

The Implications of Demographic Ageing
for
Queensland's Labour Force

A Collaborative Project of the Departments of Treasury,
Industrial Relations and Employment and Training

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Executive Summary

Population ageing has been occurring for many years in industrialised countries, as people live longer and healthier lives and have fewer children. The ageing of the Queensland population, without any policy changes, is likely to have three main economic impacts in the coming decades: slowing the rate of labour force growth; slowing the rate of economic growth; and slowing the rate of growth in average living standards. It is important to note that all three measures are projected to grow, albeit at slower rates than they currently are.

This paper focuses on labour supply and demand in Queensland over the next fifty years and the impact of changes in the labour force participation rate on the growth of living standards. In so doing it is acknowledged that labour productivity is an important issue that needs to be considered. However, the effects of labour productivity and the role of education and training in mitigating the impacts of ageing are largely outside the scope of the current document. Section 2 discusses the factors that influence the supply of labour and in doing so identifies changes that could affect the supply of labour and the impact of recent policy changes.

The main areas of discussion in Section 2 include adopting an opportunity cost framework to identify how the retirement income system, the transfer system and education influence the decision to participate in the labour force. This is followed by discussion on the impact of health, family responsibilities and the industrial relations system on labour force participation.

Section 3 presents an assessment of the influence of the issues raised in Section 2 on the potential size of the labour force. A summary of the labour force projections used in the Queensland Treasury Intergenerational Research Project is presented with an explanation of the assumptions underlying them. Alternative assumptions and the labour force participation outcomes of these assumptions are also presented. However, the projections in this paper should not necessarily be regarded as the views of the Queensland Government. A more detailed report is included at Appendix B.

As imbalances in the supply of and demand for labour can lead to skill shortages, Section 4 outlines two approaches to assessing the impact of ageing on the labour force, with a particular focus on the prospect of skills shortages occurring in the coming decades. The section suggests that the normal process of economic and labour market adjustments may, largely, prevent skill shortages due to population ageing, and impact on the role of government in relation to skill shortages.

Section 5 draws together the impact of labour supply and demand issues as a consequence of an ageing population and identifies that there will be many changes to the supply of labour, in terms of both quantity and quality, in the future that will arise without any policy intervention. Many of the measures which have been mooted to address ageing tend to be beneficial, even in the absence of ageing, as it removes or reduces distortions in labour market decisions. However, even with improved participation, it is identified that productivity will remain the key to maintaining and/or increasing living standards in Queensland over the next five decades.

Section 6 concludes with some suggestions as to how the Queensland government can respond to ageing, both from a broad economic policy approach as a major employer.

1. Introduction

Demographic ageing is a trend in most developed countries, a trend that has existed for over 100 years (Johnson 1999), with healthier and longer lives, higher material living standards and increased female participation in the labour force. Governments tend to have an interest in the ageing of the population because of the increasing 'aged dependency ratio', that is the ratio of persons aged 65 years or more, to those aged between 15 to 64 years, which in part is due to the ageing of the 'baby-boomers'¹.

Population ageing has received considerable attention in Australia since the release of the Australian Government's *Intergenerational Report* as part of the 2002-03 Budget (Australian Government 2002). Much of the current debate has been focussed on the long term sustainability of public finances, as it is anticipated that spending on the age pension, health and long-term care will increase substantially in the coming decades. However, labour market outcomes may alter the demand for the age pension and either increased participation or productivity outcomes may provide the means to meet some of the increase in spending on health or associated care.

Real incomes per capita - the main indicator used to measure material living standards - can be increased by either raising productivity (output per hour worked) or by increasing participation in the economy (total hours worked). The latter in turn is driven by increases in the labour force participation rate, a fall in the unemployment rate or increases in average hours worked per employed person.

In its *Intergenerational Report*, the Australian Government argued that ageing will reduce labour force participation, slowing the growth of tax revenue. It will also cause government expenditures (eg. pensions, health care) to rise more rapidly, resulting in a projected 'fiscal gap' of 5 per cent of Gross Domestic Product (GDP) by 2041-42. In its recent discussion paper, *Australia's Demographic Challenges*, the Australian Government stated that rather than increasing taxes, reducing spending or running deficits, its 'preferred solution to this challenge is to implement policies designed to grow the economy more quickly [and that] the best way to achieve [this] is via increases in labour force participation and productivity.'

The ageing debate has also raised the concern that a lower participation rate may result in labour shortages in coming decades, by lowering labour force growth relative to labour demand growth. This trend may be exacerbated if the ageing of the population causes a shift in the composition of demand towards more labour intensive services (eg. health and community services).

However, policies aimed at raising the participation rate need to take account of the relative importance of productivity versus participation in determining real incomes, as well as how the participation rate interacts with other economic factors to determine real incomes. While this paper is focussed on participation, it is recognised that it is one element of a suite of policy responses to ageing.

¹ Baby-boomers are those people born between 1946 and 1965. These people began entering the 'early age retirement' age group of 55 to 59 years in 2001.

Raising productivity has historically been, and may continue to be, more important than participation to higher incomes in Queensland in an aggregate sense. Queensland recorded growth in per capita real output of 2.6 per cent per annum over the 10 years to 2003-04, of which 2.1 percentage points per annum was due to productivity growth, 0.4 percentage points per annum due to a lower unemployment rate and only 0.2 percentage points per annum due to a rise in the participation rate. Queensland also has a higher participation rate relative to other Australian states, but a lower productivity level, suggesting productivity growth may be relatively more important to making further gains in aggregate real incomes.

Other influences on the supply of and demand for older workers since the 1970s include the discouraged worker effect and a changing industrial structure. Demand for older workers in the 1970s and 1980s declined as the supply of younger workers increased markedly leading to high unemployment rates. Further, as the industrial structure of the economy changed to a services-oriented, information-based economy the abilities and experience of older workers, particularly low-skilled males, were less suited to the requirements of employers. However, these changes were related to a one-off structural change in the economy, the shift to a services oriented economy, and the prevalence of low-skilled males is becoming less, which may result in greater participation by older people.

Finally, market responses may act to mitigate the negative impact of demographic ageing on labour force participation. A relative scarcity of labour is likely to be signalled by increases in wages which will encourage entrants or re-entrants into the labour force. Ensuring such wage rises are underpinned by productivity growth will be important to maintaining low labour costs for business and maintaining competitiveness and sustainable growth in labour demand and economic activity.

However, raising the participation rate may be more important than productivity growth in a distributional context, as it would widen the share of the population who actively earn income in the economy. Additionally, raising labour force participation also takes on greater importance if ageing directs more growth toward labour-intensive service industries which historically have lower measurable levels of productivity and slower productivity growth.

Similarly, policies need to take into account the fact that attempts to raise the participation rate may be partly offset by lower productivity or higher unemployment, as these factors are interrelated. For example, attempts to raise the participation rate and thus labour supply growth, if not coupled with similar increases in investment or technological improvement, will lower either the quantity or quality of the capital stock available per worker in the economy. This will lead to a partially offsetting fall in productivity and limit any overall impact on incomes. Another example is where increased labour force participation is not matched by employment growth, leading to a higher unemployment rate. This situation could occur where people without the skills sought by employers enter the labour force or, other things remaining the same, labour supply exceeds labour demand.

In this respect, policies most likely to minimise these adverse outcomes and maximise labour force participation and real incomes are those that remove or minimise impediments facing people who wish to participate in the labour market, and have a complementary impact on overall productivity. For example, providing education / training to the unskilled may increase the participation rate and cause a net fall in unemployment while at the same time raising the long-term productive capacity of the economy.

In formulating such policies, it is important to be aware of the structural issues specific to Queensland, rather than implementing a 'national' or 'international' solution. There are two Queensland-specific issues that are important in this respect, the higher participation of youth and the lower participation of older people.

Queensland's relatively high participation rate (65.0 per cent in 2003) is partly due to higher participation by youth (15-19 year olds). Yet, this higher youth labour force participation may reflect a lower rate of education participation by this group, which has long term consequences for labour force participation and productivity growth. Similarly, if mature age (55 years and older) participation rates in Queensland remain relatively low, the State's aggregate participation rate will be more adversely affected as this age group increases as a proportion of the population. Appendix A provides an interstate and international comparison of participation rates and explores these issues in more detail.

2. The impact of ageing on participation in the Queensland labour force

2.1 Factors that influence labour force participation

In the context of assessing the impact of population ageing on the labour force, an important area of research is identifying the factors which influence the decision to participate in or withdraw from the labour force. Changes in these factors could shape future participation decisions with implications for labour force growth as the population ages. In the absence of a compulsory retirement age, labour force participation of mature aged people reflects individual choices and preferences.²

A number of factors which will affect labour force participation in the future can be identified, including:

- the 'opportunity cost' of non-participation;
- health;
- family responsibilities; and
- the industrial relations system.

2.1.1 The opportunity cost of not participating in the labour force

The choice to withdraw from the labour force is influenced by the 'opportunity cost' of non-participation, essentially, the income forgone by withdrawing from the labour force. This concept is crucial to understanding why people decide to participate or not to participate in the labour force. The cost of non-participation can be influenced by a range of factors, including:

- the retirement income system, including superannuation and the age pension;
- the transfer system, both social security and taxation; and
- the effect of education and training.

² The compulsory retirement age was removed in Queensland through the *Anti-Discrimination Act 1991*, with the exception of certain occupations such as members of the judiciary and police officers. Most States abolished the compulsory retirement age from the early 1990s.

An example of the opportunity cost concept is that an increase in wealth will lead to a more comfortable life in retirement, which reduces the opportunity cost of not participating in the labour force. Another example is the benefit of generally increased income after further education which then increases the attractiveness of employment and increases the opportunity cost of not participating in the labour force.

Retirement income system

In essence, the more wealth a person acquires the greater their capacity to withdraw from the labour force. However, there are many reasons why older people may not have saved, or otherwise obtained, a sufficient sum to fund their retirement lifestyle to the level they prefer. These reasons could include circumstances such as: financial set backs, including periods of unemployment; business failure or illness; study; starting their family later in life or starting a second family; choosing to support adult children; and caring for their aged parents, other elderly relatives or grandchildren. For these people, the relatively high opportunity cost of retirement may induce them to remain in the labour force. Women are likely to be over-represented in this group because their lower average wages and greater propensity to engage in caring roles tends to reduce their capacity to accumulate wealth to fund retirement.

Apart from enjoying very strong growth in real incomes and asset prices over their working lives, acquiring significant wealth over that time, 'baby-boomers' have also acquired much higher retirement consumption aspirations than their parents' generation. Consequently, this generation may need a higher retirement income to support consumption at the level to which they are accustomed, and may need to work longer to accumulate sufficient savings.

Analogous to the opportunity cost of retirement is the *replacement rate* — post-retirement income (including basic pensions, means-tested supplements and mandatory pensions and superannuation) expressed as a proportion of pre-retirement income. The higher the replacement rate, the closer standards of living in retirement are to those enjoyed while working, and the lower the opportunity cost of not participating in the labour force or the greater the incentive to retire.

In many OECD nations there have been substantial increases in real pension benefits, and as a consequence, replacement rates increased from the early 1960s to the mid 1990s. Growth in replacement rates was slower from the mid 1970s to the mid 1990s at 0.4 per cent per annum compared with 1.6 per cent per annum in the 1960s.

However, the Australian³ replacement rate increased more rapidly than the OECD average, increasing at 1.6 per cent per annum and 0.4 per cent respectively (OECD 2002). With a higher replacement rate, the attractiveness of retirement increased, as seen in the high level of 'early' retirement from the 1970s through to the 1990s, as people perceived that they could 'afford' to retire – see Table 3 in Appendix A. If the increase in the replacement rate is unanticipated, such as through a more generous age pension or returns on savings, the attractiveness of retirement may increase.

³ It should be noted that this section is focussed more on a national level as retirement income system policy is predominantly an Australian Government issue and much of the relevant data is only available on a national basis.

In addition to the amount of wealth accumulated, the structure and institutional arrangements of the retirement income system⁴ play an important role in the retirement decisions of older workers, those aged 55 years and older, which in turn influences the labour force participation rate of this age group. With population ageing, this age group will constitute a larger proportion of the workforce and, therefore, will have a greater influence on the overall participation rate. Should people in this age group retire 'early' because they are able to support themselves (ie they can afford to retire), then 'early' retirement may not be an issue that requires a policy 'solution'. However, policy may have a role in addressing incentives that encourage people to retire before they are able to support themselves.

The actuarial fairness of a pension or superannuation scheme can also influence the retirement decision. This tends to be a more substantial issue in countries with a contributory pension system, where the pension does not increase if a person works beyond the eligibility age. In Australia, actuarial fairness issues generally arise in certain defined benefit superannuation schemes.⁵ For example, in some defined benefit schemes net retirement wealth, beyond a certain age, may decrease or not increase at an actuarially fair rate, which imposes an *implicit tax* on those who choose to work beyond that age and this can create a disincentive to continue working.⁶

Another issue, for those in defined benefit superannuation schemes is that reducing participation in the labour force, by working part-time, rather than withdrawing completely, could result in a much lower retirement wealth, which, while not necessarily actuarially unfair, may reduce the appeal of some flexible working arrangements.

However, these two issues are not likely to create major incentives for early retirement in Australia as the majority of Australians with superannuation are in defined contribution schemes⁷ (77.6 per cent), 21.0 per cent are in hybrid schemes and only 1.4 per cent of people with superannuation are in defined benefit schemes.

Additionally, not all of the defined benefit schemes have actuarial fairness issues, and part-time work is not likely to appeal to all members of defined benefit schemes, reducing the impact of any incentive to early retirement.

The Australian Retirement Income System

Australia's unique retirement income system places it in a better position than most OECD nations to address the challenges presented by an ageing population, both in terms of the fiscal pressures exerted by pension outlays and its impact on early retirement decisions.

⁴ To avoid confusion, 'Retirement Income System' has been used, as an all-inclusive term to describe the multitude of different public and private pension, superannuation and retirement saving schemes available to workers worldwide.

⁵ A Defined Benefit scheme is where the benefit payable is usually based on a formula of the salary near retirement (final average salary) and years of membership.

⁶ Some older federal public service superannuation schemes induce retirement at 54 years and 11 months because benefits are more valuable just prior to age 55 than they are after. However, this type of anomaly does not exist in the superannuation schemes covering the Queensland public sector.

⁷ A Defined Contribution scheme is where the end benefit will be equal to the total contributions plus interest credited, less charges and tax.

With the introduction of the compulsory superannuation guarantee in 1992, the Australian system has become quite similar to the ideal 'Three pillars' model promoted by the World Bank, which incorporates;

1. a modest, publicly provided, means tested pension to alleviate poverty
2. a mandatory, fully funded and privately managed pension, based on personal savings accounts (preferably, a defined contribution scheme); and
3. a voluntary occupational or personal savings plan, providing additional protection for people who want more income in their old age.

The Australian Age Pension (first pillar) was only ever designed as a poverty relief measure and, consequently, its replacement rate is one of the lowest in the OECD. Until recently, the coverage of occupational superannuation was mainly limited to public servants and senior management within the corporate sector. However, the introduction of the compulsory superannuation guarantee (second pillar) and encouragement of personal retirement saving (third pillar) should increase the coverage of formal post-retirement savings.

Despite general conformity with the 'Three pillars' model of retirement income, there are currently three key aspects of the interaction of the Australian age pension and superannuation systems that provide strong incentives toward early retirement. These key characteristics are the preservation age (the age at which a retiree can access accrued superannuation benefits), the ability to take superannuation as a lump sum⁸, and the concessions associated with the age pension.

The combination of these characteristics can encourage workers to retire early and consume some or all of their superannuation until they become eligible for the age pension. It appears that the way in which the tax, superannuation and the age pension systems interact encourages retirees to utilise their superannuation assets in a way that ensures access to the Age Pension, rather than maximising the rate of return on the assets. A general example of this is converting the majority of superannuation funds into the family home, which does not affect pension eligibility or income tax, rather than investing in other asset classes which may achieve a higher rate of return and provide an income stream, but are assessed in determining eligibility for the Age Pension.

The Australian age pension is not an income replacement scheme, like many European schemes, but rather a safety-net for those without adequate savings for their retirement. Despite this, around 74 per cent of those aged over 65 years received a pension in 2001 (FACS 2003). Part of the reason that the take-up rate for the age pension is so high is that receipt of the age pension gives people access to a number of other concessions that make retirement income stretch further.

For example, reductions in property and water rates and concessions on energy and telephone bills, motor vehicle registration, public transport and health care are available to those people in receipt of the age pension. For those receiving an age pension, 36 per cent only received a part-pension (FACS 2003), which indicates that the associated concessions may be more valuable than the pension itself.

⁸ The capacity to take superannuation benefits as a lump sum, rather than as an ongoing income stream, is a key difference between Australian superannuation funds and most retirement savings vehicles within the OECD.

Recent Federal Government changes to the Retirement Income System

Over recent years, the Federal Government has instituted a number of changes within the retirement income system aimed at, amongst other things, discouraging early retirement and encouraging labour force participation by older workers. These include:

- increasing the age at which women can qualify for the Age Pension to 65 years (the same as men) from 60 by the year 2014;
- increasing the preservation age for superannuation recipients from 55 years to 60 by the year 2024;
- relaxing the employment constraints for persons aged 65-74 who wish to continue making superannuation contributions. An annual employment test is used rather than a weekly employment test. Previously workers aged 65-74 were not allowed to make superannuation contributions, and superannuation funds were compelled to pay out older persons' superannuation, unless they were working at least 10 hours per week. Older workers will now be able to continue contributing to superannuation, reducing the disincentive to continue working beyond age 65; and
- further favourable tax concessions for people who elect to take their superannuation as an income stream rather than a lump sum.

The general tone and direction of Australian Government policy on the retirement income system and how it impacts on the labour force participation of older workers appears to be in line with the general international consensus as to what measures need to be taken to discourage early retirement and encourage continued participation of older workers. Through a combination of good foresight and luck, successive Australian governments have established a retirement income system that is reasonably well equipped to confront the challenges presented by demographic ageing, both at a labour force participation and fiscal policy level. However, that does not mean that improvements cannot be made.

The World Bank has suggested areas of reform for Australia's retirement income system, including compulsion for superannuation savings to be taken as an income stream, the complexity of taxation and the rate of compulsory superannuation contributions (Bateman and Piggott 2001). However, given the strong culture of taking superannuation as a lump sum in this country, the Australian Government continues to rely on encouragement, such as tax breaks, rather than compulsion when addressing this policy issue.

The World Bank suggests that taxation arrangements could be less complex and questions the adequacy of the nine per cent contribution level. The adequacy, or otherwise, of the nine per cent contribution level is an issue that has also been raised by the Australian Superannuation Funds Association.

Whilst much of debate over the adequacy of superannuation contributions focuses on the fiscal impacts on governments, the current relatively low rate may have a positive impact on the labour force participation of older workers should they need to work longer in order to accumulate adequate retirement savings.

Queensland-Specific Issues

Traditionally, Queensland has had a lower cost of living than some other States, especially NSW, Victoria and the ACT, whereas pension entitlements are set on a standard national basis. All other things being equal, this situation would lead to a higher retirement income replacement rate in Queensland which, as outlined above, may act as a discouragement for labour force participation.

Transfer system

The Australian taxation and income support systems aim to redistribute income and ensure adequate incomes for people who are unemployed or otherwise unable to support themselves. However, the current structure of the tax system, and its interaction with the social security system, may act to decrease the opportunity cost of not participating for those individuals seeking to increase their labour force participation.

While people work for a range of reasons, including financial and non-financial, such as self-esteem and the opportunity to interact with others, the financial incentives associated with work take on a far greater weight for those with a marginal attachment to the workforce, such as young people, women re-entering the labour market and holders of a second job in the family. The extent of the 'disincentives' to labour market participation can be measured through the effective marginal tax rate (EMTR) or as a replacement ratio.

EMTRs measure the effective tax rate applied to any additional dollar of private income when considering the combined impact of marginal tax rates, other levies or tax offsets (such as the Medicare levy or the low income tax offset) and the withdrawal of social security benefits. Recent Australian studies indicate that those facing high EMTRs "are predominantly those who have dependent children" (Beer, 2002). Replacement ratios reflect the extent of the EMTR being faced by the unemployed by measuring the amount of after-tax real income received from unemployment and other social security benefits expressed as a ratio of the after-tax real income that could be received from gaining employment.

High EMTRs⁹ and replacement rates can substantially reduce the opportunity cost of not participating in the labour force. High EMTRs, by reducing the return from earning additional income, possibly discourage low income earners from working more hours or acquiring further skills to enhance their employability, productivity and thus their standard of living – the so called 'poverty trap' (Keating and Lambert, 1998). Similarly, higher replacement ratios lower the incentive to search for employment, raising both the rate and duration of unemployment. The resulting fall in the effective labour supply also tends to put upward pressure on wages, lowering labour demand and, thereby, raising the 'natural rate' of unemployment (Layard, Nickel and Jackman, 1991). These influences are likely to become increasingly important with the ageing of the population.

Despite their economic and social costs, the incidence of high EMTRs and replacement ratios in Australia has risen over the past two decades. A shift toward social security targeting has not removed 'income test stacking', where income tests, taper rates and income tax bracket thresholds overlap. This has led to a greater incidence of high EMTRs faced by families relative to the early 1980s (Beer and Harding, 1999).

⁹ Beer describes a high EMTR as one that is "more than 60 per cent" as this exceeds the highest marginal income tax rate (which is currently 47 per cent) by a significant amount (Beer 2002).

Further, analysis following the introduction of the Australian National Tax Reform (ANTS) package shows that “the problem of lower income individuals facing higher EMTRs is just as prevalent, if not more so, in 2002 as it was in 1997” with “22 per cent of those in the bottom half of the income distribution facing high EMTRs in 2002” (Beer, 2002).

While low income earners face high EMTRs and replacement ratios, empirical research suggests that the labour supply of this group is also more responsive to changes in the financial reward from work than that of higher income earners (Heckman, 1993).

EMTRs can have an impact on people in any age group, yet some transfer payments that are available to all ages may have a greater influence on the labour force participation decision of those in older age groups. The availability of other pre-retirement pension-type benefits such as war veterans' pensions and, in particular, the easing in eligibility requirements for disability pensions have played a significant role in the earlier retirement decisions of older workers, especially men (O'Brien 2001). However, while there appears to be a correlation between earlier retirement and the increase in these categories of pensioners, the causation is less clear. The counter argument is that the increase in these categories was a response to the lower labour demand for older workers due to generally higher unemployment, increased supply of younger workers and technological change that has made older workers' skills redundant.

A change in either the generosity of these benefits or a change in the eligibility requirements has been shown to influence the labour force participation decision. For example, there has been a significant increase in the number of older persons in receipt of the Disability Support Pension (DSP) in Australia. The proportion of males aged 55-59 receiving the DSP, or its equivalent, increased from 4 per cent in 1972 to 16 per cent in 1997, and those obtaining DSP aged 60-64 increased from 8 per cent to 25 per cent over the same period (O'Brien 2001). However, the proportion of recipients aged 60-64 years has fallen to 23 per cent in 2001, although it is not clear if this is due to cyclical patterns or a tightening of eligibility criteria.

Queensland Specific Issues

In addition to the differential impacts of high EMTRs and replacement ratios on particular groups, the relative impacts across various labour markets will depend on the underlying wage and industry structure in each labour market. For example, Queensland, which has an industry structure that results in generally lower wage levels, will tend to have higher proportions of its workforce facing high EMTRs, while the unemployed will face higher replacement ratios, compared with those faced by individuals in areas where the cost of living is higher. Further, Queensland has a higher proportion of households that are reliant on Australian Government payments as the main source of income than nationally (ABS 2004).

An important policy issue is the interaction of State and Australian Government policies that work to create high EMTRs. For example, Rent Assistance is paid to individuals or families already receiving a benefit from the Australian Government and who are in the private rental market. Rent assistance effectively increases the EMTR faced by the recipient, further increasing the opportunity cost of leaving unemployment, especially for a low-wage job.

