Pathways to Retirement: Evidence from the HILDA Survey

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ABSTRACT

Using data from the first eight waves of the Household Income and Labour Dynamics in Australia (HILDA) Survey, this paper adds to existing knowledge of how pathways to retirement are decided. Two complementary estimation strategies are used to model the labour force transitions of mature age men and women. First, a standard multinomial logit model is used to determine the characteristics associated with specific patterns of labour force participation. Second, a dynamic mixed multinomial logit model is used to estimate labour market states in each year. Both approaches provide new evidence about coordinated retirement among mature age couples, not only in the timing of retirement but how the transition to retirement is made. The results also provide new evidence about the different effects of specific components of household wealth on how the transition to retirement is made. Controlling for unobserved heterogeneity in the dynamic multinomial model confirms the existence of true state dependence in the labour force states of mature age men and women. This implies that policies aimed at encouraging older workers to delay retirement will be more effective in boosting mature age participation than policies aimed at encouraging older workers back into the workforce after a period of non-participation.

This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). The findings and views reported in this paper, however, are those of the author and should not be attributed to either FaHCSIA or the MIAESR.

1. Introduction

Retirement has traditionally been viewed as a process that involves an abrupt change from working continuously in a full-time job, to leaving the labour force and remaining permanently retired. Today, the pathways to retirement are much more diverse, with more people expected to take up transition, or bridging, jobs in order to make a more gradual transition into retirement. These jobs may involve a reduction in working hours, a decline in responsibilities, or a move to self-employment or casual work. In some cases, the transition phase might involve periods of employment interspersed by periods of non-participation.

The availability of transition jobs has important implications for the willingness of the mature age population to remain in the labour force. The Productivity Commission (2005) suggests that the trend towards earlier retirement could have challenging economic and fiscal consequences, possibly dampening economic growth, reducing the tax base, and increasing demand for many government services. One potentially important way in which there may be prospects for encouraging increased labour force participation by mature age Australians is through a gradual transition to retirement. The Senior Australians Tax Offset (SATO) and the Mature Age Worker Tax Offset (MAWTO) were initial attempts to encourage part-time work among mature age Australians. In 2005, the Australian Government sought to further encourage gradual retirement transitions by introducing 'Transition to Retirement' pensions, which allow mature age workers to reduce their working hours and access part of their superannuation savings in the form of a pension to supplement their labour income.

This paper adds to existing knowledge of how pathways to retirement are decided. Using the first eight waves of the HILDA Survey, the labour force participation patterns and retirement intentions of mature age men and women are examined. The main aim of this analysis is to identify the most common pathways to retirement, and the key factors associated with which pathway a worker will choose. Two types of estimation strategies are used to model the labour force transitions of mature age men and women. The first involves the estimation of a standard multinomial logit model to identify characteristics associated with specific patterns of labour force participation over the nine-year period. The second approach involves the estimation of a dynamic multinomial logit model of current labour force status. Both approaches confirm the well-established findings that age, health and human capital are important determinants of retirement behaviour, and provide further evidence of coordinated retirement among mature age couples. We also find differences in the effects of specific types of household wealth. Controlling for unobserved heterogeneity in the dynamic multinomial model confirms the existence of both true state dependence and spurious state dependence in the labour force states of mature age men and women. This result implies that policies aimed at encouraging older workers to delay retirement will be more effective in boosting mature age participation than policies aimed at encouraging older workers back into the workforce after a period of non-participation.

The remainder of this paper is organised as follows. Previous research about retirement transitions and expectations is reviewed in Section 2. Section 3 describes the data used in this analysis and presents descriptive evidence about the main patterns of labour force participation of mature age Australians. In Section 4, two different estimation strategies are used to model retirement transitions. Section 5 concludes.

2. Background

Much of the evidence about retirement transitions comes from studies in the United States. Several studies, including Gustman and Steinmeier (1984), Honig and Hanoch (1985), Ruhm (1990) and Clark and Quinn (2002), have found that older workers in the United States follow a diverse range of pathways to retirement, and a substantial number experience a transitional period, which may involve reduced working hours, starting their own business, or taking a job that is less demanding than their career job, before retiring completely. This literature shows that estimates of the incidence of partial retirement vary according to the definition of retirement and partial retirement used. For example, using the Retirement History Longitudinal Survey (RHS) data, Blau (1994) found that 13% of older men who had left full-time employment had moved into part-time work. Rather differently, but also using data from the RHS, Ruhm (1990) used a self-reported definition of partial retirement and found that over 40% of household heads had partially retired, while Rust (1989), using a measure of annual work hours, found that just 22% of men had moved into partial retirement.

