

# WORKFORCE

## Is Demography Destiny? Labour Supply Issues in an Ageing Population

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### Introduction

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The previous chapter on demography has shown how Australia's population is set for a rapid transformation over the period 2001-2020 and beyond. In particular, the shifts in the age composition and spatial distribution of the population are important determinants of the size, composition and location of Australia's future labour force.

Recently, a number of government reports have examined the role of demographic variables in determining future labour supply in the context of an ageing population (Productivity Commission, 2005a; Productivity Commission, 2005b; DEWR, 2005). An interesting aspect of previous research is the attention given to adapting to a certain labour force future, rather than implementing policies aimed at molding the future labour force (McDonald, 2005).

The purpose of this chapter is to examine the current trends and possible futures for Australia's future labour supply. Moreover, this chapter examines the relative importance of demographic and compositional shifts in the working age population that together determine the supply of labour in Australia's future population. The chapter concludes by suggesting that demography is not necessarily destiny when it comes to labour supply. Compositional shifts such as potential increases in labour force participation play an important role in determining Australia's future labour supply.

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# Aspects of the Labour Force

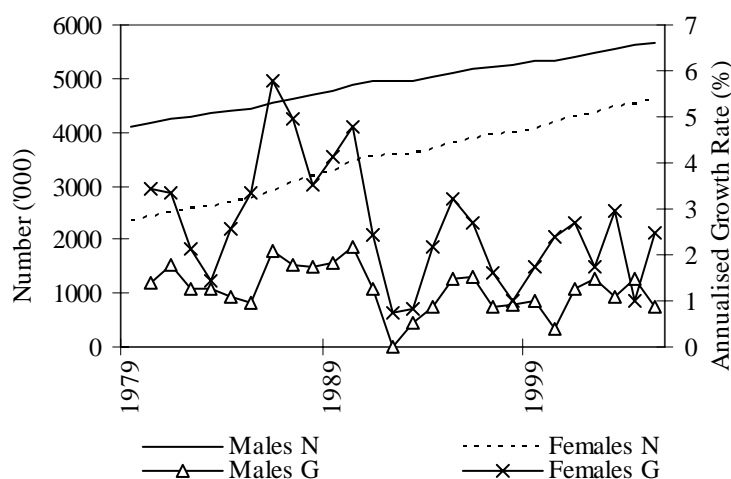
## Size of the Labour Force

Over the past 30 years, the size of the Australian labour force has increased by about 80% for several reasons. First, the entry of the baby boom generation as a result of high fertility rates during the 1950s and 1960s led to a large influx of young workers. Second, over this same period of time, labour force participation rates for women have increased significantly, as will be discussed below. Third, through Australia's migration program (in particular the skilled migration program), the number of young workers has also increased. Working in the opposite direction, the movement towards early retirement for men has reduced the potential labour supply of male workers in middle and early old age.

As shown below in Figure 28, the size of the labour force has grown considerably between 1979 and 2005: from 6.5 million to 10.3 million. On average, the growth has been considerably larger among female workers than male workers, but the number of males in the labour force outnumbers the number of women by about 23%. Smoothing the annualised variation in the growth rates, reveals that the growth in the labour force was about 26 per cent in the 1980s and 14 percent in the 1990s.

Future decades will see a much stronger reduction in labour force growth (Productivity Commission, 2005), but an important question is by how much?

**Figure 28** Change in the Annualised Growth (G) and Size (N '000) of the Labour Force, 1979 to 2005.



## Participation by Age and Gender

Apart from shifts in the underlying demography (births, deaths and migration), a key factor determining the size of the labour force is labour force participation. Table 25 displays the labour force participation rate for men over the period 1980 to 2005. Table 26 presents the female participation rates for the same period.

**Table 25** Labour Force Participation Rate, Males 1980-2005.

|       | 1980 | 1990 | 2000 | 2005 |
|-------|------|------|------|------|
| 15-19 | 64.5 | 61.8 | 58.3 | 59.0 |
| 20-24 | 91.2 | 89.7 | 86.9 | 84.8 |
| 25-29 | 95.5 | 94.4 | 91.7 | 90.3 |
| 30-34 | 96.1 | 94.9 | 92.3 | 91.7 |
| 35-39 | 96.0 | 94.1 | 91.2 | 90.9 |
| 40-44 | 95.1 | 94.1 | 91.7 | 90.0 |
| 45-49 | 93.4 | 91.8 | 89.1 | 89.0 |
| 50-54 | 90.0 | 86.6 | 84.8 | 85.4 |
| 55-59 | 82.4 | 74.9 | 72.3 | 73.3 |
| 60-64 | 53.3 | 49.9 | 46.6 | 49.6 |
| 65-69 | 17.3 | 14.1 | 18.6 | 21.3 |
| 70+   | 7.2  | 6.1  | 5.5  | 5.7  |

Source: Productivity Commission, 2005

Tables 25 and 26 indicate important sex differentials in participation rates between 1980-2005. For men, participation has dropped since 1980, with the exception of those aged 65-69 whose participation has increased. In contrast, the participation rates of women have experienced large gains over the same period of time. Nonetheless, participation rates remain higher for men than women, from ages 20 and onwards. This result is particularly pronounced during the key reproductive ages.

**Table 26** Labour Force Participation Rate, Females 1980-2005.

|       | <b>1980</b> | <b>1990</b> | <b>2000</b> | <b>2005</b> |
|-------|-------------|-------------|-------------|-------------|
| 15-19 | 59.7        | 59.8        | 60.0        | 61.4        |
| 20-24 | 70.3        | 77.9        | 77.3        | 77.5        |
| 25-29 | 52.2        | 67.8        | 71.9        | 74.9        |
| 30-34 | 50.9        | 63.6        | 66.2        | 68.8        |
| 35-39 | 56.4        | 69.5        | 68.5        | 69.4        |
| 40-44 | 59.7        | 73.3        | 73.9        | 74.7        |
| 45-49 | 53.4        | 66.1        | 74.1        | 78.2        |
| 50-54 | 42.4        | 53.0        | 65.6        | 71.0        |
| 55-59 | 27.9        | 32.3        | 46.4        | 53.6        |
| 60-64 | 12.8        | 15.1        | 20.3        | 27.7        |
| 65-69 | 5.1         | 4.6         | 8.2         | 9.1         |
| 70+   | 1.4         | 1.1         | 1.4         | 1.5         |

Source: Productivity Commission, 2005

The government is directing policy to increase participation of men at ages 55 plus. However, boosting labour force participation of older workers alone cannot solve the problem of a reduction in the number of new, young entrants to the labour market. Participation rates for those aged under 25 could fall further if full time education enrolments increase.

At ages under 45, the scope for increase in participation is relatively small. Current welfare reform policy is directed at this group. For women, there is scope for some additional participation in the 35-54 age range and potential for increased hours of work.

It is important to understand the 'fit' between having children and the labour force. Over the same period as the increase in labour force participation for young women, there has also been an extension in the median age of birth for mothers and fathers. The median age at birth for mothers was about 27.1 in 1984, compared with 30.6 today. Similarly, the median age of birth for fathers has increased from 29.9 to 32.8 (ABS, 2004). This has important implications for the provision of child care. The supply of affordable child care, in turn, has important implications for the labour supply of working age women (VandenHeuvel, 1999).

## Retirement

In the context of population ageing, the timing and consequences of retirement are important aspects of labour supply. Indeed there has been a long and sustained interest in describing and analysing the labour force behaviour of elderly Australians and their experience of retirement more generally (Lansbury, 1981; Encel and Studencki, 1996; Borland, 2005).

In 2004-05, the average age of retirement of those aged over 45 was about 58 years for men and 47 years for women (ABS, 2006). Table 27 displays the age structure of retirees. In 2004-05 an additional 0.4 million women retired when compared to men. The percentage retiring before reaching age 55 is also significantly higher for women compared to men (62% of women versus 26% of men).