Education

Education and training can increase the opportunity cost of not participating in the labour force due to the incentive to capture the greater returns from further education and training. An individual with a post-secondary qualification benefits from a stream of income that is greater than they would have earned if they had not studied, which outweighs both the direct (eg tuition fees and materials) and opportunity costs (forgone income while studying).

The relationship between education and labour force outcomes reflects a positive rate of return from the individual's and society's investment in further education. A positive rate of return is achieved when the stream of income outweighs education costs, including opportunity costs¹⁰.

An OECD report identifies individual rates of return for tertiary education and training that are in the order of 7 to 19 per cent in the late 1990s (Blöndal, Field and Girouard 2002) and Australian studies have revealed an individual rate of return for Australian tertiary education ranging from 9.4 to 14.5 per cent in the late 1990s (Borland 2002).

The high individual rate of return increases the opportunity cost of not participating in the labour force. That is, the individual must participate in the labour force if they are to receive the return. This increased attachment to the labour force is likely to lead to greater labour force participation in the future, particularly as cohorts with greater educational attainment enter the older age groups, where educational attainment and participation are currently low.

In addition to its greater return, post-secondary education is also associated with higher incomes and lower prospects of unemployment. At a broad level, the higher the qualification the higher the income and labour force participation and the lower unemployment risks. In Australia those with a vocational education qualification tend to have a lower risk of unemployment, which may be partially explained by the vocational nature of courses that impart practical skills that can be readily used in the work place. At an international level, participation rates for working age persons are almost universally higher for those who have attained a post secondary qualification compared with those who do not.

It is important to note that there are a range of other factors that influence labour force participation. The fertility rate and the impact of industry structure on demand for employees with educational qualifications, amongst other things, are also important in determining the participation rate within age groups. Simply increasing the proportion of young people with tertiary qualifications will not guarantee a higher participation rate.

In theory, an increase in the proportion of people with qualifications would, other things remaining constant, lead to an increase in the participation rate due to the increased attachment to the labour force through a positive individual rate of return and the increased opportunity cost of not participating. However, the increase in educational attainment has occurred at the same time as an increase in female participation, in both education and the labour force, and incentives or disincentives from other labour market changes, including industrial relations and the transfer system. Therefore, it is difficult to separately quantify the impact of changes in education and training on increased labour force participation.

¹⁰ Education and training costs include direct costs, such as tuition fees and materials, and opportunity costs, such as forgone income while studying.

Education is generally pursued by those people in younger age groups and, as could be expected, labour force participation tends to increase with age up to the 35-44 year age group. An exception to this is the 20-39 year group where those women who have children do not participate in the labour force for a period of time. Although even in this sub-group, those with higher educational qualifications tend to exhibit a stronger attachment to the labour force, returning to work after a shorter period than those with no qualifications. For those aged 45 and above, it is interesting to note that lower participation also coincides with a lower educational profile, particularly for females.

Adult re-skilling, promoted as a way of maintaining an adaptable workforce that updates and increases its skills, is changing the age structure of education and training participants. For example, in the vocational education and training (VET) sector, over a third of all participants nationally were aged between 30 and 49 years in 2003. The majority (around 75 per cent¹¹) of these people remain in the labour force and are employed, providing the opportunity to apply the knowledge and skills acquired through study.

Increasingly, those who are studying are also participating in the labour force, particularly in the youngest age groups at school or in higher education, and, although this may have a marginally positive impact on the aggregate participation rate, it is argued that labour force participation may have an adverse impact on the quality of human capital acquired (Demeulemeester and Rochat 2000). However, it has been argued that some participation in the labour force is beneficial for students, possibly due to improved time management, with part-time work of up to 18 hours per week associated with better than average exam results (Applegate and Daly 2003).

Employers may use qualifications as a signal of prospective employees' capabilities and prospective value to the firm; that is, qualifications may indicate the productivity of a potential employee. Employees with post-secondary education may be better equipped to find and adopt innovative solutions to issues in the workplace.

Queensland specific issues

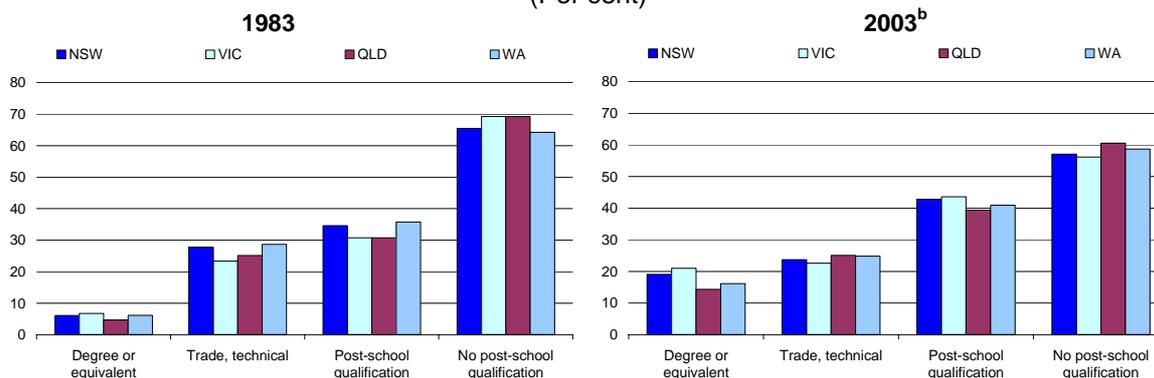
Within Australia, the proportion of people studying to obtain post-secondary qualifications has increased, for example, the proportion of the population in higher education has increased nine-fold, from 0.4 per cent in 1949 to 3.6 per cent in 2000¹² (DEST 2002). Despite recording substantial increases over the past two decades, the overall proportion of the population with a qualification in Queensland in 2003 was lower than that in other large states.

Figure 1 shows that the largest difference in educational qualifications between Queensland and the other large states is in higher education. Queensland did not record as large an increase in the proportion with a post-school qualification as Victoria over the period. However, in comparison with Western Australia, Queensland has recorded greater growth in post-secondary educational attainment since 1983.

¹¹ ABS 6227.0 Education and Work 2003 and Australian vocational education and training statistics: Students and courses 2003 (revised August 2004).

¹² Derived from data from the Department of Education, Science and Training (DEST 2002) and ABS 3105.0.65.001, *Australian Historical Population Statistics*.

Figure 1. Educational attainment of population^a, selected States
 (Per cent)



a Population aged 15 years and over

b Educational attainment is not strictly comparable over the period. In this figure Degree or equivalent is the sum of Post graduate degree, Graduate diploma/Graduate Certificate and Bachelor degree. Trade/Technical is the sum of Advanced diploma/Diploma and all Certificate levels.

Source: ABS Cat. No's 6235.0 and 6227.0

Lower educational attainment for the residents of a state does not necessarily reflect the investment made in education by that state. Census 2001 data suggest that people with qualifications tend to be more mobile and more likely to migrate, either interstate or internationally. Overall educational attainment in Queensland is also affected by being a net recipient of interstate migrants. The majority of interstate migrants to the State do not have a post-secondary qualification, which, combined with the high proportion of people migrating from Queensland with higher qualifications, leads to a slower rate of improvement in the State's qualification profile. Further, interstate migrants from Queensland generally tend to have a higher qualification profile, which suggests that, for those Queenslanders with higher qualifications, employment opportunities and remuneration may be greater in other states.

Queensland, while having a relatively lower educational qualification profile, has the second highest labour force participation rate, indicating the influence of other factors. In particular the relative strength of the Queensland labour market, compared with other states, and Queensland's industrial structure have provided more opportunity for young persons to participate in the labour force. As a result, many students often combine participation in education with labour force participation. Student labour force participation in Queensland and the rest of Australia has increased over the past sixteen years. The participation rate for Queensland tertiary students aged between 20 and 24 years increased to an annual average 67.4 per cent, compared with 60.6 per cent for the rest of Australia. Participation by 15 to 19 year olds at school in Queensland increased, in annual average terms, to 50.4 per cent in 2003, compared with 39.1 per cent for the rest of Australia.

Despite the increase in participation by students, the Queensland participation rate for the 15 to 19 years age group as a whole has remained relatively stable at around 67 per cent, while participation for the 20 to 24 years age group has increased by almost 4 percentage points since 1979 to be 83.6 per cent in 2003. Further, as the importance of the group diminished (proportion of the labour force) due to baby boomers moving into older age groups, the impact of higher youth participation rate on the overall participation rate declined.

Education and Training Reform for the Future (ETRF)

The objective of the ETRF package is to increase participation, retention and attainment of young people aged 15 – 17 years in schools and vocational training. To achieve this objective, the Government White Paper identified a range of changes to education and training at all levels of schooling. Of most interest in the context of participation rates is the impact of legislation that will require all young people to participate in education or training until they either gain a senior certificate or certificate III qualification or until their 17th birthday.

In the short-term the impact of the changes to the minimum age at which a person may leave education component of the ETRF is likely to have a marginal impact on the participation rate of young people. Ensuring young people are in either education or full-time employment will not reduce the 15 to 19 years unemployment rates, because students in full-time study will still be classified as unemployed by the Australian Bureau of Statistics if they are looking for full or part-time employment. The impact of ETRF on the participation rate is less clear, because although it may encourage some current participants to withdraw from the labour force; changes in the participation rate will depend on the size of this group. Ensuring that young people participate in education, in particular those who are not currently attending an educational institution or working full-time (approximately 5 to 6 per cent of 15 and 16 year olds), may also alter their immediate labour force outcomes, although any changes are likely to be slight given the small proportion of young people in this situation in Queensland.

The longer term impact of the ETRF package is likely to be the reinforcement of the shift in community attitudes toward education as a necessity to participate and succeed in the knowledge economy. Increasing the amount of education received may increase attachment to the labour force and have a positive impact on the participation rate, although it is difficult to determine the size of this impact. Of more importance is the impact that the ETRF package is likely to have on the productivity of the labour force.

Overall impact of the opportunity cost on labour force participation

Changes made to the retirement income system and the transfer system have increased the opportunity costs of not participating in the labour force, which is likely to induce greater labour force participation in the future. This does not mean that there is not room for further improvements to these systems in the future that will increase the attractiveness of remaining in or re-entering the labour force.

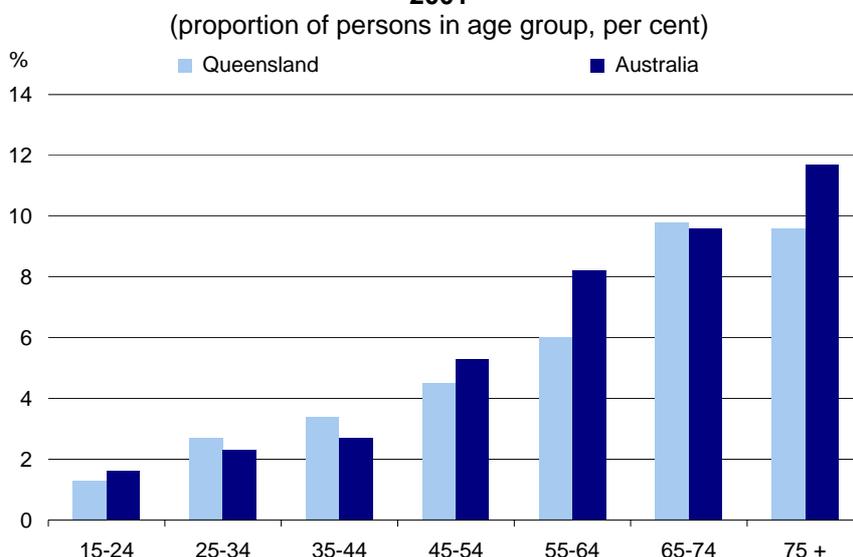
Education increases attachment to the labour force, because further study increases the opportunity cost of not participating through a positive rate of return on the investment in education. Greater attachment to the labour force is likely to lead to an increase in participation in the future, particularly as cohorts with greater education attainment enter the older age groups, where educational attainment and participation are currently low.

2.1.2 Health

Health is an important factor in the labour force participation decision, and may in some circumstances outweigh any other consideration. There is a view that the health status of the population is generally improving, as evidenced by increased life expectancy (AIHW 2002), which suggests some scope for increased higher age-specific participation rates in the future.

The proportion of the population who report that they have poor health increases with age, with around ten per cent of those aged 65 to 74 years reporting poor health (Figure 2). Nationally, around eight per cent of those aged 55 to 64 years assess themselves to be in poor health, compared with only six per cent of Queenslanders in the same age group. Such a gap indicates that poor health alone is not likely to prevent the labour force participation of this group in Queensland in the future.

Figure 2. Persons with self assessed poor health by age group, Queensland and Australia, 2001



Source: ABS Cat. No. 4364.0

The rate of those people with a disability¹³ that restricts their ability to participate in schooling or employment is another measure of possible limitations to future labour force participation. A higher proportion of people in Queensland (10 per cent) had a disability that imposed restrictions on education or employment in 1998 than in the rest of Australia (8.9 per cent). Of concern for Queensland's future labour force participation is the higher rate of restriction of Queensland's 5 to 24 year olds, and the greater prevalence of this age group in the Queensland population. Relative to the rest of Australia, Queensland is likely to, all other things remaining the same, have a greater proportion of its population in the future that is restricted in its capacity to obtain an education, reducing their attachment to the labour force.

¹³ As defined by the ABS, where a person requires help with a core activity (communication, mobility and self-care) they are classified as having a profound and severe disability, whereas a person who does not require help, but has difficulty, with a core activity is classified as having a moderate disability. A person with a mild disability needs no help and has no difficulty with any of the core activities, but may use an aid or equipment or have some difficulty with some daily activities.

Disability does not necessarily preclude participation in the labour force, although employment rates for working age disabled people are nearly 30 percentage points lower, on average, than for non-disabled people (OECD 2003). However, even for those with a mild to moderate disability, recent technological advances are lowering barriers to labour force participation. More accessible workplaces, computer monitors that accommodate less acute eyesight and communications technology that overcomes hearing impairments all bode well for the participation, safety, comfort and productivity of mature age workers (Robson 2001).

In the past, older workers may have been shielded from physical work by accepting light duties (European Foundation 2003). However, in an ageing workforce, such opportunities may become scarce. Older workers may also face problems with work intensification. Unless workplace health and safety issues are addressed there will potentially be excess demand and skill shortages for jobs that are physically demanding or intensive (Paoli 1994).

Governments seek to ensure the safety of workers through occupational health and safety legislation and regulation. Labour force participation may be enhanced by reducing accidents, rehabilitating injured workers properly so that they can return to a full and productive state and by providing facilities for disabled workers who would otherwise not be able to work. However, to the extent that this legislation and regulation imposes additional costs on employers there may be some dampening of demand for labour.

Mature aged workers may be perceived to be more vulnerable to workplace injuries and illnesses. However, analysis of WorkCover data nationally shows that although workers aged 50 years and over do not constitute the most common age group for work injuries (this being the 40-49 age group), the cost of older workers' injuries to WorkCover exceeds that of workers aged less than 50 years. Queensland workers' compensation claims data confirm a similar pattern. Queensland data show that the incidence of claims actually declines with age after peaking for the 20-24 year age group. However, the average cost of claims increases with each age group e.g. \$3,400 for 15-19 year olds compared with \$8,900 for 55-64 year olds. Unless the costs of rehabilitation for older workers are reduced, or workplaces are altered to reflect any age-specific occupational health and safety requirements, population ageing may adversely impact on employer demand for these workers and consequently, reduce labour force participation of older people.

Despite the importance of health as a prerequisite to labour force participation at the individual level, health issues do not appear to be a major impediment to increased labour force participation by older people at the aggregate level. However, Queensland may have a relatively higher proportion of people with disabilities who have employment restrictions in the future, due to the State's currently higher proportion of young people with education restrictions.

2.1.3 Family responsibilities

Family responsibilities and in particular caring are likely to continue to be an important factor in determining labour force participation as the population ages. Factors such as the increasing participation of women in the labour force, childbearing at older ages than in the past, the older age at which children leave the family home, the prevalence of disability, and perhaps increasingly, responsibility for elder care are likely to affect labour participation decisions in the future.

Important issues for people with children, particularly those with children not yet school age, include access to affordable quality childcare and flexible working arrangements. Childcare is dominated by informal care, that is, care provided by family and friends, with a substantial proportion of this care provided by grandparents. However, the importance of informal childcare has declined, with the proportion of children in informal care falling from over three-quarters in 1993 to under two-thirds in 2002. This change has, largely, been the result of increased government subsidies for children in formal care (AIHW 2003). Increased availability of formal childcare has two impacts on labour force participation, it increases participation for parents who would not have otherwise have been able to work, and at the same time it has expanded employment opportunities in this field.

The proportion of people with a disability who require care¹⁴ increases with age, particularly for those 85 years and over. Assuming that the profile of disability remains the same, large increases in the demand for care, formal and informal, are likely to occur between 2030 and 2050 as the 'baby-boomers' reach the age of 85 years. Further, improved medical intervention has increased the life expectancy of people with a disability, which with further medical innovation is likely to converge with the non-disabled life expectancy, again increasing the demand for care.

However, this increased demand for care will not inevitably result in a decline in aggregate labour force participation. For many people, family responsibilities do not necessarily entail exclusion from the labour force. Table 1 shows that more than half (58.7 per cent) of all carers in Queensland participated in the labour force in 1998, 10.2 percentage points lower than non-carers.

Table 1. Carers by labour force status, Queensland, 1998
(per cent)

	Primary carers %	Other carers %	All carers %	Not a carer %	All persons %
Employed					
Full time worker	14.9	37.1	32.5	43.8	42.2
Part time worker	25.5	20.1	21.2	18.6	19.0
Total employed	40.4	57.2	53.7	62.5	61.2
Unemployed					
Seeking full time work	2.4	3.9	3.6	5.1	4.9
Seeking part time work	1.8	1.3	1.4	1.3	1.3
Total unemployed	4.2	5.2	5.0	6.4	6.2
<i>In the labour force</i>	44.6	62.4	58.7	68.9	67.4
Not in the labour force	55.3	37.5	41.3	31.1	32.6
Total	100.0	100.0	100.0	100.0	100.0

Source: Australian Bureau of Statistics Cat. No. 4430.3.40.001

Females tend to be over-represented as carers, with 55 per cent of all carers being female in Queensland compared with a population share of 50 per cent. Primary carers in the State are predominantly female (74 per cent of primary cares in 2003 were female). Suitably flexible work arrangements, that is, those that benefit employees and employers alike, may enable the current level of labour force participation by carers to be maintained in the future despite increased demand.

¹⁴ People who need care sometimes or always require assistance with self-care, mobility or communication.

The number of older people requiring care has been estimated to grow at an annual average rate of around 3 per cent between 2001 and 2031, yet, despite increasing, the number of carers is not expected to match this growth (Percival and Kelly 2004). Any shortage of carers could adversely impact on the aggregate labour force participation rate if people choose, or are forced, to become carers and leave the labour force, rather than reduce their hours of work.¹⁵

Alternatively, as has occurred with other personal or household services, caring may move from being a predominantly 'non-market' service to a service provided by the paid labour force, either increasing labour force participation or altering the State's industry structure. The caring service may be drawn into the market by the increased financial capacity of baby-boomers or by those people who choose to remain in the labour force and pay for the service rather than become a carer.

2.1.4 Industrial Relations System and employment arrangements

The Australian and Queensland industrial relations systems¹⁶ can have an important role in the labour force participation decision. In particular, changes in 'labour market flexibility' including flexible employment arrangements are likely to increase in importance as the population ages.

Theoretical and historical background

The key concept that has underpinned the majority of labour market reforms over the past two decades has been 'labour market flexibility'. In neo-classical economic theory, a perfectly flexible labour market allocates labour in the most efficient manner, directing labour resources to the most productive purposes, producing goods and services most valued by consumers. Furthermore, labour is directed in the correct amounts and at a price (wage rate) that reflects the marginal cost of production. A perfectly flexible labour market is flexible in several ways. Firstly, the price of labour (wage rate) is flexible (both upwards and downwards) and directs labour to the most productive enterprises. Secondly, numerical flexibility allocates the correct amount of labour, at the right time, to an activity. Thirdly, functional flexibility allows the tasks of workers to be easily and quickly altered to suit changing circumstances.

In reality, a perfectly flexible labour market may not be optimal or desirable in a social sense. However, changes to the industrial relations system, nationally or in Queensland, that increase labour market flexibility are likely to encourage labour force participation. One of the main goals of many of the economic and industrial relations reforms in Australia over the past two decades has been aimed at (and in many ways succeeded in) increasing the price, numerical and functional flexibility of the Australian labour market, with the flow-on effects of lowering the costs of production and increasing productivity and real income per capita.

¹⁵ Reducing hours may have an impact on the productivity of the labour force. It is expected that productivity issues related to the ageing of the labour force will be addressed in a separate paper.

¹⁶ Industrial relations encompass the relationship between employers and employees, and the associated institutions. In this paper, the Queensland and Australian industrial relations systems are deemed to influence employment arrangements, negotiation of wages, conditions, hours of work, leave entitlements and other employment arrangements between employers and employees.

Historically, Australia and Queensland have had highly centralised industrial relations systems, with wage fixing administered via compulsory arbitration by independent Industrial Relations Commissions, which stemmed from the significant levels of tariff and non-tariff protection much of Australian industry enjoyed throughout most of the 20th century. The industrial relations system was a mechanism to:

- redistribute the 'benefits' of the protection from international competition and the cost pressures associated with such competition; and
- with due regard to macroeconomic outcomes:
 - resolve industrial disputes; and
 - achieve equitable wage outcomes.

These institutional arrangements led to wage determinations based on rigid pay relativities between various occupations and industries, known as comparative wage justice, as well as wage rates that did not necessarily correspond with the productivity of the workers or industries concerned. Furthermore, this highly institutionalised structure led to a system focused on 'traditional' employment (permanent, full-time and working during 'business hours'). In essence, the Australian labour market was in many ways highly inflexible up until the early 1980s.

However, over recent decades there have been significant changes to the institutional arrangements of the industrial relations system nationally and at the state level. The largest changes are the shift to enterprise-level bargaining, where productivity improvements are generally required to offset any real wage increases, with the Australian Industrial Relations Commission providing safety net increases to the lowest paid members of the labour force. These changes coincided with a number of other significant changes in the Australian and Queensland labour markets, including:

- a significant increase in female labour force participation rates, across most age groups.
- a reduction in the participation rates of males, across most age groups.
- a substantial increase in 'non-standard' employment¹⁷, especially part-time, casual, contract and 'out of hours' work.
- a shift in youth employment from full-time to part-time employment.
- a change in the industrial structure of the labour market towards industries that have traditionally been non-standard employers.

While some of these changes may be largely as a result of the changes in institutional arrangements, others are more associative and could be related to other economic reforms, technological and/or social changes.

Flexible employment arrangements and labour force participation

Research has shown that those less attached to the labour market such as women with dependant children, youth and older workers are attracted to the type of employment opportunities (part-time, casual and out of hours) that have been created by increased labour market flexibility (Kenyon and Wooden 1996).

¹⁷ A 'standard' job, could be defined as a permanent full-time position, working approximately 40 hours a week, Monday to Friday between around 7.00 am and 6.00pm, receiving the full standard range of benefits such as penalty rates for overtime, sick, annual and long service leave.

Conversely, many of the workers displaced by economic reform have been in the more 'traditional' jobs, many of them in blue collar industries such as manufacturing.

Another factor driving the change in participation patterns to more non-standard hours and arrangements has been Australia's significantly reduced import tariffs and a worldwide reduction in the unit costs of manufactured goods. These factors (along with increasing real incomes) have led to a relative increase in the demand for services. By their nature, many services (for example, retail trade, customer service, recreation, leisure, entertainment and eating out) can only be consumed at the time of their production, which often does not coincide with standard business hours or arrangements. Increased labour market flexibility helps facilitate the efficient provision of these services and therefore provides opportunities for marginally attached people to participate in the labour force.

