

# Labour force participation and the influence of educational attainment

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This paper uses census data from 1981 to 2006 to examine changes in labour force participation rates for people with different levels of educational attainment. We find that the participation rates of both men and women with low educational attainment rose substantially between 2001 and 2006. However, the participation rates of people with no post-school qualifications remain significantly below those with post-school qualifications (around 10 percentage points for both men and women). Within the no post-school qualifications group, the outcomes for those who completed school to year 9 or less are especially poor, with participation rates up to 20 percentage points lower than for other more highly educated groups.

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1 The authors are from Competition and Consumer Policy Division and Social Policy Division, the Australian Treasury. This article has benefited from comments and suggestions provided by Meredith Baker, Leah Efrossynis, Stephanie Gorecki, David Gruen, Laura Llewellyn, Tony McDonald, Nigel Ray, Peter Robinson, Hector Thompson, Julie Tinnion and Joann Wilkie. The views in this article are those of the authors and not necessarily those of the Australian Treasury.

## Introduction

The paper uses Australian Bureau of Statistics (ABS) data from the Labour Force Survey and Censuses from 1981 to 2006 to examine changing patterns in labour force participation rates of people with different levels of educational attainment. It updates the analysis of Kennedy and Hedley (2003), which found that declining participation rates for prime-working-age men between 1981 and 2001 were primarily driven by dramatic falls for men with no post-school qualifications. In contrast, female participation rose for all educational attainment categories.

The paper finds that the downward trend in male participation was partly reversed in the 2006 Census and that the recent reversal has been strongest for men with no post-school qualifications and men aged over 55. Female participation continued to rise over the period, and increased particularly strongly for women with no post-school qualifications. The rises in participation for men and women with no post-school qualifications may partly reflect strong economic conditions, although structural factors may also have played a role.

The paper adds to earlier analysis by focusing on the participation outcomes of people with no post-school qualifications. There are disparate outcomes within this group. The participation rates of those with year 9 or lower levels of schooling are by far the poorest: up to 20 percentage points lower than those who completed Year 10. This result along with international research suggests that policies designed to increase school retention, including compulsory school attendance to year 10, may have significant social and economic benefits. Wilkie (2007) finds that the relatively high standard of minimum educational outcomes in Australia plays an important role in enhancing intergenerational income mobility, for example.

In light of the challenges accompanying demographic change and the ageing of the population, there is an increasing focus on the '3 P's' framework, which highlights population, participation and productivity as the drivers of future economic growth. Within this framework Henry (2003) notes that, over the next 40 years, a principal economic challenge will be the participation rate. On the basis of the evidence outlined below, improving educational attainment would be one possible way to lift aggregate labour force participation. The range of other issues that affect participation rates are beyond the scope of this paper.

This paper begins with a discussion of the channels through which educational attainment might affect labour supply, including the extent to which the observed correlation between educational attainment and labour force outcomes may reflect selection effects. This is followed by an examination of labour force participation rates for people with different levels of educational attainment over the period 1981 to 2006. The paper concludes with a brief discussion of some key implications of the data.

## Human capital and labour supply — theory and evidence

Human capital theory suggests that people acquire the education level that maximises the present value of their expected lifetime earnings (Borjas, 2005).<sup>2</sup> That is, people choose (voluntarily) the level of educational attainment that is consistent with their natural abilities and their discount rate. The discount rate reflects the extent to which people are prepared to trade-off future outcomes against today's outcomes.

Given an acquired level of human capital, the neoclassical labour-leisure model assumes that the labour supply decision is based on the wage offered in the labour market relative to the reservation wage (the wage at which the individual is indifferent to the choice between working and not working). The hours of work supplied by the individual will be determined by the trade-off between leisure and consumption (out of labour income).

One channel by which educational attainment enters the labour supply decision is through its influence on the offered wage. If higher levels of educational attainment are associated with higher levels of productivity, individuals with higher levels of educational attainment should be offered higher wage rates in the labour market.<sup>3</sup> A recent Australian study (Leigh and Ryan, 2005) found that there was a positive association between educational attainment and earnings, in line with the conclusions of international literature on this issue (see, for example, Ashenfelter and Rouse (1998), Isacson (1999) or Harmon and Walker (1995)).

Another channel by which educational attainment influences participation is through its influence on the ability of people to respond to job loss. Prolonged periods of unemployment can lead to skill atrophy and to people becoming discouraged from seeking employment and dropping out of the labour force. Structural change in the economy, and/or economic downturns can displace large numbers of individuals from employment, and are often associated with persistent unemployment or what economists like to call hysteresis.

