

Educational attainment and labour force participation in Australia

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The Commonwealth Government's Intergenerational Report (published in the 2002-03 Budget) and, more recently, 2003-04 Budget Statement 4: Sustaining Growth in Australia's Living Standards (reproduced in this edition of the Roundup) noted the importance of labour force participation in the context of an ageing population. Productivity growth is also a central theme of these documents, as is the interaction between participation and productivity. This article examines trends in labour force participation for people with different levels of educational attainment. The article offers insights into the labour market behaviour of people with different skill attributes and discusses the possible implications of a more highly educated workforce.

Introduction

This article describes the labour force participation of people with different levels of educational attainment over the last 20 years. Knowing and understanding these data and associated trends offers useful insights into the labour market confronting workers with different levels of skill and improves our understanding of aggregate changes in participation.²

We find that while the labour force participation rates of prime age (25 to 54 years) males have fallen for all educational attainment groups between 1981 and 2001, the fall for those males with no post-school qualifications has been particularly dramatic. In 2001, males with no post-school qualifications were over 50 per cent of the male population aged 25 years and over. The participation rates of older males, those aged 55 years and over, fell similarly across all educational attainment categories. In contrast, female participation rose for all educational attainment categories and for most age groups, though at a slower rate in the 1990s compared with the 1980s.

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- 1 The authors are from the Domestic Economy Division, Australian Treasury. We are grateful for comments and suggestions by David Gruen, Jim Hagan, Robert Gardner, Frank Di Giorgio, Paul O'Mara and Martin Parkinson, Hui Wei of the ABS for providing data, and to Bruce Bastian and Stephanie Tsikleas for research assistance. The views in this article are those of the authors and are not necessarily those of the Australian Treasury.
 - 2 This article uses educational attainment as a broad indicator of skill level. There are a number of other approaches to capturing the skill level of workers including occupational classifications. For a discussion of measures of skill see Sheehan (2001).

In countries such as Australia, where the population is ageing, labour force participation and labour supply in general have become key policy issues. The Commonwealth Government's Intergenerational Report (2002) presents projections of economic growth and the fiscal pressures arising from Australia's ageing population and related changes in labour force participation. Naturally there is a robust debate as to the magnitude and implications for economic growth and fiscal sustainability of population ageing (see for example, Dowrick and McDonald, 2002).³ Gruen and Garbutt (2003) explore the potential to offset the decline in aggregate labour force participation by increasing the labour force participation of older persons, in part, by reversing the trend over recent years towards early retirement by male workers.

To better understand the implications of an ageing population for labour supply we must first understand past trends in participation rates and what drives them. Further, the relationship between labour force participation and productivity is potentially an important aspect of future growth scenarios. Clearly the skill characteristics of the Australian labour force and the demand and supply of workers with different skill levels is central to such analysis.⁴

This article begins by briefly reviewing the trends in aggregate male and female participation rates. This is followed by an examination of participation rates by educational attainment, age and gender using census data over the last 20 years. The paper concludes with a discussion of the observed changes in participation rates and possible implications for policy makers.

Aggregate labour force participation trends

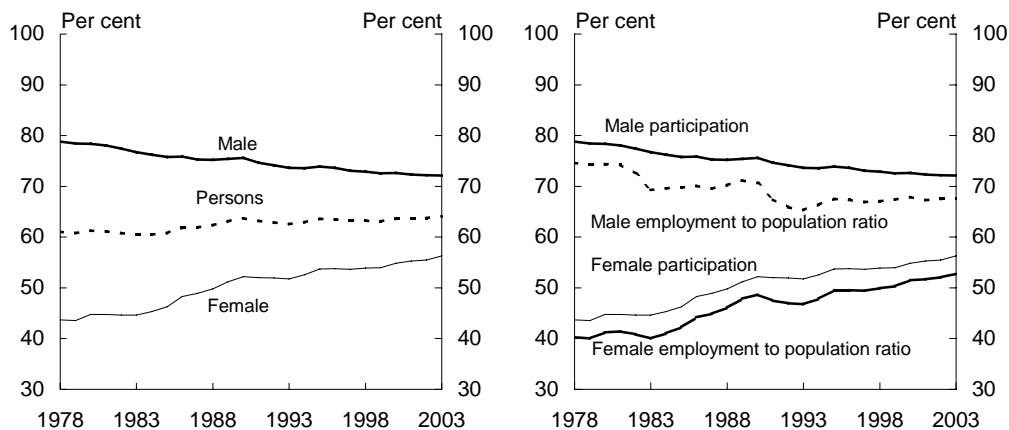
The overall trends in aggregate participation rates are well known, with rising female participation partly offset by declining male participation (see Chart 1). Female participation has tended to vary with economic activity over the last two decades more so than male participation. In particular, it appears that females have tended to withdraw from the labour force rather than become unemployed during economic downturns, whereas males have tended to stay in the labour force. We can see this in Chart 1 where the employment to population ratio of females moves more closely with their participation rate than is the case for males.