Flexible working arrangements include part-time employment, casual and contracted employment, tele-commuting and purchased leave schemes. Flexible working arrangements provide the opportunity for people to work and to either fulfil other responsibilities, such as caring or studying, or to suit their lifestyle choices. Therefore, an industrial relations system that provides the capacity for flexible working arrangements may encourage higher labour force participation, although this may be partially offset if disincentives for employers exist in the industrial relations system. In essence, flexible working arrangements should only be adopted in situations where they are beneficial to both employees and employers.

For older workers in particular, flexible working arrangements may provide a way to smooth the transition from work to retirement. Older workers may be prepared to continue in employment, but in a less intensive manner, utilising part-time or work from home options, or even in self-employment (Samorodov 1999). There are important advantages of gradual retirement. For the workplace, experience is retained within the organisation and the transfer of knowledge and skills to the next generation is facilitated. For workers, a preference for more leisure time may be balanced with the need to maintain some level of income. Part-time or reduced hours in the transition to retirement may also provide workers with more recovery time from physically demanding or stressful jobs.

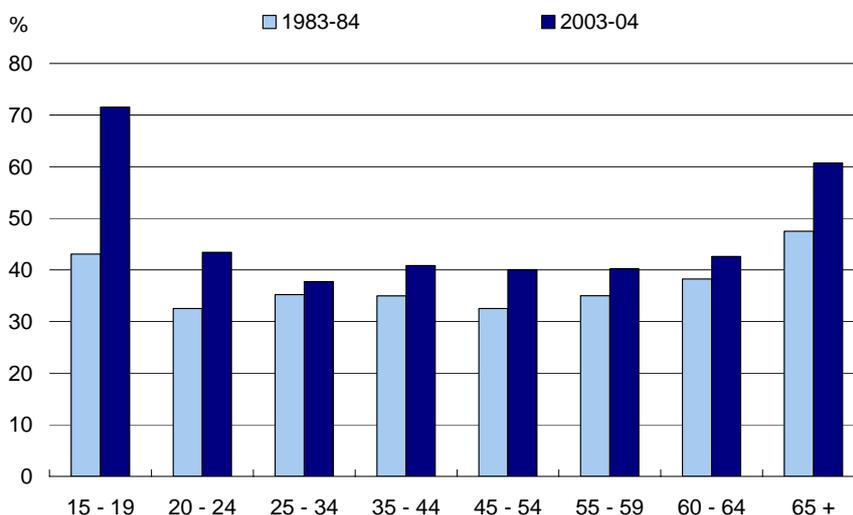
It should be noted that, while these arrangements may be appealing to older workers, the interaction of these arrangements with remuneration and superannuation may influence the decision to work or retire. As noted earlier, some defined benefit superannuation schemes have disincentives for part-time work at the end of a career. This provides a clear example of how any policy responses need to be cognisant of the possible interactions with existing policies or institutional arrangements.

Although flexible working arrangements can be seen as a tool to encourage the continued participation of older workers in the labour force, the legislative removal of discrimination on the basis of age means that the existing flexible working arrangements are available to the entire labour force. Any promotion of flexible working arrangements, even if targeted at older workers, may also increase the attractiveness of such arrangements to younger people.

Figure 3 shows that there is some evidence of workers in Queensland taking up more flexible working arrangements, in the form of reduced hours over the past 20 years. This shift is particularly marked in the 15 to 19 years and the 65-plus age groups.

The proportion of young people (15-19 years) working less than 35 hours per week increased by 28.5 percentage points over the 20 years to be 71.5 per cent of all employed 15-19 year olds in 2003-04¹⁸. In comparison, the 65-plus age group increased by 13.1 percentage points over the same period, to be 60.6 per cent of all employed persons aged 65 or more.

Figure 3. Employed persons working less than 35 hours per week by age group, Queensland
(proportion of employed persons in age group, per cent)



Source: Australian Bureau of Statistics, Cat. No. 6291.0.55.001, unpublished Labour Force survey data

Enterprise bargaining is underpinned by the notion that individual workers and employers are best placed to make workplace arrangements that suit themselves. Similarly, strategies to boost older age participation may be most effective when employers and employees deem it to be in their best interests. For example, a recent article in the *Harvard Business Review* highlighted the efforts of several major US and British firms that have implemented flexible working arrangements aimed at retaining their skilled and experienced older workers in transition to retirement (Dychtwald et al 2004).

There are also many ways that governments can help facilitate these types of flexible working arrangements, such as removing impediments to participation that exist in the retirement income system as well as the employment practices they implement as employers.

Discrimination against older people

Although discrimination in employment on the basis of age is outlawed in all state jurisdictions and at the federal level, many national recruitment agencies report that age discrimination is the number one barrier to employment for mature aged persons. Where older people face discrimination, real or perceived, they are less likely to remain in, or seek to enter, the labour force, adversely impacting the labour force participation rate for older people.

¹⁸ This may be largely due to the increased participation of young people in education over the two decades.

A study by the Australian Centre for Industrial Relations Research and Training (ACIRRT) found mature age workers were perceived at:

“One level ... as being more experienced and mature, having a better work ethic, being more committed to their jobs, and being more reliable and loyal (as evidenced by their lower rates of absenteeism and turnover). However, they can also be perceived as inflexible and rigid, with fewer abilities (physical and psychological), unreceptive to new technology, more resistant to organisational change, lacking appropriate skills, difficult to retrain, and lacking energy and enthusiasm.” (Pickersgill et al. 1996)

Other perceptions employers have of mature age workers are that they are less innovative and creative, have higher accident rates, and block the career paths of younger people. As noted elsewhere in this paper, these perceptions do not always align with reality. Older workers are also faced with changing workplace cultures that value adaptability and flexibility over longevity and commitment. This culture shift finds some employers prefer a younger person who has had a varied employment history to someone who has a long history with only one employer.

A preference for younger workers may be related to their, be it actual or perceived, lower overall cost of employment. That is, although wages may be similar, the on-costs for a mature age worker may be higher because of long service leave, and possibly a bank of unused sick leave and/or recreation leave, which if used may have an adverse impact on productivity. Despite the abolition of mandatory retirement in most occupations, some mature workers and employers continue to have an expectation that older workers should retire by the age of 65 years.

It remains unclear if the current reported difficulties faced by mature age people in obtaining or retaining employment are related to a mis-match of skills, are based on stereotypes of older people or reflect any financial disincentive due to relative costs of employment.

On a more positive note, as the population ages and labour force growth slows, non-job related assumptions and stereotypes are likely to have less weight in recruitment decisions, leading to more merit-based outcomes. While discrimination against older people may continue to exist, the adverse impact on labour force participation of older people is likely to be reduced, because of slower growth in the labour force and, through this, less discouraged workers withdrawing from the labour force.

3. Indicative projections of Queensland's long term labour supply

Informed by the factors identified in Section 2 as influencing labour force participation, it is possible to project the potential size of the Queensland labour force over the next fifty years. Some other considerations in preparing the projections are slowing population growth, the composition of the labour force by age-specific groups and the historical downward trend in male participation and the continuing strong migration into Queensland

The projections of Queensland's labour force provided here are based on the labour force projections currently employed in Queensland Treasury's Intergenerational Research Model. The methodology underlying these projections is discussed in detail in Appendix B.

Ideally, analysis of the impacts of intergenerational change, including a study of the impacts of population ageing on the labour force, should utilise a structural model that accounts for potential future changes in the economic incentives facing workers. While the Office of Economic and Statistical Research is developing such a model, the projections discussed in this paper are based on historical trends, which may or may not continue. As a result, these projections and associated commentary should not necessarily be regarded as reflecting the views of the Queensland Government.

3.1 Queensland labour force projections – the central scenario

The projections used in the Queensland Treasury Intergenerational Research Project are derived from two sources: projections of the Queensland population by age and sex; and projections of labour force participation by age and sex. In the central scenario, the 2003 Queensland Government Population Projections 'medium' series is used. Projections of labour force participation include an aggregate decline in the participation rate by around 10 percentage points, to be around 55 per cent in 2050-51.

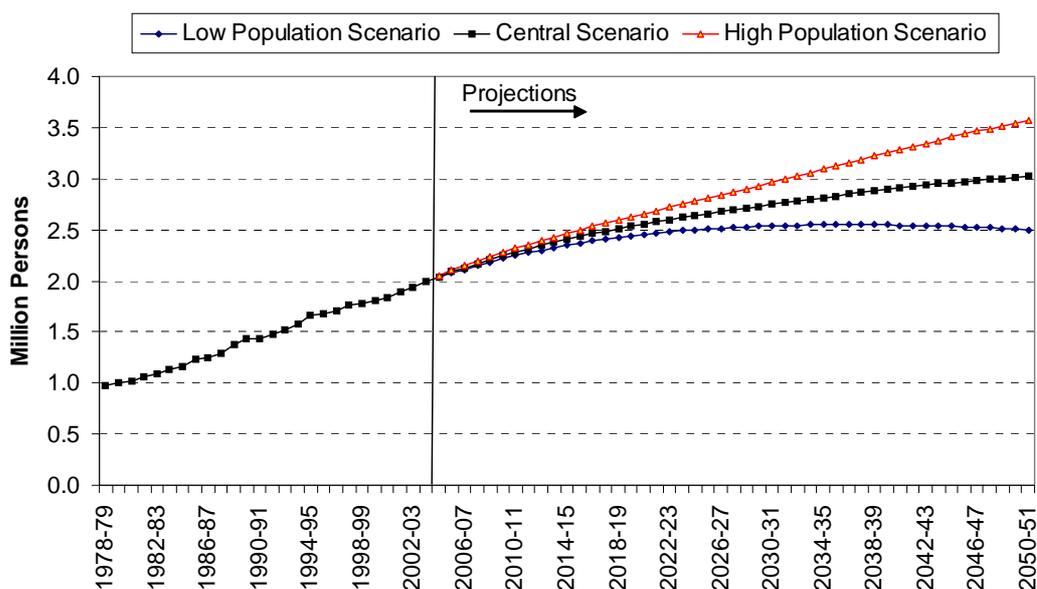
Combining the population and labour force participation projections leads to a scenario where Queensland's labour force continues to grow over the projection period. This growth slows significantly, but does not reverse, by the end of the projection period, with growth of about 49,000 people in the five years to 2050-51, which is around the current increase in the size of the labour force in one year.

3.2 Demographic scenarios

Alternative scenarios using the Queensland Government's 'high' and 'low' population projection series showed little change to the State's projected labour force participation rate, because the population age structure in each series is quite similar. However, applying these similar participation rates to the high and low population series still produced significant variation in the projected size of the labour force (Figure 4). Based on the high series, the projected labour force is some 18 per cent higher than in the 'central' scenario, and using the 'low' series it is around 17 per cent lower¹⁹.

¹⁹ The population assumptions vary in the fertility rate, life expectancy and migration – more detail is provided in Appendix B.

Figure 4. Historical and projected labour force under different demographic scenarios



Source: ABS Labour Force Survey and OESR projections.

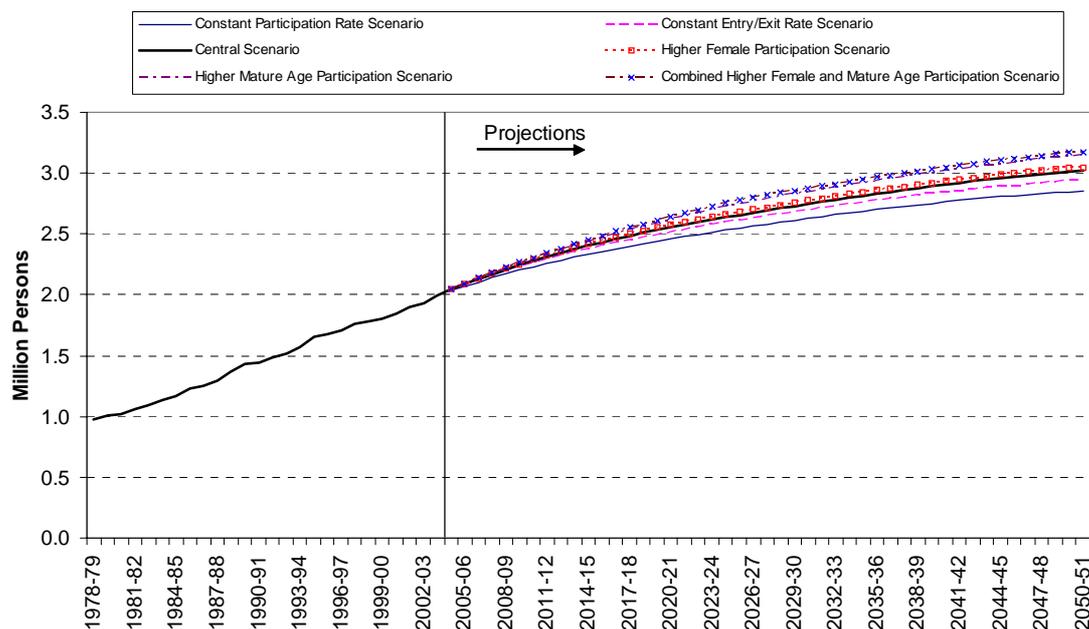
3.3 Participation scenarios

The ‘central’ scenario includes assumptions about the impact of cohort effects. Using different assumptions alters the labour force projections, which can assist in understanding possible impacts of ageing on the Queensland labour force. Scenarios that were analysed include the exclusion of the birth cohort effect, increased mature age and female participation. These and other scenarios analysed are described in more detail in Appendix B.

Removing the ‘cohort effect’ is analogous to holding the existing age specific participation rates constant for the projection period. However, this scenario is unlikely to eventuate, as it assumes the same age-specific participation outcomes for all birth cohorts. It should be viewed as a worst case participation rate scenario, primarily because the upward trend in female participation is assumed not to continue. Even under this worst case scenario, labour force growth over the projection period remains positive (Figure 5).

The higher female participation scenario assumed that a policy was introduced that halved the projected difference between male and female participation rates for the prime child bearing age groups (20 to 39 years), resulting in slightly stronger labour force growth than in the central scenario (Figure 5).

Figure 5. Projected Queensland labour force under different participation scenarios.



Source: ABS Labour Force Survey and OESR projections.

The higher mature age participation scenario assumes policy changes that increase the labour force participation of those aged 55 to 64 years. Examples of policies that might have effects of the magnitude shown are the implementation of actuarial fairness with respect to pensions and increasing the retirement age to 67 years, which were collectively assumed to increase the labour force participation rate by around 5 per cent for those aged 55 years or more. Combined with the increased proportion of older people the assumption of higher labour force participation resulted in a labour force 4 per cent larger than in the central scenario.

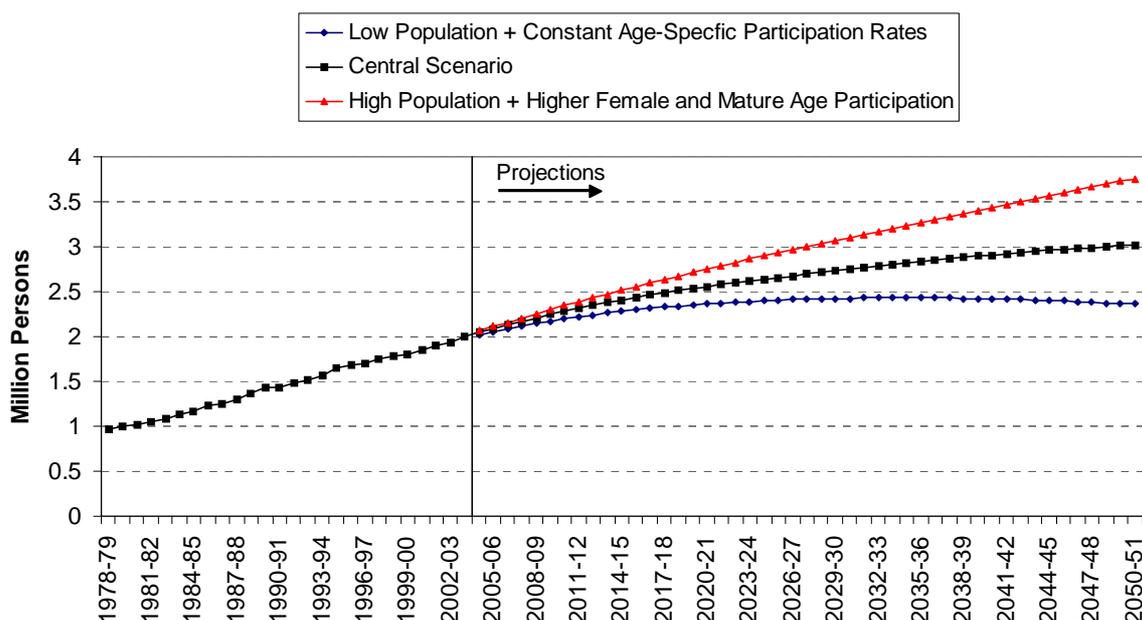
3.4 Sensitivity analysis

An upper bound for labour force projections was derived by combining the highest population and labour force participation rate assumptions. Similarly, a lower bound was derived using the lowest assumptions. Of interest is that labour force growth in the lower bound scenario projected negative labour force growth from 2034-35, the only scenario to do so, but the size of the labour force was still projected to be 18 per cent higher than in 2003-04.

3.5 The long term supply of labour in Queensland

Under all scenarios analysed in this paper, Queensland's labour force in 2050-51 is projected to be larger than today's labour force. The 'central' scenario suggests an increase of 51 per cent over the projection period, with the 'lower bound' and 'upper bound' scenarios suggesting a range of 18 per cent to 88 per cent increase (Figure 6). However, labour force growth is likely to progressively slow over time, with the net annual increase of the labour force (in persons) becoming much lower than today's levels.

Figure 6. Projected upper and lower bounds for the Queensland labour force.



Source: ABS Labour Force Survey and OESR projections.

Based on current trends and policies, further moderate declines in prime-age male participation are projected, offset to some extent by moderate increases in youth and mature age participation. Youth participation, particularly in the 15 to 19 year age group, reflects a continuation of the current trend for students to combine study and part-time employment.

Female participation is projected to continue its historical upward trend, achieving parity with male participation by the end of the projection period for all except the prime child-bearing age groups. This is in line with the increased labour force attachment of younger women generally and the increased educational attainment of females in younger age groups.

On the basis of the alternative scenarios presented here, labour force growth seems to be much more sensitive to demographic factors than to participation factors. The lower and upper bounds of the participation scenarios produced a variation in the 2050-51 labour force of around +/- 5 per cent. In contrast, the upper and lower bounds of the demographic scenarios produced a variation of around +/- 20 per cent. It should be noted that government has a greater capacity to influence factors leading to higher labour force participation than it has to alter demographic outcomes, such as the fertility rate.

Policies to increase participation may have a substantial impact, but are unlikely to completely negate the effect of population ageing on the overall participation rate. However, the difference in the size of the labour force in 2050-51 indicates that policies that remove, or reduce, incentives to withdraw from the labour force should be examined further.

4. Implications for the labour market – Will there be a shortage of labour?

Over the past twenty years, labour demand, as measured by employment growth, has grown on average in line with labour supply, at just under 3 per cent per annum. The analysis in section 3 above indicates that future labour supply is likely to grow very much more slowly over the next twenty years, by less than half the rate experienced over the past 20 years, at around 1.4 per cent per annum. Over a 40 year period, this growth is projected to fall even lower, to less than 1 per cent per annum. This apparent discrepancy between historical employment growth and projected future labour force growth sometimes results in concerns about potential future labour shortages. However, labour demand will also respond to ageing pressures. This section examines some of the evidence about the relationship between labour demand and labour supply and the consequent impact on unemployment.

4.1 Changes in labour demand

Associated with the ageing of the population and the slowing of labour force growth will be some inevitable changes to the nature of labour demand. As people age, their demands for goods and services also change, as does their capacity to pay for these goods and services. Central to this is the concept of an individual's lifecycle of demands and expenditures. In their youth, people borrow, invest in human capital by undertaking education, and work little. In their middle years, these people work more, acquire land and save financial and physical capital in order to finance future consumption. In old age, these people have a strong preference for leisure, receive implicit revenue from land, decrease their physical and financial assets and change their consumption patterns, for example by consuming relatively more health care services.

This lifecycle pattern suggests that the relative size of different age cohorts matters for a large number of economic issues. When the change in the composition of the population is as significant as indicated in section 3 above, it may bring with it significant macroeconomic effects. Individual lifecycle behaviour is the microeconomic basis for the potential macroeconomic impact of population ageing on aggregate consumption and national savings, output and economic growth, and labour supply and demand, as well as on the fiscal burden faced by governments.

The projected impact on the macroeconomy, and therefore on labour demand, can vary widely depending on the particular assumptions used. Under the more traditional view, summarised in Merette (2002), population ageing means that those of working age have to support a growing proportion of inactive people, so a decline in public and private savings must be expected. This trend is exacerbated by the fact that people in industrialised countries are living longer and healthier lives and also retiring earlier. Since the demographic change is sizable, major adjustments on the fiscal side (increased taxes etc) are inevitable. These fiscal adjustments, in turn, create a shortfall in the economy-wide savings rate relative to the investment rate. This will require larger net foreign borrowing and wider trade and current account deficits. All this will lead to a significant slowdown in economic growth and slower growth in living standards for the current young generation and future generations.

In terms of implications for the labour force, under this extreme scenario, the labour force would cease growing, come to a halt, eventually shrink and become older. This older workforce may suffer depreciation in skills and may be harder to retrain when the economy goes through rapid structural change. Furthermore, over time, population ageing is expected to lead to a lower private savings rate as individuals begin to consume their accumulated wealth when they reach retirement.

Public savings would also decline due to upward pressure on government spending, stemming from increased demand for health services and higher public pension benefits. This reduced labour force growth, increased interest rates and a shrinking tax base would act to force governments to raise taxes, resulting in a slower real potential output growth and leading to a decline in the growth in labour demand. That is, the declining labour force growth would be matched by declining labour demand growth. There would not necessarily be any change in relative labour shortages. The key impact would be felt on economic growth and living standards.

Clearly, the scenarios outlined in section 3 above are not as pessimistic for Queensland as the above would indicate. A contrasting scenario, which allows for the positive outcomes of the policy interventions currently being followed in Queensland, starts by noting that the most important determinants of aggregate economic growth are the level of technological progress and the stock of physical and human capital. Invention and innovation are then considered a source of economic growth, as both imply technological progress that improves the joint productivity of physical and human capital. The other source of GDP growth is the accumulation of factors of production, i.e. the increase in the stock of physical and human capital. This approach allows for faster rates of economic growth to be supported by a lower stock of labour. That is, labour demand is less than it would be in the absence of technological progress. The potential gap between labour supply and labour demand is removed through increased labour productivity.

While the pessimistic view argues that population ageing will act to inhibit creation and innovation, it is worth noting that historically, useful technological progress has coincided with changes in resource scarcity. The optimistic view then, stresses the importance of the adjustments that will take place in response to population ageing, adjustments that are missing from the pessimistic view. The key difference however is not the impact on labour shortages but on the potential rate at which the economy can grow. Under this more optimistic scenario which allows for technology change leading to productivity improvements, the demand for labour will still grow more modestly than experienced in the past, with productivity growth making up the difference. Some analysis of the economic "speed limits" implied by this approach is provided in Section 5 below.

4.2 Labour market adjustment

While the above suggests that labour shortages may not be as major a problem as some have argued, the issue of skills shortages may be a more serious one if an appropriate policy response is not put in place. One of the frequently cited concerns of ageing is an impending shortage of skills (for example Jackson (1996) and Cappelli (2003), with probably the most important factor in determining the implications of ageing on labour demand and skills shortages being the process of labour market adjustment. A more detailed discussion of skills shortage and labour market adjustment is provided in Appendix C.

