THE ECONOMIC BENEFIT OF INCREASED PARTICIPATION IN EDUCATION AND TRAINING

A Report by
Access Economics Pty Ltd

ISBN 0 9750250 6

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May 2005
ISBN

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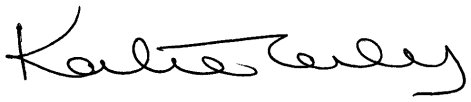
FOREWORD

For most of us the desire to see more young people actively engaged in education, training and in the workforce is seen as a self-evidently 'good thing' for them and for our society. However, good policy requires evidence and the government expenditures required to back good policy demand sound financial reasons.

This report, *The Economic Benefit of Increased Participation in Education and Training*, by Access Economics has been jointly commissioned by the BCA and DSF to test the merits of the economic case for increased policy emphasis on youth participation in education, training and employment specifically in relation to the Government's own work on inter-generational issues. It provides further analysis and modeling of the information used in the *Treasury Working Paper: A Note on Educational Attainment and Labour Force Participation in Australia* and *The Intergenerational Report 2002-03*.

We believe it is a timely and important piece of work making a compelling economic case for renewed effort in securing all young people a place in the economic life of our nation.



Katie Lahey
CEO, Business Council of Australia

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

- Australia has a problem. The ageing of the baby boomers will eat into economic growth, particularly through the years of maximum retirement from 2015-2030. And, in combination with relative health cost inflation, ageing will have an even larger impact on the Federal Budget deficit.

- These points are made at length in Federal Treasury's 2002 *Intergenerational Report* and the Productivity Commission's 2002 *Economic Implications* of an Ageing Australia.

- As a result, Federal Treasury has been urging faster productivity growth and higher levels of participation, as the resultant increase in the size of the economy would directly address many of the risks associated with slowing growth and rising deficits – a larger pie will reduce the competition over the slices from it as Australia ages.

- That point has been hammered home by the Treasury Secretary Ken Henry in several speeches including, for example in August 2004, *Policy Strategies for Future Growth*.

- Treasury researchers are also now making the point that one way to increase both productivity and participation is to have a higher skilled workforce. Productivity rises due to increased skills, and participation rises as those increased skills lead to higher wages, a reduced likelihood of unemployment and (typically) better working conditions.

- These points have been made by Kennedy and Hedley of Treasury in a 2003 Working Paper, Gruen and Garbutt in a 2004 paper and Davis and Ewing in a 2005 paper. For example, Kennedy and Hedley note (at page 15) that: "For both males and females, those who had not completed year 12 schooling had noticeably lower participation rates than those who had completed year 12."

This report joins the above dots. It introduces the stock of education into the production function of the economy in a simple intergenerational model, and then models the impact of increasing retention in education and training for young Australians.

BUILDING ON PAST WORK

The Dusseldorp Skills Forum with the Business Council of Australia have already examined the potential benefit of increasing retention in education and training for young Australians.

A 2002 report by Applied Economics clearly identified the extent of the problem of dropping out, and undertook a cost-benefit analysis of reducing the number of drop outs.

The focus of the Applied Economics report was on direct costs and benefits. Subsequent analysis by the Allen Consulting Group and Monash University's Centre of Policy Studies (CoPS) extended that to indirect costs and benefits. It estimated that the national economic pie would be 0.28 % larger in 2020. Interpolating from Exhibits 2 and 3 of that report, the benefits to GDP might be greater than 0.8% by 2040, the cut-off date for the analysis here.

This report builds on the existing analysis in three ways:

- *First,* we use a dynamic cohort model for population, the economy and the Federal Budget. This approach is analogous to the intergenerational modelling work being done by Treasury, with the difference that the stock of education is incorporated as an endogenous part of the production function. So, unlike the earlier work in this field, the model used is specifically designed to deal with demographic/intergenerational effects.

- *Second,* this work also allows for the dynamic participation benefits in later life from increased education that the recent Treasury work has been stressing. Accordingly, the results (in terms of the impact on GDP) are larger than those in the earlier work. (As noted below, the GDP impact estimated here in 2040 is 1.1%.)

- *Third,* the CoPS analysis assumed a balanced Australian Government Budget, so that the costs of the policy were offset by shifts in taxes. The work here not only allows for demographic and relative health cost influences to affect the Budget balance, but also for the policy at issue (raising retention) to affect the Budget.

WHAT IS THE IMPACT ON THE SIZE OF THE ECONOMY?

> In each of the three reports – the two earlier reports and this one – there is a ramping up in retention eventually accounting for an additional 50,000 students a year. Start dates differ (but only because time has marched on in the interim) and end-dates (in the sense of the final year modelled) also differ.

This report sets out the implications of this lift in retention rates. Chapter 7 and the Appendix describe the model used and the results achieved. In brief, an increase in 50,000 students [1] retained in school or apprenticeships is equivalent to an eventual increase in average years of education/training of close to 0.2 years.

But because modelling here only goes out to 2040, the increase in the average years of education/training in the workforce only reaches 0.15 years rather than the full 0.2 years.

- The addition of 0.15 years raises average years of education/training in the total workforce, meaning that the average stock of formal education/training in the economy rises by 1.1% by 2040. In turn, higher participation in education and training (and the resultant impact on the 'stock' of education) leads productivity to increase by 0.62%

- And, as noted above, a more highly skilled workforce will have higher rates of participation. By 2040 the boost to participation in education and training is sufficient to raise participation by 0.48%.

The combination of the boost to both productivity and participation therefore leads to a lift in the overall size of the economic pie – GDP – of 1.10% by 2040.

[1] Note the addition of 50,000 students in the modelling matches that in earlier work for the DSF aimed at lifting equivalent retention rates to 90 percent. Although ABS catalogue 4221.0 indicates that 2003-04 Australian retention rates from Year 7/8 through to Year 12 are around 75.4 percent, Applied Economics estimated a real retention rate of about 80 percent, by including those early school leavers who subsequently go on to complete Year 12 or its vocational equivalent. See Applied Economics (2002a, 21) Note the benefits from increased participation in education and training are essentially linear – a larger boost to education and training inputs would produce an equivalently larger impact on GDP.

WHAT IS THE IMPACT ON THE FEDERAL BUDGET?

So the size of the economic pie is 1.10% higher in 2040. The Federal Government's share of that cake is just over 23% – or about 0.27% of GDP.

That is the increase in its revenue. On the spending side, the increase in education spending is about 0.05% of GDP. [2]

If those are the only two effects – a bigger pie boosting revenue of 0.27% of GDP, and the increased education spend adding 0.05% of GDP to spending, then the fiscal balance would improve by 0.22% of GDP in 2040 (that calculation compares the difference in Budget balances as a ratio of GDP in the base case).

Alternatively, other areas of Federal spending could also increase. For example, pensions are linked to wages, and will therefore rise as a result of the increased productivity. There are many other direct linkages in Federal Budget spending, and indirect pressures are also likely to rise for increased spending in response to a larger economic pie.

So the second scenario considered here allows for this social dividend to be paid. As a result, the improvement in the Budget balance to GDP is just 0.04 percentage points – rather less than the 0.22 percentage points noted above. However, this second scenario has other benefits – it says that the higher average incomes arising from a more skilled Australia lead to a social dividend paid to many Australians *as well* as a reduced Budget deficit gap.

- This 'two scenario' approach to modelling the benefits to the Budget – with and without a social dividend – is the same approach currently adopted by Federal Treasury (see, for example, the Gruen and Garbutt paper). The Intergenerational Report itself implicitly uses a one scenario 'social dividend' approach. That is, when living standards rise as a result of increased retention in education and training, the government redistributes a part of the resultant revenue gains to the wider community.

> The key issue is the size of the boost to Federal revenues as a result of the increased participation in education and training. The latter weighs in at 0.27% of GDP by 2040 – a hefty boost from a relatively small policy change when measured against the yardstick of the 5% deficit on primary balance by 2041-42 pointed to by the 2002 *Intergenerational Report*.
>
> The Government (or more broadly, Australians) then have the choice to either use all of that to reduce the impending deficit, or to hand some of it back as increased public sector spending on services (the 'social dividend' we note above).

[2] That estimate is obtained direct from the model used here, but is also consistent with the earlier work done by Applied Economics, 2002a – see table S.2.

THE BOTTOM LINE

Australia faces slower economic growth and a sharp worsening in its Budget balances in response to a quantity challenge and a price challenge: a quantity challenge from the ageing of the Australian population, and a price challenge from relatively rapid health cost inflation.

Federal Treasury has noted that:

- *First*, much of the answer to this considerable challenge will lie in boosting productivity and rising participation and
- *Second*, those with higher skills have both higher productivity and higher participation.

This study therefore fleshes out the analysis begun by Treasury in this area (in particular by Gruen and Garbutt), and applies it to increasing retention in education and training for young Australians. The latter adds 50,000 to the number of young Australians participating in school or apprenticeships by 2010.

The resultant impact is surprisingly large for the cost of a relatively small increase in outlays – even assuming the latter fall completely to the Australian Government (rather than being split across Federal and State jurisdictions).

With education outlays rising by 0.05% of GDP, that is ultimately sufficient (in the first scenario considered here) to ease the worsening of the primary Federal fiscal deficit by 0.22% of GDP. That is the equivalent of 4% of the total gap identified in Federal Treasury's 2002 *Intergenerational Report* in the Federal Budget in 2040.

And the impact on the size of the economy is also notable – **with GDP some 1.1% higher in 2040, the equivalent of close to $500 a year per Australian in today's money**. Interpolating from Exhibits 2 and 3 of the Allen Consulting Group's work for the BCA, it is likely that the matching estimate from that work implies an increase in GDP by 2040 of over 0.8%. The difference between that result and this paper is attributable to this modelling also allowing for a longer term participation channel, recognising that more highly skilled workers participate for longer and at higher rates in the workforce.

1 THE TERMS OF REFERENCE FOR THIS REPORT

The Business Council of Australia (BCA) and the Dusseldorp Skills Forum (DSF) commissioned Access Economics to undertake analysis and modelling of the information used in the Treasury Working Paper: *A Note on Educational Attainment and Labour Force Participation in Australia and the Intergenerational Report 2002-03*.