3 For example, there are a number of factors that can potentially offset demographic change such as an increasingly skilled labour force and related improvements in productivity.

4 It is also important to understand trends in participation rates given that many analyses of demographic change rely on statistical trend extrapolations of participation rates, which are then applied to a projected population in deriving aggregate participation.

Over 80 per cent of the increase in female labour force participation between 1981 and 2001 reflects increases in female part-time participation.⁵ Part-time female participation is defined as the sum of part-time employment and unemployed females seeking part-time employment as a proportion of the female population. The decline in male participation over this period primarily reflects a fall in full-time participation of 11.8 percentage points, partly offset by an increase in part-time participation of 6.0 percentage points.

Chart 1: Labour force participation rates



Source: Australian Bureau of Statistics, *Labour Force, Australia*, cat. no. 6203.0, Canberra, 2003.

Participation in the labour force varies by age and changes in aggregate labour force participation are often composed of many different trends for specific age and gender groups.⁶ In Chart 2, we show the age profiles of participation rates for males and females in 1981 and 2001.

From Chart 2 we can see that male participation rates have fallen in most age groups while the reverse is true for females. An interesting feature of female participation rates is the reduction in the dip in female participation in the

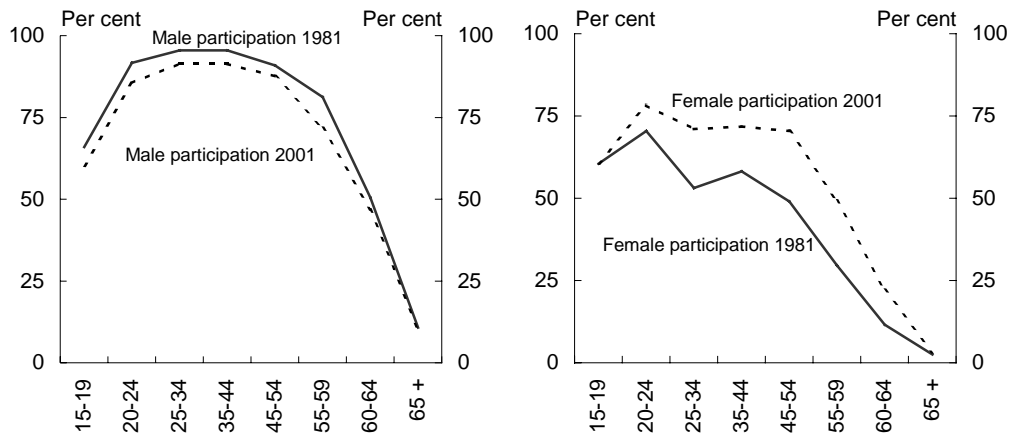
⁵ This period is chosen for discussion so these trends can be compared with data obtained from Australian censuses between 1981 and 2001.

⁶ In addition to better understanding aggregate change in participation rates, examining participation rates by age groups allows us to abstract from the broad demographic changes that affect aggregate participation. For example, applying the 2001 demographic profile (population proportions) to 1981 age group participation rates results in an aggregate participation rate of 59.6 compared with 61.1 in 1981. Thus, participation would have fallen by 1.5 percentage points between 1981 and 2001 due entirely to demographic influences.

25 to 34 years age group. This reflects increasing part-time participation by females in this age group, particularly married females.

A trend towards males leaving the labour force earlier is also identifiable in the data, with a fall of 9.5 percentage points between 1981 and 2001 in the participation rate of males aged 55 to 59 years.

Chart 2: Labour force participation rates, males and females by age



Source: Australian Bureau of Statistics, *Labour Force, Australia, Detailed - Electronic Delivery*, cat. no. 6291.0.55.001, Canberra, 2003.