The potential for skill shortages may be gauged through a comparison of recent past experience of labour market adjustment with the projected future. Lower employment growth and less industrial restructuring in the economy are projected by the Centre of Policy Studies at Monash University, in the period 2002-03 to 2010-11, suggesting that there will be decreased pressure on the labour market from structural adjustment, eliminating one source of skill mismatch.

Further, much of the debate and concern about skill shortages is due to the fact that they may arise following sudden changes in demand. Labour markets take time to adjust and this lag in adjustment may be responsible for shortages following sudden unanticipated changes in demand. However, population ageing is a gradual process and in this situation it is more likely that the adjustment in the labour market will be able to keep pace with the changes brought about by population ageing. This makes it seem unlikely that ageing will, by itself, result in skill shortages.

Some insight into the potential medium term impacts of ageing and the labour market adjustment that may take place may be obtained by looking at the changes that have taken place in the Japanese labour market, along with proposals to improve the use of labour within the Japanese economy. The process of population ageing has begun earlier in Japan than all other developed nations and for this reason, it would be expected that some of the responses and impacts of population ageing, expected in Australia over the next decade or so, have already begun to take place there.

Of the developed nations, Japan, has the highest proportion of its population of males and females over 60, at 23 per cent and 28 per cent respectively, compared with Australia's 16 per cent and 18 per cent²⁰. Goto (2001) outlines some of the problems experienced in the Japanese labour market, noting that while population policy may be powerless to prevent the dependency ratio from rising rapidly over the next 20 years or so, labour market policy appears promising.

With appropriate labour market policy, it may be possible to diminish the actual burden on the working population by keeping a balance between labour supply and labour demand. As argued above and as Goto notes, labour market imbalances are a result of both supply and demand side factors: with appropriate responses on either or both demand or supply, labour shortages may be avoided. For example, if there is a structural change to labour saving technology in Japan, and the participation rate is raised, for example, by increasing the number of female workers, a decline in the working-age population will not necessarily result in a labour shortage.

As indicated above, appropriate policy may result in an increase in labour productivity, offsetting some of the problem associated with a decline in the number of available workers. Again the Japanese economy illustrates that productivity improvements have the potential to offset the decline in labour supply: the working age population in Japan is expected to decline by 9.8 million persons in 15 years, or an annual decline of 0.7 per cent but labour productivity in Japan has been increasing by about 3 per cent per year. This suggests that a 0.7 per cent decline in the working age population can be easily offset by an increase in labour productivity in Japan.

²⁰ Source: Statistics Division and Population Division of the United Nations Secretariat

Section 2 above looked at a wide range of options which could be examined in more detail to support labour force growth. However, it should be noted that policies intended to enhance the supply of labour may have detrimental effects on the demand for labour where such a policy increased costs for employers. Further, such a policy would need to be deemed beneficial by both employees and employers if it was to be implemented in workplaces.

In Australia, tariff reductions and industry deregulation have been taking place for a considerable time. These policies have been largely aimed at improving the efficiency of the Australian economy but will also have the desirable side effect of making the Australian economy more responsive to international and domestic pressures, including the ageing of the population. This more flexible and efficient economy allows labour to move to industries where returns are higher, and therefore increase overall productivity.

Despite labour force growth slowing in the coming decades, skill shortages, at a general level, are likely to be avoided because of economic and labour market adjustment²¹. Where there are skill shortages, governments have a relatively limited capacity to directly manage demand for labour. However, important roles for governments will be to ensure information about any shortage is conveyed clearly and to ensure policies, including those aimed at increasing labour force participation, do not unnecessarily restrict labour market decisions or increase the cost of employment, and dampen labour demand.

Economic and labour market adjustment will occur with the relative scarcity of labour leading to relatively more capital (human and physical) being used in the production process. The price of labour is likely to increase as a result of its increased scarcity and this labour is likely to be more intensively used in occupations that provide a greater return. On average, the skill profile of the Queensland labour force is likely to increase, as demand increases for high skilled workers relative to low skilled workers. In this outcome, human capital will be an important part of increased productivity and sustained economic growth.

²¹ The current shortage of skills is limited to some occupations in specific industries, such as, trades in the construction industry and some types of engineers in the mining industry.

5. The impact of ageing on the Queensland labour market

The preceding sections have identified that the labour market, even in the absence of policy interventions, tends to adjust to a point where labour supply and demand are more or less in equilibrium.

Section 3 identified that labour force growth will slow substantially in the coming decades, based on current labour force participation trends. However, participation rates fluctuate in response to changes in economic conditions. For example, despite ageing, the annual average participation rate in Queensland increased 1 percentage point to a record high of 65.8% in 2004-05. In addition to cyclical fluctuations, birth cohorts have different levels of attachment to the labour force, with younger birth cohorts displaying greater attachment, in part due to increased educational attainment and higher female participation. As these birth cohorts age, their greater attachment to the labour force will generally increase the labour force participation rates of the age groups they are in. The participation rates of the older age groups in 2050-51 will be markedly different to, and are likely to be higher than, those in 2003-04.

In addition to greater attachment to the labour force, the increased educational attainment of younger birth cohorts will also be of importance because of the productivity growth associated with the overall increase in human capital in the labour force. This increased educational attainment may also be linked to the adjustment of the labour market to slowing growth in labour supply. Section 4 notes that the wages are likely to increase in response to tightening labour supply, encouraging greater use of labour saving technology and the investment in human capital by the labour force. The increased human capital, especially in the form of higher educational attainment profile, will assist in maintaining strong labour productivity growth. Higher levels of education encourage productivity growth through the capacity of those with more education to “more readily identify, adapt and implement new ideas – whether the ideas are generated domestically or overseas” (Dowrick and Day 2003).

Living standards of Queensland residents can be measured by GSP per capita, which is influenced by population growth, participation (through changes in the labour force participation rate, the unemployment rate and average hours worked) and productivity. Queensland recorded growth in per capita real output of 2.6 per cent per annum over the 10 years to 2003-04, of which 2.1 percentage points per annum was due to productivity growth, 0.4 percentage points per annum due to a lower unemployment rate and only 0.2 percentage points per annum due to a rise in the participation rate.

Slowing labour force growth in coming decades, is likely to see labour force participation detract from (or make a negative contribution to) future growth in per capita incomes. Productivity growth may partially offset the contribution from labour force participation, but is unlikely to prevent a slowing in economic growth and the rate of improvement in living standards.

Together, the growth rate of the labour force and productivity growth set an effective speed limit to the rate of growth of the economy. In conclusion, it is useful to highlight what the speed limit is likely to be under different scenarios.

Assuming that Queensland's current labour force participation trends continue, productivity continues to grow at its historical average (1.75 per cent) and there are no changes in government policy, slower labour force growth would be accompanied by a slower rate of economic growth. Under these assumptions, GSP per capita, a measure of material living standards could slow from 2.5 per cent per annum in the 1990s to around 1.4 per cent from the 2030s.

However, as this paper identifies there are likely to be changes in current labour force participation patterns, and as a result, productivity growth in coming decades. Depending on the assumptions used about labour force participation rates and, particularly, productivity growth, growth in Queensland's GSP per capita may only slow by 0.2 percentage points per annum to be 2.3 per cent (Queensland Government 2004).

Regardless of the assumptions used, it is likely that Queenslanders' standard of living will continue to increase, albeit more slowly than in the past. However, even with slower growth, the Productivity Commission note that "per capita incomes will still be much higher than today - indeed nearly double those of 2003-04 by 2044-45" (PC 2004).

It is important to note that the different policy levers of participation are likely to have a different impact on the rate of economic growth, and therefore standard of living, in the future. As the Australian Government's *Intergenerational Report* notes, "a substantial increase in participation of older workers would not have a large impact on the overall participation rate and hence economic growth" (Australian Government 2002). A similar result is indicated by the labour force projections presented in this paper. However, policies that pursue higher labour force participation should still be pursued, to reduce distortions in labour market decisions and increase the incomes of older people, which will be beneficial.

A sustained small increase in productivity growth rates can have a substantial impact over several decades, because of the compounding effect. The drivers of productivity growth, as identified in the Drivers of Economic Growth project, are: capital deepening; efficiency improvements; and technological progress. These drivers provide the scope for policy responses across a range of areas, which, combined with slower labour force growth, is likely to see productivity growth contributing more to improved living standards in the future.

To ensure that the standard of living in Queensland is able to grow at a sustainable pace in the future, any policy intervention to improve labour force participation or productivity will need to be designed and implemented in a manner that removes or prevent distortions in labour market decisions.

Current labour market participation patterns and productivity growth are shaped by past and present policy interventions. Some policies, such as the compulsory retirement age in the public sector, prevented many older workers from remaining in the workforce, and removing this limitation has allowed these workers to make a decision based on their and their employer's needs. Many of the policies introduced, or proposed, in recent times are relatively benign. That is, they tend to remove or reduce distortions to labour market decisions, for example, aligning the male and female qualification age for the Age pension reduces the incentive for women to withdraw from the labour force at an earlier age.

However, it is important to recognise that new policies aimed at encouraging labour force participation may have a detrimental impact on demand for labour. Policies that place restrictions on labour market decisions or increase the cost of employment could actually curtail demand for labour, employment and even labour force participation. Any policies would need to be seen to be beneficial to both employees and employers to gain support.

6. The Queensland Government's policy response

The previous sections of this report have identified the parameters of the ageing issue facing Queensland and Australia over the next 40 years and the likely impact of ageing on labour demand and supply in Queensland. The areas where policy responses are likely to be most effective, in increasing workforce participation, increasing productivity growth or both, have also been indicated. This section outlines how ageing is likely to impact on the Queensland Government, identifies policy options to offset some of the potentially adverse effects of ageing on the labour market and on the economy, and also discusses how the Queensland Government, as a major employer in the State, is modifying its recruitment and retention strategies and employment policies in the face of ageing.

The Queensland Government has done considerable work to identify the major impacts of ageing on the Queensland economy and Queensland budget which has been published elsewhere (for example; submissions to the Australian Government's *Australia's Demographic Challenges* Discussion Paper and the Productivity Commission *Economic Implications of an Ageing Australia* research report). This paper has limited the debate to the likely impact on the labour force. Two areas of service delivery where increased demand for government services is likely as a result of demographic changes and which have also been identified as areas which will affect labour market outcomes are health and training. While increased expenditure on these two areas is likely to improve labour market outcomes, it will also place additional pressure on State Budgets, as identified by the Productivity Commission in their recent report. Thus there is some need to identify the most cost effective policies which will lead to the improved health and employment outcomes necessary to improve the overall economic outcome for the State.

6.1 Policy imperatives for Queensland

Increased labour force participation is not likely to prevent labour force growth slowing in the future, but greater utilisation of some of the population that does not currently participate – for example, early retirees, people over the age of 65 years and some welfare recipients (such as some of those currently accessing disability pensions) may change the rate at which labour force growth moderates. (In increasing labour force participation it is important to recognise that there may be some impact on productivity and the unemployment rate.)

Increasing labour force participation is not solely a task for State governments, but requires the cooperation of all levels of government and the private sector. Most labour force participants (assuming they are successful in finding employment) are likely to work in the private sector (over 80 per cent of employed persons in Queensland were employed by the private sector in 2004).

There is a shared responsibility for the Queensland and Australian Government to work together to minimise the impact of ageing on the economic outcomes for the state and the nation. Many of the areas identified in section 2.1 as influencing the labour force participation rates of older workers lie more in the control of the Australian Government rather than the State governments. In particular, the opportunity cost of non-participation is most readily influenced by Australian Government policies, including policies surrounding superannuation and the aged pension, as well as those relating to the interaction of the social security and taxation systems.

The Australian Government could be encouraged to pursue welfare reform that reduces the high effective marginal tax rates faced by transfer payments recipients, including the unemployed, people with disabilities and families with a non-working parent. Further changes to superannuation policy could be implemented to allow older workers to draw on superannuation to supplement income from employment.

However, while the Australian Government may have the primary role in superannuation and pensions and welfare reforms, there is an important role for the Queensland Government to work with the national government to ensure that the different characteristics of Queensland industry and labour market are adequately accounted for in ensuing policies.

Other areas are ones of shared responsibility, such as education and training and it is important that the two levels of government work to ensure that their policies in this area are complementary rather than competitive.

However, in addition to working with the Australian government, the State Government does have a role in increasing labour force participation by removing or reducing impediments to the efficient operation of the labour market, where it can demonstrably do so.

Policies that could be pursued, at a State level, to increase labour force participation include:

- education and training:
 - to increase the attachment of potential employees to the labour market, through increasing their employability; and
 - to assist in matching the skills of the workforce with those required by employers. This includes retraining people who are not able to continue working in physically demanding occupations;(Policies aimed at increasing the level of education and training also have the added effect of raising the productivity of the labour force)
- preventative health measures, including health education and early intervention to enable people to continue working;
- inform employers of the benefits of employing mature age and people with disabilities;
- explore injury recovery and return to work regimes, with a particular focus on mature aged workers;
- investigate ways to combine caring and family responsibilities with employment, which may include more flexible employment arrangements or ensuring the availability of commercial caring arrangements;
- re-evaluate regulation where the regulatory costs exceed benefits; and
- recognise the skills and experiences of older workers that may be applied in other occupations, possibly certification to more readily identify these skills to potential employers.

6.2 Managing an ageing workforce

The Queensland government labour force is ageing rapidly and also has an older profile than that of broader industry. As at June 2004, 43 per cent of Queensland public service employees were aged over 45 years, up from 38 per cent in December 2000. The average age in 2004 was 43 years, up from 41.6 years in 2000. The average age of Australian workers is currently about 38.8 years.

Future capability and capacity to deliver government services will depend in part on the Queensland Government's ability to retain and further develop the skills of its existing older employees. In the public sector, secondary school teachers, managers, social welfare workers, nurses, cleaners and carers are among those with high expected retirement rates and lower proportions of younger "replacement" employees. Increasing the workforce participation of people aged 55 to 64 is critical to supporting future requirements in a more competitive and ageing labour market.

The Queensland Government has released a guide prepared by the Department of Industrial Relations to assist public service departments to assess and respond to ageing workforce management issues as appropriate to their particular demographic and skill make-up and their service delivery demands. As well as signalling the importance of specifically targeting ageing as a workforce management issue the guide identifies the following key elements of good practice in managing an ageing workforce:

- Proactively addressing age discrimination and age stereotyping in recruitment and selection, training and development, performance management, succession planning and attitudes to workforce participation.
- Using integrated approaches to recruitment, workforce planning, career and succession planning, job design, training and development and knowledge management to better develop and transfer critical organisational skills and knowledge.
- Supporting older employees to make informed choices about their workforce participation and where interested and practicable to use available flexible work practices to pursue a more gradual retirement from the workforce.
- Using skill and career development activities, good job design, raised awareness about health and well-being, work and life balance and a pro-active approach to workplace health and safety to encourage and support older workers to maintain their employability and to improve the quality of jobs on offer.

The guide contains information and suggestions for public service employers about the changing concept of retirement, age-discrimination legislation, common age stereotypes, recruitment and selection and performance management of older employees, career plateaus skills obsolescence and retraining issues, knowledge transfer and retention strategies, health and well-being of older workers, elder care issues, workplace health and safety and the use of flexible retirement options such as part-time and part-year work, job-sharing, leave without pay to take a career break or a trial period of retirement, working at a different level of responsibility and re-entering the workforce.

Workplace health and safety strategies and actions include improving job and work task design by avoiding use of excessive work rates and workload targets, providing training about the easiest and most efficient methods of task performance and adjusting aspects of the job or work practices to match changed mobility, hearing, vision or ergonomic requirements.

As a next step, the Department of Industrial Relations is examining the possibility of carrying out a survey of workforce planning issues in Queensland public service agencies in 2005-2006, with a view to encouraging departments to more clearly identify their current and future skill needs and to undertake more detailed assessments of the impacts of ageing on their workforce profiles. The survey may also identify whether there are issues that may require more specific work with individual agencies to address ageing issues within particular occupational groupings.

A number of changes to leave arrangements that would provide public service employees with a greater range of opportunities to effect a part-time or part-year work type arrangement are also currently under consideration. Suggested changes include allowing employees to access long service leave one day at a time and at half-pay for any purpose and to access recreation-leave at half-pay.

For example, an older employee who has a large long service leave balance and who is interested in continuing to work part-time beyond their anticipated retirement could opt to use their long service at the rate of one or two days a week and effectively work part-time while continuing to access a full-time salary. Similarly, an older employee who may have otherwise considered full retirement could take recreation leave at half-pay or a combination of recreation leave and long service leave at half-pay to work a reduced number of months per year as part of a more gradual approach to retirement from the workforce.

7. Conclusion

The ageing of the population is likely to lead to large economic and social changes in the coming decades. These changes will have implications for Australian governments at all levels, with one of the most pressing issues being slowing growth in the labour force. It is also anticipated that there will be lower labour force participation, slowing growth of taxation revenues and increased demand for government services such as health and aged care.

In response to these issues, the Australian Government has advocated the introduction of policies to grow the economy more quickly via increases in labour force participation and productivity. Similarly, the Queensland Government outcome of improved living standards for all Queenslanders will be supported by ensuring the economy is capable of generating sustainable, long-term rates of growth and through it increased employment opportunities.

The Australian Government's papers on the impact of ageing on the labour force highlight the need to increase labour force participation generally, and of older people in particular. One of the core assumptions in these papers is that the labour force participation rates of older people will remain static unless there is government intervention.

However, it is the contention of this paper that participation rates for older people are likely to increase in coming decades and that increasing labour force participation is only part of any adjustment required because of the economic and social changes due to an ageing population.

The main factors that influence labour force participation are the opportunity cost of not participating in the labour force, health, family responsibilities and the capacity of the industrial relations systems to provide suitably flexible working arrangements. Changes in these factors will influence labour force participation in the future, with many possibly leading to increased participation.

The opportunity costs of not participating in the labour force are influenced by the retirement income system, the transfer system and changes in educational attainment. The retirement income system and the transfer system provide incentives, intentional or otherwise, towards withdrawal from the labour force. These incentives include: large increases in the superannuation replacement rate, which increased the attractiveness of retirement; the capacity to take superannuation payments as a lump sum; and the considerable concessions afforded to those in receipt of the Age pension. Further, the availability of an array of income support payments, some of which were not activity tested, such as Newstart Allowance, Disability Support Pension and the Mature Age Allowance, may have provided avenues for withdrawal from the labour force.

Many of these incentives to labour force withdrawal have been subject to changes that include an almost universal superannuation system, incentives to convert superannuation wealth into an income stream, the introduction of a seniors concession scheme, tightening of eligibility criteria for some income support schemes, and the cessation of certain transfer payments. The sum effect of these changes is to increase the opportunity cost of not participating in the labour force into the future, which is likely to lead to increased participation, particularly in the 55 to 65 year age group. Further, the increased consumption aspirations of 'baby-boomers' and subsequent generations are likely to increase the opportunity cost of not participating in the labour force.

Significant investments in human capital through increasing levels of education and training have been, and continue to be, made nationally and in Queensland. The higher educational attainment of workers increases attachment to the labour force through the desire to realise the return on the education investment. It is anticipated that over the coming decades the higher educational attainment of workers may induce higher participation, particularly as the more educated cohorts move into the older age groups.

Improvements in the overall health of the Queensland population are likely to continue to reduce the impact of enforced labour force withdrawal due to ill-health. Further, increased employment flexibility may offer an avenue for those with health issues to maintain their participation in the labour force. Similarly, any increased requirement to care for family members may not alter aggregate labour supply substantially because of the existence of more flexible working arrangements.

However, increasing labour force participation does not necessarily entail greater employment, but could increase unemployment, and may also adversely impact on labour force productivity. Greater labour force participation may only be beneficial when an increase in the supply of labour is accompanied by a similar increase in the demand for the skills and experience of those remaining in or re-entering the labour market.

Raising participation rates of older workers is not an end in itself, but one of many ways of achieving the ultimate policy goal, which is to continue growth in real incomes and adequate provision of services in the face of rising dependency rates and government outlays as a consequence of population ageing. Raising the participation rates of all segments of the working-age population and, more importantly, continuing productivity growth will play an important role in addressing the economic challenges of population ageing.

Consequently ensuring the growth of living standards continues at a reasonable rate in the future will require appropriate planning and policy responses from all levels of government in Australia. This paper has indicated some of the most fertile areas for such policy response from both the national and Queensland governments.

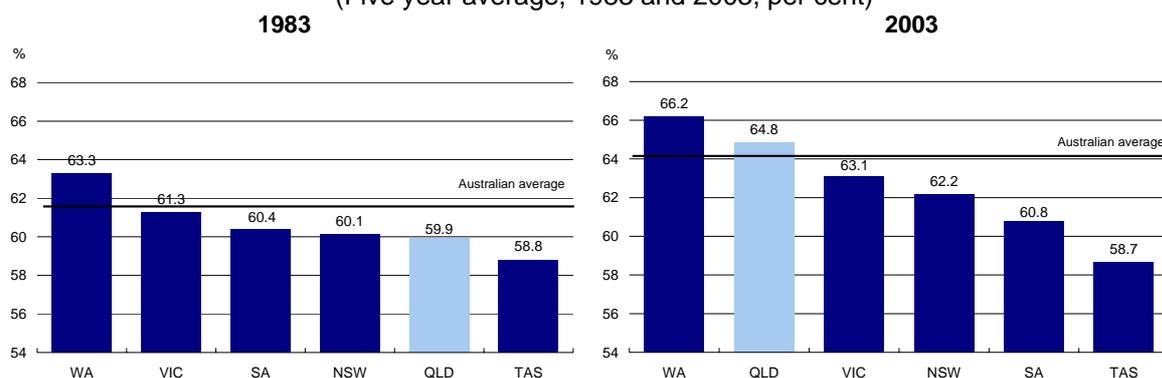
Appendix A Analysis of the Queensland participation rate

This appendix compares the Queensland participation rate with that in other Australian States and countries in aggregate and by age group and gender. Comparing Queensland's overall participation rate with that of other economies understates the participation rate challenges facing the State, and a more decomposed comparison of participation rates highlights structural issues associated with Queensland's participation rate.

Interstate comparison

Queensland's labour force participation rate for the five years to 2003 averaged 64.8 per cent, higher than the 63.3 per cent recorded nationally. The State's labour force participation rate has increased at a faster rate than the other states over the past 20 years, rising from a five-year average of 59.9 per cent in 1983 to 64.8 per cent in 2003. Figure A1 compares participation rates across the States and shows the substantial rise in Queensland's labour force participation rate over the last 20 years, both in absolute terms and relative to other States.

Figure A1. Labour force participation rate by Australian State
(Five year average, 1983 and 2003, per cent)



Source: Australian Bureau of Statistics Cat. No. 6202.0

Since Queensland's relatively high participation rate may reflect different age structures, rather than interstate differences in propensities to participate, it is instructive to compare Queensland's participation rate with that of other Australian states at a more disaggregated level. This analysis enables us to gauge the relative importance of age structure and age cohort effects in explaining differences in labour force participation rates between states. Table 2 compares the five-year average participation rate by age and gender in Queensland with that of Western Australia (with the highest participation rate) and Victoria (with the third highest participation rate behind Queensland) in 1983 and 2003.

Higher male *and* female participation explain why Western Australia has a higher labour force participation rate than Queensland and why Queensland ranks above Victoria in 2003. However, more detailed points to note about Table A1 include:

- While male participation rates have fallen in Queensland and Western Australia over the past 20 years, Queensland's total male participation rate has remained over 2 percentage points lower than Western Australia's. This is largely due to lower participation among males 35 years and over in Queensland.
- Female labour force participation rates were generally lower in Queensland relative to Western Australia in 1983. However, in contrast to males, female labour force

participation rates in Queensland have actually caught up to and overtaken those in Western Australia in 2003, with the exception of the 45-54 and 50-59 age groups.