Studies based on the Health and Retirement Study (HRS) from the 1990s also identified varying degrees of partial retirement. Quinn (1997) found that around 40% of men who had left a career job moved to a bridging job rather than immediately to full retirement. Using a self-reported definition of retirement, Kim and Devaney (2005) concluded that 32% of full-time workers had moved to partial retirement before ceasing work completely. Finally, Cahill et al. (2005) used ten years of HRS data from 1992 to 2002 and found that of those who had left their career jobs by 2002, approximately two-thirds had moved to a bridging job rather than directly out of the labour market, and that partial retirement was most common among those at the top and bottom of the wage distribution, encouraged by respectively a desire for quality of life and economic necessity.

Most of the literature about transitions to retirement has focused on the retirement behaviour of men. This reflects both a relative lack of data about women's retirement decisions, and the traditional view that retirement is more of a concern for men than for women. However, there is some evidence of gender differences in the retirement process. It has, for example, been found that while men who take up transition jobs often change to a job in a different industry or occupation than their career job, women who make a gradual transition to retirement are more likely to remain in the same industry and occupation (Ruhm, 1990).

Very few studies have used longitudinal data to examine patterns of labour force participation among mature age workers. Blau (1994) and Ruhm (1990) used the Social Security Administration Retirement History Longitudinal Survey (RHLS) to examine the patterns of labour force participation of men and women aged between 58 and 63 in 1969, and Peracchi and Welch (1994) used data from the Current Population Survey (CPS) to examine year-to-year transitions between labour force states of men and women who were aged between 49 and 68 in 1969. These studies identified health, marital status, education, work experience and household wealth as the factors most strongly associated with particular patterns of labour force participation. More specifically, men with self-reported health problems were found to be less likely to remain in continuous full-time employment, more likely to be continuously out of the labour force, and less likely to have erratic patterns of work than healthy men (Blau, 1994). Men who were not married had a higher probability of leaving the labour force and a lower probability of exiting retirement, and women who were not married had a significantly lower probability of leaving the labour force and a higher probability of exiting retirement (Peracchi and Welch, 1994). Men with higher levels of education were likely to postpone their exit from the labour force longer than other men, and less likely to follow the traditional pattern of moving directly from full-time work to complete retirement (Blau, 1994); while high school graduates were more likely to reverse partial retirement, but less likely to re-enter the labour force after completely retiring (Ruhm, 1990). Men and women with more work experience were found to be less likely to have erratic patterns of labour force participation or patterns of continuous non-participation, and higher levels of assets have been associated with an increased likelihood of participation patterns involving part-time work and a reduction in the likelihood of erratic participation patterns involving multiple transitions between labour force states (Blau, 1994).

2.1 Retirement Expectations of the Baby Boomer Generation

A group of particular interest for policy makers is the Baby Boomers — those born between 1946 and 1965 and therefore currently approaching retirement. As most of the Baby Boomers are yet to retire, most Australian and international studies of this age cohort focus on retirement expectations, the adequacy of retirement savings, and the ability to maintain their current lifestyle in retirement. In the United States, Lusardi and Mitchell (2007) used data from the HRS to compare the wealth holdings of Baby Boomers in 2004 with the wealth of men and women in the same age group in 1992 and found that while patterns of total net worth have changed relatively little, Baby Boomers are more likely than their predecessors to rely on housing equity to fund their retirement. Butrica, Smith and Iams (2003) also used the HRS to compare the wealth of boomer retirees with that of previous generations, but slightly differently, concluded that Baby Boomers will be less likely than previous generations to be able to maintain their pre-retirement standard of living. These results are likely to be a reflection of the Baby Boomers' higher expectations about standards of living in retirement, and their higher standard of living before retirement compared to the previous generation.

There is also some evidence to suggest that Baby Boomers expect to continue working longer than men and women of the previous generation. Again using data from the HRS, Gordon, Johnson and Murphy (2006) compared the retirement expectations Baby Boomers in 2004 with the retirement expectations of workers in the same age group in 1992. They found that the expectation of working full-time after the age of 65 was 23% higher for the early Baby Boomers compared to the pre-war generation. Similarly, a study conducted by the American Association for Retired Persons (2004) found that most Baby Boomers expected to 'work in retirement' because of a need for extra income.

2.2 Australian Studies of Retirement Transitions

Like the studies based on the RHS and HRS surveys in the United States, Australian studies using data from the HILDA Survey have shown that estimates of the incidence of partial retirement depend on the definition of partial retirement being used. For example, using data from the wave 3 retirement module, Borland and Warren (2006) found that approximately 20% of workers aged 45 or older in 2003 reported that their current job was part of a transition to full retirement, and that the proportion of workers who report being in a transition job is generally higher for women than for men. On the other hand, Thomson (2007) defined partial retirement as a reduction in working hours to 30 hours or less per week, and found that 54% of women and 38% of men who were aged 50 and over and engaged in full-time work in 2001 had shifted to partial retirement by 2004. Such large differences across studies reinforce how important definitions of partial retirement and transition jobs are in this literature.