**Table 27** Age Structure of Retirees, 2004-05.

|                      | <b>Men</b>        | <b>Women</b>       |
|----------------------|-------------------|--------------------|
| <45                  | 7.8%              | 33%                |
| 45-54                | 18%               | 29%                |
| 55-64                | 55%               | 32%                |
| 65+                  | 19%               | 6%                 |
| <b>Total Retired</b> | <b>1.3million</b> | <b>1.7 million</b> |

Source: Derived from ABS, 2006.

The average age of retirement for men has remained relatively constant over the past two decades (Rawnsley and Baker, 2005). The retirement age is about three years higher for part time employees when compared to full time workers. This result is indicative of older employees preferring phased retirement plans where they transition to part time employment rather than retiring fully from the labour market (Rawnsley and Baker, 2005). Reflecting the younger retirement age of women, when current members of the labour force are asked when they intend to retire, women also report an intention to retire earlier than men (Table 28).

**Table 28** Retirement Intentions - Persons Aged 45 and Over, 2004-05.

|       | <b>Men</b> | <b>Women</b> |
|-------|------------|--------------|
| <55   | 1.1%       | 4.1%         |
| 55-59 | 14%        | 27%          |
| 60-64 | 30%        | 33%          |
| 65-69 | 46%        | 30%          |
| 70+   | 10%        | 6.2%         |

Source: Derived from ABS, 2006.

Since 1992, Australia has had a compulsory superannuation scheme, the Superannuation Guarantee Charge, to subsidise public pension costs and boost the living standards of retirees. However, retirement incomes will be inadequate for many subgroups of the elderly leading into retirement with important implications for individual wellbeing and government expenditure on public programs (Kelly, Percival and Harding, 2001). The retirement behaviour of future cohorts of the elderly is subject to debate.

## Full Time and Part Time Employment

Since the 1980s, the growth in the labour force engaging in full and part time work has changed dramatically (Table 29). During the 1980s, growth in part time employment outstripped growth in full time employment in all age ranges for men and women, with the exception of women aged 25-39. By 1995-2005, all age groups experienced a larger growth in part time employment relative to full time employment (the growth rates for women 25-39 were about the same for part and full time work).

**Table 29** Growth Rates, Full and Part Time Work.

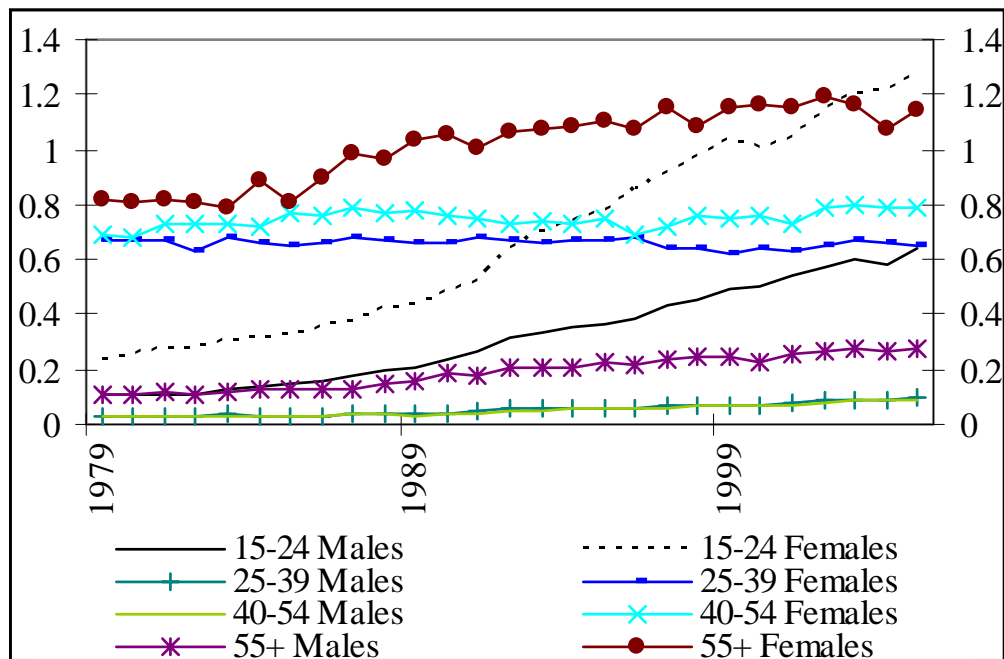
|               | 1980-1990 |           | 1990-1995 |           | 1995-2005 |           |
|---------------|-----------|-----------|-----------|-----------|-----------|-----------|
|               | Full Time | Part Time | Full Time | Part Time | Full Time | Part Time |
| 15-24 Males   | 0.95      | 1.76      | 0.79      | 1.36      | 0.94      | 1.56      |
| 15-24 Females | 0.99      | 1.70      | 0.76      | 1.31      | 0.89      | 1.45      |
| 25-39 Males   | 1.19      | 1.52      | 0.95      | 1.59      | 1.04      | 1.52      |
| 25-39 Females | 1.61      | 1.50      | 1.05      | 1.05      | 1.13      | 1.12      |
| 40-54 Males   | 1.25      | 1.53      | 1.09      | 1.82      | 1.21      | 1.89      |
| 40-54 Females | 1.58      | 1.64      | 1.29      | 1.22      | 1.36      | 1.47      |
| 55+ Males     | 0.94      | 1.34      | 0.93      | 1.22      | 1.51      | 1.96      |
| 55+ Females   | 1.06      | 1.36      | 1.12      | 1.18      | 2.09      | 2.06      |

Source: Derived from ABS.

Despite the strong growth in part time employment, full time employment remains the norm in Australia (see Figure 29). For example, in 2005, for every female aged 15-24, about 1.3 were working part time for every 1 full time worker. With the exception of the youngest (15-24) and eldest (55 plus) female employees, a greater proportion of all other age-sex groups are full time rather than part time employees.

As enrolments in full time education have increased over the period 1979-2005, the numbers of males and females aged 15-24 undertaking part time work have grown considerably. The increasing proportion of jobs that are part time relative to full time has raised questions about 'job quality' and implications for employees (Rubery et al., 2005; Burgess, 2005). On the other hand, it is argued that part time work provides flexibility for those who may otherwise not be employed.

**Figure 29** Ratio of Part Time Employees to Full Time Employees, 1979-2005.



Source: Derived from ABS.

# Demographic Influences on Aggregate Labour Supply

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Fertility and migration are the primary demographic factors driving change in the working age population, and by extension the labour supply (McDonald and Kippen, 2000). Over the long term, it is important to maintain fertility around current levels to maintain growth in the number of younger persons in the population, partially offsetting the effects of population ageing (McDonald and Kippen, 1999). This effect is two fold: maintaining fertility maintains the number of young people in the population (relatively), and also reduces the proportion of the population of retirement age, that is, there is a relatively greater number of workers to generate taxation revenue to fund the needs of an ageing population.

However, although maintaining fertility is important in stabilising the future supply of workers, only migration can fill labour supply shortages in the short to medium term. McDonald and Temple (2005) use the example of highly skilled 'Complex Problem Solvers' (CPS). Their definition of complex problem solvers is based upon fine level data on occupations. The occupations defined as CPS can be summarised into five major divisions: medical scientists, scientists (other than medical scientists), engineers (construction and non-construction), information technology and business information technology, and selected marketing and business professionals.

Should there be an absolute shortage of workers of this type; the price of these workers in the market will increase without generating additional supply for many years. If the price of domestic highly skilled workers is very high, capital may move offshore to places where the price of labour is lower.

Persons with the required skills are long in the making. An increase in the supply of young highly skilled workers cannot be achieved by increasing the birth rate 25 years ago or by increasing the number of graduates in specialised fields five years ago. Long range planning is required including increased investment in the education of young people or increased population at the young ages. Immigration offers a shorter-term response but implies appropriate immigration policies and available skilled workers will immigrate to Australia.