Table A1. Interstate comparison of labour force participation rates
(Queensland, Western Australia and Victoria)

(a) Male participation						(b) Female participation					
Age group	1983 rates			Qld differential		Age group	1983 rates			Qld differential	
	Qld	WA	Vic	WA	Vic		Qld	WA	Vic	WA	Vic
	%	%	%	% point			%	%	%	% point	
15-19	69.4	69.0	60.9	0.4	8.4	15-19	64.9	65.0	57.2	-0.1	7.8
20-24	92.9	90.7	90.0	2.2	2.9	20-24	68.3	67.5	74.5	0.8	-6.2
25-34	95.4	95.4	96.2	0.0	-0.8	25-34	49.2	52.5	55.6	-3.3	-6.5
35-44	94.7	95.8	95.7	-1.1	-0.9	35-44	54.3	59.8	59.5	-5.6	-5.2
45-54	89.9	92.5	91.3	-2.6	-1.4	45-54	43.7	50.6	49.8	-6.9	-6.1
55-59	78.1	82.5	82.1	-4.5	-4.0	55-59	25.2	28.8	29.7	-3.6	-4.5
60-64	46.5	50.3	51.9	-3.8	-5.4	60-64	10.7	12.0	12.9	-1.3	-2.2
65+	9.6	9.3	11.5	0.3	-1.9	65+	2.4	2.4	2.9	0.0	-0.5
Total	77.3	79.7	77.6	-2.4	-0.3	Total	42.8	46.8	45.6	-4.0	-2.8

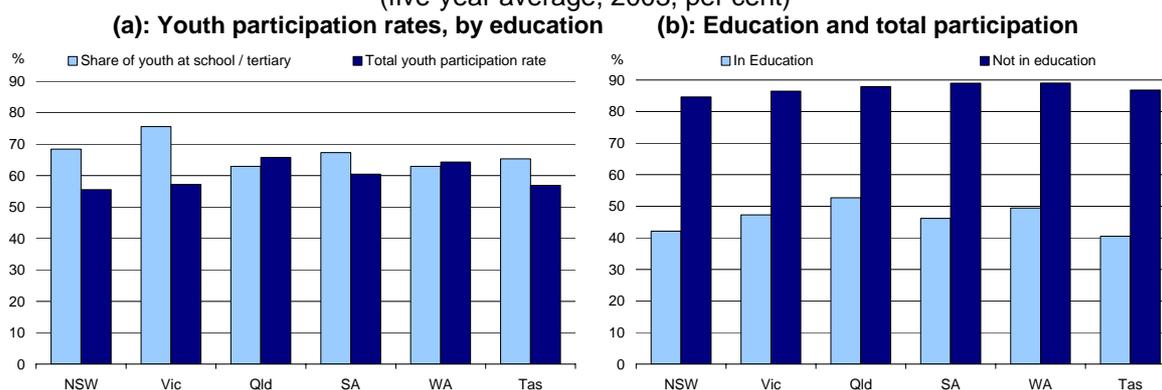
Age group	2003 rates			Qld differential		Age group	2003 rates			Qld differential	
	Qld	WA	Vic	WA	Vic		Qld	WA	Vic	WA	Vic
	%	%	%	% point			%	%	%	% point	
15-19	64.6	63.1	56.4	1.5	8.2	15-19	67.1	65.5	58.0	1.5	9.1
20-24	88.0	85.6	85.1	2.4	2.9	20-24	78.0	76.5	78.6	1.4	-0.6
25-34	91.0	91.8	92.6	-0.8	-1.5	25-34	69.9	67.9	71.5	2.0	-1.5
35-44	90.6	92.9	91.8	-2.4	-1.3	35-44	72.8	71.8	71.1	1.0	1.7
45-54	87.6	89.4	87.9	-1.8	-0.3	45-54	71.8	74.5	71.0	-2.7	0.7
55-59	73.4	78.0	72.8	-4.5	0.7	55-59	48.8	53.0	47.8	-4.3	1.0
60-64	48.9	53.7	49.8	-4.7	-0.9	60-64	25.1	24.1	22.3	1.0	2.8
65+	10.4	10.8	10.3	-0.4	0.1	65+	3.5	3.5	3.0	0.0	0.5
Total	73.0	75.2	72.1	-2.2	0.9	Total	56.9	57.3	54.5	-0.4	2.4

Note: Differentials may be subject to rounding errors.

Source: Australian Bureau of Statistics Cat. No. 6202.0

- Higher participation by youth (15-19 year olds) is the main reason Queensland has a higher participation rate relative to Victoria, with the differential between the two states with respect to this cohort for both males and females remaining fairly constant over time.
- Higher youth participation in Queensland may reflect a lower rate of education participation by this group. Figure A2(b) shows that participation rates across States for youth not in education (80-90 per cent) are nearly twice that for youth in education (40-50 per cent). Figure A2(a) shows that States with a higher share of the youth population in education (Victoria and New South Wales) have lower youth participation rates than those with a lower share of youth in education (Queensland and Western Australia).

Figure A2. Education and youth (15-19) labour force participation
(five-year average, 2003, per cent)



Source: Australian Bureau of Statistics Cat. No. 6202.0

This interstate comparison of participation rates confirms that comparing Queensland's aggregate participation rate relative to other states may mask important differences in labour force participation across age groups and gender.

For example, if higher youth participation rates are largely due to lower educational participation in Queensland, policies to raise educational attainment will in the short term lower the participation rate (everything else being constant). However, such policies will still be crucial to addressing ageing issues in the long term, by raising the long-term potential for participation in the economy and also raising overall productivity.

Similarly, if Queensland continues to have lower mature age (55 years and older) male participation rates relative to Western Australia, Queensland's overall participation rate will be more adversely affected in coming decades, as this age group increases as a proportion of the population.

Trends in the participation of older workers

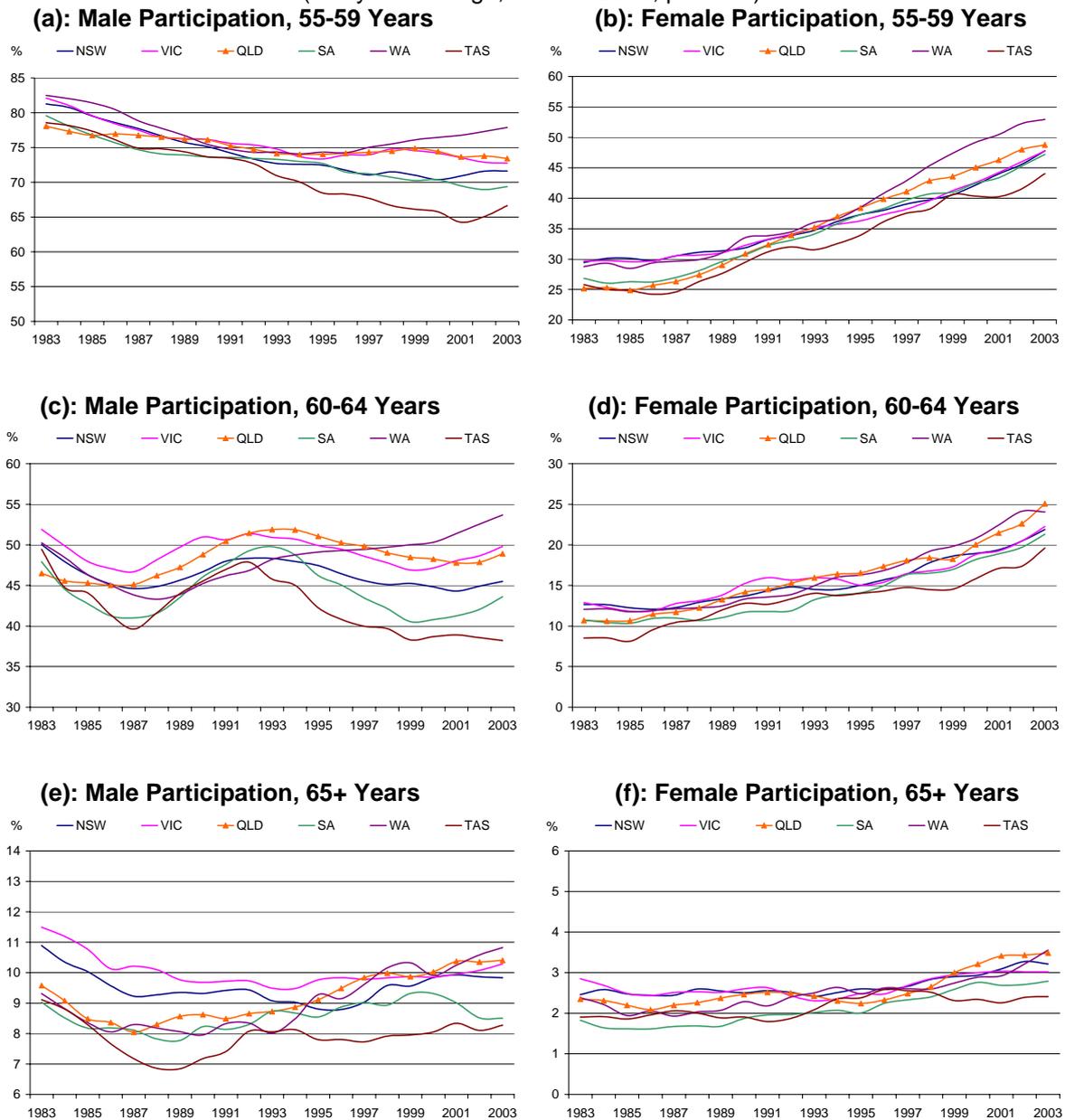
To provide further context for the discussion of factors that affect the participation decision, particularly for older workers, this section examines labour force participation trends for older workers on an international and interstate basis.

Interstate comparison

Figure A3 (including charts a to f) displays the (five-year average) labour force participation rates of the three mature-age cohorts for both males and females in all Australian States over the past two decades. The general trend for female participation, across all mature age cohorts, is for an increase in participation. In particular, participation in the 55-59 cohort has increased from around 25 per cent to 30 per cent in 1983 to around 45 per cent to 50 per cent in 2003, while the 60-64 cohort has seen participation almost double, from around 10 per cent in 1983 to over 20 per cent in 2003.

Participation by women aged 65 years and over remains to be quite low at between 2 per cent to 4 per cent, although participation in most states in this cohort appears to have increased marginally over the period. The other trend apparent in the female data is that in most States, participation rates have followed a similar path over the period and are fairly close.

Figure A3. Mature Age Labour force Participation Rates, Australian States
(five-year average, 1983 to 2003, per cent)



Source: ABS 6202.0

The trends in male mature-age participation rates across the States are more varied. In the 55-59 cohort, participation declined steadily in all states during the 1980s and early 1990s, with the decline easing in most States in recent years. Participation in the 60-64 cohort has been quite erratic, falling sharply in the early 1980s, followed by a rise in the late 1980s and early 1990s before dispersing substantially over the last decade. After falling for most of the 1980s, male participation in the 65 years and over cohort appears to have at least stabilised, or even increased, over the past ten years.

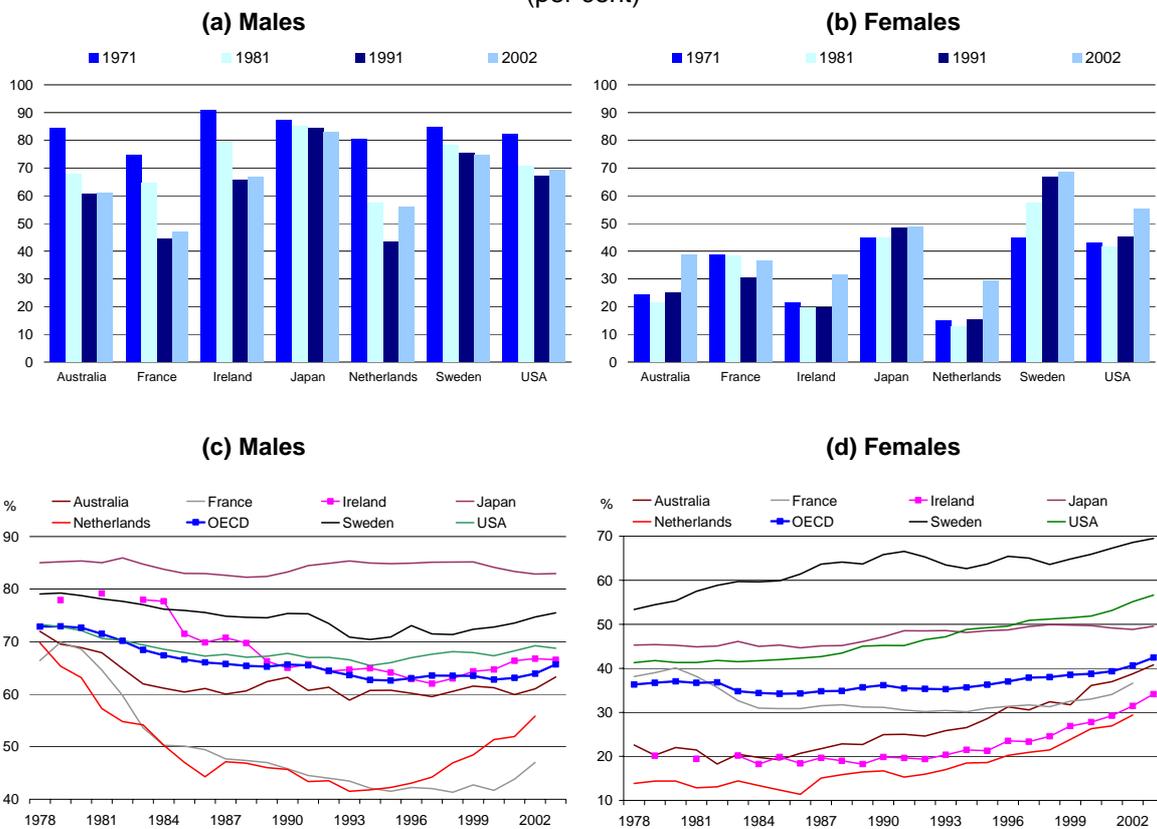
Apart from the more erratic nature of male participation trends, the other marked difference between male and female participation is that male participation rates across different States have become far more dispersed in recent years. In 2003, the range between the highest and lowest participation rate for the 55-59 age cohort was 11.3 percentage points for males and 7.9 percentage points for females, while in the 60-64 age cohort the range was 15.5 percentage points for males and only 5.5 percentage points for females.

International comparison

The general trend across most OECD countries over the past few decades has been for a significant reduction in the participation rate of older males, while the participation rate of older females, in line with the general trend for women, has been rising (Figure A4).

In many countries, labour force participation by older males appears to have resumed an upward from the mid-to-late 1990s. The OECD average participation rate for males aged 55-64 years reached a nadir at 62.6 per cent in 1995 but has since risen over three percentage points to be 65.7 per cent in 2003. However, it is not clear, at this point in time, whether these changes are merely cyclical in nature, or reflect the impact of 'baby-boomers' entering this age group.

Figure A4. Labour force participation rates of 55 to 64 year olds by gender
(per cent)



Source: OECD

Another significant trend to emerge over recent decades is that the average age of retirement has been falling for both males and females. Table A2 shows that for countries that have experienced a large fall in their male participation rate (Australia, France, Ireland and Netherlands) have also had a larger fall in the average age of retirement over a similar period. The female situation is less clear, although the consistently higher participation rate countries such as Japan (48.8 per cent in 2002), Sweden (68.6 per cent) and, to a lesser extent, the United States (55.2 per cent) have higher average retirement ages and had smaller falls in the average retirement age (-0.9, -0.4 and -3.2 years respectively) when compared to the countries with lower female participation.

Table A2. Estimates of average retirement age and participation rate changes

	Males				Females			
	Average retirement age			Participation rate	Average retirement age			Participation rate
	1970	1995	change	change 1970-	1970	1995	change	change 1970-
years	years	years	1995	years	years	years	1995	
			per cent				per cent	
Australia	65.0	61.8	-3.2	-24.3	60.3	57.2	-3.1	5.3
France	63.5	59.2	-4.3	-33.9	64.0	58.3	-5.7	-9.0
Ireland *	67.5	63.4	-4.1	-26.9	69.8	60.1	-9.7	0.0
Japan	67.7	66.5	-1.2	-1.8	64.6	63.7	-0.9	4.2
Netherlands *	63.8	58.8	-5.0	-38.3	62.9	55.3	-7.6	3.7
Sweden	65.3	63.3	-2.0	-14.5	62.5	62.1	-0.4	19.2
United States	65.4	63.6	-1.8	-17.0	64.8	61.6	-3.2	6.2

* Change in participation rate is for the period 1971 to 1995.

Source: Blöndal and Scarpetta (1999) and OECD

The important link between these two trends is that all other things being equal, the earlier the average retirement age, the lower the participation rate of the 'Retirement Zone' age cohort of 55-64 years. With population ageing, the proportion of the total working age population in this older cohort will increase and, therefore, the labour force participation decisions of older workers will have a greater impact on the overall participation rate. Consequently, over the coming decades, the retirement decisions of older workers will play an increasingly critical role in determining the participation rate.

Appendix B Projections of the Queensland participation rate

This appendix has been produced as part of the Interdepartmental Ageing Labour Force Project. Its purpose is threefold:

- i. To discuss the labour force projections currently employed in Queensland Treasury's Intergenerational Research Project;
- ii. To show how the projections might vary under different demographic assumptions; and
- iii. To show how the projections might vary under different labour force participation assumptions.

It should be noted that the projections discussed in this paper represent the first step of a long term research initiative into the intergenerational issues surrounding the labour force. While we can gauge the sensitivity of labour force projections to various assumptions, the likelihood of a given set of assumptions coming to pass is difficult to assess without a structural model of labour force participation. Once such a model is developed, these labour force projections are likely to change.

Finally, the projections and commentary contained in this paper are provided for discussion purposes only, and do not necessarily reflect the views of Queensland Treasury or the Queensland Government.

Queensland labour force projections – the central scenario

This section outlines the labour force projections currently used by Queensland Treasury's Intergenerational Research Project.

The projections are derived from two sources:

- i. Projections of the Queensland population by age and sex; and
- ii. Projections of labour force participation by age and sex.

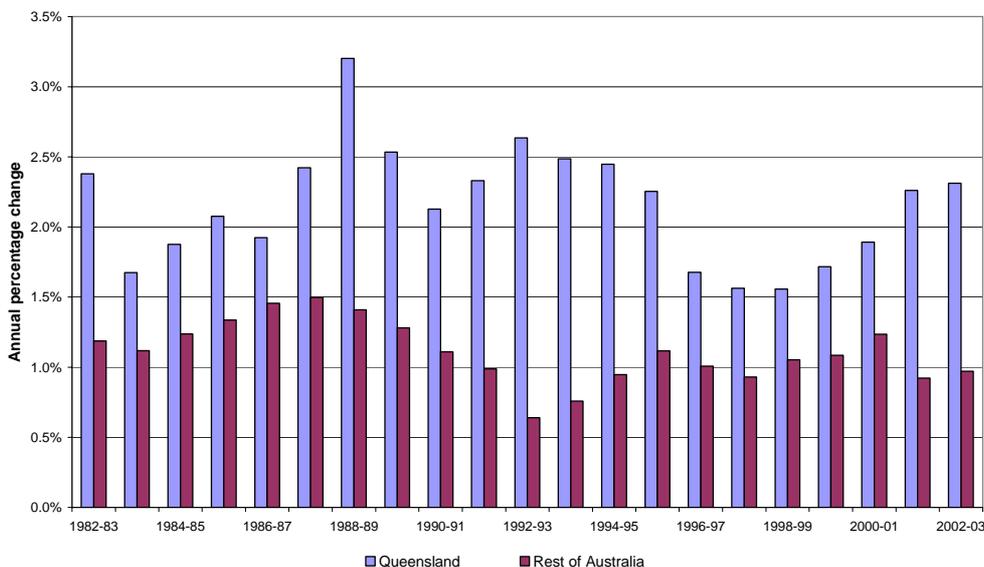
It is important to note that these projections are currently under review and should not be quoted.

Population projections

In the labour force context, the two most important population factors are the *growth* and the *age structure* of the population.

Queensland has been the fastest growing state in Australia since the mid-1970s. A comparison of population growth rates over the last 20 years is shown in Figure B1. Over the two decades to June 2003, Queensland's population has increased by over 50 per cent, compared with around 26 per cent for the rest of Australia. Consequently, Queensland has accounted for an increasing share of Australia's population, rising from 16.1 per cent in 1982-83 to 19.1 per cent in 2002-03.

Figure B1. Population Growth, Queensland and Rest of Australia.



Source: ABS 3101.0.

Over the decade to 2003, interstate migration accounted for 42 per cent of the State's population growth. The two other sources of population growth were natural increase (the surplus of births over deaths) – which contributed 38 percent – and overseas migration, which contributed the remaining 20 per cent.

Looking ahead, Queensland's strong population growth is projected to continue over the next five decades. The Queensland Government Population Projections (Queensland Government, 2003) provide three future population growth scenarios. The three scenarios use different assumptions relating to fertility, life expectancy, and interstate and overseas migration. These assumptions are shown in Table B1.

Table B1. Assumptions used in the Queensland Government Population Projections.

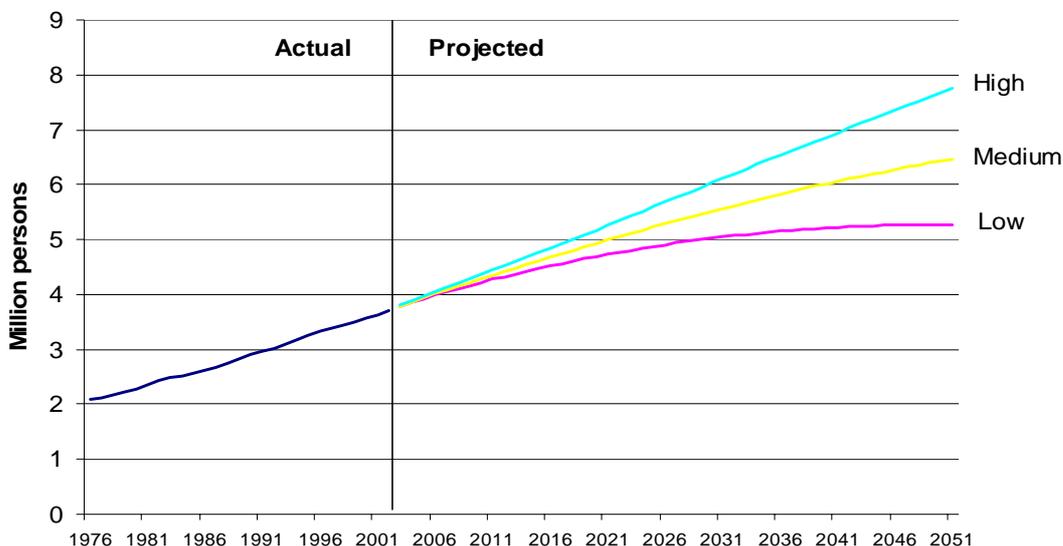
Variable	Assumptions		
	Low	Medium	High
Total Fertility Rate (live births per female, by 2050-51)	1.4	1.6	1.8
Life Expectancy (years, by 2050-51)	83.4 (m) 86.6 (f)	87.8 (m) 90.0 (f)	92.1 (m) 93.4 (f)
Net Overseas Migration (persons)	2001-02	13,950	18,600
	2002-03	13,425	17,900
	2003-50	12,000	16,000
Net Interstate Migration (persons)	2002-03	33,500	38,500
	2003-04	28,000	35,000
	2004-50	21,500 down to 11,700 by 2050-51	29,500 down to 24,500 by 2050-51

Source: Queensland Government Population Projections (2003).

The outcomes of the three population growth scenarios are shown in Figure B2. The Medium scenario is employed in Queensland Treasury's Intergenerational Research Model. In this scenario, the State's population is expected to rise from 3.8 million people in 2003 to around

5.3 million people in 25 years, further increasing the State's national population share to around 22 per cent.

Figure B2. Actual and Projected Queensland Population.