Previous studies (for example, Norris and Bradbury, 2001;; Borland, 2005; Cai and Kalb, 2007; Cobb-Clark and Stillman, 2009) have shown that age, gender, health, education, work experience, caring responsibilities, the presence of resident children, owning a home outright, marital status and the labour force participation of one's spouse are all important determinants of labour force participation for mature age Australians. However, with the exception of Cobb-Clark and Stillman, these studies are based on cross-sectional data and only identify factors affecting labour force participation at one point in time. Zuchelli, Harris and Zhao (2012) estimate the effects of health shocks on the likelihood of movements out of full-time employment into part-time employment and self-employment and inactivity for older workers, and show that poor health and health shocks increase the likelihood of movements from full-time employment to inactivity.

In Australia, the men and women of the Baby Boomer generation entered the workforce when the predominant form of retirement income was the Age Pension, and they are effectively the last generation not to have benefited from the Superannuation Guarantee for their entire working lives (Hamilton and Hamilton, 2006). Several researchers have commented on the Baby Boomers' low levels of superannuation compared to the next generation, and higher lifestyle expectations compared to previous generations of retirees (see for example, Preston and Jefferson, 2002; Kelly and Harding,

2004; AMP and NATSEM, 2007). However, not a great deal is known about the retirement intentions of this group. This reflects both the fact that older Baby Boomers are only now beginning to approach retirement age, and the general lack of data about the retirement intentions of Australian men and women in this age group.

A variety of factors have been shown to affect the retirement intentions of Australian Baby Boomers. Research by AMP and NATSEM (2007) has shown that many Baby Boomers are either planning to delay retirement, or looking for opportunities to re-enter the workforce, in order to maintain the type of lifestyle they have had throughout their working lives. A survey run by the Australian Psychological Society (2007) also found that a considerable proportion of Australian Baby Boomers intended to delay retirement, with 43% intending to retire in their sixties, 19% in their seventies and 3% in their eighties, leaving one in five who stated that they never intended to leave the workforce. Hamilton and Hamilton (2006) found that income and wealth are also strong predictors of retirement expectations of Australian Baby Boomers, identifying a sharp divide between retirement expectations of high and low income Baby Boomers — while many high income Baby Boomers saw retirement as a change to fewer working hours and more time to enjoy leisure pursuits; those with low levels of wealth had a more traditional concept of retirement, and more commonly expected to work past traditional retirement age. Similarly, based on interviews with 78 men and women born between 1946 and 1957, Quine, Bernard and Kendig (2006) identified socioeconomic status as the most important variable associated with retirement planning, with most low socioeconomic status participants, particularly single women, saying they either could not afford to reduce their working hours before retirement, or that they were employed in occupations that did not offer this option.

The available Australian and international evidence suggests that partial retirement is most common among high income and high wealth individuals, who are able to reduce their working hours and still maintain their lifestyle. Studies from the United States and Australia have concluded that relatively few Baby Boomers will retire early and a large minority will continue working past traditional retirement age, mainly due to the fact that they will not have saved enough to retire completely and still maintain their pre-retirement lifestyle. However, little is known about how the Baby Boomers expect to make the transition to retirement — how many intend to retire gradually, how long they intend to stay in transition jobs before retiring completely, and what factors influence the decision about how the transition to retirement will be made.

3. Data and Descriptive Evidence

The data used in this article come from the first eight waves of the Household, Income and Labour Dynamics in Australia (HILDA) Survey. Described in more detail in Wooden and Watson (2007), the HILDA Survey began in 2001 with a large national probability sample of Australian households occupying private dwellings. In the first wave, 7683 households were interviewed, generating a

sample of 15,127 individuals who were eligible for interview, 13,969 of whom were successfully interviewed. Almost all of the wave 1 interviews were conducted during the period between 24 August and December 2001. The members of the initial sample of households formed the basis of the panel to be pursued in each subsequent wave, with each interview being approximately one year apart. In later waves, interviews are also sought with household members who have reached 15 years of age and any non-sample members who are residing with an original sample member. By wave 8, the total number of completed interviews was 12,785. Of those individuals who were interviewed in 2008, 73% were interviewed in wave 1. In the special retirement modules which were included in the HILDA survey in 2003 and 2007, men and women aged 45 and older and not yet retired were asked about their retirement plans and expectations; and those who were already retired were asked about how the transition to retirement was made.

3.1 Transitions to Retirement

In 2007, almost 40% of men, and just over 45% of women, who were aged 45 or older considered themselves to be completely retired; and a further 7% of men and 6% of women considered themselves to be partly retired (Table 1). For men, partial retirement was most common among those in the 60 to 64 age group, with 17% reporting being partly retired. The proportion of women reporting being partially retired increased from 6% in the 50 to 54 age group to 11% of women aged between 55 and 59 and 10% of women aged 60 to 64.

