The authors find that the VET reforms designed to reach the COAG 2020 target have the potential to:

- increase labour force participation for 15–64 year olds by 1.1 percentage points (from 59.3 per cent to 60.4 per cent) in 2070
- increase productivity of 15–64 year olds by 1.65 per cent.

3.3 Overview of results

The Commission's point estimates of the effects of all policy initiatives attributable to the COAG VET reform agenda suggest that significant economic benefits could be achieved. In this section, results are summarised for 'higher qualification' scenarios in terms of realised, prospective and potential outcomes, as well as scenarios for partial completions scenarios and for completions at or below the level already held. All scenarios are presented and analysed in more detail in the following sections and in appendices D and E.

Higher qualifications

Relative to the baseline, increases in the profile of qualification attainment (the higher qualification scenarios) associated with attainment of the COAG VET targets by 2020 are projected to increase (table 3.1):

- the number of completions by about 1.29 million over the period 2010 to 2020
- employment by 1.04 per cent by 2020

- labour productivity by 0.35 per cent[3]
- GDP by 1.95 per cent.

Table 3.1 **Overview of results, higher qualification scenarios**

		Victorian realised	*Victorian prospective*	*SA prospective*	*NPAPPP realised*	*Potential*	**Total gain from achieving 2020 target**
Increased highest qualification[a]							
Cert. III to Ad. Dip.	no.	25 000	46 000	11 000	117 000	1 091 000	**1 290 000**
Employment and productivity							
Change in employ.[b]	%	0.02	0.03	0.01	0.11	0.88	**1.04**
Change in productivity[c]	%	0.01	0.02	0.00	0.04	0.29	**0.35**
GDP	%	0.03	0.04	0.01	0.20	1.67	**1.95**
Private and net social benefit[d]							
Payments to labour	$m	2 063	3 481	999	9 536	92 020	**108 099**
Net social benefit	$m	1 113	1 830	504	5 039	48 809	**57 295**

[a] Estimates rounded to the nearest thousand (table C.6). [b] Change in employment relative to the baseline expressed as a percentage of the Australian working-age population. [c] Change in productivity of the Australian workforce, relative to the baseline. [d] Present value of the change for the cohort over their working lives (assumed to be 18 years for mature learners and 42 years for young learners).

Sources: Appendices C, D, E and H.

The longer term impacts of achieving the 2020 targets over the working life of the persons achieving the higher-level qualifications increase gross payments to labour by more than $108 billion over the period 2010 (when the first graduates are assumed to enter the workforce) to 2062 (when the last 2020 graduates are assumed to retire, assuming a 42 year working life for young learners).

The initiatives are projected to produce discounted net social benefits of $57 billion over the period 2010 to 2062. These net social benefits are likely to be understated, given that they do not account for externalities and other items (appendix C).

[3] Changes in employment and productivity are relative to the relevant Australian population for comparison across the scenarios. Figures in the state-based analyses presented below (Victoria, South Australia and NPAPPP) are relative to the relevant state-based population to understand the local effects. The state-based effects are larger than those reported for the economy as a whole (table 3.1).

The potential scenario, which is defined as the effort made beyond the life of the current policy statements (which are accounted for in the realised and prospective scenarios) contributes more than 80 per cent of the projected results.

Along with increasing levels of qualification attainment, pursuit of the COAG VET targets is likely to result in some students meeting their training needs through a partial completion, or reskilling by studying at or below the level of their previous highest qualification. VET activity of this type is associated with further increases in employment and productivity, and positive net social benefits (section 3.8).

One characteristic of the policy initiatives modelled is that many of the qualifications attained require significant taxpayer subsidies. For the NPAPPP, for example:

> For each payment for an existing worker, the Commonwealth will contribute 50 per cent, the State or Territory will contribute 40 per cent and the individual/enterprise will contribute a minimum of 10 per cent. The Commonwealth will contribute 100 per cent of each payment for a job seeker. (COAG 2008c, p. 12)

One explanation for these levels of subsidisation is a large difference between the perceived private benefits of VET qualifications and the net benefits perceived by governments (attributable to myopia (underestimate of private benefits) and externalities discussed in chapter 2). Another is that individuals are credit constrained, and do not have the means to pay upfront for VET fees. The provision of income contingent loans (ICLs) for students undertaking government-funded higher-level VET qualifications suggests that this is a concern. Loans of this type are in effect in Victoria, and are planned for South Australia (subject to the passage of legislation (PM&C 2012)). In the *National Partnership Agreement on Skills Reform* (NPASR), COAG has agreed to expand the availability of ICLs.

Partial completions and reskilling

The initiatives considered in this report can be expected to produce outcomes in addition to higher numbers of completions. In particular, numbers of partial completions and of completions at or below the level of qualification already held can be expected to increase. As noted earlier (chapter 2), partial completions and acquiring a qualification at the same or lower level are commonplace in the VET system. Information about such outcomes is of lower quality than that available for constructing the scenarios presented in the previous section. Nonetheless, the Commission has constructed four scenarios for mature learners, based on existing ratios of partial completions and same or lower qualification and assuming wage and employment premiums, to illustrate the possible effects. Two scenarios are

compared to the higher completions potential scenario in table 3.2. The four scenarios are described in detail in appendix E.

Table 3.2 **Potential effects of full completions, partial completions and reskilling scenarios, mature leaners, by 2020**

	Unit	*Higher completions*	*Partial completions*[a]	*Same or lower qualification*
Increased completions/partial completions[b]				
Cert. III to Ad. Dip.	no.	731 000	237 000	570 000
Employment and productivity				
Change in employment[c]	%	0.69	0.11	0.46
Change in productivity[d]	%	0.27	0.04	0.14
Private and net social benefit[e]				
Payments to labour	$m	67 793	10 499	38 645
Net social benefit	$m	41 655	6 466	20 314

[a] Assuming 50 per cent of the premiums from full completions. [b] Estimates rounded to the nearest thousand. [c] Change in employment relative to the baseline expressed as a percentage of the Australian working-age population. [d] Change in productivity of the Australian workforce, relative to the baseline. [e] Present value of the change for the cohort over their working lives (assumed to be 18 years for mature learners).

Source: Appendix E.

3.4 Market-oriented reforms in Victoria

In August 2008, the Victorian Government released *Securing Jobs for Your Future*, a policy statement committing $316 million over four years for a number of initiatives in the training system, and an additional 172 000 training places over four years. The statement notes that:

> To stay competitive and keep creating sustainable jobs in Victoria, we must reform and refocus our skills system to best meet the emerging needs of those who depend on it. (Victorian Government 2008, p. 1)

The reform agenda was motivated by concerns about unmet demand for skills (particularly in higher-skilled occupations), the requirements of an innovation-focused economy, and addressing the goals of COAG.

Phased implementation of the initiatives began in 2009, with full operation from 1 January 2011. Changes that are particularly important for the analysis presented in this report include:

- the *Victorian Training Guarantee* — an entitlement to a government-subsidised place for people who meet the eligibility criteria, that is
  - for people aged under 20 years — training at any level

  - for people aged 20 years and over — for
    - foundation skills level courses
    - any qualification at a higher level than qualifications already held[4]
- greater contestability — delivery of government-subsidised training on demand by approved, private registered training organisations, aiming to increase competition in the VET market.

Increases in government-funded enrolments and student numbers under Victoria's policy initiatives have been large. Enrolments are estimated to have been about 542 000 in 2011, up 160 000 (42 per cent) on 2008 (the year before reform implementation began). This represents significantly higher growth than the 3 to 6 per cent per annum that the Victorian Government anticipated (Hall 2011).

Growth in student numbers has been similarly strong. About 122 000 students are estimated to have undertaken government-funded training in 2011, relative to 2008 — the policy baseline.

In response to a report by the Essential Services Commission (ESC 2011a) that identified quality issues with the reforms, the Victorian Government announced reduced subsidies for government-funded students in the fastest growing fields of delivery (business and clerical studies, finance, hospitality, property services, tourism, wholesale, and retail and recreation), commencing from 1 January 2012 (Hall 2011).

Data on additional training effort in Victoria up to the third quarter of 2011 are used to estimate the realised and prospective effects of the policy initiatives set out in *Securing Jobs for Your Future*. Estimates of realised effects are based on the additional number of students who commenced and completed training over the period 2009 to 2011, relative to 2008.[5] An estimate of completions post-2011, by students who commence between 2009 and 2012 as a consequence of the policy initiatives, is used to derive prospective effects. The new subsidy levels that will apply from 1 January 2012 are assumed to slow growth in training activity to 5 per cent in 2012.

4 Funding of $10 million was reserved for a limited number of government-subsidised places for people aged 20 years and over who needed training at or below their existing qualification level.

5 Data for the last quarter of 2011 are projected based on realised growth to the end of the third quarter of 2011.

Effects stemming from increased VET effort

The Commission estimates that the Victorian reforms led to a realised increase in student numbers of about 171 000 in 2009 to 2011 relative to 2008 (table 3.3). Prospective increases are estimated to be about 154 000. This growth in student numbers is estimated to translate into an additional 25 000 Victorians with a highest level of qualification attainment at a Certificate III to Advanced Diploma level between 2009 and 2011, and about 46 000 achieving this outcome after 2011.[6,7] The higher level of completions in the prospective period reflects the phased introduction of the reforms between 2009 and 2011, and the fact that some students who commenced during the realised period did not complete until post-2011.

Table 3.3 **Point estimates of the realised and prospective effects of the Victorian policy initiatives on educational attainment, economic activity and net social benefit**

	Realised change	*Prospective change*
Additional students — relative to 2008[a]	171 000	154 000
Additional completions — Cert. III to Ad. Dip.[a]	25 000	46 000
Employment (%)[b]	0.10	0.16
Productivity (%)[c]	0.02	0.04
Gross state product (%)[d]	0.25	0.29
Gross domestic product (%)[d]	0.03	0.04
Gross payments to labour ($ bn)[e]	2.1	3.5
Net social benefit ($ bn)[e]	1.1	1.8

[a] Estimates rounded to the nearest thousand (table C.6). [b] Change in employment relative to the baseline expressed as a percentage of the Victorian working-age population. [c] Change in productivity of the Victorian workforce, relative to the baseline. [d] Percentage changes from baseline; comparative static result for one year. [e] Present value of the change for the cohort over their remaining working lives (assumed to be 18 years for mature learners and 42 years for young learners).

Sources: Appendices C, D, E and H.

As a consequence of these increases in attainment, it is estimated that employment in Victoria could have increased by 0.1 per cent, with a further gain of 0.16 per cent

6 People who commence a traditional trade apprenticeship in 2012, for example, might not complete it until 2016.

7 Assumptions underlying the derivation of these figures are presented in appendix C.

in prospect.[8] Productivity is estimated to be slightly higher, in both the realised and prospective scenarios, relative to the baseline.

The changes in occupational structure modelled under the realised and prospective scenarios are projected to increase Victorian gross state product (GSP) in the order of 0.25 and 0.29 per cent annually, respectively. This translates into economy-wide increases in economic activity (GDP) in the order of 0.03 and 0.04 per cent in each case. A net social benefit of around $1.1 billion (in present value terms, over 42 years) is estimated from the realised scenario. The prospective scenario produces further benefit of around $1.8 billion.

Overall, the point estimates indicate that Victoria's policy initiatives are associated with positive economic impacts. As discussed in section 3.1 and appendices D and E, the confidence intervals for these results are large.

Effects of greater contestability

Two scenarios illustrating the possible impacts of greater contestability were also modelled for Victoria. Because the results have implications for all of the policy initiatives modelled, they are discussed separately, in section 3.9.

Raising qualification levels in Victoria

One feature of the Victorian policy initiatives is that the eligibility criteria discourage churning through lower-level qualifications. This has been identified as an issue of particular relevance to disadvantaged learners:

> … there is evidence to suggest that disadvantaged learners in low level Foundation Skills programs are frequently referred back into low cost, low level courses without any clear vocational outcomes. This problem, often referred to as 'churn', sees some groups of learners repeating programs at the same level. (Roberts and Wignall 2010, p. 12)

In the case of Indigenous learners, it has previously been suggested that VET participation rates, to some extent, reflect churning of the same people through low-level training (Young, Guenther and Boyle 2007).

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[8] Changes in employment and productivity in this section are reported relative to Victorian base employment and productivity to facilitate an understanding of Victorian effects (similarly for following sections).

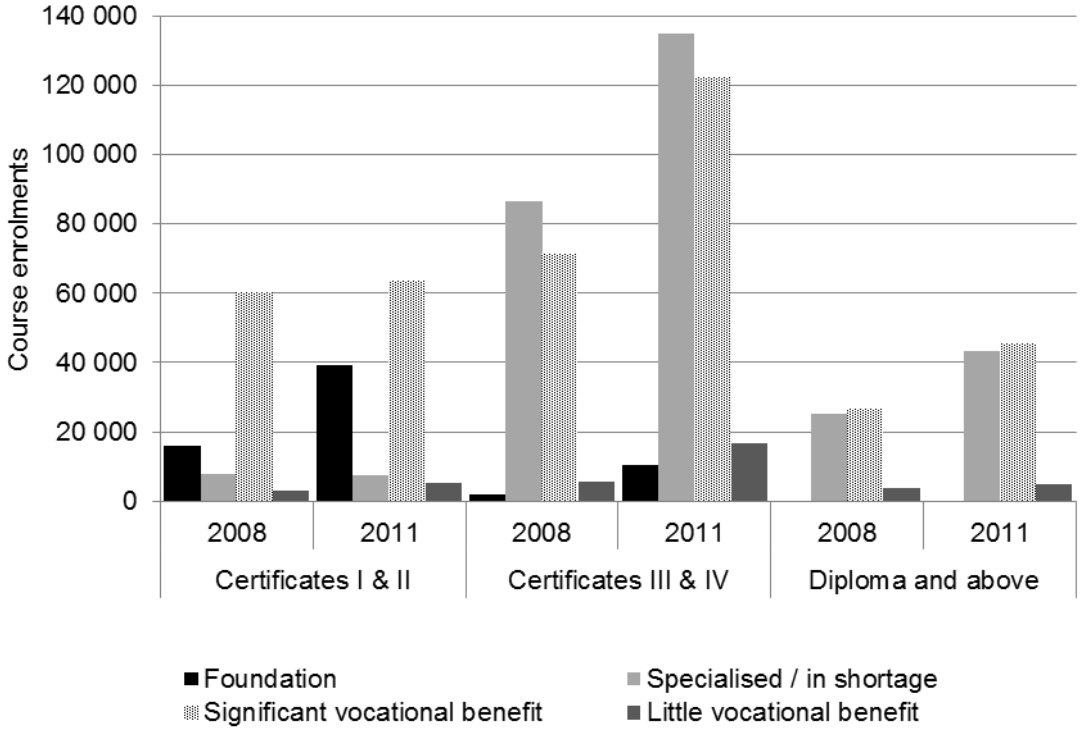
However, in Victoria, enrolment growth has been relatively fast in qualifications above a Certificate I and II level — a positive given the greater improvement in labour market outcomes associated with higher-level qualifications.

The Commission's quantitative analysis assumes that students use their newly acquired skills in employment. Data from the *Student Outcomes Survey*, show that the percentage of Victorian graduates employed in May of the year after completing their qualification increased from 76.3 per cent in 2010 to 78.6 per cent in 2011 (NCVER 2010, 2011c). The extent to which this might be attributable to increases in qualification attainment versus changing economic conditions is unknown.[9] However, analysis by Skills Victoria indicates that 'the vast majority of government-subsidised training is either aimed at improving literacy and numeracy or is focused in areas of skills needs' (2011c, p. 38), an indication that the qualifications that students acquire are likely to be used. The numbers of enrolments in training assessed to be of little vocational benefit is relatively low (figure 3.1).

9 These data are based on a sample of graduates. As such, they might not exactly reflect the experiences of the relevant populations of Victorian graduates.

Figure 3.1 **Victorian Government subsidised training, 2008 and 2011**

Excludes courses that are not Australian Qualification Framework qualifications and at the foundation level



Source: DEECD (2011).

3.5 National Partnership Agreement on Productivity Places Program

The Productivity Places Program (PPP), which was a 2007 election commitment, aimed to reduce skill shortages and increase the productivity of Australian enterprises.

The PPP has three components — the *New Enterprise Incentive Scheme PPP*, the *Enterprise Based PPP* and the *National Partnership Agreement on Productivity Places Program* (NPAPPP). Responsibility for administration of the first two elements sits with the Australian Government, and the number of training places involved is small (about 20 000 over three years for the *New Enterprise Incentive Scheme PPP*, and 14 000, also over three years, for the *Enterprise Based PPP*). As

part of the COAG reform agenda, States and Territories (excluding Victoria) committed to the delivery of places through the NPAPPP.[10]

The NPAPPP commenced on 1 July 2009, and concludes on 30 June 2012. States and Territories committed to delivering an additional 403 000 new places (qualification commencements) over this period, in qualifications on a national priority list.[11] The list 'refers to national priority industries, occupations and qualifications in areas of current skills shortages and emerging skills needs' (COAG 2008c, p. 5).

About 133 000 places at Certificate II to Diploma level were allocated to job seekers, and 270 000 to existing workers for study at a Certificate III to Advanced Diploma level. The Australian Government undertook to meet the full costs of each job seeker place, and 50 per cent of the costs of an existing worker place. State and Territory governments committed to meet 40 per cent of the costs of existing worker places, and individuals/enterprises were to contribute the rest.

In a mid-term review of the NPAPPP, ACG (2010b) reported that actual enrolments under the agreement in 2009 were about 71 000, considerably less than the target of 103 000 contained in the agreement. However, training delivery under the national partnership did not begin in some jurisdictions until after the intended start date of 1 July 2009.

The COAG Reform Council in its most recent progress report to COAG on the NASWD, reported actual enrolments under the agreement for 2010 of about 176 000, just over targeted levels (CRC 2011). This growth in enrolments correlates strongly with increased student numbers reported in National Centre for Vocational Education Research (NCVER) data. The Commission has based its estimates of increases in qualification attainment in 2009 and 2010 due to the NPAPPP on the NCVER data. Enrolment commitments for 2011 and 2012 (196 000 and 105 000, respectively) have been used in deriving estimates for those years. Because the agreement concludes on 30 June 2012, the Commission has treated all of the effects of the NPAPPP as realised. Consistent with the NPAPPP, the baseline for this scenario is set at the annual average level of government-funded training activity in States and Territories excluding Victoria over the period 2005 to 2007.

10 By moving to an entitlement-based system, Victoria became eligible to receive funding outside the terms and conditions of the NPAPPP. Using this funding, Victoria agreed to deliver an additional 138 000 places over four years under the Victorian Training Guarantee.

11 The average level of enrolments in Certificate III to Advanced Diploma qualifications in a State or Territory between 2005 and 2007 represents the base against which additionality is measured.

A characteristic of the NPAPPP was a requirement that students only be enrolled in full qualifications, a reflection of the Australian Government's desire to encourage completions of qualifications through the agreement (ACG 2010b, p. 21). This feature possibly explains the relatively high completion rates reported for the agreement (New South Wales Department of Education and Communities, sub. V6, South Australian Department of Further Education, Employment, Science and Technology (DFEEST), sub. DR-V7).

Effects of the NPAPPP

The Commission estimates that by the end of the agreement, about 117 000 people will have obtained a qualification above their previous highest level as a consequence of the NPAPPP (table 3.4).[12] This additional educational attainment is estimated to translate into a 0.15 per cent increase in employment in States and Territories excluding Victoria. Productivity increases slightly. Economic activity in these jurisdictions (and nationally) is projected to increase by 0.2 per cent annually. Net social benefit is estimated to increase by about $5 billion (in net present value terms) over the working lives of the cohort affected by the NPAPPP.

Table 3.4 **Point estimates of the realised effects of the NPAPPP on educational attainment, economic variables and net social benefit**

	Realised change
Additional students — relative to the average of 2005, 2006 and 2007	387 000
Additional completions — Cert. III to Ad. Dip.[a]	117 000
Employment (%)[b]	0.15
Productivity (%)[c]	0.04
Gross domestic product (%)[d]	0.20
Gross payments to labour ($ bn)[e]	9.5
Net social benefit ($ bn)[e]	5.0

[a] Estimate rounded to the nearest thousand (table C.6). [b] Change in employment relative to the baseline expressed as a percentage of the working-age population outside Victoria. [c] Change in productivity of the workforce outside Victoria, relative to the baseline. [d] Percentage change from baseline; comparative static result for one year. [e] Present value of the change for the cohort over their remaining working lives (assumed to be 18 years for mature learners and 42 years for young learners).

Sources: Appendices C, D, E and H.

12 Assumptions underlying the conversion of student numbers to numbers of additional higher qualifications are presented in appendix C.

Evidence on NPAPPP outcomes

The ACG mid-term review of the NPAPPP (ACG 2010b) concluded that the data needed to assess the effectiveness of the agreement were not readily available. While data on outcomes for students who finished studying in 2011 are available, it is not possible to isolate students who studied under the NPAPPP in the national data. However, South Australia managed their PPP in a way that does enable tracking of participants, and commissioned the NCVER to assess outcomes for its PPP students. That analysis indicates positive outcomes from the program, for example:

- an estimated 67% of job seekers whose primary motivation was employment and completed study found employment, and 12.9% of job seekers found employment before the training was completed. (South Australian Government, sub. G1, p. 7)
- 95% of respondents [employers] said that their organisation benefited from the training and the employee benefited from the training. (DFEEST, sub. DR-V7, p. 7)

Other study participants also reported positive PPP effects:

> By encouraging Registered Training Organisations to apply for funds in partnership with employment services providers, PPP facilitated better matching of job seekers and training provision, and ensured job seekers were supported during and after participation in the program. (Department of Premier and Cabinet, Tasmania, sub. G3, p. 3)
>
> The Productivity Places Program has been a successful model enabling enterprises in the forest, wood, paper and timber products industry to engage with the National Training System in workforce development activities and increase their skill base. (ForestWorks Industry Skills Council, sub. V3, p. 2)

3.6 Market-oriented reforms in South Australia

In a 2010 election commitment, the South Australian Government promised to spend an extra $194 million on training places over six years. Together with expenditure under the NPAPPP, this funding was to cover an additional 100 000 places from 2010-11. A total of 37 000 places were allocated to the NPAPPP (DFEEST, sub. DR-V7, p. 7).

In February 2011, the South Australian Government released *Skills for All*, a policy statement that sets out the strategic direction for VET in South Australia for 2011 to 2014 (Government of South Australia 2011). The aim of the policy initiatives is to:

> … create a vocational education and training (VET) system that responds quickly and flexibly to the needs of individuals and industry — a system which is simpler to access and navigate, and supports more people to enter training, progress to higher qualifications and employment. (Government of South Australia 2011, p. 1)

Among a number of policy initiatives, *Skills for All* includes (South Australian Government, sub. G1):

- an entitlement to a subsidised training place for all eligible South Australians aged 16 years and over in identified courses:
  - Pre-vocational and Certificate I and II places will be fully subsidised.
  - Higher level courses that align with industry demand and the State's strategic priorities will be partly subsidised.
  - People with an existing qualification will be able to access a training subsidy for a qualification at or above the level of the one that they hold, and the subsidy at the same level will be available for two separate qualifications at Certificate II level or above.
- greater contestability.

Based on information provided by South Australia, the Commission has assumed that *Skills for All* results in an additional 60 000 training places over the period 1 June 2012 to 30 June 2016 (DFEEST, sub. DR-V7, p. 7 and pers. comm., 2 March 2012). Of these, an estimated 41 000 will be at the Certificate III to Advanced Diploma level. Given the 1 July 2012 scheduled commencement date for this policy initiative, and because of the steps already undertaken to implement changes to the South Australian training system, the effects of these additional places are deemed to be prospective.[13]

The Commission estimates that, as a consequence of the prospective increase in training activity in South Australia, about 11 000 people will obtain a qualification (Certificate III to Advanced Diploma) above their previous highest level.

Prospective changes in educational attainment in South Australia are projected to lead to an increase in employment of 0.16 per cent. Productivity is estimated to be increase slightly.

The changes in occupational structure modelled for this prospective scenario are projected to translate into an increase in GSP of 0.23 per cent and GDP of 0.01 per cent. A prospective increase in net social benefit of $500 million (in net present value terms, over 42 years) is estimated (table 3.5).

[13] In preparation for the commencement of delivery under *Skills for All*, for example, an Office of TAFE SA and an interim TAFE board have been established as a transitional arrangement until TAFE SA becomes a statutory authority.

Table 3.5 **Point estimates of the prospective effects of the South Australian policy initiatives on educational attainment, economic variables and net social benefit**

	Prospective increase
Additional places — 2012 to 2016	60 000
Additional completions — Cert. III to Ad. Dip.[a]	11 000
Employment (%)[b]	0.16
Productivity (%)	0.05
Gross state product (%)[c]	0.23
Gross domestic product (%)[c]	0.01
Gross payments to labour ($ bn)[d]	1.0
Net social benefit ($ bn)[d]	0.5

[a] Estimate rounded to the nearest thousand (table C.6). [b] Change in employment relative to the baseline expressed as a percentage of the working-age population in South Australia. [c] Percentage change from baseline; comparative static result for one year. [d] Present value of the change for the cohort over their remaining working lives (assumed to be 18 years for mature learners and 42 years for young learners).

Sources: Appendices C, D, E and H.

Overall, the point estimates for South Australia are positive. However, as discussed in section 3.1, the confidence intervals for these results are large.

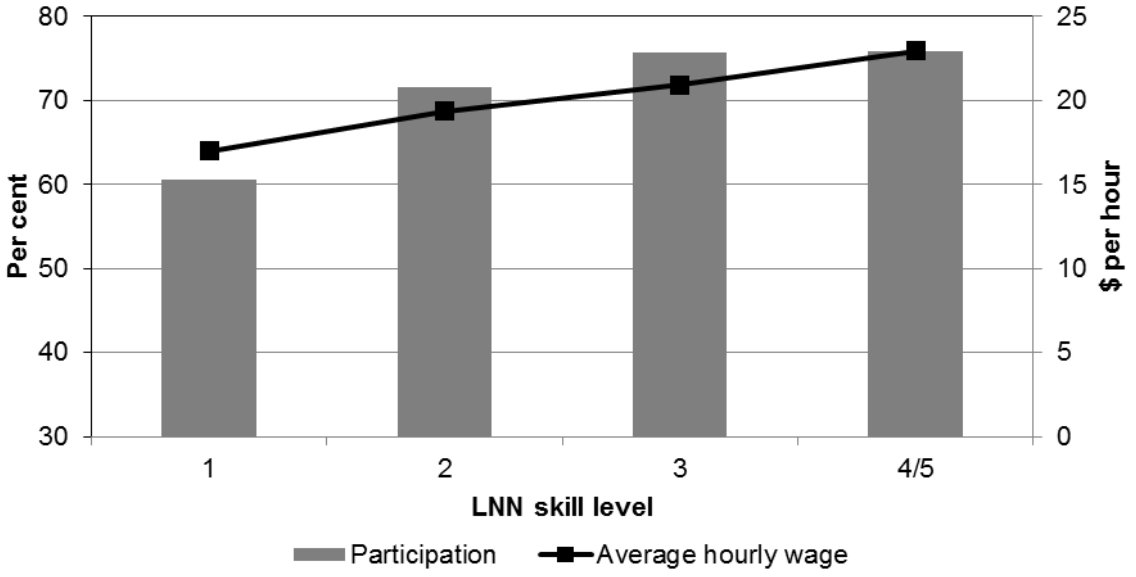
3.7 Foundation skills

Results from a 2006 survey by the Australian Bureau of Statistics (ABS) suggested that over 40 per cent of the Australian working-age population have language, literacy and numeracy (LLN) abilities below the level regarded by the survey designers as the 'minimum required for individuals to meet the complex demands of everyday life and work in the emerging knowledge-based economy' (2008a, p. 5).

In reality, many individuals with low measured LLN skills have good labour market outcomes. That said, research by Shomos (2010) reveals a strong association between both workforce participation and productivity (measured as wages), and LLN abilities (figure 3.2).[14] Efforts to enhance LLN skills in the working-age population have the capacity to improve labour market outcomes.

[14] Levels 1 and 2 of LLN skills are defined as being below the minimum required to meet the complex demands of everyday life (ABS 2008a).

Figure 3.2 **The association between LLN skills and workforce participation and productivity, females, 2006[a, b]**



a Predicted average participation rates and hourly wages by level of LLN skills, other characteristics being equal. **b** LLN skills are a composite of prose and document literacy and numeracy skills.

Source: Productivity Commission estimates based on Shomos (2010).

To date, LLN policy activity attributable to the COAG reform agenda has been limited. In analysing realised and prospective effects of initiatives, the Commission has considered:

- the expansion of the Australian Government-funded *Language, Literacy and Numeracy Program* (LLNP) and the *Workplace English Language and Literacy* (WELL) program
- changes in LLN student numbers as a consequence of policy initiatives under the new skills system implemented in Victoria and South Australia.

LLN skills are the primary focus of a *National Foundation Skills Strategy for Adults*, to be launched during the first half of 2012. Section 3.8 presents results from a scenario of the effects of meeting the target associated with the strategy — that by 2022, two thirds of working-age Australians have literacy and numeracy skills at Level 3 or above. The target was announced by COAG's Standing Council on Tertiary Education, Skills and Employment in November 2011 (SCOTESE 2011).

The 2010-11 and 2011-12 Australian Government budgets committed funding for an additional 43 570 LLNP places to 2014-15. After adjustments for assumed completion rates and the program effectiveness, the Commission estimates that these places will translate into about 13 700 people achieving an increase in their LLN skill level. The budgeted expansion in the LLNP is estimated to result in very

small changes in the LLN skills profile of the population aged 25–64 years, and small employment and productivity effects (appendix F).

The labour market effects are so small that related impacts on GDP have not been estimated. Similarly, given the small estimated realised and prospective effects of the LLNP expansion, and the fact that the WELL program is expected to grow by only 22 500 places as a consequence of new budget initiatives, the Commission has not modelled the effects of this program. Realised and prospective impacts of the Victorian and South Australian initiatives are also estimated to be small.

3.8 Potential reform effects

Effects of increased Certificate III/IV and Diploma/Advanced Diploma attainment — the higher qualification scenario

As discussed in chapter 1, the potential effects of the COAG VET reform agenda will flow from policy initiatives that have yet to be implemented, or where there is scope for further reform to deliver additional benefits. The Commission has assumed that potential effects of initiatives will begin to accrue when the current Victorian and South Australian policy statements expire, and the NPAPPP concludes. In the case of Victoria, this means that the period from 1 January 2013 onwards falls into the category of potential effects. For South Australia, the period of potential effects begins on 1 July 2016.[15] Other States and Territories, will enter a period of potential reform effects when the NPAPPP concludes on 30 June 2012.

In its 2011-12 budget, the Australian Government committed funding through a new *National Partnership for Vocational Education and Training* for States and Territories that 'make a genuine commitment to achieving reforms which complement the objectives of the revised *National Agreement for Skills and Workforce Development* which is expected to be in place by 1 July 2012' (Australian Government 2011, p. 145). A total of $1.75 billion was flagged for expenditure over five years from 2012-13. Detail on the types of reform sought by the Australian Government through the partnership were announced on 19 March 2012, with the launch by the Prime Minister of the policy document *Skills for All*

[15] For simplification, the potential scenario is assumed to cover the period 2013 to 2020, although the South Australian prospective scenario ends in 2016. Double-counting was avoided in the modelling.

Australians (box 3.2). The proposal includes an entitlement to a government-subsidised place at a Certificate III level for all people of above compulsory school age, and below age pension age, who do not already have a qualification at or above this level. The entitlement is accompanied by access to subsidised Certificate I and II qualifications where these are components of the Certificate III, and foundation skills training, where a person requires it in preparation for training at the Certificate III level.

Box 3.2 Key elements of the Australian Government's skills reform proposal

The Commonwealth has committed $1.75 billion over five years to achieve key reforms to be negotiated with the States and Territories through the Council of Australian Governments (COAG) [in 2012]:

- a national entitlement to training at a minimum of the first Certificate III qualification so working age Australians have the opportunity to gain the skills needed to get a decent, sustainable job in Australia's new economy
- wider access to student loans to reduce upfront cost barriers to study at the Diploma and Advanced Diploma level
- increased availability of information about courses, costs and training provider quality through a new *My Skills* website so students and business can make well informed choices about their training options, linked to their own needs and the needs of the economy; and choose a high quality training provider to help them develop the skills they seek
- support for quality teaching and assessment, including trialling models for independent validation of training provider assessments so students and employers can have confidence in the quality and consistency of training they purchase
- support for a strong public training provider network through the implementation of the reforms to ensure a high quality training system is accessible to all Australians
- incentives to achieve improved completion of full qualifications, particularly at higher levels and for disadvantaged students, to deliver the qualified workers that business needs and give all Australians the opportunity to develop skills and participate in the workforce.

Source: PM&C (2012, p. 8).

While *Skills for All Australians* indicates that expenditure, and VET activity, will continue to be higher when the current Victorian and South Australian policy statements expire and the NPAPPP concludes, relative to the pre-reform period, the precise shape of future VET activity over and above the baseline is not clear. As is noted in *Skills for All Australians*, with respect to the Certificate III entitlement:

States and territories may choose to go beyond this minimum guarantee, for example, to expand the entitlement beyond certificate III or make the entitlement available to people who already have a certificate III or higher. (PM&C 2012, p. 40)

At the time of writing (April 2012), the likely shape of future policy initiatives in many jurisdictions was uncertain. States and Territories other than Victoria and South Australia were at different points in developing new policy initiatives (box 3.3).

The key elements of the new NPASR released on 13 April 2012 are:

- introducing a national training entitlement for a government-subsidised training place to at least the first Certificate III qualification for working age Australians without qualifications;
- income-contingent loans for government-subsidised Diploma and Advanced Diploma students for students undertaking higher level qualifications, thereby reducing their upfront costs of study;
- developing and piloting independent validation of training provider assessments and implementing strategies which enable TAFEs to operate effectively in an environment of greater competition;
- a new My Skills website to improve access for students and employers to information about training options, training providers and provider quality; and
- supporting around 375,000 additional students over five years to complete their qualifications, and improving training enrolments and completions in high-level skills and among key groups of disadvantaged students, including Indigenous Australians. (COAG 2012)

This will condition State and Territory policy initiatives, but does not provide guidance on how they will be implemented.

In analysing potential effects of the reform agenda, the Commission has, therefore, adopted the targets set out in the current NASWD (these targets have been reiterated by COAG):

- halve the proportion of Australians aged 20 to 64 without qualifications at Certificate III level or above between 2009 and 2020
- double the number of higher-level (Diploma and Advanced Diploma) qualification completions between 2009 and 2020.

Box 3.3 **Reform progress by Australian States and Territories**

New South Wales released a consultation paper, *Smart and Skilled: Making New South Wales Number One*, on 28 September 2011. Key areas being considered include the introduction of a training entitlement to increase participation in VET, increasing contestability and further improving VET completion rates (New South Wales Department of Education and Communities, sub. V6, p. 4).

In 2011, the Queensland Government committed to introducing an entitlement system and greater student choice of provider, but a date for reform implementation was not announced:

> The new long term strategic vision for the tertiary education and training sector will include a five year plan for system reform which will be developed in consultation with stakeholders and industry and is expected to be released in 2012. (DET Qld 2011, p. 1)

Information on potential reform directions in other jurisdictions is not in the public domain.

Given the lack of detailed information about the shape of VET policy initiatives in the future, estimates from this work are even more subject to uncertainty than others discussed in this report. They should be viewed as projections of what is achievable (with large confidence intervals), and not forecasts of what necessarily will be achieved. To some extent, the potential scenario shares some of the outer-envelope characteristics of projections in the NRA report mentioned earlier.

If these targets are met, the percentage of Australians without a qualification at Certificate III level or above is projected to be 23.6 per cent in 2020, down from 47.1 per cent in 2009, and higher-level qualification completions would have to double to 108 230 per annum (CRC 2011).

Some progress towards these targets will occur without any change in policy settings. Younger cohorts have much higher levels of educational participation and attainment than older cohorts. Therefore, as older cohorts leave the workforce, the qualifications profile of the population will increase. A continuation of pre-reform trends is projected to result in the proportion of the working-age population without at least a Certificate III level qualification falling to 32.5 per cent in 2020 (CRC 2011). (This figure represents the Commission's baseline in assessing the potential effects of the reform agenda.)

Will the targets be met with current and planned increases in training activity attributable to the COAG VET reform agenda? In its most recent assessment of performance of governments against the NASWD, the COAG Reform Council concluded that the targets are ambitious, and achieving them might require additional effort. This view was shared by other participants in this study:

> … unless additional investment in the VET sector is made by government, individuals and enterprises … [Australia will] fall short in meeting the aspirational COAG targets for the transformation of the Australian qualification profile. (Skills Australia, sub. V4, p. 3)
>
> … work on the COAG targets undertaken by Skills Queensland in 2010 … revealed that the targets would not be met without considerable additional investment from all jurisdictions. (Department of Premier and Cabinet, Tasmania, sub. G3, p. 5)

The Commission does not dispute the COAG Reform Council's conclusion. Taking into account realised and prospective efforts, future Australian Government budget commitments and recent trends in training activity, the Commission projects that 31 per cent of the working-age population will not have completed at least a Certificate III qualification by 2020. In terms of future activity, this projection assumes that:

- Victorian training activity continues at the level projected for 2012
- South Australian activity is consistent with the level projected for 2014
- activity in other States and Territories is consistent with the levels achieved under the NPAPPP in 2011.

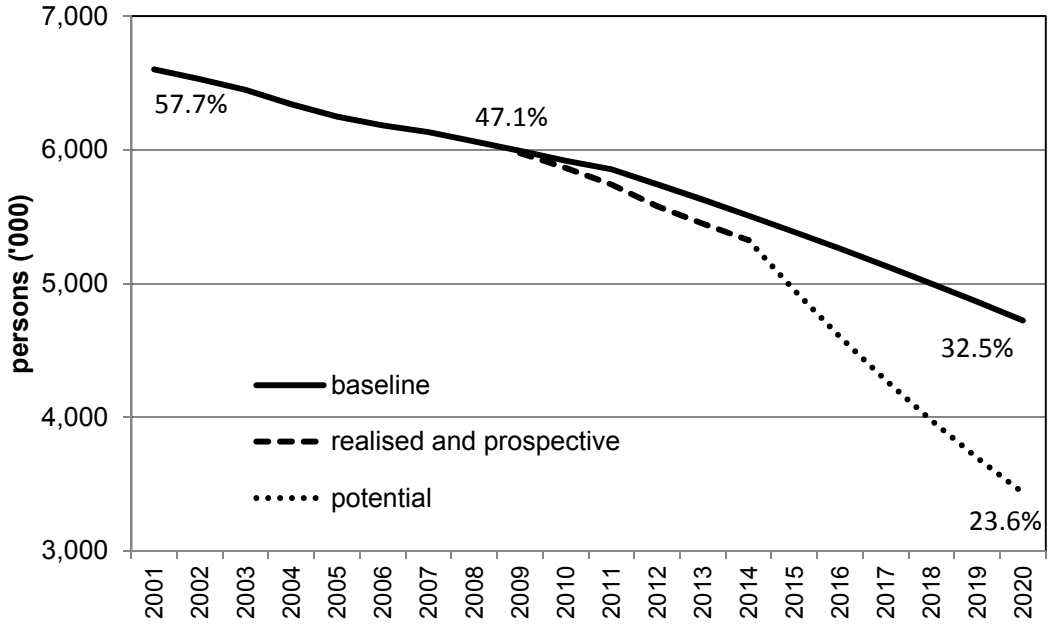
In summary (figure 3.3):

- With a continuation of pre-reform policy settings, the COAG Reform Council projected the proportion of 20–64 year olds without a Certificate III or higher qualification to fall to 32.5 per cent in 2020 (equivalent to 9.8 million *with* a Certificate III or above, assuming 14.4 million 20–64 year olds in 2020). This is the baseline against which the effects of attaining the targets is measured.
- Realised and prospective increases in training activity to date are estimated to have produced almost 200 000 higher-level completions.
- A level of effort above current commitments will be required to achieve the COAG target of only 23.6 per cent of 20–64 year olds without at least a Certificate III level qualification (equivalent to 11.1 million with a Certificate III or above by 2020).[16]

16 In the discussion draft, projecting the realised and prospective completions forward resulted in a proportion of 20–64 year olds without a Certificate III or higher qualification of 28 per cent. This proportion in the final report is closer to 31 per cent.

Figure 3.3 **Proportion and numbers of 20–64 year olds without a Certificate III or above, 2001–2020[a,b]**

Baseline and estimates



a The assumptions underlying these estimates are detailed in the adjoining text. **b** The percentages represent the proportion of 20–64 year olds in the population without a Certificate III or above.

Sources: Productivity Commission estimates based on CRC (2011) and ABS (2011a, Series B).

Consistent with this, the Commission has estimated that an additional 1.1 million higher-level completions are required. This is modelled by assuming that, in each of the seven years following 2013, an additional:[17]

- 32 000 people increase their highest level of education attainment to Diploma or Advanced Diploma level
- 124 000 increase their highest level of education attainment to Certificate III or IV.[18]

Assuming a continuation of pre-reform trends, the COAG Reform Council (CRC 2011) projects that annual completions of Diplomas and Advanced Diplomas will be about 80 000 in 2020 — short of the target of 108 230. The level of additional effort

17 Progress towards the COAG target is measured using the ABS *Survey of Education and Work*. This survey is collected in May of each year. It is therefore assumed that students will need to have completed qualifications by the end of 2019 to be counted towards the target in May 2020.

18 The assumptions used in deriving these figures are discussed in appendix C. Rounded to the nearest thousand.

at these qualification levels modelled by the Commission is consistent with attainment of the relevant target.

The analysis isolates the effects of changes in government-funded training in the VET sector attributable to the COAG VET reform agenda from any other influences. It assumes, therefore, that highest qualification completions at or above Degree level do not increase beyond trend levels — a strong assumption given the potential effects of the move to a demand-driven system in the higher education sector from 1 January 2012:

> In regard to both [COAG] targets, early indications are that the demand led system in higher education is resulting in significantly increased enrolments, which will contribute to the targets. (Skills Australia, sub. V4, p. 21)

It also ignores the effects of possible changes in VET attainment that are not associated with government-funded training attributable to the COAG VET reform agenda.