We modelled the impact of increasing retention in education and training for young Australians on projected deficits in the *Intergenerational Report 2002-03* (Treasury, 2002) addressing:

- the correlation between levels of educational attainment and labour force participation in Australia;
- the longer term implications of this relationship in light of the *Intergenerational Report*;
- the impact of a rise in the level of Year 12 or equivalent levels of attainment (specifically a halving of those who fail to attain such levels) by year 2010 on the projected Intergenerational Report scenarios for 2040;
- the level of increased migration or increased participation of older workers required to provide the same impact; and

The modelling has been done using an equivalent approach and data sources as per the Treasury papers.

2 INTRODUCTION

Currently there are between 45,000 and 50,000 'early education exits' every year – young people who exit school early and do not go into some form of further education and training or sustainable employment. These young people are significantly more likely to become long term unemployed adults at later stages of their lives.

With the Australian economy facing the dual pressures of an ageing population and rising skill shortages, there are clear benefits in reducing the number of 'early education exits':

- The ageing of the baby boomers will eat into economic growth, particularly through the years of maximum retirement from 2015-2030. And, in combination with relative health cost inflation, ageing will have an even larger impact on the Federal Budget deficit.

- These points are made at length in Federal Treasury's 2002 *Intergenerational Report* and the Productivity Commission's 2004 *Economic Implications of an Ageing Australia.*

- As a result, Federal Treasury has been urging faster productivity growth and higher levels of participation, as the resultant increase in the size of the economy would directly address many of the risks associated with slowing growth and rising deficits.

- That point has been hammered home by the Treasury Secretary Ken Henry in several speeches including, for example, in August 2004, *Policy Strategies for Future Growth.*

- And Treasury researchers are now making the point that one way to increase both productivity and participation is to have a higher skilled workforce. Productivity rises due to increased skills, and participation rises as those increased skills lead to higher wages, a reduced likelihood of unemployment and (typically) better working conditions.

- These points have been made in the Treasury Working Paper 2003-03 *A Note on Educational Attainment and Labour Force Participation in Australia* by Steven Kennedy and David Hedley which provides an overview of the different labour market behaviours of people with different skill attributes. Kennedy and Hedley note (at p 15) that: "for both males and females, those who had not completed year 12 schooling had noticeably lower participation rates than those who had completed year 12." They highlight the challenges faced by the low skilled in the labour market. This Treasury Working Paper complements earlier work undertaken in the context of the *Intergenerational Report* of 2002.

The analysis presented here is designed to investigate the links between reducing the number of early school exits and increased economic prosperity. By examining the growing economic literature on the effects of higher skills in the workforce, and modelling the impact of higher productivity and participation on the economy as a whole, the potential contribution of early school leavers can now be measured in full.

3 BUILDING ON PAST WORK IN THIS AREA

The Dusseldorp Skills Forum and the Business Council have already examined the potential benefit to Australia of increasing retention in education and training for young Australians.

A 2002 report by Applied Economics clearly identified the extent of the problem of dropping out, and undertook a cost-benefit analysis of reducing the number of drop outs. That work showed that early school leavers represent a significant untapped economic resource. By increasing rates of retention in education and training for young Australians between 2004 and 2010, the report estimated benefits of around $8.2 billion in net present value terms (at a 5% discount rate) could be achieved.

The focus of the Applied Economics report was on direct costs and benefits. Subsequent analysis by the Allen Consulting Group and Monash University's Centre of Policy Studies (CoPS) extended that analysis of increasing rates of retention in education and training for young Australians by covering a series of indirect costs and benefits as well. The latter report used the CoPS Monash model to estimate the impact of a permanent increase in retention. This picked up the dynamic path of employment effects (for example, lower while people studied), as well as a number of Australian Government Budget impacts. The report estimated that the impact on GDP of the policy is that the national economic pie is 0.28% larger in 2020. The report then extrapolated the trend gains out further to estimate that, by 2050, consumption would increase by more than 1% (implying that GDP would do the same). An examination of Exhibits 2 and 3 in the Allen Consulting Group report suggests that, as of 2040 (the cut-off date for the analysis here), consumption would increase by more than 0.8% (implying that GDP would do the same).

This report builds on the existing analysis in three ways:

- *First*, we use a dynamic cohort model for population, the economy and the Federal Budget. This approach is therefore analogous to the intergenerational modelling work being done by Treasury, with the difference that it incorporates the stock of education as an endogenous part of the production function. So, unlike the earlier work in this field, the model used is specifically designed to deal with demographic and related intergenerational effects.

- *Second*, this work also allows for the dynamic participation benefits in later life from increased education that the recent Treasury work has been stressing. Accordingly, the results (in terms of the impact on GDP) are larger than those in the earlier work. (As noted below, the GDP impact estimated is 1.1% in 2040.)

- *Third*, the CoPS analysis assumes a balanced Australian Government Budget, so that the costs and benefits to the Budget of the policy were offset by shifts in taxes. The work here not only allows for demographic and relative health cost influences to affect the Budget balance, but also for the policy at issue (raising retention) to affect the Budget.

In each of the three reports there is a ramping up in retention eventually accounting for an additional 50,000 students a year. Start dates differ (but only because time has marched on in the interim) and end-dates (in the sense of the final year modelled) also differ.

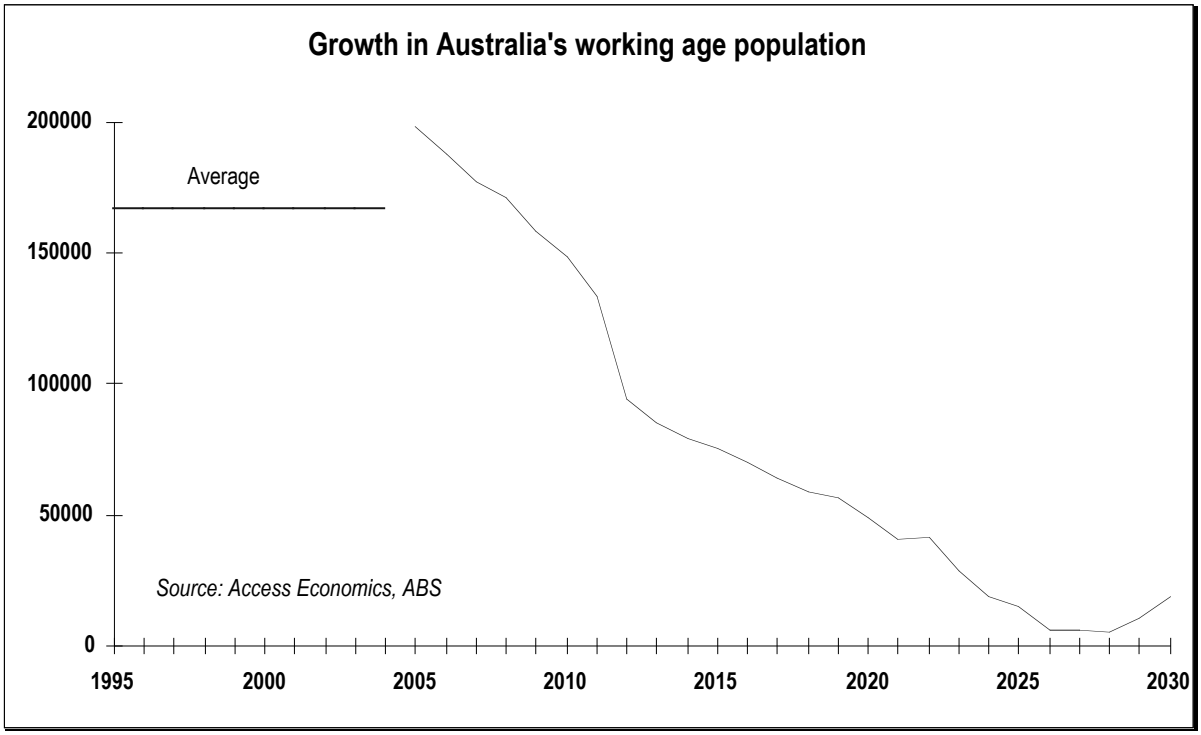
4 KEY CHALLENGES IN LIGHT OF THE *INTERGENERATIONAL REPORT*

Every nation has a compact with itself, taxing its workers to pay for subsidies to its young and its old. But in May 2002 the Australian Government's *Intergenerational Report* (IGR) noted that Australia's intergenerational compact with itself was at risk in coming decades:

- **First from a quantity challenge:** Australia's ageing population means there will be a big increase in numbers of the aged relative to numbers of workers, and a notable fall off in growth of those traditionally seen as being 'of working age' – see Figure 1.

- **And second from a price challenge:** As the Australian Government heavily subsidises health spending for the aged in particular, the fact that the cost of delivering health care tends to rise over time relative to other costs in the economy means an additional strain.

FIGURE 1: THE DEMOGRAPHIC CHALLENGE



So the *Intergenerational Report* told Australians that, for this nation's intergenerational compact with itself to be sustained, then either tax rates on workers will have to rise, or subsidy rates to the young and the old will have to fall – or some mix of those two.

The *Intergenerational Report* said that, in the absence of action, then by 2041-42 Australia's intergenerational compact with itself would be in primary deficit ('primary' means abstracting from interest payments) to the tune of 5% of national output each year – over $40 billion a year in today's money. However, that is a public sector deficit figure – not an estimate of lost output. The bigger picture figure is the impact on national output of ageing. By 2041-42, the figuring in the *Intergenerational Report* implies a reduction in annual national output (compared with where it would otherwise be in the absence of ageing) of 13%.