Educational attainment and labour force participation rates

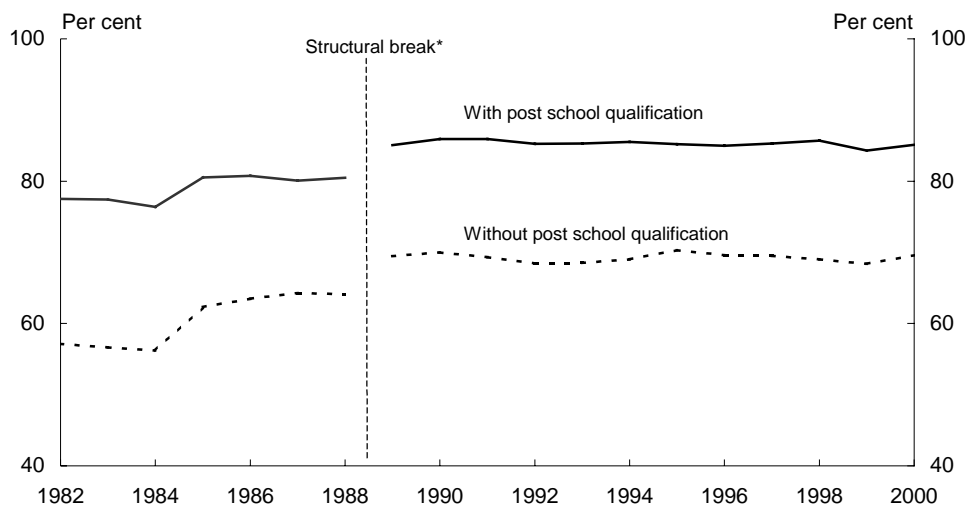
In Chart 3 we use data from various labour force surveys to examine labour force participation rates by educational attainment.⁷ These data show that over the 1990s, participation rates remained reasonably stable for both categories of educational attainment.

While the data in Chart 3 are useful, it is difficult to construct a valid comparison through time given changes in the nature and scope of the surveys underlying the data. It is also the case that dissections of these data are not readily available and the data do not support detailed analysis by educational attainment, age and gender.⁸

⁷ There are a number of changes to the surveys that underlie these data that make it difficult to make comparisons over time. Some of these issues are discussed in DeBelle and Swann (1998) and Vickery (1999) and include change to the age group from which data were collected and change to the educational attainment classifications themselves.

⁸ An alternative source of data with which to calculate participation rates by age, gender and educational attainment is the Australian Bureau of Statistics' Survey of Income and Housing Costs and Income Distribution Survey.

Chart 3: Labour force participation rates by qualifications



*Prior to 1989 the labour force and participation rates included 15-69 year old persons, after 1989 this definition changed to 15-64 year old persons creating a structural break in the series. In addition, in 1994 due to the adoption of the Australian Bureau of Statistics Classification of Qualifications, approximately 300 000 people were reclassified from skilled to unskilled in February 1994. This was due to the new series excluding certificate qualifications of a duration equivalent to less than 1 semester full-time.
Source: Australian Bureau of Statistics, *Labour Force Status and Educational Attainment*, cat. no. 6235.0, Canberra, 1994 and Australian Bureau of Statistics, *Transition from Education to Work*, cat. no. 6227.0, Canberra, 2000.

Census data

In the following discussion we use Census data for 1981, 1986, 1991, 1996 and 2001 to compare the single-year age-specific participation rates of men and women with different levels of educational attainment.⁹ While censuses are a very useful source of data, it is important to appreciate the difficulties in using census data to compare the labour force status of individuals with different levels of educational attainment. For example, while questions on labour force status in the various censuses are largely consistent and allow accurate estimates at a fine level of detail by age, the estimates are not directly comparable to those from the labour force survey.¹⁰ Similarly, census questions on educational attainment are not consistent through time and for the purposes of this paper have been collapsed into three groupings: no

⁹ We are very grateful to Hui Wei of the Australian Bureau of Statistics for providing these data.

¹⁰ See Australian Bureau of Statistics (1994) and Carew, Woods and Brady (1999).

post-school qualifications; non-degree post-school qualifications; and degree qualifications.¹¹

Despite the difficulties in deriving comparable estimates of labour force status by educational attainment across various censuses, these data remain a valuable source of information and should still provide a broadly accurate picture of changes in labour force participation.

Educational attainment, participation rates and age profiles

We begin by comparing labour force participation rates by single-year age groups for the three levels of educational attainment for men and women. We have chosen to look at people aged 25 years and older so that the educational attainment category 'degree or higher qualifications' will be largely full formed. That is, most persons who will obtain this qualification will have done so by age 25 years.