The incremental effects of meeting the COAG 2020 targets over and above the realised and prospective changes estimated

Attainment of the COAG targets implies a significant increase in the qualifications profile of the working-age population (the total impact is presented in table 3.1). Some of the initiatives to achieve those gains are already in place and are prospective as a result of the NASWD, but others will be required. At the time of writing the NPASR had just been agreed. To achieve the 2020 target there will need to be further efforts beyond this agreement. This sections sets out the estimated incremental gains from moving from the South Australian, Victorian and NPAPPP initiatives to the target (this is what the Commission has called the potential gains, in keeping with the terms of reference).

Moving from the realised and prospective gains to achieving the target is estimated to see employment rise by about 0.88 per cent, and productivity by 0.29 per cent. GDP is estimated to be 1.67 per cent higher than in the baseline. The incremental increase in net social benefit is estimated to be $48.8 billion (in net present value terms) over the working life of the affected cohort (table 3.6).

Table 3.6 **Projected incremental effects of achieving the COAG 2020 targets over and above that estimated from realised and prospective reforms**

'Higher qualifications' scenario

	Potential change
Employment (%)[a]	0.88
Productivity (%)	0.29
Gross domestic product (%)[b]	1.67
Gross payments to labour ($ bn)[c]	92.0
Net social benefit ($ bn)[c]	48.8

[a] Change in employment relative to the baseline expressed as a percentage of the Australian working-age population. [b] Percentage change from baseline; comparative static result for one year. Effect of achieving the target, less the effect of other initiatives modelled. [c] Change for the cohort over their remaining working lives (assumed to be 18 years for mature learners and 42 years for young learners).

Sources: Appendices D, E and H.

To the extent that attainment of higher education qualifications grows at above trend rates, the incremental economic benefits of achieving the COAG targets are likely to be larger, given the stronger employment and productivity effects associated with qualifications at those levels.

Readers should note that table 3.6 only shows the incremental impact. The total estimated impact of the COAG reforms realised, in prospect and potentially available from attaining the 2020 target for those obtaining higher qualifications is set out in table 3.1.

Effects of increased partial completions and attainment at or below the level of an individual's previous highest qualification

It is unlikely that individuals who report having achieved their training aims with a partial completion, and those who attain qualifications at or below the level of their previous highest, would have engaged in VET unless they anticipated a net benefit. Estimates of the economic impacts of skill acquisition via these types of VET activity are presented in this section.

Partial completions

Study participants drew the Commission's attention to the value of partial qualification completions:

> The decision to cease training, albeit part way through a broader qualification, is a specific choice and not so much a matter of circumstance. It is recognized as best suited

> to the way in which a modern worksite operates for residential building trades. (Housing Industry Association, sub. DR-G7, p. 9)
>
> The productive value of acquiring specific additional competencies has also been attested to by employers, an increasing number of whom are encouraging employees to complete designated sub-qualification 'skill sets'. (TAFE Directors Australia, sub. DR-V12, p. 6)

In response to this feedback, two partial completion scenarios were modelled. In the first, the probability of employment and productivity of partial completers was assumed to be 25 per cent of the levels they might expect from a full completion and the associated private and public funding was assumed to be 25 per cent of the cost of a full completion. In the second, the modelled increases in the probability of employment and productivity were 50 per cent of those assumed for full completion, and the cost of this was assumed to be 50 per cent of that a full qualification.

These scenarios were run for mature learners (aged 25–64), using an estimate of the level of partial completions at a Certificate III to Advanced Diploma level associated with the level of upskilling needed to attain the COAG VET targets. As discussed in appendix E, this estimate represents partial completions by people who reported that their main reason for not completing was having met their training goals. A projection of 237 000 people fitting this description was derived.[19]

Partial completions are likely to be associated with increases in employment, productivity and net social benefits (table 3.7). The relatively modest effects are a function of the fact that only 17 per cent of Certificate III to Advanced Diploma partial completers are projected to have met their training goals on leaving the VET sector (chapter 2), and the associated benefits (employment and productivity premiums) are modest. While the Commission has not added either of these scenario figures to its estimated totals, the figures below are on the same terms as those in table 3.1.

[19] Assumptions underlying the derivation of these figures are presented in appendix E.

Table 3.7 **Projected effects of partial completions associated with the achievement of the COAG targets on economic variables and net social benefit**

Estimates for mature learners

	25%[a]	*50%*[a]
Employment (%)[b]	0.05	0.11
Productivity (%)[c]	0.02	0.04
Net social benefit ($ bn)[d]	3.1	6.5

[a] Assumed share of the cost, probability of employment and productivity premiums of a full qualification. [b] Change in employment relative to the baseline expressed as a percentage of the working-age population. [c] Change in productivity of the Australian workforce, relative to the baseline. [d] Present value of the change for the cohort over their remaining working lives (assumed to be 18 years).

Source: Appendix E.

Qualification attainment at or below an individual's previous highest level

Study participants also suggested that the Commission should consider the impacts of completions at or below the level of an individual's previous highest qualification:

> Increasingly, lifelong work patterns and skill development can be expected to include not only vertical movement within an occupation, but lateral and tangential movements across occupations and industry sectors. A different skill mix and/or qualifications at the same level or even a lower level are often essential for the job mobility required to respond to structural shifts or cyclical fluctuations in the economy, particularly for workers in occupations at the Certificate III level and below. For the economy as a whole, the inability to respond to such shifts in employment opportunities will clearly have a negative impact on participation and, although additional productivity from these qualifications might be negligible, the impact of *not* facilitating these lateral movements in employment is likely to be negative. (TAFE Directors Australia, sub. DR-V12, p. 7)

In response to this feedback, the Commission modelled two 'reskilling' scenarios, the first assuming places were funded only for study at the same level as individuals' previous highest qualifications, the second assuming funding was available for qualifications at the same or a lower level. As discussed in chapter 2, VET activity of this type might be prompted: by a need to reskill; to support a career change; to gain complementary skills; as a consequence of regulatory requirements; as a step to further study; or for personal interest reasons. Activity consistent with the first four motivations was modelled in these scenarios, and the short-hand term 'reskilling' is used to represent this form of VET.

Again, the scenarios were run for mature learners, and were based on reskilling commensurate with attainment of the COAG targets. It was estimated that 418 000

mature learners will reskill at a Certificate III to Advanced Diploma level (the same level as their previous highest qualification) as a consequence of the COAG VET reform agenda between 2013 and 2019. An estimate of around 517 000 reskillers was used in the second scenario (table 3.8).[20]

Table 3.8 **Potential effects of reskilling associated with the achievement of the COAG targets on economic variables and net social benefit**

Estimates for mature learners

	Places funded	
	At the level of an individual's previous highest qualification	*At or below the level of an individual's previous highest qualification*
Employment (%)[a]	0.33	0.46
Productivity (%)[b]	0.08	0.14
Net social benefit ($ bn)[c]	14.1	20.3

[a] Change in employment relative to the baseline expressed as a percentage of the Australian working-age population. [b] Change in productivity of the Australian workforce, relative to the baseline. [c] Present value of the change for the cohort over their remaining working lives (assumed to be 18 years).

Source: Appendix E.

While the Commission has not added either of these scenario figures to its estimated totals, the figures below are on the same terms as those in table 3.1. It is once again stressed that the estimates presented in this section are experimental. The information on which they are based is less well-founded than that used in other parts of the study.

Effects of improved foundation skills

The Australian Government has developed a *National Foundation Skills Strategy for Adults*, which includes the target 'that by 2022, two thirds of working age Australians will have literacy and numeracy skills at Level 3 or above' (SCOTESE 2011, p. 1). To illustrate the potential effects of an improvement in LLN skills, the Commission modelled, as an outer-envelope exercise, the impacts of achieving this target (resulting changes in the LLN skills profile are presented in table 3.9). The New Zealand experience, in achieving a 7 percentage point improvement in adult reading literacy between 1996 and 2006 (Skills Australia 2010), suggests that an improvement of this magnitude could be feasible.

[20] The assumptions underlying these estimates are presented in appendix E.

Table 3.9 **Projected baseline and potential foundation skills profile, 2022**

Per cent

	Men		*Women*	
	Baseline	*Potential*	*Baseline*	*Potential*
Level 1	12.3	9.3	14.1	9.4
Level 2	25.8	24.0	26.9	23.9
Level 3	38.7	43.5	41.0	48.7
Level 4/5	23.2	23.2	18.0	18.0

Source: Appendix F.

If the targeted improvements in LLN skills were achieved, the Commission estimates that a 0.16 per cent increase in employment for men and a 1.03 per cent rise for women could ensue (table 3.10). It is also estimated that average productivity of men could rise by 0.82 per cent, and for women by 0.91 per cent. These changes are estimated to translate into a GDP increase of 0.7 per cent.

Table 3.10 **Point estimates of potential employment and productivity impacts of improved LLN skills in 2022**

Relative to 2022 baseline results, per cent

	Employment	*Productivity*
Men	0.16	0.82
Women	1.03	0.91

Source: Appendix F.

The relatively high productivity effects associated with improvements in LLN skills reflect the fact that:

- wage premiums for LLN skills are not discounted for unobserved ability because these skills are assumed to reflect an individual's cognitive ability. Recapping, the argument for discounting the effects of qualifications on wages is that they reflect both the skill acquired through study, and unobserved abilities, including cognitive (chapter 2)
- a fixed-coefficients approach was adopted for this analysis. Use of an optimisation model would probably have produced smaller point estimates, especially given the large increases in skills implied by the targets.

Nonetheless, given the potential improvements in employment and productivity from increasing LLN skills, and the apparent success of LLN programs such as the LLNP, significant increases in investment in LLN skills delivery might result in marked productivity and employment increases. Opportunity exists to significantly improve the population's LLN skills. However, it will likely require a significant

increase in investment on current levels. Intervening earlier, such as through early childhood education and care or during school years, might be more cost effective and lead to better long-term outcomes.

3.9 Effects of contestability on the quality of VET outcomes

Concerns about the quality of VET outcomes in an environment of greater contestability, were raised by a number of study participants. Concerns of this type tend to be more pronounced during periods of rapid growth in VET activity. Victoria's recent experience provides an example of this phenomenon. The Essential Services Commission (ESC) review, for example, received many comments about the issue (ESC 2011a). Concerns raised tended to relate to private registered training organisations (RTOs). As a result of greater contestability in the Victorian VET market, private RTOs were responsible for over 90 per cent of the increase in enrolments in Victoria between 2008 and 2011. Given private RTOs' success in increasing their market share, questions have arisen about the possible effects of contestability on quality.

In some 'mixed markets' where services are supplied by private and public providers, contestability has been introduced under the assumption that private providers can produce better outcomes for the same cost. In the case of VET, this might occur, for example, with an expansion in the choices available to students. It is also sometimes argued that private providers have more incentives to innovate and can provide services of a given quality at a lower cost. Both of these outcomes would represent improvements in productivity.

Others argue that contestability risks decreasing the quality of service provision. In VET, it might be argued that private providers reduce the quality of teaching or produce lower quality qualifications as a consequence of efforts to push down costs and maximise profits. That said, quality is a variable that is subject to optimisation. 'Gold plating' or the production of a service at a very high standard can use resources that would be better used in other ways. Furthermore, low quality outcomes are less likely to emerge if adequate regulatory settings, monitoring and enforcement are in place, and VET clients have good information on which to base their training choices (chapter 4).

The quality of a VET outcome can be considered from two perspectives. First, does a student assessed as competent actually have the skills implied by that assessment? Concerns that some private providers move students through courses in inappropriately short timeframes and incorrectly deem them to be competent, have

been raised in many fora. The Commission, for example, reported on this concern in its inquiries on the aged care (PC 2011b) and early childhood development (PC 2011c) sectors.

Second, has a competent student developed skills in demand in the labour market? A concern with greater contestability is that profit-driven private providers might seek to increase enrolments in areas of limited labour market need through marketing campaigns. Skills Victoria raised this possibility in an analysis of potential skills mismatch for sports and personal service workers (2011b). Activity of this type would be inconsistent with the NASWD objective that 'skills are used effectively to increase labour market efficiency, productivity, innovation, and ensure increased utilisation of human capital' (COAG 2008b, p. 6). There is some evidence that VET Diploma graduates employed in higher paid jobs, and whose skills are under-utilised, earn in the order of 6 per cent less than their peers whose skills are fully utilised (Mavromaras et al. 2012). No evidence of a link between skills under-utilisation and wages was found for Diploma graduates in lower paid roles, and Certificate III / IV graduates.

In its analysis of young learners (aged 15–24 years), the Commission modelled the effects in the Victorian realised scenario of assuming improved or reduced quality (appendix D). An improvement in quality was represented by a 5 per cent increase in the premiums for the probability of employment and wages, relative to the baseline; a reduction in quality, by a 5 per cent decrease.

Improving the quality of outcomes increases the value of VET qualifications relative to the baseline and increases the number of students seeking VET qualifications. The flow-on effects for employment, productivity, labour incomes and net social benefits are all positive and are large relative to estimated realised effects (table 3.11).

When lower quality of outcomes is assumed, fewer students undertake VET qualifications than when assuming constant quality. Moreover, for those who do attain VET qualifications, these qualifications translate into lower employment and productivity outcomes, which translate into lower labour incomes and net social losses, relative to the baseline.

Table 3.11 **Illustrative effects of changes in quality**
Relative to the baseline, annual effects

		Lower quality	*Victorian realised*[a]	*Higher quality*
Employment and productivity[b]				
Change in employment	%	-0.05	0.05	0.11
Change in productivity	%	0.01	0.01	0.04
Private and net social benefit[c]				
Payments to labour	$m	-277	322	857
Net social benefit	$m	-361	138	572

[a] Victorian realised effects divided by three to convert to annual effects. [b] Relative to Victorian 15–24 year olds. [c] Changes are present value terms, discounted at 6 per cent (real) over 42 years.

Source: Appendix D.

3.10 Youth transitions

In the Commission's analysis of youth transitions, success is defined with reference to a person's employment status in the period before they turn 25. Estimates of the prevalence of successful transitions depend on how the requirements for employment outcomes are set. Appendix G presents estimates based on three possible employment outcomes over the seven months before someone turns 25:

- employment in at least four of the seven months
- continuous employment of any kind
- continuous full-time employment.

About 66 per cent of young people who turned 25 in 2008 were employed full-time in the seven months prior to their birthday. When success is defined using this criteria, just over 20 per cent of the cohort are classified as having failed to make a successful transition. Remaining members of the cohort were either engaged in study or child-rearing. With the inclusion of people working part-time, the percentage of young people deemed to have made a successful transition rises to nearly 80 per cent. The percentage classified as having failed falls to 13 per cent.

When success is defined as employment, of any type, in four of the seven months prior to turning 25, 88 per cent of the cohort is estimated to have made a successful transition, and 7 per cent to have failed.

Young people classified as having made a successful transition under this definition differed significantly from their peers who had not, in a number of ways. They are less likely to have no post-school qualification, slightly more likely to have a university educated mother and much less likely to have a disability (table 3.12).

Table 3.12 **Selected characteristics of young people who do, and do not, make a successful transition**[a]

Per cent of cohort

	Success	*Failure*
No post-school qualification	30.8	41.7
Bachelor degree or higher qualification	32.9	24.9
High measured ability at age 15	25.5	17.5
Mother's education — University	22.1	16.3
Disability	1.6	8.8

a All differences between success and failure are significant at the 95 per cent level, except for mother's education for which the difference is significant at the 90 per cent level.

Source: Appendix G.

4 Opportunities for further gains

The terms of reference ask the Commission to assess, where practicable, whether Australia's reform potential is being achieved and to identify opportunities for improvement. In the course of consultations, study participants raised a number of issues relevant to this request. This chapter presents discussion of the issues.

4.1 Information available to students

As discussed in chapter 2, markets do not work as well as they otherwise might when consumers lack the information that they need to make informed decisions. A number of study participants raised concerns about the information available to would-be vocational education and training (VET) students:

> … greater access to comprehensive information about quality and availability of training is essential if VET clients are to access information they require for making informed choices about their training. The issue of transparency has become even more important with the expansion of the training market and increased moves to introduce training entitlements. (National Centre for Vocational Education Research, sub. V1, p. 5)

> For demand-driven models to work effectively, clients — be they individual learners or enterprises — must be able to access reliable information about the relative value and performance of providers both public and private. (Skills Australia, sub. V4, p. 15)

In the case of VET, in order to make informed decisions, study participants suggested that potential students need information about:

- the education and training requirements of different occupations
- the labour market outcomes associated with different courses — including employment and wage outcomes
- providers — including courses offered, course costs and the prospects of employment with a qualification from that provider.

Many websites provide content relevant to some of these information needs (box 4.1). However, the absence of some key information detracts from these sites:

> The Australian Government has made a significant investment in on-line information sources. However, the links between the various web sites are confusing to a novice and, do not include information about the employment and earnings outcomes from different providers. (TAFE Directors Australia, sub. DR-V12, p. 11)

Box 4.1 Sources of information on VET and the labour market

At the Australian Government level, the Department of Education, Employment and Workplace Relations (DEEWR) manages a number of initiatives to provide information to prospective VET students, including:

- *Job Guide*, produced for Year 10 students, contains occupational profiles and discussion of the suitability of occupations to different people
- *Year 12 — What Next?* outlines pathways from Year 12 into tertiary education and work. This website contains information on the unemployment rate by educational qualification to demonstrate the benefits of education and training
- *Job Outlook* is a careers and labour market research information site, and includes content on wages, job tasks, work prospects and the demographic profile of occupational workforces
- *Skills Info* provides data on industry employment trends and industry prospects
- *Australian Career Development Studies* is a DEEWR initiative designed to assist people, such as career counsellors, parents and teachers, who give career advice to students
- *training.com.au* provides information on VET providers and courses
- *MySkills* is a career planning service for careers in the manufacturing, engineering and automotive industries
- *myfuture* is an interactive career information service, which allows people to build a profile and create a career plan
- *Australian Apprenticeships* is a website that provides information to employers and students about apprenticeships and traineeships. The website contains a link to the National Skills Needs List, which identifies trades in demand.

In addition, Centrelink operates Career Information Centres.

Similar types of information tend to be available from State and Territory government agencies, and on the websites of many registered training organisations.

Furthermore, many privately operated employment websites, such as Seek and MyCareer, contain information on VET courses and employment prospects by occupation.

Data on post-completion employment success rates by course and provider are not available. Furthermore, the Commission has observed that it is difficult to compare the prices of courses on offer from different providers. A similar conclusion was drawn by the Essential Services Commission (ESC) in its recent VET fee and funding review (ESC 2011a). TAFE Directors Australia also observed, with respect to Victoria, that 'the complexity of eligibility requirements is confusing to students' (sub. V5, p. 3).

The introduction and development of *MySkills* will help address the information needs of potential VET clients. The Australian Government intends that *MySkills* will provide information relevant to individuals' decisions about VET at a single website (PM&C 2012). Collection and publication of the range of information intended for this site would address many of the concerns raised by study participants:

> Once fully implemented in 2014, the new website will provide comparable information about training providers, courses, training outcomes, fees and other costs, available subsidies and provider performance — enabling employers and students to choose the right training option for them. (PM&C 2012, p. 62)

4.2 The quality of student outcomes

A number of study participants argued that it is difficult to make the case for reform if stakeholders are not confident that the quality of delivery will be maintained.

Concerns about the quality of VET delivery have emerged in a number of recent Commission reports (box 4.2). Participants in this study have also raised the issue of quality:

> … there is quite widespread concern about the integrity of national qualifications being delivered by some training providers. (Skills Australia, sub. V4, p. 13)

> There is considerable evidence that the continuing drive to reduce the cost of training to the lowest possible level has reached a point where it is now compromising the quality of delivery. (TAFE Directors Australia, sub. V5, pp. 2–3)

Furthermore, it is a topic that has received comment in other reviews, for example, the ESC (2011a, p. 17) reported that:

> Quality was an issue that was raised repeatedly during the review consultations. Concerns were expressed about the quality of teaching and training; course content, design and delivery; and student outcomes.

While governments have undertaken reforms to improve quality, including revisions to the *Australian Quality Training Framework* and creation of the Australian Skills Quality Authority (ASQA), the Commission notes that the overwhelming emphasis of quality control to date has been on inputs and not student outcomes. Increased audit activity might be warranted, and was supported by study participants (Australian Chamber of Commerce and Industry, sub. DR-V15).

Box 4.2 Recent Productivity Commission conclusions on the quality of delivery in the VET sector

In a study of the VET workforce, the Commission reported that:

> … concerns about the quality of delivery by some providers [of the Certificate IV in Training and Assessment] are well founded … (VETAB 2008, cited in PC 2011a, p. 259)

The study into the provision of aged care services concluded that:

> While the delivery of many training courses is of high quality, there are some registered training organisations that are not delivering accredited courses to the standard required … (PC 2011b, p. 347)

Most recently, the study on the early childhood development workforce found that:

> Study participants report that the quality of ECEC [early childhood education and care] training … is highly variable. While there are examples of excellence, concerns about poor quality training from [registered training organisations] are widespread. (PC 2011c, p. 203)

In addition, a number of study participants, including Skills Australia, advocated mandatory external validation of a sample of student assessments annually. Validation is a process that involves checking that assessment tools produce evidence that 'enable reasonable judgements to be made [about whether] the requirements of a Training Package or accredited course had been met' (National Quality Council 2009, p. 7).

The announcement that the Australian Government 'will work with the States and Territories to ensure the qualifications delivered by the VET sector are independently assessed' (Gillard 2012, p. 4) indicates that steps are being taken in the direction of external validation of training outcomes. This should also contribute to higher quality training outcomes. The 2012 *National Partnership Agreement on Skills Reform* (NPASR) specifies the 'development and piloting of independent validation of [Registered Training Organisation (RTO)] assessment practices with a view to informing the development of a national model' (para. 27 b).

The Commission considers that the provision of data on the performance of individual RTOs would provide incentives for them to focus on quality training and assessment. This view is supported by Skills Australia (sub. V4). Furthermore, the provision of data on the performance of individual RTOs — advocated by both the Commission in its study of the VET workforce (PC 2011a) and Skills Australia (sub. V4) — would provide incentives for RTOs to focus on quality training and assessment. Inclusion of data at an RTO-level on *MySkills* would be likely to help in this regard. The Commission notes the planned introduction of *MySkills* by 2015-16. The NPASR specifies that consumer information is to be improved by the 'development of proposals for release of comparable data on the national *MySkills* website and on RTOs' own websites, with data to include quality of providers,

prices, government support, including subsidies, and labour market information' (para. 26 d). However, valid and reliable data on employment outcomes at a provider and course level are not currently collected and it is unclear if these will be included in the labour market information available on *MySkills*.

Any initiatives to improve quality will involve costs that need to be balanced against the benefits likely to ensue.

4.3 Completion rates

Around two thirds of Certificate III and above students do not complete the qualification in which they enrol (chapter 2). Some level of non-completion is consistent with optimal training decisions by individuals. For example, if a highly skilled worker only needs a unit or two of training, it could be wasteful of his or her time and resources, and public funds, for them to complete a full qualification. This view was expressed by a number of study participants:

> … many of the students who do not complete may have completed sufficient training to obtain a benefit – for example via achieving a skill set. (Department of Industry, Innovation, Science, Research and Tertiary Education, sub. DR-V9, p. 1)

> There are many instances where it would be more acceptable and useful for rural and regional RTO/VET providers to be able to put together a suite of competencies and have each competency measured as a unit of completion. (Sustainability Learning Institute, sub. DR-V8, p. 2)

Australia's low completion rate, in the main, reflects people leaving for reasons other than obtaining the skill sets they sought (chapter 2). This is cause for concern:

> We agree current completion rates in the VET sector are unacceptably low and that this impacts on the overall supply of qualifications. Although we acknowledge that RTOs enrolling a large proportion of disadvantaged students are more likely to have lower completion rates and there are cases when a partial completion may be considered a successful outcome, we maintain that such low qualification completion rates represent wastage for individuals, employers and government. (Skills Australia, sub. DR-V11, p. 11)

Study participants highlighted the need to offer adequate support for disadvantaged students in order to boost completion rates. According to the Department of Further Education, Employment, Science and Technology in South Australia, '[c]ompletion rates can be improved through programs such as Learner Support Services and VET to Work (a program to improve both VET and employment outcomes for people with a disability)' (sub. DR-V7, p. 3). Skills Australia called for 'mentoring and learning support, especially for disadvantaged students … [and] adequate loan

support and student financial assistance' (sub. DR-V11, p. 12). The Australian Council for Private Education and Training (ACPET) argued that:

> Flexible support services and enhanced funding are necessary to improve workforce participation rates for disadvantaged and disengaged individuals. Contestability for a greater share of public funds will enable independent providers to expand their delivery of skills training to disadvantaged students, particularly in rural and remote areas, as student demand increases.
>
> ACPET believes that the roll-out of the National Broadband Network (NBN) will provide new learning opportunities for people in regional and rural areas and support for providers to harness the benefits of the NBN needs to be considered in relation to future VET funding. (sub. DR-V14, p. 10)

Study participants also identified funding on outcomes as a strategy for improving completions:

> We suggest … [i]ntroducing outcomes based funding — rewarding completions, but only after required quality processes are in place. We recommend that public funding should move progressively to a system of staged payments at enrolment, midpoint and a final payment based on module completion. Putting the emphasis on completions also has the potential to promote a much stronger focus on student selection and support. (Skills Australia, sub. DR-V11, p. 12)
>
> The ACTU generally supports a shift in the funding model towards a greater focus on outcomes, such as completion rates, rather than input measures based on activity and volume. This would provide an incentive for providers to address currently poor completion rates and it recognises the value and importance of individual students and workers obtaining a full, nationally-recognised, vocationally relevant qualification that allows them to work across an occupation or industry. (Australian Council of Trade Unions, sub. DR-V13, p. 8)

However, potential risks associated with this approach were also noted:

> … the ACTU also recognises that such a shift [to outcomes based funding] comes with its own set of risks and potential perverse outcomes and behaviour. For example, this can occur if funding completions simply encouraged providers to train those who are easiest to train with the least effort and in skill areas of low priority. The design of the funding model needs to be such that there is also a clear link to industry and community priorities, and the extent of training effort and rigour.
>
> It is important too that any such shift is complemented by renewed effort on the quality front, particularly in assessment. … [T]he quality of assessment needs to improve so there is industry confidence that those who complete, and are assessed and signed off as competent, can in fact perform the skills on-the-job that the qualification says they can perform. This is a vital ingredient in any move towards an outcomes-based funding model based on completion rates. Changes to funding and assessment systems need to be done as a package to improve quality. (Australian Council of Trade Unions, sub. DR-V13, p. 8)

The Australian Government recently identified low completion rates as 'an enormous waste of public funds, a big loss of potential skills and a human tragedy as well' (Gillard 2012, p. 4). Improvements in student retention and outcomes from State and Territory training systems have been flagged as issues for negotiation through the Council of Australian Governments (COAG) (PM&C 2012). Mooted strategies to improve completion rates include better approaches to training content and delivery, teacher quality and student support.

4.4 The importance of sequencing to successful policy initiatives

Study participants raised the importance of a number of building blocks for a successful move to a more competitive system.

First, regulatory systems that can identify and respond to poor performance need to be in place. Skills Australia argued that 'opening up the training market to greater contestability must be preceded by more stringent quality measures. The danger otherwise is that providers will only compete on price and additional investment in the sector will be compromised as a result of poor quality' (sub. DR-V11, p. 10).

There have been significant national regulatory developments in the past 12 months, with the establishment of the ASQA and the new National Skills Standards Council. The ASQA's regulatory approach is based on risk assessments that draw on information from a range of sources including advice from auditors, feedback from industry regulators and associations and complaints data. The ASQA (2011, p. 1) also:

> … has a range of powers including the application of sanctions, and prosecutions involving civil and criminal penalties, to effectively regulate training providers.

In moving to a more competitive VET system, both Victoria and South Australia have adopted additional regulatory measures. For example, South Australian RTOs:

> … will be required to demonstrate financial capability to maintain services; demonstrate established industry engagement; maintain quality training, assessment and information services; and support learners with additional needs. (South Australian Government, sub. G1, p. 9)

Measures flagged by the Australian Government (PM&C 2012), noted in section 4.2, also have the potential to identify poor performance and over time improve outcomes.

Second, mechanisms for timely information collection and data analysis are required. Victoria, for example, requires that training organisations that receive government funding provide data regularly to Skills Victoria. These data are used to 'shape policy, monitor VET activity, evaluate initiatives and plan for the future' (Skills Victoria 2011d). Availability of timely data informed the October 2011 decision to reduce government subsidies from January 2012 to courses that have grown rapidly (Hall 2011).

Third, potential VET clients need access to an adequate level of information (section 4.1).

Fourth, public providers need governance arrangements that allow for greater autonomy and capacity to compete with other providers. In South Australia, for example, TAFE SA is being established as a statutory authority from 1 July 2012, with the aim of strengthening its ability to compete by being more flexible and responsive to client needs.

Fifth, systems to pay providers on outcomes achieved (for example, module completions) rather than an input measure (for example, the number of student contact hours), need to be developed. For example, the new policy regimes adopted in Victoria and South Australia involve payments to providers on the basis of successful completion of competencies. Victoria has developed a 'comprehensive web based information technology system, the Skills Victorian Training System (SVTS) … [which] provides 'real time' information about contracted RTOs' training delivery and funding' (Skills Victoria 2011a, p. 10).

A Benchmarking results from this report

A.1 Background

A number of interested parties, in response to the discussion draft, suggested that the Commission undertake a comparative analysis of its own results on the impact of the Council of Australian Governments' (COAG) Vocational Education and Training (VET) reforms with other estimates.

The Commission has done this in two tranches: initially for workshop participants using revised estimates; and for the final results contained in this report. The final analysis benefited from consideration of the feedback received in submissions and from discussions at the workshop.

This appendix draws out the implications of the labour market modelling results found in other parts of this report, so that those results may be benchmarked against external comparators.

The main comparators used in this appendix are labour force participation and productivity projections that were described in a letter from the Chair of Skills Australia to Presiding Commissioner Patricia Scott (Bullock, P., Chair, Skills Australia, Canberra, pers. comm., 14 February 2012) (box A.1). Participation and productivity effects of COAG VET reforms are important because, in addition to being of independent interest, they are a key driver of the overall benefits and costs the reforms are expected to generate (chapter 2).

Alongside those contained in Skills Australia's letter, an additional source of comparator estimates is KPMG Econtech's (2010b) report, *Measuring the Impact of the Productivity Agenda*. This report was commissioned by the Department of Education, Employment and Workplace Relations. In its analysis, KPMG Econtech estimated the impact of — among other COAG productivity agenda policies —

increasing the proportion of 25–34 year olds with at least a Certificate III qualification.[1]

Box A.1 Labour market comparators cited by Skills Australia

Labour force participation

In its letter, Skills Australia refers to a consultancy report it commissioned from Access Economics (2009). Based on the various scenarios contained in that report, Skills Australia suggests that the full implementation of COAG educational reforms (to higher education as well as VET) will increase the labour force participation rate[2] from 64.5 per cent in 2009 to 68.3 per cent in 2020.[3] This represents an increase in that rate of 3.8 percentage points or 5.9 per cent.[4]

Labour productivity

Skills Australia's letter also contains unpublished research by Skills Australia Board member Michael Keating, suggesting that the upskilling of the labour force recommended by Skills Australia (2010) in its *Australian Workforce Futures* report would add 1.25 percentage points to average labour productivity growth by 2025, relative to a scenario without upskilling.[5]

Sources: Access Economics (2009); Bullock, P., pers. comm.; Keating (2012); Skills Australia (2010).

In the following sections, selected results from this report are benchmarked against the relevant comparators, using two approaches.

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1 KPMG Econtech projects both labour force participation and labour productivity. However, in this appendix, the latter only is examined, as the report does not provide sufficient information to allow a suitable participation comparator to be constructed.

2 In this appendix, the labour force participation rate is given its conventional definition as the proportion of the population aged 15 and over who is either employed or unemployed. When referring to the employment to population ratio, the term 'employment rate' is used.

3 The 64.5 per cent figure is referred to in the letter from Skills Australia to Commissioner Scott as the 'workforce participation rate' (Bullock, P., pers. comm., p. 1). However, it clearly points to the corresponding 'labour force participation' rate in Chart 2.6 of Access Economics (2009, p. 9). It should be noted that the Skills Australia/Access figure does not match the trend labour force participation rate reported in the ABS *Labour Force Survey* for the same month (June 2009), of 65.5 per cent. For benchmarking purposes, however, the 64.5 per cent figure is retained as the starting point throughout this appendix.

4 The former is obtained as 68.3 - 64.5 = 3.8 and the latter as (68.3 - 64.5) / 64.5 = 5.9.

5 Keating (2012) — in an attachment to Bullock, P., pers. comm. — uses Access Economics' 'Low Trust' (supply) scenario as the base in his calculations, and the 'Open Doors' scenario for its policy (COAG) deviations.

- A back-of-the-envelope approach (section A.2) allows various projections for 2020 to be compared on a consistent basis. It reveals only minor differences in projections between Commission estimates published in this report and the alternative figures provided by some stakeholders.
- A combination of detailed simulations and back-of-the-envelope approach (section A.3) allows a decomposition of the sources of difference between this report's figures and their comparators.

Section A.4 concludes.

A.2 Minor differences in overall projections

Simple, back-of-the-envelope calculations reveal that, when compared on a consistent basis, there are no major, order-of-magnitude differences between the Commission's projections in this report and those contained in the work of Access Economics (Access) (2009) and Keating (2012). This conclusion is substantiated below in relation to both participation and productivity.

Labour force participation

An assumption common to the analyses above is that COAG VET reforms will contribute to successfully halving the proportion of the population aged 20–64 without a Certificate III or higher between 2009 and 2020.[6] As illustrated in figure 3.3, the rate will drop from 47.1 per cent in 2009 to 23.6 per cent in 2020, due in part to the various reforms discussed in chapter 3. Equivalently, there will be an increase of 23.5 percentage points in the qualification-holding rate (Certificate III or higher) of 20–64 year olds. This will fulfil the main COAG target for VET attainment. What would be the labour force participation consequences of reaching this target?

Ability-discounted employment premium estimates for mature learners moving from below Certificate III to qualifications at or above Certificate III appear in appendix E (table E.10, second column). Weighting these discounted premiums by population numbers from the ABS (2010b) *Survey of Education and Training* yields a weighted average employment premium of approximately 16 percentage points for holding a qualification at or above Certificate III.

6 The exception is KPMG Econtech's analysis, which models VET attainment of 25–34 year olds.

It follows that the increase in the overall employment rate of 20–64 year olds that can be expected from fully meeting the COAG Certificate III target by 2020 is:

[(23.5 x 1.16) - 23.5] = 3.8 percentage points *(1)*

As mentioned in box A.1, Access Economics (2009) projects the *labour force participation rate* to increase from 64.5 per cent in 2009 to 68.3 per cent in 2020, under its Open Doors scenario. The report does not make assumptions regarding unemployment. Assuming a constant unemployment rate of 5 per cent throughout, the Access projection is equivalent to the *employment rate* increasing from 61.3 per cent to 64.9 per cent over the same period.[7] As Access attributes this increase to the fulfilment of the COAG goal of halving the proportion of the 20–64 population with no post-school qualification, it is possible to conclude that attainment of this goal is responsible for a *64.9 - 61.3* = 3.6 percentage points increase in the employment rate.

The overall *employment* participation gain projected by Access is, therefore, very similar to that implicit in this report (3.6 and 3.8 percentage points, respectively). Correspondingly, the percentage point increase in the *labour force* participation rate estimated by Access (3.8 percentage points) is also close to that implied in this report (4.0 percentage points).[8]

Labour productivity

A similar back-of-the-envelope approach can be used in relation to labour productivity. It is again assumed, as a starting point, that the major COAG target of halving the proportion of non-Certificate III holders in the population aged 20–64 is met by 2020.

Appendix C (table C.14) gives discounted wage premiums for holding qualifications at Certificate III level or above, relative to having completed Year 12 or lower (mature learners) or Year 11 or lower (young learners). A single weighted wage premium of approximately 13 per cent was calculated from these figures by:

- adjusting the premiums for young learners to a Year 12 base (rather than Year 11 or below as in the original table)

7 Noting that, with a constant unemployment rate, the percentage change in the employment rate is identical to the percentage change in the labour force participation rate.

8 This figure is obtained by applying the percentage increase previously obtained for the employment rate to the initial labour force participation rate.

- taking the mid-point between the young learner (adjusted) and mature learner premiums
- weighting these by numbers in the labour force with a given level of educational attainment.[9]

As is the case throughout this report, average wages are regarded as a proxy for average labour productivity. Consequently, the percentage increase in productivity associated with the achievement of the COAG targets can be calculated as:

[(23.5 x 1.13) - 23.5] = 3.1 per cent *(2)*

In the absence of COAG reforms, the proportion of 20–64 year-olds without at least a Certificate III is projected to decrease from 47.1 per cent in 2009 to 32.5 per cent in 2020 (chapter 3, figure 3.3). What might be termed a 'natural trend' is due to non-COAG factors driving human capital investment, such as demographic change, migration, increased female participation and the greater educational attainment of younger cohorts as a result of pre-COAG policies. The natural trend scenario implies an increase of 14.6 percentage points in the qualification-holding rate (Certificate III or higher) of 20–64 year olds. Using the same method of calculation as for result (2) above, the percentage increase in productivity from the natural trend would be approximately:

[(14.6 x 1.13) - 14.6] = 1.9 per cent *(3)*

Combining results (3) and (4), the percentage point difference associated with achieving the COAG reforms by 2020, relative to the counterfactual of no reforms, would be approximately:

3.1 per cent - 1.9 per cent = 1.2 percentage points *(4)*

Keating's (2012) figure of 1.25 percentage points relates to the period 2010–2025. Pro-rating his estimate to 11 years to harmonise with the projection period used in this report (2009–2020) reduces it to 0.92 percentage points, similar to result (4) above.

9 As this report assumes no change in the proportion of degree or higher holders, the premium associated with this qualification is not included in this estimate.

A.3 Decomposition of apparent discrepancy

The back-of-the-envelope calculations in the preceding section suggest that the Commission's results contained in this report should be broadly consistent with those of Access and Keating, provided:

- full attainment of the COAG targets is assumed as the end point
- changes in participation and productivity are measured using the same metrics.

Yet, the participation and productivity results reported in chapter 3 (table 3.1) are very different from their respective comparators.[10] Why is this the case?

When benchmarking against the Access figures, the main reason for the difference is that the natural trend in qualification attainment — the change that would happen in the absence of COAG reforms — is netted out from the Commission's reporting of the effect of reforms, which are provided in a 'deviation from baseline' format. By contrast, the Access figures are presented only as an overall deviation from 2009 rates.

In the following section, the relevant results in the body of this report are combined with the natural trend, a component of the total participation rate change between 2009 and 2020 that the Access analysis includes but does not single out.

In the subsequent sections, the results are further adjusted for other potential sources of divergence — ability discounts and employment and wage premiums. These secondary adjustments are more directly relevant to the reconciliation of productivity estimates.

Adding in the natural trend

Table A.1 reproduces part of table 3.1 (chapter 3), for convenience, and shows the Commission's projected employment participation and productivity impacts from all the COAG VET related reforms — realised, in prospect and potential.

[10] Table 3.1 summarises the effects of the 'higher qualification' scenarios, and is, therefore, the relevant source of Commission estimates for this appendix's benchmarking.

Table A.1 **Impacts of the COAG VET reforms by 2020**

Per cent deviation from base

	Vic realised	*Vic prospective*	*South Australia*	*PPP*[a]	*Australia potential*	***Total***[b]
Change in employment[c]	0.02	0.03	0.01	0.11	0.88	**1.04**
Change in productivity[d]	0.01	0.02	0.00	0.04	0.29	**0.35**

[a] Realised effects of the National Partnership Agreement on Productivity Places Program (NPAPPP). [b] Rows may not sum due to rounding. [c] Change in employment relative to the baseline, expressed as a percentage of the Australian working-age population. [d] Change in productivity of the Australian workforce, relative to the baseline.

Source: Table 3.1.

The percentage increase in the labour force participation rate will equal that of the employment rate in table A.1, as long as the unemployment rate remains constant. This implies that COAG reforms will increase the labour force participation rate in 2020 by 1.04 per cent, relative to a 'no reforms' scenario.

This result is much lower than the Access comparator — a 5.9 per cent increase between 2009 and 2020 (from 64.5 per cent to 68.3 per cent), due to table A.1 netting out the natural trend (as mentioned above).

The natural increase in labour force participation, implicit in the Commission's work, can be estimated on the basis of the projected decrease in the proportion of 20–64 year-olds without at least a Certificate III, from 47.1 in 2009 to 32.5 in 2020 (absent any COAG reforms). Using the weighted employment participation premium of 16 percentage points from section A.2, the corresponding trend increase in employment participation is:

$$(47.1 - 32.5) \times 0.16 = 2.3 \text{ percentage points} \quad (5)$$

This natural percentage point change to 2020 can be added to the percentage point policy effects as follows.

First, the 1.04 per cent increase in the employment rate due to the COAG reforms can be converted to a percentage point change by applying the per cent change to a 2020 trend base of $61.3 + 2.3 = 63.6$ per cent:

$$(63.6 \times 1.04) / 100 = 0.66 \text{ percentage points} \quad (6)$$

Then, adding the total of the reform effects in percentage points to the trend effect gives a total increase in the employment rate (rounded) of 3.0 percentage points, of which approximately 2.3 points is due to the natural trend and 0.66 points is due to consolidated reform effects.

This can be contrasted with the 3.6 percentage point increase in the employment rate implied by the Access results (section A.2).

The 3.0 percentage point increase in the employment rate can also be converted to a per cent increase in the labour force participation rate. From a 2009 rate of 61.3 per cent, a 3.0 percentage point increase is an increase in the employment rate of 4.9 per cent. Once again assuming a constant unemployment rate of 5 per cent, this figure also measures the increase in the labour force participation rate.

The 4.9 per cent rate of increase is somewhat lower than the figure of 5.9 per cent implied by Access Economics (2009).[11] However, it should be noted that both figures are point estimates, surrounded by confidence intervals. While it is not possible to be certain, the possibility exists that the gap between the two figures is not statistically significant.