Because the market for young, highly skilled workers is a global market, migration is highly relevant in the supply of such workers. Consequently, young Australians can command high wages in economies where workers of this type are in short supply. Indeed, the levels of emigration of Australian residents have increased substantially over the past decade and young people in professional or associate professional occupations have constituted a large component of these departures. Birrell et al. (2004) suggest that these trends have generated 'brain drain' hysteria in Australia. However, they conclude on the basis of a detailed analysis of movements into and out of Australia that, on balance, Australia currently gains more than it loses through the international movement of skilled people.

A study by Osbourne (2004) has indicated that of those Australian residents who stated that they were leaving Australia permanently, 25 per cent had returned to Australia permanently within five years. Of course, more may return beyond five years. However, the return rate was lower for those in professional occupations (18 per cent). This implies that the loss of young professionals may indeed be an issue for Australia if those leaving Australia are the very best that Australia has to offer. There are no data to measure ‘the very best’ but it is possible to examine detailed occupation data of movers. Birrell et al. (2004) have estimated that about three-quarters of Australian professionals who leave Australia on a permanent or long-term basis return to Australia within a two-year period. Of those who went to the United Kingdom, about 85 per cent returned. Overall, Birrell et al take a sanguine approach to out-migration of Australian professionals. They see it mainly as a means by which young Australians can gain overseas experience and connections that will enhance their human capital when they return to Australia. The Senate Legal and Constitutional Committee’s report on Australian expatriates (Commonwealth of Australia 2005) took a similar attitude and made recommendations about how Australians overseas might be encouraged to remain attached to Australia.

## Simulations of Australia’s Future Labour Supply

In the following discussion, we examine variations in the size of the working age population (all persons aged 15-64) under each of the population scenarios developed in Chapter 5, and reproduced below in Table 30. It important to recognise that these simulations are not considered ‘predictions’ of labour supply. In search for policy directions about the labour supply itself, we examine ‘what if’ futures. Such simulation is important as current policy attention is on adaptations to a given labour supply future, rather than upon changing Australia’s labour supply future (McDonald, 2005).

**Table 30** Models of Population Change.

| Model              | TFR                    | ANM                             | e0m         | e0f         |
|--------------------|------------------------|---------------------------------|-------------|-------------|
| 1 – Base           | 1.8                    | 110,000                         | 77.0-->86.5 | 82.4-->91.5 |
| 2 – Low migration  | 1.8                    | 110,000-->70,000,<br>10 years*  | 77.0-->86.5 | 82.4-->91.5 |
| 3 – High migration | 1.8                    | 110,000-->190,000,<br>10 years* | 77.0-->86.5 | 82.4-->91.5 |
| 4 – Low fertility  | 1.8-->1.5,<br>10 years | 110,000                         | 77.0-->86.5 | 82.4-->91.5 |
| 5 – High survival  | 1.8                    | 110,000                         |             |             |
| 6- Zero migration  | 1.8                    | 0                               | 77.0-->86.5 | 82.4-->91.5 |

Note 1: TFR - Total Fertility Rate.

Note 2: ANM - Annual Net Migration.

Note 3: e0m - Life expectancy at birth for males.

Note 4: e0f - Life expectancy at birth for females.

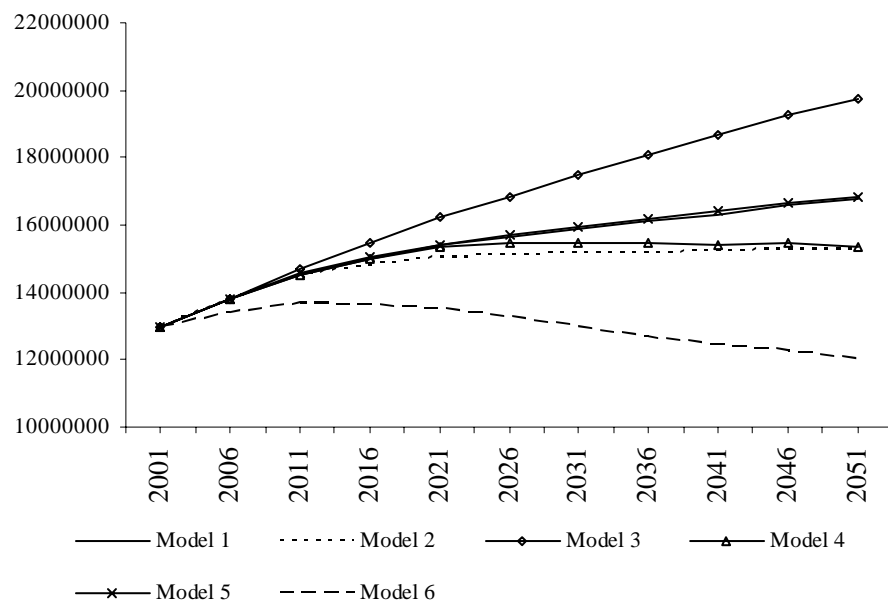
Note 5: \* To 2015.

## Variations in Demographically Determined Working Age Population

Figure 30 displays variations in the size of the working age population, using the assumptions outlined in Table 30. Under current trends, the working age population is projected to rise from 13.8 million in 2005 to 15.4 million in 2021 and 16.8 million in 2051 (model 1). With an improvement in survival, the number in the working age population increases only slightly because gains in life expectancy accrue mainly after age 65 for both men and women.

With a drop in migration to 70,000 the projected labour supply is considerably lower, by about 1.5 million by 2051. Eliminating a migration program altogether would have a strongly negative effect on labour supply, falling from 13.5 million in 2021 to 12 million in 2051 (model 6). In contrast, increasing international migration from its current level to about 190,000 over a 10 year period has a strong positive effect on labour supply (2021=16.2 million, 2051= 19.8 million).

**Figure 30** Working Age Population, by Scenario (2001-2051).



Source: Calculations by authors.  
 Note 1: Model 1 - Current demography.  
 Note 2: Model 2 - Low migration.  
 Note 3: Model 3 - High migration.  
 Note 4: Model 4 - Low fertility.  
 Note 5: Model 5 - High survival.  
 Note 6: Model 6 - Zero net migration.

Table 31 summarises the decade growth rates in the working age population under each of the demographic models (The full assumptions are spelt out in chapter 5). Continuing existing trends (model 1), the growth in the working age population is predicted to fall from about 7% between 2001-2011 to just over 3% between 2021-2031. These figures strongly contrast the growth in the labour force during the 1980s (26%) and 1990s (14%). The growth rates fall considerably faster given a reduction in migration (models 2 and 6) or fertility (model 4). An increase in migration to 190,000 (model 3) almost maintains the growth in the working age population out to 2050.

**Table 31** Percentage Change in Working Age Population, by Scenario.

|         | <b>2001<br/>2011</b> | <b>2011<br/>2021</b> | <b>2021<br/>2031</b> | <b>2031<br/>2041</b> | <b>2041<br/>2051</b> |
|---------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Model 1 | 7.0%                 | 5.9%                 | 3.3%                 | 2.6%                 | 2.8%                 |
| Model 2 | 6.7%                 | 3.6%                 | 0.9%                 | 0.2%                 | 0.8%                 |
| Model 3 | 8.3%                 | 10.3%                | 7.8%                 | 6.7%                 | 6.0%                 |
| Model 4 | 7.0%                 | 5.5%                 | 0.9%                 | -0.3%                | -0.6%                |
| Model 5 | 7.1%                 | 6.1%                 | 3.4%                 | 2.7%                 | 2.8%                 |
| Model 6 | -0.5%                | -1.2%                | -4.1%                | -4.0%                | -3.4%                |

Source: Calculations by authors.  
 Note 1: Model 1 - Current demography.  
 Note 2: Model 2 - Low migration.  
 Note 3: Model 3 - High migration.  
 Note 4: Model 4 - Low fertility.  
 Note 5: Model 5 - High survival.  
 Note 6: Model 6 - Zero net migration.