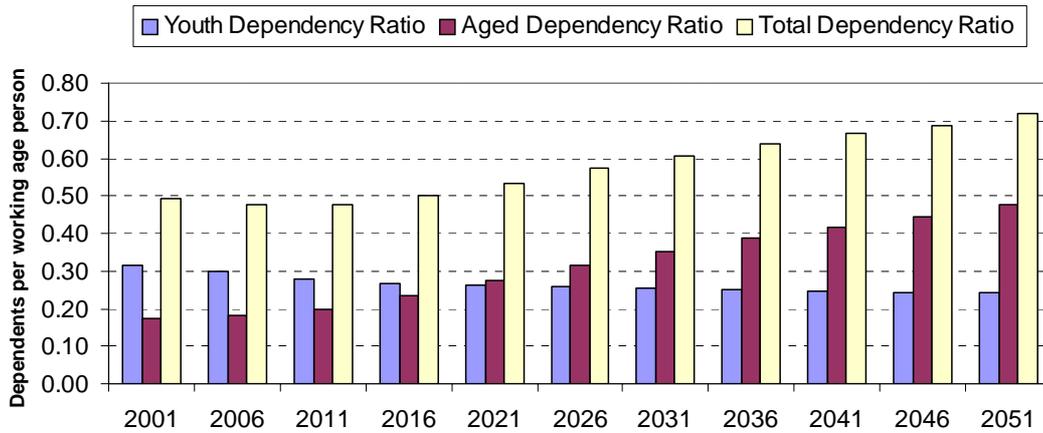
Sources: ABS 3201.0 and Queensland Government Population Projections (2003).

Although continued strong population growth is expected, this does not insulate Queensland from other demographic trends – in particular, *the ageing of the population*. Population ageing is a global trend resulting in changing proportions of young and old people. It is driven by the decline in fertility that has occurred since the early 1960s, and the continuing increase in life expectancy due to improved health services, nutrition, and living standards. A consequence of these trends for the labour force is their effect on the *working age* population proportion.

A key indicator of this effect is the *dependency ratio*, which is the ratio of the non-working age to working age²² population (Figure B3). In recent decades, below-replacement fertility has been the dominant factor. With relatively fewer children, and the large baby boomer cohorts still in the labour force, Queensland's total dependency ratio has declined to just below 50 per cent, or 2 potential workers per 'dependant'. A further slight decline is projected out to around 2011, after which the total dependency ratio is projected to increase as larger numbers of baby boomers pass the traditional retirement age. By 2051, the total dependency ratio is projected to reach around 72 per cent, or 1.4 potential workers per dependant.

²² In this context, 'working age' is taken to be from the youngest school leaving age (15 years) to traditional retirement age (65 years). An obvious problem with the dependency ratio concept is that many people remain dependent on their parents past the age of 15, and many people over 65 are not dependent on either family or government. Nevertheless the dependency ratio is still a useful device with which to illustrate the changing prevalence of important groups in the population.

Figure B3. Dependency Ratios, Queensland, 2001 to 2051.

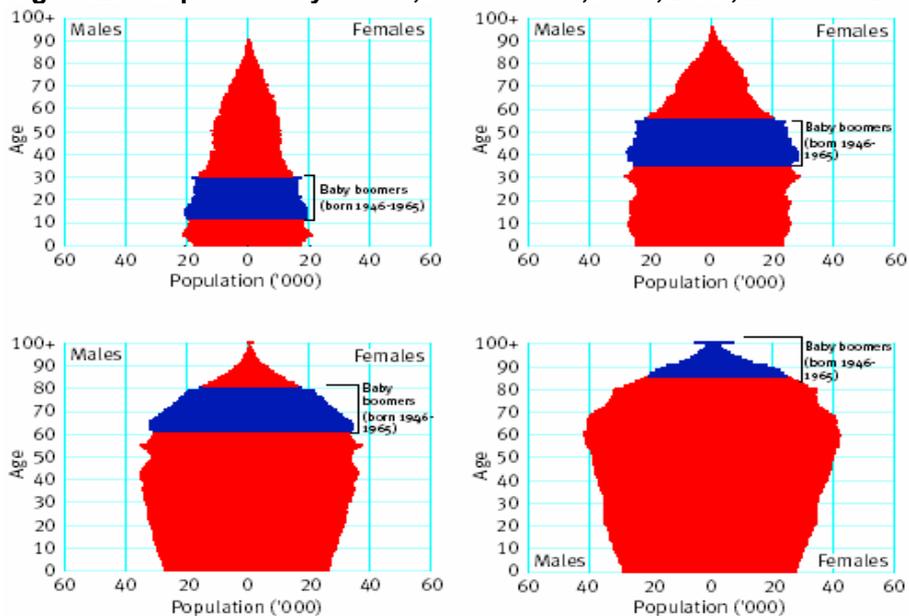


Source: Queensland Government Population Projections (2003, Medium Series).

Further insights can be gained by considering the growth differentials between different age groups. While Queensland's total population in 2051 is expected to be 78 per cent larger than in 2001, there are marked differences in the growth patterns across the age cohorts. Over this period, the fastest growing cohorts are those aged 65 years and over – projected to increase more than fourfold (324.2 per cent) – and the older working age group (45 to 64 years) – projected to almost double (92.8 per cent). In contrast, those aged 15 years and under are projected to increase by only 18.6 per cent and those of young working age (15 to 44 years) by only 34.3 per cent.

Reflecting the anticipated ageing of the State's population, the median age of Queenslanders is projected to increase from 35.0 years in 2002, to 40.2 years by 2021, and then to 47.3 years by 2051. Queensland's current, past and future age profiles are shown in Figure B4, where the progression of the 'baby boom' age groups can be clearly seen.

Figure B4. Population Pyramids, Queensland, 1976, 2001, 2036 and 2051



Sources: ABS 3101.0 and Queensland Government Population Projections (2003, Medium Series) .

Labour Force Participation Projections

Methodology

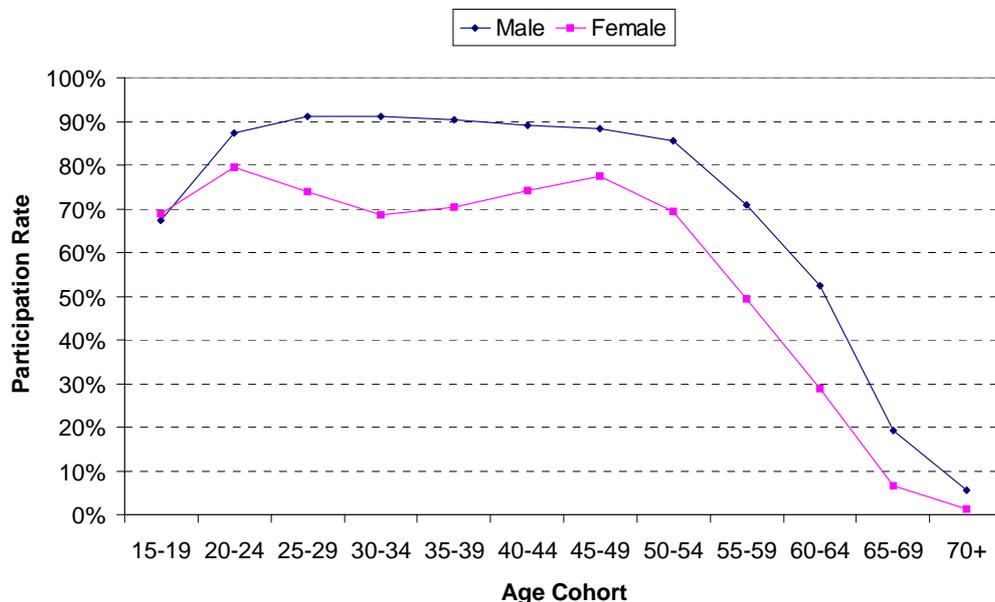
The labour force participation projections in this paper attempt to take into account two effects:

- The 'age cohort' effect, whereby people of different ages tend to participate to different degrees (for example, men aged 25 to 34 have a higher participation rate than men aged 55 to 64); and
- The 'birth cohort' effect, whereby people born in different periods tend to participate to different degrees (for example, the current female cohort aged 25 to 34 has a higher participation rate than women aged 25 to 34 twenty years ago).

Both of these effects, and their implications for the projection methodology, are discussed below, starting with the age cohort effect.

The overall labour force participation rate at a given point in time is the population-weighted sum of age- and sex-specific participation rates. Participation is not uniform across age groups, so changes to the population age structure have the potential to affect overall participation. To illustrate this point, Figure B5 shows average age-specific participation rates for Queensland males and females in 2003-04. A striking feature is the sharp decline in participation after 54 years of age. Remembering the key features of the population projections discussed earlier, the implication is that the age groups which are projected to grow the most rapidly are those that currently participate least in the workforce. Accordingly, based on current age cohort participation rates, population ageing will tend to cause overall participation to decline.

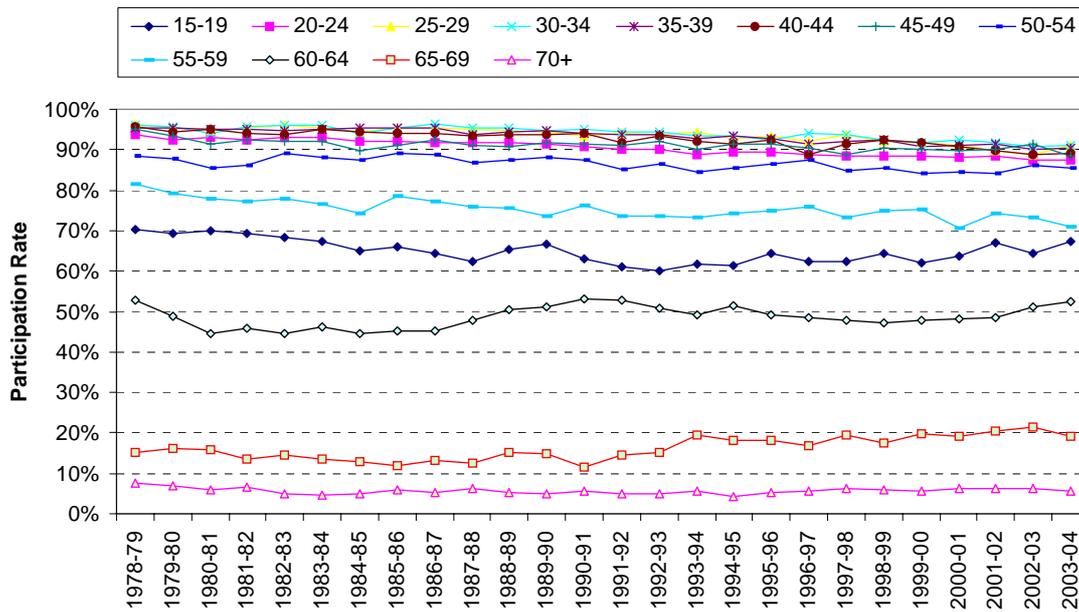
Figure B5. Age-specific participation rates, Queensland, 2003-04.



Source: ABS Labour Force Survey.

However, many of these age cohort participation rates have not remained static over time. Figures B6 and B7 illustrate the historical paths of male and female participation rates, respectively.

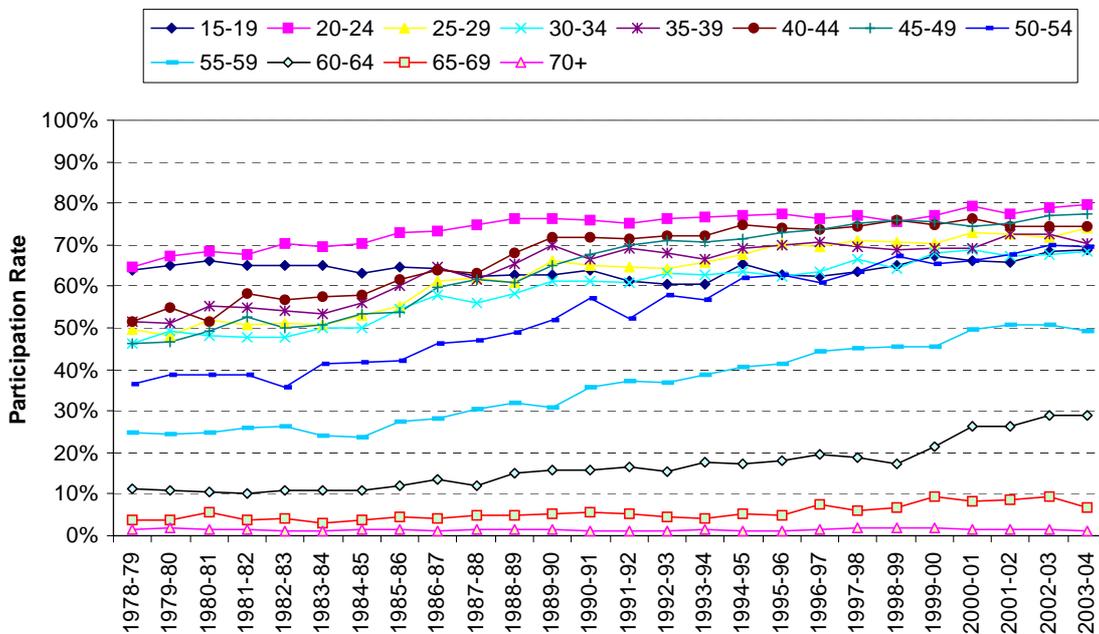
Figure B6. Historical Male Participation Rates, Queensland, 1978-79 to 2003-04.



Source: ABS Labour Force Survey.

It is apparent from Figures B6 and B7 that the participation rates of most of the male cohorts have declined since the late 1970s (if only slightly in some cases), while the participation rates of the female age cohorts have generally increased.

Figure B7. Historical Female Participation Rates, Queensland, 1978-79 to 2003-04.



Source: ABS Labour Force Survey.

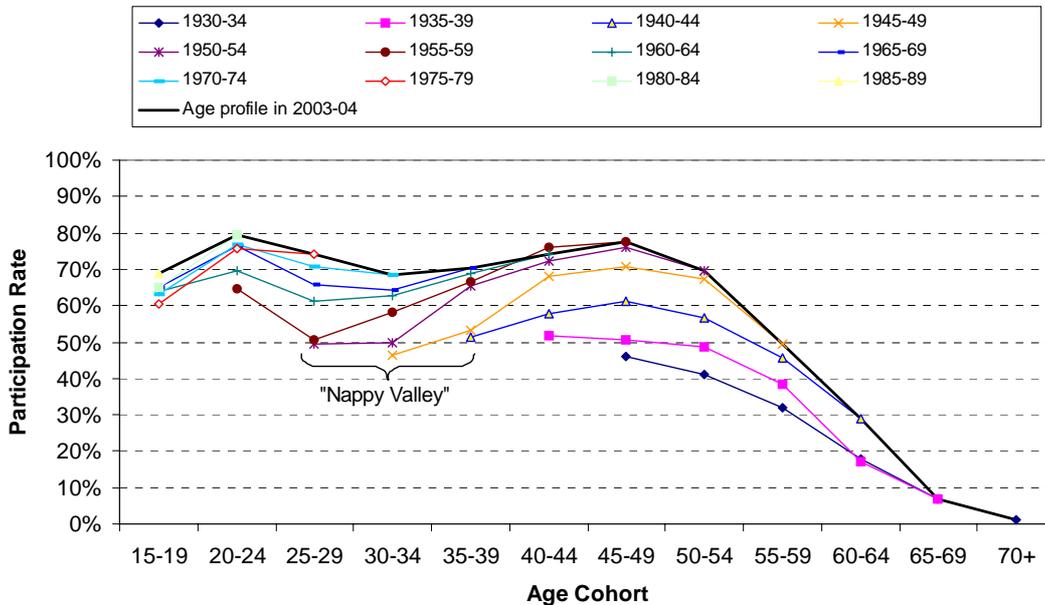
Because these historical trends appear likely to continue (at least in the short to medium term), assuming that future age-specific participation rates remain constant at 2003-04 levels is unlikely to provide an accurate projection. Hence, the labour force participation projections

for the Central Scenario are based on assumptions about the future path of each age- and sex-specific participation rate.

In considering how to project future participation rates, it is tempting to directly extrapolate from the age cohort trends illustrated in Figures B6 and B7. However, there is another important source of information that should be taken into account: information on the differences between successive *birth cohorts*.

The age-specific participation pattern that we observe at any given time (eg. as in Figure B5) involves many birth cohorts, each with a potentially different participation history. Both age factors and historical factors combine to give the observed participation rate for a given age cohort at a given time. This is illustrated in Figure B8, which shows how the observed participation profile for Queensland women in 2003-04 is composed of twelve 5-year birth cohorts spanning the period 1928 to 1988. Each successive birth cohort has exhibited higher labour force participation.

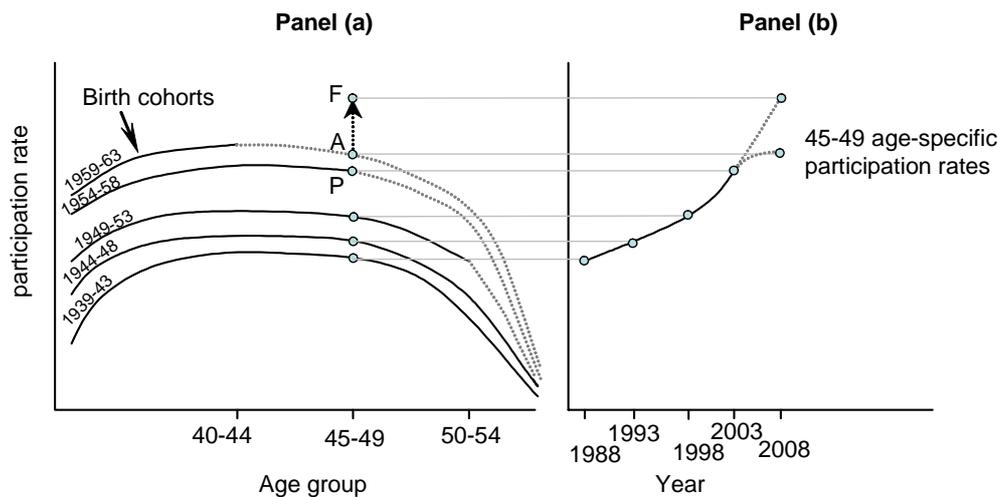
Figure B8. Historical Female Participation Rates by Birth Cohort, Queensland, 1978-79 to 2003-04.



Source: ABS Labour Force Survey.

The potential importance of taking birth cohort information into account is illustrated by the hypothetical example in Figure B9. Panel (a) shows the longitudinal (or birth cohort) view of participation, while Panel (b) shows the cross-section (or age cohort) view. The objective is to project the next value for the participation rate of the 45 to 49 age cohort. If we extrapolate only on the basis of the information in Panel (b), we might think that point F was a reasonable projection. However, if we take into account the characteristics of the birth cohort which is about to move into the 45 to 49 age group (the 1959-63 cohort), shown in Panel (a), we can see that F would imply an unreasonable departure from the normal lifetime participation profile. Hence, point A provides a much better projection because it takes into account the relativities between the 1959-63 and 1954-58 birth cohorts.

Figure B9. Comparison of participation projection methods.



Source: Productivity Commission (2004).

The OECD (Burniaux et al, 2004) has developed a method for incorporating birth cohort effects into participation rate projections. Briefly, projected participation for a given birth cohort is the product of its previous participation and a net entry or exit rate, which is calculated from the most recent historical data, and is held constant over the projection period. As a consequence of using fixed exit and entry rates, youth participation remains fixed at current levels, and the relativities between projected lifetime participation profiles are determined entirely by the relativities in youth participation.

The Productivity Commission (2004) has improved upon the OECD's methodology by taking into account trends in entry and exit rates. This approach has two main advantages over the OECD method. Firstly, youth participation trends can continue to evolve in line with historical trends. Secondly, trends in the participation relativities between birth cohorts are captured. An example of an important trend of this type is the decreasing depth and later incidence of "nappy valley" in Figure B8, signifying the female trend towards having children later in life and returning to work in greater numbers and relatively sooner. The Productivity Commission approach allows trends of this nature to be projected into the future.

In line with the Productivity Commission's approach, the procedure employed by OESR to derive participation rate projections by age and sex was as follows:

- Annual historical age- and sex-specific participation data was obtained, for the period 1978-79 to 2003-04.
- The historical data was smoothed using the Hodrick-Prescott filter to remove the effects of the business cycle.
- Historical net entry and exit rates were derived from the smoothed data.
- The future paths of the entry and exit rates were projected by fitting flexible non-linear trends to the smoothed historical data. In some cases, this was facilitated by the existence of clear inflection points and/or an already asymptoting trend in the historical data. In other cases (eg. where a trend reversal had occurred in the recent past), deriving the parameters of the trend required a more subjective approach coupled with some experimentation with different settings. Desired relativities between males and females of the same age were also taken into account in setting the limits for the nonlinear trends.

- The projected participation rates were then calculated using the projected entry and exit rates.

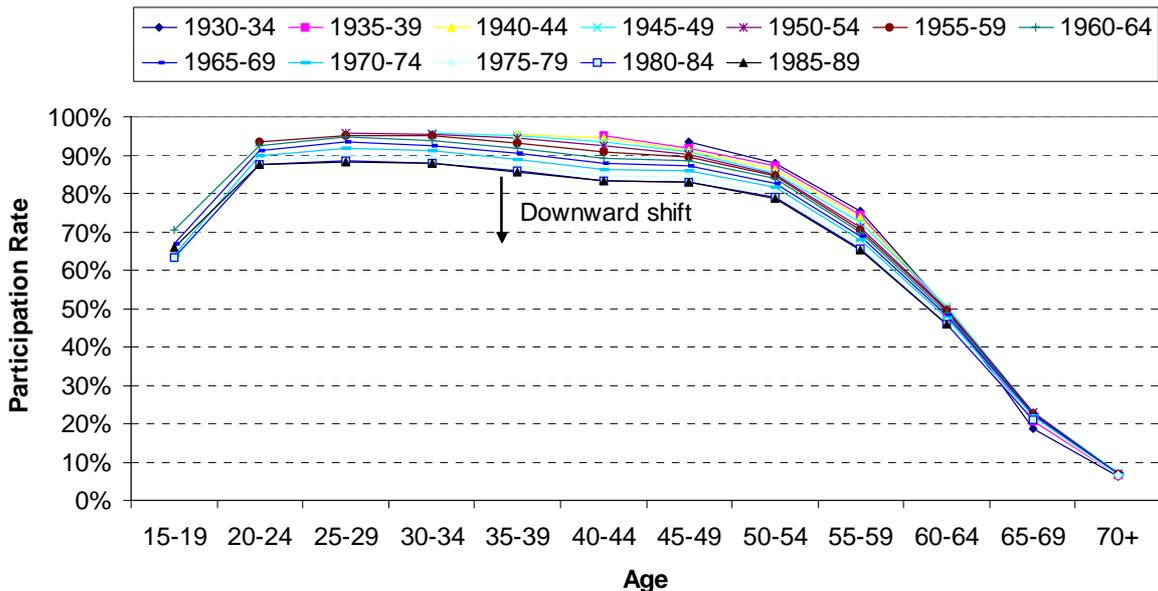
Participation Projections

This section outlines the Central Scenario projections for Queensland's labour force participation, which were derived using the methodology described above. The Central Scenario assumes no policy change over the projection period.

Male Participation Projections

The male participation projections can best be understood by first considering the actual and projected characteristics of each birth cohort. These are shown in Figures B10 and B11²³. The most salient feature of the male participation projections is the eventual reversal (on a birth cohort basis) of the historical downward participation trend. Figure B10 shows the last segments of the downward trend, which is projected to end with 1985-89 birth cohort (ie. the current 15 to 19 age cohort). From the 1990-94 cohort onwards, male participation is projected to progressively increase, as shown in Figure B11. However, this upward trend is not projected to be strong enough to regain all of the territory lost by the cohorts in Figure 10.