Nonetheless, the remaining gap might also be due to the fact that the analysis so far has used 'ability discounted' employment premiums, an issue which is now investigated.

Removing the ability discounts

The ability discounting used in the Commission's modelling affects the projected participation and productivity impacts presented in chapter 3, as well as the preceding analyses in this appendix.

To gauge the impact of discounting on the Commission's results, the relevant models were re-run after removing all employment and wage discounts (both for young learners and mature learners). The results are presented in table A.2, which should be read as incorporating the totals already presented in table A.1.

Table A.2 **Impacts of the COAG VET reforms by 2020, no ability discounts[a,b]**

Per cent deviation from base

	Total
Change in employment participation	1.12
Change in productivity	0.39

a As in table A.1, total figures represent the global effect of all COAG policies taken together. Individual policies are not provided here for simplicity. **b** Appendix C contains a discussion of ability discounting.

Source: Productivity Commission estimates.

11 Refer to footnote 4.

Impact on employment and participation

By comparing the total columns in table A.1 and table A.2, the impact of discounting on Commission results can be inferred. On the employment side, it appears that ability discounting lowered only slightly the results published in the body of this report (the difference being only 0.08 percentage points). Nonetheless, to investigate further, the Commission has repeated the combination of back-of-the-envelope participation rate calculations performed in the previous section. Because the new calculations pertain to a 'no discount' situation, an undiscounted weighted employment premium of 18 per cent is used, rather than the 16 per cent used previously to derive result (1).

The increase in the overall employment rate of 20–64 year olds that can be expected from fully meeting the COAG Certificate III target in 2020 when ability discounting is removed from the modelling is:

[(23.5 x 1.18) - 23.5] = 4.2 percentage points *(7)*

This percentage point increase is now higher than that implied by the Access modelling — a 3.6 percentage point increase in the employment rate (noting that, now, neither methodology incorporates an ability discount into its employment premiums). It is also higher than section A.2's estimate of 3.8 percentage points [result (A)]. Thus, back-of-the-envelope results suggest that ability discounting will produce a sizeable difference in the headline participation figure. A more precise estimate of the size of the ability discounting effect is provided by the combination of back-of-the-envelope and modelling approaches.

The trend increase in the employment rate when the overall weighted employment premium is not discounted is equal to:

(47.1 - 32.5) x 0.18 = 2.6 percentage points *(8)*

Using the same methodology as in the preceding section, the total per cent change in employment from table A.2 can be converted to a percentage point change. This yields an increase of 0.72 percentage points in the employment rate, up from 0.66 percentage points when ability discounting is applied (calculations not shown for brevity).

Adding this result to result (8) gives the percentage point increase in employment for the 2009–2020 period when the component methodologies (back-of-the-envelope and report modelling) do not include ability discounts:

2.6 + 0.72 = 3.3 percentage points *(9)*

Based on the same methodology as previously used, a 3.3 percentage point increase in the employment rate implies a 5.4 per cent increase in the labour force participation rate due to all reforms and trends to 2020, similar to the Access estimate of 5.9 per cent.[12]

Impact on productivity

Removal of all ability discounts increases only slightly the total productivity effects of the COAG reforms, from 0.35 per cent (table A.1) to 0.39 per cent (table A.2).

While the 'no discounts' figure of 0.39 per cent is closer to Keating's (pro-rated) value of 0.92, it is still on the low side. It is also lower than an adjusted figure of 1.2 per cent obtained, based on the KPMG Econtech (2010b) analysis (box A.2). Like that of Keating, KPMG Econtech's analysis does not use ability discounts,[13] so the Commission estimate with no ability discounts in table A.2 is the appropriate comparator.

Not enough is known about the sequential adjustments performed by the KPMG Econtech modelling (table A.3 in box A.2) to be able to pinpoint the source of the gap remaining with the productivity estimate in table A.2. It can be hypothesised, however, that the gap remaining between Commission productivity estimates and those of Keating is due in part to a difference in the wage premiums used in each analysis. Different (employment) premiums are also a possible reason behind the discrepancy between Commission participation results and those of Access.

Employment and wage premiums

Exploratory calculations by the Commission suggest that the Access and Keating results cited by Skills Australia (Bullock, P., pers. comm.) rely on implicit premiums that are higher than those used in this report.

12 (3.3 / 61.3) x 100 = 5.4.

13 Wage premiums were based on Leigh (2008) and slightly discounted for 'conservatism', but no explicit ability discount was applied.

Box A.2 **KPMG Econtech (2010b) — productivity estimates**

KPMG Econtech's (2010b) analysis assumes that the COAG VET target of halving the proportion of the population without at least a Certificate III will be achieved through an 11.8 per cent increase in the qualification holding rate (Certificate III to Advanced Diploma), with the remaining 8.1 per cent increase to come from attainment of degree-level qualifications. However, KPMG Econtech reports the productivity impact of increased degree completions separately. As a consequence, the estimated productivity impact of the VET reforms to 2020 (approximately, a 0.7 per cent deviation from baseline, based on a reading of chart 1, p. v) represents the effect of the 11.8 per cent increase in VET qualifications only. KPMG Econtech further assumes that the increase in VET attainment is confined to the 25–34 year old age group, and initially presents estimated productivity effects for the cohort of 25–34 year olds in 2070. That effect is then converted into an effect covering the working-age population as a whole in that year.

This differs from the Commission's approach, in which the COAG VET target is achieved entirely through the greater prevalence of Certificate III to Advanced Diploma qualifications across the population. To adjust KPMG Econtech's result for comparability, it is assumed that there is a 19.9 per cent increase in VET (Certificate III to Advanced Diploma) qualification holding among 25–34 year olds. Using the same wage premium as KPMG Econtech, an increase in productivity is calculated for the relevant cohort (25–34 year olds), and the same implied adjustment factors are used to extrapolate a working-age population productivity increase and then an increase to 2020 only (rather than 2070) (table A.3).

Table A.3 **Adjusting the productivity estimates in KPMG Econtech (2010b)**

Increase in VET qual holding[a]	*Wage premium*	*Increase in productivity*		
		25–34 year olds, in 2070	*Working-age population, in 2070*	*Working-age population, in 2020*
%	%	Per cent deviation from base		
KPMG Econtech estimates[b]	11.8	18.0	2.1	1.6	0.7
Adjusted estimates	19.9	18.0	3.6	2.8[c]	1.2[d]

[a] Certificate III to Advanced Diploma. [b] From KPMG Econtech (2010b); chart 1, p. v; table 2.9, p. 27. [c] Calculated from cohort productivity increase using an adjustment factor of 0.78 implied in KPMG Econtech results. [d] Calculated from productivity increase to 2070 using an adjustment factor of 0.42 implied in KPMG Econtech results.

Benchmarking employment premiums

With respect to labour force participation, the premiums used by Access are not known with certainty. However, in chart 2.9 of its report (Access Economics 2009, p. 11), a graph of age-specific labour force participation rates by level of educational attainment is provided. On the basis of that chart, it is possible to infer approximately what the underlying numbers are. Moreover, based on the Access commentary surrounding the chart, it is reasonable to assume that the participation differentials illustrated in that chart form the basis of the report's 'alternate method' for calculating the labour force participation rate in 2020.

The data for the Access chart are from the 2007 ABS *Survey of Education and Work*. Using population by age group figures from the same edition of this survey, it is possible to calculate that the weighted average labour force participation premium for all those aged 25–64 is 14 percentage points.

It is then necessary to transform this premium into an employment premium as used in this report. This requires knowledge of unemployment rates by age group and by qualification level.

From the 2007 *Survey of Education and Work — Summary of Findings* (ABS 2007), the unemployment rate for all those aged 15–64 with a Certificate III or higher was 2.4 per cent in that year.

For those without a post-school qualification,[14] the corresponding figure was 7.6 per cent. Combining these two rates with the weighted average above suggests that the employment premium for those aged 25–64 with a post-school qualification is around 18 percentage points (higher than the corresponding participation premium, due to the difference in unemployment rates by qualification level).[15]

This 'global' employment premium is somewhat higher than the range of ability-discounted premiums used in this report's modelling for both young and mature learners (appendix C, table C.15). For example, the weighted average of the discounted mature learners premiums is 16 percentage points, around 2 percentage points lower than the (notional) weighted Access premium.

14 Defined as Certificate III or higher, consistent with Access Economics.

15 Inclusion of people aged 15–24 in this calculation is not likely to bias the analysis significantly. In the absence of a Confidentialised Unit Record File for the SEW 2007 data, more accurate estimates cannot be readily constructed.

Benchmarking wage premiums

Keating provides data on average weekly earnings in main job by level of highest educational qualification (Keating 2012, table A.1, p. 13).[16] He then applies those figures to changes in the qualifications profile of the employed population under the Open Doors and Low Trust Globalisation (supply) scenarios devised by Access. He estimates from this calculation that the education and training reforms recommended by Skills Australia will increase growth in labour productivity by 1.25 per cent between 2010 and 2025 (relative to 2010).[17]

The wage differentials identified by Keating are central to his estimate of a productivity effect due to the training and education reforms recommended by Skills Australia. If these premiums are too high, the productivity boost from additional training and education is likely to be overestimated.

Data in Keating's earnings table allow notional wage premiums to be calculated for various levels of educational attainment. These premiums can then be loosely compared to those used by the Commission in this report (table A.4).

Table A.4 **Comparison of Keating and Commission wage premiums[a]**

	Keating	*Productivity Commission*	*Times ratio*
	%	%	Number
Year 12 (base)			
Certificate III or IV	38.2	7.9	4.8
Diploma or Advanced Diploma	42.6	20.9	2.0
Degree or higher	87.0	51.8	1.7

a Keating's premiums have been derived by weighting the earnings figures in table A.1 in Keating (2012) by the qualifications profile of the employed population in 2010 (table 2 in Keating 2012). Productivity Commission figures are the arithmetic mean of the young and mature learner premiums in table C.14 (appendix C), after adjusting the young learner premiums to a Year 12 base for comparability with the mature learner premiums. 'Times ratio' measures the absolute ratio of Keating to Productivity Commission figures.

Sources: Keating (2012); Productivity Commission estimates.

As this comparison indicates, the implicit premiums used by Keating are approximately 2 to 5 times higher than those the Commission has estimated and used.

16 The data are from the 2009 ABS *Survey of Employee Hours and Earnings*.

17 His result is expressed in terms of percentage points, but is equivalent to a percentage increase, given that the base is the origin year of 2010.

Effect of higher premiums

To illustrate the possible impact of lower premiums on the Commission's results, the models were re-run using the higher wage premiums implicit in the Keating analysis.[18] To simulate the Keating premiums, a correction factor of 2 rather than 5 was applied to the premiums used in this report, to obtain a conservative estimate.

The results from this exercise are presented in table A.5. Once again, this table should be read as incorporating corresponding results in tables A.1 and A.2.

Table A.5 **Impacts of the COAG VET reforms by 2020, higher wage premiums and no ability discounts**

Per cent deviation from base

	Total
Change in employment[a]	1.14
Change in productivity	0.95

[a] The employment participation rate under this scenario is slightly higher than the total reform effect of 1.12 per cent when no discount is applied (table A.2). This is because, while the undiscounted average employment premium of 18 percentage points was the same as that used in deriving the table above, optimising agents in the model now respond to higher wage premiums and increase their employment participation accordingly.

Source: Productivity Commission estimates.

Applying the same methodology used above, the estimated per cent deviation in employment as a result of COAG VET reform can be converted to a percentage point change in the employment rate, added to the natural trend percentage point change in the employment rate (calculated using an 18 percentage point employment premium), and then converted to a per cent increase in labour force participation over the 2009 rate. Doing so obtains an estimated increase in the labour force participation rate of 5.4 per cent, equal to within one decimal place to the undiscounted overall estimate without the higher wage premium.

As could be expected, the use of higher wage premiums ('on top' of the removal of ability discounting) results in an estimated productivity impact of COAG VET reforms that is much larger than the Commission's published result (table A.1). The estimated impact of 0.95 per cent is very close to Keating's (pro-rated to 2009–2020) estimate of 0.92 per cent.

[18] The removal of ability discounts in the preceding adjustment step (table A.2) for Commission results brings Commission employment premiums and those implicit in Access Economics (2009) very close to each other. For this reason, an equivalent employment simulation was not implemented.

This shows that 'headline' productivity (and, most likely, participation) results are sensitive to the premiums used to express the labour market gains reaped by individuals acquiring VET qualifications above those already held.

A.4 Conclusion

The preceding sections have shown that there are no substantive differences between the Commission's modelling results and the key participation and productivity figures put forward by Skills Australia (Bullock, P., pers. comm.).

The apparently large differences between the Commission's results, as summarised in chapter 3 of this report, and those of Access and Keating, can be variously attributed to the Commission's:

- netting out of the natural trend increase in VET attainment
- use of ability discounting
- choice of employment and wage premiums.

Once Commission results are expressed on the same basis as the comparators cited in this appendix, the perceived differences disappear or are considerably lessened. This is shown in table A.6, which summarises the participation results obtained in preceding sections and compares them to the Access estimates. The last three rows of this table illustrate the conclusion that Commission estimates (back-of-the-envelope and decomposition) are broadly consistent with those of Access. According to these estimates, it is reasonable to expect that the full attainment of the COAG VET objectives will lift labour force participation by between 5.5 and 6.0 per cent between 2009 and 2020.

Table A.6 **Participation impact — summary**[a]

Reported estimate	*Employment participation rate*		*Labour force participation rate*	
	ppt	% change	ppt	% change
Initial 2009 level	61.3		64.5	
Total reform effect (deviation)	0.66	1.04		
Trend (2009–2020) effect	2.3			
Deviation and trend	3.0	4.9		4.9
Ability impact	0.3[b]			
Deviation and trend without ability discounting	3.3	5.4		5.4
Deviation and trend with no ability discounting and with higher wage premiums	3.3	5.4		5.4
Overall back of the envelope (with ability discounting)	3.8	6.2		6.2
Access Economics equivalent	*3.6*	*5.9*	*3.8*	*5.9*

[a] Minor sub-total discrepancies due to rounding. [b] Calculated as 3.3 (total impact plus trend, without ability discounting) minus 3.0 (total impact plus trend, with discounting).

Sources: Access Economics (2009); Productivity Commission estimates.

On the productivity side, the gap between the Commission's result and Keating's estimate is mostly due to reliance on different sets of wage premiums (table A.7). After adjusting the Commission's estimate for higher wage premiums, removing ability discounting and pro-rating Keating's estimate to the same time period, the Commission's figure (0.95 per cent) is almost identical to Keating's (0.92 per cent). A slight gap remains with the KPMG Econtech figure, the reasons for which cannot be explained without access to further information.

Table A.7 **Productivity impact — summary**

Per cent increase in labour productivity by 2020, relative to 2009

Productivity Commission	*Productivity impact*	*External estimates*	*Productivity impact*
Reported impact of COAG VET reforms, 2009–2020	0.35	Keating (2012) (pro-rated)	0.92
Without ability discounting	0.39	KPMG Econtech (2010b) (adjusted)	1.2
With higher wage premiums (and without ability discounting)	0.95		
'Back of the envelope'	1.2		

Sources: Keating (2012); KPMG Econtech (2010b); Productivity Commission estimates.

The benchmarking exercise contained in this appendix has highlighted the sensitivity of modelling results to assumptions about parameters. The magnitude of employment and wage premiums, and whether to use ability discounting and at

what rate, are modelling choices that can influence — in some cases, significantly — the resulting headline labour market numbers.

The Commission maintains its preference for the more conservative, ability-discounted premiums it has used in this report. It considers that the alternatives implied by the Access and Keating work are likely to be overestimates of the effects of upskilling on labour force participation and labour productivity. This is for two reasons: bias from omitted observables and from omitted unobservables.

It is well known that cross-tabulation differences — as used by Access and Keating — can result from many confounding influences. By not controlling for omitted observable variables, this approach cannot give an accurate representation of the importance of qualifications alone for labour market outcomes. By contrast, multivariate techniques as used by the Commission in this report are capable of isolating the effects of greater educational attainment from other influences.

Multivariate analysis, however, is generally unable to control for bias due to the existence of unobservable variables, in particular, ability. The Commission has adjusted for this effect through the use of ability discounting. This is in contrast to Access and Keating, who did not include this adjustment.

For both of these reasons — bias from omitted observables and from omitted unobservables — the Commission has confidence in its adjusted estimates of the returns to education.

B The Education and Labour Market Outcomes model

Three appendixes are devoted to the Education and Labour Market Outcomes (ELMO) model. This appendix provides an outline of the modelling task set out in the terms of reference and the Commission's general approach, as well as a simple and intuitive explanation of the model. Appendix C discusses the data used to link the model to the real world. The reform simulations undertaken with the model and the results are presented in appendix D. Readers looking for a basic understanding of the ELMO model and its application to Council of Australian Governments' (COAG) vocational education and training (VET) reforms are advised to read this document and appendix D.

The Commission is committed to ensuring that its modelling work is transparent. In this spirit, the appendixes fully document every equation and parameter in the ELMO model. In addition, the modelling code will be released on the Commission's website so that interested parties can replicate the results and apply the ELMO model to their own research.

B.1 The modelling task

The terms of reference require the Commission to report on the effects of various COAG VET reforms. This raises two questions — what reforms should be assessed, and what effects should be estimated? Discussion of the first question is located in chapter 1. In terms of the second question, the terms of reference ask the Commission to assess the benefits, costs and fiscal effects of the reforms.

Consistent with mainstream economics, benefits and costs are defined broadly to include anything that affects people's wellbeing. The Commission's definition goes beyond changes in gross domestic product (GDP) to consider all relevant benefits and costs. Changes in GDP are sometimes used as a ballpark indicator of benefits. GDP is a measure of the economic activity that happens in markets — it does not consider the value of non-market activities, such as leisure and caring for family.

To see the implications of excluding non-market activities, consider the following example. Suppose a reform causes people to move into paid employment where

they produce $30 an hour worth of goods and services, and that the value of their non-market activities, which must be given up in order to work, is $20 an hour. In this case, GDP increases by $30 an hour, but the net benefit is only $10 an hour. This shows that the selective exclusion of benefits and costs can result in misleading conclusions, and highlights the rationale for not estimating GDP effects in the present analysis.

The terms of reference ask the Commission to estimate the implications of COAG VET reforms for participation, productivity and social inclusion. These effects are sources of benefits, since they tend to increase people's wellbeing. An increase in participation or productivity increases the availability of goods and services, while people generally benefit from participating in their communities.

By contrast, fiscal effects sit outside the benefit–cost framework. They are essentially transfers between people. If someone pays an additional $100 in tax, that person has $100 less and the government (or beneficiaries of government spending) has an additional $100. There is a positive fiscal effect from the government's perspective, but it washes out from a benefit–cost perspective — it is assumed that the cost to the taxpayer is equal to the benefit to the recipient of government spending.

This makes the value judgment that an additional dollar to one person should be treated the same as an additional dollar to another. This value judgment is also implicit in the Commission's definition of net benefit, which similarly abstracts from distributional effects. The conceptual relationship between key reporting measures is summarised in table B.1.

Table B.1 **Conceptual relationships between key reporting measures**

Terms of reference	*Indicator*
Immediate effects	Change in educational attainment Change in occupation
Productivity	Change in average wages
Participation	Change in employment
Gross payments to labour	Change in employment multiplied by productivity multiplied by population
Social inclusion	Change in literacy and numeracy
Benefits and costs	Changes in gross payments to labour, social inclusion, non-market activity, and more
Fiscal effects	Change in tax revenue less government spending

The final modelling task required by the terms of reference is to examine how sensitive the results are to plausible changes in key parameters.

B.2 The modelling approach — an overview

The ELMO model was developed especially for this study, based on the modelling task discussed above. That said, the model is fairly general, and can easily be used to examine other types of education reform. It builds on previous Commission work on the benefits and costs of hypothetical education reforms under the National Reform Agenda (PC 2006). That report used economic modelling to estimate the consequences of assumed changes in education levels. The ELMO model is fundamentally different in that it can be used to estimate both the changes in education levels and the consequences of those changes.

The Commission has drawn on the economics of education literature in developing the ELMO model. The central theme of this literature is that the education that people receive is, at least partly, based on their decisions. Some people might choose to undertake a certificate at a local VET institution, whereas others might not. (It is recognised that people face constraints that could rule out some options.)

Becker (1974) developed a theory to explain how people make these decisions. He argued that people invest in human capital through education to increase their options to secure better work and various non-monetary benefits. According to human capital theory, people compare the benefits and costs, as they perceive them, from different types of education when making education decisions. Human capital theory has become widely accepted as an explanation of the motivation for education (Quiggin 1999).

If education decisions are based on some assessment of benefits and costs, and education decisions differ across people, it must be that the benefits or costs of education also differ across people. Heckman, Stixrud and Urzua (2006) offer evidence that people's underlying abilities can affect the increase in wages they receive from education. For example, a person with low cognitive ability might struggle to learn and apply the knowledge taught in VET. Hence, difference in underlying abilities is one explanation for why there is a wide range of education decisions, and why some people might choose to undertake a certificate at a local VET institution, whereas others might not.

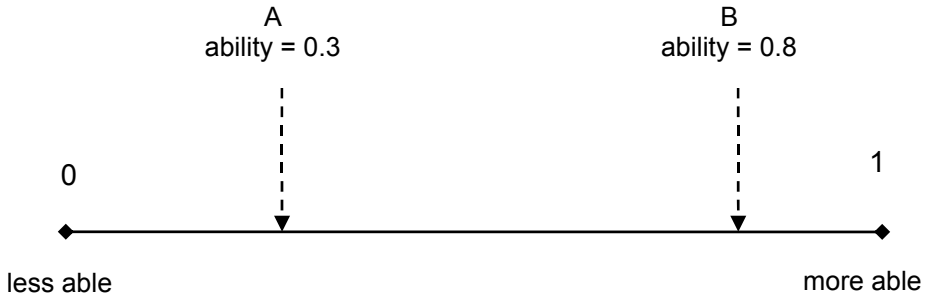
The ELMO model is essentially a traditional partial-equilibrium individual education investment model, where the benefits and costs of education depend on people's ability. As such, it is consistent with both Becker's (1974) and Heckman, Stixrud and Urzua's (2006) education models.

B.3 A stylised version of the ELMO model

The main concepts behind the ELMO model can be explained with a number of stylised diagrams. The model is a traditional education investment model, where the benefits and costs of education depend on a person's ability. Suppose that child care is the only type of work available. In this case, ability would be defined as the potential to learn the skills necessary to be a good child care worker and apply those skills in the workplace.

To model ability, every person is assigned a score — the least able person is given zero and the most able, one. Figure B.1 shows two hypothetical people, A and B. The scores are interpreted as percentiles, so that Person A, who has a score of 0.3, has higher ability than 30 per cent of the relevant population.

Figure B.1 **Ability with respect to work in child care**

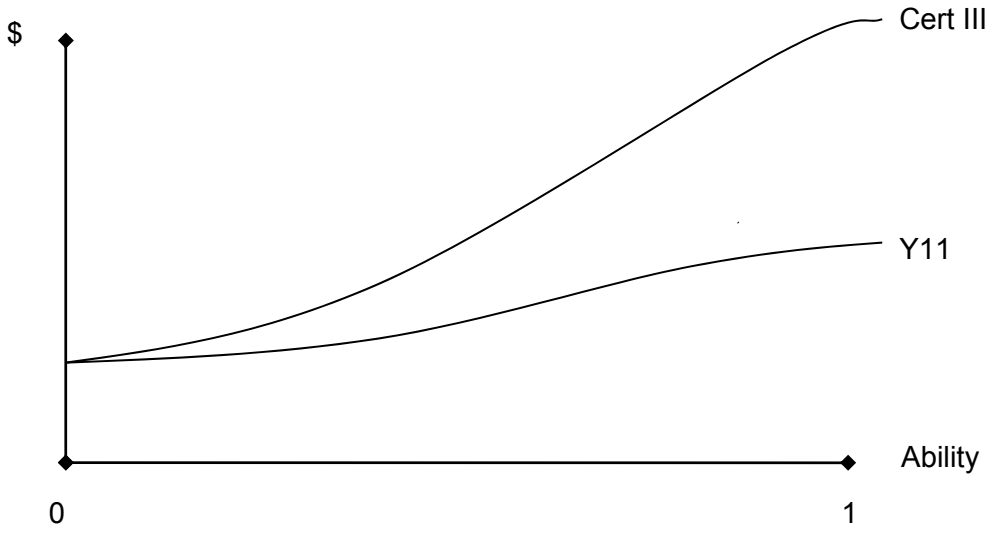


Optimisation

Ability determines the benefits of different education options in the ELMO model. Two education options are illustrated in figure B.2. The Year 11 (Y11) curve represents the (monetary and non-monetary) benefits associated with a Year 11 education for people of different ability. The curve slopes upwards, indicating that people who have a Year 11 education receive larger benefits as ability increases. The Certificate III (Cert III) curve has a similar interpretation. Since having a Certificate III tends to increase people's income, relative to Year 11, the Certificate III curve will be higher than the Year 11 curve.

The benefits of additional education could depend on people's ability.[1] One possible explanation is that people with higher ability might be better at learning and applying the skills acquired from additional education. The magnitude of the benefits in moving from Year 11 to a Certificate III, for someone of a given ability, is illustrated by the distance between the curves.

Figure B.2 **Benefits associated with different education options and abilities**



The costs of education are also relevant, and include course fees and forgone income as a result of time spent studying. Unlike benefits, the costs are assumed not to depend on ability.

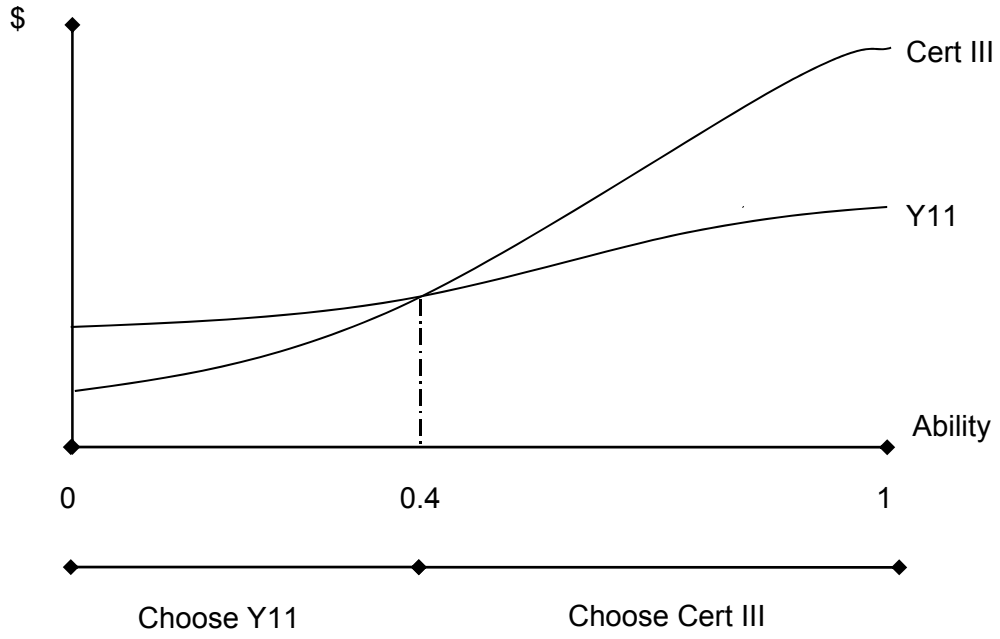
Net benefit curves are derived by subtracting the costs from the benefits (figure B.3). People select the education option with the highest net benefit. The net benefit associated with Year 11 exceeds the net benefit associated with a Certificate III for people with ability lower than 0.4. In other words, the increase in benefits from a Certificate III are not sufficient to cover the increase in costs, and these people are unlikely to undertake a Certificate III. By contrast, net benefits associated with a Certificate III exceed the net benefits associated with Year 11 for people with ability above 0.4.

This stylised representation of the ELMO model can be used to illustrate the effects of various reforms. Given that education decisions are based, to some extent at least,

[1] Adjustment for ability differences is a research methodology that dates back to at least Psacharopoulos (1975) and more recently, has been noted by Kortt and Leigh (2010).

on an assessment of net benefits, any reform that influences the net benefits of education has the potential to affect the number of people undertaking a Certificate III.

Figure B.3 **Net benefits associated with different education options by ability**

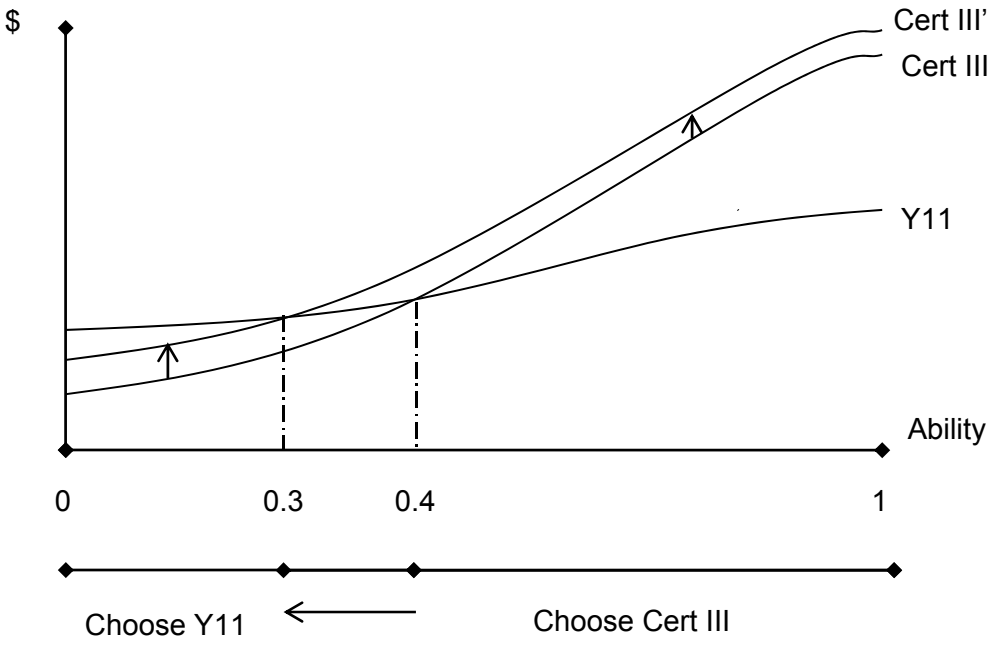


Assume that the government introduces a subsidy for Certificate III qualifications, thereby increasing the net benefits relative to Year 11 (figure B.4). In this case, the Year 11 curve is unchanged, but the Certificate III curve shifts upwards(to Cert III'). As a result, some people who previously would not have undertaken a Certificate III would now find it worthwhile to do so.

In this hypothetical example, the ability score at which people are indifferent between the education options moves from 0.4 to 0.3 as a result of the subsidy, causing a large shift towards Certificate III qualifications.

The effect of the subsidy, and any other reform that influences the relative net benefits of the education options, depends on the magnitude of the subsidy (which determines the extent to which the curves shift) and the slopes of the curves. In general, the more similar the slopes of the curves, the greater the effect of the subsidy. That is because with similar slopes there are many people who do not feel strongly either way, and could easily be induced to change their decisions.

Figure B.4 **The effect of a subsidy to students undertaking a Certificate III**



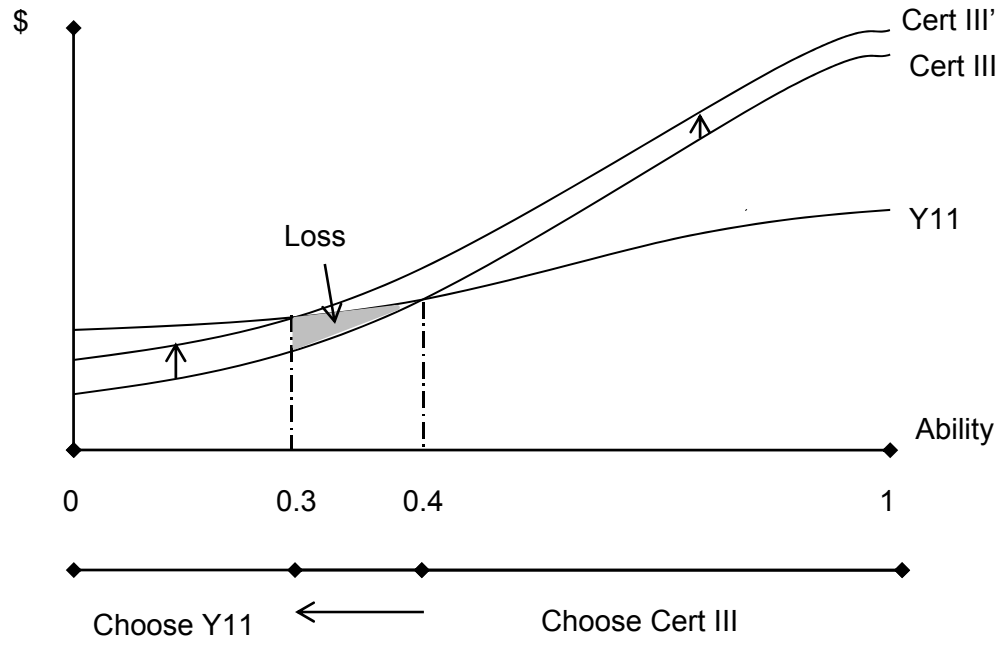
Reporting

The first part of the model estimates the effects of a policy change stemming from the reform agenda on individuals' decisions, and by implication, the number of people in each education group. The second part examines the consequences, including the benefits and costs of the reform to the community and the fiscal effects.

In calculating the net social benefit it is necessary to include all relevant benefits and costs. The net benefit curves in figure B.4 reflect only the benefits and costs to students and miss the external benefits and costs to the wider community as a result of students' decisions. External effects can arise because of market distortions such as externalities. Some distortions of this type (chapter 2) are included in the full ELMO model.

For simplicity, it is assumed in this appendix that there are no substantial distortions. This means that the private net benefit curve in figure B.4 can be used to measure net social benefit. For example, the social net cost of a subsidy is given by the vertical distance between the two original curves for people who are motivated by the subsidy to undertake a Certificate III (figure B.5). Although some people are better off due to the subsidy, these gains are more than offset by losses to people who bear the expense of the subsidy.

Figure B.5 **The welfare loss from a subsidy in the absence of other distortions (assuming there are no external benefits)**



B.4 The ELMO model

The first part of this section discusses the differences between the ELMO model and the stylised representation discussed above. The second explains how the model solves and reports on key effects.

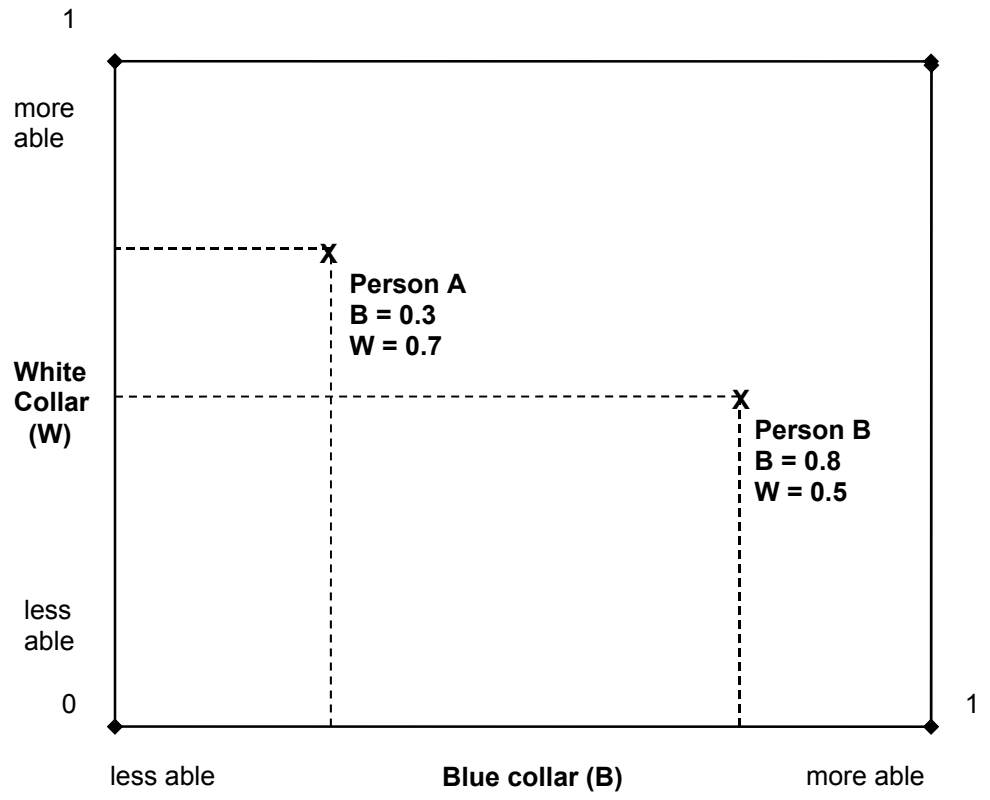
The ELMO model has much broader coverage than the stylised representation discussed above, including:

- blue collar and white collar occupations and abilities, which in combination, cover the range of abilities required to perform all possible jobs
- 10 000 people with different abilities, each representing a number of people in the population
- five education levels
- multiple education and work options.

Work types and abilities

The ELMO model includes two occupation types — blue and white collar. These are the same classifications used by Heckman, Stixrud and Urzua (2006). Accordingly, a person's ability has two dimensions, and this can be represented in a diagram. In figure B.6, the ability to undertake blue collar work is expressed along the horizontal axis, while the ability to undertake white collar work is expressed along the vertical axis. Units of measurement along each axis are percentiles. For example, Person A has high white collar ability (on the 70th percentile), but low blue collar ability (on the 30th percentile). Person B has average white collar ability (on the 50th percentile), and high blue collar ability (on the 80th percentile).

Figure B.6 **Blue collar and white collar ability**



Representative people

In ELMO, it is assumed that there are 10 000 representative people evenly spaced throughout the box in figure B.6. Each represents a number of people in the population being considered. For example, Person A might represent 10 people, while Person B might represent 15 people.

If blue collar and white collar abilities are positively correlated, people are more likely to be talented at blue collar and white collar work than talented at one and poor at the other. In this case, it would be desirable to attach a higher weight to people with similar levels of blue collar and white collar ability.

Education levels

The ELMO model adopts the following classification of education levels.

- Year 11 or lower (including Certificates I and II)
- Year 12
- Certificates III and IV
- Diploma (including Advanced Diploma)
- Degree or higher.

Individuals are assigned to a level on the basis of their highest educational attainment. For example, someone with a Certificate III or IV and a Diploma is assigned to the Diploma group. This approach was adopted over alternatives because it is consistent with the way that the Australian Bureau of Statistics (ABS) collects data, and much of the empirical research on the relationship between human capital and labour market outcomes. The ABS classifications were also used to rank the education levels from lowest to highest.

Education–work options

The ELMO model simultaneously chooses people's education level and work type to maximise net benefits for every person in the model. The five education levels and two work types create 10 possible combinations of these two variables. However, only seven are assumed to be valid (table B.2). Although this is a simplification, it is assumed that blue collar workers do not receive labour market benefits from Year 12, Diploma and Degree or higher study. Since people are unlikely to select education levels that have costs without benefits, these education–work options can be ruled out.

Table B.2 **Valid combinations of education level and work type**

	Blue collar	*White collar*
Year 11 or lower	✓	✓
Year 12	×	✓
Certificates III or IV	✓	✓
Diploma	×	✓
Degree or higher	×	✓

Optimisation

People have an individual net benefit table, which shows the net benefit associated with different education–work options (table B.3). In the stylised representation of the model (section B.3), this is equivalent to the height of the net benefit curve for each education level, for people of different abilities. People select the education–work option with the highest net benefit. In this example, Person A chooses a Diploma and white collar work and Person B chooses a Certificate III or IV and blue collar work.

Table B.3 **Hypothetical net benefit associated with different education–work options for people with different abilities**
Net present value

	Person A	*Person B*
	$	$
Year 11 or lower and blue collar	1 100 000	1 150 000
Certificate III or IV and blue collar	1 150 000	1 300 000
Year 11 or lower and white collar	1 150 000	1 100 000
Year 12 and white collar	1 200 000	1 150 000
Certificate III or IV and white collar	1 250 000	1 200 000
Diploma and white collar	1 400 000	1 150 000
Degree or higher and white collar	1 300 000	1 100 000

Net benefits

The net benefit of an education–work choice received by an individual depends on his or her abilities. For example, Person A will receive higher net benefits from white collar work than Person B because Person A's white collar ability is higher. For each person, the perceived net benefit from an education–work option can be expressed as:

perceived private net benefit = private benefit – private cost + residual + overestimate *(1)*

The perceived private net benefit is expressed in net present value terms — future values are discounted to reflect the fact that a dollar in the future is worth less than a dollar today. The private benefit and private cost terms are explained below. The residual term captures any benefits and costs that would otherwise be missing from the equation. For example, the non-monetary benefits of education are, at least partly, reflected in the residual. Finally, the overestimate term allows for the possibility that people might overestimate or underestimate the net benefit associated with different education–work options. For example, people from disadvantaged backgrounds might underestimate the benefits from a Degree (chapter 2).

Private benefits

For each person, the private benefit associated with an education–work option can be expressed as:[2]

private benefit = after tax earnings – value of non-market activity forgone as a result of working *(2)*

The private benefit depends on wages (as well as other parameters, such as the tax rate and the probability of being employed). An education–work option with higher wages will lead to an increase in an individual's after-tax earnings, all else equal. Wages are modelled as a cubic function of ability to enable sufficient flexibility. For example, the relationship between wages and white collar ability for individuals with Year 11 or lower education could be:

$$wage\ (Y11, white) = 10 + 10*W - 4*W^2 + 0*W^3 \quad (3)$$

where W is white collar ability. Drawing on the example used in figure B.6, Person B's wage would be \$14 per hour (W = 0.5), and Person A's would be around \$15 per hour (W = 0.7).

The wage equation for Year 12 and white collar could be:

$$wage\ (Y12, white) = 10 + 15*W - 4*W^2 + 0*W^3 \quad (4)$$

In this case, Person B's wage would be \$16.50 per hour, and Person A's would be around \$18.50 per hour.