Table 1: Self-reported Retirement Status, Men and Women Aged 45 and over, 2007 (%)

	Age Group					
	45-49	*50-54*	*55-59*	*60-64*	*65+*	*Total*
Men						
Completely Retired	4.9	8.2	19.7	46.9	86.9	39.5
Partly Retired	*1.7	*2.9	8.6	16.9	7.7	7.0
Not Retired at All	92.4	87.3	71.1	36.1	5.2	52.8
Never Been in Paid Work	*1.0	*1.6	*0.6	*0.2	*0.2	*0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
Women						
Completely Retired	7.4	13.1	29.7	53.5	86.3	45.4
Partly Retired	*2.7	6.2	10.8	9.8	2.8	5.6
Not Retired at All	83.4	77.5	55.8	31.4	2.2	43.0
Never Been in Paid Work	6.6	*3.2	*3.7	*5.3	8.6	6.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: Population weighted results. * Estimate not reliable.

The two most common reasons that mature age men and women gave for considering themselves to be partly retired were that they worked only casually or occasionally, or that they worked fewer hours than before. Among men and women who reported being partly retired in 2007, 56% of men and 58% of women said that they considered themselves to be partly retired because they worked fewer hours than before, and 44% of men and 40% of women said they considered themselves to be partly retired because they worked only casually or occasionally.

Those who were employed at the time of their 2007 interview were asked if their current job was part of a transition to full retirement from the labour force, and almost 20% of mature age men and women indicated that this was so. The proportion of employed men and women who reported being in a transition job increased with age, from 7% of men and 8% of women aged between 45 and 49, to 61% of men and 55% of women aged 65 or older. However, being in a transition job did not necessarily mean working part-time, particularly for men. Among those who said their current job was a transition job, 80% of women, but only 49% of men, were working part-time. The most commonly reported difference was that the transition job was less demanding, or involved less responsibility, than their previous job. Still, 60% of men and 65% of women who said that their transition job was less demanding or involved less responsibility than their previous job also said that their transition job had involved a change from full-time work to part-time work. Similarly, among the 38% of men and 34% of women who said that their transition job had involved a change to casual or contract work, 79% of men and 69% of women said that this change had also involved a change from full-time work to part-time work. Moving into self-employment was also a relatively common way to make the transition to retirement, with more than 20% of individuals who were in transition jobs saying that their transition job had involved a change to working for themselves rather than for someone else. Among those who had become self-employed as part of their transition to retirement, 55% of men and 65% of women had also reduced their working hours from full-time to part-time.

3.2 Retirement Intentions of those who are not in Transition Jobs

Approximately 60% of men and women aged 45 and over who did not consider their current job to be part of a transition to retirement said that they expected to withdraw from the labour force gradually. However, in both 2003 and 2007, the proportion of individuals expecting to retire gradually decreased with age, suggesting that people revise their expectations about making a gradual retirement transition as they get closer to retirement age.[1] Among those who expected to make a gradual withdrawal from the labour force, the most common path they expected to follow in making this transition was via a move from full-time work to part-time work.

A comparison of retirement intentions in 2003 and 2007 provides further evidence that people revise their expectations about retirement, and the way they intend to make the transition to retirement, as they approach retirement age. Table 2 compares the retirement status in 2007 of mature age men and women who were not yet retired in 2003, according to their retirement intentions in 2003.

Of those who said that the job they had in 2003 was part of a transition to retirement, 41% of men and 38% of women were still in a transition job in 2007 and 26% of men and 29% of women had

[1] In 2003, 60% of men and 65% of women in the 45 to 49 age group said they expected to make a gradual transition to retirement, compared to 51% of men and women aged between 60 and 64. Similarly, in 2007, 64% of men and 73% of women aged 45 to 49 said that they expected to retire gradually, compared to 55% of men and 46% of women in the 60 to 64 age group.

retired from the labour force. However, 30% of men and 27% of women were still employed, but no longer considered their job to be part of a gradual transition to retirement.

Table 2: Retirement Status and Intentions in 2007, by Retirement Intentions in 2003, Employed Men and Women Aged 45 and over in 2003 (%)

	Status in 2007						
	Employed			*Retired*			
Status in 2003	*Currently in a Transition Job*	*Intend to take a Transition Job*	*Do not intend to take a Transition Job*	*Retired Gradually*	*Did not Retire Gradually*	*Not Employed but not Retired*	*Total*
Men							
Currently in a transition job	40.9	15.9	13.6	12.2	14.0	*3.3	100.0
Intend to take a transition job	16.2	55.3	17.4	*0.5	6.4	4.2	100.0
Do not intend to take a transition job	9.1	27.4	42.1	*1.4	16.6	*3.4	100.0
Total	18.1	38.9	25.1	2.9	11.2	3.8	100.0
Women							
Currently in a transition job	37.7	16.5	10.0	9.5	19.6	*6.7	100.0
Intend to take a transition job	13.2	57.6	16.9	*0.3	6.1	5.9	100.0
Do not intend to take a transition job	12.2	25.7	46.1	*1.6	9.7	*4.6	100.0
Total	18.1	38.6	24.9	2.7	10.1	5.7	100.0

Note: Population weighted results. *Estimate not reliable.