More highly educated individuals may be less likely to experience long-term unemployment or withdraw from the labour market as a result of a period of unemployment. Further, they may be more able to adapt to new employment

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2 Formally, a person will invest in education up to the point where the marginal rate of return to schooling (MRRS) is equal to their discount rate. Simply formulated, the MRRS is equal to the percentage increase in annual earnings over the lifetime associated with an additional year of schooling.

3 The standard 'schooling' model suggests a causal relationship between education and productivity. An alternative 'signalling' model suggests that higher levels of educational attainment may act primarily as a signal to employers that a particular worker is more productive, rather than being the cause of higher productivity.

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opportunities, reskill and upskill, to adapt to a changing labour market. They may also be more geographically mobile and more able to respond to regional shifts in labour demand. It is also likely that more skilled people are able to shift into less skilled employment for short periods following job loss, opportunities that are then not available to the less skilled. Farber (2003) showed for the United States that those with lower levels of educational attainment experienced greater volatility in employment rates over the business cycle and were less likely to find work once unemployed.

The data and analysis presented in this paper support these contentions, in finding a strong positive correlation between educational attainment and participation. However, there is a need for caution in interpreting these correlations. As discussed by Lattimore (2007), low educational attainment and poor labour market outcomes may also be a consequence of other unobserved factors. For example, there may be a selection bias in the observed data, insofar as people with a high probability of participating in the labour force due to natural abilities or personal preferences 'select' into higher levels of educational attainment. Some proportion of the observed differences in participation between groups with different levels of educational attainment is likely to be explained by such a selection bias – in other words, there are likely to be differences between the marginal and average impacts of higher attainment on participation.

This issue was examined by Laplagne, Glover and Shomos (2007). Using data from the Household Income Labour Dynamics Australia (HILDA) Panel survey for 2001-2004, they estimated econometric models of labour force participation correcting for selection bias. The results indicated that while there may be some selection bias in the correlation between educational attainment and participation for women, there was no strong evidence to support this conclusion for men.

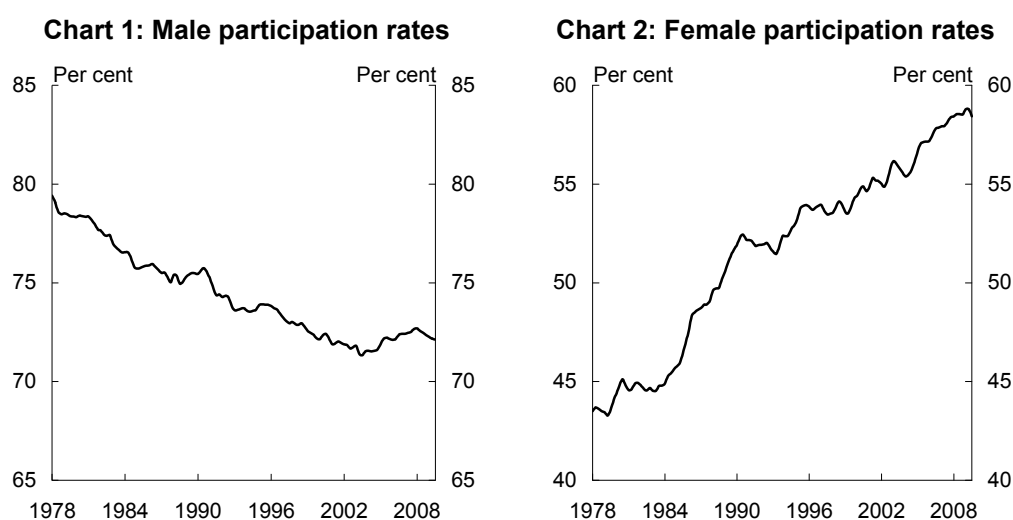
This provides some support for the proposition that there is a causal link between educational attainment and labour force participation. It would also seem to imply that policy makers seeking to increase participation rates should consider promoting higher educational attainment as a means of accomplishing this outcome.

However, policies designed to increase labour force participation need to be considered in a broader context of wellbeing and social welfare. That is, rather than higher participation being a policy objective in and of itself, the key objective is to eliminate barriers to participation. Higher participation should be seen as playing a role in achieving improved social and economic outcomes and enhancing individual wellbeing.