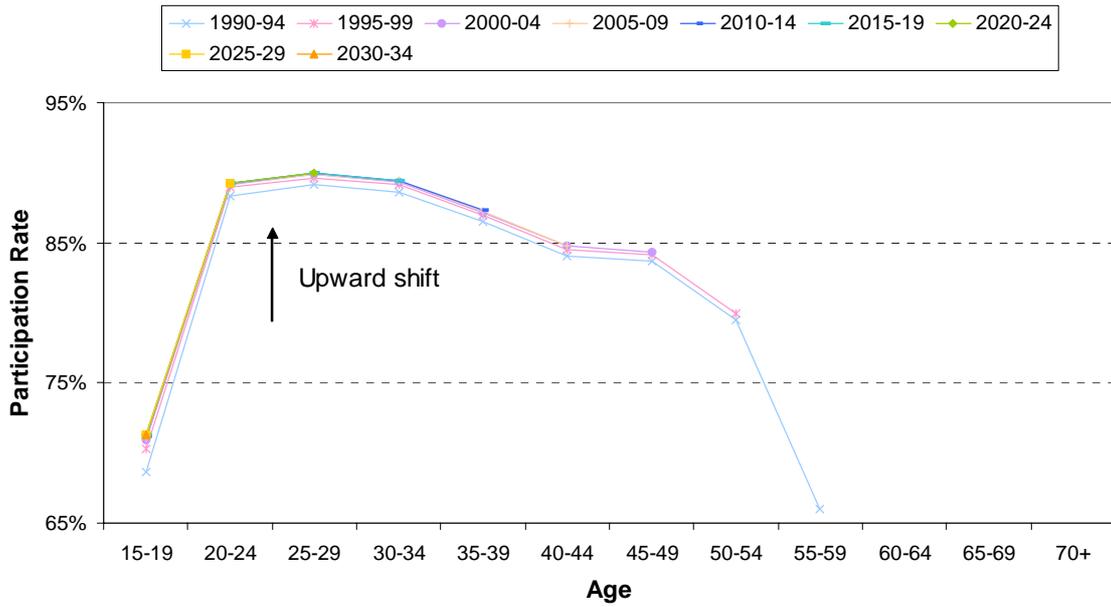
Figure B10. Historical and projected male participation by birth cohort up to the 1985-89 cohort.



Source: ABS Labour Force Survey and OESR projections.

²³ Note: the birth cohort participation profiles in Figures B10 and B11 consist of both historical observations (where we have the data) and projected observations (within the 2050-51 projection limit).

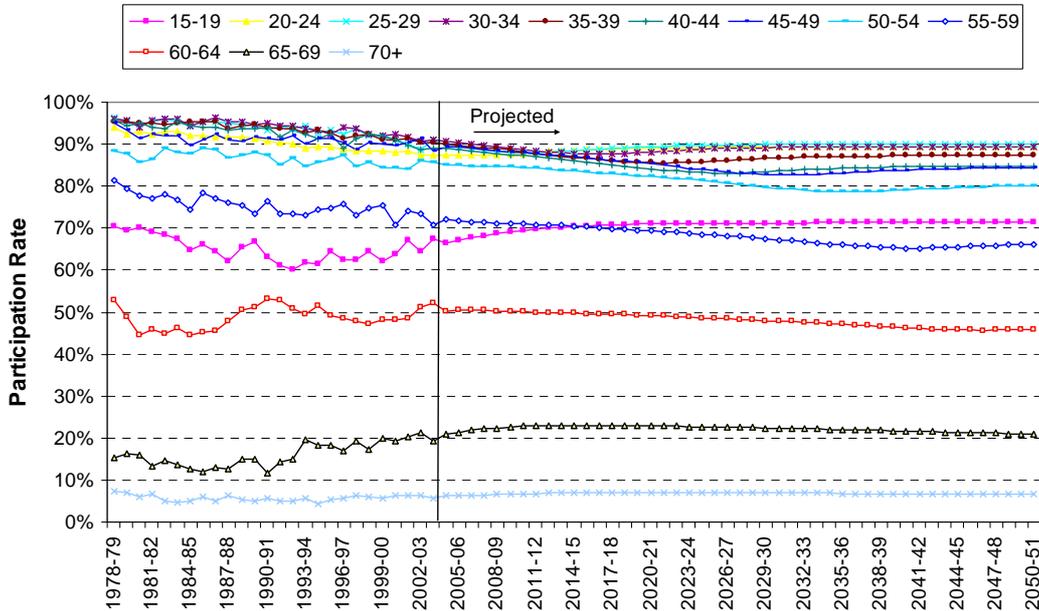
Figure B11. Projected male participation by birth cohort from the 1990-94 cohort on²⁴.



Source: OESR projections.

In moving to a time series viewpoint (Figure B12), the projected paths of age-specific male participation rates can best be understood by considering the path of each birth cohort through the age spectrum.

Figure B12. Historical and projected Queensland male participation by age cohort.



Source: ABS Labour Force Survey and OESR projections.

²⁴ The absence of projections after the 55 to 59 age cohort in Figure B11 is because none of the depicted birth cohorts attains an age greater than this by the end of the projection period.

Leaving aside the fact that the entry and exit rates are projected to change, there are two broad effects:

- (i) As the birth cohorts with progressively lower participation (Figure B10) age, their participation at each age will tend to be lower than that of previous birth cohorts. Hence, in the short to medium term, there will be a tendency for the participation of prime age and mature age men to continue to decline.
- (ii) Over time, the lower-participating cohorts will be progressively replaced by the higher-participating cohorts (Figure B11), putting upward pressure on participation rates. However, this effect will take some time to move right through to the mature age groups. For example, the first higher-participating birth cohort (1990-94) only reaches the 55 to 59 age group by the end of the projection period.

The dynamics of this stylised explanation are slightly changed by incorporating projected trends in the labour force entry and exit rates.

The two most important trends in this context are:

- A projected continuation of the downward trend in the entry rate of the 15 to 19 age cohort²⁵. This means that the projected increasing participation of the 15 to 19 age cohort does not start flowing through to subsequent age cohorts until around 2010²⁶.
- A projected continuation of the downward trend in the exit rate of the 60 to 64 age cohort²⁷. This has the effect of increasing the participation of the 65 to 69 cohort out to around 2015, after which the exit rate is assumed to stabilise and the effect of the declining-participation cohorts dominates again until the mid-2040s.

In summary, the broad short-to-medium term picture suggested by these constant-policy projections of male participation is one of rising youth participation, continuing moderate decline of prime-age participation, and steady or slightly rising mature age participation. In the long term, prime age participation recovers to some extent, on the assumption that higher youth participation eventually has an effect on participation at older ages.

Female Participation Projections

Historically, the female birth cohorts have exhibited a continuous upward participation trend, which is projected to continue (Figure B13). This makes the explanation of the female participation projections much more straightforward than for the male participation projections. It is projected that female participation will continue to increase at a discernible rate until the females being born now enter the workforce, after which there is projected to be very little further movement²⁸.

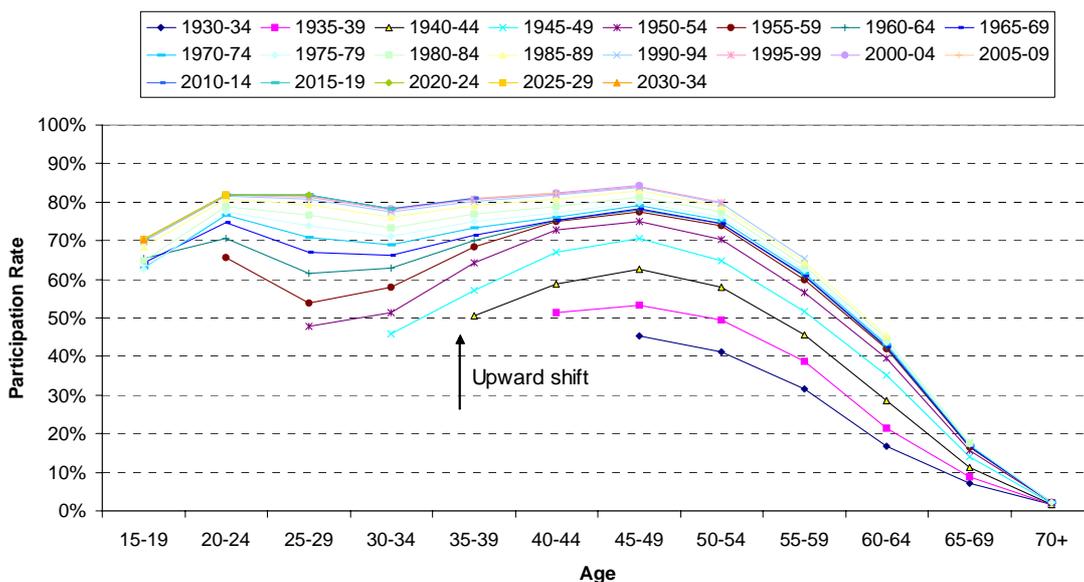
²⁵ The entry rate of the 15 to 19 cohort is defined as the net rate at which the 15 to 19 year olds not in the labour force, enter the labour force by the time they are aged 20 to 24.

²⁶ The projected flow-through of higher youth participation depends critically on the estimated/assumed parameters of the increasing entry trend for 10 to 14 year olds and the declining entry trend for 15 to 19 year olds. The latter is projected to asymptote earlier than the former, but there is a great deal of uncertainty surrounding this outcome.

²⁷ The exit rate of the 60 to 64 cohort is defined as the net rate at which 60 to 64 year olds who are in the labour force, exit the labour force by the time they are aged 65 to 69.

²⁸ To an extent, this tapering off is a product of the assumed trend parameters, which cause the increasing entry trend for 10 to 14 year old females to asymptote at around 2014. However, as a first guess, this seems to be a good assumption, because assuming a greater long run entry rate has the effect of pushing female participation at older ages significantly above male participation, which we have judged to be an implausible outcome.

Figure B13. Historical and projected Queensland female participation by birth cohort.

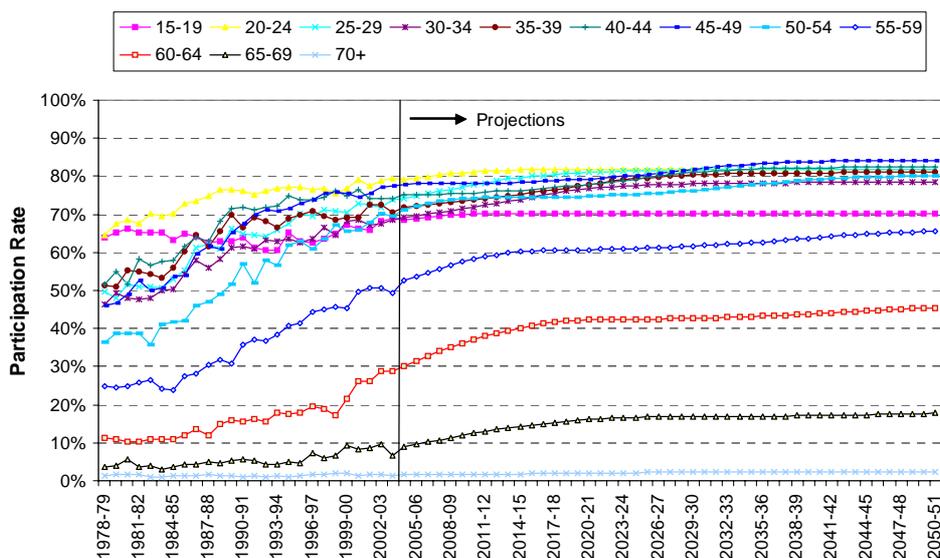


Source: ABS Labour Force Survey and OESR Projections.

From a time series viewpoint (Figure B14), perhaps the most interesting feature is that the participation rates of the 40 to 44 and 45 to 49 cohorts eventually exceed that of the 20 to 24 cohort. From a birth cohort perspective this has always been the case, but from a time series viewpoint it has never happened before because the participation of the 20 to 24 cohort has increased rapidly enough for it to remain the highest participating cohort. However, because the entry and exit rates are projected to eventually stabilise in the second half of the projection period, the participation pattern approaches a steady state, in which the age cohort and birth cohort participation patterns coincide.

In summary then, female participation is projected to increase moderately across all age cohorts, broadly in line with the trends of recent years.

Figure B14. Historical and projected Queensland female participation by age cohort.



Source: ABS Labour Force Survey and OESR projections.

Male versus Female Participation Projections

The final section of this discussion of age- and sex-specific participation projections provides a comparison of projected male and female rates over time. This is shown graphically in Figure B15.

The broad trend is one of convergence, with male participation tending to decline and female participation tending to increase. By the end of the projection period, the convergence process has run its course for all age cohorts. Permanent participation differentials remain for the main child-bearing cohorts, while for the other cohorts male and female participation rates are projected to become virtually identical.

Figure B15. Historical and projected Queensland male and female participation by age cohort.

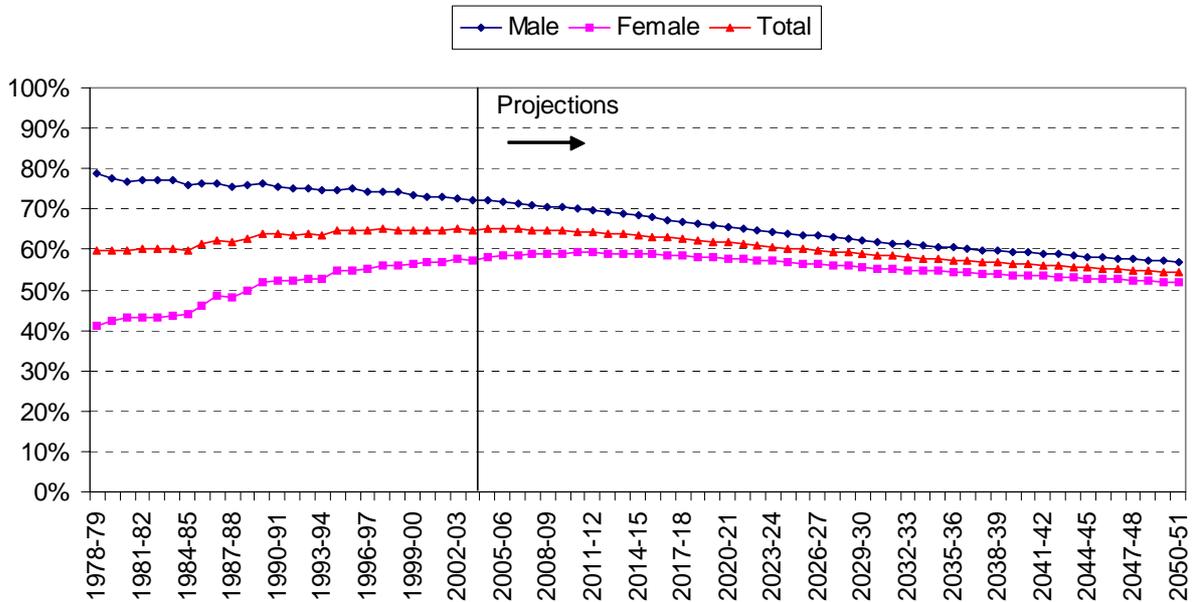


Source: ABS Labour Force Survey and OESR projections.

Aggregate Participation

Combining the projections for age- and sex-specific labour force participation with the projected Queensland population age structure yields a projection for aggregate labour force participation for people aged 15 and over (Figure B16)

Figure B16. Historical and projected aggregate participation rates, Queensland.



Source: ABS Labour Force Survey and OESR Projections.

Aggregate male participation is projected to decline steadily by more than 15 percentage points from 2004-05 to 2050-51. Aggregate female participation is also projected to decline, but at a slower rate, with a projected fall of about 6 percentage points. Total participation is the weighted average of the male and female rates, and therefore sees a decline of around 10 percentage points.

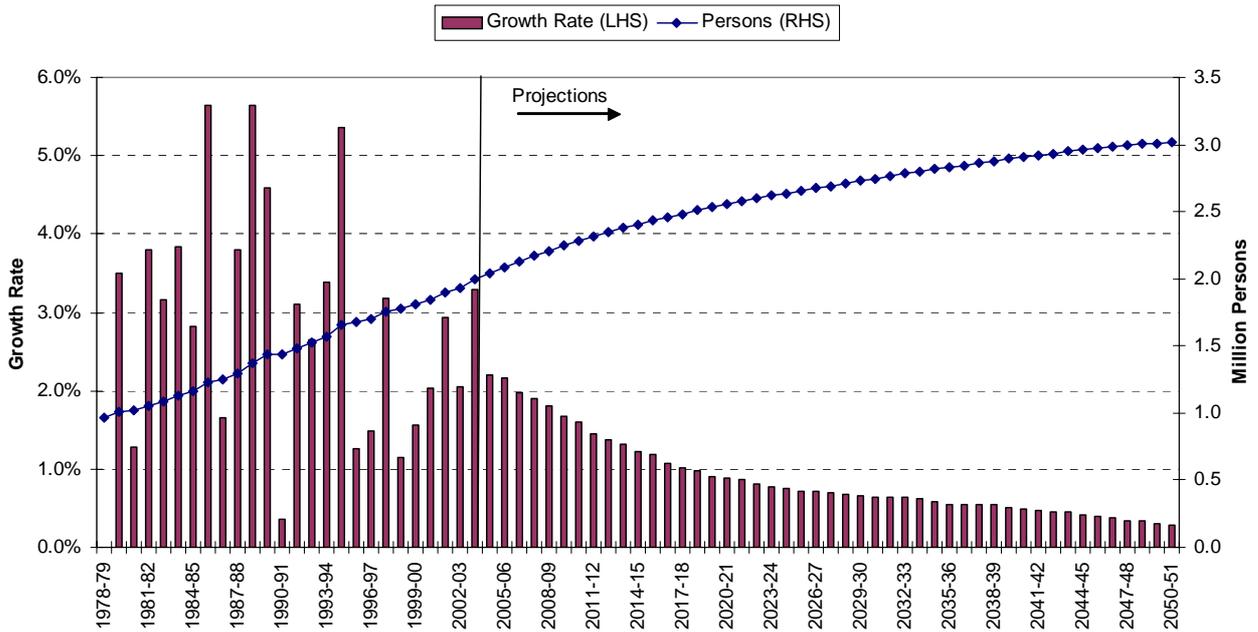
Labour Force Projections

Finally, combining our projections of aggregate labour force participation with the projected Queensland population (in particular, the Medium population series) yields a projection of the size of the Queensland labour force²⁹ (Figure B17).

It should be noted that because these are long term trend projections, the figures shown for the next few years do not necessarily accord with Treasury's Budget forecasts for those years, which necessarily take account of cyclical and other short-term factors.

²⁹ Adjustments were also made to account for the fact that the ABS Labour Force Survey is based on the civilian population, and therefore excludes defence force personnel. The labour force projections in this paper are for the total labour force, ie. including defence force personnel.

Figure B17. Projected Labour Force and Labour Force Growth, Historical and Projected, Queensland.



Source: ABS Labour Force Survey and OESR Projections.

The Central Scenario projection shown in Figure B17 highlights two important points:

- Queensland’s labour force is projected to continue growing over the projection period, despite the effects of population ageing; and
- The growth of the labour force is likely to slow significantly, however. For example, the labour force growth in the last five years of the projection period (about 49,000 people) is approximately equivalent to the current average labour force growth in one year.

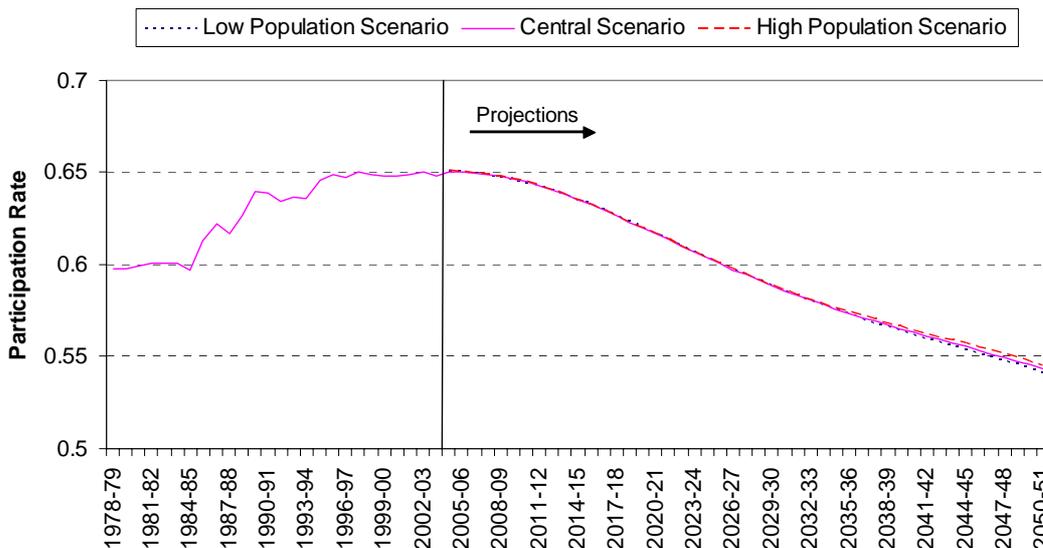
The following sections show how these projections might change if some of the underlying assumptions were to change.

Sensitivity analysis – Demographic factors

In this section two additional scenarios are described, which are derived by varying some of the demographic factors underlying the projections. The two scenarios are based on the published variants of the Queensland Government Population Projections, the parameters of which were set out in Table B1. Summarising, there is a ‘High’ scenario, which assumes higher fertility, life expectancy, and migration, and a ‘Low’ scenario, which assumes lower settings for these three variables.

The impact of alternative population projections on overall labour force participation is shown in Figure B18. It is evident that the different population scenarios have virtually no effect on the aggregate participation rate, with the respective time paths being virtually coincident. This is related to the fact that the assumed variations in the demographic variables tend to offset each other in their net impact on the population age structure. For example, the High scenario assumes higher fertility, which tends to slow population ageing, but also higher life expectancy, which tends to accelerate population ageing.

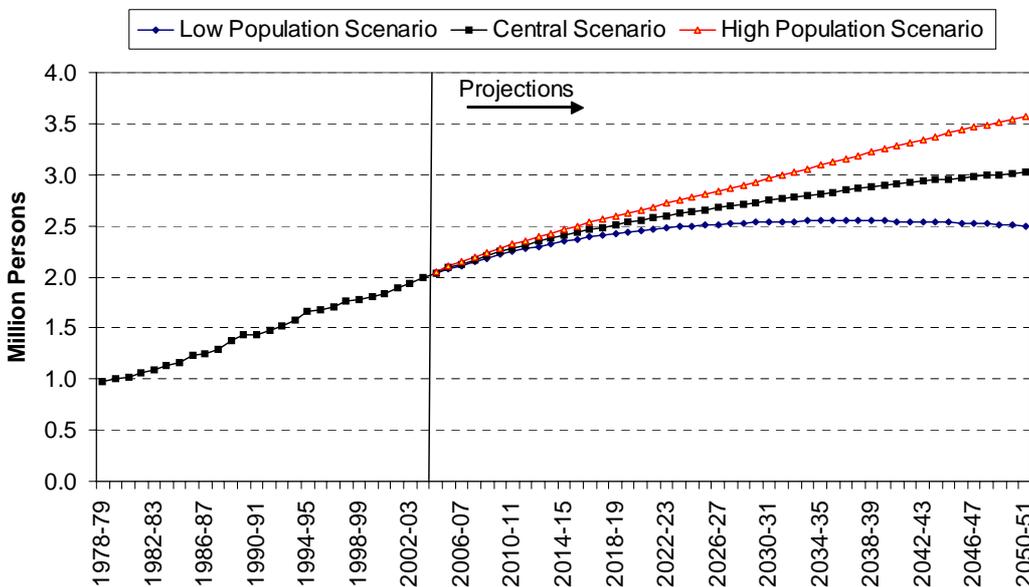
Figure B18. Overall labour force participate rates, historical and projected, demographic scenarios.



Source: ABS Labour Force Survey and OESR projections.