Among those who were not in a transition job in 2003, but intended to make a gradual withdrawal from the labour force at a later date, 55% of men and 58% of women continued to express an intention to retire gradually at some time in the future; 16% of men and 13% of women had moved to a transition job, and 16% had changed their retirement plans, saying that they no longer intend to make a gradual withdrawal from the labour force. One possible reason for this change may the realisation that such a transition job would mean a substantial drop in income and a subsequent drop in living standards.

Of those who said that they did not intend to retire gradually in 2003, 17% of men and 10% of women had followed through on those plans by 2007, retiring from the labour force without a transition job. However, a substantial proportion had changed their retirement plans — more than a quarter expressed an intention to retire gradually and a further 9% of men and 12% of women reported being in a transition job in 2007. For those who changed their retirement plans from not intending to retire gradually to intending to retire through a transition job, policy changes such as the introduction of transition to retirement pensions and the abolition of tax on superannuation taken after the age of 60, may have made it more financially viable to make a gradual transition to retirement.

3.3 Patterns of Mature Age Labour Force Participation

Tables 3 and 4 provide an overview of changes in labour force status of mature age men and women between 2001 and 2008. Average transition rates, computed by comparing the distribution of individuals in each labour force state in each year, conditional on their labour force status in the previous year, are presented in Table 3. Table 4 shows labour force status in 2008 conditional on labour force status in 2001.

Table 3: Annual Labour Force Transitions, 2001 to 2008, Men and Women Aged 45 to 70 (%)

	Labour Force Status at Time t				
Labour Force Status at Time t-1	*Employed Full-time*	*Employed Part-time*	*Unemployed*	*Not in the Labour Force*	*Total*
Men					
Employed Full-time	89.2	5.2	1.0	4.5	100.0
Employed Part-time	14.5	68.4	1.4	15.7	100.0
Unemployed	19.6	14.8	34.4	31.2	100.0
Not in the Labour Force	1.8	3.8	1.5	92.9	100.0
Total	48.1	12.8	2.0	37.1	100.0
Women					
Employed Full-time	84.1	10.5	0.8	4.6	100.0
Employed Part-time	9.5	76.0	1.1	13.4	100.0
Unemployed	11.6	19.6	25.9	42.9	100.0
Not in the Labour Force	1.0	4.2	1.0	93.9	100.0
Total	24.0	22.8	1.4	51.8	100.0

Note: Population weighted results.

There is a relatively high degree of persistence in labour force status from one year to the next for full-time employees and also for those not in the labour force, with 86% of men and women in these groups at any point in time still in the same labour force state one year later. For mature age women, there was also quite a high degree of persistence in part-time work, with 76% still in part-time work one year later, compared to 68% of mature age men. The most fluid labour force state is unemployment, with only 34% of men and 26% of women still unemployed one year later.

Table 4: Labour Force Transitions, 2001 and 2008, Men and Women Aged 45 to 64 in 2001 (%)

	Labour Force Status in 2008				
Labour Force Status in 2001	*Employed Full-time*	*Employed Part-time*	*Unemployed*	*Not in the Labour Force*	*Total*
Men					
Employed Full-time	62.0	12.7	*0.8	24.6	100.0
Employed Part-time	18.0	36.0	*2.2	43.9	100.0
Unemployed	*23.4	*14.9	*6.4	55.3	100.0
Not in the Labour Force	*3.5	6.1	*1.6	88.9	100.0
Total	41.5	13.7	1.3	43.6	100.0
Women					
Employed Full-time	53.7	23.7	*0.7	21.9	100.0
Employed Part-time	16.2	44.4	*2.8	36.6	100.0
Unemployed	*11.1	*36.1	*8.3	44.4	100.0
Not in the Labour Force	1.3	5.7	*1.0	91.9	100.0
Total	21.2	22.3	1.6	54.9	100.0

Note: Population weighted results. * Estimate not reliable.

During this period, transitions from full-time work to part-time work were more common among mature age women than men — 24% of women, but only 13% of men, who were working full-time in 2001 had reduced their working hours to part-time by 2008. For a substantial proportion of mature age men and women, part-time work was part of a gradual transition to retirement — 44% of men and 37% of women who were working part-time in 2001 were no longer in the labour force in 2008. Most mature age men and women who were not in the labour force in 2001 were not working or looking for work in 2008. This suggests that for the majority of those who had already left the labour force, retirement was a permanent decision and returning to work after a period of retirement was quite uncommon.