## Participation rates — time series data

Over recent decades, women’s participation has tended to rise while, until recently, men’s participation has tended to fall (see Charts 1 and 2).

Around 2003, men’s participation began to rise. While some of the rise has been unwound during the current global economic downturn, men’s participation is still well above its low point and above the level reached in 2006 when the last census data was collected. Women’s participation initially continued to rise during the current economic downturn, although it has declined in the last three months.



Source: Labour Force Survey (quarterly trend).

Census data can be used to analyse trends in male and female participation rates by level of educational attainment. The participation rates of prime-working-age men and women by level of educational attainment over the period 1981 to 2006 are shown in Charts 3 and 4 below. We show the participation rates of prime-working-age individuals (ages 25 to 54) in order to limit the influence on the data of changing retirement patterns and compositional effects arising from the ageing of the population. The education levels used are those with no post-school qualification, those with a non-degree post-school qualification, and those with a degree, or higher qualification.<sup>4</sup>

The data show a steady decline in participation rates for prime-age men at all levels of education over the twenty years to 2001, although this decline was greatest for men

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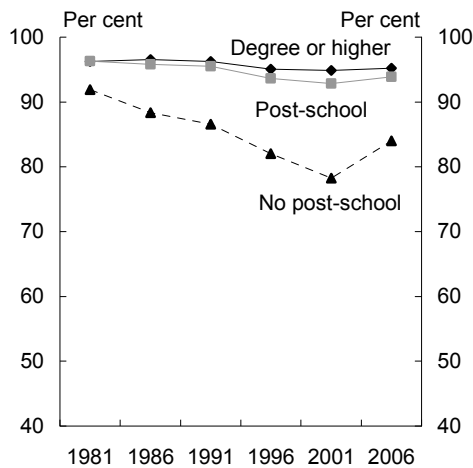
<sup>4</sup> See Appendix B for further details. This choice of educational groups and issues relating to data quality are discussed further in Kennedy and Hedley (2003).

## Labour force participation and the influence of educational attainment

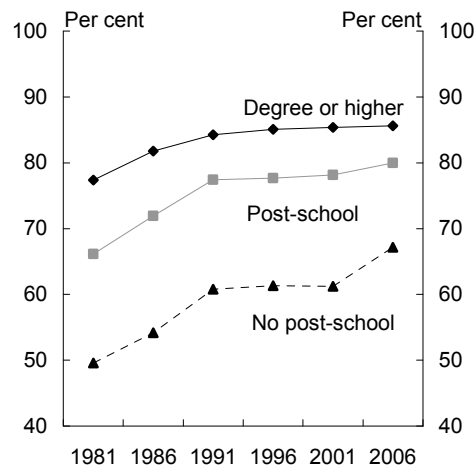
with no post-school qualifications (Kennedy and Hedley 2003). Higher skilled males experienced much less substantial declines in participation over the period.

The most recent Census shows that between 2001 and 2006 all educational groups of prime-age men increased their participation, with the increase being strongest for unskilled men. There was an increase of 5.8 percentage points in the participation rate for prime-age men with no post-school qualifications, whereas those males with post-school qualifications, or degrees, increased their participation rates by just 1.1 and 0.3 percentage points respectively – see Chart 3 below.

**Chart 3: Prime age males (25 to 54) participation rates**



**Chart 4: Prime age females (25 to 54) participation rates**



Source: Census data.

The data show a rise in participation rates across all educational groups of prime-working-age women over the period 1981 to 2006. The upward trend in women's participation flattened out somewhat between 1991 and 2001, before resuming over the period from 2001 to 2006, particularly for the low skilled.

The rise in the participation rates of prime-working-age women over the period 2001 to 2006 was much greater for lower skilled women, consistent with the observed trend for prime-working-age men. Specifically, women aged 25 to 54 with no post-school qualifications experienced a sharp 6.0 percentage point rise in participation between 2001 and 2006. Those with a post-school qualification increased their participation rates by a relatively small 1.8 percentage points, and those with a degree or higher increased their participation by just 0.2 percentage points – see Chart 4.

The Labour Force Survey data shown in Charts 1 and 2 indicate that participation rates for men also improved during other periods of relatively tight labour market conditions, such as in the late 1980s. This observation, and the concurrent above-trend

growth in participation for low-skilled women between 2001 and 2006, tend to support the conclusion that cyclical factors played some part in the recent increase. There is evidence that low levels of participation by unskilled males in the late 1990s was a form of hidden unemployment (Kennedy and da Costa, 2006); in this context, strong demand for labour may have resulted in an 'encouraged worker' effect, with low-skilled men drawn back into the labour force by strong wages growth and greater availability of vacancies.