These differing demographic assumptions also alter the timing and composition of labour market entries and exits, as measured by the Labour Market Entry Exit Ratio, LMEER (see Figure 31). This ratio measures the number of people entering the labour market (defined as those aged between 15-24) as a ratio of the number of people leaving the labour market (defined as those aged between 55-64).

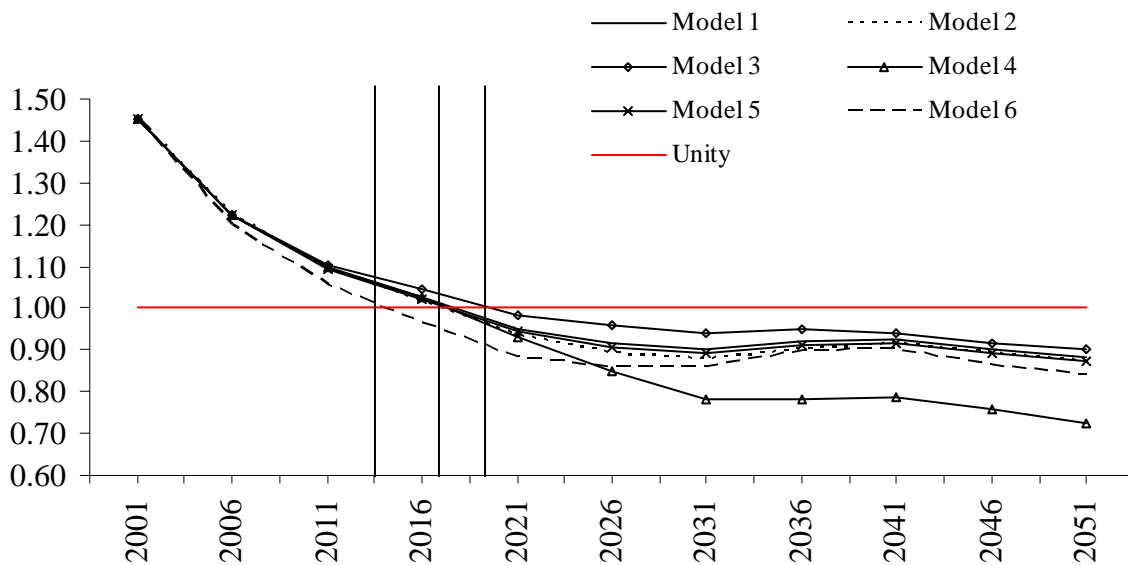
The red line in Figure 31 indicates that the number of people of labour market entry age matches the number of people of labour market exit age. Below the line, the number of exits outnumbers entrants and the converse is true for values above the line. In 2001, the base year, there are 1.45 persons of labour market entry age to every person of labour market exit age. Assuming current demography, by 2017 the number of labour market exits outnumbers entrants and by 2026, there are 0.91 entrants for every one exit.

As shown by the three vertical lines, the timing of labour market supply problems differs considerably between the models. With zero annual net migration, there is an excess of labour market exits much earlier than all other models. Importantly, under the high migration model, the excess of exits over entrants is delayed much further.

(These LMEER presented below are not adjusted for participation rates, they are in Figure 34). When interpreting the LMEER, it is important to recognise a major limitation as pointed out by Jackson and Felmingham (2002):

*“Labour force participation and retirement rates, which help determine this key ratio [LMEER], will be influenced by many economic factors, such as the state of the business cycle, the relative price of labour, and its productivity. Here, attention is focused exclusively on demographic influences on the ratio; consideration of the economic consequences requires a separate analysis”* (Jackson and Felmingham, 2002:15).

**Figure 31** Labour Market Entry/Exit Ratios, LMEER by Scenario.



Source: Calculations by authors.

Note 1: Model 1 - Current demography.

Note 2: Model 2 - Low migration.

Note 3: Model 3 - High migration.

Note 4: Model 4 - Low fertility.

Note 5: Model 5 - High survival.

Note 6: Model 6 - Zero net migration.

Note 7: Example 1 - in 2001 in all models 1.47 persons entered the workforce for every exit.

Note 8: Example 2 - in 2017 (model 1) for every person entering the workforce a person also exited the workforce.

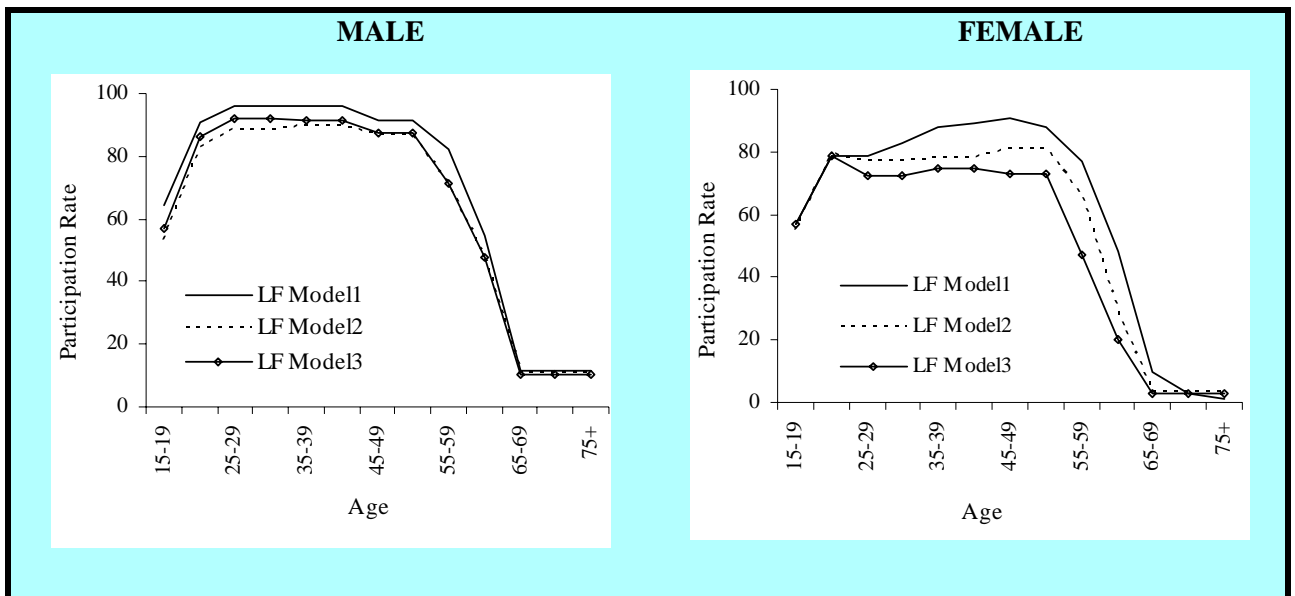
Note 9: Example 3 - in 2025 (model 1) for every 9 persons entering the workforce another 10 persons left.