It is assumed that blue collar ability does not contribute to wages in white collar work, and vice versa. This assumption is less restrictive than it might initially seem,

2 The historical context for consideration of the value of non-market activity is detailed by Eckaus (1973).

because it does not rule out the possibility of substantial overlap in blue collar and white collar ability. For instance, intelligence and a good work ethic are likely to increase people's blue collar and white collar ability.

Private costs

For each person, the private cost associated with an education–work option can be expressed as:

private cost = private money cost + after-tax time cost *(5)*

The private money cost is the amount paid by the person for their education. The time cost is the amount of money the person could have earned, after tax, if they used the time spent on education to work instead. The private cost does not depend on the type of work chosen, or ability.

Calibration of residuals

The values of the residuals are determined through model calibration (box B.1). The ELMO model uses an algorithm to uncover the values of the residuals that equate the modelled number of people in each education–work group with ABS data. For example, if the ELMO model solves for too few people in the Certificate III or IV and blue collar group, the residual assigned to that group is increased. The ELMO model makes hundreds of these adjustments, continuing until the model is calibrated.

Reporting

The ELMO model disaggregates the predicted education–work outcomes to report on the estimated number of people in eight ABS occupational classifications (sub-major groups in the Australian and New Zealand Standard Classification of Occupations). The ELMO model parameters include estimates of the likelihood of people in each education–work group working in these occupations. For example, four per cent of people in the Certificate III or IV and blue collar group might be construction labourers, compared with six per cent in the Year 11 or lower and blue collar group. To estimate the number of construction labourers, these probabilities are multiplied by the estimated number of people in each education–work group. The resulting numbers are then summed across education–work groups.

Box B.1 **The motivation behind model calibration**

As discussed in previous sections, the ELMO model assumes that people make education and employment decisions based on an assessment of benefits and costs, given the information available. If the ELMO model allocates fewer people to the Certificate III or IV and blue collar group than observed, it suggests that the model has underestimated the perceived net benefits of the Certificate III or IV and blue collar option (relative to other options). Assuming that the benefits and costs explicitly captured by the ELMO model have been estimated accurately, there must be unobserved benefits or costs (such as non-monetary benefits or costs) that have motivated people to make decisions that are inconsistent with the predictions of the model. Calibration enables these unobserved benefits and costs to be taken into account. Although the corresponding residuals can be interpreted as the consumption value of education (if positive) or the disutility of education (if negative), they could also include the effects of statistical or measurement errors that might affect the model predictions or the dataset against which it is calibrated. In this study, the residuals are interpreted as non-monetary benefits or costs of education and are identified separately. This allows readers to abstract from them if preferred.

The ELMO model combines information on people's abilities with their estimated education–work decisions to report on a range of effects, including net social benefits, participation, productivity, social inclusion (as indicated by literacy and numeracy), criminal activity, and fiscal impacts.

Gross payments to labour and net social benefits

As discussed above, the ELMO model reports both gross payments to labour and a more precise measure of net social benefits that is consistent with mainstream welfare economics.

Gross payments to labour are calculated as the average wage (productivity) multiplied by the total number of hours worked (employment) less forgone economic activity as a result of time spent studying. To calculate net social benefits from gross payments to labour the following equation is applied:

net social benefit = gross payments to labour – money cost of education – value of non-market activity forgone by working + adjustment to capture the value of government revenue + external benefits + residual *(6)*

Social inclusion

Some benefits are difficult to quantify. Social inclusion relates to people's ability to engage in community life. The main indicators of social inclusion in the ELMO model are literacy and numeracy, which enable people to participate more fully in employment and community activities. The ELMO model links people's literacy and numeracy to their education levels. Hence, it is possible to estimate literacy and numeracy based on estimated education levels.

Partial fiscal effects

There are two main fiscal effects in the ELMO model. In the short run, there are expenditure on education and a reduction in net tax revenue (that is, tax revenue less welfare payments) based on the time people devote to education. Tax revenue falls because any increase in time spent on education is matched by a decrease in time spent working (with no change in leisure). This reduces labour market earnings, and net tax revenue, in the short term. In the long term, education has the potential to increase labour market earnings relative to the baseline, and this will tend to increase net tax revenue. The overall fiscal effect is the sum of these short and long term effects.

Simulations

To simulate a reform using the ELMO model, the model is run once with net benefit tables that define the baseline scenario and again with different net benefit tables that define the alternative scenario. For example, the baseline scenario could involve low subsidies to Certificate III and IV education–work options, while the alternative scenario could have higher subsidies. The results are compared to estimate the effects of the subsidies.

Sensitivity analysis

There is always uncertainty in quantitative analysis. One of the advantages of modelling is to better understand what range of results is plausible, given the uncertainty surrounding key parameters. In the ELMO model, parameters can be specified as having particular distributions. For instance, the value of the government revenue parameter could be modelled as having a normal distribution with a mean of $0.3 (per dollar of government revenue) and a standard deviation of 0.1. Sensitivity analysis can be conducted for many values of the parameter jointly.

The results can then be expressed as a distribution or confidence intervals, rather than a single estimate of the simulation outcome.

B.5 Key assumptions

While the model is fairly general, there are some important assumptions. First, people are able to borrow sufficient money to finance education that has private net benefits. This rules out the possibility that people cannot undertake education because of credit market issues.

Second, ability has no effect on education costs. This is a simplification, since people with higher ability might be able to learn the course material in less time, thus reducing the time cost.

Third, people can acquire any education they are willing to pay for, subject to availability. That is, there are no entry requirements. If the number of places in an education option is limited, available places are rationed to those who benefit most from them.

Fourth, people undertake education early in their lives. The effects of reforms on mature learners are addressed through a different methodology (appendix E).

Fifth, the reforms are small enough to have minimal impact on prices, such as wages and education fees. This assumption could be violated if a reform caused a large influx of students into an area, such as hairdressing. In the short term, this could increase the costs to providers of running hairdressing courses, as they must compete for qualified people to run the courses. This is likely to increase the prices of hairdressing courses to students. The growth in the number of hairdressing students could also depress the wages of hairdressers when the students graduate, by increasing the supply of hairdressers. These effects are not modelled. Labour demand curves are assumed to be approximately flat over the relevant range and labour markets are assumed to clear. For many of the reforms modelled, these partial-equilibrium assumptions are likely to be reasonable approximations.

Sixth, government subsidies do not reduce the number of privately-funded VET places. 'Crowding out' occurs when subsidised places are taken by people who would otherwise have paid for a place themselves. The assumption that there is no crowding out increases the probability that the ELMO model will overestimate the effects of a subsidy on the total number of qualifications.

C Modelling assumptions and parameter estimates

Key assumptions underlying the estimated economic impacts of the Council of Australian Governments' (COAG) vocational education and training (VET) reform agenda presented in this study are described in this appendix.

C.1 Translation of additional training effort into completed qualifications

Realised, prospective and potential increases in training effort attributed to the COAG reform agenda have been translated into estimates of changes in qualification attainment. A range of assumptions have been made in the process, with the potential to influence the estimates of attainment in either direction. Not all assumptions are relevant to all scenarios and, in some instances, different assumptions are applied to the same concept in different scenarios where available information supports a different approach.

Excel workbooks containing the calculations underlying the estimates of qualification attainment for each scenario modelled will be available from the Commission's website.

Data on additional effort

For the different policy initiatives assessed, data on additional training effort was reported in terms of one, or more, of:

- places — new qualification commencements in a year
- enrolments — places plus enrolments relating to qualifications commenced in previous years
- students — enrolments adjusted to take account of multiple enrolments by some students. Data are typically presented in terms of the highest qualification of enrolment.

For the scenario capturing the potential impacts of attaining the COAG targets, the relevant input was the number of people in the population aged 20–64 by highest level of educational attainment.

Table C.1 summarises the nature of the data on additional training effort available for each policy initiative.

Table C.1 **Initial data inputs on additional training effort**

Scenario	*Initial input*
Victorian policy initiatives	Students
National Partnership Agreement on Productivity Places Program	Students (2009 & 2010), enrolment commitments (2011 & 2012)
South Australian initiatives	Places
Achievement of COAG targets	Highest level of educational attainment

Where possible, data reflecting actual outcomes attributable to the reform agenda were used.

For Victorian policy initiatives, data on actual additional training effort up to the third quarter of 2011 were used to estimate the realised and prospective effects of the policy initiatives in that jurisdiction. Estimates of realised effects were based on the additional number of students that commenced and completed training over the period 2009–2011, relative to 2008.[1] An estimate of completions post-2011, by students who commence between 2009 and 2012 as a consequence of the policy initiatives, was used to derive prospective effects. The new subsidy levels that applied from 1 January 2012 were assumed to slow training activity growth to 5 per cent in 2012.

For the *National Partnership Agreement on Productivity Places Program* (NPAPPP), data on actual additional students in the VET sector in 2009 and 2010 in all States and Territories excluding Victoria were used, along with the anticipated increase in enrolments in 2011 and 2012 attributable to this policy initiative.[2] Enrolments were converted into student numbers using a factor of 1.3. This factor was derived from a comparison of Victorian data on enrolment and student numbers between 2008 and 2010 (Skills Victoria 2011c).

1 Numbers for the last quarter of 2011 are projected based on realised growth to the end of the third quarter of 2011.

2 Data on actual student numbers were not available for 2011 at the time of writing (early April 2012).

For South Australian initiatives, an estimate of anticipated additional training places between 1 July 2012 and 30 June 2016 was used.

Durations of study — volume of learning

Data on VET students in any year include both people who have commenced, and those who are continuing, qualifications. The additional learning associated with qualifications above a Certificate II level can take more than one year (table C.2). In addition, part-time study is very common in the VET sector. In 2010, 60 per cent of Diploma and Advanced Diploma, 83 per cent of Certificate III and IV and 93 per cent of Certificate I and II students were enrolled on a part-time basis (NCVER 2011a). The fact that 70 per cent of apprentice and trainee commencements are on a full-time basis suggests that the proportion of part-time students among non-apprenticeship Certificate III and IV students is even higher.

Table C.2 **Volume of learning associated with VET qualifications**

Qualification	*Volume of learning*
Certificate I	0.5–1 year
Certificate II	0.5–1 year
Certificate III	1–2 years (up to 4 for a trade apprenticeship)
Certificate IV	0.5–2 years
Diploma	1–2 years
Advanced Diploma	1.5–2 years

Source: Australian Qualifications Framework Council (2011).

Relatively low completion rates (section C.2), suggest that a significant proportion of students do not continue past one year of study.

In deriving estimates of qualification completions for Victoria, the Commission has assumed that:

- students who complete Diploma and Advanced Diploma qualifications do so in the second year of their enrolment. Those who do not, leave the VET system in the first 12 months of study
- 80 per cent of Certificate III and IV students in qualifications other than traditional apprenticeships leave the VET system (either with, or without completing a qualification) within 12 months of commencing their course of study. The remaining 20 per cent leave during their second year
- Certificate I and II students leave the VET system within one year.

In the case of the NPAPPP, preliminary evidence from Queensland presented in ACG (2010a, p. 64) indicated that:

- Certificate II and III qualifications for job seekers can be completed within 12 to 16 weeks;
- Certificate IV qualifications for existing workers can be completed in less than 12 months; and
- Diploma and Advanced Diploma qualifications for existing workers can be delivered in less than two years in most industries.

Therefore, the assumption regarding Diploma and Advanced Diploma tenures described above was applied in the NPAPPP scenario, but it was assumed that Certificate III and IV students that complete do so within one year. Traditional trade apprentices are assumed not to take up NPAPPP places on the grounds that ACG (2010) noted that the take up of such places was low.

Because the South Australian estimates of additional effort were based on additional places, that is, commencing students, adjustments for duration of study were not required. It was assumed that none of the additional places would be allocated to traditional trade apprenticeships because it was unclear how the South Australian policy initiative might influence the take up of training of this type.

Durations of study are not relevant to estimating the number of qualification completions required to meet the COAG targets in 2020. In this scenario, the question driving estimates of additional effort was not 'how many completions at different qualification levels will an increase in training effort lead to', but 'how many completions will be needed to meet the target'.

Implications of the durations assumptions

Assumptions about durations of study affect estimates of completed qualifications.

In the first year of any policy initiative, additional students at any qualification level are assumed to be commencements. In subsequent years, the number of commencements is not known, but is estimated as the difference between the total number of students in excess of the baseline in a year, less the estimate of the number continuing from previous years. The number of completions depends on the number of students commencing qualifications. As the number of continuing students increases, the estimated number of commencements in a year falls. Completions, therefore, also fall. The converse also applies. This means, for example, that, to the extent that:

- Diploma and Advanced Diploma students complete within one year, estimates of completions at this level could be understated

- Diploma and Advanced Diploma students spend more than two years in the VET system, estimates of completions at this level could be overstated
- trade apprentices were enrolled in NPAPPP places, or will be in South Australia, estimates of qualification completions at a Certificate III/IV level could be overstated
- less than 20 per cent of Certificate III/IV students (excluding traditional apprentices) remain in the VET system beyond one year, estimates of completions could be understated.

Completion rates

The number of qualification completions by level is determined by applying completion rates to the estimated numbers of students that commence training as a consequence of the COAG agenda. Ideally, estimates of completion rates would come from datasets that track students across time. Data of this type are not yet available.

The National Centre for Vocational Education Research (NCVER) has estimated completion rates, but these estimates are not uncontroversial. As the Department of Industry, Innovation, Science, Research and Tertiary Education (sub. DR-V9, p. 2) notes:

> While we acknowledge that the NCVER work on completions is the best estimate currently available, in the absence of a Unique Student Identifier a series of assumptions are made in calculating the estimate which reduces its reliability. Many of these would appear likely to result in downward bias.

In the absence of better information, the NCVER rates (table C.3) were used in estimating increases in non-traditional trade qualification attainment for the Victorian policy initiative. For trade apprentices, an estimate of 56.6 per cent derived by Karmel (2011) for the cohort commencing in 2005, was adopted.

In feedback on the discussion draft, the South Australian Department of Further Education, Employment, Science and Technology (DFEEST, sub. DR-V7) reported that a focus on learner support services was anticipated to lead to higher rates than those presented in table C.3. On the basis of outcomes from a learner support services pilot program, DFEEST suggested that future rates will be 4 percentage points higher than those used for Victoria (pers. comm., 2 March 2012). This

suggestion was implemented in developing the estimates of qualification attainment for the South Australian policy initiative.[3]

Table C.3 **Rates adopted in estimating completions of non-trade qualifications for Victoria**

	Young learners[a, b]	*Mature learners*[b, c]
Diploma and above	36.5	32.6
Certificates III/IV	40.2	32.0
Certificates I/II	30.1	20.4

[a] Rates for young learners reflect estimates for people aged 25 years and under who commenced in 2007 on a full-time basis, with no post-school qualification. [b] Rates for Certificates III/IV and Certificates I/II were derived by weighting the rates for each qualification in a group by the shares of young or mature learners at each qualification level in that group. [c] Rates reflect estimates for all people who commenced qualifications in 2007.

Source: NCVER (2011g).

For the NPAPPP, a rate of 60 per cent was used for all qualification levels for several reasons. While the funding model for the NPAPPP was based on an assumption that 35 per cent of participants would complete their qualifications, New South Wales reported that a retention rate of 55 per cent was more likely to be achieved. The Northern Territory agreed that anticipated completion rates were too low. The ACG report (2010b, p. 47) also reported, however, that 'the Australian Government notes that states and territories have not been able to demonstrate an attrition rate for the program'.

New South Wales subsequently noted that completion rates in the first two years of the Partnership were 55–60 per cent (NSW Department of Education and Communities, sub. V6).

In response to the discussion draft, South Australia reported that they had managed the NPAPPP in a way that allowed outcomes to be tracked. Data were collected and analysed by the NCVER through a student outcomes survey. The results indicated that:

> At the time of the survey, 70.1% of job seekers and 47% of existing workers had completed their qualification with 21.2% of job seekers and 48.9% of existing workers still in training. Only 8.6% of job seekers and 3.9% of existing workers had left their training before completing. (DFEEST, sub. DR-V7, p. 5)

The higher completion rates reported for the NPAPPP than in the NCVER estimates possibly reflect the fact that an NPAPPP place had to be used for a full qualification because, in entering into the partnership, all parties aimed 'to increase the number

[3] That is, 4 percentage points were added to the completion rates in table C.3.

of people with qualifications and the number of people with higher level qualifications' (COAG 2008c, p. 3).

As New South Wales accounts for a large share (43 per cent) of NPAPPP activity, in contrast to South Australia (10 per cent), New South Wales' experience was given greater weight in determining the completion rate for the NPAPPP. Reflecting the higher rates reported by South Australia, the upper end of the range indicated by New South Wales was adopted (60 per cent).

Completion rates were not an issue in the scenario capturing the potential effects of attainment of the COAG targets because, in that scenario, the numbers modelled were estimates of how many additional qualifications would be required to meet the targets, not how many would result from an increase in training activity.

To the extent that the completion rate estimates adopted for the realised and prospective estimates are too high, increases in qualifications for these scenarios could be overstated, and those for the potential scenario would be understated.

Highest level of qualification attained

In estimating the effects of increases in the profile of qualification attainment, estimates of completions for the NPAPPP and South Australia were adjusted to account for graduates who would have attained qualifications at or below the level of their previous highest qualification.

Adjustments were not made for Victoria, because (with limited exceptions), students were only eligible for a government-funded place if they enrolled above their previous highest qualification level.[4]

Adjustments applied are presented in table C.4. For example, an estimated 86 per cent of young learner VET graduates achieved a qualification above their previous highest level under the NPAPPP.

The higher rates for South Australia reflect the fact that government-funded places will be available to students studying at, but not below, their previous highest level of attainment.

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4 This restriction did not apply to people aged up to 20, but this is unlikely to markedly affect the results for Victoria. The Commission estimates that about 90 per cent of Certificate III and IV, and 95 per cent of Diploma and Advanced Diploma graduates aged 15–19 increased their level of qualification. A limited number of places were also available to people aged 20 and over who needed training at the same or lower level as their existing qualification.

Table C.4 **Factors used in adjusting completions for highest level of attainment**

Percentage of VET graduates estimated to have increased their level of qualification attainment

	NPAPPP		*South Australia*	
	Young learners	*Mature learners*	*Young learners*	*Mature learners*
	%	%	%	%
Dip./Ad. Dip.	86.1	52.2	87.9	69.1
Certs III/IV	77.6	41.4	82.1	59.1
Certs I/II	87.4	48.7	96.4	92.3

Source: Productivity Commission estimates based on unpublished data from NCVER 2010, *Student Outcomes Survey*, Confidentialised Unit Record File, NCVER Adelaide.

These estimates were derived from data for all VET graduates in 2010. To the extent that they do not reflect actual outcomes under the NPAPPP, or future outcomes for South Australia, resulting estimates of qualification completions at higher levels than those already attained will be different from actual outcomes.

In addition, the factors were calculated for the aggregated categories adopted in the Commission's modelling (Diploma/Advanced Diploma and Certificate III/IV). To the extent that students up-skill from Diploma to Advanced Diploma, or Certificate III to Certificate IV qualifications, the factors reduce the estimated number of completed qualifications that result in increased levels of attainment.[5] The effect of this form of up-skilling is not included in the projected changes in employment or productivity presented for the NPAPPP and South Australia scenarios.

Attainment of multiple higher qualifications

It is likely that some individuals increase their highest level of attainment by more than one level due to a policy initiative. For example, some students who obtain a Certificate III will take up another place and obtain a Diploma.

Data on the number of students who graduated in 2009 and had completed, or were engaged in, further VET study in May 2010 (when data for the *Student Outcomes Survey* were collected), were used in deriving factors to adjust for this phenomenon (table C.5). The data indicate, for example, that an estimated 4 per cent of young learners who completed a qualification at the Certificate III/IV level were assumed

[5] For mature learners in the NPAPPP scenario for example, allowing for this activity would have increased the estimated number of qualification completions at a Diploma/Advanced Diploma by 14 per cent, and Certificate III/IV level by 19 per cent.

to have gone on to complete a qualification at the Diploma/Advanced Diploma level.

Activity of this type is likely to be more common the longer the period assessed, and the stronger the restrictions on studying at or below a level previously attained. It is, therefore, likely that these adjustment factors understate the extent to which the reform agenda might lead to students obtaining multiple qualifications at increasing levels of attainment.

Table C.5 Factors used in adjusting completions for the attainment of multiple qualifications

Percentage of students estimated to have increased their level of qualification attainment twice

	Young learners	*Mature learners*
	%	%
Certs III/IV	4.0	2.7
Certs I/II	9.1	4.3

Source: Productivity Commission estimates based on unpublished data from NCVER 2010, *Student Outcomes Survey*, Confidentialised Unit Record File, NCVER, Adelaide.

Summary of changes in attainment, Victorian, South Australian and NPAPPP policy initiatives

The estimated increases in qualification attainment as a result of the Victorian, South Australian and NPAPPP policy initiatives are summarised in table C.6.

Table C.6 Summary of higher qualification attainments

	Vic realised	*Vic prospective*	*SA*	*NPAPPP*
Student/places	170 900[a]	153 900[a]	60 000[b]	387 000[a]
Estimated higher qualifications				
Total				
Dip./Ad. Dip.	3 665	12 313	2 366	21 637
Certs III/IV	21 403	33 488	9 013	95 313
Young learners				
Dip./Ad. Dip.	498	4 010	1 024	10 762
Certs III/IV	13 141	21 761	5 513	48 906
Mature learners				
Dip./Ad. Dip.	3 167	8 304	1 342	10 933
Certs III/IV	8 262	11 726	3 499	44 296

[a] Students. [b] Places.

Source: Productivity Commission estimates.

Attainment in the Australia potential scenario

In analysing potential effects of the reform agenda, the Commission has assessed the potential impacts of attainment of the COAG VET targets set out in the first *National Agreement for Skills and Workforce Development* (NASWD) (COAG 2008b).

- Halve the proportion of Australians aged 20–64 without qualifications at Certificate III level or above between 2009 and 2020.
- Double the number of higher-level (Diploma and Advanced Diploma) qualification completions between 2009 and 2020.

Between 2009 and 2020, educational attainment at or above a Certificate III level in the working age population could be expected to increase without any additional reform effort as less well educated cohorts retire from the labour market, and more highly educated young cohorts enter the labour market. Following the COAG Reform Council, a continuation of pre-reform trends was projected using data from the Australian Bureau of Statistics' (ABS) *Survey of Education and Work* (ABS 2010a) to produce a proportion of the working age population without at least a Certificate III level qualification of 32.5 per cent in 2020.

The implication of the first COAG VET target is that the proportion of the working age population without at least a Certificate III falls from 47.2 per cent to 23.6 per cent by 2020. To estimate the number of qualifications consistent with this target, the working-age population was projected to 2020 using ABS Series B projections (ABS 2008c). The COAG Reform Council trend (figure 3.3) was used to calculate the number of people projected to be without at least a Certificate III in 2020. The difference between this figure and the number consistent with meeting the COAG target was then estimated. Increases in attainment attributable to realised and prospective VET reform associated with the Victorian, South Australian and NPAPPP policy initiatives was then subtracted from this figure to arrive at the gap that potential effort needs to fill.

This gap was then attributed to Certificate III to Advanced Diploma qualifications in proportion to the estimated shares of these qualifications in realised and prospective outcomes. Approximately one third of these qualifications were then assumed to be undertaken by young learners and two thirds by mature learners.

Baselines

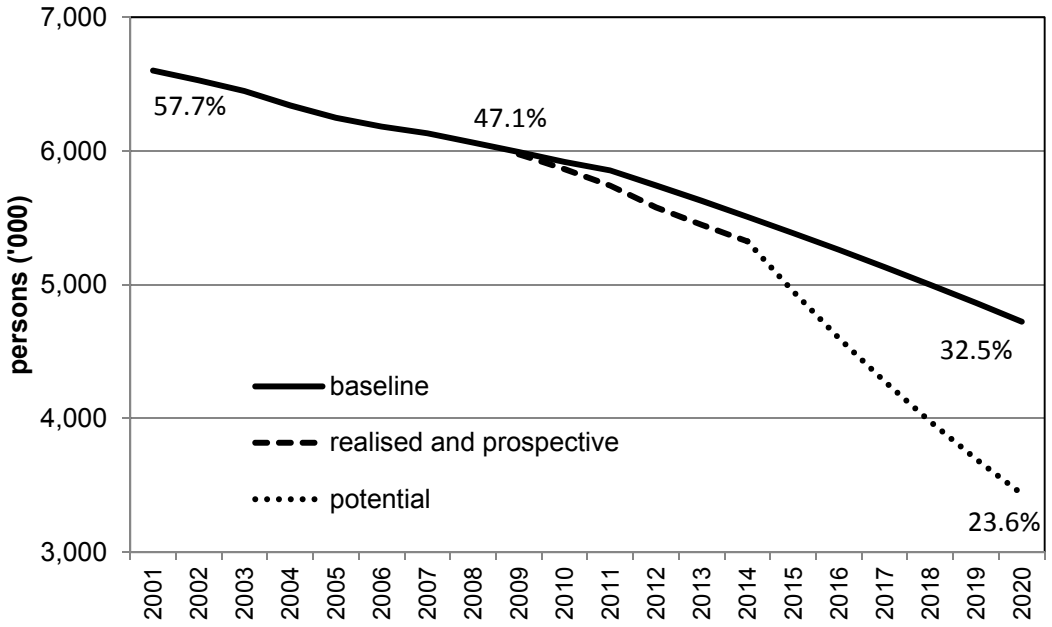
In theory, the effect of additional qualifications attributable to the COAG reform agenda should be considered relative to the level of attainment that would have

occurred in the absence of any reform effort — the baseline. In the case of the Victorian, South Australian and NPAPPP policy initiatives assessed in this study, the baseline is assumed to be the level of attainment prevailing when the reforms were introduced. For these scenarios, changes in attainment in the baseline were not taken account of because these changes are assumed to be small over the relatively short period covered by each initiative

To the extent that levels of attainment rise in the baseline, this approach will lead to an overstatement of the effects of the reform agenda.

A baseline is projected for the Australia potential shock (as at 2020). Realised and prospective increases in qualification attainment were added to the projected levels of attainment based on pre-reform trends. This represents the Commission's baseline in assessing the potential effects of the reform agenda on both young and mature learners (figure C.1).

Figure C.1 **Persons without a Certificate III or above**



Sources: Productivity Commission estimates based on CRC (2011) and ABS (2011a, Series B).

C.3 Employment and wage premiums for increased educational attainment

In order to calculate the employment and productivity effects of improvements in qualification attainment attributable to the COAG agenda, the Commission has estimated the effects of VET study on these indicators. The relationships between highest qualification attained and employment and productivity were estimated econometrically by the Commission using data from the 2009 ABS *Survey of Education and Training* (ABS 2010a).[6] Wages were used as a proxy for productivity.

Two separate equations were estimated — an employment equation and a wage equation. These equations included variables representing qualifications levels and other characteristics, such as experience, as explanatory variables. Qualification coefficients from both equations were transformed into marginal effects, which measure the effect of a person increasing their highest qualification to that level, relative to a base qualification. Two further adjustments were made.

First, the marginal effects were reduced by 10 per cent to account for the bias that affects econometric estimates of wage and employment premiums that do not account for the potential for natural ability to influence wage and employment prospects. Variables that might be used to account for ability are rare in datasets. As Leigh (2007, p. 2) observed:

> Assuming that workers with higher cognitive skills earn higher wages regardless of their level of education, the observed correlation between education and income will reflect both education and cognitive ability. Of course, the relationship could also go the other way. For example, since the cost of schooling will be higher to those with better outside opportunities, it is possible that lower-ability people might be more likely to undertake formal education.

Empirically, researchers have concluded that some part of the returns to education actually reflect unobserved ability. Results from Australian studies that have used data from natural experiments indicate that between 9 and 39 per cent of the returns to education are attributable to ability (Leigh 2007).[7] Similar results come from a

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6 Although there are many potential sources for such premiums, in the literature, none match the scope of this study or the split between young and mature learners. Estimating the required parameters within the context of this project also meant that the premiums could be based on recent data.

7 In a natural experiment, participants are randomly assigned to groups of interest (in contrast to a controlled experiment, in which researchers allocate participants to a treatment and a control group). Such experiments arise, for example, through policy changes that affect one group, and not another. In the case of studies of the relationship between education and labour market outcomes, there is a risk that estimated returns to education will include the effect of the

study of the effects of language, literacy and numeracy (LLN) skills on labour market outcomes. The effect of a Diploma/Advanced Diploma or Certificate III/IV qualification on earnings fell 50 per cent for men and 25 per cent for women when controls for LLN skills were added to the equation (Shomos 2010).

The Commission has used a conservative value of 10 per cent to account for ability bias, in line with the estimate used in Leigh (2007).[8]

Second, an adjustment to the marginal wage effects was also made to account for the interaction observed by Heckman, Stixrud and Urzua (2006) between ability and highest qualification attained. It has been assumed that students who increase their highest qualification as a result of VET policy initiatives have higher ability than people in the group they have come from, and have lower ability than people in the group they have joined. In other words, it is assumed that, as an additional person enters the VET sector, their ability to benefit from additional education is slightly lower than the ability of the previous person. Therefore, average returns from a policy initiative that leads to a larger increase in student numbers are assumed to be lower than for an initiative involving a smaller number of students.[9]

This approach differs from that adopted in the discussion draft in the mature learners framework. In its submission to the discussion draft, TAFE Directors Australia (sub. DR-V12) contested the Commission's use of ability discounts and noted 'excessive' discounting of wage premiums for mature learners. Skills Australia (sub. DR-V11) also contested the Commission's use of ability discounts. Independent Economics prepared an attachment to TAFE Directors Australia's submission which examined the Commission's modelling work. This attachment summarised the effects of ability discounts on wage premiums for mature learners (box C.1).

unmeasured ability of individuals who choose a certain educational pathway. Natural experiments remove this element of choice. Results are therefore considered to provide a better indication of the returns to education separate from the influence of unmeasured ability.

8 This conservative approach was the preferred approach for a number of participants at a Workshop held on 5 April, 2012. The value of 24 per cent used in the discussion draft resulted in lower premiums, and therefore smaller effects in the scenarios.

9 This principle is part of the structure of the ELMO model and is parameterised through the relationship between wages and ability. It was transferred to the mature learners framework. Parameters for this adjustment were derived from ELMO model results, that is, the way in which returns decreased as new individuals entered the VET system. The parameters reduce returns to the *average* mature learner by a maximum of 7 per cent.

The Commission has modified the method for modelling ability for this report.[10]

For mature learners' wage premiums, the method used in the discussion draft has been replaced by an adjustment that is sourced from the ELMO model results; this amounts to less than 1 per cent for all except the potential scenario (in which it is about 7 per cent). The revisions for the final report reduce the effective discount rates substantially (box C.1). For example, a mature learner that completes a Certificate III, whose highest prior qualification was Year 12 or lower, is modelled to expect a wage increase of approximately 8.6 per cent.[11] Using the discussion draft approach this mature learner was modelled to expect a 0.8 per cent wage increase.[12]

[10] As illustrated in box C.1, the discussion draft used an ability bias discount of 24 per cent and a procedure to account for marginal ability effects that reduced the wage premium by a factor based on the difference between the 55th percentile of the wage distribution relevant to a person's previous highest qualification and the 45th percentile of the distribution relevant to the most recent qualification as observed in the SET. An intermediate version used an ability bias discount of 25 per cent and the procedure involving input from the ELMO model described in this report. The final uses an ability bias discount of 10 per cent and the procedure using input from the ELMO model.

[11] Table B in box C.1.

[12] Table A in box C.1.

Box C.1 Ability bias and marginal ability effects in the mature learners framework

Wage and employment premiums estimated in this study are adjusted to account for ability bias and for the marginal ability effect associated with increasing the number of students in the VET sector. The method used to implement the marginal ability effect in the discussion draft led to unrealistic 'discounts' of the unadjusted wage premiums estimated. This is illustrated in the table A.

Table A Wage premiums and effective discounts, mature learners, discussion draft

Per cent

	Unadjusted [1]	*After 24% ability discount* [2]	*After further discount* [3]	*Effective % discount* % change between [1] and [3]
Degree	67.5	51.3	28.2	-58.3
Diploma	33.3	25.3	15.1	-54.7
Certificate III/IV	10.0	7.6	0.8	-92.1

Source: Independent Economics analysis contained in TAFE Directors Australia (sub. DR-V12, Attachment A, p. 3).

The method for implementing the marginal ability effect on wage premiums was modified for this report. It borrows the effect that occurs in the ELMO model. For the sake of comparison, the structure of table A is reproduced with an ability bias discount of 25 per cent (instead of the original 24 per cent) with the new method implemented (the Degree row is not reproduced, because it is not used in the modelling). The new method of accounting for marginal ability effects adds less than 5 percentage points to the first discount (difference between -25 per cent and column [4] in table B.

Table B wage premiums and effective discounts, mature learners, 25 per cent ability bias discount

Per cent

	Unadjusted [1]	*After discount for ability bias* [2]	*After marginal ability effect adjustment* [3]	*Effective adjustment of raw estimates* % change between [1] and [3]
Diploma	33.3	25.0	23.4	-29.8
Certificate III/IV	10.0	7.5	7.2	-28.0

Source: Productivity Commission estimates.

(Continued next page)

Box C.1 (continued)

In this report, a discount for ability bias of 10 per cent was implemented. Table C illustrates the effects of accounting for marginal ability on the unadjusted wage premiums. This adds less than 7 percentage points to the procedure.

Table C **Raw wage premiums estimated and effective discounts, mature learners, 10 per cent ability bias discount, this report**

Per cent

	Unadjusted [1]	*After discount for ability bias* [2]	*After marginal ability effect adjustment* [3]	*Effective adjustment of raw estimates* %change between [1] and [3]
Diploma	33.3	30.0	27.9	-16.2
Certificate III/IV	10.0	9.0	8.6	-13.5

Source: Productivity Commission estimates.

Accounting for young and mature learners in the analysis

Slightly different estimation approaches were adopted for young and mature learners. In both cases, the research question addressed was, 'what employment and wage effects might a potential young/mature learner anticipate from increasing their level of qualification attainment'.

Significant expansions in VET, and changes in the nature of VET qualifications, over the past 30–40 years suggest that the effects for the average person in the workforce might not be that relevant to people contemplating VET today. The average reflects the experiences of all graduates, including those who completed their qualifications over 40 years ago.

Looking back about 30 years (to 1981), about 6 per cent of the population aged 15–64 engaged in VET. By 2009, the rate of participation was over 11 per cent. In part, this reflects the development of nationally recognised VET qualifications for an expanded range of occupations, for example, child care, real estate services and retail. Regulatory requirements around qualification attainment have also played a role in qualification uptake. The effects of the expansion in the types of VET qualifications available are reflected in the fall in the percentage of the student body engaged in trade apprenticeships — from 20 per cent in 1981 to 12 per cent in 2009.

The large expansion in higher education is also relevant in this context. Thirty years ago, people were much less likely to complete school, and those who did were much less likely to go on to university. The average person who did not complete school earlier was probably much more academically able than the average person who did not complete in 2009.

Given these trends, the employment and wage effects facing potential young learners are based on estimates derived for people aged 20–34. The effects were calculated relative to the employment and wage outcomes of people who had not completed Year 12.

In the case of mature learners, the effects were based on the experiences of people aged 35–64 who obtained their highest qualification in the 10 years prior to being included in the *Survey of Education and Training* in 2009. Estimates of the employment and productivity effects of qualification for all people aged 25–64 were used in calculating employment and productivity of people who did not engage in VET. The effects were calculated relative to the employment and wage outcomes of people who had not completed a post-school qualification at a Certificate III level or above. The decision to include people who had completed Year 12 in the base category reflects an assumption that people aged 35, in thinking about further education, will be unlikely to be considering Year 12 study.

Employment equation

The following employment equation was estimated using a logit regression:

$$Emp = \beta_0 + \beta_1 Age + \beta_2 Age^2 + \beta_3 Degree + \beta_4 Diploma + \beta_5 Certs34 + \beta_6 Ausborn + \beta_7 ESB + \beta_8 Married + \beta_9 KidU3 + \beta_{10} Kid34 + \beta_{11} Kid59 + \beta_{12} Kid1014 + \beta_{13} Male + \beta_{14} Citydweller \quad (1)$$[13]

The explanatory variables capture age, highest qualification, whether someone was born in Australia or an English-speaking country, marital status and the age of the youngest child that a person has:

Emp is a dummy variable for employment status

Age is a person's age in years

Degree is a dummy variable for highest qualification

Diploma is a dummy variable for highest qualification

[13] For the regression on the sample of people aged 20–34 a dummy variable representing Year 12 was included in the estimated equation.

Certs34 is a dummy variable for highest qualification

Ausborn is a dummy variable for born in Australia

ESB is a dummy variable for born in another English-speaking country

Married is a dummy variable for marital status

KidU3 is a dummy variable for having a youngest child aged under 2

Kid34 is a dummy variable for having a youngest child between 3 and 4

Kid59 is a dummy variable for having a youngest child between five and nine

Kid1014 is a dummy variable for having a youngest child between 10 and 14

Male is a dummy variable for males

Citydweller is a dummy variable for people who live in capital cities

Marginal effects estimates, that is, the change in the probability of being employed for a one unit change in an explanatory variable, were calculated at the sample means.

Estimation results were compared with those obtained by other researchers (table C.7). To facilitate the comparison, a logit regression using participation as the dependent variable was run for the population aged 20–64. Results from these regressions are reported in section C.4.

The results obtained were not dissimilar to those reported by Laplagne, Glover and Shomos (2007), who used data for 2001–04, and Shomos (2010) who used data for 2006 (although higher results were obtained for diploma and certificate qualifications). They were more similar to those reported by Dawkins, Lim and Summers (2004, 2001 data) and Karmel and Nguyen (2006, 2003 data) (although these authors report stronger effects for Year 12 completion). Finally, Breusch and Gray (2004, 2001 data) found similar effects for VET qualifications but larger effects for degrees and Year 12 completions.

Table C.7 **Effect of education on the probability of participation and employment**

Marginal effect, percentage points

Study and data	*Participation and/or employment measure*	*High school*	*Other post-school qualification*	*Degree or higher*
Laplagne, Glover and Shomos 2007[a] (First four waves of HILDA, 16–64 years)	Participation	Males: 5.7 Females: 9.0	Males: 3.4 Females: 10.2	Males: 8.6 Females: 19.7
Shomos 2010[a] (ALLS, 25–64 years)	Participation	Males: 0.0[b] Females: 5.7	Males: 2.9 Females: 10.5	Males: 2.8 Females: 14.9
Dawkins, Lim and Summers 2004[a, c] (Second wave of HILDA, 15–64 years)	Participation	***30 year old:*** Males: 7.1 Females: 12.4 ***50 year old:*** Males: 4.8 Females: 13.5	***30 year old:*** Males: 8.7 Females: 16.4 ***50 year old:*** Males: 5.9 Females: 17.4	***30 year olds:***[d] Males: 10.3 Females: 21.5 ***50 year olds:***[d] Males: 6.9 Females: 21.8
Karmel and Nguyen 2006[a, e] (2003 NCVER *Student Outcomes Survey*)	Employment	Males: 6.0 Females: 6.6	Males: 10.9[f] Females: 12.2[f]	Males: 12.7 Females: 14.3
Breusch and Gray 2004[a] (First wave of HILDA, 15 years and over)	Employment	Males: 17.8[b] Females: 13.7	Males: 15.4[b,g] Females: 13.9[g]	Males: 30.0 Females: 28.7
Current study[h]	**Participation**	**5.7**	**9.3 (Dip./ Ad. Dip.)** **10.9 (Cert. III/IV)**	**13.9**

[a] Results are compared with someone who did not complete year 12 using *Household, Income and Labour Dynamics in Australia* (HILDA) and the *Adult Literacy and Life Skills Survey* (ALLS). [b] Not statistically significant at the 10 per cent level. [c] Marginal effects were calculated from predicted probabilities for married individuals in Melbourne. Single individuals and individuals from other parts of Victoria are not reported. However, results are similar. [d] Includes Diplomas. [e] Marginal effects were calculated from predicted probabilities. Where an education measure includes multiple education levels, simple averages were taken to get a predicted probability for that group. [f] Certificate III and IV qualifications. [g] Identified as 'trade' qualifications by study. [h] Estimation based on pooled data that were used to estimate the young learners and mature learners equations separately. For the purpose of comparison within this table, a participation equation was estimated. Results for young and mature learners are presented in table C.8.

Sources: Breusch and Gray (2004); Dawkins, Summer and Lim (2004); Karmel and Nguyen (2006); Laplagne, Glover and Shomos (2007); Shomos (2010); Productivity Commission estimates.

The premiums used in this analysis in calculating the effects of qualification attainment by young and mature learners are reported in table C.8. The results mean, for example, that completion of a Diploma/Advanced Diploma qualification is associated with a probability of employment that is 11.2 percentage points higher, on average, than the rate for people aged 20–34 who have not completed a post-school qualification at or above this level.

Looking at young learners, the results indicate that attainment of a Certificate III or above increases the likelihood of employment for a young learner, relative to someone who does not finish school, by more than the results from the equation estimated for the population aged 25–64 would imply. This suggests that a young person who does not achieve beyond Year 11 today will be more disadvantaged in the labour market (less likely to be employed) than the average person who did not complete school in the past. This is consistent with a hypothesis that the pool of people who have not completed Year 11 has changed across time with the expansion in access to education. Many people who go on to complete school and post-school qualifications today would not have had that opportunity in the past.

The results also indicate that increasing qualification attainment as a mature learner markedly improves a person's probability of employment, relative to the effects of qualifications in the overall population aged 25–64. This might reflect changes in the nature of VET qualifications over time, the value placed by the labour market on VET qualifications relative to not having completed school and the characteristics of mature learners. On the latter point, it is possible, for example, that people who opt to complete a qualification as a mature age student are more motivated than those who gained their qualifications 10 or more years ago.

Table C.8 **Effects of qualification attainment on the probability of employment**

Percentage points

	Young learners[a]	*Mature learners — people 35–64*[b]	*People 25–64*[c]
Degree	19.5	20.9	15.6
Dip./Ad. Dip.	12.2	18.2	9.5
Certs. III/IV	15.7	15.9	10.1
Year 12	9.6	na	na

[a] Rates for young learners reflect estimates for people aged 20–34 years in 2009. The base category is people who had not completed Year 12, and includes those whose highest level of attainment was Certificate I or II. [b] Rates for people aged 35–64 in 2009 who had either not completed at least a Certificate III qualification (the base category), or who had completed a qualification at Certificate III level or above 10 years ago or earlier. [c] Rates for all people aged 25–64 in 2009. The base category is people who had not completed at least a Certificate III qualification.