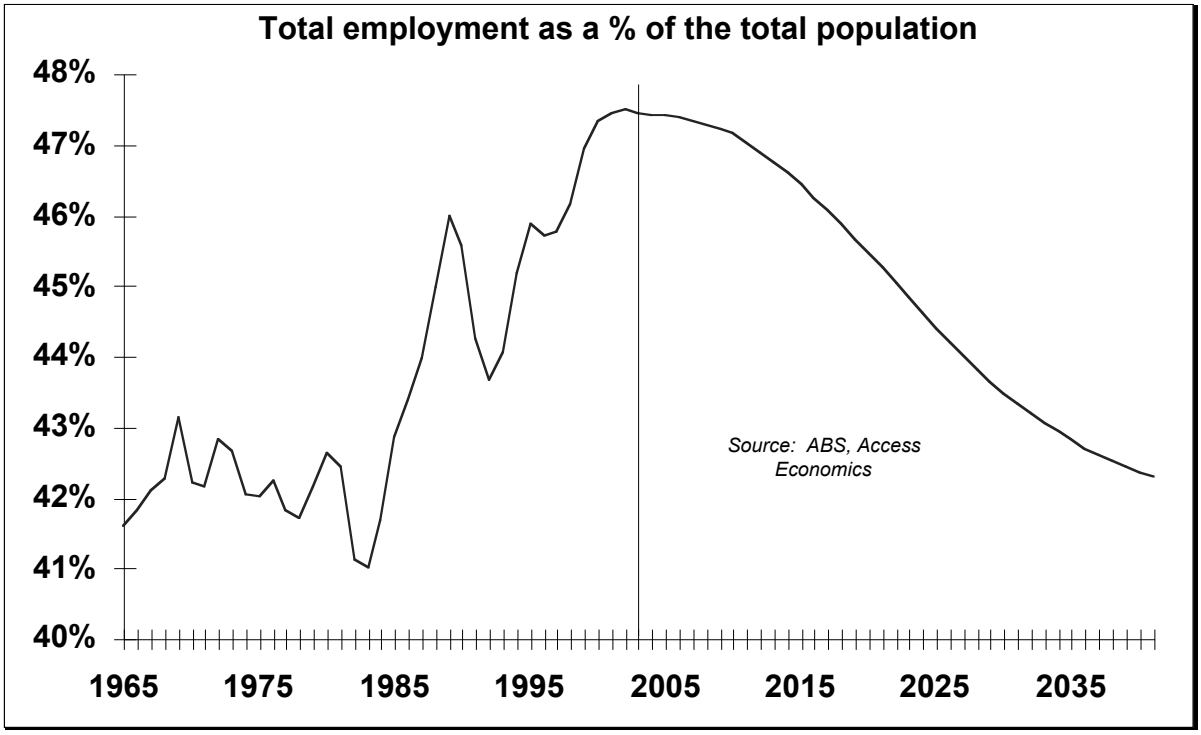
5 THE '3 PS' – A RECIPE FOR FUTURE GROWTH

Alternatively, and using the analytic approach adopted in this field by Treasury, Australia's economic growth prospects in coming decades can be summarised in terms of 'the 3 Ps':

- **Population** – Those aged 15+.
- **Participation** – The proportion of that population pool who are available to work.
- **Productivity** – How productive each worker is.

The challenges put forward by an ageing population relate mainly to the **participation** component to that equation. As a larger share of Australia's adult population move into retirement, the overall ratio of employment to population is set to fall (see Figure 2).

FIGURE 2: THE SLIPPERY SLOPE



Note that the fall in this ratio, which is closely linked to the participation rate (the difference is that the above figure removes the unemployed, and allows for those aged under 15), explains the reduction in annual national output (compared with where it would otherwise be in the absence of ageing) by 2041-42 of 13% noted above.

Declining birth rates over recent decades also present challenges on the **population** front. Fewer young workers will be entering the workforce over coming decades to replace the growing number of retirees.

Australia's working age population usually grows by an average of around 166,000 people every year. But trends already in place will see the working age population grow by just 190,000 for the entire decade of the 2020s – a tenth of the current pace.

With challenges ahead in two of the '3 Ps', it is clear that productivity growth remains a central component of growth in the Australian economy in coming decades. Many comments from the Federal Treasury on adjusting to Australia's ageing trends have focused on the need to lift productivity growth over the longer term.

But the '3 Ps' framework is not only useful for examining coming economic challenges. It also points to the nature of possible improvements to Australia's longer term growth outlook.

Policies which boost any of these three factors will increase future growth, and counter the demographic trends which threaten future prosperity and the Federal Budget balance.

Much of the discussion presented here relates directly to these three key growth drivers – population, participation and productivity.

5.1 THE COST OF DROPPING OUT TO THE '3PS'

Each year in Australia around 86,000 teenagers leave school without completing 12 years of education. Of these, around 50,000 never complete 12 years of schooling or equivalent vocational training.

Without the skills gained through education and training, these young people face significant challenges in the workforce. Early school leavers receive lower wages than their more skilled counterparts, are less likely to participate in the labour force, and are much more likely to experience periods of unemployment – particularly in their younger years.

In recent years, much work has been done to quantify the costs to both individuals and society associated with early exit from education and training. In 2002, Applied Economics undertook a cost-benefit analysis of reducing the number of young people who drop out.

That work showed that early school leavers represent a significant untapped resource. By halving the number of early leavers between 2004 and 2010, it was estimated that benefits of around $8.2 billion in net present value terms could be gained.[3]

Leaving aside the social costs of dropping out (which can include increased crime and poorer health outcomes), there are a number of costs to the economy, including:

- Lower levels of productivity.
- Increased unemployment.
- Lower participation rates as low skilled workers opt out of the labour force.

As pressures on economic resources, particularly the availability of skilled labour, increase in coming decades, it is crucial that the economic potential represented by early school leavers is not wasted.

[3] The interest in the linkage between skill levels and participation post-dated the analysis by Applied Economics. It therefore did not take account the potential participation effects from increased education. Costs of early school leaving are higher once these effects are included. See Applied Economics, 2002a.

6 THE LINKS BETWEEN EDUCATION AND WORK

6.1 WHAT THE THEORY SAYS

The '3Ps' framework discussed above noted that national output was a function of population, participation and productivity.

It is however possible to look behind those proximate drivers to note that three factors determine a nation's economic potential:

- First is the quantity and quality of **natural endowments** such as mining, farming, fishing and forestry resources.
- Second is the quantity and quality of **physical capital** such as buildings, infrastructure, machinery and software.
- Taken together, these first two factors affect productivity.
- Third, and most important, is the quantity and, especially **quality, of the labour force** (affecting both participation and productivity).

The quality of the labour force is determined by competencies and skills of the workforce.

As Alan Greenspan recently noted:

> *"Over the past half-century, the increase in the value of raw materials has accounted for only a fraction of the overall growth of US gross domestic product. The rest of that growth reflects the embodiment of ideas in products and services that consumers value. This shift of emphasis from physical material to ideas as the core of value creation appears to have accelerated in recent decades. Ideas are at the centre of productivity growth."*

Higher levels of education provide an economic payoff for the nation and for individuals.

For the **economy** as a whole more education means more skilled workers, which means:

- **Higher productivity**. Workers with more education bring a higher level of skills to the workplace.
- **Higher participation**. Workers with higher skill levels are more likely to work, and also tend to work for longer by choosing to delay retirement.
- **Higher employment**. Workers with more education are more employable and enjoy lower unemployment rates.

There is a clear and well-established relationship between education levels and levels of productivity.

Economists have also begun to emphasise the second and almost as well-established linkage – that those with higher levels of education also have higher rates of workforce participation, both during working age and as they approach traditional retirement age.

For **society**, higher levels of education also mean higher average incomes. That in turn means even faster growth in income tax collections because of our progressive income tax system (which applies higher average tax rates to higher earnings).

Those increased taxes may be spent for the benefit of everyone.

These increased tax collections – which can then be redistributed to everyone by the government – are perhaps the most direct economic channel by which society benefits from having a more educated workforce.

6.1.1 THE DIRECT EFFECT OF EDUCATION ON PRODUCTIVITY

Education is increasingly becoming the 'engine room' of modern economies. If we get this part of the economy right, most other things ought to fall into place (or be better placed), because increased investment in education boosts both productivity and participation.

Education has a direct effect on the level of productivity in the economy (and therefore output growth) because it increases the productivity of individuals. A more educated worker is a more productive worker, and investment in education provides a pool of more skilled labour.

Individuals benefit from investing in higher skills because they can command higher earnings in the labour market.

FIGURE 3: EDUCATION DELIVERS HIGHER PAY TO AUSTRALIANS

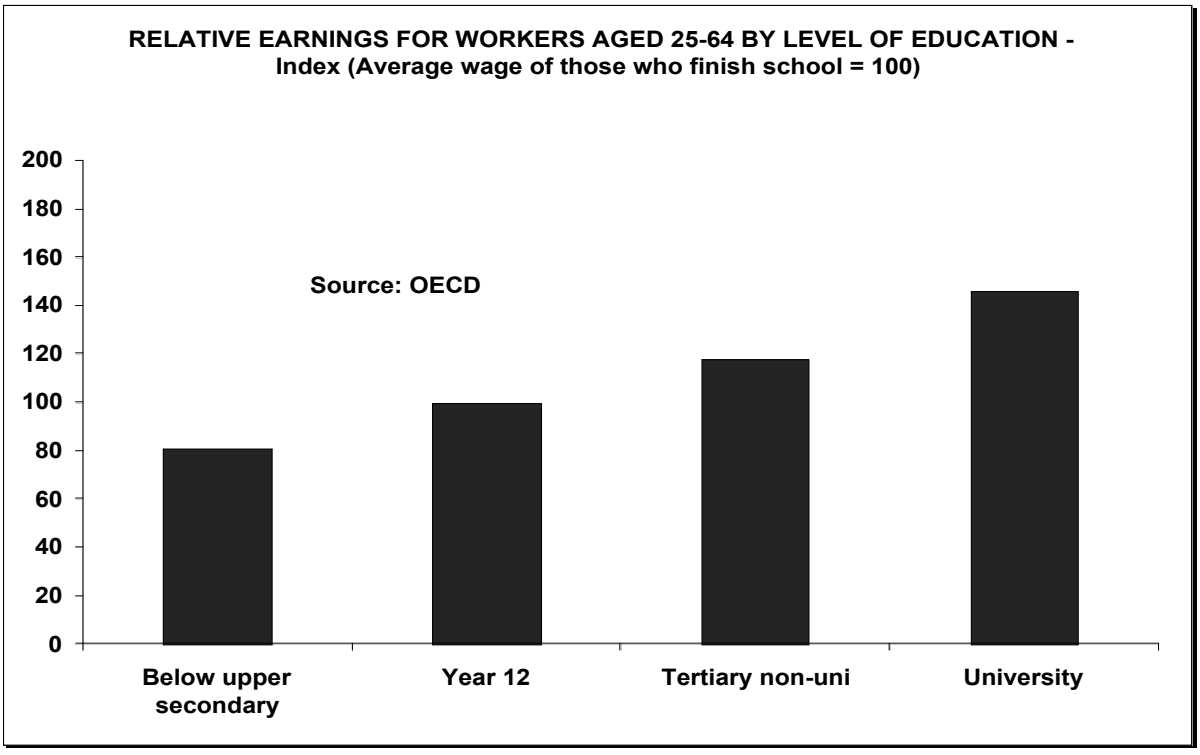


Figure 3 compares the relative earnings of workers with different levels of education.