Males

The most striking aspect of the male participation rate age profiles is the substantially lower participation of males with no post-school qualifications in 2001, both compared to their level in 1981 and relative to other male education groups (see Chart 4).¹² Another interesting aspect of the data is the fall in participation rates of males aged 55 to 59 years in all educational attainment categories. We can see both these effects more clearly in the fifth panel of Chart 4, where the percentage point difference in participation rates between 2001 and 1981 is calculated for one-year age groups. This panel shows that a

11 In addition, census data contain a number of other difficulties, in particular, the treatment of the large numbers of 'not stated' responses to labour force and educational attainment questions. In this paper we follow Wei (2001) in the derivation of various educational attainment and labour force categories. Wei treats 'not stated' responses for labour force questions as not in the labour force, which simplifies somewhat comparisons through time. However, by treating 'not stated' responses as not in the labour force, participation rates will tend to understate those derived from the labour force survey. Perhaps more importantly, this practice will more substantially understate participation for the no post-school qualifications category given that 'not stated' labour force is highly correlated with 'not stated' educational attainment. These aspects of the data should be kept in mind when considering the comparisons presented in this article. A table detailing the correspondence between the censuses highest educational attainment questions is contained in the Appendix.

12 A preliminary analysis of participation rates for males with no post-school qualifications using the 1982 Income Distribution Survey and 1999-2000 Survey of Income and Housing Costs, suggests somewhat smaller falls in participation than those derived from census data and reported in this article. However, both sources of data suggest that falls in participation for prime age males with no post-school qualifications were significantly larger than for males with higher levels of educational attainment.

consistent fall in participation rates of around 14 percentage points is evident for prime age males with no post-school qualifications.

We also examined the change in participation rates across the intervening censuses between 1981 and 2001 and found that participation rates for prime age males with no post-school qualifications fell steadily across censuses (see Chart 5). The falls in participation for other male education groups tended to be more pronounced for older males and occur in the 1980s.

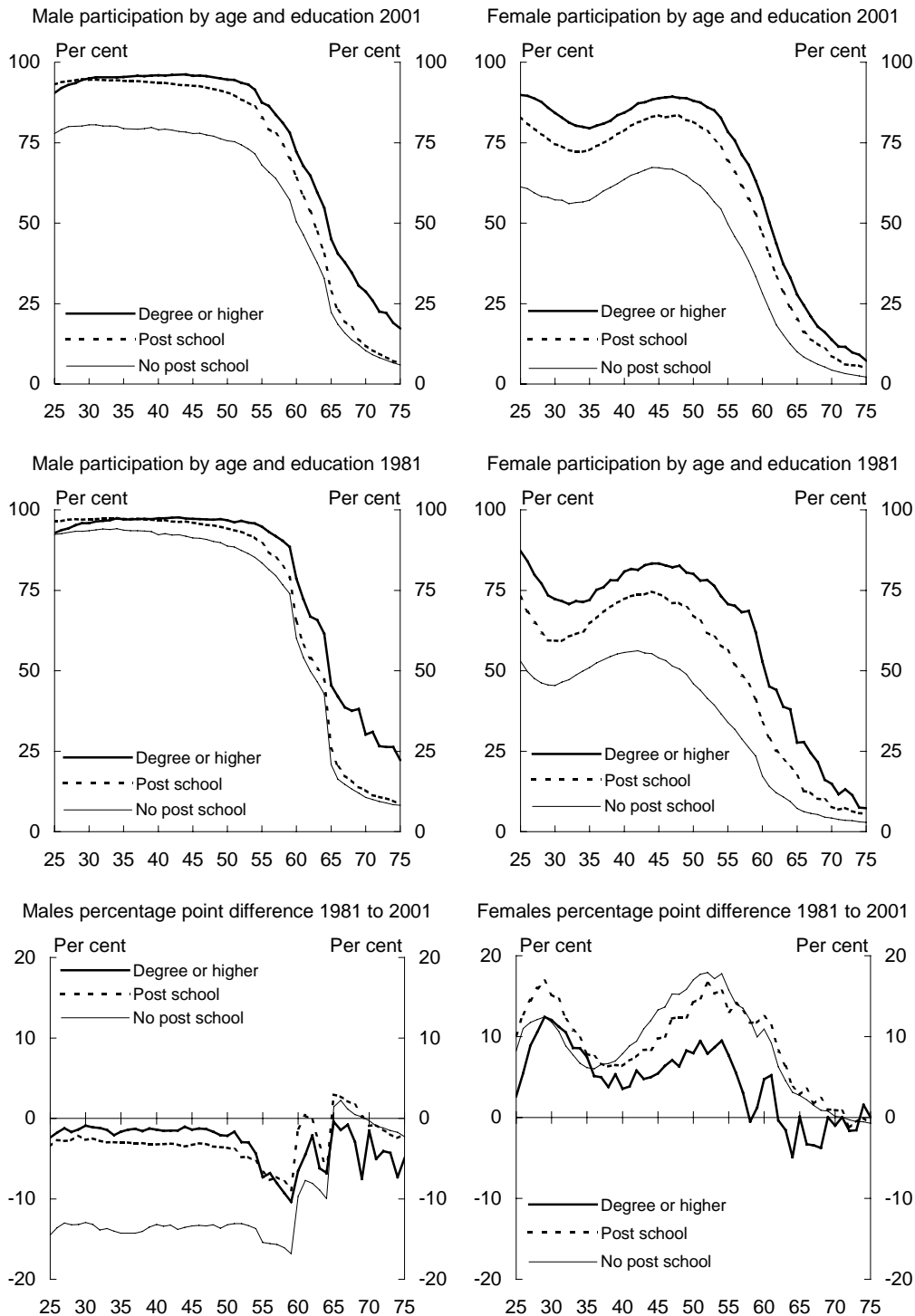
In Table 1, we summarise the changes in participation rates evident in Charts 4 and 5 and show the total falls in male labour force participation by educational attainment and the falls for males aged 25 to 54 years, and 55 years and over. While all educational attainment categories show substantial falls in participation for males aged 55 years or more, the no post-school qualifications category is unique in the large fall in participation recorded for those aged 25 to 54 years compared with the other educational attainment groups. The total fall in participation amongst males with no post-school qualifications is larger than both the fall in those aged 25 to 54 years and those aged over 55 years as the aggregate change reflects demographic change (ageing of population) in addition to the fall in each sub-group.