Source: Productivity Commission estimates based on ABS (2010a).

The probabilities of employment for both young and mature learners were reduced by 10 per cent to account for unobserved ability bias.

These probabilities were then used in deriving predicted employment rates associated with each level of education, which were then used to estimate changes in employment attributable to changes in educational attainment.

Wage equation

The Commission used a two-step Heckman approach for its wage equation to account for potential 'selection effects' that might bias the estimates. These effects might be present because the sample for the wage equation only includes people who are employed, and who might have different characteristics to the broader population. For example, they might be more likely to have non-school qualifications, which could bias results (Heckman 1979). The selection equation, which tests for the presence of selection effects, is: [14]

$$Emp = \beta_0 + \beta_1 Age + \beta_2 Age^2 + \beta_3 Degree + \beta_4 Diploma + \beta_5 Certs34 + \beta_6 Ausborn + \beta_7 ESB + \beta_8 KidU3 + \beta_9 Kid34 + \beta_{10} Kid59 + \beta_{11} Kid1014 + \beta_{12} Married + \beta_{13} Male + \beta_{14} Citydweller \quad (2)$$

The explanatory variables capture age, highest qualification, whether someone was born in Australia or another English-speaking country, his or her marital status, gender and the age of his or her youngest child.

Results from this equation suggest that selection effects are present and a two-step Heckman approach is appropriate.

In the second step the following wage equation is estimated: [15]

$$Log(Hrwages) = \beta_0 + \beta_1 Exp + \beta_2 Exp^2 + \beta_3 Degree + \beta_4 Diploma + \beta_5 Certs34 + \beta_6 Whitecol + \beta_7 Ausborn + \beta_8 ESB + \beta_9 Married + \beta_{10} Citydweller + \beta_{11} Male \quad (3)$$

where: Log(Hrwages) is the logarithm of hourly wages

Exp is a person's work experience in years

Whitecol is a dummy variable for white collar occupations

Again, estimation results were compared with those obtained in a selection of other studies. To facilitate the comparison, a Heckman two step approach was run for the population aged 20–64. Results from the literature and the wage equation estimated using the *Survey of Education and Training 2009* (SET) are reported in table C.9. Results vary across the studies included. Overall, the comparison indicates that the estimates derived from SET are in line with those obtained by other authors.

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14 For the regression on the sample of people aged 20–34 a dummy variable representing Year 12 was included in the estimated equation.

15 For the regression on the sample of people aged 20–34 a dummy variable representing Year 12 was included in the estimated equation.

Table C.9 **Wage equation coefficients, various studies**

Per cent

	High school	*Certificate*	*Diplomas*	*Degree*	*Income measure*	*Data source*
Shomos (2010)		Includes Diplomas and Ad. Dips			Hourly wages	*Adult Literacy and Life Skills Survey* (2006)
- Males	14.4	16.5		47.1		
- Females	11.3	14.2		49.7		
Forbes et al. (2010)		Includes Diplomas and Ad. Dips			Hourly wages	HILDA (pooled cross section 2001 to 2005)
- Males	12.4	13.7		38.4		
- Females	10.7	12.0		38.2		
Daly et al. (2006)	18.3 (Comp'd secondary school)			41.3 (Post-secondary qual.)	Hourly earnings (men) (similar results for women)	AWIRS95
Miller and Eastough (2004)	5.9	13.2	23.5	36.8	Hourly earnings	1991 Census
Breusch and Gray (2004)					Hourly wages	HILDA (2001)
- Males	12.3	14.5		47.0		
- Females	8.5	11.2		42.7		
Miller and Volker (1993)						ALS (1986)
- Males	12.7		30.1	41.0	Hourly earnings	
- Females	12.0		37.6	45.9	Hourly earnings	
Current study[a]	**13.5**	**12.0**	**25.6**	**48.2**	**Hourly wages**	***Survey of Education and Training* 2009**

[a] Estimation based on pooled data that were used to estimate the young learners and mature learners equations separately. Results for young and mature learners are in table C.10.

The effects of qualifications on wages that are used in estimates of productivity in this analysis are reported in table C.10.

For young learners, the returns to Certificate III/IV and Year 12 are markedly higher than those for people aged 25–64. This is consistent with a change in the nature of Certificate III/IV qualifications over time, and with a change in the labour market prospects of people who do not complete school. The latter observation is consistent with the notion that the pool of young people who do not complete school today are less able than the pool who did not complete in the past.

Similarly, the results show that mature learners receive higher returns to education than their peers who achieved their qualifications more than 10 years previously.

Again, these results are consistent with changes in the nature of VET qualifications over time, and the value of a qualification increasing over time.

Table C.10 **Wage equation coefficients**

	Young learners[a]	*Mature learners — people 35–64*[b]	*People 25–64*[c]
	%	%	%
Degree	52.5	51.6	43.7
Dip./Ad. Dip.	26.2	28.7	21.1
Certs. III/IV	21.3	9.5	4.9
Year 12	18.5	na	na

[a] Estimates for people aged 20–35 years in 2009. The base category is people who had not completed Year 12, and includes those whose highest level of attainment was Certificate I or II. [b] Rates for people aged 35–64 in 2009 who had either not completed at least a Certificate III qualification (the base category), or who had completed a qualification at Certificate III level or above 10 years ago or earlier. [c] Estimates for people aged 25–64 in 2009. The base category is people who had not completed at least a Certificate III qualification.

Source: Productivity Commission estimates based on ABS (2010a).

The coefficients from a wage equation of the type estimated need to be transformed to produce the estimated, raw marginal effects that are reported in table C.11:

$$\textit{Marginal effects} = exp^{\beta} - 1 \qquad (4)$$

Table C.11 **The effect of qualification attainment on wages**

Estimated marginal effect

	Young learners[a]	*Mature learners*[b]
	%	%
Degree	69.1	67.5
Dip./Ad. Dip.	30.0	33.3
Certs. III/IV	23.7	10.0
Year 12	20.3	na

[a] Rates for young learners reflect estimates for people aged 20–35 years in 2009. The base category is people who had not completed Year 12, and includes those whose highest level of attainment was Certificate I or II. [b] Rates for people aged 35–64 in 2009 who had either not completed at least a Certificate III qualification (the base category), or who had completed a qualification at Certificate III level or above within the past 10 years.

Source: Productivity Commission estimates based on ABS (2010a).

These marginal effects were then used in deriving predicted wage rates associated with each level of education which were then used as input into estimating changes in productivity attributable to changes in educational attainment due to the COAG reform agenda.

C.4 Parameters used in the ELMO model and the mature learners framework

This section summarises the sources for other parameters included in the Education and Labour Market Outcomes (ELMO) model and the mature learners framework. Due to uncertainty about some of the data, some of the concepts used in the ELMO model were not parameterised, as indicated in table C.12.

Table C.12 **Parameter data sources**

Parameter/input	*Estimate*	*Source*
Wage parameters		
Wage premiums	Table C.14	Productivity Commission estimates based on *ABS Microdata: Education and Training* (ABS 2010a)
Average wage of Year 11 blue collar workers (base on which premiums are added in ELMO)	$21 per hour	Productivity Commission estimates based on *ABS Microdata: Education and Training* (ABS 2010a)
Average wage of a worker whose highest level of attainment is Year 12 or below (base on which premiums are added in the mature learners framework)	$25 per hour	Productivity Commission estimates based on *ABS Microdata: Education and Training* (ABS 2010a)
Cubic relationship between ability and wages	Table C.13	Assumption
Assumed growth in present value of real wages	1.5 per cent per year	Assumption
Employment related parameters		
Employment premiums	Table C.15	Productivity Commission estimates based on *ABS Microdata: Education and Training* (ABS 2010a)
Average employment probability of Year 11 blue collar workers (base on which predicted probabilities are added in ELMO)	59.0 per cent	Productivity Commission estimates based on *ABS Microdata: Education and Training* (ABS 2010a)
Average employment probability of a person whose highest level of attainment is Year 12 or below (base on which predicted probabilities are added in the mature learners framework)	65.5 per cent	Productivity Commission estimates based on *ABS Microdata: Education and Training* (ABS 2010a)

(Continued next page)

Table C.12 (continued)

Parameter/input	*Estimate*	*Source*
Lifetime hours worked		
Average hours worked per week	36 hours	Productivity Commission estimates based on *ABS Microdata: Education and Training* (ABS 2010a)
Average weeks worked per year	48 weeks	Productivity Commission estimates based on *ABS Microdata: Education and Training* (ABS 2010a)
Average years left in workforce – based on average retirement age, young learners	42 years	Average retirement age projections sourced from Retirement and Retirement Intentions (ABS 2009c)
Average years left in workforce– based on average retirement age, mature learners	18 years	Average retirement age projections sourced from Retirement and Retirement Intentions (ABS 2009c)
Time cost of study parameters		
Average time in education	Year 12 – 870 hours Cert. III/IV – 870 hours Diploma – 1 740 hours Degree – 3 915 hours	An estimate of the average number of hours spent studying per week by full-time students is sourced from How Australians Use Their Time (ABS 2008b). By assumption, full-time students study for 30 weeks per year of study. Year 12 and Cert. III/IV qualifications are assumed to take one year. Diplomas are assumed to take two years. Degrees are assumed to take three and a half years
Opportunity cost of studying	$18 per hour	Productivity Commission estimates based on ABS Microdata: Education and Training (ABS 2010b)
Monetary cost of study		
Private cost of university degree	$26 075	Productivity Commission estimates based on DEEWR (2011d) and DEEWR (ndb)
Public cost of degree	$51 427	Productivity Commission estimates based on Access Economics (2010)
Private cost of VET	Cert. III/IV – $1 758 Diploma – $6 345	Productivity Commission estimates based on ABS Microdata: Education and Training (ABS 2010b) and Chapman, Rodrigues and Ryan (2007)
Public cost of VET	Cert. III/IV – $5 333 Diploma – $6 807	Productivity Commission estimates based on ABS Microdata: Education and Training (ABS 2010b) and SCRGSP (2011)
Private cost of Year 12	$2 201	Productivity Commission estimates based on Gonski (2010) and ABS (2011c)
Public cost of Year 12	$10 057	Productivity Commission estimates based on Gonski (2010) and ABS (2011c)

(Continued next page)

Table C.12 (continued)

Parameter/input	*Estimate*			*Source*
Other parameters				
Correlation between cognitive and mechanical ability	0.275			Williams and Cummings (1996)
Value of non-market activity	$10.50 per hour			Assumed to be 50 per cent of average wage for Year 11 blue collar workers
Effective tax rate	38 per cent			Productivity Commission estimates based on Survey of Household Income and Expenditure 2003–04 (ABS 2006)
External benefit of education	Zero			Assumption
Overestimate of returns to education	Zero			Evidence is inconclusive (Usher 2005)
Value of tax revenue – Deadweight loss of taxation	0.24			KPMG Econtech (2010)
Population: numbers of 15–24 years olds in each State/Territory (ELMO)		*2009*	*2020*	Population estimates sourced from Australian Demographic Statistics (ABS 2011a)
	NSW	1 000 164	1 203 963	
	VIC	787 708	949 907	
	QLD	644 083	816 329	
	SA	224 260	268 581	
	WA	329 159	401 810	
	TAS	66 813	75 308	
	NT	35 777	43 984	
	ACT	55 354	70 785	
Population: numbers of 25–64 years olds in each State/Territory (Mature learners)		*2009*	*2020*	Population estimates sourced from Australian Demographic Statistics (ABS 2011a)
	NSW	3 852 955	4 332 535	
	VIC	2 977 456	3 348 062	
	QLD	2 397 790	2 696 245	
	SA	870 046	978 341	
	WA	1 239 882	1 394 211	
	TAS	264 095	296 967	
	NT	127 930	143 854	
	ACT	200 146	225 058	

Returns to education estimated within ELMO

ELMO calculates the combination of wage premiums and education costs for each option available to individuals to produce the net benefits that condition the individuals' choices. The wage is estimated using the wage premiums attached to qualifications (reduced by the 10 per cent discount for ability bias) and an assumed cubic relationship between ability and wages. It is assumed that the relationship between ability and wages can be represented by a cubic functional form.[16] In the absence of any data to support this relationship, the parameters were chosen by assumption to generate plausible wage estimates (table C.13).

Table C.13 **Assumed cubic relationship between ability and wages[a]**

Education level	*wa*	*wb*	*wc*	*wd*
Y11_blue	1	0.33	0	0
Y11_white	1	0.33	0	0
Y12_white	1	0.64	-0.54	0.29
C34_blue	1	0.26	1.11	-0.58
C34_white	1	0.52	0.15	-0.22
Dip_white	1	0.11	1.24	-0.79
Deg_white	1	-0.08	1.06	-0.21

a The cubic function is $wage = wa + wb * ability + wc * ability^2 + wd * ability^3$.

The wage and employment premiums applied are presented in tables C.14 and C.15, respectively.

Table C.14 **Effects of qualification attainment on wages**
Marginal effect applied in the ELMO model (discounted by 10 per cent)

	Young learners[a]	*Mature learners*[b]
	%	%
Degree	62.2	60.8
Dip./Ad. Dip.	27.0	30.0
Certs. III/IV	21.3	9.0
Year 12	18.3	na

a Rates for young learners reflect estimates for people aged 20–35 years in 2009. The base category is people who had not completed Year 12, and includes those whose highest level of attainment was Certificate I or II. **b** Rates for people aged 35–64 in 2009 who had either not completed at least a Certificate III qualification (the base category), or who had completed a qualification at Certificate III level or above within the past 10 years.

Source: Productivity Commission estimates based on table C.11.

16 The decision to use a cubic function is arbitrary but it was chosen as it allows sufficient flexibility to model the effects of ability on wages.

Table C.15 **Effects of qualification attainment on employment probabilities**

Marginal effect applied in the ELMO model (discounted by 10 per cent)

	Young learners	*Mature learners*
	ppt	ppt
Degree	17.6	18.8
Dip./Ad. Dip.	11.0	16.4
Certs. III/IV	14.1	14.3
Year 12	8.6	na

[a] Rates for young learners. The base category is people who had not completed Year 12, and includes those whose highest level of attainment was Certificate I or II. [b] Rates for people aged 35–64 who had either not completed at least a Certificate III qualification (the base category), or who had completed a qualification at Certificate III level or above within the past 10 years.

Source: Productivity Commission estimates based on table C.8.

Externalities

Education is thought to produce external benefits that are not accounted for in this report due to lack of time. External benefits can be important in net benefit calculations and constitute a rationale for public funding. The implications of omitting the possible effects of externalities are discussed briefly in box C.2.

Box C.2 **Education externalities**

Due to time constraints, the Commission has not been able to include in the calculation of net benefits, the value of externalities that might be associated with additional education. This means that social benefits are likely to be underestimated, due to potential for additional education to reduce crime rates, and increase productivity by fostering greater innovation. However, the size of external benefits is difficult to estimate. For example:

- Rauch (1993) estimated that an additional year of education increased total factor productivity by 2 to 3 per cent
- Acemoglu and Angrist (2000) found that each additional year of schooling was associated with external returns between 1 and 3 per cent
- Lochner and Moretti (2004) estimate that the value of reduced crime associated with additional education was between 14 and 26 per cent of the private return.

Whilst externalities do not affect the private return to education, and therefore do not influence people's education choices, they can affect the social return to education.

Sensitivity analysis

Sensitivity analysis is performed to evaluate the effect of changing key exogenous parameters (table C.16) and to generate confidence intervals for key reporting parameters.

Table C.16 **Sensitivity analysis — assumed distribution of parameters**

Parameter	*Distribution*	*Lower*[a]	*Mean*	*Upper*[a]
Effective tax rate	Normal	0.28	0.38	0.48
Value of tax revenue	Uniform	0.04	0.24	0.44
Wage premiums scalar[b]	Normal	0.4	1	1.6
Employment premiums scalar[c]	Normal	0.4	1	1.6
Real wage growth factor	Uniform	0.005	0.015	0.025
Value of non-market activity	Uniform	0.25	0.5	0.75
Lifetime hours worked[d] (young learners)	Uniform	62 576	72 576	82 576
Lifetime hours worked[e] (mature learners)	Uniform	26 104	31 104	36 104

[a] Lower and upper values are the endpoints for uniform distributions and the 95 per cent confidence intervals for the normal distribution. [b] This scalar is used to adjust the wage premiums. The lower value of 0.4 scales the wage premiums to 40 per cent of their mean value and so on. [c] This scalar is used to adjust the employment premiums. The lower value of 0.4 scales the wage premiums to 40 per cent of their mean value. [d] The mean lifetime hours worked is based on someone working 36 hours per week, 48 weeks per year for 42 years. [e] The mean lifetime hours worked is based on someone working 36 hours per week, 48 weeks per year for 18 years.

C.5 Estimation results

In the interest of transparency and to facilitate comparisons with other estimations, results from a Heckman two step approach for wages and for a logit regression for employment for people aged 20–64 are presented in this section.

Table C.17 **Employment equation results**

Variable	
	Coefficient
Age	0.2330*
Age squared	-0.0032*
Degree	1.2556*
Diploma	0.8617*
Certificate III and IV	0.9794*
Year 12	0.4660*
Born in Australia (*ausborn*)	0.7387*
Born in another English speaking country (*ESB*)	0.8455*
Marital status (*married*)	0.4114*
Youngest child under three (*kidu3*)	-1.2954*
Youngest child between three and four (*kid34*)	-1.0899*
Youngest child between five and nine (*kid59*)	-0.4135*
Youngest child between ten and 14 (*kid1014*)	-0.0422
Male	0.9828*
Live in a capital city (*citydweller*)	0.0618
Constant	-3.7449*
	Marginal effect
Age	0.0317*
Age squared	-0.0004*
Degree	0.1388*
Diploma	0.0934*
Certificate III and IV	0.1089*
Year 12	0.0569*
Born in Australia (*ausborn*)	0.1110*
Born in another English speaking country (*ESB*)	0.0915*
Marital status (*married*)	0.0588*
Youngest child under three (*kidu3*)	-0.2340*
Youngest child between three and four (*kid34*)	-0.1985*
Youngest child between five and nine (*kid59*)	-0.0628*
Youngest child between ten and 14 (*kid1014*)	-0.0058
Male	0.1345*
Live in a capital city (*citydweller*)	0.0084

* Significant at the 5 per cent level. Log likelihood: -8968.3. Pseudo R squared: 0.1577. Number of observations: 20 952.

Source: Productivity Commission estimates based on ABS (2010a).

Table C.18 **Wage equation coefficients**

Variable	
Selection equation	
Age	-0.1099*
Age squared	0.0010*
Degree	0.3359*
Diploma	0.1208*
Certificate III and IV	-0.0394
Year 12	0.0448
Born in Australia (*ausborn*)	-0.0270
Born in another English speaking country (*ESB*)	-0.0057
Youngest child under three (*kidu3*)	-0.1254*
Youngest child between three and four (*kid34*)	-0.0528
Youngest child between five and nine (*kid59*)	0.0416
Youngest child between ten and 14 (*kid1014*)	0.0397
Marital status (*married*)	-0.0465
Male	-0.2206*
Wage equation	
Work experience (*exp*)	0.0176*
Work experience squared	-0.0003*
Degree	0.4817*
Diploma	0.2564*
Certificate III and IV	0.1201*
Year 12	0.1349*
White collar occupation (*whitecol*)	0.1356*
Born in Australia (*ausborn*)	0.1080*
Born in another English speaking country (*ESB*)	0.1767*
Marital status (*married*)	0.0782*
Live in a capital city (*citydweller*)	0.0011
Male	0.1713*
Constant	2.4258*
Lambda	*0.3151*

* Significant at the 5 per cent level.

Source: Productivity Commission estimates based on ABS (2010a).

D Young learners — ELMO results

This appendix presents estimates of the effects of vocational education and training (VET) reforms that have been, or will potentially be, implemented as part of the Council of Australian Governments (COAG) reform agenda. Effects relating to increases in educational attainment among learners aged 15 to 24 are the focus of analysis. Estimates for mature learners (aged 25 to 64) are presented in appendix E.[1]

The Commission has estimated the:

- realised and prospective effects of reform in Victoria, as well as the effects of contestability in Victoria
- prospective effects of reform in South Australia
- realised effects of the *National Partnership Agreement on Productivity Places Program* (NPAPPP)
- potential effects of reforms Australia-wide as defined in chapter 3.

The effects of these reforms on young learners are estimated using the Education and Labour Market Outcomes (ELMO) model, in which individuals are assumed to maximise the returns to the education they undertake. The ELMO model is described in detail in appendix B. Young learners usually enter the VET system to gain their first post-school qualification, and need to consider various career pathways in choosing the level of qualification and the field of training. These choices can be approximated by a relatively simple optimisation model in which individuals are assumed to maximise the net benefits of various education choices.

A different framework is used to estimate effects on mature learners (appendix E), The decisions facing mature learners are more difficult to represent simply, in part, because of the diversity of their circumstances. Mature learners need to balance their current career circumstances against the costs and benefits of gaining a qualification, which can also be a requirement for employment. They must also

[1] Appendix E also presents results for scenarios in which (i) partial completers are assumed to access publicly funded places and (ii) reskillers are assumed to access publicly funded places at the same or lower level than the highest qualification already held.

consider the shorter time during which they will be able to realise the benefits from their new qualifications.

The Commission has made many assumptions in estimating the impacts of COAG's VET reform agenda. These are detailed in appendix C. Sensitivity analysis indicates that those assumptions are critical. When the assumptions change, so do estimated changes in employment, productivity and broader economic effects, often quite markedly. The results, therefore, should be regarded as only broadly indicative of the possible impacts of the policy initiatives assessed. The estimates and analysis are intended to advance understanding of the scale of benefits that might accrue. The estimates presented are not forecasts of the economic or fiscal impacts of the reforms. Rather, they are illustrative projections, relative to a baseline, of the effects of the policy initiatives modelled.

D.1 Modelling the effects of the COAG VET reforms

The Commission's modelling work estimates the effects of changes in qualification attainment attributable to policy initiatives enacted under the COAG VET reform agenda on economic measures like employment and productivity. In turn, these measures affect net social benefit, government revenue and social inclusion.

Some intuition

Individuals compare the benefits and costs of different education options to choose the option that yields the highest net benefit. For an individual who elects to complete a Certificate III/IV, the net benefit of that option exceeds the net benefits of all other options. By funding part of the qualification, the government influences the private cost of education and thereby choices. The initial funding of the qualification and any taxes collected on the additional income that results from a higher qualification affect government net expenditure.

For an individual who pursues a Certificate III/IV, the private cost is composed of $1,758 in fees and $15,660 in foregone earnings (estimated as $18/hour, the wage assumed to be obtainable for a young person with a Year 11 qualification). Ignoring the effect of ability on wages, the estimated benefit is an increase in the hourly wage from $21/hour (the wage imputed to a person aged 25 and over with a Year 11 qualification) to $25.47. This translates to an (undiscounted) increase in lifetime earnings of $324 632,[2] or about $7 700 per year, over 42 years.

[2] $140 664 discounted (6 per cent, real).

The government's contribution is about $5 333 and the (undiscounted) change in net government taxation revenue is about $123 000 over 42 years.[3]

Productivity

In this study, productivity refers to the average or aggregate productivity of the workforce. It is a partial measure of productivity that is measured by the average wage, assuming that employers hire up to the point at which a worker's marginal product is equal to its cost. In the context of this study, there are four possible contributors to the aggregate productivity index.

- An increase in the productivity of people with low ability, holding employment constant. This increases the average productivity index.
- An increase in the employment of people of low ability. These people earn less than the average wage and increasing their numbers in the working population reduces the productivity index.
- A decrease in the productivity of people with high ability, holding employment constant. Initiatives that decrease the cost of VET qualifications can result in some high ability students electing to study higher-level VET courses instead of degrees. This lowers the productivity index, as these students forego the higher productivity associated with holding a degree.
- A decrease in the employment of people with high ability, holding their productivity constant. As these people substitute from degrees to VET, they might work fewer hours. As this group's productivity is higher than average, contributing fewer hours lowers aggregate productivity.

Net social benefit

Net social benefit reflects a broader range of policy effects, compared with GDP, as it also includes the value of non-market activities, such as leisure and caring for family members. It is calculated from changes in labour income before taxes minus an estimate of the costs of non-market activities foregone and the time and money costs of education.[4]

3 $53 452 discounted (6 per cent, real).

4 The time cost of studying is calculated as labour income foregone, and accounted for in gross payments to labour.

Adjustments have also been made to capture the value of government revenue.[5] Although the model is set up to account for external benefits, none were estimated in the context of this project due to resource constraints.

Other benefits

The item 'other benefits' of education is a residual that is obtained from the calibration of the model with data from the 2009 *Survey of Education and Training* (SET, ABS 2010b). The calibration is done by measuring the amount of income that is required to match the education–work choices that are revealed in the SET. For example, if the calibration requires more fashion designers than predicted, it assigns a positive value to the residual, indicating that fashion courses are more popular than the model would predict and have higher expected returns (monetary and non-monetary) than the model would predict. The calibration residuals include unknown components that are due to:

- statistical and measurement errors in the model and in the data
- consumption value of education (a positive contribution to the residuals, consistent with the model underestimating the returns to training, and students deriving non-monetary benefits from attending the training)
- disutility associated with education (a negative contribution to the residuals, consistent with the model overestimating returns to training, relative to the data, and revealing non-monetary costs)
- any other factors that might impact on someone's education–work choices. For example, preferences for certain jobs (for example fashion designer).

Given the large uncertainty associated with this part of the calculation, the net social benefit could be larger than shown in the results. For this reason, some of the results are discussed as ranges.

Further research in this area (for example, on the non-monetary benefits that might accrue to individuals in the course of their study or in their job) would improve the performance of the model.

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5 The value of tax revenue is assumed to be $0.24 per dollar of tax revenue (based on KPMG Econtech (2010a); appendix C). This was used in the Henry Tax Review (Australia's Future Tax System Review 2009).

Government revenue and fiscal effects

The reforms entail additional government expenditure. To the extent that this increases wages and employment, it also increases future income tax revenue, assuming current income tax settings.[6] The net effect, that is, the difference between the initial outlay and the discounted future flows, does not account for any other changes in tax revenue, such as increased GST collection that might arise from additional consumption that occurs as income increases, or additional payroll tax, excise tax from additional consumption of goods subject to excise, etc. This would require detailed tax modelling that is beyond the scope of the ELMO model.[7] An indication of the order of magnitude of the GST revenue not accounted for could be obtained by assuming that all the additional income is spent on goods and services that are subject to GST — this additional revenue would amount to 10 per cent of the estimated after-tax payments to labour.

This calculation of partial fiscal effects is akin to an investment calculation in which an initial outlay — the additional expenditure associated with increasing the number of subsidised places — is compared with a future stream of revenue — the additional tax revenue that might arise from increases in income induced by the policy.

The partial fiscal effects that are reported depend critically on the effects on wages. To the extent that some of the partial equilibrium assumptions mentioned in appendix B are not satisfied and wages might be higher or lower than projected, future tax revenue could also be higher or lower than projected. The results are also affected by education subsidies, which can counteract the effects of taxation (box D.1).

6 Additional labour income is assumed to be taxed at 38 per cent on average.

7 Given the characteristics of the policy initiatives (which are like discrete projects that change the qualification composition of the population) and demographic dynamics, it is difficult to estimate a 'steady-state' situation with constant annual expenditure and revenues. That said, the Monash Multi-Regional Forecasting (MMRF) model could be used to generate changes in aggregate annual tax revenue over a given time period.

Box D.1 Effects of income taxes and education subsidies

Taxes on labour income reduce the after-tax returns to a qualification. Relative to a situation without taxes (or with lower taxes), this results in an under-investment in education. Education subsidies reduce the private cost of education and, relative to a situation without subsidies, provide incentives to over-invest in education. If subsidies shift choices away from the socially optimal mix, this can be a source of distortion.

The subsidy implied by the expansion of publicly-funded VET places counteracts the effect of the tax on labour income. For example, in the Victoria realised scenario, it could account for about 72 per cent of the estimated net social benefits. This figure is obtained as the difference between running the ELMO model with the current tax setting and without it, and allowing for greater substitution between degrees and VET qualifications than is used throughout this report.

D.2 Projected effects of COAG VET reforms

The COAG VET reforms have the potential to lead to higher employment and productivity, and could generate social benefits. Commission projections show that the realised and prospective reforms are likely to have contributed small increases in national employment and productivity statistics.

The total net social benefit of the reforms is projected to be almost $10 billion, over a period of roughly 50 years,[8] most of which (about $7 billion) is attributable to the potential scenario which reflects policy initiatives that might be adopted in the future.[9] These estimates do not account for other labour market factors, such as any potential decrease in wages that might occur from increasing the supply of certain types of labour beyond any increase in the corresponding demand. To the extent that some wages might decrease, the estimates are likely to be upper bounds. Realised net social benefits (stemming from Victorian policies and the NPAPPP) are estimated to be more than $2.6 billion (table D.1).

8 These results are not annual, but for the entire period covered by the simulations and discounted at 6 per cent, real. That is, notionally, from 2010, the year when the first graduates from the Victoria realised scenario enter the workforce to 42 years after the last students complete their qualifications in 2020.

9 Net social benefit could be as high as $20 billion over the simulation period if one abstracts from the 'other benefits' item.

Table D.1 **Projected national effects of COAG VET entitlement reforms, by policy initiative, people aged 15–24**

		Victorian realised	*Victorian prospective*	*SA prospective*	*NPAPPP realised*	*Potential*	*Total*
Increased highest qualification[a]							
Dip./Ad. Dip.	no.	498	4 010	1 024	10 762	55 399	71 693
Certs. III/IV	no.	13 141	21 761	5 513	48 906	304 320	393 641
Employment and productivity[b]							
Change in employ.	%	0.008	0.014	0.004	0.034	0.180	0.239
Change in prod.	%	0.001	0.001	0.001	0.006	0.013	0.022
Private and net social benefit							
Payments to labour[d]	$m	965	1 565	535	4 068	24 227	31 360
+ value of non-market activity[e]	$m	-298	-518	-147	-1 228	-8 098	-10 289
+ savings in education cost[f]	$m	42	67	10	128	589	836
+ adjustment for value of govt. rev.[g]	$m	13	-33	-2	-25	-995	-1 042
+ external benefits[h]	$m	0	0	0	0	0	0
+ other benefits[i]	$m	-309	-504	-188	-1 313	-8 568	-10 882
Net social benefit	$m	413	577	208	1 630	7 154	9 982
Partial fiscal effects	$m	409	674	218	1 713	10 030	13 044

[a] Higher qualifications only (appendix C presents assumptions and derivation). [b] Effects relative to the Australian working-age (15-64) population. [c] Changes are in present value terms, discounted at 6 per cent (real) over 42 years. [d] Additional wage income less time cost of education. [e] Associated with increased participation. A negative figure represents non-market activity foregone. [f] Sum of private and public costs. A positive number is associated with the savings in education costs that results from encouraging young learners into VET, which is cheaper than alternative qualifications. [g] Excess burden of taxation if negative. Value is positive for the realised scenario because the small number of completions produces small reductions in wage premiums due to the marginal ability effect (and therefore a larger increase in future tax revenues relative to subsidy costs than in other scenarios). [h] Not estimated. [i] Includes any consumption value of education (positive) or disutility of attending education (negative) assuming no statistical or measurement errors in the data to which the model is calibrated, or in the parameterisation of the model. It also includes a host of potential statistical and measurement errors (calibration section in this appendix).

Source: Productivity Commission estimates.

Realised and prospective effects of the introduction of VET entitlement in Victoria

The conversion of student numbers into higher qualifications is explained in appendix C. Over the period 2009 to 2011 (the realised period), the Commission projects the number of young learners with higher level qualifications in Victoria to be about 13 600 higher than would be the case in the absence of policy changes.[10]

[10] Using data on actual student numbers to the third quarter of 2011 (appendix C). As a guide, in 2008, there were 133 500 young learners in Victoria (Skills Victoria 2011b).

Reflecting the rapid growth in enrolments, higher qualifications in 2012 (the prospective period) are estimated to be about 25 700 above the baseline. The largest number of students comes from the group who would have completed Year 12 under the baseline set of incentives (box D.2).

Box D.2 Changes in incentives and substitution between qualifications

An expansion in the number of government-funded places reduces the private costs of VET to some individuals. This change in the structure of private incentives can be expected to increase the number of students who undertake VET. The degree to which a potential student responds to changes in incentives depends on the substitutability between different education and employment choices, which is regulated by the relative net benefits of the options that they face.

The ELMO model projects changes in the likely education and work choices of individuals as incentives change. The vast majority of adjustments to an expansion in government-funded VET places occurs between the Year 12 and Certificate III/IV groups. In other words, relative to the baseline, as the number of government-funded VET places increases, the most common response projected by ELMO is that individuals who might otherwise not have studied beyond Year 12 go on to pursue a Certificate III or IV qualification.

The model assumes that the more able Year 12 graduates choose to invest additional time and funds (to the extent that the places are not fully funded) into pursuing a VET qualification. The employment probability and productivity of these individuals are projected to increase. In particular, their productivity increases by up to the difference in average wages of Year 12 and VET graduates (3 per cent for a Certificate III/IV and nearly 9 per cent for a Diploma). The relevant wage premiums are in table C.14.

People who might otherwise have planned (in the base case) on undertaking a Degree, could respond to changes in the incentives before them by pursuing a VET qualification instead. The relevant population would be that of the less able higher education students, and they would be most likely to switch to Diploma study. The investment in time (typically more than three years) and funds that are associated with a Degree is significantly larger than the investment required to obtain a VET qualification. This is reflected in the relatively large wage premiums that are typically associated with Degrees, and is modelled as a 43.9 per cent difference (table C.14).

(Continued next page)

Box D.2 continued

In the version of the ELMO model used in this report, the substitution between degrees and VET qualifications is assumed to be limited. To the extent that this is not the case, the results could be different. For example, when an individual substitutes VET for higher education, they forego the productivity premium associated with a Degree. As a result, his or her productivity would be up to 39.1 per cent lower than in the baseline. On the other hand, the fiscal cost of a VET qualification is a fraction of that of a Degree, which has implications for the net social benefit stemming from the individual's decision. A sensitivity analysis performed with ELMO shows that allowing for some substitutability between higher education and VET qualifications translates into a small number of individuals choosing a VET qualification over a Degree. This is likely to reduce estimates of aggregate productivity and increase net social benefit.

Increasing the qualification attainment of the population can be expected to produce increases in the labour productivity index and in the employment rate. The contributions of the Victorian realised and prospective scenarios to the Australian economy are modest, since Victoria accounts for about a quarter of the Australian economy (table D.1). Contributions to the Victorian economy are correspondingly larger (table D.2).

The net social benefit of the realised increases in Victorian young learners' educational attainment is estimated to be $413 million in net present value terms, and $577 million for prospective increases in attainment, over a period of 42 years. The main contributors to this result are: the net benefit from increasing qualifications, the value of non-market activity forgone as the employment rate increases, and the apparent disutility associated with education. This latter component is more speculative than the others, since it arises from model calibration. To the extent that it is an overestimate, the net social benefits could be correspondingly larger. Further, external benefits associated with increased attainment could not be estimated in time for this project. Several researchers have shown that such benefits exist, but their estimates are relatively small. Further research in this area would provide a better basis on which to estimate the possible contribution of external benefits.

From the government's perspective, initial expenditures on the Victorian entitlement project are projected to be offset by estimated tax revenue on increased future labour incomes. The net effect is estimated to be a net increase in discounted government revenues of around $409 million for realised changes and a net increase of $674 million for prospective changes, over 42 years.

Contestability – illustrative scenarios

Further changes could occur as a result of the introduction of contestability reforms in Victoria, which could affect the quality of VET qualifications as measured by their effects on employment or productivity prospects (box D.3). Giving private providers access to public funding and producing a more responsive VET sector, two aspects of contestability, have been claimed to have negative and positive effects on outcomes. As a result, two illustrative scenarios are modelled.

- Improved quality is represented by a 5 per cent increase in the wage and probability of employment premiums that a student can expect from a VET qualification, relative to the baseline.
- Reduced quality is represented by a 5 per cent decrease in the corresponding wage and employment probability premiums, relative to the baseline.

As can be seen in box D.3, one year of the illustrative effects of contestability on VET outcomes is estimated to produce results that are of similar orders of magnitude to the sum of those for the Victorian realised and prospective scenarios.

Box D.3 **Contestability reforms in Victoria**

The introduction of contestability has allowed private providers to offer some of the VET places that are funded by government. There is a debate about the effects of contestability, especially in terms of the quality of the qualifications produced (chapter 3).

In some 'mixed markets' where services are supplied by private and public providers, contestability has been introduced under the assumption that private providers can produce better outcomes for the same cost. For example, it is argued that increased access to private providers can expand the choices available to students. Others argue that contestability could decrease the quality of the qualifications, as private providers might reduce the quality of teaching to reduce costs. Recent reports (for example, ESC 2011a) indicate that quality is an issue with some providers. The recent inception of the Australian Skills Quality Authority is one initiative designed to improve quality standards. This, along with increased competition and improved information, is likely to improve quality over time.

Positive effects on quality can enhance the projected effects of Victorian entitlement policies, and negative effects can detract from these effects. The estimates in the table below can be added to those presented in table D.1.

Illustrative effects of contestability policies

Victorian young learners, annual effects; changes from the baseline

	Unit	*Improved quality effect*	*Reduced quality effect*
Change in highest qualification			
Diploma/Advanced Diploma	%	0.48	-2.37
Certs. III/IV	%	2.98	-1.67
Employment and productivity			
Change in employment	%	0.11	-0.05
Change in productivity	%	0.04	0.01
Net social benefit calculation			
Gross payments to labour	$m	857	-277
+ value of non-market activity	$m	-214	96
+ savings in education cost	$m	16	-105
+ adjustment for value of govt. rev.	$m	72	-50
+ external benefits	$m	0	0
+ other benefits	$m	-159	-25
Net social benefit	$m	572	-361
Partial fiscal effects	$m	343	-181

Source: Productivity Commission estimates.

Prospective effects of the South Australian VET entitlement

The prospective increase in places is estimated to translate into an additional 6 500 higher level qualifications attained in South Australia. This results from significant growth in student numbers and completion rates.

As a result of these increases, employment and productivity are projected to contribute small increases toward the COAG target, but larger contributions to the South Australian economy (table D.2).

The young learners component of the net social benefit associated with South Australian policy initiatives is estimated to be about $208 million in net present value terms, over 42 years.

Realised effects of the NPAPPP

The mechanisms at work in the NPAPPP are similar to those described in the cases above, with one main difference — the places associated with the NPAPPP are restricted to areas of need. The ELMO model abstracts from this complication, spreading additional places across the VET system according to their unconstrained returns. Therefore, the results are likely to overestimate the effects of the NPAPPP.

The net social benefit is estimated to be about $1.6 billion in net present value terms as a consequence of the NPAPPP's effects on young learners' educational attainment. Depending on the degree to which the areas of need distort students' choices, the results could be overestimates. The ELMO model was used to assess the likely extent of this (box D.4).

Box D.4 Effect of restricting VET places to areas of need

The ELMO model was modified to estimate the effects of restricting places to areas of need for sensitivity analysis. These areas were assumed to constitute about 70 per cent of the VET system. The estimated net social benefit is reduced by about 49 per cent, relative to the unconstrained solution.

This is mainly attributable to some of the students who had chosen a VET course in the unconstrained case, switching to an area that is defined as an area of need and that produces smaller returns than in the unconstrained case.

Potential effects of reforms to 2020

To achieve the COAG target for 2020, the proportion of 20–64 year olds without a Certificate III or above has to fall to 23.6 per cent (figure 3.3). It is assumed that the additional number of qualifications required to achieve this target is produced in the seven years to 2020, Australia-wide.

Net social benefits of about $7.2 billion in net present value terms are estimated as a consequence of the potential changes in young learners' educational attainment. The partial fiscal effects are estimated to be an increase of about $10 billion in net government revenues.

D.3 Projected jurisdictional effects of COAG VET reforms on employment and productivity

The Commission estimates that the COAG VET realised and prospective reforms are likely to make small positive contributions to national employment and productivity (table D.1). Jurisdictional effects are larger than the national effects, when compared with the working-age population of the relevant jurisdiction (table D.2). The increase in productivity of the incumbent workers contributes unambiguously to an increase in the average labour productivity index, whereas the addition of new workers with productivity less than the average contributes a small reduction to the average productivity index attached to the relevant population.

Table D.2 **Projected jurisdictional effects of COAG VET reforms on employment and productivity, by policy initiative, for people aged 15–24**

Per cent

	Victorian realised[a]	*Victorian* prospective[a]	*SA prospective*[b]	*NPAPPP realised*[c]
Change in employment	0.155	0.269	0.272	0.215
Change in productivity	0.019	0.021	0.083	0.040
Contribution of incumbent workers	0.048	0.078	0.129	0.082
Contribution of new workers	-0.030	-0.057	-0.046	-0.042

[a] Relative to the Victorian 15–24 year old population. [b] Relative to the South Australian 15–24 year old population. [c] Relative to the 15–24 year old population in all States and Territories except Victoria.

Source: Productivity Commission estimates.

D.4 Projected occupational effects of COAG VET reforms

The increase in qualification completions due to the introduction of the COAG VET reforms reflects the associated reduction in the costs of VET courses to students, relative to other study alternatives. The increase in the number of people with VET qualifications as their highest level of education is determined by the characteristics of the entitlement (that is, the additional number of places, and eligibility requirements), and is matched by a fall in the number of people who would have pursued other educational options.

Changes in educational attainment are projected to increase employment in occupations more commonly entered by people with VET qualifications, such as community and personal services, technicians and trades and some types of managers. Employment in occupations more commonly entered by people with non-VET qualifications is estimated to decrease — for example, clerical and administrative jobs (1.6 per cent reduction for realised effects and 3.1 per cent reduction for prospective effects in Victoria) (table D.3).