- The index is compiled on the basis that those who completed year 12 are assumed to have an average wage of 100.
- Lesser skilled workers have relatively lower average wages. Those who had not completed Year 12 earned (in 1999) almost 20% less than those who had.

- Higher skilled workers have relatively higher average wages. University educated workers earned 40% more than those who completed Year 12, and 75% more than the least educated.

Research has attempted to measure the effect of education on productivity in two broad ways.

The first looks at relative wages across skill levels, and attempts to estimate the 'private return to education' via the increased wages received by workers who have undertaken an additional year of schooling.

- Figure 3 provides evidence of the strength of the results.
- Aschenfelter and Krueger (1993) undertook a study of wage data for a sample of twins in the US. They found that an additional year of schooling resulted in increased wages of between 12% and 16%.
- An Australian study (Miller, Mulvey and Martin (1995), using similar twins data collected in the 1980s) found a wage increment from an additional year of schooling of around 7.5%. This study ignores the effects of schooling on wages within occupations, instead focusing on the effect of education on wages through the impact on the occupation of the individual.

The second method of estimating the return to schooling looks at levels of education and income across countries.

- As with all cross-country studies, the strength of any conclusions is limited by the availability of comparable data.
- Research by Bassanini and Scarpetta of the OECD indicates that an extra year of schooling eventually – by the time the whole workforce has benefited from it – raises GDP by around 6%.
- This approach has not (as yet) incorporated the further refinement of adjusting for cross-country differences in schooling quality. Note that this figure combines the productivity and participation channels of higher education levels.

6.1.2 THE POSSIBLE EFFECT OF EDUCATION ON PRODUCTIVITY GROWTH

In addition, some researchers argue that a more skilled workforce is more able to adapt to new technologies in the workplace. This argument puts forth the idea that not only does education increase the *level* of productivity in the economy, it also has an effect on the *growth* of productivity over time[4].

Research into this 'catch up' phenomenon has produced some interesting results by comparing countries over time, but is yet to produce solid evidence for developed countries.

It is perhaps too early to tell whether productivity growth is improved over and above the direct increase in worker productivity, but to the extent that there are positive 'spillovers' from education, there is potential for an increase in broad productivity growth.

The modelling here has therefore allowed for a linkage between education levels and productivity levels, but not between education levels and productivity growth.

[4] This is a strand of the literature on 'endogenous growth' economic models which attempts to identify the forces underlying multifactor productivity growth rather than applying the traditional assumption of an 'exogenous' parameter.

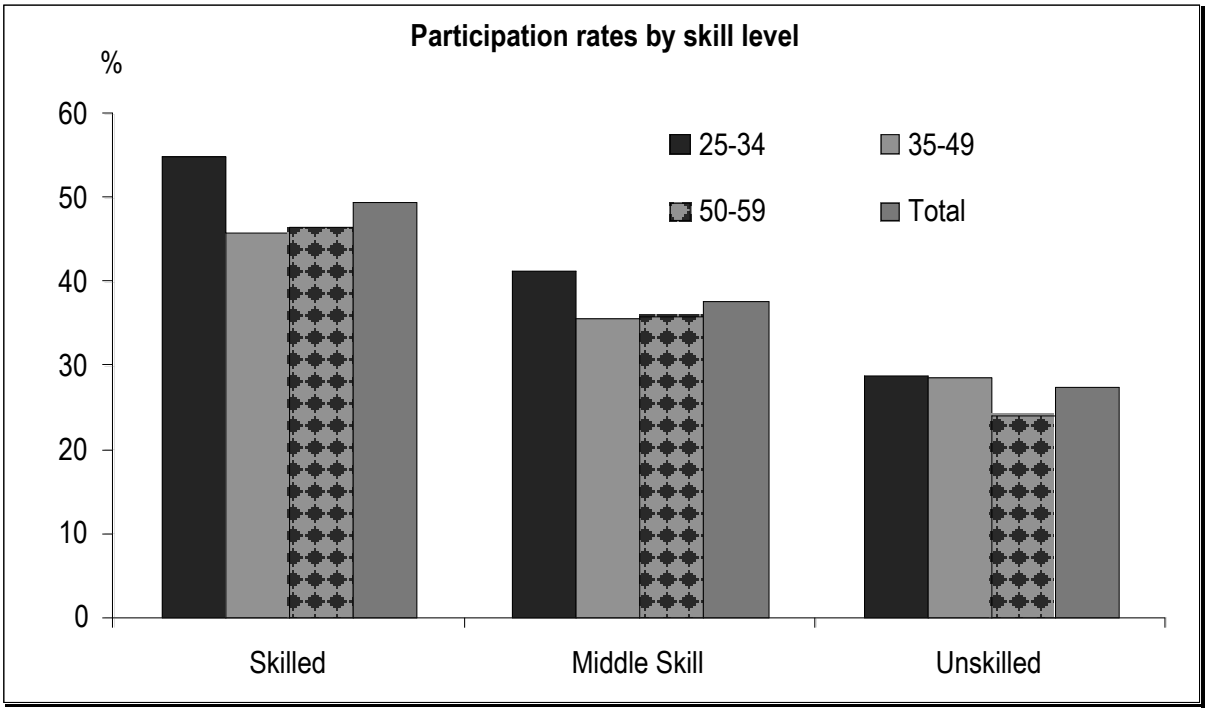
6.1.3 THE EFFECT OF EDUCATION ON PARTICIPATION RATES

Higher education increases the wage an individual can command, giving them a stronger incentive to work, and reduces their likelihood of any spells in unemployment.

To the extent that higher skilled jobs tend to be less 'back breaking' and more interesting, it also means that older higher skilled workers are more likely to be willing and able to maintain a connection with the workforce than less skilled workers.

While detailed data on the effects of a small increase in education on the length of working life are not available, there is ample evidence that increased educational attainment results in increased labour force participation – see Figure 4.

FIGURE 4: AUSTRALIAN PARTICIPATION RATES RISE WITH SKILL LEVELS



*Where Skilled represents a bachelor degree or higher, and unskilled no qualification

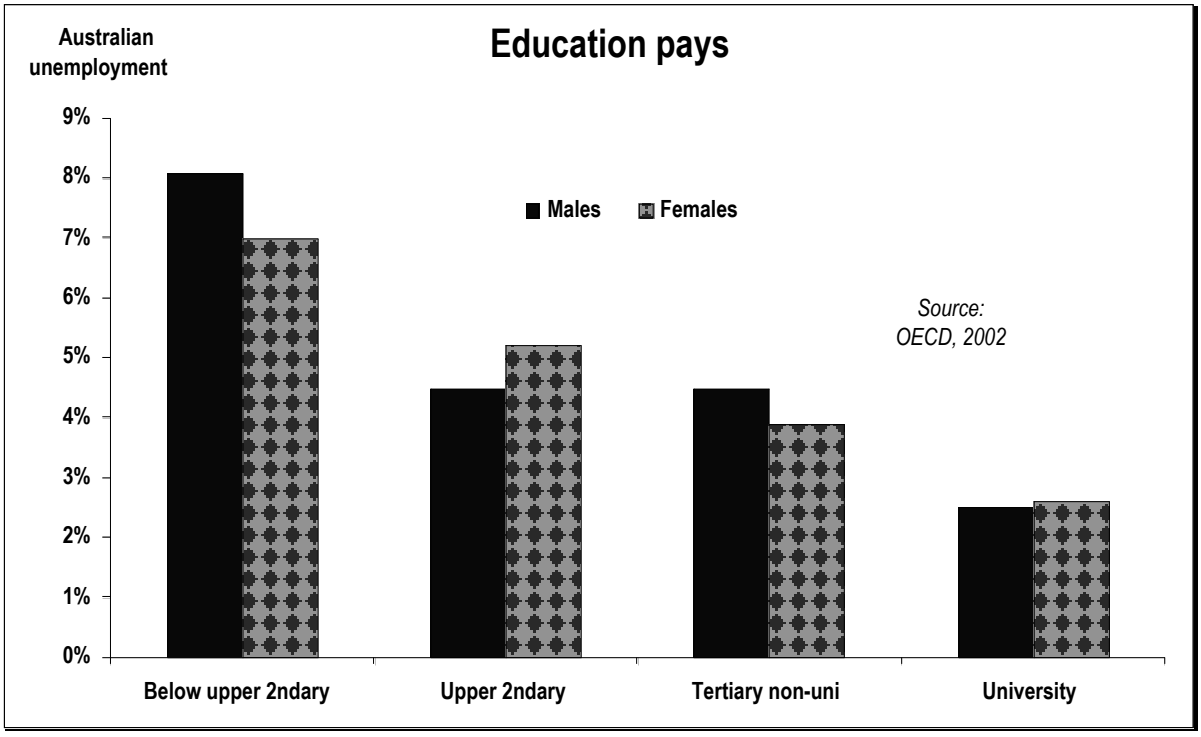
6.1.4 THE EFFECT OF EDUCATION ON UNEMPLOYMENT

Higher rates of education also reduce the likelihood of unemployment because the unemployment rate declines as education levels rise – see Figure 5.

- Economic growth inevitably involves a degree of disruptive change – capital and labour is made redundant in some industries at the same time that other industries are experiencing capital and labour shortages.
- Higher levels of education allow displaced workers to more easily pick up the threads of their career and take advantage of new opportunities.
- Less educated workers have greater difficulty in demonstrating the skills that would allow them to quickly find another job.

- In Australia, the chances of being unemployed are three times greater for those who have not completed Year 12 compared to those who have completed a university degree.

FIGURE 5: AND EDUCATION DELIVERS JOBS IN AUSTRALIA



6.2 MEETING THE IGR CHALLENGE – THE ROLE OF EDUCATION

Given the evidence that education can improve both the overall level of productivity and of participation in the long term, the possibilities for increasing retention rates (to Year 12 or its apprenticeship equivalent) are clearly relevant to softening the blow from an ageing population.

If declining birth rates and an ageing population means a drop in the quantity of young workers entering the labour force, increasing the level of year 12 attainment (or its apprenticeship equivalent) represents an increase in the quality of those workers that can help to offset the relative decline in quantity growth.

Increasing average levels of education therefore has the potential to boost two of the '3 Ps' mentioned above:

- by boosting overall **productivity**, and
- by cushioning the impending decline in average **participation** rates.