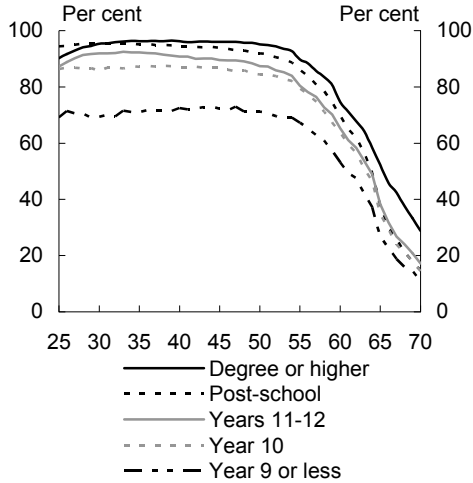
## Examining the participation rates of unskilled males and females in more detail

The substantial differences between the participation rates of people with no post-school qualifications and those with higher-level qualifications suggest a closer examination of the no post-school qualifications group is warranted. In this section, we therefore disaggregate the group of people with no post-school qualifications into those with Year 9 or less, those with Year 10, and those with Year 11 or Year 12 level attainment (see Charts 5 and 6).

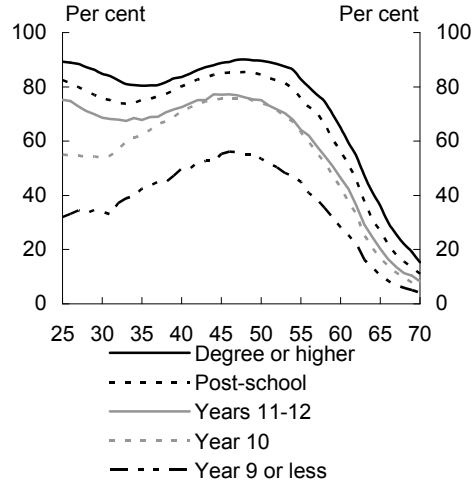
People with year 9 or less have much lower rates of labour force participation over most of the life-cycle compared to those with higher levels of educational attainment. The participation gap between those with Years 10 to 12 and those with degree or non-degree post-school qualifications is smaller, although still material. There is a considerable narrowing of the differences in participation levels between different educational groups of men once they pass age 50.

The participation gap between prime-working-age women with year 9 or less compared with women with degree or higher qualifications is 37 percentage points, while for men the gap is 24 percentage points. Further, women aged under 40 with year 10 have particularly low participation rates compared with those with year 11 or 12; however, this difference largely disappears by the time they reach 45. These observations may partly reflect differences in the age of child rearing for women with different levels of educational attainment; however, it was not uncommon for women in these age cohorts to leave school with Year 10 and gain employment with specific 'on the job' training. It may be that the participation rates for these groups are similar because labour market experience is more important than educational attainment for them.

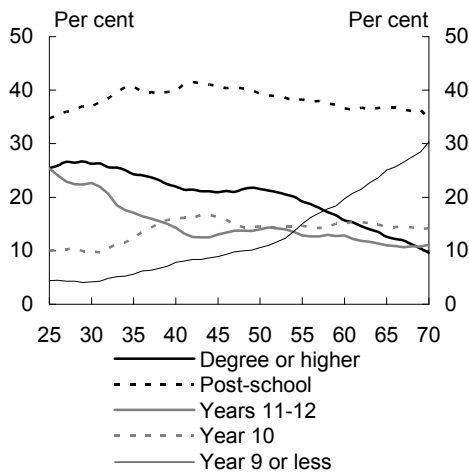
**Chart 5: Male participation rates by educational attainment and age in 2006**



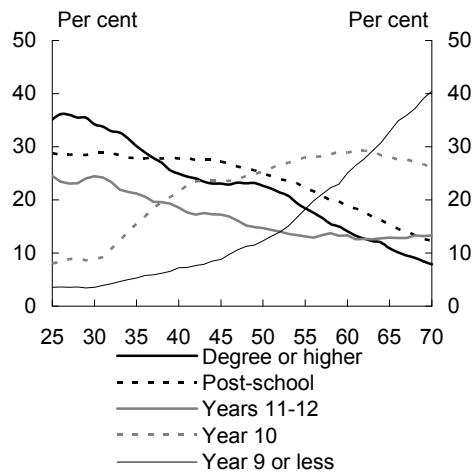
**Chart 6: Female participation rates by educational attainment and age in 2006**



**Chart 7: Educational attainment and age — 2006 — males**



**Chart 8: Educational attainment and age — 2006 — females**



Source: Census data.

