The Transformation of Australia’s Population, 1970 to 2030
Labour Force, Employment and Unemployment

Bruce Chapman* and Cezary Kapuscinsky†

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ABSTRACT

This paper deals with transformations in the labour force, employment and, by construction, unemployment. We cover the past three decades and likely outcomes in decades following, exploring the historical profile of the labour force in the context of employment growth and likely future scenarios of both population and labour force participation rates. Following this we consider the methodology behind our projections of employment and unemployment, and illustrate differences between projections derived on the basis of alternative policy interventions. The implications of alternative employment growth scenarios are drawn for likely long term unemployment outcomes.

Keywords: labour market, employment, unemployment, labour force, labour force projections;

JEL codes: J21 Labour force and employment, size and structure, J18 Labour and demographic economics – public policy, J11 Demographic trends and forecasts, N37 Economic History: Labour: Oceania;
Introduction

Projections of the Australian population have been regularly produced by the Australian Bureau of Statistics (ABS) since the late 1970s.¹ Labour force participation is one of the most stable economic indicators and this has encouraged the ABS to provide projections in this area. The first such projections were published in 1992² with the most recent set covering the period from 1999 to 2016.³ These demographic projections have been used to alert researchers, policy-makers and the wider community to fundamental changes in the structure of the population and the labour force due to the ageing of the population.

However, almost nothing is available with respect to the likely future profile of either employment or unemployment. While aggregate macroeconomic models (such as the Treasury’s TRYM model) or general equilibrium models (such as the MONASH model) do provide some indications of short-term trends (or future deviations from extrapolated current trends) they usually only span several quarters and rarely go beyond a decade.

The story of unemployment cannot be studied in isolation, and in particular, without consideration of employment growth. While the analysis of population and labour force provides a picture of long-term trends in economic activity of the population, examination of employment and unemployment is much more important from a policy perspective since it deals with the behaviour of the economically active subset of the population.

It is important to note that demand side policies include a number of instruments available to the government (such as interest rates and labour market training programs), but the range of policy options relevant to population dynamics is much weaker (for example, the size and composition of immigration). We should keep in mind that Australia’s internationally open character and the importance of the agricultural sector exert an influential role on economic activity but are beyond the control of the government. With this acknowledged, there still remains room for counter-cyclical policies which impact on employment growth and thus unemployment.

This paper could have been concerned solely with the implications of alternative population projections on the profile of the future labour force, but it is much more interesting to consider also employment and unemployment. We use the identities which link labour market components and a number of scenarios regarding the behaviour of employment growth in order to derive alternative profiles of future unemployment. While these profiles are not forecasts of future employment, they nevertheless have great value as comparisons of potential outcomes in the labour market.

1 See Adam (1992) for a brief historical overview.
3 ABS (1999).
The paper is structured as follows. The next section explains the basic relationships between population to the labour force and employment, describes how unemployment fits into the picture, and explores the mechanics behind the generation of both population and labour force projections. Section three examines the profile of the labour force over the last three decades. After this we turn to employment growth over the last three decades and ask what happens to the employment profile as a result of just a couple of poor years of growth.

Finally, we utilize a number of simple scenarios of future employment growth, derived from the outcomes of past cycles, to investigate the significance of employment on aggregate unemployment and long-term unemployment.

**Methodological Issues**

It is useful to begin with some basic definitions. First, the analysis of labour force issues is usually restricted to the adult population, that is, persons aged 15 and above. The labour force is defined as the sum of all people who are either employed or unemployed. To be employed a person must work in the market place (that is, receive income for work) and a person is classified as unemployed if he/she is not employed and is both available and looking for work.4

To provide indicators of movements in the labour force economists usually quote relative measures of the sizes of the appropriate segments of the labour market. Thus, the labour force participation rate is the proportion of the adult population which is in the labour force and the unemployment rate is the proportion of the labour force which is in the state of unemployment. A different summary of the labour market is the employment-population ratio which provides a picture of the labour market unaffected by participation.