Increasing retention in education and training represents a chance to take advantage of resources that are currently not being used to their full potential. **While much of the policy debate in recent years has focused on maximising the contribution of older workers to the economy, providing for an improvement in the quality of future workers is also an opportunity to increase future prosperity.**

As younger workers become more scarce, and the need for a wide range of skills more pressing, a skilled flow of new workforce entrants will become crucial to future growth. Providing 12 years of education and training to as many of these new workers as possible will provide a solid foundation, and improve the effectiveness of other long term policies aimed at increasing Australia's economic prosperity.

Education is a prime channel through which to invest economic resources now to improve the growth prospects of the Australian economy over coming decades. As the Federal Government's *Intergenerational Report* pointed out, when ageing challenges begin to weigh on the economy, there will be many pressing spending priorities. That argues for investing in future growth now, before government finances and private pockets become too stressed.

The good news is that the potential payoff from increasing retention in education and training for young Australians could come at the right time for Australia, ramping up to help boost growth in the decades where the greatest ageing challenges lie.

7 MODELLING INCREASED RETENTION IN EDUCATION AND TRAINING

7.1 ACCESS ECONOMICS' MODELLING

7.1.1 AN ECONOMY WIDE APPROACH

In modelling the effects of a lift in retention in education and training (achieved by the year 2010), Access Economics has constructed a model designed to track changes in productivity and participation through time. This approach has a number of advantages, including:

- A capacity to account for second-round participation effects as more educated workers remain in the workforce for longer.
- A clear identification of the timing of costs and benefits to the economy from increased participation in education by the young.
- The ability to track the transition of more educated cohorts into the workforce.
- Results and data sources which are comparable with the Treasury's *Intergenerational Report*, and a growing body of work on Australia's future ageing challenges.

In addition to standard intergenerational modelling techniques, we have introduced the stock of education into the production function of the economy. This results in a model where productivity and participation rates – and hence economic growth – are endogenous (rather than assumed and imposed).

In addition to tracking the impact of education on the economy as a whole, this model projects the likely effects on the Australian Government's Budget bottom line. This allows us to examine how far increased education and training could go towards filling the coming fiscal gap identified by the *Intergenerational Report.*

In practice, the fiscal costs of increased education and training would be met by both Federal and State jurisdictions. In the modelling here, all the costs are ascribed to the Federal Budget. Each year these costs are factored up by projected education price inflation, and by the number of students in the system. When the retention rate changes, so does the cost to the Australian Government, allowing the model to project the impact of the changes to retention rates on the Federal fiscal balance over time.

7.1.2 A TOP DOWN APPROACH

As noted above, the literature on the benefits of education is divided into two main groups:

- **'Bottom-up'** approaches use data on individual incomes to measure the benefits of increased education to the economy.
- In contrast, a **'top-down'** approach looks at evidence at the economy wide level, and relates policy changes to changes in key macroeconomic variables.

The modelling presented here falls into the latter category. Taking evidence from the OECD and other research, we have constructed parameters for use in estimating the economy wide effects of increased retention in education and training.

In terms of the '3 Ps':

- The model assumes a modest **productivity** gain of 4% per person per year of education on average. This is a conservative figure, given that many studies show higher productivity gains.

- Participation rates increase by 6% (not 6 percentage points) over the long term for workers aged 25 and above, but fall 2% for 15-25 year olds. This reflects both the long term participation effects of education, and its nature as an investment in the younger years of life. These assumptions are also consistent with OECD work in this area.

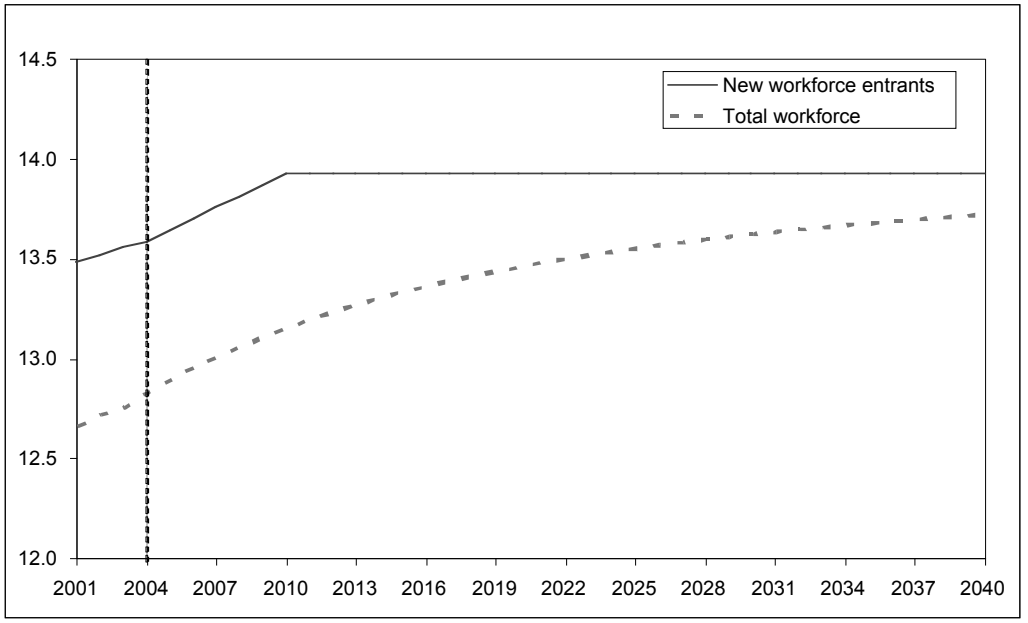
The 'everyman interpretation' of the modelling results on the economy

While the modelling that underlies the results in the following section is complex, it is possible to view the impact of increased retention in a more intuitive way. With that in mind, it is worth considering a few simple rules of thumb.

The modelling here matches the profile for participants in education programs given in the 2002 Applied Economics report for the DSF, but with a two year delay (given the passing of time since that report was completed). That is, there are an additional 10,000 participants in 2006, rising steadily to 50,000 by 2010. If each of those participants receives 2 extra years of education/training, the average increase is 0.2 years.

Of course the benefits of this boost to participation in education and training take decades to mature in full, as the extra education is only received by new workers, and it takes decades for these young Australians to work their way through the workforce, replacing those before them with lower average education levels. Average years of schooling are rising anyway (see Figure 6), but the impact of this change to retention rates after some 30 years (that is, by the year 2040) is that average years of schooling will have risen by around 0.15 years.

FIGURE 6: YEARS OF SCHOOLING, NEW AND EXISTING WORKERS



That 0.15 year increase in the stock of education has two effects. The first is on **productivity**.

Relative to a current average of 13.73 years of education and training per Australian, the additional 0.15 years represents a 1.1% increase in the stock of education over and above where it would be.

What is the impact of that extra education on Australia-wide productivity?

Think of the stock of human capital in the economy as having essentially two elements:

1. There are the mental and physical endowments of the labour force combined with on-the-job training. These factors influence the productivity of the workforce, but are not a direct product of the formal education system.

2. And there is the contribution made by formal education to raising skill levels.

The contribution of each of these two components to (total) human capital formation is unknown – but both components are likely to be important.

Assuming (for the sake of this 'everyman interpretation' of the results) that these two are of equal importance (we have no evidence that would contradict this assumption), then a 1.1% increase in formal training would result in an increase in GDP of around 0.55% arising as a result of higher productivity due to a better educated and more highly skilled workforce.

While the production function used in the modelling here does not make this 50/50 assumption, the actual result achieved is close, at around 0.62%.

With respect to **participation**, as noted above, a more highly skilled workforce will also have higher rates of participation. Across those of working age, there is roughly a 10 percentage point differential in participation rates between those with year 10 or year 12 qualifications and those who went on to get university degrees or other tertiary qualifications.

There is also a difference of, on average, about 4 years education between those two groups. That implies a second rule of thumb to help understand the results – that an extra 4 years of school generates an extra 10 percentage points or so on participation (or 12.5%, given average participation rates in these age cohorts).

(Note the rule of thumb for the impact of extra education derived here is based on the participation difference accruing between high school and tertiary education – which may have a larger or smaller proportional impact than the shock here.)

That observation implies that 4 years of education results in a 12.5% increase in participation, so that a 0.15 year increase in average length of education (as occurs here by 2040) is sufficient to boost participation by 0.46% – pretty much the same result actually generated in the modelling here (of 0.48%).

The combination of the boost to both productivity and participation therefore leads to a lift in the overall size of the economic pie – GDP – of 1.1% by 2040.

7.2 RESULTS FROM MODELLING INCREASED RETENTION

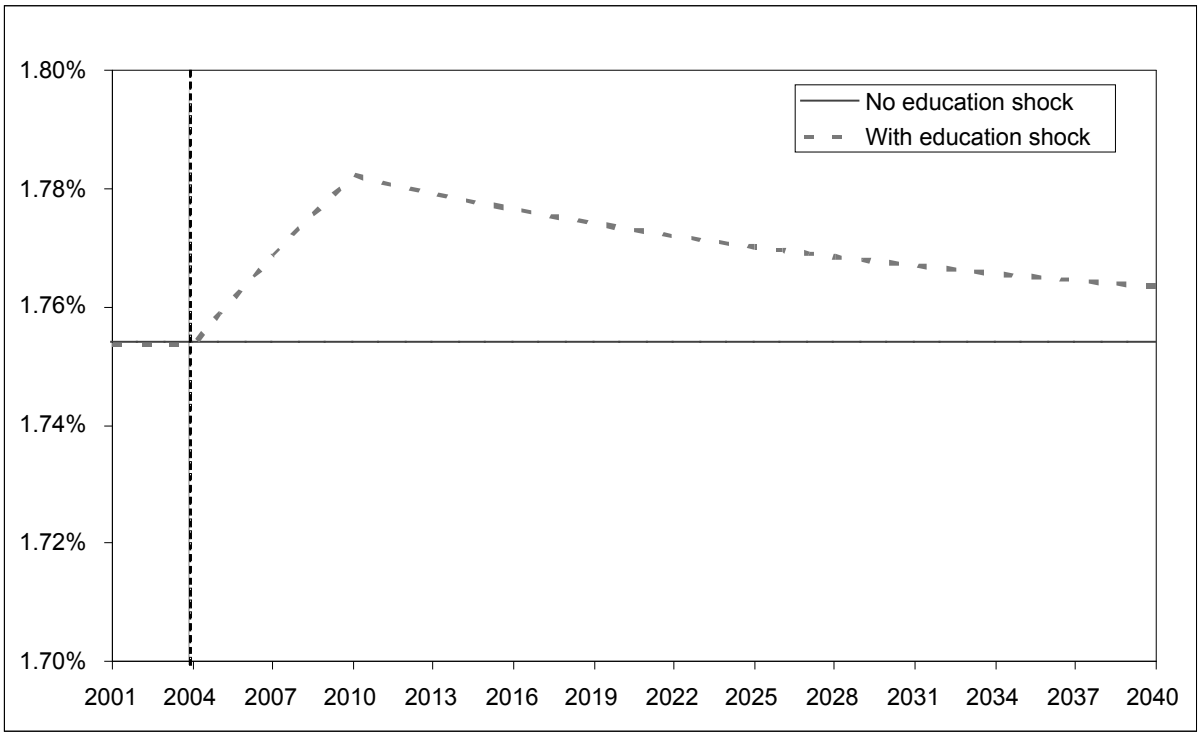
The scenario considered here is equivalent to that examined by both Applied Economics and the Allen Consulting Group in previous work undertaken for the BCA[5].