The differences in participation rates between educational groups, particularly for those with very low levels of schooling, suggest that rising educational attainment levels in recent years may have a positive influence on participation in the future. According to the Census data, around four per cent of the population aged 25 had only Year 9 or less in 2006; this included around 4,000 females and 5,000 males (see Charts 7



and 8 below).<sup>5</sup> This is a significantly lower share of early school leavers than in earlier cohorts.

Even four per cent of population with year 9 or less educational attainment seems high and it appears likely there is potential to lift participation by improving educational outcomes for this group. Furthermore, an additional eight per cent of 25-year-olds had only Year 10 in 2006, and improving attainment for this group may also have benefits.

Research from the United States and United Kingdom undertaken by Oreopoulos (2003, 2006, 2007) indicates that an additional year of schooling can have significant benefits for disadvantaged youth in terms of earnings, health and wellbeing, consistent with earlier United States research by Angrist and Krueger (1991).

In Australia, the Australian Government and the States have recently entered into a National Partnership agreement to achieve a national Year 12 or equivalent attainment rate of 90 per cent by 2015 (bringing forward the earlier commitment in the National Education Agreement to achieve this target by 2020). Complementary to this, the participation requirements associated with certain income support payments have been strengthened to encourage continued participation in education. Moreover, since 2003 most States have raised the minimum school leaving age to at least 16 and require students to remain in some form of education, training or employment until they turn 17.

It is also worth noting there are a range of pathways for individuals to achieve higher educational attainment, including apprenticeships and vocational education and training. The proportion of young people not completing Year 12 but going on to complete an apprenticeship or other vocational qualification has risen over the past decade.

While levels of educational attainment are important, the benefits of additional schooling may not be fully realised unless the quality of the educational experience is high. Indeed, as Tunny (2006) and Hanushek and Woessman (2007) outline, differences in learning achievements matter more in explaining cross country differences in productivity and productivity growth than differences in the average years of schooling or enrolment rates. It is the knowledge acquired while engaged in schooling that counts; time in the classroom can be of little value if students are not gaining learning and skills from the experience. That said, human capital acquisition can occur through other channels, such as on-the-job training.

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5 Access Economics (2005) notes that 2003-04 Australian retention rates from Year 7/8 to Year 12 were around 75.4 per cent.

## Participation rates — life cycle patterns

The trends in participation rates over recent decades have also exhibited different patterns between different age groups, as well as across genders and education levels (see Table A1, Appendix A). Changes in patterns of participation over the life cycle between 2001 and 2006 are discussed in more detail in the next section.

### Males

Kennedy and Hedley (2003) reported broad declines in participation by men across educational attainment levels between 1981 and 2001. The 2006 Census shows that there have been some noteworthy changes since 2001, principally the rise in participation by prime-working-age men with no post-school qualification, which was discussed above. However, the data also show that the participation rates of older men with lower skill levels have risen sharply since 2001, almost offsetting a significant reduction over the period to 2001. This group experienced an increase in participation between 2001 and 2006 even greater than that observed for prime-working-age men with the same educational attainment.

Men with no post-school qualifications aged 55 to 70 experienced an increase of 8.5 percentage points in their participation rate between 2001 and 2006, effectively reversing the decline in participation by this group in the period 1981 to 2001 (see Table A1).<sup>6</sup>

On a related note, Kennedy and Hedley (2003) described a decline in participation rates for men aged 55 to 59 in all educational groups between 1981 and 2001. This group have increased their participation between 2001 and 2006 (see Table 1), but it remains below the 1981 level. This may be indicative of changing retirement patterns; where the 1981 data show steep declines in participation at ages 60 and 65 the 2006 data show a more gradual decline from age 55 onwards. As a result, participation rates are lower in 2006 relative to 1981 for men aged between 55 and 59, but higher for those aged over 60.

The data suggest that mature-age men with no post-school qualifications appear to be staying in the workforce much longer than they did 25 years ago, which may reflect improvements in health, or may instead be a temporary outcome resulting from exceptionally strong economic conditions. More generally, Australian men may be taking a more flexible approach to their retirement age, with expanded opportunities for part-time work likely to have played a part in this development.