While Tables 3 and 4 show changes in labour force status between two points in time, they do not provide any information about patterns of participation. One way of characterising the transition to retirement is in terms of patterns that summarise the entire observed sequence of labour force states. The longitudinal nature of the HILDA Survey data allows us to examine the different labour force participation patterns of mature age Australians over a nine-year period.[2] By constructing patterns of labour force status at the time of interview in each year for men and women who were aged between 45 and 64 in 2000, and who were interviewed in waves one and eight of the HILDA Survey, a total of 231 unique patterns of movement between full-time work, part-time work, unemployment and non-participation were identified.[3] The most common patterns of labour force participation over the nine-year period are shown in Table 5.[4]

Table 5: Labour Force Participation Patterns 2000 to 2008, Men and Women Aged 45 to 64 in 2000 (%)

Transition Pattern		*Men*	*Women*	*All*
F	Continuous full-time	28.9	12.9	20.8
N	Continuous non-participation	19.4	33.0	26.2
FN	Traditional full-time to non-participation	10.8	4.3	7.5
PN	Part-time to non-participation	2.1	5.8	4.0
P	Continuous part-time	*1.1	6.1	3.6
FP	Full-time to part-time	3.2	3.6	3.4
FPF	Full-time, Part-time, Full-time	3.7	*1.0	2.3
PF	Part-time to full-time	1.3	2.8	2.1
NPN	Non-participation, Part-time, Non-participation	*0.9	2.4	1.6
FPN	Full-time to part-time to non-participation	1.9	1.3	1.6
PFP	Part-time, Full-time, Part-time	1.2	1.8	1.5
FPFP	Full-time, Part-time, Full-time, Part-time	*0.9	1.7	1.3
NP	Non-participation to Part-time	*0.6	1.5	1.0
PNP	Part-time, Full-time, Part-time	*0.3	1.4	0.8
UN	Unemployed to non-participation	*0.8	*0.9	0.8
Other patterns	Other patterns	22.9	19.6	21.2
Total		100.0	100.0	100.0

Note: Population weighted results. *Estimate not reliable.

The majority of individuals in this cohort had very simple patterns of labour force participation, either not changing labour force status at all, or changing labour force status only one time during the reference period. For mature age men, the three most common participation patterns, which accounted for 59% of all participation patterns, were those of continuous full-time work, continuous non-participation and the traditional shift from full-time work to retirement. For mature age women, these

[2] While only eight waves of data are used, the Wave 1 calendar provides information about labour force status one year before the first interview, allowing the observation of labour force transitions over a nine-year period. For the 284 individuals who were not interviewed in all 8 waves, transition patterns were determined using other information (e.g. job tenure or the calendar of labour force activity) for 175 people.

[3] For example, patterns of moving from full-time work to part-time work such as FPPPPPPPP, FFFPPPPPP and FFFFFFFFP are all grouped under the same pattern and labeled 'FP'.

[4] It is important to keep in mind that transition jobs do not necessarily mean a move from full-time work to part-time work, particularly for men who began their transition job in their forties or early fifties. The patterns of labour force participation described in Table 5, for example the pattern of continuous full-time work, may or may not involve a transition job. Still, the descriptive analysis earlier in this section has shown that for approximately half of the mature age men and women already in transition jobs, moving to a transition job had involved a change from full-time to part-time work; and also that the vast majority of those who intend to retire gradually, but have not yet taken up a transition job, expect to work part-time. Other types of transition, such as a move to self-employment or casual work while still working full-time are difficult to identify without explicitly asking respondents if that change was in fact part of a transition to retirement. For this reason, the transition patterns in this section are limited to the four states of full-time work, part-time work, unemployment and non-participation.

three patterns made up 50% of all participation patterns and, while continuous part-time employment was quite uncommon for mature age men, 6% of mature age women had been working part-time for the entire nine-year period and a further 6% had moved from part-time work to non-participation.[5]

In view of the Government's policy objectives of encouraging a gradual transition to retirement in order to keep mature age workers in the labour force until a later age, a key point is to note is that completing a gradual transition from full-time work, to part-time work, to complete retirement was quite uncommon. However, it might be assumed that for some of those who moved from full-time work to part-time work, this was the beginning of a gradual transition to retirement. Similarly, a change from part-time work to non-participation, particularly for men, may have been the completion of a gradual transition from full-time work that began before the start of the reference period.