Reliance on a single measure provides an incomplete picture of developments in the labour market and is ill-advised. For example, during early periods of recovery even rapid job creation may have little impact on unemployment if labour force participation rates increase in response to job growth. Because of these and other issues a combination of measures will be presented.

The population projections produced by the ABS are based on the cohort component method, in which the population is aged year by year and applies pre-specified fertility and mortality rates to each cohort (subset) of the population. Traditionally, these cohorts are single year sex-specific sub-populations. In addition, the cohort method accounts for migration by utilizing pre-specified rates of immigration and emigration.

The procedure is relatively simple, involving the specification of assumptions regarding fertility, mortality and immigration. For example, the latest set of ABS population

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4 See ABS (1991) for precise definitions of both the activity test and the availability test.
projections spans fertility rates from 1.6 to 1.75 births per woman. Presentation of a number of scenarios provides an indication of the sensitivity of projected trends of population with respect to the underlying assumptions.

The generation of labour force participation rates (and, with population, labour force levels) starts with an evaluation of the past trends of labour force participation for sex and age group cohorts. Simple linear (or logistic) models are then fitted to the data and used to extrapolate future participation rates.\(^5\) Since such modelling and derivation of participation rates does not incorporate socio-economic factors such as income, it is limited to providing only very broad trends in labour force participation rates. Nevertheless, it provides a number of variants of the labour force (by multiplying the extrapolated participation rates by the population projections) determined by underlying population projections.

**Labour Force and Employment: an Historical Overview**

Modern statistical measurement of the labour markets commenced in Australia in 1964 with regular quarterly surveys of adult populations in capital cities. Later these were extended to cover the whole country and in 1978 were transformed into monthly labour force surveys. Many facets of labour market measurement had not been standardised until the onset of the monthly surveys. In particular, the measurement of long-term unemployment (that is, people who have been unemployed for 12 months or longer) was only introduced in February 1978.

Figure 1 plots the size of the Australian population over the last three decades and labour force participation.

It is evident from this figure that population has been increasing at a very steady rate since 1964. On the other hand, participation rates have varied somewhat over the same period, ranging from a low of 58.3 per cent at the beginning of the sample to 63.7 per cent in 1990. Population changes are essentially due to long-term secular movements in fertility and mortality rates, and international migration, while short-term vagaries of the economic business cycle influence the labour force participation rate.

Labour force participation has also exhibited a relatively stable long-term trend. Increased entry into the labour force by women has more than compensated for the decrease in labour force participation by younger males (due to higher participation in education) and older males (due to the trend towards early retirement). The longer term perspective adopted in what follows allows us to separate cyclical changes from underlying trend movements in population and its components.

\(^5\) See ABS (1999) for a fuller description.
Figure 1: Population and labour force participation, 1964 – 1999.

Sources:
1. ABS, Labour Force, Australia, ABS Catalogue No, 6203.0 (various issues),

Figure 2: Labour force and employment, 1964 – 1999.

Sources: As for Figure 1.
Figure 2 presents the relative sizes and trends of labour force and employment since 1964.

The upward trend in labour force participation and population growth are the reasons that the size of the labour force has also been rising over this period, on average by about 2 per cent per year. A somewhat different picture emerges with respect to employment, in two ways. First, employment is much more variable than the labour force with distinct troughs being visible in the major recessions of 1981–82 and 1990–92. Second, since the first oil shock of 1974, employment growth has become increasingly different from the increases in the labour force. The difference between the two is, of course, unemployment, which has been high since the mid-1970s and continues to be one of Australia’s major policy challenges.

It is worth at this point to consider more closely the growth of employment, now illustrated in Figure 3.

Figure 3: Employment growth and GDP growth rate, 1965 – 1999.