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<sup>6</sup> This recent increase in participation by mature aged males was discussed by Kennedy and Da Costa (2006) using Labour Force Survey data.

**Table 1: Mature aged — changes in participation rates from 2001 to 2006 (percentage points)**

Educational attainment	Age 55 to 59 years	Age 60 to 64 years	Age 65 to 70 years
<b>Males</b>			
Degree or higher	2.0	3.4	4.6
Non-degree post-school	3.5	7.7	6.0
No post-school	6.5	10.0	6.0
<b>Females</b>			
Degree or higher	3.5	7.7	4.7
Non-degree post-school	7.2	10.2	4.5
No post-school	8.7	9.4	2.7

Source: Census data.

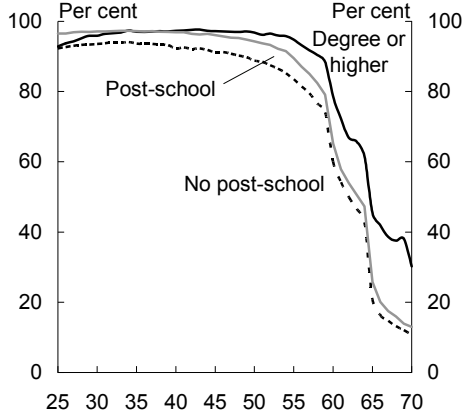
## Females

Female participation rates have risen significantly since 1981 across most age groups and all levels of educational attainment.<sup>7</sup> The increases were greatest for those with lower skill levels but, despite this, women with degree or higher qualifications continued to have substantially higher participation rates in 2006 than women with lower levels of educational attainment. The data suggest that educational attainment and participation rates are more strongly correlated for women than for men.

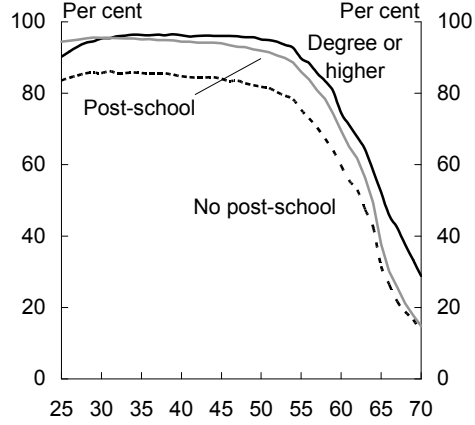
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<sup>7</sup> However, as noted by Lattimore and Abhayaratna (2007), Australia still has relatively low participation rates of child-bearing age women (25-44 years old), and is ranked 23rd out of 30 in OECD data (although Australia rises to 20<sup>th</sup> in Lattimore and Abhayaratna's adjusted data).

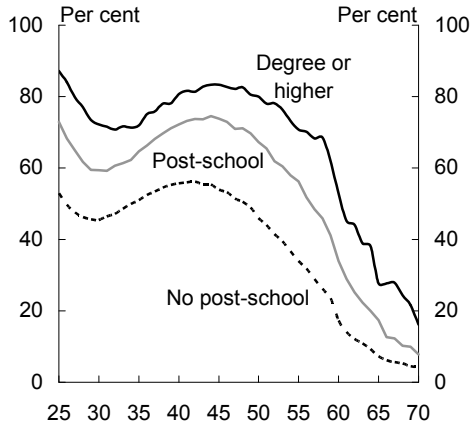
**Chart 9: Male participation by age and education, 1981**



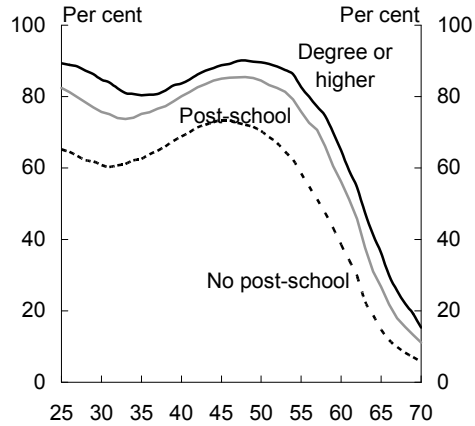
**Chart 10: Male participation by age and education, 2006**