> In each of the three reports – the two earlier reports and this one – there is a ramping up in retention eventually accounting for an additional 50,000 students a year. Start dates differ (but only because time has marched on in the interim) and end-dates (in the sense of the final year modelled) also differ.

7.2.1 PRODUCTIVITY

As new workers enter the workforce with more years of education and training, productivity growth increases quickly (see Figure 7), but these growth benefits are then diluted over time as more and more of the overall workforce is made up of more skilled workers.

FIGURE 7: THE EFFECT ON ANNUAL PRODUCTIVITY GROWTH

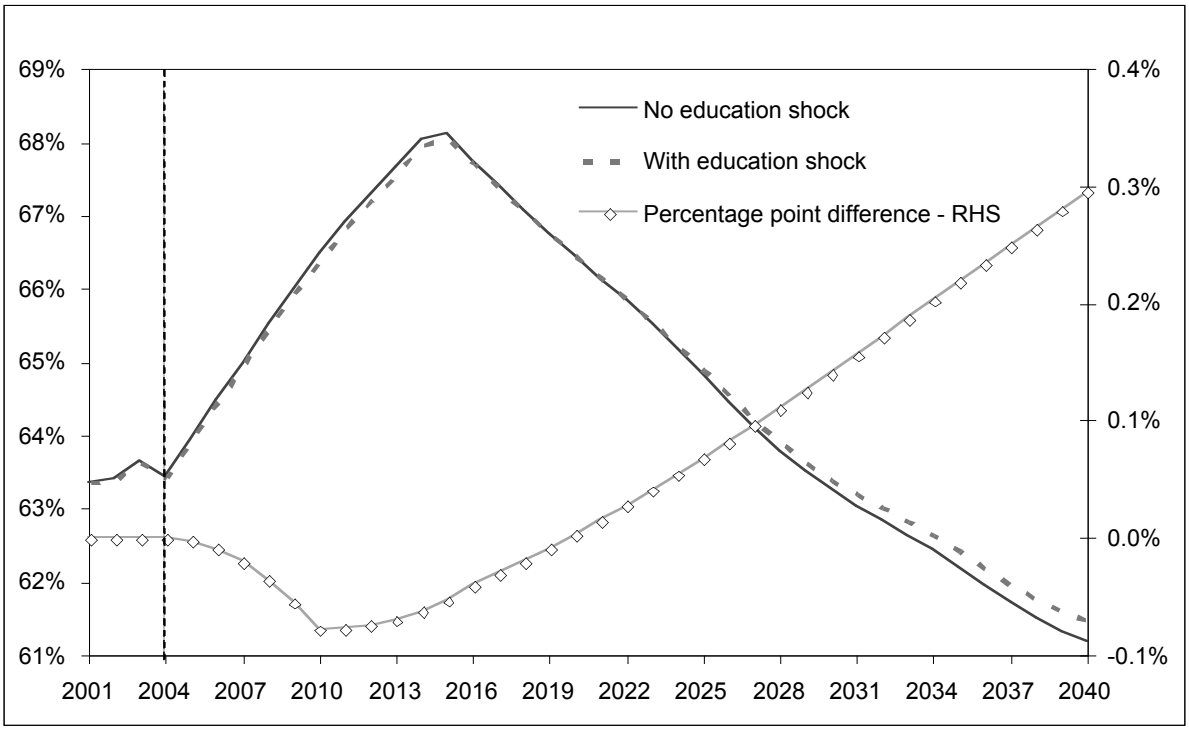


[5] See the Allen Consulting Group's *The economy-wide Benefits of Increasing the Proportion of Students Achieving Year 12 Equivalent Education*, 2003.

7.2.2 PARTICIPATION

Participation rates are affected in two ways:

FIGURE 8: CHANGES TO PARTICIPATION



- First, younger people are less likely to be in the labour force, as they are more likely to be gaining extra education/training.

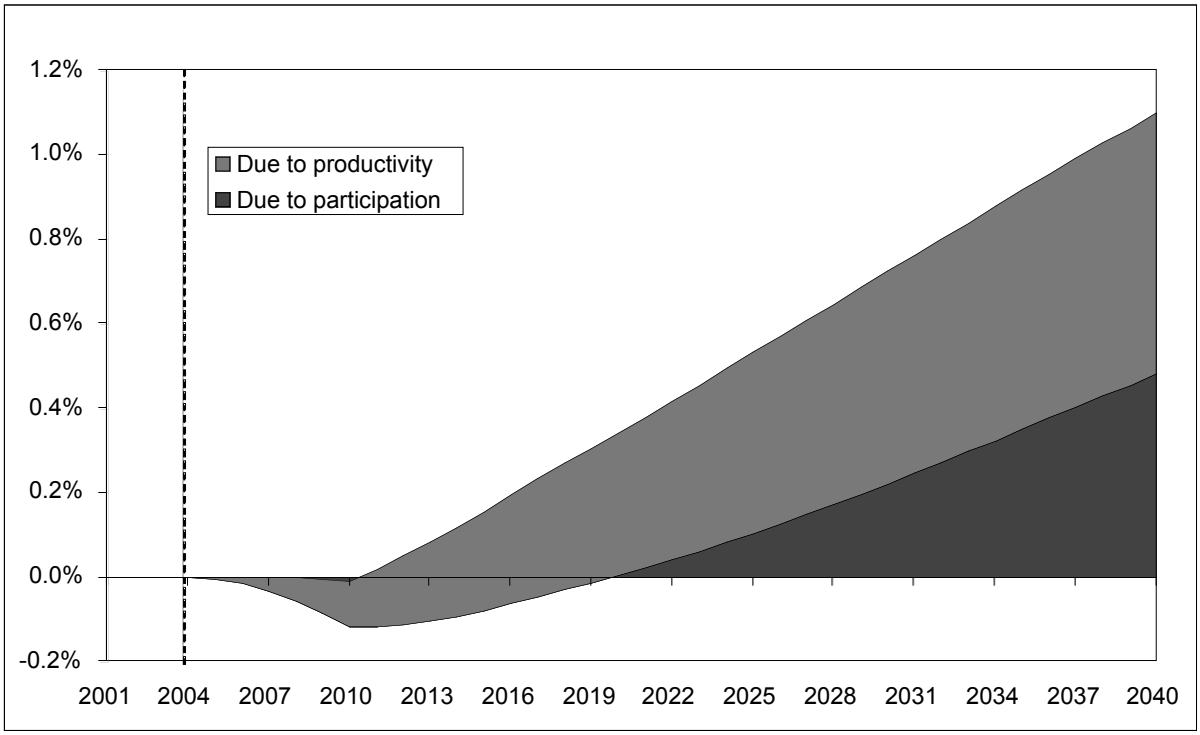
- Second, post-school age workers are more likely to participate, as they have more years of education/training behind them.

Figure 8 shows the net result of these two effects over time, with participation falling slightly in the early years of the change, but rising strongly through the 2020s and 2030s. Importantly, those are the decades when a particular boost to the economy is most needed, as they are the years in which boomer retirement will be most affecting GDP growth rates for the economy as a whole.

Overall, these two positives result in higher GDP growth over the projection period.

Figure 9 shows that both effects contribute to long term gains in GDP. It is important to note that these positive effects also continue beyond the projection period (before then levelling off), as less educated workers continue to be replaced.

FIGURE 9: THE EFFECT ON GDP



7.2.3 THE FEDERAL BUDGET

The Australian Government Budget sees three key developments as retention rates in education and training rise:

- First, there is increased spending as the additional students draw on additional education funding. In practice this would fall to both State and Federal jurisdictions. In the modelling here, the full cost is attributed to the Australian Government Budget.

- Second, there are increased revenues, as a more skilled workforce contributes to economic growth, raising more taxes.

- Third, other areas of Federal spending could also increase. For example, pensions are linked to wages, and will therefore rise as a result of the increased productivity. There are many other direct linkages to productivity in Federal Budget spending, and indirect pressures are also likely to rise for increased spending in response to a larger economic pie.

With these developments in mind, we have constructed two scenarios for the fiscal impact of the retention changes examined here.