Note: GDP growth rates are calculated as quarter-to-quarter changes with June values plotted in the graph.
Sources:
1. Employment - as for Figure 1.
2. GDP - ABS, National Income and Expenditure, Australia, ABS Catalogue No, 5206.0 (various issues).
By comparing employment growth with the growth of Gross Domestic Product (GDP), a yardstick of the performance of an economy, we can relate developments in employment to wider changes in the economy. Thus, as shown in Figure 3, employment exhibits a very cyclical pattern of growth with negative rates during recessions (i.e. when GDP exhibits negative growth rates) and positive rates over the remainder of the business cycles. In other words, employment seems to depend more on economic conditions (aggregate demand in the economy) rather than on the labour force (aggregate supply).

Over the last three decades two years, 1983 and 1991, stand out with respect to the magnitude of the contraction of the stock of jobs. The number of jobs fell respectively, by 2.1 and 2.3 per cent, compared to an annual average growth of employment over the sample period of 1.9 per cent. Such large declines in employment are rare and, as such, provide a clue to the possible importance of counter-cyclical policies. They are also pivotal for the design of our counterfactual simulations, presented in the next section.

To put these outcomes in perspective, we can compare average growth rates of employment with average growth in the labour force. Figure 3 suggests that, apart from the very few periods of negative growth, the vast majority of years in the 1964 to 1999 period looked reasonably healthy. However, as Figure 2 implies and Table 1 illustrates, the average growth of employment since the mid-1960s has been marginally less than the average growth of the labour force, i.e. the economy has not been able to generate enough jobs to stop the unemployment rate from rising.

Table 1: Average annual growth of employment and labour force, decade by decade, 1964 to 1999

<table>
<thead>
<tr>
<th>Period</th>
<th>Employment growth (per cent)</th>
<th>Labour force growth (per cent)</th>
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<tr>
<td>1960 to 1969</td>
<td>3.12</td>
<td>3.17</td>
</tr>
<tr>
<td>1970 to 1979</td>
<td>1.54</td>
<td>2.03</td>
</tr>
<tr>
<td>1980 to 1989</td>
<td>2.22</td>
<td>2.35</td>
</tr>
<tr>
<td>1990 to 1999</td>
<td>1.27</td>
<td>1.31</td>
</tr>
<tr>
<td>1964 to 1999</td>
<td>1.93</td>
<td>2.13</td>
</tr>
</tbody>
</table>

Sources: Authors’ calculations based on data from:
The above relationships and outcomes are reflected in Figure 4 which provides a picture of Australia’s unemployment history over the last three decades. The most pronounced aspect of this graph is the substantial and rapid rise in unemployment at the onset of the recessions of the mid-1970s and the early 1980s and 1990s. There is, however, a noticeable lack of symmetry: during the expansionary phases of the business cycle the unemployment rate has declined very slowly and has not come down fully to the pre-recession level. That is, increasing unemployment seems to be associated with more pronounced difficulties associated with its reduction, a phenomenon known as hysteresis.

Figure 4: The unemployment rate, 1964 – 1999.

Sources: As for Figure 1.

To illustrate how unemployment has increased over the period it is useful to look at simple period averages: during the 1960s the unemployment rate averaged 1.5 per cent; in the 1970s the average was 4.2 per cent; in the 1980s, 8.1 per cent and in the 1990s, 9.6 per cent. In fact, the early nineties saw a consistent period of double digit unemployment rates with 11.6 per cent being recorded in 1993 — the highest jobless rate since the depression of the 1930s.

The impact of recessions on employment can also be assessed by comparing the employment-population ratio and employment growth. This is a useful extension because a fall in the employment-population ratio unambiguously indicates a deterioration in economic conditions (job availability) irrespective of whether it is accompanied by changes in the
unemployment rate; as noted, a fall in the unemployment rate can come about through a lower participation rate which is a possible indication of a discouraged worker effect. However, if accompanied by a rising employment-population ratio a fall in the unemployment rate necessarily indicates an improving labour market situation.