## Variations in Participation Rates

Using the working age population projections presented above, we also examine the effects of compositional changes within the labour force itself, that is, changing the age-sex specific labour market participation profile. Figure 32 displays the assumed labour force participation schedules in three scenarios.

|                               |  |
|-------------------------------|--|
| LF Model 1<br>'High' series   | In the first, the 'high' series (LF Model 1) assumes that men's labour force participation rates 25 plus would over the next 30 years, return to the rate that they were in 1979. For women, the 'high' series assumes that women's participation increases over 30 years to the level of female labour force participation in Sweden today. This represents about a 20% labour force participation increase at some ages. |
| LF Model 2<br>'Medium' series | In the second series 'medium' (LF Model 2), ABS projected labour force participation rates for 2016 are extrapolated to 2050 for both men and women (ABS, 1999).   |
| LF Model 3<br>'Low' series    | In the final series 'low' (LF Model 3), current age-sex specific labour force participation rates are applied to the future working age population to estimate labour supply.  |

**Figure 32** Male and Female Labour Force Participation Rate Scenarios, 2030 Assumptions.

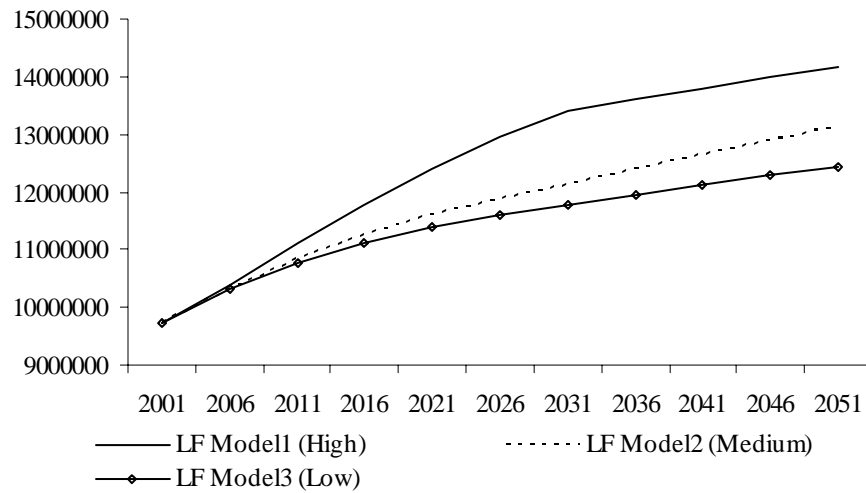


Note 1: LF Model 1 - High series.  
 Note 2: LF Model 2 - Medium series.  
 Note 3: LF Model 3 - Low series.

Figure 33 displays the projected change in the labour supply under each of the participation scenarios (LF Model 1, LF Model 2 and LF Model 3). These projections are based upon an underlying demography of constant fertility, constant migration and improving survival prospects (Model 1, Table 30).

Results in Figure 33 underscore the important potential effects of increasing participation on the labour supply. Compared to current level participation rates, the labour supply would be higher by 207,000 in 2021 and 678,000 in 2051 under the ‘medium’ participation scenario. Differences in the labour supply are much larger under the high scenario: In 2021 the projected labour supply reaches 12.4 million and by 2051, 14.2 million.

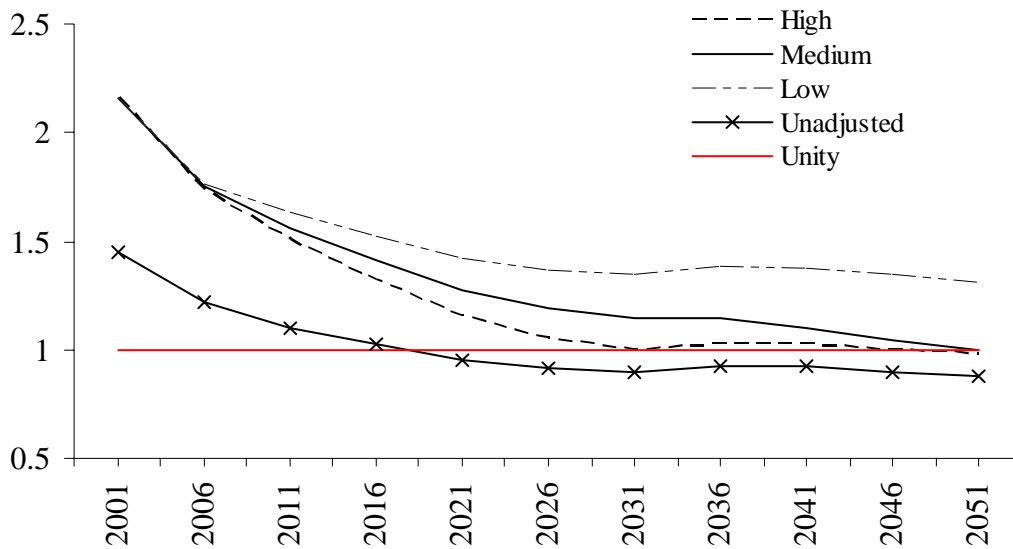
**Figure 33** Variations in Labour Supply Given Current Trends in Demography with Changing Participation Rates.



Source: Calculations by authors.  
 Note 1: LF Model 1 - High series.  
 Note 2: LF Model 2 - Medium series.  
 Note 3: LF Model 3 - Low series.

Figure 34 displays the recalculated Labour Market Entry Exit Ratios (LMEER) adjusted for the simulated participation rates. As can be seen, the value of the LMEER is much higher once participation is accounted for (above 2). Nonetheless, the speed of decline in the LMEER is much faster once participation is accounted for, as shown by the three vertical lines. The first decline, at 2017, shows when the unadjusted number of entrants equals exits; the second decline occurs at about 2030 when under the high participation scenario, the number of entrants equals the number of exits; and the final line, when under the medium participation scenario, the number of entrants equals exits. These results may seem contradictory; higher participation exacerbating the timing of labour market exits. However, this is due to the higher participation scenarios increasing participation at older age. Indeed, the results presented below need to be interpreted in terms of the total size of the labour supply as shown earlier. This once more underscores the importance of maintaining fertility to ensure a continued supply of younger workers.

**Figure 34** Labour Market Entry Exit Ratios (LMEER) Adjusted by Projected Participation Rates, 2001-2051.



Note 1: Unadjusted LMEER does not adjust for participation rates.

## The Relative Importance of Demography and Participation

The above analysis points clearly to the role of both demographic change (in particular higher migration and stable fertility) and improving labour force participation in changing future labour supply. An important question is: is it demography primarily driving the size of the future labour supply or increases in participation? The result has important implications for the direction of labour supply policy. For example, how can policy makers best maximise labour supply through a combination of fertility, migration and participation policies?

**Table 32** Changes in Labour Supply Due to Demography and Participation.

|               | 2016           |              | 2031           |              | 2051           |              |
|---------------|----------------|--------------|----------------|--------------|----------------|--------------|
|               | N              | %            | N              | %            | N              | %            |
| Migration     | 382976         | 36.7         | 1339590        | 45.1         | 2522254        | 59.4         |
| Participation | 659567         | 63.3         | 1630299        | 54.9         | 1720671        | 40.6         |
| <b>Total</b>  | <b>1042543</b> | <b>100.0</b> | <b>2969889</b> | <b>100.0</b> | <b>4242924</b> | <b>100.0</b> |
| Fertility     | 0              | 0.0          | 315623         | 19.4         | 1194847        | 69.4         |
| Participation | 659567         | 100.0        | 1314677        | 80.6         | 525823         | 30.6         |
| <b>Total</b>  | <b>659567</b>  | <b>100.0</b> | <b>1630299</b> | <b>100.0</b> | <b>1720671</b> | <b>100.0</b> |
| Mortality     | 21657          | 3.2          | 54606          | 3.2          | 71858          | 4.0          |
| Participation | 659567         | 96.8         | 1630299        | 96.8         | 1720671        | 96.0         |
| <b>Total</b>  | <b>681224</b>  | <b>100.0</b> | <b>1684905</b> | <b>100.0</b> | <b>1792529</b> | <b>100.0</b> |

Table 32 decomposes the changes in labour supply under the scenario of increasing migration (to 190,000 by 2015), reducing fertility (falling to 1.5 births per woman by 2015) and increasing survival relative to an increase in participation to the high scenario.

In 2016, participation adds the largest number of workers to the labour supply, with the effects of demographic change remaining weak for the mortality and fertility scenario. Nonetheless, about 40% of the increase in the labour supply is due to migration in the migration model.