4. Modeling the Transition to Retirement

Two types of estimation strategies are used to model the labour force transitions of mature age men and women. The first, following Blau (1994), involves the estimation of a standard multinomial logit model in which labour force transition patterns are generated for a nine-year period, then aggregated into seven main categories. These categories are used as the dependent variable in a multinomial logit model to identify characteristics associated with specific patterns of labour force participation. The second approach, which makes better use of the panel nature of the data, involves the estimation of a dynamic multinomial logit model. Here, labour market states for all individuals in waves 1 to 8 are estimated using their labour market state in the previous wave as a regressor; and random effects are included to account for unobserved heterogeneity.

Each approach has a different advantage. The first approach allows the identification of patterns of labour market transitions over a nine-year period, but is essentially cross-sectional in nature. Furthermore, the grouping of over 200 unique transition patterns into only seven categories means that the factors associated with less common transitions to retirement cannot be determined by this model. The second approach looks back only one period, but is able to take into account unobserved heterogeneity and address the issue of state dependence in labour market states — that is, the situation in which an individual's current labour market state depends on his or her past labour force state.[6] Therefore, for the purposes of identifying the main factors affecting the labour force transitions of mature age individuals, the second approach is the preferred option.

[5] The figures in Table 5 are likely to overestimate labour market stability, as not all labour force transitions can be picked up using labour force status at the time of interview. Blau (1994) studied the labour force history of men at quarterly intervals and showed that significant numbers of transitions are missed in studies based on annual or biannual data particularly in the case of married women whose intermittent labour force participation patterns result in many relatively short spells of participation and non-participation. There is potential to extend this work by using the calendar information in the HILDA Survey data to identify quarterly or monthly labour force transitions. However, transitions between full-time and part-time work among those who had several jobs between interviews are extremely difficult to identify.

[6] While there are several examples of dynamic models of transitions to retirement, including those of Blau (1997) and Schils (2001), only Zuchelli, Harris and Zhao (2012) have examined the issue of state dependence. This study focused mainly on the effects of health changes on the likelihood of moving out of full-time employment into part-time employment, self-employment or inactivity.

There are two sources of state dependence — true state dependence and unobserved heterogeneity generated by different preferences resulting in spurious dependence (Heckman and Willis, 1977). True state dependence is often due to the fact that working leads to accumulation of human capital, which increases job prospects in the future, while not working results in depreciation of human capital (Heckman, 1981). Differences in search costs associated with different labour market states may also cause state dependence (Eckstein and Wolpin, 1990). That is, there may be a fixed cost associated with entering the labour market, such that the cost of finding a job for those who are not employed is considerably higher than the cost of finding a new job for individuals who are already employed. Spurious dependence, on the other hand, results from individual unobserved heterogeneity that is correlated over time. That is, there are a range of other factors, related to individual characteristics other than labour market history, such as differences in ability, work ethic and preferences for work and leisure, that may explain persistent labour market behaviour (Cai, 2010).

Persistence in labour market states has important implications for policy makers, as policies that encourage, or discourage, retirement are likely to have a lasting effect. For example, policies such as transition to retirement pensions, which encourage mature age workers to retire gradually, and possibly remain in the labour force longer than they would have if this option was not available, are likely to have a long-term effect in the presence of true state dependence. Conversely, policies which treat the mature age labour force as a 'reserve army of labour' that can be systematically removed from the labour force in times of high unemployment, are also likely to have a (possibly unintended) lasting effect, making it difficult to persuade retirees to re-enter the labour force when unemployment rates are low.[7]

4.1 Approach 1: A Multinomial Logit Model of Transition Patterns

In order to determine the factors associated with specific patterns of labour force transitions, the many possible sequences of labour force participation described in Table 5 are aggregated into the following seven categories to be included as the dependent variable in a multinomial logit analysis:

1. Continuous full-time work (F).
2. Not in the labour force for the entire period; i.e., continuous NLF (N).
3. The traditional retirement pattern of moving from full-time work to not in the labour force (FN).
4. Gradual transition to retirement through part-time work (FP or FPN).
5. Continuous part-time work or transition from part-time work to non-participation (P or PN).
6. Simple patterns involving a return to work after a period out of the labour force (e.g. NF, NP, NPN, FNP).
7. All others. This category contains patterns involving other paths from employment to non-participation (e.g., FPFN, PUN), patterns involving moving in and out of employment (e.g. FUP, PNUF) and patterns involving moving between employment, unemployment and non-participation (e.g. NUNP, NFPU).[8]

[7] O'Brien (2004) finds that hidden and high unemployment rates have been an important aspect of the decline in older men's participation over recent decades and suggests that in many countries, including Australia, the government has historically treated older workers as a 'reserve army of labour' that can be systematically removed from the labour force in periods of sustained high unemployment.