Table D.3 **Projected occupational effects of COAG VET reforms, by policy initiative, for people aged 15–24**

Per cent

	Victorian realised[a]	*Victorian prospective*[a]	*SA prospective*[b]	*NPAPPP realised*[c]	*Potential*[d]
Change in occupational profile					
Managers	0.45	0.63	-0.02	0.45	2.51
Professionals	-0.01	0.29	0.03	0.15	0.64
Technicians and trades	0.79	0.97	1.34	0.78	2.53
Community and personal services	3.55	6.23	4.05	3.32	14.91
Clerical and administrative	-1.62	-3.09	-0.85	-0.95	-4.64
Sales	-0.70	-1.40	0.63	-0.68	-1.85
Machinery operators and drivers	-0.38	-0.77	-1.62	-0.76	-4.87
Labourers	-0.77	-1.37	-1.51	-0.91	-6.08
Change in productivity					
Managers	-0.07	-0.12	0.09	-0.05	-0.55
Professionals	0.01	-0.07	0.04	-0.02	-0.16
Technicians and trades	0.12	0.17	0.13	0.13	0.70
Community and personal services	-0.38	-0.73	-0.41	-0.38	-2.15
Clerical and administrative	0.25	0.52	0.15	0.17	0.91
Sales	0.09	0.19	0.05	0.14	0.43
Machinery operators and drivers	0.26	0.39	0.44	0.31	1.68
Labourers	0.25	0.38	0.44	0.30	1.69

[a] Relative to the Victorian 15–24 year old population. [b] Relative to the South Australian 15–24 year old population. [c] Relative to the 15–24 year old population in all States and Territories except Victoria. [d] Relative to the 15-24 year old population Australia-wide.

Source: Productivity Commission estimates.

D.5 Projected social inclusion effects of COAG VET reforms

The increase in educational attainment attributable to VET policy initiatives is projected to increase employment and improve literacy and numeracy outcomes (table D.4).

Table D.4 **Projected effects of COAG VET reforms on social inclusion**

	Unit	*Victorian realised*[a]	*Victorian prospective*[a]	*SA prospective*[b]	*NPAPPP realised*[c]	*Australia Potential*[d]
Change in employment	%	0.155	0.269	0.272	0.215	0.862
Change in average literacy score[e]	no.	10.54	9.32	10.00	9.62	10.20
Change in literacy/numeracy level[f]	no.	1 529	2 438	1 180	7 141	63 367

[a] Relative to the Victorian 15–24 year old population. [b] Relative to the South Australian 15–24 year old population. [c] Relative to the 15–24 year old population in all States and Territories except Victoria. [d] Relative to the Australian 15–24 year old population. [e] Change in average literacy score on a scale of 0 – 500 for those who increase their educational attainment due to the reforms. [f] Number of 15–24 year olds who move to a higher literacy/numeracy level.

Source: Productivity Commission estimates.

D.6 Sensitivity analysis

Numerous modelling assumptions have been made regarding parameter values in estimating the effects of the COAG VET reforms. Altering these assumptions changes the estimated effects.

The sensitivity analysis results (table D.5) illustrate how the estimated effects change in response to changing many of the sets of assumptions that underlie the ELMO model (for example, assumptions about the employment and wage premiums, the value of government revenue or the tax rate). The distribution ranges for these parameters are presented in appendix C (table C.16). The lower and upper bounds of the ranges are estimated as 95 per cent confidence intervals, and some also include zero — implying that policies might not increase productivity or generate a net social benefit. Since some assumptions were not tested in this sensitivity analysis, the confidence intervals are likely to underestimate the uncertainty associated with the parameter values, and therefore, the uncertainty associated with the estimates.

Sensitivity analysis is performed using a Monte Carlo approach by running each policy initiative scenario 500 times, adjusting the values of key parameters according to their assumed distribution. Typically Monte Carlo simulations involve 10 000 iterations. This wasn't possible with ELMO due to time constraints. To demonstrate the validity of using a Monte Carlo approach with 500 iterations, the results for the Victorian realised sensitivity analysis were compared to a simulation with 5000 iterations (table D.6). The results are similar.

Table D.5 **Sensitivity analysis of projected effects of the COAG VET entitlement reforms**[a]

Young learners (aged 15 to 24)

Victorian entitlement policies				
	Realised		*Prospective*	
	Lower[b]	Upper[b]	Lower[b]	Upper[b]
Employment (%)	0.03	0.47	0.01	0.78
Productivity (%)	-0.11	0.42	-0.16	0.68
Gross payments to labour ($m)	353	2 912	148	5 177
Net social benefit ($m)	-42	1 297	-77	2 488

South Australian entitlement policies		
	Lower[b]	Upper[b]
Employment (%)	0.09	0.93
Productivity (%)	-0.12	1.27
Gross payments to labour ($m)	265	1 950
Net social benefit ($m)	-23	920

NPAPPP (Australian young learners, excluding Victoria)		
	Lower[b]	Upper[b]
Employment (%)	0.01	0.59
Productivity (%)	-0.10	0.76
Gross payments to labour ($m)	128	13 155
Net social benefit ($m)	-32	5 800

COAG's VET targets to 2020		
	Lower[b]	Upper[b]
Employment (%)	0.02	1.70
Productivity (%)	-0.24	1.56
Gross payments to labour ($m)	514	60 940
Net social benefit ($m)	-1 426	27 780

[a] Total change in present value terms over 42 years. [b] 'Lower' and 'upper' define the bounds of the 95 per cent confidence interval.

Source: Productivity Commission estimates.

Table D.6 **Comparison of sensitivity analysis results**

Victorian realised policy initiative

	500 iterations		*5000 iterations*	
	Lower	Upper	Lower	Upper
Employment (%)	0.03	0.47	0.03	0.50
Productivity (%)	-0.11	0.42	-0.10	0.45
Gross payments to labour ($m)	353	2 912	276	2 958
Net social benefit ($m)	-42	1 297	-41	1 367

Source: Productivity Commission estimates.

E Mature learner results

The Council of Australian Governments' (COAG) vocational education and training (VET) policy initiatives focus on the working aged population — people aged 15–64 years. As discussed in chapter 2, the Commission has divided VET students into two categories — young learners (15–24) and mature learners (25–64) — and is estimating the impacts of VET policy initiatives for these two groups separately. This appendix presents the estimated effects of the reforms on the mature learners group.

The Commission has made many assumptions in estimating the impacts of COAG's VET reform agenda. These are detailed in appendix C. Sensitivity analysis indicates that those assumptions are critical. When the assumptions change, so do estimated changes in employment, productivity and broader economic activity, often quite markedly. The results, therefore, should be regarded as only broadly indicative of the possible impacts of the policy initiatives assessed. The estimates and analysis are intended to advance understanding of the scale of benefits that might accrue. The estimates presented are not forecasts of the economic or fiscal impacts of the reforms. Rather they are illustrative projections, relative to a baseline, of the effects of the policy initiatives modelled.

For mature learners, the Commission has estimated the effects of reforms on the following outcomes:

- full completions at a higher level (up-skilling)
- partial completions (or module completions) and
- full completions at or below the highest level of qualification held (reskilling).

The basic approach for estimating the effects of changes in these types of VET attainment consists of estimating:

1. the likely effects of the agenda on full completions
2. partial completions and reskilling consistent with a given level of up-skilling through full qualification attainment
3. the possible employment and productivity implications of these changes.

For completions at a higher level, further analysis produces the private and social benefits and costs associated with them.

The framework accounts for changes in the qualifications profile over time[1] and includes assumptions about the proportions of students that might be affected by the policy.

E.1 Mature learners in VET

About 55 per cent of VET students are mature learners — aged between 25 and 64 (NCVER 2011b). By comparison, 40 per cent of students enrolled at a university in 2009 were aged 25 and over (Productivity Commission estimates based on ABS (2010a)).

Mature learners differ from young learners in a number of ways. For example, they are more likely to enrol in a VET course with the intention of completing a module and obtaining a specific skill, rather than completing a full qualification. In 2010, 40 per cent of 25–64 year olds, who completed at least one module in the VET sector in 2009, and were not studying in 2010, were module completers. In contrast, about 25 per cent of young learners had this characteristic.

Mature learners are more likely to be employed when studying. This is reflected in their motivations for undertaking training. Survey data from 2010 (NCVER 2010) reveal that mature learners were much less likely to have undertaken VET 'to get a job' and were more likely to have studied either because it was a requirement of their job or because they wanted extra skills (table E.1).

1 For the potential scenario, which covers 7 years, but not for the shorter 1–3 year scenarios.

Table E.1 **Main reason for undertaking training for VET module completers and graduates, by age group, 2010[a]**

Per cent

	Module completers			*VET graduates*		
	15–24 years	*25–64 years*	*Total*[b]	*15–24 years*	*25–64 years*	*Total*[b]
To get a job	25.4	10.4	14.5	29.4	16.0	21.7
To develop my existing business	0.8	4.2	3.3	0.3	3.4	2.1
To start my own business	1.8	2.9	2.6	2.4	2.9	2.7
To try for a different career	8.3	7.2	7.5	7.2	11.2	9.5
To get a better job or promotion	2.5	3.9	3.5	3.8	7.1	5.7
It was a requirement of my job	18.4	27.9	25.3	19.8	22.2	21.2
I wanted extra skills for my job	12.1	19.7	17.6	12.1	22.0	17.8
To get into another course of study	4.8	1.2	2.2	7.4	2.1	4.3
To improve my general education skills	19.1	12.9	14.6	14.2	7.7	10.4
To get skills for community/voluntary work	1.5	3.9	3.2	0.8	2.3	1.7
To increase my confidence/self esteem	2.1	3.3	2.9	1.3	2.1	1.8
Other reasons	3.2	2.5	2.7	1.3	0.9	1.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

a Excludes 'not stated'. **b** Includes 15–64 year olds.

Source: Productivity Commission estimates based on NCVER 2010.

E.2 The mature learners framework

The Commission has developed the mature learners framework to assess the quantitative impacts of VET policy initiatives that affect outcomes for people aged 25–64.

This framework has two parts. First, the effect of a policy initiative on the highest level of educational attainment for the population aged 25–64 — the 'qualifications profile' — is estimated. Derivation of these estimates is described in appendix C. Second, the effects of changes in the qualifications profile on employment, productivity and other measures are estimated. This second part is similar to the relevant component of the Education and Labour Market Outcomes (ELMO) model (appendix B).

The effects of changes in the qualifications profile on employment, productivity and other measures are estimated over 18 years — the average remaining years of work for the population aged 25–64, assuming an average retirement age of 63 and a median age of 45 for this cohort. The Commission has assumed that the employment and productivity effects of VET study persist throughout this timeframe.

Occupational effects

The mature learners framework assumes that workers are employed in one of eight broad occupation categories: managers; professionals; technicians and trades; community and personal service; clerical and administrative; sales; machinery operators and drivers; and labourers.

The occupational effects of VET policy initiatives are estimated using data on the highest qualifications held by workers in particular occupations. For example, people with Certificates III/IV or Diplomas/Advanced Diplomas are more likely than others to be working in community and personal service occupations. Therefore, if a policy initiative leads to an increase in the proportion of the working age population with a Certificate III/IV or Diploma/Advanced Diploma as their highest qualification, the proportion of people working in community and personal service occupations is likely to increase.

The mature learners framework is also used to estimate the proportion of workers employed in each occupation group — the occupational profile. The framework is also used to estimate how changes in the occupational profile affect wages for each occupation.

Limitations of the mature learners framework

The mature learners framework has a number of limitations.

- The policy initiatives are assumed not to change the public and private costs per VET student.
- It is assumed that changes in student numbers in higher-level VET courses do not affect student numbers in the higher education sector. In reality, some mature learners who study higher-level VET courses because of new VET policy initiatives might have attained a degree in the absence of these policy initiatives. For example, VET policy initiatives might reduce the cost of nursing courses in the VET sector, which might lead to some mature learners studying nursing in the VET sector rather than at a university.

E.3 Projected effects of COAG VET reforms

The realised and prospective changes result from the Victorian and South Australian policy initiatives and the *National Partnership Agreement on Productivity Places Program* (NPAPPP). Costs of these initiatives are incurred in the short term, while

the benefits will accrue in the long term — over the remainder of the cohort's working lives. All estimates are present values.

The Commission estimates that the realised and prospective scenarios will result in 93 583 mature learners achieving higher qualifications than they currently hold. The net social benefit of these policy initiatives is estimated to be about $6 billion, derived primarily from the NPAPPP. These initiatives are estimated to have a positive effect on governments' net revenue, which is estimated to rise by over $2.9 billion (table E.2).

Table E.2 **Projected effects of COAG VET reforms, by policy initiative, for people aged 25–64**

	Unit	*Victorian realised*	*Victorian prospective*	*SA prospective*	*NPAPPP realised*	*Potential*	*Total*
Increased highest qualification[a]							
Diploma/Adv. Diploma	no.	3 167	8 304	1 342	10 875	166 200	189 888
Certs. III/IV	no.	8 263	11 726	3 499	46 407	565 200	635 095
Employment and productivity							
Change in employment[b]	%	0.012	0.020	0.005	0.065	0.695	0.797
Change in productivity[b]	%	0.007	0.014	0.003	0.029	0.273	0.325
Change in net social benefit							
Gross payments to labour	$m	1 099	1 916	464	5 468	67 793	76 739
+ value of non-market activity	$m	-382	-617	-162	-2 009	-25 133	-28 303
+ savings in education costs	$m	-100	-192	-42	-472	-6 194	-7 000
+ adjustment for value of govt. revenue	$m	84	146	36	422	5 188	5 876
+ external benefit[d]	$m	0	0	0	0	0	0
Net social benefit	$m	701	1 253	296	3 409	41 655	47 313
Partial fiscal effects	$m	352	609	149	1 756	21 616	24 482

[a] Change in degree uptake due to VET policy initiatives assumed to be small. [b] Effects relative to the Australian working age (15-64) population. [c] Total change in present value terms over 18 years. [d] Not estimated.

Source: Productivity Commission estimates.

Substantial additional benefits could be achieved if potential policy initiatives are adopted in line with the *National Agreement for Skills and Workforce Development* (NASWD). By 2020, this national agreement aims to halve the proportion of Australians without qualifications at Certificate III level or above, and double the

number of higher-level (Diploma and Advanced Diploma) qualification completions.

Relative to the baseline, an additional 105 000 mature learners, per annum, from 2013–2019, will need to increase their highest qualification if the 2020 COAG target is to be achieved. This could result in net social benefits of nearly $42 billion. At the same time, government net revenues could rise by nearly $22 billion.

Changes in employment and productivity

Due to the positive relationship between increased educational attainment and employment, it is estimated that the realised and prospective scenarios implemented as part of the COAG VET reforms will increase employment rates for the mature learners cohort (table E.3). The most substantial effects on employment are estimated to stem from the NPAPPP. For all scenarios, it is estimated that productivity effects are small.

Table E.3 **Projected jurisdictional effects of COAG VET reforms on employment and productivity, by policy initiative, for people aged 25–64**

Per cent

	Victorian realised[a]	*Victorian prospective*[a]	*SA prospective*[b]	*NPAPPP realised*[c]
Change in employment	0.062	0.100	0.091	0.109
Change in productivity	0.033	0.070	0.052	0.048

[a] Effects are for Victoria. [b] Effects are for South Australia. [c] Effects are for States and Territories except Victoria.

Source: Productivity Commission estimates.

Occupational effects

The estimated changes in educational attainment are projected to affect the occupational profile of workers aged 25–64. For realised and prospective policy initiatives, changes in the occupational profile are moderate. Similar changes, although on a larger scale, are estimated to occur as a result of potential policy initiatives (table E.4).

Table E.4 **Projected occupational effects of COAG VET reforms, by policy initiative, for people aged 25–64**

Per cent

	Victorian realised[a]	*Victorian prospective*[a]	*SA prospective*[b]	*NPAPPP realised*[c]	*Potential*[d]
Change in occupational profile					
Managers	0.13	0.22	0.15	0.19	1.69
Professionals	0.13	0.33	0.20	0.15	1.21
Technicians and trades	0.24	0.05	0.44	0.69	4.56
Community and personal services	0.46	0.75	0.49	0.50	4.61
Clerical and administrative	-0.02	0.06	0.01	-0.05	-0.13
Sales	-0.02	0.05	0.07	-0.07	-0.43
Machinery operators and drivers	-0.32	-0.64	-0.55	-0.45	-5.32
Labourers	-0.44	-0.80	-0.52	-0.58	-6.68
Change in productivity					
Managers	0.03	0.06	0.05	0.04	0.21
Professionals	-0.01	-0.03	-0.01	-0.01	-0.12
Technicians and trades	0.05	0.07	0.07	0.10	0.66
Community and personal services	0.03	0.08	0.06	0.04	0.18
Clerical and administrative	0.06	0.11	0.07	0.08	0.65
Sales	0.06	0.12	0.08	0.08	0.74
Machinery operators and drivers	0.03	0.04	0.03	0.06	0.59
Labourers	0.02	0.03	0.03	0.05	0.56

[a] Effects are for Victoria. [b] Effects are for South Australia. [c] Effects are for States and Territories except Victoria. [d] Effects are Australia-wide.

Source: Productivity Commission estimates.

Under each policy initiative modelled, the number of people employed as managers professionals, technicians or tradespersons, and community and personal services workers is projected to increase slightly. The number employed in other occupations is projected to fall slightly. Small changes (mostly increases) are also expected in productivity for some occupations.

E.4 Projected social inclusion effects of COAG VET reforms

The increase in educational attainment attributable to VET policy initiatives is projected to increase employment and improve literacy and numeracy outcomes (table E.5).

Table E.5 **Projected effects of COAG VET reforms on social inclusion**

	Unit	*Victorian realised*[a]	*Victorian prospective*[a]	*SA prospective*[b]	*NPAPPP realised*[c]	*Australia Potential*[d]
Change in employment	%	0.062	0.100	0.091	0.109	0.878
Change in average literacy score[e]	no.	8.56	8.48	8.56	7.97	10.20

[a] Relative to the Victorian 25–64 year old population. [b] Relative to the South Australian 25–64 year old population. [c] Relative to the 25–64 year old population in all States and Territories except Victoria. [d] Relative to the Australian 25–64 year old population. [e] Change in average literacy score on a scale of 0–500 for those who increase their educational attainment due to the reforms.

Source: Productivity Commission estimates.

E.5 Sensitivity analysis

Numerous modelling assumptions have been made regarding parameter values in estimating the effects of the COAG VET reforms. Altering these assumptions changes the estimated effects.

Sensitivity analysis (table E.6) illustrates how the estimated effects change in response to changing many of the sets of assumptions that underlie the mature learners framework. For example, assumptions about the employment and wage premiums, the value of government revenue or the tax rate. The distribution ranges for these parameters are presented in appendix C (table C.16). Since some assumptions were not tested in this sensitivity analysis, the confidence intervals are likely to underestimate the uncertainty associated with the parameter values, and therefore, the uncertainty associated with the estimates.

Table E.6 **Sensitivity analysis of projected effects of the COAG VET entitlement reforms[a]**

Mature learners (aged 25–64)

Victorian entitlement policies				
	Realised		*Prospective*	
	Lower[b]	Upper[b]	Lower[b]	Upper[b]
Employment (%)	0.03	0.10	0.04	0.14
Productivity (%)	0.01	0.06	0.01	0.10
Gross payments to labour ($m)	415	1 806	702	3 157
Net social benefit ($m)	99	1 352	132	2 424

South Australian entitlement policies		
	Lower[b]	Upper[b]
Employment (%)	0.04	0.14
Productivity (%)	0.01	0.09
Gross payments to labour ($m)	174	756
Net social benefit ($m)	38	566

NPAPPP (Australian mature learners, excluding Victoria)		
	Lower[b]	Upper[b]
Employment (%)	0.04	0.17
Productivity (%)	0.01	0.09
Gross payments to labour ($m)	2 120	8 848
Net social benefit ($m)	568	6 608

COAG's VET targets to 2020		
	Lower[b]	Upper[b]
Employment (%)	0.36	1.40
Productivity (%)	0.04	0.64
Gross payments to labour ($m)	25 281	111 843
Net social benefit ($m)	5 427	81 137

a Total change in present value terms over 18 years. **b** 'Lower' and 'upper' define the bounds of the 95 per cent confidence interval.

Source: Productivity Commission estimates.

E.6 Additional effects of COAG VET reforms

In addition to increasing the number of completions at a higher level of attainment, the number of completions at the same or a lower level and the number of partial completions can be expected to increase. The extent to which this occurs will depend on the eligibility criteria attached to places funded as part of the effort to achieve the COAG objectives.

The initiatives in the potential scenario increase completion rates by 4 per cent (appendix C). In South Australia, funding will be provided for enrolment in a qualification at the same level or a higher level than current attainment. South Australian policy is to allocate funding so that 6 per cent of additional places are for skill sets (partial qualifications); this could be feasible.[2] However, while students' capacity to enrol in partial qualifications will be limited, some proportion of those who enrol in full qualifications will not complete — leading to additional partial completions. For this reason, the likely number of partial completers is highly uncertain.

For the purpose of this exercise, the Commission assumed that other States and Territories are likely to follow South Australia's reform approach, and provide funding for additional places to people enrolling at or above the level of their previous highest qualification. In addition, the Commission has modelled an outer-envelope scenario where funding for additional places is available to people studying below their highest previous qualification.

The Commission has produced additional scenarios:

- two partial completions scenarios, in which partial completers are assumed to receive 25 per cent or 50 per cent of the benefits they might expect from a full completion. The associated private and public funding is assumed to be 25 and 50 per cent of the cost of a full completion.
- two 'reskilling' scenarios, in which: (i) students complete a VET qualification at the same level as their highest qualification; (ii) students complete a VET qualification at the same or lower level than their highest qualification. Reskilling is assumed to:
  - increase workers' productivity by about 5 per cent in addition to the premium they received from their previous qualification
  - increase workers' probability of employment by three-quarters of the corresponding employment premiums.

These four scenarios are developed relative to the higher qualification potential completion scenario in the following sections. The effects of these scenarios are only estimated for mature learners, since about 75 per cent of partial completers and

[2] Under the NPAPPP, New South Wales and South Australia reported completion rates of 55–60 per cent, leaving 40–45 per cent as non-completers, who can be thought of as module completers (table E.7) and those who do not complete at least one module. Little is known about the split. However, assuming that module completers account for 90 per cent of non-completers, and that about 18 per cent of module completers have learnt the skills they required or achieved their training goals (table E.8), then skill sets could represent about 7 per cent of enrolments assuming NPAPPP completion rates.

reskillers are mature learners (Productivity Commission estimates based on NCVER 2010).

Partial completions scenarios

For the baseline, the Commission has identified partial completers on the basis of the following information (table E.7):[3]

- About 32 per cent of VET students completed between 2005 and 2007 (based on Karmel (2011)).
- About 10 per cent of VET students who enrol do not complete a module (based on The National VET Provider Collection, pers. comm., 20 March 2012).

This produces a proportion of partial completers of about 58 per cent.

The Commission has assumed that:

- completion rates will be four percentage points higher with VET reform. This is consistent with outcomes at present in South Australia (DFEEST, sub. DR-V07).
- the proportion of students who exit the sector without completing at least one module remains unchanged (table E.7).

Table E.7 **Assumed proportions of students who complete and partially complete[a]**

Per cent

	Baseline		*With VET reforms*	
	Diplomas[b]	*Certs. III/IV*	*Diplomas*[b]	*Certs. III/IV*
Complete	32.6	32.0	36.6	36.0
Partially complete	57.4	58.0	53.4	54.0
Do not complete	10.0	10.0	10.0	10.0
Total	100.0	100.0	100.0	100.0

a The Commission has assumed that 10 per cent of VET students do not complete a module at both levels and in both scenarios. **b** Includes Diplomas and Advanced Diplomas.

Sources: National VET Provider Collection, pers. comm., 20 March 2012; Productivity Commission estimates based on Karmel (2011).

To estimate the number of mature learners who partially complete a VET qualification, the Commission has applied ratios of partial completers to completers

3 Although these pieces of information are not contemporaneous and could be incompatible, it is the best information available to set up the required set of shares for a baseline.

at each qualification level to the number of additional completions modelled in the potential scenario.[4]

The resulting estimates are adjusted for partial completers who received vocational benefits, based on the *Student Outcomes Survey* (NCVER 2010). The Commission has assumed that people who have discontinued training, reporting that they had learnt the skills required or achieved their training objectives, have received vocational benefits — 12.4 per cent at the Diploma/Advanced Diploma level and 20.2 per cent at the Certificate III/IV level (table E.8, rows 3 and 4).

Table E.8 **Main reason VET students discontinued studying at a higher level than prior qualification, 2010[a]**

Mature learners, module completers

	Diploma[b]	*Certs. III/IV*[c]	*Total*
	%	%	%
1. Changed jobs or started a new job	11.3	12.4	12.1
2. I lost my job	0.5	3.0	2.3
3. I learnt the skills I needed for my job[d]	7.1	11.8	10.5
4. I achieved my training goals[d]	5.3	8.4	7.5
5. I started other training	6.8	0.5	2.2
6. The training no longer related to my plans	2.8	3.9	3.6
7. The training was not what I expected	6.4	7.1	6.9
8. The training timetable was not flexible enough	4.3	1.8	2.5
9. I moved	2.6	1.9	2.1
10. Illness	3.4	7.1	6.0
11. Family reasons	15.1	13.0	13.6
12. Financial reasons	6.9	7.3	7.2
13. Too many pressures on my time	16.8	12.9	14.0
14. Other reason	10.9	9.0	9.5
Total	**100.0**	**100.0**	**100.0**

a Only partial completers are considered. **b** Students who partially complete a Diploma or Advanced Diploma and have a lower highest prior qualification. **c** Students who partially complete a Certificate III or IV and have a lower highest prior qualification. **d** Assumed to have gained vocational benefit from study.

Source: Productivity Commission estimates based on NCVER (2010).

4 This requires making an assumption about the completion rate in the potential scenario. The low completion rates recorded in the past are not appropriate. On the basis of outcomes from a learner support services pilot program, the South Australian DFEEST suggested that future completion rates will be four percentage points higher than the 32 per cent completion rate used to model Victorian reforms (DFEEST, pers. comm., 2 March 2012). This higher completion rate is assumed to prevail in the potential scenario.

The Commission has modelled two scenarios assuming that:

- partial completers receive 50 per cent of the productivity and employment premiums and that this activity involves 50 per cent of the costs of a full qualification
- partial completers receive 25 per cent of the productivity and employment premiums and that this activity involves 25 per cent of the costs of a full qualification.

Reskilling scenarios

The Commission has developed 'reskilling' scenarios to analyse the possible effects of completions by graduates who do not increase their level of attainment, in addition to the potential scenario for higher level completions. There is no indication in the NASWD (COAG 2008b) that there will be any limits on the types of VET qualifications that are to be funded.

That said, in the implementation of the Agreement, there have been some limitations. For example, the NPAPPP states:

> … all parties aim to increase the number of people with qualifications and the number of people with higher qualifications. (COAG 2008c, p. 3)

In addition, two States have implemented an entitlement policy. Both have limited the types of qualifications that might attract government funding:

- In Victoria, government funding has been constrained (with limited exceptions) to enrolments in a qualification above that already held.
- In South Australia, funding is allocated to enrolments in qualifications that are at or above the level of the highest already held.

Therefore the Commission has modelled two reskilling scenarios — where places are funded for the same or higher level than previous highest qualification, and where all places are funded. Only completions at the Diploma or Certificate III/IV level are considered. In addition, reskilling and the acquisition of complementary skills are most likely to affect mature learners. As a result, this scenario is limited to mature learners. In 2010, Australia-wide, completions at or below highest

qualification accounted for about 40 per cent of all completions by the mature learners.[5]

Completions at the same level as the previous highest qualification

There are many reasons why students might pursue a second qualification of equal level as the one they hold (table E.9). Among the reasons listed, motivations 1–7 are assumed to be relevant to this scenario. This accounts for about 90 per cent of the students surveyed and this proportion is assumed for the scenario.

A ratio of mature learners studying at the same level to those studying at a higher level is applied to the number of full completions modelled in the potential 'higher completions' scenario.

Table E.9 **Motivations for training at the same level, mature learners, 2010[a]**

		Current qualification		
		Diploma	*Certs. III/IV*	*Total*
		%	%	%
1.	To get a job	16.2	13.6	14.0
2.	To develop my existing business	2.8	3.6	3.4
3.	To start my own business	3.2	4.4	4.2
4.	To try for a different career	11.4	11.9	11.8
5.	To get a better job or promotion	12.7	6.6	7.6
6.	It was a requirement of my job	9.5	23.7	21.5
7.	I wanted extra skills for my job	32.6	24.2	25.6
8.	To get into another course	2.8	2.2	2.3
9.	To improve my general education skills	6.4	5.7	5.8
10.	To get skills for community/voluntary work	0.6	1.5	1.4
11.	To increase my confidence or self-esteem	1.6	1.7	1.6
12.	Other reasons	0.2	0.8	0.7
	Total	**100.0**	**100.0**	**100.0**

a Estimates are for mature learners who complete a qualification at the same level as their highest prior qualification. People who study at the Degree or higher level are excluded. People who study at the Year 12 or lower level are excluded.

Source: Productivity Commission estimates based on NCVER (2010).

5 Based on analysis of the *Student Outcomes Survey* (NCVER 2010), the numbers of completers per year at the lower/same/higher levels are as follows:

	Lower	Same	Higher
Diploma/Adv. Dip.	10 579	12 724	43 292
Certificate III/IV	60 543	72 923	190 722

The Commission has assumed that people studying at the same level as their prior highest qualification earn higher wages since they have obtained complementary skills (a weighted average of the wage premiums estimated in Ryan 2002):

- A mature learner who completes a Diploma, and already has one, increases his or her wages by 6.5 per cent.
- A mature learner who completes a Certificate III/IV, and already has one, increases his or her wages by 5.7 per cent.

The evidence on which to base an employment premium is scant. That said, it seems clear that mature learners who undertake further training have reached a fork in the road of their career. About 40 per cent of mature learners who undertook further training at the same level indicated that they did so: to get a job; to start a new business or develop an existing one; or because it was a requirement of their job (table E.9, rows 1, 2, 3 and 6). For some in this group (those working in their own business), obtaining the qualification could be very costly. For others, it could be the difference between working and not working in their preferred job, implying that the qualification could have significant effects on their employment prospects. It is therefore assumed that obtaining a complementary qualification at the same level could increase the probability of employment for this group by three-quarters of the employment premium assumed otherwise. Employment premiums used in the mature learners framework are given in table E.10.

Table E.10 **Assumed employment effects of education and training for mature learners**[a, b, c, d]

Percentage point change

	Higher qualifications[e]	*Same level qualifications*[f]
Degree or higher	18.8	14.1
Diploma/Adv. Dip.	16.4	12.3
Certs. III/IV	14.3	10.7

[a] Each figure represents the employment effects of education and training relative to the baseline — people who have not completed a post-school qualification above a Certificate II level. [b] The sample used for estimating the effects for mature learners was restricted to people aged 35–64 who either have obtained a non-school qualification in the past ten years or have no non-school qualification. [c] Each premium has been adjusted downwards by 10 per cent to account for ability bias (appendix C). [d] The sample size used for estimating the effects for mature learners was 7 647. [e] These employment effects are estimated. [f] These employment effects are assumed to be three-quarters of the higher qualifications effects.

Source: Productivity Commission estimates based on ABS (2010b).

Completions at the same or lower level as previous highest qualification

In this scenario, an analogous approach is used as in the other reskilling scenario where completions at the same level are considered. Mature learners who have a Degree are not considered in this analysis.

There are many reasons why students might pursue a second qualification at equal or lower level to the one they hold (table E.11). Motivations for training appear to be similar for mature learners completing at the same level and mature learners completing at a lower level.

A ratio of mature learners studying at the same or lower level to those studying at a higher level is applied to the number of full completions modelled in the potential 'higher completions' scenario.

It is assumed that people who complete a qualification at a lower level than their previous highest qualification obtain the same wage and employment premiums as those who complete at the same level.

Table E.11 **Motivations for training at the same or lower level, mature learners, 2010[a]**

	Current qualification		
	Diploma	*Certificate III/IV*	*Total*
	%	%	%
1. To get a job	14.0	12.2	12.5
2. To develop my existing business	3.3	4.0	3.9
3. To start my own business	2.7	3.6	3.4
4. To try for a different career	11.8	11.8	11.8
5. To get a better job or promotion	12.5	7.8	8.6
6. It was a requirement of my job	8.1	23.0	20.6
7. I wanted extra skills for my job	35.0	27.7	28.8
8. To get into another course	3.5	2.0	2.3
9. To improve my general education skills	6.8	5.2	5.5
10. To get skills for community/voluntary work	0.3	1.2	1.0
11. To increase my confidence or self-esteem	1.8	1.1	1.2
12. Other reasons	0.1	0.6	0.5
Total	**100.0**	**100.0**	**100.0**

a Estimates are for mature learners who complete a qualification at the same or lower level as their highest prior qualification. People who study at the Degree or higher level are excluded. People who study at the Year 12 or lower level are excluded.

Source: Productivity Commission estimates based on NCVER (2010).

Results

The Commission estimates of the additional effects of COAG VET reforms (partial completions and reskilling) are presented in table E.12.

Table E.12 **Additional effects of COAG VET reforms, for mature leaners[a]**

	Unit	*Partial completions*		*Reskilling*	
		50 per cent of returns	*25 per cent of returns*	*Same level qualifications*	*Same or lower qualifications[b]*
Increased completions/partial completions					
Dip. / Adv. Dip.	no.	52 674	52 674	64 939	64 939
Certs. III/IV	no.	184 397	184 397	352 567	504 621
Employment and productivity[c]					
Change in employ.	%	0.13	0.07	0.42	0.58
Change in prod.	%	0.05	0.02	0.10	0.17
Change in net social benefit[c]					
Payments to labour[d]	$m	10 499	5 113	27 478	38 645
+ value of non-market activity[e]	$m	-3 830	-1 915	-11 994	-16 618
+ savings in education cost[f]	$m	-1 000	-500	-3 354	-4 483
+ adjustment for value of govt. revenue[g]	$m	797	386	1 949	2 770
+ external benefits[h]	$m	0	0	0	0
Net social benefit[c]	$m	6 466	3 084	14 078	20 314
Partial fiscal effects	$m	3 319	1 607	8 119	11 540
Literacy and numeracy[i]	no.	4.09	2.05	7.74	7.57

[a] Effects relative to Australians aged 25–64. [b] If the effects of reskilling by Degree holders are considered, change in employment rises to 0.74 per cent, change in productivity rises to 0.35 per cent, and net social benefit increases to $22 965 million. [c] Total change in present value terms over 18 years. [d] Additional wage income less time cost of education. [e] Associated with increased participation. A negative figure represents non-market activity foregone. [f] Sum of private and public costs. A positive number is associated with the savings in education costs that results from encouraging young learners into VET, which is cheaper than alternative qualifications. [g] Excess burden of taxation if negative. [h] Not estimated. [i] Change in average literacy score on a scale of 0 – 500 for those who increase their educational attainment due to the reforms.

Source: Productivity Commission estimates.

While not as large as the potential effects of completions above highest prior qualification, the potential effects of partial completions and completions at or below highest prior qualification might be substantial (table E.12).

Relative to the baseline, it is estimated that an additional 240 000 mature learners will partially complete qualifications at or above their highest qualification level. These additional partial completions are estimated to increase employment by 0.13 per cent and productivity by 0.05 per cent, if mature learners are assumed to receive half of the benefits and incur half the costs of a full completion. The change in net social benefit is estimated to be $6.5 billion in present value terms. Estimates are roughly half as large if partial completers are assumed to receive 25 per cent of benefits and incur 25 per cent of costs.

It is estimated that about 560 000 additional mature learners will complete qualifications at or below their previous highest qualification. These additional completions are estimated to increase employment by 0.58 per cent and productivity by 0.17 per cent. The change in net social benefit is estimated to be $20.3 billion in present value terms. If completions at the same level only are considered then estimates fall to 0.42 per cent for employment and 0.10 per cent for productivity. The net social benefit estimate falls to $15 billion in present value terms.

F Foundation skills attainment

The *National Agreement for Skills and Workforce Development* (NASWD) includes four outcomes for the Council of Australian Government (COAG) vocational education and training (VET) reforms. The first outcome relates to foundation skills attainment — 'the working age population has gaps in foundation skills levels reduced to enable effective educational, labour market and social participation' (COAG 2008b, p. 5).

The framework used to assess the impacts and benefits of COAG initiatives is described in chapter 2. To assess the impacts of foundation skills-related reforms on employment, productivity, and broader economic, social and fiscal outcomes, the Commission has:

- projected the profile of language, literacy and numeracy (LLN) skills in the 25–64 year old population for the years 2011, 2015 and 2022, as a baseline for what might occur without the policy initiatives
- estimated the impacts of changes in the LLN skills profile of the 25–64 year old population as a result of the policy initiatives
- applied results from Shomos (2010) on the links between literacy and numeracy skills and labour market outcomes to estimate the effects that changes in the LLN skills profile of people aged 25–64 years might have on employment and productivity
- estimated and discussed the broader social impacts of changes in the profile of LLN skills
- estimated and discussed the potential occupation and partial fiscal effects of reforms.

An overview of foundation skills in the Australian population, including what they are, the current profile of these skills in the Australian working-age population, and a summary of foundation skills course delivery in presented in section F.1. Why governments might want to intervene to improve foundation skills is then discussed (section F.2), and foundation skills-related policy initiatives associated with the COAG reform agenda that are being assessed are summarised (section F.3). The baseline (section F.4) presents a skills profile and estimates of employment and productivity in the absence of the foundation skills policy initiatives considered.

This then provides a benchmark against which the effects of the policy initiatives can be measured. The realised, prospective and potential estimates of the impacts of reforms are then presented (sections F.5 and F.6). Section F.7 concludes.

The Commission has made many assumptions in estimating the impacts of the COAG reform agenda. These are detailed throughout the report. Sensitivity analysis undertaken indicates that those assumptions are critical. When the assumptions change, so do estimated changes in employment, productivity and broader economic activity, often quite markedly. The results, therefore, should be regarded as only broadly indicative of the possible impacts of the policy initiatives assessed. The estimates and analysis are intended to advance understanding of the scale of benefits that might accrue. The estimates presented are not forecasts of the economic or fiscal impacts of the reforms. Rather, they are illustrative projections, relative to a baseline, of the effects of the policy initiatives modelled.

F.1 Foundation skills in Australia

What are foundation skills?

There is no universally accepted definition of foundation skills. The Department of Education, Employment and Workplace Relations (DEEWR) is currently developing the *National Foundation Skills Strategy for Adults* (NFSS) (discussed below). It is anticipated that the definition adopted by this strategy will include two components.

- Skills described by the Australian Core Skills Framework[1] — learning, reading, writing, oral communication and numeracy. These are often referred to as LLN skills.
- Employability skills, such as communication, teamwork, problem solving, initiative and enterprise, planning and organising, self-management, learning and technology (Roberts and Wignall 2010).

Consistent with the direction of the relevant NASWD outcome, this analysis will focus on 'LLN skills'. The term LLN skills will be primarily used in place of foundation skills, unless discussion is focused on the broader definition, or others' definitions of foundation skills.

[1] The Australian Core Skills Framework provides a structure for measuring a person's LLN skills (DEEWR 2008).

Australians' LLN skills

The most recent data on the Australian population's LLN skills comes from the *Adult Literacy and Life Skills Survey* (ALLS), conducted by the Australian Bureau of Statistics (ABS) in 2006. This was the second survey of its type in Australia. The first was the 1996 *Survey of Aspects of Literacy* (SAL), also conducted by the ABS. The ALLS was part of a wider international study undertaken by Statistics Canada and the Organisation for Economic Co-operation and Development (OECD). The Australian survey covered almost 10 000 people aged 15–74 years (ABS 2008a).

The survey measured LLN skills in five 'domains' (box F.1). Skills were measured on a continuous scale, with each individual being assigned a score between 0 and 500 for each domain. Higher scores indicated better skills. These scores were then grouped into five levels[2], with level 1 being the lowest level of literacy. Level 3 is regarded as the 'minimum required for individuals to meet the complex demands of everyday life and work in the emerging knowledge-based economy' (ABS 2008a, p. 5).

Box F.1 **ALLS skill domains**

Prose literacy — ability to understand and use information from various kinds of narrative texts, including texts from newspapers, magazines and brochures.

Document literacy — knowledge and skills required to locate and use information contained in various formats, including job applications, payroll forms, transportation schedules, maps, tables and charts.

Numeracy — knowledge and skills required to effectively manage and respond to the mathematical demands of diverse situations.

Problem solving — goal-directed thinking and action in situations for which no routine solution is available.

Health literacy — knowledge and skills required to understand and use information relating to health issues such as drugs and alcohol, disease prevention and treatment, safety and accident prevention, first aid, emergencies and staying healthy.

Source: ABS (2008a, p. 4).

LLN skill levels in 2006

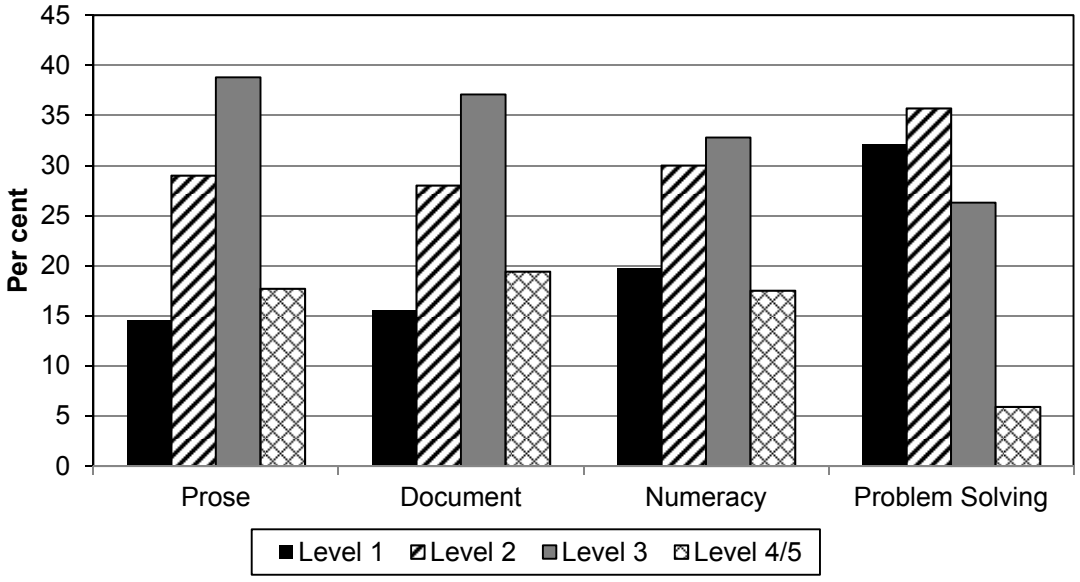
In 2006, the proportion of the working-age population (15–64 years) who had LLN skills at levels 1 or 2, supposedly lower than the minimum required, was 44 per cent

2 Except the problem solving scale, which had four levels.

for prose literacy and document literacy, and 50 per cent for numeracy (figure F.1). The proportion at level 3 was 39 per cent for prose literacy, 37 per cent for document literacy and 33 per cent for numeracy.