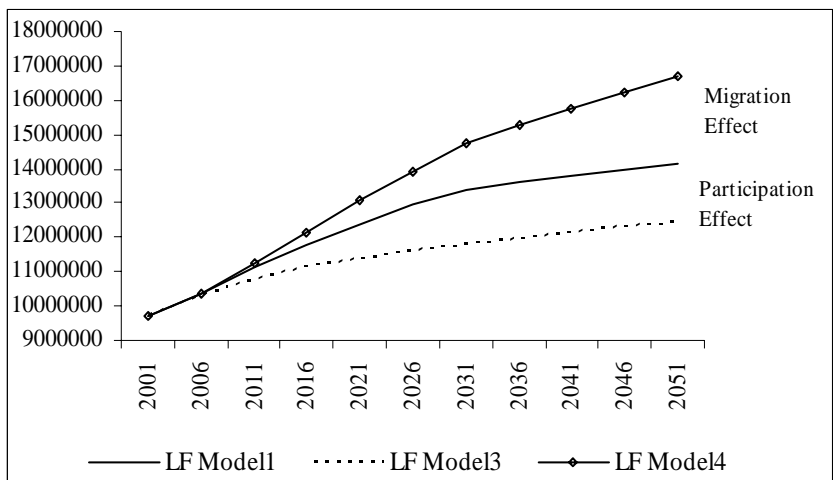
The zero effect of fertility is expected given that projecting from 2001, the first cohort of births is yet to reach working population age. By 2031, the effects become stronger for both migration and fertility. In the first, an additional 1.3 million workers is added through migration and about 315,000 workers would be lost given a fall in fertility. By 2051, workers added through migration account for about 60% of the increase in the labour supply and the increase in the labour supply would have been smaller by 70% given a fall in fertility.

Throughout the projection period, the effect of increasing survival remains very low, which can be expected given the low labour force participation rates at the oldest ages (see Figure 32). Figures 35-37 divide the changes in the future labour supply into demographic (migration, fertility and mortality respectively) and compositional (labour force participation) components.

The key result is that demography is not the only potential factor affecting the future growth of the labour supply. With appropriate policies in place, labour force participation can be lifted to boost labour supply significantly in the short and medium term. Moreover, with policies aimed at maintaining fertility at its current level, and/or a targeted increase in overseas migration, the future labour supply can be increased substantially also.

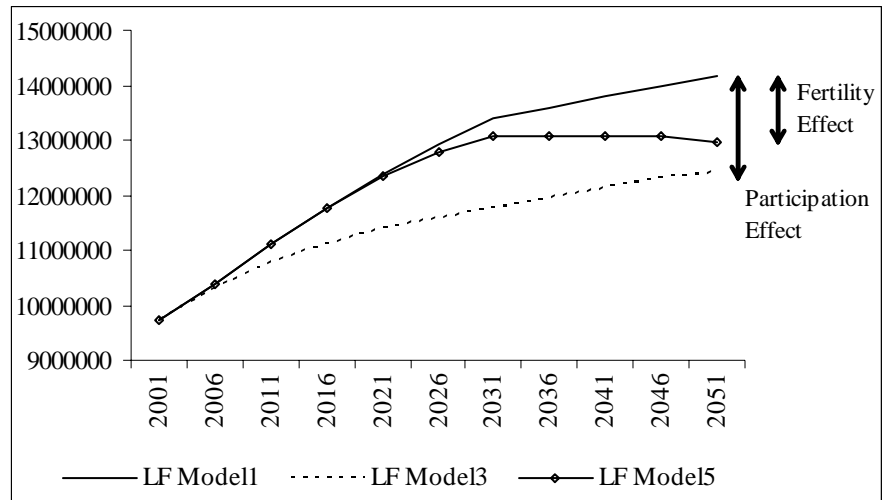
In summary, demography is not necessarily destiny for Australia's future labour supply.

**Figure 35** Decomposing the Migration Effect from the Participation Rates in Labour Supply.



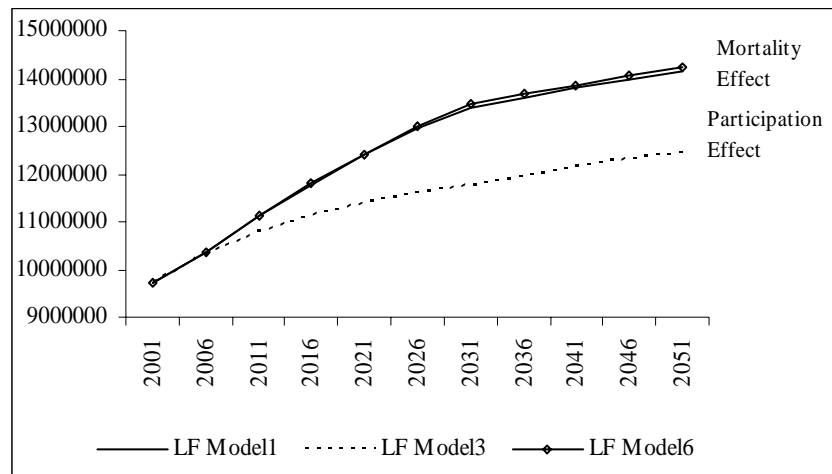
Source: Calculations by authors.

**Figure 36** Decomposing the Fertility Effect from the Participation Rates in Labour Supply.



Source: Calculations by authors.

**Figure 37** Decomposing the Mortality Effect from the Participation Rates in Labour Supply.



Source: Calculations by authors.

## Industry/Occupation Level, Results from MONASH

An additional component of projected labour supply futures is the effect of population ageing on specific industries and occupations. Detailed estimates from the MONASH model (Tables 33 and 34) provide an insight into possible sectorial shifts from 2004-05 to 2009-10 (DEWR, 2005).

The column headed 'Employment growth' shows the projected compound average annual employment growth from 2004/05 to 2009/10. The column headed 'Ageing reduction' estimates the average annual reduction in employment growth that is projected to occur specifically due to population ageing. For example, between 2004-05 and 2009-10, the projected annual average growth rate in 'Metal ore mining' is 1.36%. This growth rate is 1.31% lower due to the effect of population ageing, than would be the case if the labour market had a static age composition.

Importantly, these projections show that, over this period, employment growth in defence is only marginally influenced by population ageing (a reduction of about 0.09%) with a forecast compound employment growth rate of about 1.72%. It is important to recall from the results in Chapter 5, that population ageing has very little effect to 2010. To 2020 and beyond the speed of population ageing is projected to increase significantly, which would suggest ongoing labour supply problems for many of the industries in Table 33.

**Table 33** Forecast Compound Average Annual Employment Growth and Reduction in Employment Growth Due to Ageing by Selected Industry, 2004-05 to 2009-10.

|                          | Employment |           | Ageing                     |           |      |
|--------------------------|------------|-----------|----------------------------|-----------|------|
|                          | Growth     | Reduction | Growth                     | Reduction |      |
| Other Mining             | 6.93       | 3.22      | Communications             | 0.1       | 0.45 |
| Services to Agriculture  | 6.43       | 1.57      | Air Transport              | 0.39      | 0.43 |
| Services to mining       | 1.41       | 1.47      | Education                  | 3.18      | 0.43 |
| Metal Ore Mining         | 1.36       | 1.31      | Sport/Recreation           | -1.15     | 0.37 |
| Machinery/Equipment      | 2.37       | 1.2       | Personal Services          | 1.21      | 0.36 |
| Petrol/Chemical Products | 2.61       | 1.18      | Libraries/<br>Museums/Art  | -1.17     | 0.33 |
| Forestry/Logging         | 4.4        | 1.02      | Road Transport             | 1.58      | 0.31 |
| Coal Mining              | -1.09      | 0.99      | Property Services          | 2.4       | 0.31 |
| Oil/Gas                  | -1.16      | 0.79      | Business Services          | 2.3       | 0.31 |
| Rail Transport           | 0.76       | 0.78      | Non-metal Mineral Products | -2.46     | 0.26 |
| Metal Products           | 1.43       | 0.76      | Household Good Retailing   | 2.07      | 0.26 |
| Storage                  | -0.48      | 0.74      | Agriculture                | 1.35      | 0.2  |
| Finance                  | 0.43       | 0.58      | Water/Drains               | -0.96     | 0.2  |
| Electricity and Gas      | 0.38       | 0.66      | Health Services            | 1.95      | 0.16 |
| Water Transport          | -1.75      | 0.65      | Government Administration  | 0.88      | 0.14 |
| Services to Transport    | -0.32      | 0.63      | Community Services         | 1.75      | 0.12 |
| Other Manufacturing      | 1.79       | 0.51      | Defence                    | 1.72      | 0.09 |
| Household Good Wholesale | 1.89       | 0.5       | Construction Services      | 0.19      | 0.02 |
| Machinery/Auto Wholesale | 1.87       | 0.49      | General Construction       | 0.21      | 0    |
| Basic Material Wholesale | 1.92       | 0.48      | Other Transport            | 0         | 0    |

Source: DEWR, 2005.