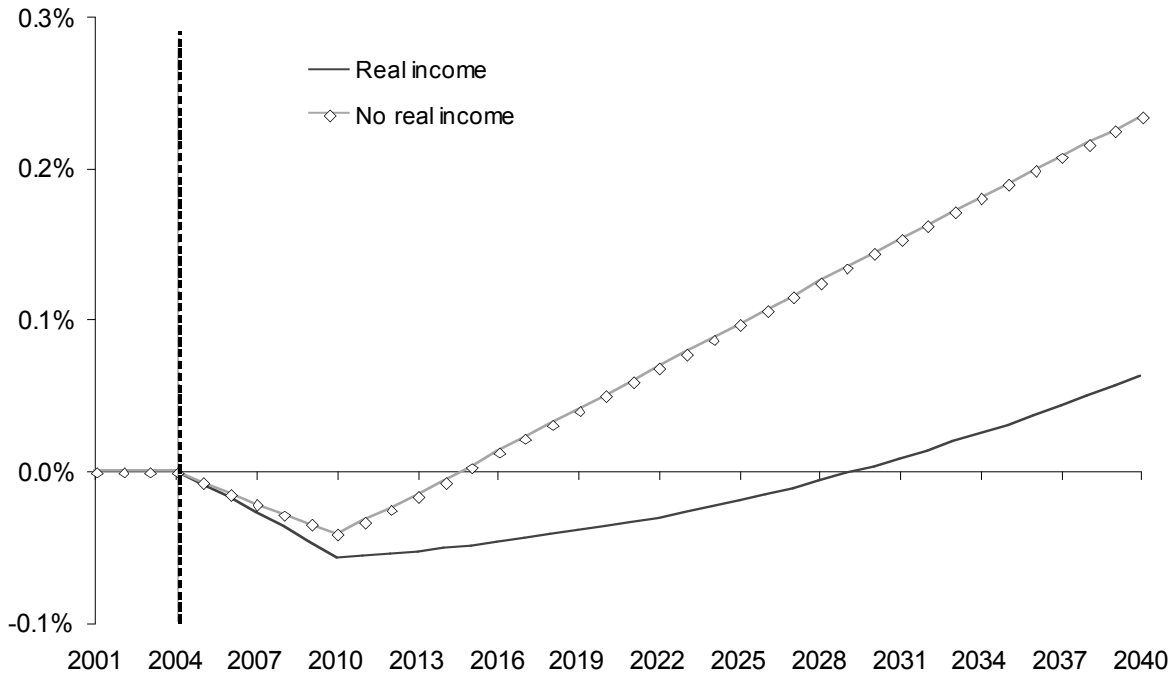
Allowing for two scenarios – one in which the Government passes back a proportion of the tax gains it makes as a social dividend through higher pensions and the like, and one where it does not – is fairly standard in these types of intergenerational analysis (see, for example, Gruen and Garbutt).

The first scenario, the 'no real income' case, assumes that spending pressures outside Federal education spending are unaffected by the change.

The second scenario considered here, the 'real income' case, assumes that all Federal spending will be subject to pressure to grow in line with GDP per head. This represents an increase in community expectations, as well as more spending on indexed items such as pensions. (The *Intergenerational Report* itself is implicitly equivalent to this approach.) The increased spending on government programs can be thought of as a 'social dividend'. That is, when living standards rise as a result of increased retention in education and training, the government redistributes a part of the resultant revenue gains to the wider community.

Figure 10 shows the Australian Government's primary fiscal balance under both of these scenarios. Under the real income scenario, the improvement in the Budget balance to GDP is just 0.04 percentage points – rather less than the 0.22 percentage points under the no real income case. However, this second scenario has other benefits – it says that the higher average incomes arising from a more skilled Australia lead to a social dividend paid to many Australians as *well* as a reduced Budget deficit gap.

FIGURE 10: CHANGE TO AUSTRALIAN GOVERNMENT'S PRIMARY FISCAL BALANCE TO GDP RATIO



The 'everyman interpretation' of the modelling results on the Budget

The size of the economic pie is 1.10% larger in 2040. The Federal Government's share of that larger cake is just over 23% – or about 0.27% of GDP. (That is the increase in its revenue.)

The increase in public sector education costs is about 0.05% of GDP (matching the equivalent cost in the Applied Economics report in Table S.2).

Allowing only for those two effects – a bigger pie boosting revenue by 0.27% of GDP, and the increased education spend adding 0.05% of GDP to spending, means that the primary fiscal balance would improve by around 0.22% of GDP by 2040.

8 THESE ECONOMIC BENEFITS IN CONTEXT – A COMPARISON WITH OTHER POLICIES

To understand the magnitude of the economic benefits offered by increased retention in education and training, it is worthwhile comparing these benefits with those of other proposed solutions to the ageing challenges ahead.

As we have seen, these challenges can be thought of in terms of the '3 Ps', because a larger economic pie can ease the competition over the size of the slices from it induced by ageing and relative health case cost inflation on the Australian Government Budget.

In this section, we look at two policies aimed at two of those key elements of the '3 Ps':

- First, an increase in migration flows, providing a direct boost to the pool of potential workers in the economy. Such a policy represents an attempt to lift future growth through a direct increase in the working age **population**. This can be thought of as a 'quantity-driven' rather than 'quality-driven' increase in the size of the national economic pie.

- Second, a lift in mature age **participation rates**. Such a change would act as an offset to the coming retirement of the baby boomers.

To examine the effects of these two changes and compare them with increased retention in education and training, we have applied the same model used to create the results shown above. Policy settings within the model were adjusted to find the magnitude of change required to duplicate the effects of the retention scenario in the previous section.

Specifically we ask:

- what increase in migration levels would deliver equivalent economic benefits to the modelled increase in retention; and

- what lift in participation rates of older workers (those aged 55-64 years) would be required to deliver the modelled benefits of education attainment levels?

8.1 INCREASED MIGRATION

With declining birth rates, net migration is becoming an important channel for overall population growth. Indeed, it already accounts for about half Australia's population growth. In the context of the ageing challenges in coming decades, migration represents an opportunity to increase the absolute growth in the working age population.

Compared with the resident population, relatively more migrants into Australia are of prime working age. That is important, since it has an immediate effect on the supply of labour, and because it eliminates the need for Australia's Federal Budget to subsidise the health and education needs of those migrant workers through their childhood.

In simulating the effects of additional migration, the scenario examined here assumes that migrants have the same skill levels as current Australian residents. That is, **it is conservatively assumed that more migrants make the Australian economy 'bigger' without necessarily making it 'better'.**

That is conservative because:

- As the focus of migration policy shifts, a larger emphasis is now placed on the skills of incoming migrants. In fact, recent migrant intakes have shown a higher average level of education than current Australian residents.

- Migration can also, by definition, be used to help plug areas of specific skills shortages in the economy over time, as well as help more firms and industries take greater advantage of economies of scale.

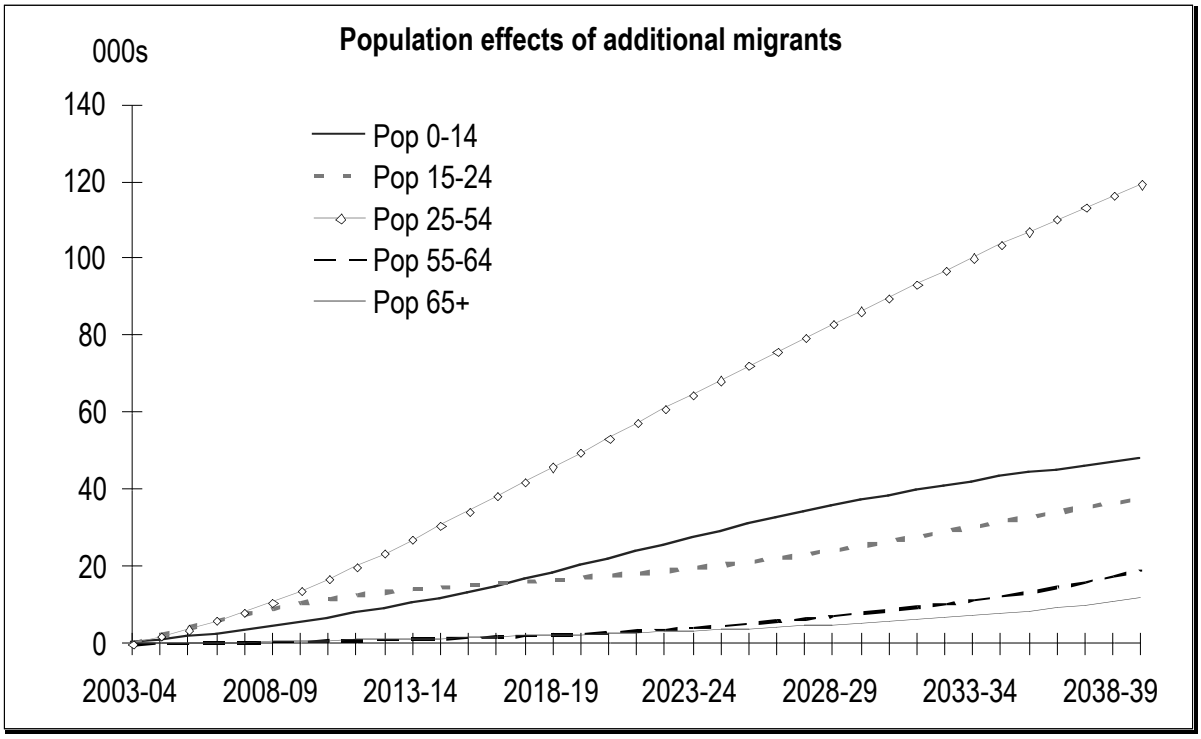
Within the model, migrants are assumed to have a constant age structure similar to that of the existing migrant intake.

Subject to these two assumptions, a simulation was created within the model to examine the level of increased migration needed to provide the same benefit over time as the increase in retention examined above.

To provide the equivalent impact on GDP in the year 2040 (an increase of 1.1%), the current migration intake would need to be increased by around 4,950 migrants a year. Compared to Australia's planned intake for 2004-05 of around 105,000, this represents a 4.7% increase.

Over the projection period, the additional flow of migrants totals 178,200, or 0.7% of Australia's total population in 2039-40. Figure 11 shows the cumulative effect of the extra migrants on population levels. Note that due to the age structure of the migrants, most effect only the working age population over the projection period – which is why an extra 0.7% of total population can generate an extra 1.1% of GDP.