Figure 5 shows clearly the periods of significant contraction of employment growth and decreases in employment-population ratios. The very marked decreases in both measures in the early 1980s and 1990s is particularly striking and apposite for our later exercises.

Figure 5: Employment-population ratio and the employment growth, 1965 – 1999.

Sources: As for Figure 1.

**Labour Market and Economic Policy**

We now consider a number of counter-factual experiments in order to illustrate the potential gains of anticipating an emerging problem and putting in place appropriate counter-cyclical action. The obvious place to start is with the two outliers in the profile of employment growth: the troughs of the recessions of the early 1980s and early 1990s. An interesting question is: what would employment and unemployment profiles have looked like if instead of the 1983 and 1991 decreases in employment growth the economy experienced different situations?
To address this question we consider three scenarios. Instead of the high negative employment growth values experienced in 1983 and 1991, it is assumed that for these years:

(i) Employment growth was stagnant (i.e., a growth rate of zero per cent);

(ii) Employment growth was higher than it was by the annual average of employment growth in the lower half of the years between 1966 and 1999 – that is, 0.38 per cent is added to the actual employment growth in 1983 and 1991, giving new figures of -1.72 and -1.92; and

(iii) Employment growth was higher than it was by the annual average employment growth in the period 1966 to 1999 – that is, 1.93 per cent is added to the actual employment growth in 1983 and 1991. Thus the new employment growth rates for 1983 and 1991 become -0.24 and -0.36 respectively.

While these scenarios are “what if” questions it should be realized that during an international recession it is very difficult to imagine that the government could implement policies which would generate an extra growth equal to a sample average growth of employment. Thus, the third scenario provides what must be an upper bound on employment growth, to be contrasted with actual experience. The second scenario provides an exposition of the effect of a mildly successful counter-cyclical policy. Finally, scenario (i) implies a very strong intervention resulting in over 2 per cent additional job growth in both 1983 and 1991.

Since the unemployment rate is a result of interactions between the supply of and the demand for labour, one cannot simply derive the profiles of the simulated unemployment rate on the basis of the new employment growth rates without taking account of the implied increases in labour supply. To handle a pro-cyclical participation response we have estimated an auxiliary equation linking the growth of the labour force with the current and lagged growth of employment and a time trend. This equation is then used to predict labour force participation rate increases (and, hence, the resulting growth in labour force) for each of the three scenarios of employment growth.

Once both employment and the labour force are derived, we can then calculate the associated unemployment rates, reflecting both changes in employment (the demand side) and changes in labour force participation (the supply side) under the three scenarios of employment growth.

Our calculations of the resulting unemployment rate profile under the three scenarios are presented in Figure 6. Given that we influence only two points, the resulting profiles are all approximately of the same pattern. The major difference, however, is the magnitude of the generated unemployment rates. First, scenarios (i) and (iii) translate into a 1999 unemployment

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6 Details of this equation are available on request from the authors.
rate of around 4.2 per cent. Scenario (ii) results in a 1999 unemployment rate of around 6 per cent. These are important results since, as is well known, under-utilization of labour resources results in significant economic and social costs to the society including from individual loss of income, present and future productive capacity and from the disruption of the social fabric of society.

Figure 6: Policy effects on Unemployment rate, 1964 – 1999.

Source: As for Figure 1 and authors’ calculations.

The exercises can be made more interesting through considering a component of the unemployment stock involving people more disadvantaged than others — the long-term unemployed. Through the use of techniques presented in Chapman, Junankar and Kapuscinski (1992), it is a straightforward matter to translate these generated unemployment rate scenarios into outcomes for long-term unemployment (LTU). The methodology involves estimating a reduced form model of LTU on a subset of the available data and forecasting the levels of LTU using the generated unemployment rates under different scenarios. Given the similarity of the unemployment rates for scenarios (i) and (iii), our discussion focusses on scenarios (ii) and (iii) representing small and large changes respectively. The results of these forecasts is given in Figure 7.