Table 1: Change in participation rates from 1981 to 2001 (percentage points)

| Educational Attainment | Age 25 years & over | Age 25 to 54 years | Age 55 years & over |
|------------------------|---------------------|--------------------|---------------------|
| Males | | | |
| Degree or higher | -4.1 | -1.4 | -6.6 |
| Non-degree post-school | -7.6 | -3.5 | -8.8 |
| No post-school | -14.2 | -13.7 | -10.9 |
| Females | | | |
| Degree or higher | 6.0 | 8.0 | 4.9 |
| Non-degree post-school | 10.6 | 12.0 | 7.4 |
| No post-school | 6.3 | 11.6 | 2.1 |

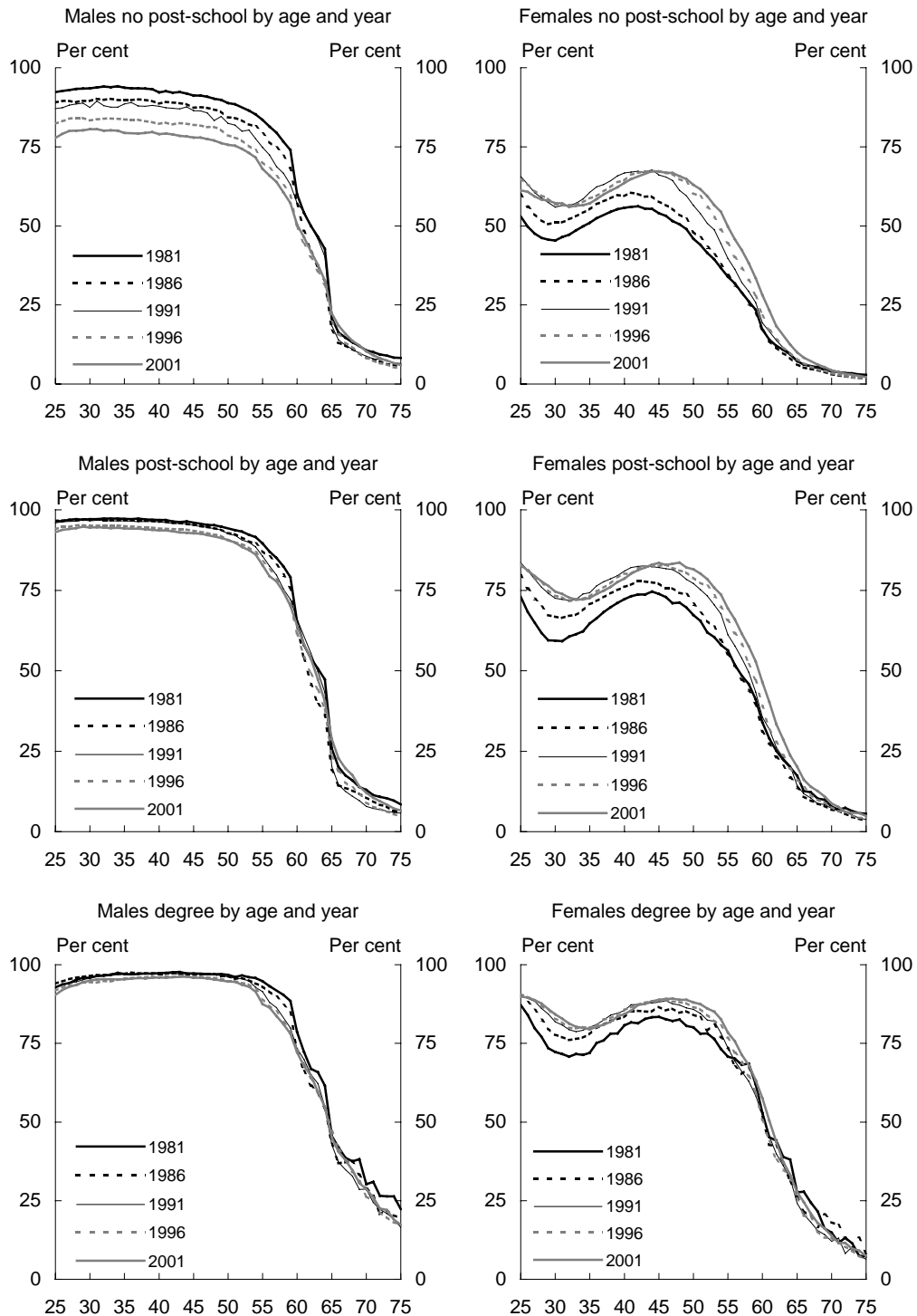
Note: The change in participation rates for age groups 25 to 54 years and 55 years and older for each education category don't add to the total change due to changes in population proportions over the period (ageing of the population). We conducted a shift-share analysis to determine the effect of ageing compared with participation rate changes on the overall change in participation. For males with non-degree post-school and degree qualifications, ageing accounted for around 40 and 30 percent of the overall fall respectively, while for those with no post-school qualifications only 10 percent of the fall was due to ageing. For females, age group participation rate changes dominated the increase in overall participation for all educational attainment categories and were only partially offset by ageing effects.