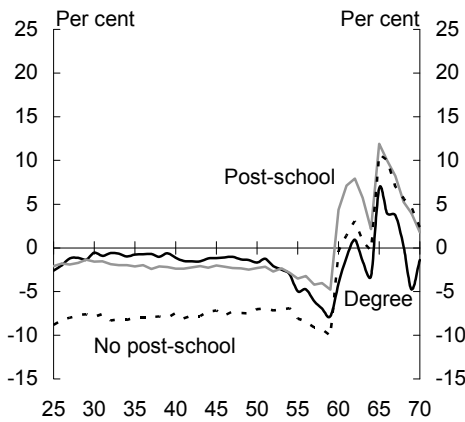
**Chart 11: Female participation by age and education, 1981**



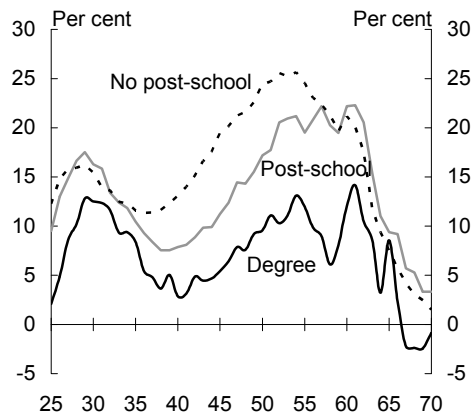
**Chart 12: Female participation by age and education, 2006**



**Chart 13: Changes in male participation, 1981 to 2006**



**Chart 14: Changes in female participation, 1981 to 2006**



Source: Census data.

The pattern of women's participation during childbearing years varies across levels of education, with the dip in participation at childbearing age occurring later in life for more highly educated women (Kennedy, 2007). In addition, the decline in participation also appears to be happening later in life for each educational group in the 2006 data than in 1981.

In particular, the trough in participation at childbearing age is around age 31 (30 in 1981) for those with no post-school qualifications, age 33 (31 in 1981) for those with post-school qualifications and age 35 (32 in 1981) for those with a degree or higher qualification (see Chart 12). This suggests that the participation decisions of childbearing age women with degrees or higher may be diverging from those with lower levels of educational attainment over time (see A2, A4 and A6 in Appendix 1).

The 2006 data also appear to indicate that the magnitude of the reduction in participation associated with childbirth has declined since 1981 (see Charts 11 and 12). The peak to trough decline in participation rates for women of childbearing age has gone from 16.4 percentage points to 8.9 percentage points for women with a degree or higher qualification; from 13.7 percentage points to 7.7 percentage points for women with post-school qualifications; and from 7.6 percentage points to 4.9 percentage points for women with no post-school qualifications.<sup>8</sup>

## Concluding comments

In this paper, we updated previous analysis undertaken by Kennedy and Hedley (2003) to include data from the 2006 Census and identified some changes in participation trends. Following a long period of declining participation, men with no post-school qualifications (particularly low-skilled mature age men) have experienced substantial increases in labour force participation in recent years. Participation has continued to rise for all educational attainment groups of women. However, it is worth noting that Australia's participation rates of 25- to 44-year-old women remain relatively low compared with other OECD countries.

We have also examined in some detail the participation outcomes of those with no post-school qualifications, disaggregating this group by the level of secondary education attained. The labour force outcomes of those who have completed year 9 or less are especially poor compared with more highly educated groups, and a significant proportion of people continue to report year 9 or Year 10 as their highest level of educational attainment (12 per cent of 25 year olds in 2006). It seems highly likely that reforms aimed at improving the educational attainment of this group would translate into significantly improved labour market outcomes.

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8 As age 25 is the first data point we have available, this is defined as the 'peak'.

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## Appendix A

**Table A1: Changes in participation rates from 1981 to 2006 (percentage points)**

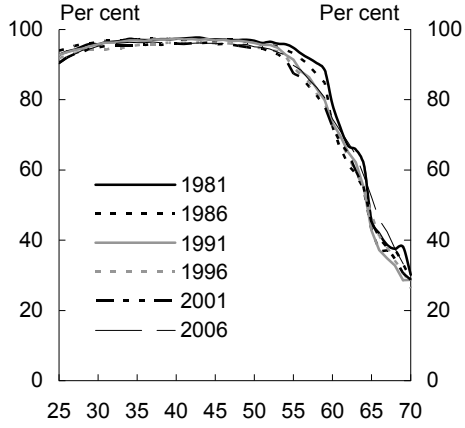
<b>Educational attainment</b>	<b>Age 25 to 70 years</b>	<b>Age 25 to 54 years</b>	<b>Age 55 to 70 years</b>
<b>Males</b>			
Degree or higher	-3.0	-1.0	-1.7
Non-degree post-school	-4.3	-2.4	-0.1
No post-school	-6.7	-7.9	-0.2
<b>Females</b>			
Degree or higher	6.8	8.3	10.0
Non-degree post-school	13.6	13.8	19.4
No post-school	15.1	17.6	14.8