This contrasts with other measures of LLN skills. The proportion of 15–19 year olds that achieve levels 1 or 2 in the ALLS ranges from about 47 per cent for document literacy to about 57 per cent for numeracy (ABS 2008a). However, the 2009 *National Assessment Program — Literacy and Numeracy* (NAPLAN), which measured students' LLN skills at years 3, 5, 7 and 9, found that about 90 per cent of students achieved the national minimum standard in reading, writing and numeracy (CRC 2009). In addition, the 2009 *Programme for International Student Assessment* (PISA), which assessed 15 year old students' reading, mathematical and scientific literacy, found that about 86 per cent achieved level 2 in reading, considered the minimum level at which people can 'actively participate in real life situations' (Thomson et al. 2010, p. iv).

Figure F.1 **Proportion of 15–64 year olds at each skill level[a]**



a Levels 4 and 5 are grouped together due to the relatively small proportion of people at level 5, which results in unreliable estimates of the number of people at this level.

Source: ABS (2008a).

The different results could be due to the different age groups tested and performance benchmarks employed in each survey. While the ALLS measures the proportion of the working-age population with a 'proficient standard' of literacy and numeracy to effectively participate in society, the NAPLAN measures student performance in meeting the 'minimum standards' of literacy and numeracy (CRC 2009). The PISA defines level 2 as the level at which 'students begin to demonstrate

the reading literacy competencies that will enable them to actively participate in real life situations'(Thomson et al. 2010, p. iv).

Many individuals with low measured LLN skills already have good labour market outcomes. For example, about 40 per cent of people who achieve level 1 or 2 in prose literacy are employed. And as discussed in section F.2, improving LLN skills can improve labour market outcomes.

How have Australians' LLN skills changed over time?

Australians' LLN skills appear to have improved over time. Two domains in the 2006 ALLS, prose and document literacy, are directly comparable with results from the 1996 SAL. Between 1996 and 2006 there was a small, statistically significant decrease in the proportion of people aged 15–74 years at level 1 in prose literacy (from 20 per cent to 17 per cent) and document literacy (from 20 per cent to 18 per cent). While the proportions of individuals at other document literacy levels did not significantly change, the proportion of individuals at levels 2 and 3 in prose literacy increased.

LLN skill levels are correlated

The performance of individuals in different LLN skill domains was highly correlated. For example, about 70 per cent of the population recorded the same level of document literacy and numeracy skills (table F.1).

Table F.1 **Correlation between document literacy and numeracy**
Per cent of population

	Numeracy				
Document literacy	Level 1	Level 2	Level 3	Level 4/5	Total
Level 1	**14.78**	1.67	0.05	0.00	16.50
Level 2	5.36	**19.39**	3.72	0.00	28.48
Level 3	0.17	9.78	**24.19**	3.93	38.07
Level 4/5	0.00	0.07	5.19	**11.70**	16.95
Total	20.31	30.91	33.15	15.63	100.00

Source: Shomos (2010).

Correlates of LLN skills

LLN skill levels differed between males and females in the ALLS. Males did better on the numeracy and document literacy domains, while females did better on the prose literacy domain (ABS 2008a).

LLN skills generally decreased with age. A higher proportion of people in older age groups attained scores below level 3. The exception to this was the 15–19 years age group, which tended to achieve lower scores than the 20–24 years age group. This could be due to a large proportion of the younger age group still studying and potentially improving their LLN skills. The decline in skill levels with age could reflect labour force withdrawal, differences in the quality of education over time, or higher education levels among younger cohorts (Shomos 2010).

A strong association existed between educational attainment and LLN levels. This held for both the years of formal education completed, and the level of education attained. This association increased at a decreasing rate, indicating that the returns to education in terms of LLN skills developed are relatively higher at lower levels, and less years, of education (Shomos 2010).

Foundation skills courses and delivery

Post-school foundation skills training is delivered through the VET and Adult Community Education sectors, and through Australian Government-funded projects. Training delivered through the VET sector can be either stand-alone, where the courses focus solely on foundation skills, or embedded in other vocational training. Box F.2 provides examples of foundation skills-related courses. This analysis will focus on the impacts of reforms that affect engagement in courses that are foundation skills-focused.

Foundation skills delivery appears to comprise a significant proportion of publicly funded VET activity. In 2008, students undertaking general education programs (which include language, literacy and learning programs and school equivalence qualifications for adults) accounted for 12 per cent of students undertaking publicly funded VET studies nationally, ranging from 4 per cent in Tasmania to 21 per cent in Queensland (Roberts and Wignall 2010). However, it is unclear what proportion of this relates specifically to LLN training. In Victoria, foundation level training accounted for about 7 per cent of total government funded VET enrolments in 2010 (Skills Victoria 2011c).

Along with the current VET reform activity in many States and Territories, there are two projects underway that could significantly change foundation skills training delivery: the development of the NFSS and the development of a foundation skills training package.

Box F.2 **Examples of foundation skills courses**

Adult Community Education sector courses

- Speaking English clearly
- Statements of attainment in foundation and vocational education
- Numeracy and literacy for special needs clients

Australian Government-funded programs

- Language, Literacy and Numeracy Program
- Workplace English Language and Literacy program
- Adult Migrant English Program

VET sector courses

- Course in Initial General Education for Adults
- Course in Language, Literacy and Numeracy
- Course in Foundation Studies
- Certificate I in Initial Adult Literacy and Numeracy
- Certificates I–II in Introduction to Vocational Education
- Certificates I–IV in Spoken and Written English
- Certificates I–III in General Education for Adults

Sources: National Centre for Vocational Education Research (NCVER) (sub. V1); Roberts and Wignall (2010).

The development of the NFSS is in response to the ALLS finding that a relatively high proportion of the population have poor LLN skills. The Australian Government, working with State and Territory governments, is developing the strategy for implementation in early 2012. It will include a target 'that by 2022, two thirds of working age Australians will have literacy and numeracy skills at Level 3 or above' (SCOTESE 2011, p.1).

Innovation and Business Skills Australia has commissioned TAFE NSW and TAFE SA to develop a foundation skills training package containing qualifications at the Australian Qualifications Framework Certificate I and II levels. This is expected to be completed in June 2012 (IBSA 2011).

F.2 Why might governments intervene to improve LLN skills?

Improving LLN skills can have a range of benefits, both for the individual and external benefits for others, such as employers. The potential benefits, and whether or not governments should intervene to improve skills, are discussed below.

Benefits of increasing LLN skills

Benefits to individuals

Higher-level LLN skills are associated with better employment outcomes. Shomos (2010), using ALLS data, estimated that an improvement in literacy and numeracy skills from level 1 to 3 would:

- increase the likelihood of labour force participation by about 15 percentage points for women and 5 percentage points for men
- increase hourly wages by about 25 and 30 per cent for women and men, respectively.

Barrett (2012), using the same data as Shomos (2010), estimated the mean return to an additional year of education to be 6.2 per cent, with almost one third of this possibly being attributable to the acquisition of cognitive skills.

As mentioned in section F.1, LLN skills also appear to be linked to educational attainment.

LLN skills are linked to social inclusion. A study of the social capital outcomes attained from undertaking literacy and numeracy courses found that about one third of participants reported that the training improved their ability to engage or interact with a social network (Balatti, Black and Falk 2006).

Better LLN skills have also been linked with improved health outcomes. Bynner and Parsons (2006) reported a correlation between poor basic skills and poor physical health and mental wellbeing. Poor skills were related to poor health-related practices, such as lack of exercise and smoking. It was also concluded that improving literacy levels might lead to better health literacy.

Benefits to others

Improving parents' LLN skills might significantly impact their children's outcomes. Canadian research has shown that parents who undertake LLN training become more active in their children's education (The Conference Board of Canada 2002, 2005, cited in Skills Australia 2010). Studies have also found that students' test performance is related to their parents' employment and educational attainment, and that a person's wage is linked to his or her parents' wage levels. This relationship could be partly due to LLN skills (DEEWR 2011c).

Improving the LLN skills of employees could also benefit businesses. The Australian Industry Group (2008, 2010) found that a large proportion of employees do not have adequate LLN skills to effectively operate in the workplace. This impacted negatively on productivity, workplace safety and competitiveness.

The relationship between LLN skills and social inclusion has benefits for others. UK studies have found those with poor LLN skills were significantly less interested in politics, less likely to vote and less likely to trust people in their area. Those with good LLN skills were four times more likely to be a member of a social or community organisation (Dugdale and Clark 2008). Studies have also found that people with poor literacy skills are disproportionately represented in prisons (Dawe 2007; KPMG 2006).

Why should government intervene?

Although there are benefits from increasing LLN skills, this is not a sufficient reason for governments to intervene. Governments might intervene for equity reasons, or if a substantial distortion exists (such as a market failure or a distortion due to previous government intervention). To maximise net social welfare, the intervention chosen must address the distortion, have the largest net social benefit of all possible interventions, and the benefits of intervening must outweigh the costs. More information on arguments for government intervention in the VET sector can be found in chapter 2.

There is an equity argument for government intervention in education markets to support LLN skills attainment. People with low LLN skills are more likely to come from disadvantaged backgrounds than those with good skills, and are less likely to be employed (ABS 2008a).

There also appear to be positive externalities associated with increasing LLN skills. As discussed above, increasing foundation skills might confer benefits on children, businesses and other employees, and the broader community.

Incomplete information could be a greater problem for potential LLN students relative to VET students more broadly. People who might benefit from foundation skills courses are likely to have, on average, lower ability than the average VET student. As a result, they might be more vulnerable to misleading information, or have less understanding of the long-term benefits of undertaking LLN training.

F.3 Foundation skills reforms assessed

As identified in the terms of reference and the letter of direction, the focus of this study is on reforms to the VET and youth transitions areas under the COAG reform agenda. This includes the Victorian reforms under *Securing Jobs for Your Future* (Victorian Government 2008) and the South Australian reforms under *Skills for All* (Government of South Australia 2011). In addition, as mentioned in chapter 1, the Commission has also assessed funding in the 2010-11 and 2011-12 budgets for the Language, Literacy and Numeracy Program (LLNP) and Workplace English Language and Literacy (WELL) program as they are measures that support the COAG reforms. The potential effects of the forthcoming NFSS are also assessed.

Securing Jobs for Your Future

The reforms to the Victorian VET system that directly influence foundation skills training include:

- the Victorian Training Guarantee
- changes to the tuition fees structure.

Under the Victorian Training Guarantee, access to foundation skills courses is unlimited, regardless of age or previous qualifications (Skills Victoria 2011b). The training guarantee for foundation skills courses was first implemented in January 2010 for students aged 15–24 years, and was extended to all age groups in January 2011.

The tuition fee structure for foundation skills courses changed in July 2009. The Victorian Government contribution increased and now averages 90 per cent of total fees. The minimum and maximum yearly fees were reduced to $50 and $500, respectively (Victorian Government 2008).

Since these reforms have been implemented, the number of people undertaking government-funded foundation skills training has increased. For example, government-subsidised foundation level enrolments increased 67 per cent between the third quarter of 2010 and the third quarter of 2011 (Skills Victoria 2011c).

Skills for All

The reforms to the South Australian VET system that directly influence foundation skills training include:

- access to a government funded training place for people aged 16 years or over. The subsidy amount will be linked to the level and type of qualification sought. Certificate I and II qualifications, including many of the foundation skills courses, are fully funded
- investment of $6.4 million over six years in the Adult Community Education sector for an additional 6000 foundation skills-related training places (Government of South Australia 2011).

These reforms are to be implemented from mid-2012. They are expected to result in 100 000 additional training places over six years. Of these, 11 000 are expected to be at foundation and Certificate I levels (Department of Further Education, Employment, Science and Technology, South Australia, sub. DR-V7).

Language, Literacy and Numeracy Program

The LLNP is an Australian Government funded program overseen by DEEWR. The program aims to improve unemployed people's LLN skills, with the expectation this will help them participate in training and employment. The program provides up to 800 hours (in blocks of 200 hours) of free training for job seekers whose LLN skills are below those considered necessary to participate in employment, education or training (DEEWR 2011a). It is estimated that about 390 000 unemployed people have LLN skills below the level required in the workplace (Skills Australia 2010).

The LLNP is targeted at disadvantaged client groups, such as Indigenous people, young males, people with disabilities, isolated female job seekers and those excluded from the workforce based on their age (NCVER 2011d). Participants must be referred to an LLNP provider by Centrelink, a Job Services Australia provider or a Disability Employment Services provider (DEEWR 2011a). LLNP providers then assess the LLN skills of clients against the Australian Core Skills Framework to determine their needs and suitability for the LLNP (DHS 2011). Training is generally undertaken in certificate-level courses such as those listed in box F.2 (Roberts and Wignall 2010).

As of 2010, the program was assisting about 18 500 jobseekers annually (Roberts and Wignall 2010). Funding for the provision of more LLNP places was provided in the 2010-11 and 2011-12 Australian Government budgets.

- 2010-11: the Government allocated $67.0 million over four years to fund approximately 13 570 additional places (Australian Government 2010a).
- 2011-12: the Government allocated $143.1 million over four years to fund approximately 30 000 additional places (Australian Government 2011).

Workplace English Language and Literacy program

The WELL program is an Australian Government funded program overseen by DEEWR. The program aims to assist employers with training workers in English language, literacy and numeracy skills. Funding is allocated on a competitive grants basis (DEEWR 2011e). Businesses are required to contribute at least 25 per cent in the first year, and 50 per cent in the second and third years, to the cost of WELL provision (NCVER 2011d). As of 2010, about 12 000 employees were undertaking the WELL program annually (Roberts and Wignall 2010). Funding for the provision of more WELL program places was provided in the 2010-11 and 2011-12 Australian Government budgets.

- 2010-11: the Government allocated $15.7 million over four years to fund approximately 9500 additional places (Australian Government 2010a).
- 2011-12: the Government allocated $20.0 million over four years to fund approximately 13 000 additional places (Australian Government 2011).

National Foundation Skills Strategy for Adults

The Australian Government announced the development of the NFSS in the 2010-11 Budget (Australian Government 2010a). As discussed in section F.1, this includes a target of two thirds of working age Australians having LLN skills at level 3 or above by 2022 (SCOTESE 2011).

F.4 Baseline

Even without policy initiatives designed to improve foundation skills, the LLN skills profile of the population is expected to improve due to increases in educational attainment (chapter 3). This section presents the skills profile, employment and productivity under the baseline, from which changes resulting from policy initiatives can be measured.

LLN skills profile

To project the profile of LLN skills in the population over time without reform, it is assumed that changes in LLN skills in the adult population are primarily driven by changes in education, age and gender composition. This approach is supported by the results of the ALLS (section F.1).

Projections of the education profile of 25–64 year olds for 2015 and 2030, by gender and age group, are taken from the Commission research paper *Potential Benefits of the National Reform Agenda* (PC 2006), which used 2005 as its base year. Education profiles for 2008, 2011 and 2022 are derived from these projections using average yearly changes in the profiles between 2005 and 2015, and 2015 and 2030, respectively.

These estimates, along with population projections from the Commission's Modified Demographic and Economic Model (MoDEM 2.0), and the distribution of LLN skills in 2006 by gender, age and educational attainment from the ALLS, are used to project the future LLN skills profiles. The variable used to measure LLN skills is a combination of document literacy, prose literacy and numeracy skills, as used by Shomos (2010). The projected LLN skills profiles are for people aged 25–64 years, which is also consistent with Shomos (2010).

The LLN skills profile of the population is expected to improve over time, even without reform (table F.2 and figure F.2). This is due to large expected increases in educational attainment. For example, the Commission projected that over the period 2005 to 2022, the proportion of females aged 25–34 years who have a degree would increase from 29 per cent to 46 per cent.

Table F.2 **Projected baseline LLN skills profile of 25–64 year olds[a]**

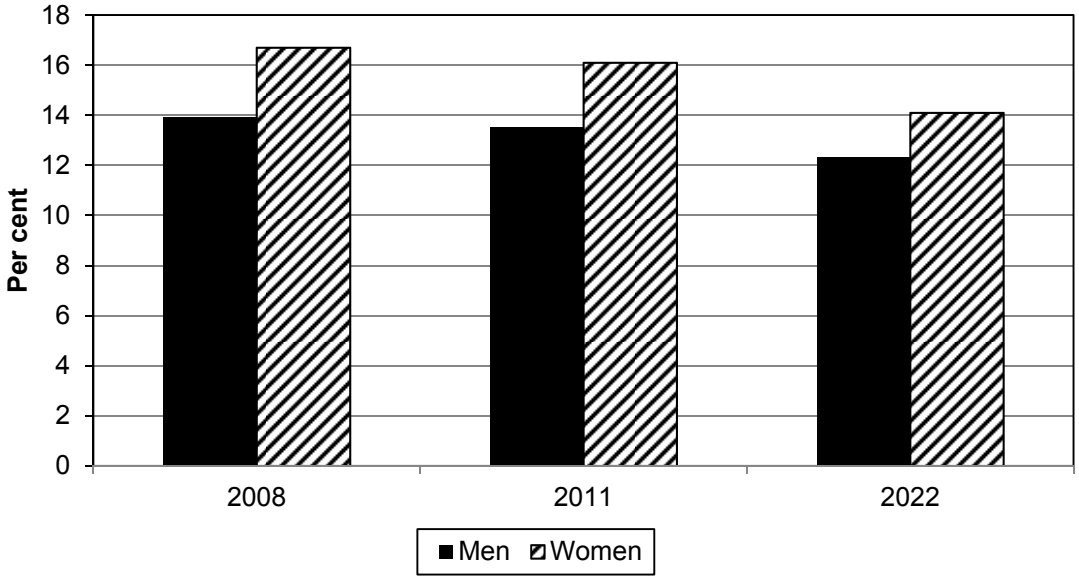
Per cent

	Men			*Women*		
	2008	*2011*	*2022*	*2008*	*2011*	*2022*
Level 1	13.9	13.5	12.3	16.7	16.1	14.1
Level 2	27.8	27.2	25.8	29.0	28.4	26.9
Level 3	38.3	38.3	38.7	39.6	39.9	41.0
Level 4/5	20.0	21.0	23.2	14.7	15.6	18.0

a The LLN skills measure is a combination of document literacy, prose literacy and numeracy skills.

Source: Productivity Commission estimates based on ALLS, MoDEM 2.0 and PC (2006).

Figure F.2 **Proportion of 25–64 year olds at LLN skill level 1 over time**
Baseline projections



Source: Productivity Commission estimates based on ALLS, MoDEM 2.0 and PC (2006).

Changes in employment and productivity in the baseline

Results from Shomos (2010) are used to estimate the impact of changes in the LLN skills of 25–64 year olds on employment and productivity. Shomos used ALLS data and multivariate econometric models to estimate the effect of improving literacy and numeracy skills on the probability of labour force participation and on wages.

As mentioned earlier, the LLN variable used by Shomos (2010) is the combination of document literacy, prose literacy and numeracy. Participation in the labour force is measured as those employed or unemployed, and wages are the hourly wage in a person's main job. Wages are used as a measure of productivity, based on the assumption that workers are paid the value of their marginal product (chapter 2).

Table F.3 presents the marginal effects of increasing literacy and numeracy skills on participation and wages, relative to level 1, as estimated by Shomos (2010). These results suggest, for example, that if the skill level of a man increased from level 1 to level 2, his probability of participating in the workforce would increase by 3.7 percentage points and his wage would increase by 17.9 per cent, on average.

Table F.3 Marginal effects of increasing literacy and numeracy skills on participation and wages relative to level 1

	Participation		*Wages*	
	Men	*Women*	*Men*	*Women*
	ppt	ppt	%	%
Level 2	3.69***	11.03***	17.92***	13.82**
Level 3	4.67***	15.17***	32.13***	23.19***
Level 4/5	6.16***	15.25***	54.25***	34.97***

a ppt is percentage points. *** Significant at 1 per cent. ** Significant at 5 per cent.

Source: Shomos (2010).

These marginal effects are used along with the 2008, 2011 and 2022 LLN skills profiles to estimate employment rates (table F.4) and average hourly wages (table F.5) in the baseline for 2011 and 2022. As Shomos' (2010) marginal effects relate to participation, not employment, the baseline participation rates are first predicted. This is adjusted using estimates of the average monthly seasonally-adjusted participation rate and unemployment rate for 2011 to get the baseline employment rates (ABS 2012).

Table F.4 Baseline level and change in employment rate, 25–64 year olds

Per cent

	Employment rate			*Change in employment from 2008*	
	2008	*2011*	*2022*	*2011*	*2022*
Men	84.71	84.75	84.85	0.04	0.16
Women	68.33	68.43	68.79	0.15	0.64

Source: Productivity Commission estimates based on ABS (2012), ALLS, MoDEM 2.0, PC (2006) and Shomos (2010).

Table F.5 Baseline level and change in average hourly wages, 25–64 year olds

	Average hourly wage[a]			*Change in average hourly wage over 2008*	
	2008	*2011*	*2022*	*2011*	*2022*
	$	$	$	%	%
Men	26.98	27.07	27.29	0.33	1.17
Women	20.24	20.29	20.43	0.24	0.95

a 2006 dollars.

Source: Productivity Commission estimates based on ALLS, MoDEM 2.0, PC (2006) and Shomos (2010).

Shomos' (2010) marginal effects for wages relate to members of the population aged 25–64 years who are employed. In order to be as consistent as possible, the LLN skills profile of the labour force, rather than the population, is used to project the average hourly wage.[3] The projected increase in LLN skills over time, all else being equal, increases employment and productivity.

F.5 Realised and prospective impacts of policy initiatives

The realised and prospective impacts of the LLNP, the WELL program, the Victorian reforms and the South Australian reforms are discussed below.

Language, Literacy and Numeracy Program

The total additional LLNP places funded in the 2010-11 and 2011-12 Australian Government budgets is 43 570. A number of assumptions are made in translating these places into estimated changes in the profile of LLN skills in the population aged 25–64 years.

According to unpublished DEEWR figures, about 50 per cent of people who commence the LLNP program complete it. Of those who complete the program, about 90 per cent are over 25 years of age, and about 70 per cent are female (DEEWR, pers. comm., 24 October 2011). Therefore, 19 607 people aged 25–64 years are assumed to complete LLNP training each year due to the additional budget expenditure.

There is no publicly available evidence on the effectiveness of the LLNP. The Commission has assumed that 70 per cent of LLNP students who complete the program achieve a skill level gain on the combined measure of prose literacy, document literacy and numeracy. Sensitivity analysis of this assumption is presented in tables F.11 and F.12.

Of the people who experience a skill level increase, it is assumed that two thirds will move from level 1 to 2 and one third from level 2 to 3. This program is likely to attract people with relatively poor skills, and it is reasonable to assume that an improvement in skill is more likely to occur from a lower, rather than higher, level. It is also assumed that the effectiveness of the program does not differ by gender.

[3] The LLN skills profile of the labour force rather than of those employed is used to facilitate estimation. It is not expected that this will substantially affect the overall results.

Overall, 13 725 people are assumed to achieve a skill level increase by 2015 (table F.6).

Table F.6 **Number of people achieving a skill level gain due to additional LLNP places, up to and including 2015**

Additional places, of which:	**43 570**
50% of people complete the program, of which:	21 875
90% are aged 25–64, of which:	19 607
70% achieve a skill level gain	13 725
Men achieving a skill level gain:	**4 117**
Two thirds move from level 1 to 2	2 745
One third move from level 2 to 3	1 372
Women achieving a skill level gain:	**9 607**
Two thirds move from level 1 to 2	6 405
One third move from level 2 to 3	3 202

Source: Productivity Commission estimates based on Australian Government (2010a, 2011) and unpublished DEEWR figures.

The expansion of the LLNP is estimated to result in very small changes in the projected skills profile of the population in both 2011 and 2015 (table F.7). This is not surprising given the small number of additional LLNP places and completions relative to the size of the population.

Table F.7 **Realised and prospective changes in the LLN skills profile of 25–64 year olds due to the LLNP**

Relative to the baseline

	Men			*Women*		
	2008	*2011 (realised)*	*2015 (prospective)*	*2008*	*2011 (realised)*	*2015 (prospective)*
	%	ppt	ppt	%	ppt	ppt
Level 1	13.9	-0.010	-0.046	16.7	-0.022	-0.106
Level 2	27.8	0.005	0.023	29.0	0.011	0.053
Level 3	38.3	0.005	0.023	39.6	0.011	0.053
Level 4/5	20.0	0.000	0.000	14.7	0.000	0.000

Source: Productivity Commission estimates based on ALLS, Australian Government (2010a, 2011), MoDEM 2.0, PC (2006), Shomos (2010) and unpublished DEEWR figures.

It is likely that, on average, people who move to a higher skill level as a result of LLN training will have lower unobserved ability — such as lower non-cognitive skills — than people who were at that skill level already. As a result, the wage for a person who moves to a higher skill level could be lower on average than that received by those already at that level. This will partly depend on the number of people moving to a higher skill level. The marginal payoff is likely to be lower as more people move. When estimating the effect of the NFSS, this is taken into

account and the NFSS is discounted for this 'marginal ability effect'. However, due to the small number of additional LLNP places, relative to the population, the marginal effect on employment and productivity of moving up a LLN skill level is not discounted for the marginal ability effect. Sensitivity analysis of this assumption is presented later (tables F.13 and F.14).

The impact of improved LLN skills due to the additional investment in the LLNP on employment and productivity is presented in table F.8. Consistent with the small changes in LLN attainment, the labour market effects are very small.

Table F.8 **Realised and prospective employment and productivity impacts from improved LLN skills among 25–64 year olds**

Per cent

	Employment		*Productivity*	
	2011 (realised)	*2015 (prospective)*	*2011 (realised)*	*2015 (prospective)*
Men	..	0.002	0.002	0.009
Women	0.004	0.019	0.003	0.018

.. Between -0.001 and 0.001.

Source: Productivity Commission estimates based on ABS (2012), ALLS, Australian Government (2010a, 2011), MoDEM 2.0, PC (2006), Shomos (2010) and unpublished DEEWR figures.

Social inclusion impacts

As discussed in chapter 2, the Commission uses LLN skills and employment as indicators of social inclusion. LLN skills have been shown to be linked to social inclusion (section F.2), and the Australian Government has included adult literacy and numeracy, and employment indicators, as headline indicators for its social inclusion agenda (Australian Government 2009b).

The LLNP increases LLN skills as well as employment, thereby improving social inclusion. However, due to the very small magnitude of the changes, the resulting social inclusion improvement will likely be similarly small.

Sensitivity analysis

Sensitivity analysis is undertaken for the assumption that 70 per cent of people who complete the course and are aged 25–64 achieve a skill level increase, and for the assumption of no discount for the marginal ability effect. The sensitivity of the 70 per cent assumption is tested by comparing it with 58 per cent and 82 per cent. Tables F.9 and F.10 present a comparison of the realised and prospective changes in

the LLN skill profile of the population under the different scenarios. Overall the results remain small under each scenario.

Table F.9 **Realised and prospective changes in the LLN skills profile of men aged 25–64 years under each skill level increase scenario**

Relative to the baseline

	2008	*2011 (realised)*			*2015 (prospective)*		
		58%	*70%*	*82%*	*58%*	*70%*	*82%*
	%	ppt	ppt	ppt	ppt	ppt	ppt
Level 1	13.9	-0.008	-0.010	-0.011	-0.038	-0.046	-0.054
Level 2	27.8	0.004	0.005	0.006	0.019	0.023	0.027
Level 3	38.3	0.004	0.005	0.006	0.019	0.023	0.027
Level 4/5	20.0	0.000	0.000	0.000	0.000	0.000	0.000

Source: Productivity Commission estimates based on ALLS, Australian Government (2010a, 2011), MoDEM 2.0, PC (2006), Shomos (2010) and unpublished DEEWR figures.

Table F.10 **Realised and prospective changes in the LLN skills profile of women aged 25–64 years under each skill level increase scenario**

Relative to the baseline

	2008	*2011 (realised)*			*2015 (prospective)*		
		58%	*70%*	*82%*	*58%*	*70%*	*82%*
	%	ppt	ppt	ppt	ppt	ppt	ppt
Level 1	16.7	-0.018	-0.022	-0.026	-0.088	-0.106	-0.125
Level 2	29.0	0.009	0.011	0.013	0.044	0.053	0.062
Level 3	39.6	0.009	0.011	0.013	0.044	0.053	0.062
Level 4/5	14.7	0.000	0.000	0.000	0.000	0.000	0.000

Source: Productivity Commission estimates based on ALLS, Australian Government (2010a, 2011), MoDEM 2.0, PC (2006), Shomos (2010) and unpublished DEEWR figures.

Varying the assumed effectiveness of the program does not change the typical result of a very small increase in employment and productivity (tables F.11 and F.12).

Table F.11 **Realised and prospective employment impacts from improved foundation skills among 25–64 year olds under each skill level increase scenario**

Relative to the baseline, per cent

	58% scenario		*70% scenario*		*82% scenario*	
	2011	*2015*	*2011*	*2015*	*2011*	*2015*
Men	..	0.002	..	0.002	0.001	0.003
Women	0.003	0.016	0.004	0.019	0.005	0.023

.. Between -0.001 and 0.001.

Source: Productivity Commission estimates based on ABS (2012), ALLS, Australian Government (2010a, 2011), MoDEM 2.0, PC (2006), Shomos (2010) and unpublished DEEWR figures.

Table F.12 **Realised and prospective productivity impacts from improved foundation skills among 25–64 year olds under each skill level increase scenario**

Relative to the baseline, per cent

	58% scenario		*70% scenario*		*82% scenario*	
	2011	*2015*	*2011*	*2015*	*2011*	*2015*
Men	0.002	0.007	0.002	0.009	0.002	0.011
Women	0.002	0.015	0.003	0.018	0.003	0.021

Source: Productivity Commission estimates based on ALLS, Australian Government (2010a, 2011), MoDEM 2.0, PC (2006), Shomos (2010) and unpublished DEEWR figures.

The assumption of no discount for the marginal ability effect is tested by comparing it with discounts of 10 and 20 per cent, for illustrative purposes. The effectiveness of the program is assumed to be 70 per cent. Changing the discount for the marginal ability effect does not markedly change the estimated employment and productivity impacts, relative to the baseline (tables F.13 and F.14).

Table F.13 **Realised and prospective employment impacts among 25–64 year olds under each marginal ability effect scenario**

Relative to the baseline, per cent

	Discount for marginal ability effect					
	0% discount		*10% discount*		*20% discount*	
	2011	*2015*	*2011*	*2015*	*2011*	*2015*
Men	..	0.002	..	0.002	..	0.002
Women	0.004	0.019	0.004	0.018	0.004	0.017

.. Between -0.001 and 0.001.

Source: Productivity Commission estimates based on ABS (2012), ALLS, Australian Government (2010a, 2011), MoDEM 2.0, PC (2006), Shomos (2010) and unpublished DEEWR figures.

Table F.14 **Realised and prospective productivity impacts among 25–64 year olds under each marginal ability effect scenario**

Relative to the baseline, per cent

	Discount for marginal ability effect					
	0%		*10%*		*20%*	
	2011	*2015*	*2011*	*2015*	*2011*	*2015*
Men	0.002	0.009	0.002	0.008	0.002	0.008
Women	0.003	0.018	0.003	0.016	0.002	0.015

Source: Productivity Commission estimates based on ALLS, Australian Government (2010a, 2011), MoDEM 2.0, PC (2006), Shomos (2010) and unpublished DEEWR figures.

Workplace English Language and Literacy program

Unlike the LLNP, measurement of WELL participants' LLN skills has only recently commenced (DEEWR, pers. comm., 24 October 2011). As a result, no information on the program's effectiveness in improving participants' LLN skills is available. However, a 2006 evaluation of the program found that both employers and employees were satisfied with the program. Employers stated that the WELL program resulted in:

- more effective communication
- improved teamwork
- improved relationships between workers and management
- higher ability for the organisation to meet regulatory requirements
- increased productivity (KPMG 2007).

As evidence of the program's effectiveness in improving LLN skills is not currently available, the impact of the program on the skills profile of the population, employment and productivity is not estimated here. Given the number of additional places is less than that for the LLNP — 22 500 overall between 2010-11 and 2014-15 — the additional investment would likely have a very small effect.

Victorian reforms

As mentioned earlier, the *Securing Jobs for Your Future* reforms introduced a training guarantee for foundation level courses and reduced the cost of these courses.

To estimate the realised effects of these reforms, it is assumed that the change in enrolments between 2010 and 2011 is due to the reforms. Although the change to tuition fees occurred earlier, enrolments in 2008 and 2010 were similar, and are therefore not taken into account. In addition, the reforms were only fully implemented in January 2011. Enrolments in foundation courses that focus on LLN skills increased by about 40 per cent between the third quarters of 2010 and 2011 (Productivity Commission estimates based on Skills Victoria, pers. comm., 18 November 2011).[4] Enrolments in LLN-focused foundation courses were 40 688 in 2010. It is assumed that enrolments in 2011 were 40 per cent higher, or 56 964, a difference of 16 276 enrolments as a result of the reforms.

In estimating the prospective effects of reforms, it is assumed that the reforms will result in the same increase in the number of enrolments in 2012 as in 2011.

The assumptions used in assessing the effects of the increase in enrolments as a result of reform are the same as those used when assessing the LLNP, as the courses completed by those who undertake the LLNP in Victoria are often the same as courses classified as foundation courses. Similar to the LLNP, the reforms are estimated to result in positive but very small changes in employment, productivity and social inclusion, and are therefore not reported in more detail.

South Australian reforms

The South Australian reforms include changing eligibility to government-subsidised training places and the subsidy amount, and increasing investment in the Adult Community Education sector for foundation skills-related courses. Over six years, 11 000 additional places are expected at the Certificate I and foundation level, or about 1830 per year. Similar to Victoria, the impacts of this increase on employment and productivity are estimated to be very small and are not reported in more detail.

F.6 Potential impacts of reforms

The current NASWD contains targets relating to VET qualifications at or above a Certificate III level only. However, as discussed in section F.2, the NFSS will include a target of increasing the proportion of working-age Australians with LLN

4 This excludes foundation courses such as Vocational Preparation, Transition Education, Work Preparation, Japanese, and courses completed in school, such as the Victorian Certificate of Applied Learning (Skills Victoria, pers. comm., 18 November 2011).

skills at level 3 or above to two thirds by 2022 (SCOTESE 2011). The Commission has estimated the effect of achieving this target.

To achieve the target for both males and females will require a 4.8 percentage point increase in the proportion of males at level 3 and above, and a 7.7 percentage point increase for females, compared with the 2022 baseline scenario (table F.15). The required improvement is similar to that achieved by New Zealand between 1996 and 2006, where there was a 7 percentage point improvement in adult reading literacy (Skills Australia 2010).

The assumed proportions of people increasing their skill level are presented in table F.16. The relative movements between levels is different to that assumed for the LLNP, where the investment is assumed to result in a greater proportion of people increasing their skill level from level 1 to 2 than from level 2 to 3. Given that the target involves people increasing their skill level up to level 3, it is assumed that a relatively higher proportion of people at level 2 undertake training as a result of the reform than people at level 1. It is also assumed that there will be people who improve their skills from level 1 to 2 due to increased foundation skills training under the strategy. These people do not contribute directly to achieving the target, however they will still contribute to the cost of the policy initiative, and to its impacts on employment and productivity.

Table F.15 **Foundation skills profile without reform and with achievement of the NFSS target, 25–64 year olds, 2022**

Per cent

	Men		*Women*	
	Baseline	*Potential*	*Baseline*	*Potential*
Level 1	12.3	9.3	14.1	9.4
Level 2	25.8	24.0	26.9	23.9
Level 3	38.7	43.5	41.0	48.7
Level 4/5	23.2	23.2	18.0	18.0

Source: Productivity Commission estimates based on ALLS, MoDEM 2.0, PC (2006), SCOTESE (2011) and unpublished DEEWR figures.

Table F.16 **Proportion of people moving between skill levels due to the NFSS, 2022**

Relative to the baseline, percentage points

	Men	*Women*
Level 1 to 2	2.4	3.8
Level 1 to 3	0.6	0.9
Level 2 to 3	4.2	6.8

The potential effects of increasing LLN skills to the target levels on employment and productivity are small (table F.17), although larger than those assessed in section F.5. The marginal effect of increasing LLN skill levels has been discounted by 6 per cent (marginal ability effect is discussed in section F.5). The size of the discount was derived from the ELMO model taking into account how many people would undertake training due to reform (appendix E).

Table F.17 **Employment and productivity effects of the NFSS, 2022**

Relative to the baseline, per cent

	Employment	*Productivity*
Men	0.156	0.820
Women	1.028	0.905

Source: Productivity Commission estimates based on ABS (2012), ALLS, MoDEM 2.0, PC (2006), SCOTESE (2011), Shomos (2010) and unpublished DEEWR figures.

Occupation impacts

The Commission estimated the impact of the NFSS on employment and productivity by occupation using the Australian and New Zealand Standard Classification of Occupations major groups. The current occupational profile of those employed differs by LLN skill level. Occupations such as labourers, which are considered less skill intensive and require lower qualifications, have relatively higher representation at the lower LLN skill levels. Occupations such as managers and professionals that are considered more skill intensive are more highly represented at higher LLN skill levels.

The change in employment was derived by assuming that people who increase their skill level have the same employment probability as people employed at the new skill level. For example, if 40 per cent of labourers at level 1 were employed and 50 per cent at level 2 were employed, the employment rate of the group of managers who move from level 1 to 2 due to the policy initiative is assumed to increase by 10 percentage points. It is assumed there is no change in occupation at the major group level due to the NFSS.

Wages are higher for those employed in higher skilled occupations, and people within the same occupation group earn different wages if they have different LLN skill levels. In estimating the impact on wages, it is assumed that people who become employed as a result of the reforms receive the average expected wage for that occupation and LLN skill level. People who remain in employment, but whose skill level increases as a result of the reforms, receive the average expected wage for that occupation and new skill level. The impacts are discounted by 6 per cent to take account of the marginal ability effect.

Achievement of the NFSS target is projected to increase employment and productivity, relative to the baseline (table F.18).

Partial fiscal effects

The NFSS will also impact on governments' budgets, both in the short and long term. In the short term, governments might incur additional expenditure in subsidising the training and incur a loss in revenue if people work less while undertaking training. In the long term, government revenues might increase if there is an increase in employment and productivity due to the reforms. More information on how fiscal effects were calculated can be found in appendix D.

Table F.18 **Potential impact of the NFSS on employment and productivity by major occupation group, 2022**
Relative to the baseline, per cent

	Employment	*Productivity*
Managers	0.42	1.25
Professionals	0.56	0.38
Technicians and trades	0.31	0.62
Community and personal service	0.80	0.12
Clerical and administrative	0.92	0.71
Sales	0.66	1.27
Machinery operators and drivers	0.23	2.03
Labourers	0.42	0.89
Total	**0.55**	**0.79**

Source: Productivity Commission estimates based on ABS (2012), ALLS, MoDEM 2.0, PC (2006), SCOTESE (2011), Shomos (2010) and unpublished DEEWR figures.

The partial fiscal effects of the NFSS for those who complete LLN training are estimated based on a number of assumptions.

- The cost to government of subsidising LLN training per person is assumed to be $2830 (in 2010 dollars) on average. This is Skills Australia's estimate of the expenditure per trainee in the LLNP (Skills Australia 2010).

- People are assumed to work 36 hours a week, 48 weeks in a year and, on average will be working for another 18 years (based on an average retirement age of 63 and a median age of 45 for the 25–64 year old cohort (appendix E)).
- There is no short-term loss in revenue to government. People who are employed are assumed to undertake LLN training outside of work hours and not decrease their hours of work.
- The effective average tax rate is 38 cents in the dollar (appendix C).
- The long-term benefits are discounted by 6 per cent to account for the time value of money (appendix C).

The partial fiscal effect of the NFSS is estimated to be about $4.4 billion in 2010 dollars.

Sensitivity analysis

Sensitivity analysis of the six per cent discount for the marginal ability effect is presented in tables F.19 and F.20. Varying this discount to 16 and 26 per cent does not markedly change the overall result of an improvement in employment and productivity.

Table F.19 **Employment impacts from improved LLN skills among 25–64 year olds in 2022 under each scenario**

Per cent

	Discount for marginal ability effect		
	6% discount	*16% discount*	*26% discount*
Men	0.156	0.121	0.086
Women	1.028	0.809	0.590

Source: Productivity Commission estimates based on ABS (2012), ALLS, MoDEM 2.0, PC (2006), Shomos (2010) and unpublished DEEWR figures.

Table F.20 **Productivity impacts from improved LLN skills among 25–64 year olds in 2022 under each scenario**

Per cent

	Discount for marginal ability effect		
	6% discount	*16% discount*	*26% discount*
Men	0.820	0.674	0.529
Women	0.905	0.731	0.556

Source: Productivity Commission estimates based on ALLS, MoDEM 2.0, PC (2006), Shomos (2010) and unpublished DEEWR figures.

F.7 Conclusion

The policy initiatives assessed in this appendix will likely result in improvements in foundation skills, employment, productivity and social inclusion. Achieving the NFSS target would also have a positive partial fiscal effect. The small realised and prospective results are at least partly due to the small number of enrolments and completions associated with the assessed reforms, relative to the size of the population. Given the potential improvements in employment and productivity from increasing LLN skills, and the apparent success of LLN programs such as the LLNP, significant increases in investment in improving the LLN skills profile of the population might result in marked employment and productivity improvements. Intervening earlier, during school years for example, might be more cost effective and lead to better outcomes in the long term.