Chart 4: Participation rates by age, educational attainment and sex



Source: Australian Bureau of Statistics, 1981 and 2001 Censuses.

Chart 5: Participation rates by age, educational attainment, sex and year



Source: Australian Bureau of Statistics, 1981, 1986, 1991, 1996 and 2001 Censuses.

Females

In contrast to males, participation rates for all female educational attainment categories increased significantly between 1981 and 2001. The largest increases were for women with post-school and no post-school qualifications. Despite these increases, females with degree or higher qualifications aged 25 to 54 years in 2001 had participation rates over 20 percentage points higher than those with no post-school qualifications.

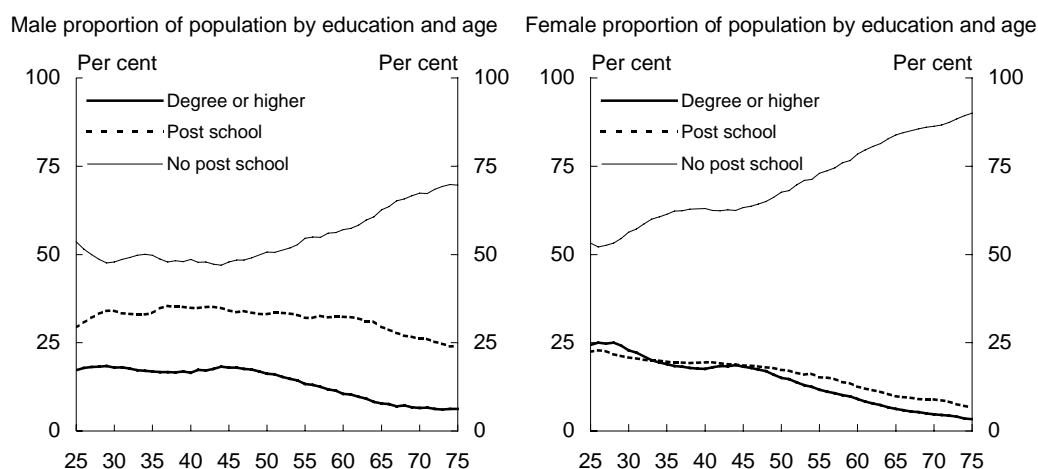
The increase in female participation rates by educational attainment across censuses is consistent with the aggregate trends in female participation. That is, the largest increases in participation were in the 1980s, with much more modest increases since 1991 (see Chart 5).