Furthermore, results from MONASH show important effects of ageing on individual occupations. For example, between 2004-05 and 2009-10, the number of building and engineering professions is projected to grow by 1.7 per cent annually. Over this same period, population ageing suppresses employment growth by about 0.56 per cent. That is, employment growth would be higher by 0.56 per cent if the ageing effect did not exist. Across all occupations, annual employment growth is projected to average about 1.5 per cent, with population ageing suppressing growth by about 0.37 per cent annually.

**Table 34** Forecast Compound Average Annual Employment Growth and Reduction in Employment Growth Due to Ageing by Selected Occupation, 2004-05 to 2009-10.

|  | <b>Employment<br/>Growth</b> | <b>Ageing<br/>Reduction</b> |
|--|------------------------------|-----------------------------|
| Natural/Physical Science Professionals                 | 1.70                         | 0.56                        |
| Building/Engineering Professionals                     | 1.97                         | 0.34                        |
| Accountants/Auditors                                   | 2.36                         | 0.45                        |
| Computing Professionals                                | 1.81                         | 0.70                        |
| Medical Practitioners                                  | 1.99                         | -0.17                       |
| Nursing Professionals                                  | 1.51                         | 0.23                        |
| Misc. Health Professionals                             | 1.39                         | 0.25                        |
| Medical/Science Technical Officers                     | 1.68                         | 0.62                        |
| Building/Engineering Assoc. Professionals              | 1.26                         | 0.31                        |
| Enrolled Nurses  | 2.37                         | 0.41                        |
| Mechanical Engineering Trades Persons                  | 0.47                         | 0.48                        |
| Fabrication Engineering Trades Persons                 | -0.07                        | 0.70                        |
| Automotive Engineering Trades Persons                  | -0.71                        | 0.54                        |
| Electrical and Electronics Engineering Trades Persons  | -0.32                        | 0.50                        |
| Structural Construction Engineering Trades Persons     | 0.05                         | 0.34                        |
| Final Finishes Construction Engineering Trades Persons | 0.45                         | 0.10                        |
| Plumbers   | 0.10                         | 0.37                        |
| Intermediate Mining and Construction Workers           | 0.00                         | 0.64                        |
| Mining, Construction and Related Labourers             | 0.46                         | 0.39                        |
| <b>TOTAL</b>   | <b>1.50</b>                  | <b>0.37</b>                 |

Source: DEWR, 2005.

Results also indicate that over the period 2004-05 to 2009-10, there is projected to be a further rise in part time relative to full time employment and a lower average number of hours worked. For a more detailed overview see DEWR, 2005 and Shah and Burke, 2003.

# Implications of Australia's Changing Workforce

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## The Importance of Age Composition

The projected slow growth of Australia's labour supply is a central issue to 2020 and beyond. At the same time as the labour market growth falls, the projected increase in young workers is even slower and negative for some ages. In contrast, much of the age specific growth in the labour supply is at older ages. As shown in Table 35, the age distribution of the labour force shifts significantly over the observed and projected periods (1980-2005 and 2021-2051 respectively).

In the next 20 years, we can expect Australia's young labour supply to be relatively static, so long as the present loss of these workers to overseas does not increase. To 2020, increased migration is a more effective measure to increase supply at younger ages than increased participation, although increasing participation has a desirable effect, mainly for young women.

The efficacy of the approach of increasing participation is contingent upon the scope for increase, that is, upon how low participation rates are at present. However, it is also contingent upon the assumption that an older worker induced not to retire early is a substitute for a younger worker. Because the relative fall in labour supply stems from falls in fertility, falls in labour supply in the future are very heavily concentrated at the young end of the labour market (under 40 years). McDonald and Kippen (2001) have estimated that, over the next 50 years, Japan's labour supply would fall by 20 million and Italy and Germany's by 11 million each if their demography and labour force participation rates of the late 1990s were to continue unchanged. Almost all of the projected fall in labour supply is among younger workers. If younger workers and older workers are not substitutes for each other, then a labour supply problem may remain even though participation rates at older ages increase. At the very least, there will be an adjustment problem.

Because fertility has been higher in the past, especially during the baby-boom period, most advanced economies are conditioned to an ever-growing supply of young workers. If there is a sudden change in the flow of new young workers, as will be the case in the absence of large-scale immigration in most advanced countries in the immediate future, the economic adjustment required could be considerable.

Some argue that labour shortages will provide a stimulus to technological development and to higher productivity resulting from increases in capital per worker (Kosai et al. 1998; Dowrick 2002). However, this argument implies that there are sufficient adequately skilled workers to develop and implement the new technologies. If this is not the case, because technology is readily transportable, capital may flow to economies that have an ample supply of skilled workers. Emerging economies today have an abundant supply of highly skilled young workers available at lower wages than apply in the older advanced countries. The key to economic competitiveness in the future, as many writers have argued, will rest upon a country's capacity to produce and maintain highly skilled workers (Florida, 2002, 2005a, 2005b; Reich, 1991).

**Table 35** Age Distribution of the Labour Force (%).

|   | <b>15-24</b> | <b>25-39</b> | <b>40-54</b> | <b>55+</b> | <b>Total Size *</b> |
|---|--------------|--------------|--------------|------------|---------------------|
| 1980                                      | 27.34        | 36.88        | 25.51        | 10.27      | 6600('000)          |
| 2005                                      | 19.39        | 33.86        | 34.01        | 12.74      | 10305('000)         |
| <b>Model 1 – Current Trend Demography</b> |              |              |              |            |                     |
| High Participation, 2020                  | 16.69        | 32.88        | 34.01        | 16.42      | 12385000            |
| Medium Participation, 2020                | 17.01        | 33.39        | 34.32        | 15.27      | 11595000            |
| High Participation, 2050                  | 15.85        | 31.47        | 33.81        | 18.88      | 14153000            |
| Medium Participation, 2050                | 15.61        | 31.69        | 34.51        | 18.19      | 13111000            |
| <b>Model 3 – High Migration</b>           |              |              |              |            |                     |
| High Participation, 2020                  | 16.67        | 33.41        | 34.09        | 15.83      | 13062000            |
| Medium Participation, 2020                | 16.98        | 33.91        | 34.38        | 14.72      | 12234000            |
| High Participation, 2050                  | 15.82        | 31.71        | 34.05        | 18.41      | 16675000            |
| Medium Participation, 2050                | 15.59        | 31.93        | 34.75        | 17.74      | 15450000            |
| <b>Model 4 – Low Fertility</b>            |              |              |              |            |                     |
| High Participation, 2020                  | 16.47        | 32.97        | 34.10        | 16.46      | 12353000            |
| Medium Participation, 2020                | 16.80        | 33.48        | 34.41        | 15.31      | 11565000            |
| High Participation, 2050                  | 14.28        | 29.70        | 35.41        | 20.62      | 12958000            |
| Medium Participation, 2050                | 14.07        | 29.90        | 36.16        | 19.87      | 12005000            |

Note 1: \* Total size rounded to nearest 1000.

Larsson (2003) has made the observation that 80 per cent of technology becomes obsolete within ten years while 80 per cent of the work force gained its qualifications more than 10 years ago. Young, recently trained workers have been the conventional means by which economies have met their demand for workers skilled in the latest high technology. If lifelong learning cannot raise older workers to the technological standard of recent young graduates, and we argue that this is indeed the case in highly specialised occupations, economies must look to ways to increase the numbers of young highly skilled workers.