G Youth transitions

This appendix describes the data used to characterise youth transitions for this project (section G.1), and presents data on the prevalence and characteristics of those who do, and do not, make a successful transition. Four groups of individuals are identified, namely those with successful transitions, those with failed transitions, those currently studying and those otherwise occupied with child-rearing activities. The prevalence of each group under three definitions of success is assessed using the key data source adopted for this study — the *Longitudinal Surveys of Australian Youth* (LSAY) (section G.2). Estimates of prevalence from the LSAY are then validated against other sources (section G.3). Finally, data on the characteristics of individuals in each of the transition groups derived from the LSAY are described (section G.4) and the potential for multivariate analysis using the LSAY is canvassed (section G.5).

G.1 Transitions data in LSAY

The LSAY program is a large, individual-based panel study of young people from about age 15. It contains more than 5000 variables covering ten major topics:

1. demographics (student age, sex, Indigenous status, country of birth, parents' country of birth, education, occupation)
2. schooling (school characteristics, student achievement, perceptions about school and self, workplace learning, subjects undertaken, qualifications and results, government payments)
3. transition from school (intentions to leave, post-school plans, receipt of careers advice)
4. post-school study (current and past study and qualifications, apprenticeship/traineeship study, reasons for deferring/stopping, satisfaction, careers advice, government payments, income)
5. work (current employment characteristics, hours worked, wages/benefits, at school/post-school jobs, job training, satisfaction)
6. job history (past employment characteristics, hours worked, wages/benefits, job training information)

7. job search activity (job search calendar, problems looking for work)
8. non-labour force activities (main activity, plans for seeking employment/study)
9. living arrangements, finance and health (disability, health, living arrangements, marital status, children, government payments, housing payments)
10. general attitudes (interests, life satisfaction, volunteering).

Several groups of individuals, called cohorts, have been surveyed since the LSAY began in the 1970s.[1] Each cohort is designed to be nationally representative, and its members are interviewed annually, for up to 12 years, providing longitudinal information as they transition to adulthood. Data collection for the more recent cohorts (2003, 2006 and 2009) is not yet complete. The 1998 cohort (DEEWR 2011b) is the most recent panel that allows examination of individuals in their mid-20s, therefore data for that cohort are used in this study.

The LSAY is available from the Australian Social Science Data Archives (ASSDA). The survey is managed and funded by the Australian Government Department of Education, Employment and Workplace Relations (DEEWR), with support from State and Territory governments.[2]

The 1998 cohort

The LSAY sample for the 1998 cohort began with 14 117 students in Year 9 from across Australia. The sampling process had two stages. The first stage involved the selection of a random sample of 300 schools, stratified to ensure coverage of all states and territories and school sectors (government, Catholic and independent). The second involved randomly selecting two Year 9 classes from each school. Each student in these classes was then surveyed, where possible, until the final wave (survey year) in 2009.

Variables derived for this study

A number of variables relating to successful transitions were derived for this study, including the date of an individual's 25th birthday, their monthly labour force status and their study or child-rearing activities in the seven months before they turned 25.

1 LSAY has been conducted under several other names.

2 Further information on the LSAY is available at www.lsay.edu.au.

G.2 Prevalence of successful transitions

As discussed in chapter 2, for the purposes of this study, a successful transition is defined with reference to an individual's labour force status in the seven months before he or she turns 25. In examining successful transitions, three definitions of success with progressively more demanding conditions were adopted:

1. any employment for four out of seven months prior to turning 25
2. any employment for all seven months prior to turning 25
3. full-time employment for all seven months prior to turning 25.

Under each of these definitions of a successful transition, failure is defined as not meeting those requirements. However, study and child-rearing activities do not fit with successful or failed transitions. Rather, study could be seen as an intermediate stage (still in transition) and child-rearing could indicate temporary or permanent 'time-out' from the labour market rather than being an indicator of a failed transition.[3] As a result, individuals who were in full-time or part-time study or who had young children were extracted from the failure group and listed separately as students (about 25 per cent of the failure group) or in child-rearing activities (about 7 to 20 per cent, depending on the definition of failure used).[4] As there are currently no calendar variables in LSAY for education or child-rearing activities, these two variables were approximated by activities at the time of the last interview before an individual turned 25.[5]

Weighted data from the LSAY show how individuals are distributed between the four transition groups (success, fail, study or child-rearing) under each definition of a successful transition (table G.1). Under the least demanding definition of a successful transition (any employment for four out of the seven months before turning 25), nearly 90 per cent of people who turned 25 in 2008 are deemed to have made a successful transition, and 7 per cent to have failed to do so. Given a population of about 300 000 25 year olds (ABS 2010b), these estimates imply that around 21 000 young people who turned 25 in 2008 would be assessed as not having made a successful transition. A further 9000 were engaged in study and 6000 in child-rearing.

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3 However, there is evidence that the labour market prospects of some young women engaged in child-rearing are poor. About half of the group had no post-school qualification beyond, or at most, a Certificate II.

4 Under each definition of a successful transition, individuals who combined study (or child-rearing) with the relevant type of work remained in the successful transition group.

5 Calendar variables capture recall-based information for each month between surveys.

Under the most strict definition (seven months of full-time employment prior to turning 25) two thirds of individuals are estimated to have made a successful transition and the failure rate rises to 21 per cent (or 63 000 people). Individuals in study or child-rearing who did not meet the criteria for a successful transition are separately identified. Their numbers increase with a stricter definition of a successful transition because there are more failures.

Table G.1 **Distribution of transition groups in LSAY[a]**

1998 cohort, per cent

Definition	*Success*	*Failure*	*Study*	*Child-rearing*
Any employment 4/7 months	88	7	3	2
Any employment all 7 months	79	13	5	3
Full-time employment all 7 months	67	21	9	3

a Estimates are for the population of individuals turning 25 and are based on weighted data representing approximately 300 000 individuals.

Source: Productivity Commission estimates based on data for the 1998 cohort of LSAY.

G.3 Validation

Over the 12 waves of data for the 1998 cohort, survey attrition has reduced the sample size in the LSAY and there have been changes in the population. This might have led to differences between the composition of the sample and the population, reducing the reliability of sample-based inferences about the population.

Although attrition is usual in longitudinal surveys, there is no generally accepted way to fix it. Some surveys deal with attrition by 'replacing' individuals through 'topping-up' or boosting the sample, or in more organic ways by including individuals as they enter relationships with existing sample members, for example, through cohabitation or marriage (table G.2). Many household samples, including the *Household Income and Labour Dynamics in Australia* (HILDA) survey sample, adopt this approach. In LSAY, individuals who dropped out (or could not be contacted) during the life of the cohort survey were not replaced.

Attrition from household survey samples tends to be lower than that for individual-based surveys like LSAY, as the data presented in table G.2 from a range of surveys illustrate. This can be the result of difficulties in tracking down individuals (who might be more mobile than households) when they change location. It might also be the result of differences in the incentives to remain in a survey, as participation can be rewarded with gratuities. The probability of attrition might also be higher for younger respondents, as attrition rates for the 15 year olds in wave 1 of HILDA are higher than overall attrition rates from the same survey.

Table G.2 **Survey attrition estimates and responses**

Survey	*Average attrition rate per wave*[a]	*Response to attrition*
	%	
Individual surveys		
LSAY (1998 cohort)	11.7	None
Longitudinal Survey of Immigrants to Australia (cohort 1)	30.3	None
Longitudinal Survey of Immigrants to Australia (cohort 2)	15.2	None
Household surveys		
HILDA	4.9	Replacement
HILDA (15 year olds)	6.3	Replacement
German Socio-economic Panel — subsample F	6.7	Replacement
British Household Panel Survey	4.1	Replacement

[a] Average attrition rate per wave is the compound annual rate of change in the sample size.

Source: Productivity Commission estimates based on LSAY and HILDA data, information about the British Household Panel Survey, the German Socio-economic Panel (subsample F) and the Longitudinal Survey of Immigrants to Australia (cohorts 1 and 2).

To check the validity of the LSAY results, the distribution of transition groups based on LSAY has been compared with that from other sources for each definition of a successful transition. The ABS *Labour Force Survey* (LFS) and the HILDA survey have been used in this comparison. Only employment in the current month could be compared across all sources, so the definitions were modified to facilitate comparisons. For each definition, the distribution of transition groups in LSAY is broadly similar to that from the other data sources (table G.3). These comparisons give confidence in the LSAY results.

Table G.3 **Distribution of transition groups from various sources**[a]

Per cent

Definition and data source	*Success*	*Failure*	*Study*	*Child-rearing*
Any employment in current month				
LSAY (1998 cohort)	88	7	4	2
LFS	81	5	7	7
HILDA	83	8	6	3
Full-time employment in current month				
LSAY (1998 cohort)	75	14	9	2
LFS	64	22	7	7
HILDA	63	19	14	3

[a] LSAY estimates are for the population of individuals turning 25 and are based on weighted data representing approximately 300 000 individuals.

Source: Productivity Commission estimates based on data for HILDA, LFS and the 1998 cohort of LSAY.

G.4 Characteristics of transition groups

Based on the least restrictive definition of a successful transition (employment for four out of seven months prior to turning 25), comparison of the characteristics of young people who did and did not make a successful transition reveals few large differences (table G.4). However, similarities and differences for some characteristics are noteworthy.

Disability is much less common among those making a successful transition (2 per cent compared to 9 per cent for failed transitions).

In terms of human capital, measured ability at age 15 and having post-school qualifications have positive associations with transition success. In particular, having a Bachelor Degree (or higher) or a Certificate III is more closely associated with successful transitions.

Having accessed careers information while at school is also more strongly associated with success, but the statistical significance of this effect would need to be confirmed with multivariate analysis. It is possible that this association reflects individuals' other characteristics — for example, it is possible that individuals who do well academically (and are more likely to make a successful transition) are also more likely to access careers advice.

It is often thought that being from a non-metropolitan location is associated with labour market disadvantage. However, there does not appear to be any real difference in the proportions of young people from non-metropolitan locations among those who make a successful transition and those who fail. Parental education is also not strongly associated with making a successful transition.[6]

Tables G.5 and G.6 present data on the characteristics of individuals in each transition group for the other two (more restrictive) definitions of transition success. These results show the effect of changing the definition of a successful transition and are presented as differences from the results presented in table G.4. For example, making the definition more restrictive reduces the proportion of males in the failure category by about 5 percentage points (from about 50 per cent to about 45 per cent). This results from a higher proportion of women in sporadic work, who are no longer considered to make a successful transition when the requirement for success is continuous employment (either part-time or full-time) over seven months.

6 Although mother's education has a marginally significant association at the 90 per cent level.

The association between high self-assessed ability and failure declines as more restrictive definitions of success are adopted. This might be due to individuals with higher self-confidence having more stable employment.

The extent to which changes in any one of these characteristics affect the probability of success, holding other characteristics constant, would require multivariate analysis.

G.5 Potential for multivariate analysis using LSAY

To gain an understanding of the relationships between these characteristics and their relevance to the probability of a successful transition, multivariate analysis is required.

In the context of youth transitions, there are two types of research questions that could be asked:

1. What factors influence the probability of different outcomes (an analysis of 'destinations')?
2. What factors influence the time it takes for a successful transition to occur (an analysis of the determinants of duration)?

Answering each of these questions requires a distinct multivariate modelling approach.

The first approach could use standard limited dependent variable modelling techniques to gauge the contribution of policy-amenable factors to transition outcomes, while controlling for other factors.[7] It would use a model of the form:

Pr(outcome) = f(demographics, human capital, policy, other)

This approach could measure the effects on participation (and, with some adjustment, productivity) of the Council of Australian Governments' policy initiatives targeted at improving youth transitions.

The second approach would use duration analysis to explore determinants of the length of transitions between school, further education or training, and work. Rather than modelling the outcome, it would focus on time:

[7] These factors include individual attributes developed earlier in life (before or during school years), and others determined closer to the transition outcome (for example, during the initial post-school years).

Time to outcome = f(demographics, human capital, policy, other)

This type of analysis would show how transition policy initiatives could shorten the time taken to achieve a successful transition.

LSAY is the best available data collection for this type of work as it includes key transition activities (work and study) for individuals tracked for up to 12 years through annual interviews. However, there are several constraints on the usefulness of LSAY for this type of work. These constraints relate to the inclusion of policy-relevant variables and practicality — areas of potential improvement to the survey.

Potential improvements to LSAY

LSAY is designed to capture information on a variety of topics. With limited 'space' on the questionnaire, there is a trade-off between the number of topics that can be covered and the detail with which they can be captured. This increases LSAY's relevance in a number of policy-relevant areas at the expense of depth in any single area.

For the early cohorts of LSAY, there are few policy-relevant variables for transitions analysis. Individuals are asked whether they have accessed careers advice in most years. In the later cohorts, individuals are asked for more detailed information about their use of (and attitudes to) different aspects of careers information. With COAG policy initiatives focused on careers advice and mentoring, there is scope to ask questions of future cohorts to assess the effects of any mentoring programs.[8]

In a practical sense, LSAY could be made more user friendly. At present, significant time is required to set up the data for analysis. This results from the many variables (and responses) in LSAY being identified in different ways across waves. Although variable naming is currently designed to enable users to easily identify the survey question, it hinders cross-wave analysis. HILDA provides a good benchmark, as the team conducting the HILDA survey invested significant time in setting up consistent variable names to make longitudinal analysis of their survey easier.

Furthermore, the LSAY calendar only covers work and job search information. A full labour market activity calendar is cumbersome and time-consuming for users to

8 There is, however, a trade-off between the more recently acquired information that will become available for future cohorts and the shorter time over which to observe transition outcomes.

derive (particularly for more than one year). As a result, this valuable information often goes unused.[9]

Some additional variables are derived by the LSAY team. However, more could be done in this respect, such as using existing date and calendar information to derive spell and duration variables for education and labour market activities. LSAY documentation would also need to include detailed information on how derived variables are calculated.

Thinking beyond one cohort of LSAY, it should be possible to pool several cohorts. This would allow users to explicitly account for cohort effects as well as increasing the sample for analysis. However, care would need to be taken when selecting variables for analysis from a pooled dataset as questions and response categories can differ between cohorts.

9 In the course of this study, the Commission has developed a labour market calendar. Further details are available on request.

Table G.4 **Individual characteristics by transition group**[a, b]

People employed for four out of seven months before turning 25, per cent

		Success	*Failure*	*Study*	*Child-rearing*
Demographics					
	Male	53.3	49.9	50.3	2.5
	Non-Indigenous	97.3	96.0	98.2	95.2
	Disability	1.6**	8.8	0.6	0.0
	NES country of birth	7.2	10.9	8.9	0.0
Location					
	Metropolitan	53.2	55.0	59.3	34.7
	Regional	24.4	24.7	24.2	38.7
	Rural/remote	20.3	18.2	15.7	24.5
Mother's education					
	Completed school	54.9	51.1	59.8	38.7
	Apprenticeship	6.8	5.0	7.6	6.5
	TAFE	14.4	13.1	18.2	14.5
	University	22.1*	16.3	22.0	17.0
Father's education					
	Completed school	52.1	53.4	55.8	34.9
	Apprenticeship	28.6	23.5	27.0	25.3
	TAFE	12.7	11.7	11.9	14.7
	University	22.3	27.7	25.2	12.8
School type					
	Catholic	20.2	18.3	18.5	7.5
	Independent	12.4	10.3	16.0	5.1
	Government	67.4	71.4	65.6	87.4
Ability/engagement at age 15					
	High measured ability	25.5**	17.5	30.4	10.9
	Low measured ability	25.1	30.2	19.9	35.9
	High self-assessed ability	54.2	60.7	69.6	28.8
	Accessed careers information	57.2	52.7	51.4	38.1
Current school attainment					
	Year 12	83.3	81.4	87.8	54.2
	Below year 10	8.6	6.6	3.2	27.7
Current non-school attainment					
	Bachelor degree or above	32.9**	24.9	31.7	7.2
	Diploma	9.2	12.0	7.7	7.4
	Certificate IV	4.9	5.1	3.4	5.4
	Certificate III	11.3**	5.4	7.7	9.2
	Certificate I/II	8.3	9.5	1.9	27.4
	No post-school qualifications	30.8**	41.7	45.2	42.6

a Transition outcomes are measured at age 25, based on weighted data. **b** Some numbers might not add to 100 per cent because of item non-response of approximately 2–3 per cent. ** Denotes a significant difference between success and failure for the characteristic at the 95 per cent level. * Denotes a significant difference at the 90 per cent level.

Source: Productivity Commission estimates based on data for the 1998 cohort of LSAY.

Table G.5 **Differences in individual characteristics between transition groups[a]**

Percentage point difference from employed for four out of seven months for individuals employed for all seven months

		Success	*Failure*	*Study*	*Child-rearing*
Demographics					
	Male	1.4	-5.3	-2.0	-0.1
	Non-Indigenous	-0.2	1.2	0.6	0.1
	Disability	0.0	-3.7	0.4	0.0
	NES country of birth	0.0	-1.4	-2.4	0.0
Location					
	Metropolitan	0.3	-2.7	-0.7	-0.9
	Regional	-0.6	3.8	-1.0	-1.0
	Rural/remote	0.2	-0.7	1.9	2.0
Mother's education					
	Completed school	-0.2	2.9	-0.3	-1.0
	Apprenticeship	0.2	0.1	-2.0	-0.2
	TAFE	0.3	-0.9	-1.9	-0.4
	University	0.0	1.1	4.4	-0.4
Father's education					
	Completed school	-0.7	3.4	-0.3	-0.9
	Apprenticeship	-0.3	3.2	2.7	2.0
	TAFE	0.4	-0.8	-1.5	-0.4
	University	-0.1	-2.6	1.0	-0.4
School type					
	Catholic	0.5	-1.3	-0.9	-0.2
	Independent	-0.1	-0.1	3.1	-0.1
	Government	-0.4	1.4	-2.2	0.3
Ability/engagement at age 15					
	High measured ability	-0.4	4.5	3.0	-0.3
	Low measured ability	0.2	-2.2	-3.0	1.7
	High self-assessed ability	0.1	-4.7	-3.2	-0.8
	Accessed careers information	0.2	0.7	2.5	1.7
Current school attainment					
	Year 12	0.0	-0.4	1.8	1.2
	Below year 10	0.4	-0.5	-0.3	-0.8
Current non-school attainment					
	Bachelor degree or above	0.6	0.0	2.2	-0.2
	Diploma	0.2	-1.9	-0.8	-0.2
	Certificate IV	0.1	-1.5	3.3	-0.2
	Certificate III	0.2	2.9	-1.0	-0.2
	Certificate I/II	-0.3	1.5	1.3	-0.7
	No post-school qualifications	-0.9	-0.7	-5.0	1.5

a Based on weighted data. There were no significant differences from employed for four out of seven months, at the 90 per cent level.

Source: Productivity Commission estimates based on data for the 1998 cohort of LSAY.

Table G.6 Differences in individual characteristics between transition groups[a]

Percentage point difference between individuals employed for four out of seven months and individuals employed full-time for all seven months

		Success	*Failure*	*Study*	*Child-rearing*
Demographics					
	Male	4.0	-8.7	-1.1	-0.1
	Non-Indigenous	-0.3	1.5	0.5	0.1
	Disability	-0.5	-3.7	0.9	0.0
	NES country of birth	0.2	-3.6	0.1	0.0
Location					
	Metropolitan	0.4	-4.6	1.8	-0.9
	Regional	-1.6	5.3	-0.9	-1.0
	Rural/remote	1.3	-1.2	-1.1	2.0
Mother's education					
	Completed school	-0.3	1.0	3.3	-1.0
	Apprenticeship	0.4	0.7	-2.4	-0.2
	TAFE	0.1	0.5	-2.2	-0.4
	University	0.1	2.9	2.5	-0.4
Father's education					
	Completed school	-0.8	-1.0	4.4	-0.9
	Apprenticeship	0.1	3.5	-0.4	2.0
	TAFE	1.2	-1.8	-1.9	-0.4
	University	-0.1	-5.5	3.0	-0.4
School type					
	Catholic	1.1	-2.4	1.9	-0.2
	Independent	-1.0	2.3	3.4	-0.1
	Government	-0.1	0.1	-5.3	0.3
Ability/engagement at age 15					
	High measured ability	-0.4	3.2	5.7	-0.3
	Low measured ability	-0.4	0.8	-4.5	1.7
	High self-assessed ability	1.2	-8.9	-7.7	-0.8
	Accessed careers information	1.3	-0.7	2.5	1.7
Current school attainment					
	Year 12	-0.1	-0.4	1.4	1.2
	Below year 10	0.4	0.8	1.8	-0.8
Current non-school attainment					
	Bachelor degree or above	1.6	0.5	1.1	-0.2
	Diploma	-0.1	-1.7	0.9	-0.2
	Certificate IV	0.0	-0.9	2.9	-0.2
	Certificate III	-0.1	5.8*	-1.2	-0.2
	Certificate I/II	0.2	-0.6	2.3	-0.7
	No post-school qualifications	-1.9	-3.5	-5.3	1.5

a Based on weighted data. There were no significant differences from employed for four out of seven months, at the 90 per cent level.

Source: Productivity Commission estimates based on data for the 1998 cohort of LSAY.

H Economy-wide modelling of VET entitlement and language, literacy and numeracy policies

The Commission used the Monash Multi-Regional Forecasting (MMRF) model to estimate the economy-wide impacts of the Council of Australian Governments (COAG) Vocational Education and Training (VET) reforms, and of the Language, Literacy and Numeracy (LLN) policy initiatives. The MMRF model is a computable general equilibrium (CGE) model of the Australian economy, and has been used by the Commission and others to examine the impacts of public policy in Australia. The model treats each state and territory as a separate economy, and is especially well-suited to examining policies that have a state focus.

Section H.1 summarises some of the characteristics, structure and data contained in the MMRF model, and how they relate to the COAG initiatives. Section H.2 outlines the direct effects used as inputs to the model, with reference to materials contained elsewhere in this report. Section H.3 outlines and explains the key results, including economy-wide, regional and fiscal impacts. Section H.4 the sensitivity of the economy-wide results to assumptions about contestability, focussing in particular on the economic impacts resulting from policies targeting Victorian young learners. Results are reported for Victoria and Australia as a whole.

H.1 The MMRF model

The MMRF model is a multi-regional applied general equilibrium model developed by the Centre of Policy Studies (CoPS) at Monash University. It is a 'bottom-up' model, which includes a range of industries, commodities and labour types. The version of MMRF used by the Commission models the six States and two Territories as separate regions, recognising:

- 64 industries in each region
- eight region-specific labour markets, divided into nine occupations
- eight region-specific household sectors, which supply production factors, consume goods and services, and pay income and commodity taxes

- aggregate foreign demands for Australia's exports
- eight State and Territory Governments
- and the Australian Government.

The model contains explicit representations of intra-regional, inter-regional and international trade flows based on regional data developed at CoPS. It also includes detailed data on State, Territory and Australian Governments' budgets, consistent with the Government Financial Statistics (GFS). Second round effects are determined on the basis of the model's input-output linkages, assumptions about the economic behaviour of firms and households, and resource constraints. Important elements of the theoretical structure of the version of MMRF used in this project include the following:

- households change their consumption bundles in response to changes in their incomes and in relative prices
- producers adapt their output and their use of labour, capital and agricultural land in response to changes in the relative prices
- productivity improvements can be modelled as a reduction in the resource costs required per unit of output
- and demand for Australian exports responds to the export price of Australian products, and Australian exporters can accrue short-term rents in response to price changes.

The reference year in the MMRF database used for this study is 2005-06, updated to 2010-11. The database accounts for a range of state and territory and Australian government taxes, including income and payroll taxes, the GST, excise and other commodity taxes and tariffs.

The comparative static version of the model is used for this study to illustrate the long-run impacts. The dynamic version of the model is used to illustrate the adjustment path of output over time. The results are presented in terms of percentage changes relative to the base, and are best interpreted as how the economy would differ if the agents faced the environment reflected in the modelled shocks, rather than the ones reflected in the base.

H.2 Direct effects

The COAG reforms were modelled using several scenarios, based on the policies discussed in chapter 3. The direct impacts for each of the scenarios were taken from the analysis contained in appendices D, E and F.

The simulations examine:

1. the realised impacts from the introduction of the VET entitlement in Victoria (appendix D; appendix E)
2. the prospective impacts that could be expected as a result of the introduction of the VET entitlement in Victoria (appendix D; appendix E)
3. the prospective impacts that could be expected to result from reforms implemented in South Australia (appendix D; appendix E)
4. the realised impacts that flow from the *National Partnership Agreement on Productivity Places Program* (NPAPPP) across all states and territories (appendix D; appendix E)
5. the potential effects of reforms Australia-wide that could result if the COAG VET targets are reached (appendix D; appendix E)
6. the potential effects of Language, Literacy and Numeracy reforms (appendix F).

Each initiative is modelled as changes in occupational labour supply and employment, changes in labour productivity and increases in education-related government expenses.

The policies were estimated to result in increases in the number of workers by occupation (appendices D, E and F). For the CGE modelling, these increases in labour supply and employment were assumed to come from those currently not in the labour force, and the unemployed. Table H.1 summarises the labour supply and employment shocks.[1]

[1] Increases in labour supply brought about by the initiatives are assumed to reduce the rate of unemployment. This is a strong assumption about the labour market response to the shocks, and consequently the CGE results should be considered an upper bound on the possible benefits flowing from the initiatives.

Table H.1 **Modelled changes in labour supply and employment, by occupation**

Percentage change in persons relative to baseline[a]

	Victoria		*South Australia*	*NPAPPP*	*Australia*	
	Realised[b]	*Prospective*[c]	*Prospective*[d]	*Realised*[e]	*Potential*[f]	*LLN*
Managers	0.20	0.31	0.12	0.10	0.85	0.42
Professionals	0.10	0.32	0.16	0.00	1.00	0.56
Technicians and trades	0.33	0.21	0.63	0.12	0.79	0.31
Community and pers. service	1.12	1.94	1.15	0.14	0.89	0.80
Clerical and admin.	-0.36	-0.60	-0.16	0.18	0.73	0.92
Sales	-0.16	-0.25	0.17	0.26	0.98	0.66
Mach. operators and drivers	-0.33	-0.66	-0.71	0.16	0.97	0.23
Labourers	-0.48	-0.86	-0.67	0.15	0.94	0.42

[a] The changes detailed in this table are a result of combining the labour market effects for both young learners (appendix D) and mature learners (appendix E). Given that the base number of mature learners is (on average) 5 times the number of young learners, mature learners are given a larger weight towards the total change shown. [b] VET students commencing 2009–2011, begin to supply labour between 2010–2012. [c] VET students 2011–2012, begin to supply labour between 2012-2014. [d] VET students commencing 2012-2014, begin to supply labour between 2013–2016. [e] VET students commencing 2010–2012, begin to supply labour between 2011–2013. [f] VET students commencing 2013-2020, begin to supply labour between 2014–2020.

Source: Appendixes D, E and F.

The changes in productivity for different occupations reflect two effects. First, changes in education can affect individual productivity, with higher levels of education generally corresponding with higher individual productivity.. Second, changes in education can affect the probability of people working in different occupations. For example, an individual with a diploma as their highest qualification is less likely to work as a professional than someone with a degree. This means that a change in the composition of an occupation can change the average ability of the group of workers and affect their average productivity. For example, the shift of people from year 12 to certificates increases the average abilities of technicians and trades, explaining some of the estimated increase in the productivity of technicians and trades shown in table H.2.

Table H.2 **Modelled changes in productivity, by occupation**

Percentage changes relative to the baseline

	Victoria		*South Australia*	*NPAPPP*[a]	*Australia*[a]	
	Realised	*Prospective*	*Prospective*	*Realised*	*Potential*	*LLN*
Managers	-0.01	0.01	0.07	0.01	0.09	1.25
Professionals	0.00	-0.03	0.00	-0.01	0.46	0.38
Technicians and trades	0.04	0.05	0.04	0.07	0.63	0.62
Community and pers. service	-0.25	-0.43	-0.21	-0.15	-0.58	0.12
Clerical and admin.	0.19	0.38	0.13	0.11	0.51	0.71
Sales	0.11	0.23	0.04	0.10	0.45	1.27
Mach. operators and drivers	0.05	0.08	0.12	0.07	0.19	2.03
Labourers	0.05	0.08	0.12	0.06	0.17	0.89

[a] These shocks differ at the state level. The table presents the weighted, aggregate equivalent.

Source: Appendixes D, E and F.

The policies have costs to government in the form of increases in expenditure, shown in table H.3.

Table H.3 **Assumed cost to government of publicly funded completions**[a]

$ million cost per annum[b]

	Victoria		*South Australia*	*NPAPPP*	*Australia*
	Realised	*Prospective*	*Prospective*	*Realised*	*Potential*
NSW	0	0	0	123	0
VIC	329	329	0	0	0
QLD	0	0	0	142	0
SA	0	0	71	38	0
WA	0	0	0	122	0
TAS	0	0	0	3	0
NT	0	0	0	6	0
ACT	0	0	0	13	0
Australia	**329**	**329**	**71**	**478**	**2 877**

[a] Assumed cost of entitlement programs, excludes cost of literacy and numeracy programs. [b] See note a to table H.1 for relevant years.

Source: Productivity Commission estimates.

H.3 Results

Increasing labour supply and aggregate labour productivity across the economy generates long-run increases in gross state and domestic product (GSP and GDP) (table H.4). A large proportion of the economy-wide impacts can be explained by the changes in GDP that result from the direct effects (box H.1). Table H.4 shows the impact of the policies on GSP and GDP, and figure H.1 shows the timeframe over which the GDP increases occur.

Table H.4 **Impacts on real GSP and GDP**

Percentage changes from base

	Victoria		*South Australia*	*NPAPPP*	*Australia*	
	Realised	*Prospective*	*Prospective*	*Realised*	*Potential*	*LLN*
NSW	-0.02	-0.02	0.00	0.21	1.82	0.53
VIC	0.25	0.29	0.00	0.20	1.36	0.62
QLD	-0.06	-0.06	0.00	0.23	1.69	0.79
SA	-0.05	-0.05	0.23	0.12	1.69	0.79
WA	-0.09	-0.09	0.00	0.15	1.79	1.05
TAS	0.01	0.02	0.00	0.05	2.09	0.84
NT	-0.04	-0.04	0.00	0.17	2.16	0.68
ACT	0.01	0.01	0.00	0.23	1.47	0.11
Australia	**0.03**	**0.04**	**0.01**	**0.20**	**1.67**	**0.68**

Source: Productivity Commission estimates.

Box H.1 Contribution of the direct effects to the economy-wide results

CGE models are used to estimate the macro-economic impacts of the direct effects of policy, as well as the flow-on effects resulting from inter-industry linkages, changes in relative prices, and trade flows.

A large proportion of the impact of policy is explained by the direct effects alone. A useful way of demonstrating this, is through the use of *back of the envelope* (BOTE) calculations. A BOTE calculation estimates the direct effects of a policy by multiplying the percentage change in model inputs by the appropriate values and shares from the database underlying the CGE model. For example, the direct effect on GDP resulting from a labour market policy could be estimated by multiplying the percentage change in employment by the initial value of labour income. This type of calculation is most useful when a policy does not target one particular industry, but instead causes relatively uniform changes across the economy.

The COAG VET reforms primarily cause expansions in aggregate labour supply, employment and productivity. To the extent that the occupational mix is relatively similar across industries, these changes are unlikely to benefit one industry over another, and are well-suited to BOTE calculations. As shown in the table below, approximately 90 per cent of the aggregate, economy-wide impact of the COAG VET reforms can be explained by the direct effects.

Table 1 Change in GDP — BOTE calculation compared to model results[a]

Percentage change from base

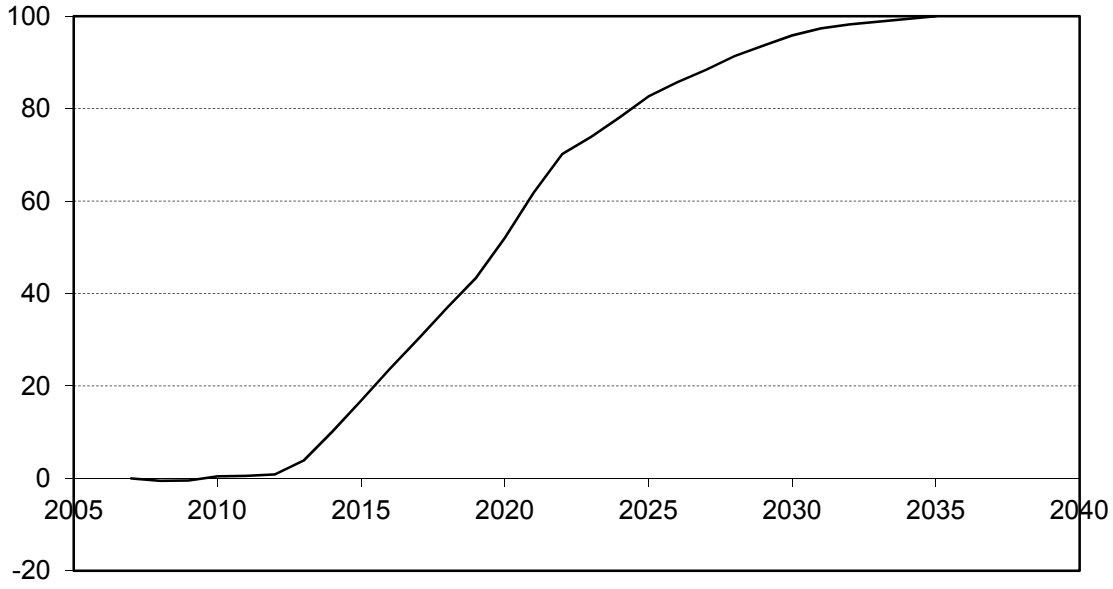
	BOTE result	*Modelled result*
Victoria — realised	0.02	0.03
Victoria — prospective	0.04	0.04
South Australia — realised	0.01	0.01
NPAPPP	0.18	0.20
Australia — Potential	1.53	1.67
Australia — LLN	0.62	0.68

a Change in labour supply multiplied by gross labour income, plus percentage change in productivity multiplied by the value of labour output, assuming other factors move in fixed proportions to output at current prices.

Source: Productivity Commission estimates.

Figure H.1 **Timescale over which impacts are estimated to occur, 2007-08 to 2035-36[a]**

Per cent of increase in real GDP



a Dynamic simulation results of the impact of the VET and LLN reforms assessed, including setup and transition costs and benefits. Assumes that all of the prospective and potential impacts are realised.

Data source: Productivity Commission estimates

Increasing the supply of labour places downward pressure on the real wage and expands output. As the labour supply expands above that modelled in the baseline, wages fall relative to the baseline to balance labour demand and supply. As cheaper labour is taken up by firms, the cost of output falls, increasing the quantity of domestic output demanded.

As more people complete higher VET qualifications, the increase in supply of skilled labour relative to less skilled labour increases productivity in the economy. Workers previously employed in lower value added occupations move to higher value added occupations, increasing the marginal product of the average worker. This causes a decline in the labour cost per unit of output, further increasing the demand for domestic production, and increasing the real wage.

Table H.5 shows the net impact on the real wage by jurisdiction. Table H.6 decomposes the total impact on the real wage as a result of the VET entitlement policies into contributions from:

- the real wage decrease resulting from the modelled increase in labour supply
- the real wage increase that results from the modelled productivity improvements.

Table H.5 **Regional impacts on real wages**

Percentage changes from base

	Victoria		*South Australia*	*NPAPPP*	*Australia*	
	Realised	*Prospective*	*Prospective*	*Realised*	*Potential*	*LLN*
NSW	0.006	0.003	-0.005	0.018	0.325	-0.216
VIC	0.018	0.024	-0.006	0.022	0.257	-0.214
QLD	0.007	0.010	-0.005	0.014	0.461	-0.205
SA	0.008	0.009	0.020	0.020	0.659	-0.196
WA	0.006	0.004	-0.006	-0.015	0.263	-0.213
TAS	0.003	0.008	-0.004	0.009	0.712	-0.165
NT	-0.010	-0.024	-0.013	-0.051	-0.063	-0.283
ACT	0.002	-0.018	-0.010	-0.024	-0.162	-0.330
Australia	**0.009**	**0.009**	**-0.004**	**0.012**	**0.347**	**-0.214**

Source: Productivity Commission estimates.

Table H.6 **Decomposition of the impact on real wage**

Percentage change from base

	Additional labour supply	*Productivity improvement*	*Total effect*
Victoria — realised	-0.002	0.011	0.009
Victoria — prospective	-0.002	0.011	0.009
South Australia — realised	-0.007	0.003	-0.004
NPAPPP	-0.006	0.018	0.012
Australia — Potential	0.224	0.123	0.347
LLN	**-0.216**	**0.002**	**-0.214**

Source: Productivity Commission estimates.

In the long run, the VET initiatives have a positive impact on government balances. While the programs increase government education-related expenses, these costs are more than offset by increases in tax revenues, and decreases in other expenses. The increase in output and real wages cause large increases in tax collections, as well as increases in other forms of government revenues. The increased participation and employment reduce welfare payments such as unemployment benefits. The fiscal impacts of the initiatives are shown in tables H.7, H.8 and H.9.

Table H.7 Estimates of the realised and prospective longer-run government revenue implications of the VET reforms assessed

$ million (2010-11 dollars), real government spending assumed fixed

Item	*State, Territory & Local Government*	*Australian Government*	*Total*
Operating revenues (excluding GST receipts)	248	756	1 003
GST receipts (net of GST-tied payments)[a]	99	0	99
Total operating revenues	347	756	1 103
Operating expenses (excluding GST-tied grant payments)	-293	-120	-413
Operating balance (*net* government revenue)	640	876	1 516

[a] GST receipts and GST tied payments sum to zero.

Source: Productivity Commission estimates.

Table H.8 Estimates of the potential longer-run government revenue implications of the VET reforms assessed

$ million (2010-11 dollars), real government spending assumed fixed

Item	*State, Territory & Local Government*	*Australian Government*	*Total*
Operating revenues (excluding GST receipts)	1 541	4 614	6 155
GST receipts (net of GST-tied payments)	593	0	593
Total operating revenues	2 134	4 614	6 747
Operating expenses (excluding GST-tied grant payments)	-1 778	-446	-2 225
Operating balance (*net* government revenue)	3 912	5 060	8 972

Source: Productivity Commission estimates.

Table H.9 **Estimates of the potential longer-run government revenue implications of the LLN reforms**

$ million (2010-11 dollars), real government spending assumed fixed

Item	*State, Territory & Local Government*	*Australian Government*	*Total*
Operating revenues (excluding GST receipts)	477	1 271	1 747
GST receipts (net of GST-tied payments)	182	0	182
Total operating revenues	659	1 271	1 929
Operating expenses (excluding GST-tied grant payments)	-514	-780	-1 294
Operating balance (*net* government revenue)	1 173	2 051	3 223

Source: Productivity Commission estimates.

H.4 Contestability

Contestability has the potential to either increase or decrease the economy-wide benefits that would flow from the VET entitlement policies by improving or reducing the quality of VET outcomes. The quality changes are represented by an arbitrary 5 per cent smaller or larger employment and wage premium associated with the VET qualifications. As in appendix D, the scenarios are compared to the Victorian young learners higher qualification scenario.

Appendix D (box D.3) goes through the logic and policy implications of contestability in greater detail.

Tables H.10 and H.11 summarise the labour supply and productivity shocks used to test the impact of contestability on the economy-wide results.

Table H.10 **Modelled changes in labour supply, by occupation**

Percentage changes in persons relative to baseline, realised Victorian young learners scenario

	Outcome premiums		
	Smaller	*Central*	*Larger*
Managers	-0.82	0.20	2.09
Professionals	2.10	0.10	0.22
Technicians and trades	-5.04	0.33	5.95
Community and pers. service	-10.99	1.12	15.76
Clerical and admin.	2.96	-0.36	-6.83
Sales	0.43	-0.16	-2.84
Labourers	-0.22	-0.33	-1.13

Source: Productivity Commission estimates.

Table H.11 **Modelled changes in productivity, by occupation**

Percentage changes relative to the baseline, realised Victorian young learners scenario

	Outcome premiums		
	Smaller	*Central*	*Larger*
Managers	0.29	-0.01	-0.01
Professionals	0.20	0.00	0.09
Technicians and trades	-1.33	0.04	1.45
Community and pers. service	0.51	-0.25	-1.12
Clerical and admin.	-0.54	0.19	1.53
Sales	-0.41	0.11	0.81
Mach. operators and drivers	-1.62	0.05	2.19
Labourers	-1.46	0.05	2.08

Source: Productivity Commission estimates.

If contestability results in quality degradation, reflected in a 5 per cent discount on the outcomes of VET, GSP and GDP are projected to contract. Conversely, if quality is improved by contestability, as reflected by an additional 5 per cent premium, then GSP and GDP increases exceed those for the central case. GSP and GDP results are shown in table H.12. Table H.13 shows the fiscal implications of the alternative contestability assumptions.

Table H.12 **Impacts on GSP and GDP**

Percentage changes from base, realised Victorian young learners

	Outcome premiums		
	Smaller	*Central*	*Larger*
NSW	-0.01	-0.02	-0.06
VIC	-0.82	0.29	1.71
QLD	-0.26	-0.06	0.23
SA	-0.17	-0.05	0.16
WA	-0.35	-0.09	0.37
TAS	-0.28	0.02	0.43
NT	-0.20	-0.04	0.20
ACT	-0.11	0.01	0.15
Australia	**-0.31**	**0.04**	**0.51**

Source: Productivity Commission estimates.

Table H.13 **Estimates of the potential longer-run government revenue implications of the VET reforms assessed**

$ million (2010-11 dollars), real government spending assumed fixed, realised Victorian young learners

	Outcome premiums					
	Smaller		*Central*		*Larger*	
Item	*State, Territory & Local Gov't*	*Australian Gov't*	*State, Territory & Local Gov't*	*Australian Gov't*	*State, Territory & Local Gov't*	*Australian Gov't*
Operating revenues (excluding GST receipts)	-200	-367	-10	96	407	1075
GST receipts (net of GST-tied payments)	-83	0	13	0	166	0
Total operating revenues	-283	-367	3	96	573	1075
Operating expenses (excluding GST-tied grant payments)	54	-66	-2	17	-562	14
Operating balance (*net* government revenue)	**-337**	**-301**	**5**	**79**	**1135**	**1062**

Source: Productivity Commission estimates.

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