Unlike males there has been no increase in early exit from the labour force for females aged 55 years and over. In fact, there has been a moderate increase in female participation in this age group. The increase in participation of older females may, in part, reflect earlier increases in the participation of younger females. In this case a cohort effect is operating with higher participation being reflected over females' lifecycle.

Educational attainment and implications for aggregate changes in participation

In Chart 6 we show the proportion of females and males in the three educational attainment categories in 2001. Given the differences in participation rates between educational attainment groups, the higher proportions of males and females with post-school qualifications in younger age groups will have a positive effect on aggregate participation rates in years to come (see Gruen and Garbutt, 2003). In addition, the higher productivity associated with more highly skilled individuals means that an increasing proportion of these persons in the population should also have a positive effect on economic growth.

Chart 6: Proportion of population by educational attainment in 2001



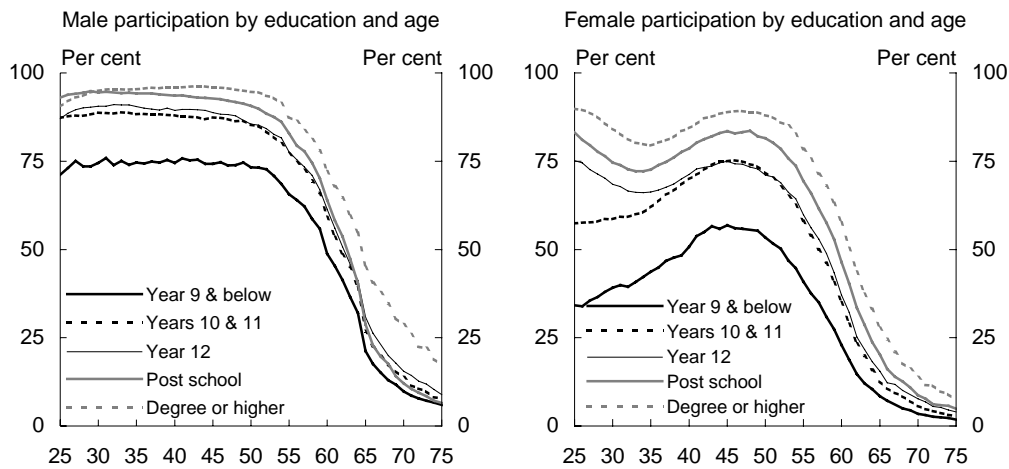
Source: Australian Bureau of Statistics, 2001 Census.

The participation rates of unskilled males and females in more detail

The large fall in participation rates for males with no post-school qualifications, and the substantial differences in female participation rates between those with no post-school qualifications and those with higher educational levels prompts a closer examination of the no post-school group. In Chart 7 we have partially disaggregated the no post-school group by the level of schooling completed. The participation rates of males who have completed year 12 schooling are only just below those with post-school qualifications. However, as the level of schooling completed declines, participation rates fall dramatically.¹³ Similar to the experience of males, female participation rates are lowest for those with the least schooling across all age groups. Female participation rate age profiles also varied with the level of educational attainment. Females who did not complete year 12 had much lower participation rates at younger ages than other female education groups. This pattern probably reflects when women in different education groups tend to have children.

¹³ A substantial portion of the no post-school qualifications category is persons who did not state their level of schooling. This group had extremely low participation rates reflecting, in part, that many of these persons also didn't state their labour force status. Exclusion of the 'not stated' group would substantially increase (for example, by around 5 to 6 percentage points for prime age males) participation rates for the no post-school qualifications group. However, to promote consistent treatment of this group across censuses we have chosen to follow Wei's (2001) approach and include 'not stated' labour force status as not in the labour force. These issues remind us that these data need to be interpreted cautiously.