See for example, Junankar and Kapuscinski 1992.
A first point about these forecasts is that they follow a general pattern of cyclical variations with the profile of LTU still increasing quickly after a recession and falling slowly during a recovery. However, even a small decrease in unemployment (scenario (ii)) has significant repercussions: the average annual reduction in the number of long-term unemployed in absolute terms is around 55,000 people with the final value being approximately 60 per cent of the actual stock in 1999.

The forecasts for scenario (iii), which are for marked increases in employment growth, suggest a reduction of LTU by over 100,000 people by 1999. These results highlight how critical it can be to avoid just a few very poor years of labour market performance.

It is worth closing this section with a brief consideration of the policy significance of LTU. There are two basic points relating essentially to issues of distribution and macroeconomic efficiency. In terms of distribution (and equity) the case for attention being paid to the long-term unemployed is overwhelming. Members of the group are some of the least advantaged in the labour market, and are disproportionately made up of those with low formal skills and education, Aboriginals and Torres Strait Islanders, and/or immigrants.
from non-English speaking backgrounds. Moreover, those with high unemployment duration are by definition not accumulating labour market experience, one of the most important determinants of future wage income.

Long-term unemployment is also fundamental to policy due to its impact on macroeconomic efficiency. The basic point is that a labour supply pool with a large proportion of long-term unemployed will be a labour supply pool characterised by structural mismatch, with employers tending not to hire people with high unemployment duration. Such an outcome results in a wastage of society’s resources given that the labour market works more efficiently when the unemployed are able to slot easily into vacancies. Piggott and Chapman (1995) have estimated that long-term unemployment in the early 1990s cost Australian taxpayers around $1billion per annum from lost taxes and high welfare payments. In addition, there is considerable evidence that the associated structural mismatch decreases the potential for rapid recovery, because the skill losses associated with long-term unemployment imply that employers will be bargaining over a relatively small pool of “relevant” labour. This, in turn, implies higher prospects for wage inflation, even in periods of high measured unemployment, lower potential output, budgetary waste, and continuing inequities for those with lengthy unemployment duration.

### Labour Force, Employment and Unemployment: the Future

The projections of the population based on the medium scenario (which assumes a fertility rate of 1.75, current trends in mortality rate changes and net annual migration of 70,000) and the projections of the labour force published by the ABS (1999) are shown in Figure 8.

The Figure shows that, due to decreasing participation rates, the growth rate of labour force is expected to average about 0.8 per cent per annum (compared to 2.1 per cent over the last thirty years, and 1.3 per cent during the 1990s), which results in a labour force of 10.8 million by 2016. It should be stressed that these medium term projections involve people who are already alive (since to be in the labour force in 2016 a person must be at least one year old in year 2000). As a result, variations in fertility and mortality will not be important influences on labour force projections. Related to this is that the labour force participation rate is likely to come down to levels lower than these experienced in the 1970s and 1980s.

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9 See Budd, Levine and Smith 1987; Fahrer and Pease 1993.
Based on these projected population and labour force series it is straight-forward to
derive employment levels consistent with unemployment following a certain profile, or vice
versa. While we are unable to predict future economic conditions, it is sensible to ask what the
required rates of growth of employment would be given target levels of unemployment
(assuming there is no participation rate response). Figure 9 provides four scenarios of the future
growth of employment (conditional on labour force projections) if a target unemployment rate
is to be achieved over the next decade and a half. The four target values of the unemployment
rate: 9, 7, 5 and 3 per cent.

The data of Figure 9 can be understood as follows. If target rates of unemployment are
to be reached by 2016 average annual employment growth rates illustrated would achieve this
(in a smooth fashion). Of course, there is an infinite array of possible time paths that would
achieve these outcomes; those shown are illustrative only.