## Sources of Skilled Labour

A number of recent reports have examined aspects of skilled shortages in Australia. We contend that there are a number of options available to increase the supply of skilled workers:

1. Increase the size of the population in the working age population. The above simulations have shown that increasing migration has the strongest short term effect on boosting labour supply, whereas maintaining fertility at around current levels (TFR = 1.7-1.8) is important for long term stability in both the numbers of future employees and in stabilising the age composition of the labour force. Furthermore, immigration is an effective way of targeting young skilled workers in the short and medium term.
2. Increase the percentage of young people who are trained.
3. Retraining of existing older workers in the labour market. Current government policies in this area have been weak, and no large scale policy is in place. McDonald and Temple are working on a proposal for a Higher Education Contribution Scheme (HECS) style financing arrangement for retraining of older workers.
4. Employment of trained workers not currently employed in their area of skill.

Options 2, 3 and 4 emphasise the compositional aspects of the population which can boost the labour supply without changing the size of the population. It is important to recognise that the increasing speed of technological change means that Australia must give higher priority to its supply of young skilled workers.

The options and projections presented above indicate that policies that reinforce the balance between work and family will help to increase women's labour force participation. Both government and social institutions should be promoting employment through means that are consistent with the needs of young children and other caring roles performed by families (McDonald, 2006). In 2004, 32% of women not in the labour force were not actively seeking employment due to child care commitments (ABS, 2005).

If, as is projected, Australia's living standards continue to increase and given the ageing of the population, there is likely to be an increase in demand for service workers who are relatively less skilled. Some possibilities for boosting labour supply through immigration to meet this demand include a focus on immigrants with lower skills, increasing the number of temporary workers on labour agreements or increasing the humanitarian intake.

## Summary

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This chapter has examined recent trends and future projections for Australia's labour supply. With irreversible population ageing, an understanding of the role of demography upon the future supply of workers is crucial. However, this chapter has also shown that labour supply futures are not determined by demography alone, with scope to increase labour force participation rates in the population. Among the key findings from this chapter are:

The Australian labour supply grew by about 26 per cent in the 1980's and 14 per cent in the 1990s, fuelled by the remnants of the baby boom and increasing labour force participation of women. Assuming current demography, between 2001 and 2011, the working age population is projected to grow by 7 per cent. Between 2021 and 2031, this figure falls to 3.3 per cent.

Increasing labour force participation among the over 55's is an important direction for policy. However, such a policy should exist in tandem with stabilising fertility to ensure an ongoing supply of younger workers in the future.

Although part time employment has grown very strongly since the 1980's, full time work remains the norm in the Australian labour market. Although the increasing proportion of part time jobs raises questions about 'job quality', part time work provides flexibility for those who may otherwise be unemployed. Part time work is likely to play an increasing role in an ageing labour market.

Both demography and participation play an important role in determining the future supply of labour. From the demography side of the equation, maintaining current fertility (around 1.8 births per women of reproductive age) and increasing migration have a strong effect on future labour supply. Maintaining fertility is particularly important for the future supply of young workers. From the participation side, with appropriate policies in place, increases in participation can lift the potential labour supply much faster than delivered by fertility.

By altering the age composition of the population, population ageing is predicted to effect industries and occupations differently. Between 2004-05 and 2009-10, average employment growth is projected to be 1.5 per cent per annum. Over this same period of time, ageing is projected to decrease employment growth by about 0.37 per cent per annum.

## Defence Implications – Workforce

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This chapter has examined recent trends and future projections for Australia's labour supply.<sup>45</sup>

Defence should realise it is part of the national workforce landscape. It has a particular focus on gaining younger workers for its specialised combat roles. As noted earlier, the numbers of younger people is set to grow numerically but this group is decreasing as a percentage of the total Australian population. This causes workforce supply pressure for young workers as demand in the economy is projected to be high. This has significant implications for Defence's ability to attract younger Australians to undertake military service when other attractive employment options exist. Defence in utilising Scan 2025 data may be able to develop more appropriate policies and targeting that can stimulate youth recruitment.

The future supply of workers is crucial to Defence not only in relation to the recruitment of young Australians to perform military tasks but also to the maintenance and support of the Defence organisation via the Defence APS, Defence Industry and Defence contractors. Significantly, the data shows that labour supply futures are not determined by demography alone. Significant scope exists to increase labour force participation rates in the population with both a direct and indirect benefit to Defence.

The direct benefits to Defence of enhanced participation are to address some shortages in general workers within the Departments support areas. The indirect benefits are that additional participation by certain groups will reduce to some level the demand for younger workers. This may release more young people to perhaps take up more challenging roles in the Services. It should be noted that competition for younger workers is still likely to be very competitive but particularly for those young people with higher cognitive abilities.

The point that the economy/workplace now faces a significant decrease in workforce entrants at a time of increased workforce exits (retirements) means that the following aspects will need additional attention:

- Personnel management policies designed to enhance participation and productivity.
- The use of technology to replace or reduce the requirement for personnel.
- Processes and procedures that streamline workflows.

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45. This section developed by Mr John Hearps, DSPPR.

Increasing the labour force participation among the over 55's was noted as an important direction for policy and this applies to the Defence APS situation as well. However, service in the military particularly in the combat arms is predominately a younger persons' role. The key personnel objective of the ADF is to enhance the recruitment of younger Australians (aged 16 – 28) and to sustain them in military service until their mid 30's (10 – 20 years of service point). Not to achieve this outcome restricts Defence capabilities and subsequently government military options.

The fact that fertility rates is a national concern should also be recognised by the Department in relation to developing supportive family aspects to enable members to have children as well as a career. Considered further in the society chapter are both child care which is perhaps the most active issue in regard to stimulating workforce participation and, the changing lifestyle aspects of caring for an ageing population.

Part time work was noted as likely to play an increasing role in an ageing labour market. Defence needs a new total workforce approach which would include an alternate approach to phased retirement, reallocation of tasks, developing mentoring staff, and transitional arrangements for military personnel who have completed 12 or more years service to Defence APS and other agency APS positions. Likewise, arrangements with Defence Industry for ADF specialised trades needs to be considered, especially in light of high and increasing demand for these people both by Defence and by Industry.

Workforce skill demands by industry sectors needs to be understood by Defence. This includes the likely demand levels for currently serving/separating Defence personnel across the entire range of Defence trades and professions.

Some professions within the Australian and global workforce are particularly vulnerable to ageing. Of particular note are the shortages of scientists, engineers, laboratory technicians, doctors and nurses. The situation is further exacerbated as the demand for these skill sets is increasing as organisations attempt to address the impacts of an ageing population, a growing global economy and climate change.

Training and development of ADF personnel to fulfil their military tasks whilst gaining skills, qualifications and experience to be able to transition successfully to the civilian workforce could form part of a potent attraction and retention strategy. The approach would need to take into consideration national workforce opportunities.

Reserve service may come under threat as civilian employers respond to the decrease in the number of employees in the market place. This may impact on the ability of employers to release employees for Reserve service. However, employers are expected over time to change their working practices to be more supportive and accepting of part time work arrangements. This could result in increased willingness to both serve in the Reserve and to enhance Reservist availability. Transfer of permanent force members to the Active Reserve may be enhanced over time due to businesses becoming more 'part time friendly'.

Skilled migration can be a direct contributor to Defence workforce aspects via recruitment of military personnel from allied overseas nations where skill sets are similar but this is generally not likely to be viable on a larger scale particularly into the longer term as other nations workforces also age and the demand and opportunities for allied discharged service personnel increases in their own countries.

Skilled migration indirectly contributes to Defence outcomes by building up the national labour supply. Migration reduces the demand for local younger workers who are then more responsive to Defence recruitment. Migration also reduces some demand opportunities in the local economy for potentially separating experienced Defence staff. Finally, migration also brings people with skills to Defence industry and to some extent the Defence APS.