Chart 7: Participation rates by educational attainment and age in 2001



Source: Australian Bureau of Statistics, 2001 Census.

The differences within both the male and female no post-school qualifications groups suggest that the increase in year 12 retention rates is likely to have a positive effect on participation regardless of whether these people obtain additional qualifications. Further, it suggests, not surprisingly, that policies that increase education retention are likely to increase labour force participation and promote improved labour market outcomes.

Concluding comments

In this article we have identified substantial variations in the labour force participation rates of males and females with different levels of educational attainment. For males, these differences have grown over the past 20 years, with those in the no post-school qualifications category participating less in the labour force in all age groups. There was also a significant increase in early exit from the labour force for all males aged 55 years and over for all educational attainment categories.

Consistent with the increase in aggregate female labour force participation, participation rates increased for the three female educational attainment categories for all age groups. However, there remain large differences in participation rates between educational groups, with females with post-school qualifications having much higher participation rates than those without post-school qualifications. Since the early 1990s, the increase in female participation for all educational attainment groups has slowed substantially.

To better understand the participation rates of those with no post-school qualifications we looked at selected sub-groups of this category. For both males and females, those who had not completed year 12 schooling had noticeably lower participation rates than those who had completed year 12.

The changes in male and female participation rates by educational attainment level identified using census data in this article are consistent with the aggregate trends obtained from the labour force survey. They reflect declining male participation which, this article suggests, is primarily composed of falls in low-skilled male participation and early exit from the labour force, and increasing female participation composed of increases in participation for all skill and age groups. These findings are also consistent with other studies, which have found that there has been a relative increase in demand for high-skilled workers matched by an increase in supply, see for example, Vickery (1999) and Borland (1999).¹⁴ Interestingly, while studies have found that unemployment rate differences between skill groups have remained stable (Vickery, 1999), this article suggests that the composition of supply of low-skilled workers has changed dramatically. That is, the supply of male (mostly full-time) low-skilled workers has contracted while the supply of female (mostly part-time) has increased. Wooden (2000) found that the increase in jobs for low-skilled workers was mostly explained by increased part-time and casual work and that the total volume of low-skilled work (taking into account hours worked) had changed very little over the 1990s.

The relatively low participation rates for low-skilled males and females, coupled with other research, suggest that there are challenges in the area of low-skilled labour in Australia, especially in relation to policies affecting skill formation in low-skilled workers and school retention rates. On a more positive note, notwithstanding the ageing of the population, Australia's more highly educated labour force is likely to contribute to future economic growth through higher participation in the labour force and higher productivity.

14 Vickery (1999) found that for Australia the relative increase in demand for high-skilled workers had been matched by an increase in supply and that relative unemployment rates between low and high skilled workers had remained fairly stable. Borland (1999) noted that the relative earnings of low and high skilled workers had varied little over time and did not explain increases in earnings inequality. Increases in earnings inequality were mostly explained by increases in within-education-group earnings differences.

Appendix

Educational attainment as measured in Australian censuses

For census data, the measure of educational attainment is highest post-school educational qualifications. In this paper we follow Wei's (2001) construction of consistent educational attainment categories for censuses though we reduce Wei's four categories of educational attainment to three - essentially collapsing degree and post degree qualifications into one category.

Table A1: Correspondence of educational attainment categories

| Collapsed Educational Attainment Categories | 1981 Census | 1986 Census | 1991 and 1996 Censuses | 2001 Census |
|--|---|---|--|---|
| Degree plus qualifications | Graduate Diploma, Bachelor Degree, Higher Degree | Graduate Diploma, Bachelor Degree, Higher Degree | Postgraduate Diploma, Bachelor Degree, Higher Degree | Graduate Diploma and Graduate Certificate Level, Bachelor Degree Level, Postgraduate Degree Level |
| Non-degree post-school qualifications | Diploma, Certificate-Trade Level; Certificate-Other Level | Diploma, Certificate-Trade Level; Certificate-Other Level | Undergraduate Diploma, Associate Diploma, Skilled Vocational Qualifications, Basic Vocational Qualifications | Advanced Diploma and Diploma Level, Certificate Level |
| No post- school qualifications | Not Classifiable, Other, Not applicable | Level of Attainment Inadequately Described, Not Classifiable, Level of Attainment Not Stated, No qualifications, Not Applicable | Level of Attainment Inadequately Described, Level of Attainment Not Stated, Not Applicable | Level of Education Inadequately Described, Level of Education Not Stated, Not Applicable |

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