The detailed breakdown shows that one third of the growth of the labour force is going to occur
in the 45–54 age group while only 20 per cent of the growth will occur in the 20–44 age group.
Based on these projections, achieving an unemployment rate of 5 per cent by 2016 requires an average employment growth of just under 1 per cent, which ranges from 1.4 per cent in 2000 to 0.5 per cent in 2016. This target is not optimistic; it is worth remembering that employment growth of 1.4 per cent is much less than the sample average over the last three decades. Furthermore, in the light of historical profiles of the growth rates of employment and labour force, and given the projected growth rates of the labour force of 0.8 per cent, the average annual growth rate of employment of 0.98 per cent should be regarded as a credible target.

Finally, we also consider the longer-term future of the labour force over the next three decades. In this period, demographic factors tend to assume much more important roles in driving the labour force than do cyclical (economic) factors. For example, the ABS publishes only one set of labour force projections (which were discussed above and which cover a relatively short period (up to a decade and a half) and assume a total fertility rate of 1.75, net migration of 70,000 and the continuation of current trends in mortality rates. Unpublished projections based on alternative assumptions indicate very little change in the population series and, hence, the projected labour force series.
Longer time periods, however, bring about an increased importance of such underlying assumptions on the labour force projections. Utilizing unpublished projections of labour force series by McDonald (2000), we can illustrate such an impact. Thus, Figure 10 compares two labour force projections: one based on a higher fertility rate (1.76) and one based on a lower fertility rate (1.5). Both series assume 80,000 net migration and current profile of mortality rates. The results indicate that projections of labour force conditional on a lower fertility rate imply a slightly slower growth rate of the labour force (0.44 per cent per annum) than under the higher fertility rate (0.76 per cent per annum). As a result, the projected level of the labour force in 2030 is 10.9 and 11.2 million under the lower and higher fertility scenarios respectively.

Figure 10: Projected size of the labour force, 2000 - 2030.


The unpublished projections of the labour force series by McDonald (2000) also allow a look into the age decomposition of the future labour force. While the basic trends and, in particular, the aging of the population, are well known facts little discussion has so far been accorded the compositional changes in the labour force. However, Figure 11 indicates that over the next three decades there will be a substantial decrease in the share of young people in the work force (from around 38 per cent to 31.6 per cent).
Figure 11: Projected composition of the labour force by age, 2003 - 2033.


The data also suggest that people aged 25 to 34 will also account for a decreasing proportion of the labour force: from 26.1 per cent in 2003 to 23.9 per cent three decades later. At the same time the proportion of people aged 55 to 64 will more than double, from 5.3 per cent to 11.2 per cent. A similar trend is also projected for the 45 to 54 age group: an increase from 7.7 per cent to 9.9 per cent. The only age group which seems to be unaffected by the demographic change is the 35 to 44 age group which is predicted to remain at 23 per cent of the total labour force. The compositional changes might well have important implications for the structure and nature of employment.

Conclusions
Population and labour force projections indicate that in the next three decades the growth of the labour force will slow. This is a consequence of current (and projected) declines in fertility, the subsequent slowing of the population growth rate, and the overall fall in participation rate. It should be noted that while aggregate female participation rates are increasing slowly, male rates are declining. Even though the former developments are bigger than the latter, the overall changes in the composition of the population (specifically, the relative increase in the size of the age groups with lower participation rates) explains the overall decline in participation rates.

The analysis presented also indicates that understanding of labour force movements provides relatively few policy-relevant lessons. However our focus on unemployment provides
much more meaningful input into issues of policy. Our scenarios and the comparisons of the unemployment projections, even though derived in a theoretical way, indicate that the avoidance of just two bad employment growth years can substantially affect subsequent outcomes up to three decades later. This implies that avoidance of downturns and the possible role of pre-emptive active counter-cyclical policies are arguably critical to the long run health of the labour market, perhaps much more so than are policies designed to promote recovery. This is a particularly apposite point with respect to longer term unemployment, which remains the major labour market policy challenge.

References


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