Despite the lack of impact on the overall participation rate, there are still significant impacts on the projected *size* of the labour force (Figure B19). In the High scenario, the labour force is around 18 per cent larger in 2050-51 than in the Central Scenario. In the Low scenario, it is around 17 per cent smaller.

Figure B19. Historical and projected labour force under different demographic scenarios



Source: ABS Labour Force Survey and OESR projections.

In the following section, some contrast to these demographic scenarios is provided by holding the demographic parameters constant, and instead varying the participation rate assumptions.

Sensitivity analysis – Participation rates

In this section, five alternative scenarios for participation rates are analysed – two scenarios of lower rates and three scenarios of higher rates. All scenarios employ the Medium Series of the Queensland Government Population Projections – only the participation rates are varied. Descriptions of the participation scenarios follow.

The 'Constant Age-Specific Participation' Scenario

In this scenario, both male and female age-specific participation rates are held at 2003-04 levels over the projection period. Hence, the participation dynamics of the Central Scenario are missing. There is no further decline and subsequent partial recovery of age-specific male participation, and no further increase in age-specific female participation. Effectively, this scenario assumes away birth cohort effects. Upon reaching each successive age group, each birth cohort is assumed to take on the characteristics of the birth cohort occupying that age group in 2003-04. Hence, this scenario is arguably not a particularly plausible one, but it is sometimes used as a 'worst case' participation scenario, and is shown here for that reason.

The 'Constant Entry/Exit Rate' Scenario

As explained earlier, a key element of the derivation of the Central Scenario was the projection of future labour force entry and exit rates by age cohort. An alternative to this dynamic approach is to assume that entry and exit rates remain constant at 2003-04 levels (ie. the OECD method). Again, this is not particularly realistic because some of the entry and exit rates are currently trending quite strongly. However, it serves to show the relative importance of this element of the projection procedure to the results, and also provides an interesting comparison between the original OECD methodology and the modified methodology employed by the Productivity Commission.

The 'Higher Female Participation' Scenario

This scenario assumes a policy change that encourages greater lifetime labour force participation by women. A key question is: how much additional female participation could we realistically expect to achieve?

The OECD's approach to policy projections of this type is to use multivariate econometric analysis to estimate the effects of policy differences at the margin, and then to impose these estimated effects on their projection baseline (Burniaux et al, 2004).

In Burniaux et al (2004), the multivariate analysis is sourced from Jaumotte (2003), who provides the following estimates for Australia:

- The estimated effect of eliminating high effective marginal tax rates on the second earner in a family is an increase in prime-age (25 to 54) female participation of 4.8 percentage points;
- The estimated effect of increasing childcare assistance to the OECD average is an increase of 3 percentage points; and
- The estimated effect of a more favourable tax treatment of part-time work is an increase of 6.1 percentage points.

Hence, the overall implication is an increase of around 14 percentage points, which would place females about 8 points higher than projected prime-age male participation. The OECD circumvents this problem by imposing the constraint that female participation cannot exceed male participation, so that their final result is that female prime-age participation is exactly the same as prime age male participation. Even this is implausible, however, because it assumes no net exit from the labour force related to the birth of children.

Because of these problems with using the OECD's results for female participation, we have adopted a more pragmatic approach of assuming an unspecified policy change which eliminates half of the difference between male and female participation for the four cohorts between the ages of 20 and 39 years. It is assumed that this policy change is implemented in 2004-05, and that its full effect on female participation accrues over the following 20 years³⁰.

The 'Higher Mature Age Participation' Scenario

As for the Higher Female Participation Scenario, the OECD's estimates of the effect of potential policy reforms provide a starting point. In the case of mature age participation, the relevant research is provided by Duval (2003), who estimates the following results for Australia:

- For the implementation of actuarial fairness in relation to pensions (in other words, the longer you wait, the greater the pension you receive), a participation increase in the range of 2.2 to 5.5 percentage points for the 55 to 64 age cohort, and 2.6 to 3.7 percentage points for those aged 65 and over is estimated; and
- For an increase of the standard retirement age to 67, a participation increase of 1 percentage point for those aged 55 to 64, and 1.3 percentage points for those aged 65 and over is estimated.

Hence, a total increase in participation of 3.2 to 6.5 percentage points for those aged 55 to 64, and 3.8 to 5.0 percentage points for those aged 65 and over is implied. The settings used in this scenario were derived by taking the midpoints of the quoted ranges for each age group, and then adjusting these for differences between the OECD's baseline participation projections for Australia, and our Central Scenario participation projections for Queensland. The resulting assumptions were an increase of 5.6 percentage points for those aged 55 to 64, and an increase of 5.3 percentage points for those aged 65 and over.

A test of the feasibility of these assumptions is to determine how much of a reduction of the labour force exit rates relevant to these cohorts is required to increase participation by the amounts assumed. It was found that an across-the-board exit rate reduction of around 15 per cent was required. This degree of variation is generally within the bounds of historical exit rate variation over the past 20 years, and hence it was judged to be a feasible scenario to model here. It is assumed that the policy changes are implemented in 2004-05, and that their full effects on male and female participation accrue over the following 20 years.

The 'Combined Higher Female and Mature Age Participation' Scenario.

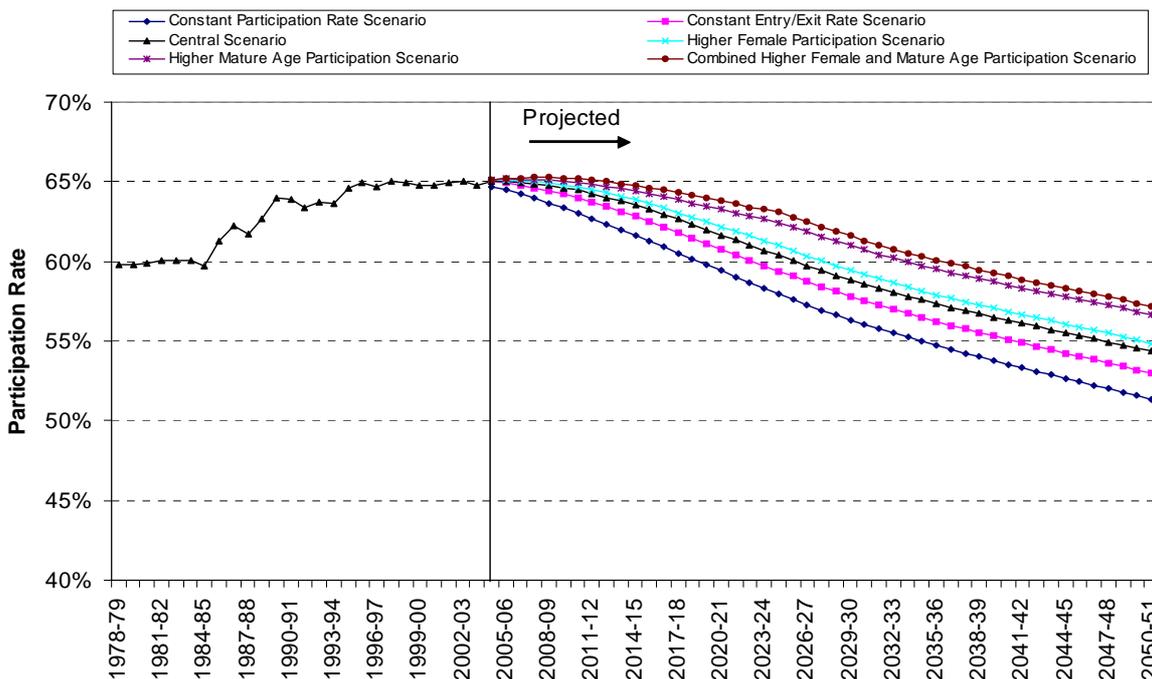
This scenario combines the effects of the previous two scenarios and thereby forms an effective upper bound on the participation projections.

Participation Scenario Results

Figure B20 shows the projected path of aggregate labour force participation for each scenario, while Figure B21 shows the corresponding projections for the Queensland labour force. Note that the scale of Figure B20 is somewhat smaller than normal in order to clearly show the differences between the projections.

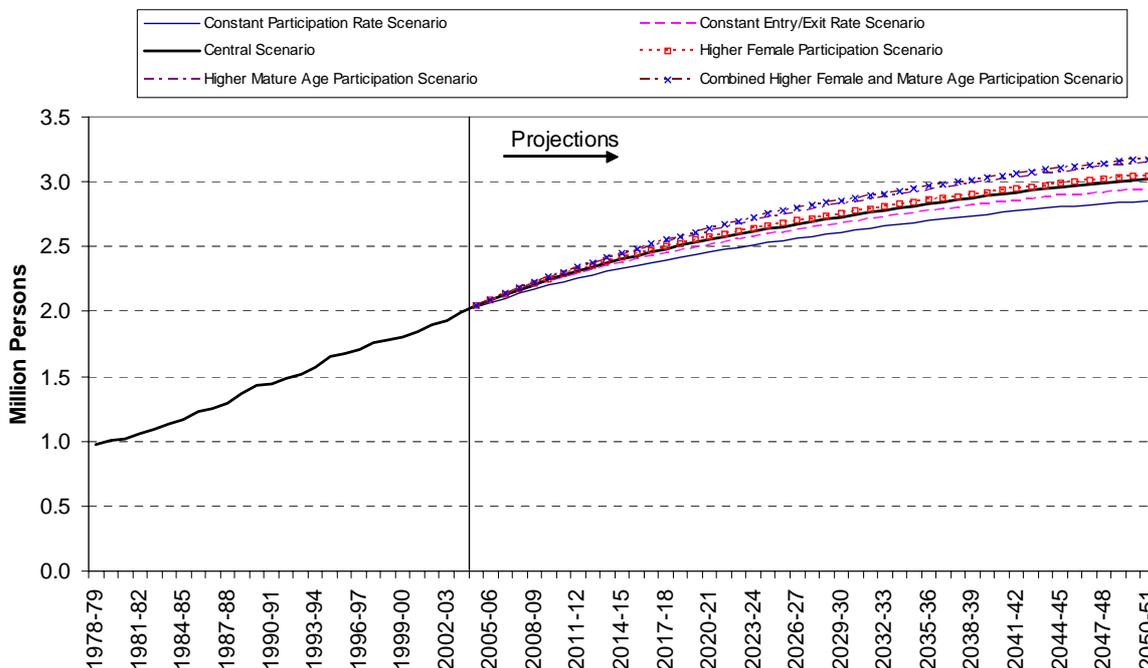
³⁰ A further implicit assumption is that the increase in female participation does not reduce male participation.

Figure B20. Historical and projected aggregate participation rates for the participation scenarios.



Source: ABS Labour Force Survey and OESR projections.

Figure B21. Projected Queensland labour force under different participation scenarios.



Source: ABS Labour Force Survey and OESR projections.

The most pessimistic scenario is the Constant Age-Specific Participation Scenario. Under this scenario, the Queensland labour force is projected to be some 5 per cent smaller than the in Central Scenario at the end of the projection period. It is worth noting, however, that even in this very pessimistic participation scenario (which is effectively a lower bound to the projections), labour force growth is still projected to remain positive.

As expected, the Constant Entry/Exit Rate Scenario results in lower participation than in the Central Scenario, because positive trends in youth and mature age entry and exit rates are not included. However, the flowthrough of the higher-participating youth cohorts of the present and recent past in this scenario ensures that participation is higher than in the Constant Age-Specific Participation Scenario.

The Higher Female Participation Scenario yields only a small increase in overall participation, principally because the Central Scenario left relatively little to be gained, in terms of convergence with male participation. Only four out of twelve female cohorts were affected, and these had already converged to a close proximity with the relevant male rates in the Central Scenario (see Figure B15).

As would be expected given the population ageing effect, the Higher Mature Age Participation Scenario makes a significant addition to participation. At the end of the projection period, the labour force is projected to be some 4 per cent larger than in the Central Scenario.

Finally, the Combined Higher Female and Mature Age Scenario provides the most optimistic projection, with the labour force projected to be some 5 per cent larger than in the Central Scenario by the end of the projection period.

Upper and lower bounds

The final part of the sensitivity analysis is to establish some bounds or extremes within which we can be reasonably confident that the future labour market outcomes will occur. Section 3 discussed the upper and lower bounds of the demographic factors, while Section 4 established some bounds for the future path of participation.

In this section, then, absolute upper and lower bounds are derived by respectively combining the most optimistic and pessimistic scenarios from Sections 3 and 4.

Specifically, two additional scenarios are modelled:

Low Population + Constant Age-Specific Participation Rates

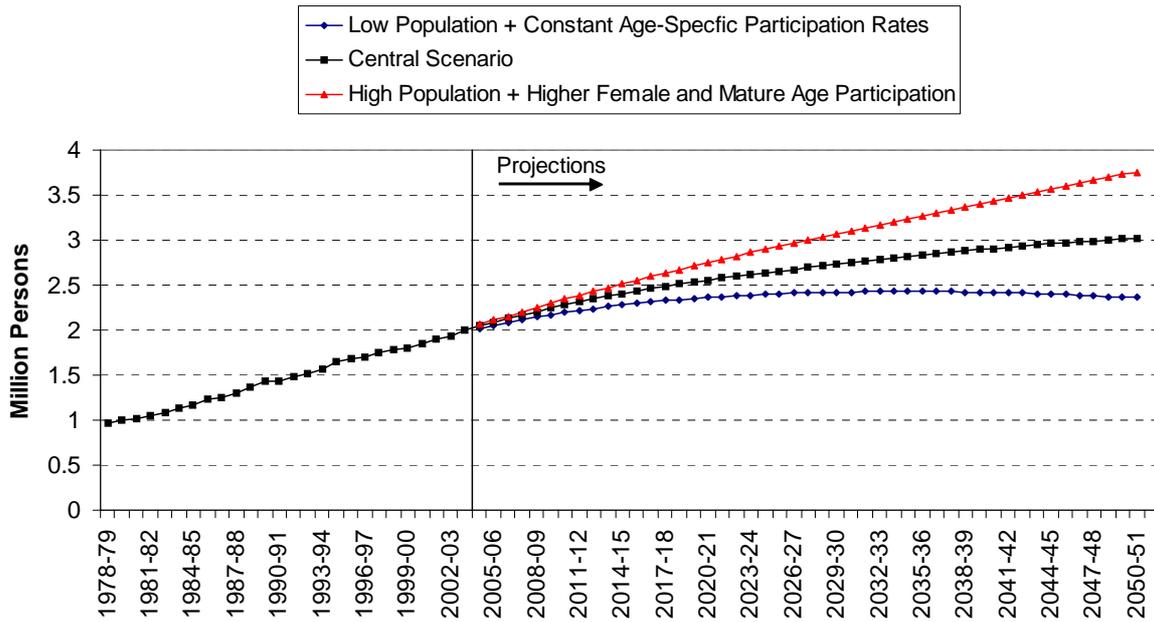
This 'lower bound' scenario employs the 'Low' population series from the Queensland Government Population Projections, combined with the assumption that male and female age-specific participation rates remain at 2003-04 levels over the projection period.

High Population + Higher Female and Mature Age Participation

This 'upper bound' scenario employs the 'High' population series from the Queensland Government Population Projections, combined with the participation settings of the Combined Higher Female and Mature Age Participation Scenario described in Section 4.

The implications of these two scenarios for the projected labour force are shown in Figure B22.

Figure B22. Projected upper and lower bounds for the Queensland labour force.



Source: ABS Labour Force Survey and OESR projections.

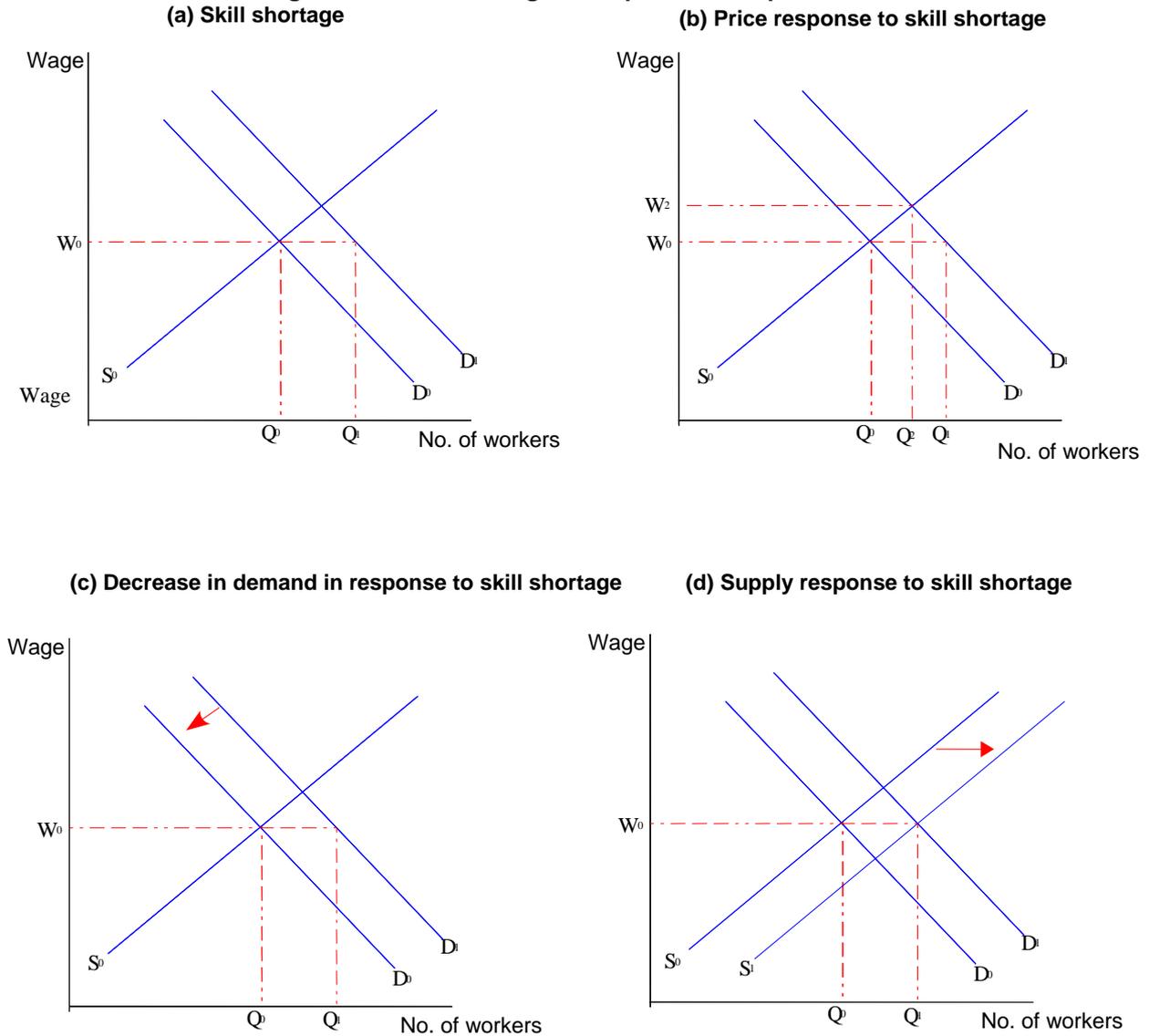
The most interesting aspect of these scenarios is that the ‘lower bound’ scenario exhibits negative growth after 2034-35. This is the only scenario in the paper that does so, and it is achieved by combining the lowest feasible population projections with an implausible (albeit often-used) participation scenario. Overall, the ‘lower bound’ labour force is projected to be some 22 per cent smaller than in the Central Scenario (but still 18 per cent larger than the 2003-04 level).

The ‘upper bound’ scenario sees labour force growth continuing at approximately its historical rate. The implication is that the absolute best that can be achieved in the context of population ageing is to maintain the current labour force growth rate. To do this, both population growth and participation outcomes for women and mature age people must be at the upper end of expectations. Overall, the ‘upper bound’ labour force is projected the be some 24 per cent larger than under the Central Scenario.

Appendix C Labour market adjustments

The concept of skilled labour shortages is ill-defined and often defined in a manner inconsistent with basic economic theory. Figure C1 provides a brief introduction to the concepts of shortage and demonstrates that there are many possible responses to a shortage of skilled labour, including a price response, the substitution of skilled labour for other factors in the production process, such as less skilled labour or capital equipment or alternately, a supply response, increasing the supply of skilled workers. Figure C1 outlines how these responses overcome the skill shortage problem.

Figure C1: Skill shortages and possible responses



Panel (a) shows the outcome when there is no response. In this figure, the demand for skilled labour has increased, shifting the demand curve out from D_0 to D_1 . If there is no response the labour market will demand Q_1 units of skilled labour. However, at the going wage rate workers will only supply Q_0 . Consequently a shortage, equal to the distance $Q_1 - Q_0$ will exist.

An obvious response by firms facing skill shortages would be to increase the wages and/or working conditions of desirable workers. Higher wages and better working conditions would tend to attract more workers with desirable skills to enter the labour market for the particular

skill category. At the same time, the higher labour costs would deter employers hiring intentions. As a consequence, the skill shortage may be reduced or even eliminated by adjusting the wage rate.

Panel (b) outlines the effect of a wage response. After the outward shift in the demand curve, firms demand Q_1 units of skilled labour. With an upward sloping supply curve, additional labour will only be attracted by an increase in the wage rate. However, the higher wages will result in a decrease in the amount of labour that firms demand. In the example presented in figure 3b, the wage rate will increase to W_2 with the demand for workers falling from Q_1 to Q_2 . At this point demand will equal supply and the shortage will disappear.

Several factors may prevent wages from responding, chief among these being that it has generally been observed that wages are not highly flexible. There may be several reasons for this, including that while collective agreements are more flexible than the centralised wage setting system, they may not offer enough scope to alleviate shortages. In addition, the wage leadership model of wage determination concludes that workers and unions respond to changes in wage relativities, meaning that award changes in response to the scarcity of certain skills may result in industrial unrest and wage inflation. These factors will tend to slow the adjustment process, suggesting that firms may need to adopt alternate approaches to meet production requirements.

An alternate response is provided in panel (c). In this case the demand curve shifts from D_1 back towards D_0 . In this situation the demand for skilled labour falls in response to the shortage to bring about an equilibrium. There are two possible ways by which this might come about. Firstly, the production methods may be altered so that less skilled workers are able to replace skilled workers or secondly, the firm may undertake capital investment, replacing labour with machinery. The investment in capital or the change in production processes will see the demand for skilled labour shift inwards, either diminishing the shortage or leading to its complete disappearance as in the case illustrated in panel (c) where the demand curve moves all the way back to its initial position.

Replacing skilled workers with capital equipment is a long term solution to skill shortages. Examples where this has occurred in Australia are the Wholesale and Finance and insurance industries, and to a lesser degree Mining and Manufacturing industries. These industries recorded a substantial increase in labour productivity in the decade to 2002-03 due to capital deepening and the use of information technology. In contrast, employment, as measured by total hours worked, only recorded subdued or negative growth over the same period. This highlights the fact that skills, to a certain degree, may be substituted by other factors of production in the long term.

Another long term responses to a persistent skill shortage that may be employed by the private sector is to alter the production methods to reduce the skill levels required in the production process. One example is the extensive division of labour in modern production processes such that low-skilled or unskilled workers may be able to replace high-skilled workers. More importantly, modern production technologies have become increasingly firm-specific, skills acquired by workers in one firm may not be readily transferable to another firm. Since workers endowed with firm-specific skills are less likely to change jobs, the problem of retention of skilled workers may be reduced.

Another possible response to a persistent skill shortage would be to provide additional training. This can be done by the firm or by the public training provider. The effect of this response is shown in panel (d). In this case, the increase in training results in an increase in the supply of skilled labour, shifting the supply curve outwards towards S_1 . In this case,

wages have not increased and the excess demand for skilled labour has disappeared. There may be two limiting factors to this response in the case of the firm. Firstly, smaller firms may not have the financial resources to engage in systematic training and secondly, the difficulties in retaining trained workers deter employers from providing workers with more generic skills.

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