Source: Census data

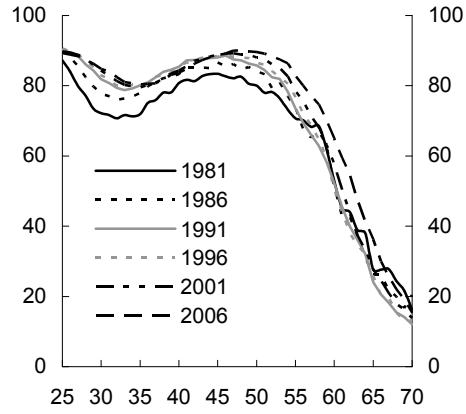


**Participation rates by educational attainment — 1981 to 2006 — Census**

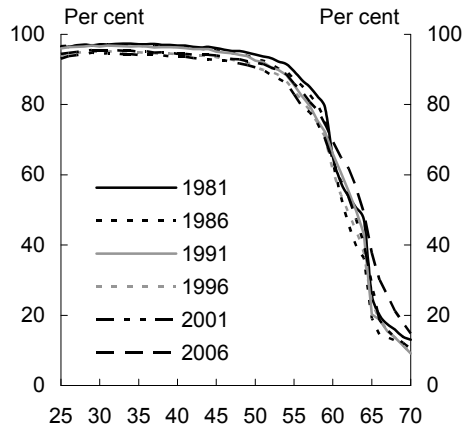
**Chart A1: Males — degree or higher**



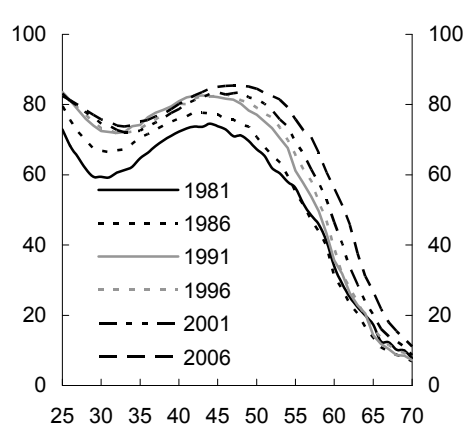
**Chart A2: Females — degree or higher**



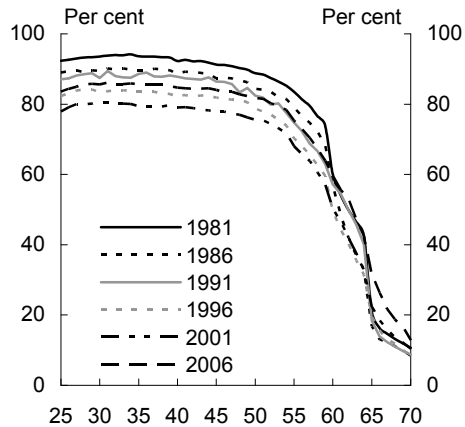
**Chart A3: Males — post school**



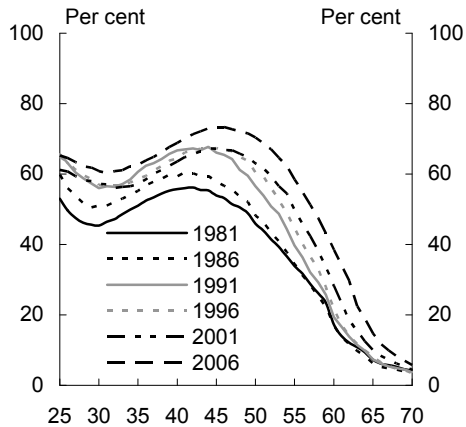
**Chart A4: Females — post school**



**Chart A5: Males — no post school**



**Chart A6: Females — no post school**



Source: Census data.

## Appendix B

### 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 A2: Correspondence of educational attainment categories**

<b>Collapsed Educational Attainment Categories</b>	<b>1981 Census</b>	<b>1986 Census</b>	<b>1991 and 1996 Censuses</b>	<b>2001 Census</b>
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