FIGURE 11: POPULATION EFFECTS OF ADDITIONAL MIGRANTS



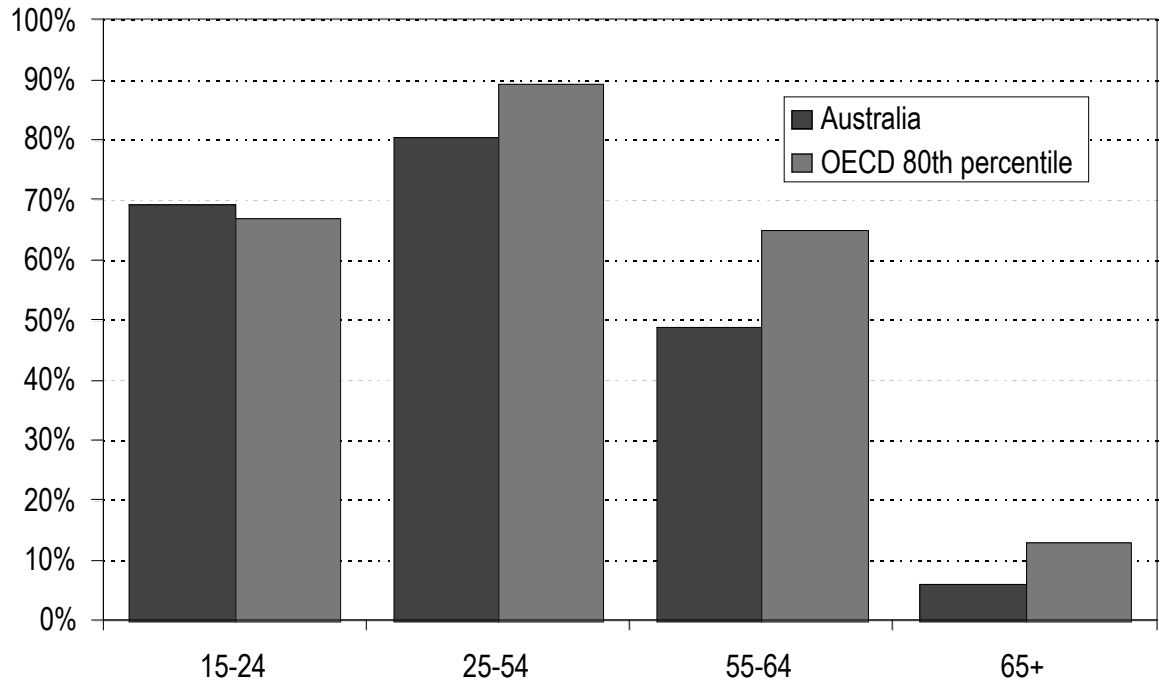
8.2 RAISED PARTICIPATION RATES FOR OLDER WORKERS

Participation is the element of the future growth equation facing the greatest challenges in coming decades. As more Australians enter their older years, it is sensible to consider opportunities for increasing the participation of mature age workers.

Under this scenario the only change relative to the baseline projections is an increase in the participation rate for 55-64 year olds.

In brief, and as Figure 12 shows, we lag 'OECD best practice' on participation at given ages.

FIGURE 12: WE LAG 'BEST PRACTICE' ON PARTICIPATION



To achieve the equivalent impact on GDP in the year 2040 arising from higher retention rates (an increase of 1.1%) would require workforce participation rate among those aged 55 to 64 to increase by 6.6 percentage points from 52.9% to 59.5%. As Figure 12 shows, that would still leave Australia shy of the '80th percentile' of OECD experience.

To conclude, the benefits from a modest rise in educational attainment are comparable to raising net migration rates or raising participation rates for older workers. Of course, the policy choice is not *between* these distinct policy actions. Each course of action may be separately pursued without undermining the expected benefits from the other policy choices.

That said, increased investment in the education of Australia's 15-19 year olds has a double benefit – it increases both the quality (productivity) as well as the quantity of workers. The other options assessed above boost only (or, depending on the assumptions, mainly) the quantity of workers.

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APPENDIX: THE MODEL

The model consists of a number of linked sections. These are outlined below:

POPULATION

Base population projections follow ABS Series B (mid-range) as published in ABS Catalogue No.3222.0. These have been adjusted to match the latest actual population results for 2003-04.

There are separate population estimates for persons aged 0-14, 15-24, 25-54, 55-64 and 65-plus.

There is an assumption that the population will not change due to higher or lower economic growth.

(In this instance that is mostly relevant in that it implies that higher female participation would not reduce birth rates. In practice there are linkages from skill levels to participation to birth rates, but the impacts are second order in terms of the final results here.)

EMPLOYMENT

Unemployment and participation rates are forecast for the 15-24, 25-54, 55-64 and 65-plus cohorts. These rates, combined with population in each cohort, imply an overall level of employment, unemployment and the labour force. The base case has constant participation by age group. The model can simulate the effects of different participation scenarios (for example, such as participation rates move towards the OECD 80th percentile figure where that is higher than Australia's current position).

The model has a built in linkage between retention rates and participation rates for 15-24 year olds. Participation rates are also affected in older age cohorts by changed skill levels – as in the scenarios examined in this report – although much of the latter effect occurs after the end of the scenario timeframe.

In the base case, age-specific unemployment rates trend down in line with Productivity Commission forecasts. The total unemployment rate is also suppressed by the changing age structure of the population (highest unemployment rates occurring at the education to work transition, and being very low for over 65s due to the alternative option of retirement).

PRODUCTIVITY

Productivity growth comes through three factors: capital deepening, multi-factor productivity and additional productivity growth caused by increasing education in the workforce.

The first two rates of productivity growth (capital deepening and multi-factor productivity) occur at exogenous assumed rates.

The third source of productivity growth is the increase in the forecast stock of education (measured in the average years of education across the entire workforce). Note that this modelling assumes that the usual increase in the stock of education in the workforce that has occurred in the past and will occur in the future is already captured in the estimate of multi-factor productivity growth. So the modelling here allows for any education stock growth above this amount to be explicitly added to productivity growth.

EDUCATION

The education block estimates the numbers of years of schooling for both the overall workforce and the cohort entering the workforce in any given year. Separate forecasts are made for level of Year 12, university degree and non-university diploma attainment.

The base and 'higher participation' scenarios assume retention rates remain at 2003-04 rates while the 'education' scenario assumes a move to higher equivalent retention rates (an extra 50,000 students[6]), 27.0% of people obtaining a university degree and 35.7% a diploma. For the purposes of estimation, university is assumed to require four years of education and a diploma is assumed to require three years.

The combination of new 'higher educated' workers entering the workforce (in all scenarios) and old 'lower educated' workers leaving implies a gradual increase in the average amount of education in the workforce.

IMPACTS OF HIGHER EDUCATION

The first impact of increased education is on participation (as noted earlier). In the longer term, a 1 year increase in education in the workforce decreases 15-24 year olds' participation rates by 2% (as they forego work now by studying), but increases 25-54 year olds' by 6% (as the benefits of higher education levels translate to more workers). These effects take some time to be fully realised – the first gradually ramped up over the first 10 years of the scenario, the second taking 10 years to commence and a further 20 to have its full impact.

The second impact is on productivity. In the longer run, an increase in education levels in the workforce equivalent to an additional year of education for each worker will increase productivity per worker by 4.0% - and hence increase overall economic output by 4.0%.

This impact is modelled cumulatively, using a complicated equation that combines the standard capital deepening and multi-factor productivity effects with the educational impacts in a single equation. In principle, the current estimate of productivity (adjusted for the increase in education over the baseline) is deflated back to remove those additional effects. The growth in productivity due to capital deepening and multi-factor productivity increases is then applied and then the updated level of additional education is applied to the total productivity estimate.

OUTPUT

Real economic growth occurs in line with growth in employment and growth in productivity, using the equation outlined in the main body of the report. Increasing education changes output forecasts by changing both parts of the equation. It changes participation rates (negatively at first but increasingly positively), and so changes the number of workers in the economy. It also changes (positively) the productivity level (or output per worker).

[6] Note the addition of 50,000 students in the modelling matches that in earlier work for the DSF. The latter was aimed at lifting equivalent retention rates to 90%. ABS catalogue 4221.0 indicates that 2003-04 Australian retention rates from Year 7/8 through to Year 12 are around 75.4% - lifting the latter to 90% would actually imply more than an extra 50,000 students.

NATIONAL ACCOUNTS

Within total output, a level of business investment occurs such that the capital stock per worker grows in line with the amount of capital deepening. Dwelling investment as a share of output rises or falls in line with changes in overall rates of economic growth, and public investment as a share of output rises or falls in line with the change in business investment as a share of output. Exports grow slightly faster than the overall economy and imports grow to keep the contribution of net exports constant. The remaining components of the national accounts block fill the remaining total output gap, growing at a consistent rate.

WAGES AND PRICES

The CPI and GDP deflator both grow at an assumed rate (in line with the RBA target), with real wage growth equal to the growth in labour productivity. The ratio between minimum and average wages is also held constant – which limits the decline in unemployment rates.

INTEREST RATES

Short-term domestic rates move in line with the Taylor rule, with the gap between short and long rates assumed to grow back towards its historical average.

WEALTH

The wealth to GDP ratio moves against the trend in long-term interest rates, in line with historic tendencies, allow an estimate of nominal wealth and wealth per head.

FEDERAL BUDGET

The Federal Budget model uses economic growth and its sub-components (employment, wages, profits, consumption and the like) to drive growth in both revenue and expenditure variables.

The summary output from the Federal Budget model is shown below, using the structure of accrual UPF reporting:

Taxes on income
Company income tax(a)
Other taxes on enterprise
Total income taxes

Fringe benefits tax
Superannuation guarantee charge
Taxes on property
Sales taxes
Goods and Services Tax
Excise duties on petroleum
Other excise duties
Total excise duties
Customs duty on imports
Total taxes on goods and services
Other taxes
Total tax revenue

Total non-tax revenue

Total Federal Budget revenue

General public sector (21)
Defence (22)
Public order and safety (23)
Education (24)
Health (25)
Social security and welfare (26)
Housing and community amenities (27)
Recreation and culture (28)
Transport and communications (32)
Other (balance) (29, 30, 31, 33, 34)
Total portfolio expenses

Total depreciation
Employee wages
Employee superannuation
Total employee expenses
Other operating expenses
Gross operating expenses
Superannuation interest
Other interest expenses

Total grant expenses
Subsidy expenses
Other current transfers

Capital transfers

Total expenses

GFS Net operating balance
Net operating balance in real terms
Net operating balance to GDP
Net lending to GDP
Net financial liabilities to GSP
Total purchases of non-financial assets to GSP
Net debt to GSP
Real net worth

The Australian Government Budget sees three key developments as retention rates in education and training rise:

- First, there is increased spending as the additional students draw on additional education funding. In practice this would fall to both State and Federal jurisdictions. In the modelling here, the full cost is attributed to the Australian Government Budget.

- Second, there are increased revenues, as a more skilled workforce contributes to economic growth, raising more taxes.

- Third, other areas of Federal spending could also increase. For example, pensions are linked to wages, and will therefore rise as a result of the increased productivity. There are many other direct linkages to productivity in Federal Budget spending, and indirect pressures are also likely to rise for increased spending in response to a larger economic pie.

A caveat on the modelling: It is worth noting that the models applied here have been developed with the aim of simulating broad classes of risk to Federal finances (most notably, demographic and health care cost pressures), and use of the models outside that scope is not appropriate.