[8] A Chow test rejects the hypothesis that the coefficients are equal in the male and female sub samples. Therefore, the models are estimated separately for men and women. The initial set of categories included separate groups for patterns involving transitions from unemployment

A transition from part-time employment to non-participation is likely to be part of a gradual transition to retirement, particularly for men. For women, part-time employment is less likely to be part of a gradual retirement transition, with a substantial proportion of women choosing to work part-time earlier in life because of family and caring responsibilities. Likelihood ratio tests indicate that for men, but not for women, category 5 (that of continuous part-time work or a transition from part-time work to non-participation) should be combined with either category 3 or category 4. One of the aims of this analysis is to identify differences in the factors associated with the traditional pattern of moving directly from full-time employment to non-participation and the gradual transition to retirement through a reduction in working hours. Therefore, for men, categories 4 and 5 are combined into one category, which represents a gradual transition to non-participation through part-time employment. In other words, for men, but not for women, continuous part-time employment and the transition from part-time employment to non-participation are assumed to be part of a gradual retirement transition which started prior to the beginning of the reference period.

The model to be estimated is a standard multinomial logit model:

$$\Pr(Y_i = j) = \frac{\exp(\beta_j X_i)}{\sum_{k=1}^{j} (\beta_k X_i)} \quad \text{for } j = 1, 2, \ldots, J \tag{1}$$

where $\Pr(Y_i = j)$ is the probability that individual i belongs to subgroup j, X_i is a vector of factors assumed to be related to an individual's labour force participation decision and β_j is a vector of parameters to be estimated. In order to identify the model, the categories are normalised around one of the six or seven possible categories, which in this case is the continuous full-time work category. That is, the set of coefficients for one category (in this case β_1) are set to zero, and the remaining coefficients measure the change in the odds of being in any particular category, relative to the base category.

To examine the labour force transition patterns of mature age Australians, a sample of men and women who were aged between 45 and 64 in 2000 and interviewed in both wave 1 and wave 8 of HILDA Survey was constructed — a total of 2844 individuals, 2735 of whom had complete information about their labour force status for the entire reference period. The sample was further restricted to individuals who had valid information about components of individual and household wealth from wave 2 of the HILDA Survey, resulting in a total of 2644 observations.

The explanatory variables used are either indicators of the characteristics of the individual in the first period of observation (e.g. age, occupation, education, labour market experience), or indicators of

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to non-participation, patterns involving work and unemployment with no time out of the labour force, patterns of continuous full-time employment involving a reduction in working hours, and patterns involving moves into casual work or self-employment. However, for these categories the number of cases was very small, and when likelihood ratio tests were applied, the results indicated that some categories should be combined.

changes that occurred during the observation period (for example, a decline in health, a change in carer status, whether the mortgage had been paid completely since 2001).[9] The value of specific components of individual and household wealth (individual superannuation, partners' superannuation, home equity and other household wealth) are included, as it is possible that different types of household wealth may have different effects on pathways to retirement. As many couples presumably choose to coordinate their retirement, indicators of partner's employment patterns during the reference period are included. A list of the explanatory variables included in the model, along with short descriptions and summary statistics, is provided in Appendix Table A.1.[10]

The hypotheses about the explanatory variables used in this model are as follows. It is expected that the likelihood of remaining in continuous employment (either full-time or part-time) will decrease with age, and the likelihood of continuous non-employment will increase with age. Health is expected to be a very strong predictor of labour force participation patterns. Those with a work-limiting health condition or disability are expected to be less likely have patterns of continuous full-time work, more likely to be continuously out of the labour force, and more likely to have participation patterns involving part-time work or movements in and out of the labour force. Those who experienced a worsening in health during the reference period are expected to be more likely to have participation patterns involving a reduction in working hours, either moving from full-time to part-time work, or moving from employment to non-participation.

Men and women with high levels of human capital, measured by education, occupational status and labour market experience, are expected to also have high earning capacities and therefore may be more likely to remain in full-time work.[11] However, it is also likely that individuals who are able to earn high wages may reach a point where they have saved enough for a comfortable retirement and so decide to either leave the labour force completely, or substantially reduce their working hours.

Household characteristics such as the presence of resident children, caring responsibilities and partner's labour force participation patterns are expected to have a strong influence on patterns of participation. Those with resident children will be more likely to have patterns of continuous employment and patterns of continuous full-time work, due to the higher level of disposable income needed to support a larger household; while those whose children left home during the reference period may be able to reduce their working hours as a result of a reduction in the amount of income needed for household expenses. Conversely, those who did not have resident children at the beginning of the reference period but did have resident children at the end of the reference period (i.e. children

[9] As questions about individual and household wealth are not asked in each year of the HILDA Survey, measures of the various components of wealth from wave 2 of HILDA are used.

[10] Note that because the dependent variable in these models is the pattern of labour force participation over a nine-year period, there is no way of controlling for the effects of fluctuations in macroeconomic conditions over this period.

[11] For those who were not in paid employment at the time of their 2001 interview, occupational status of their most recent job is used. For more information about the occupational status scale, refer to McMillan et al. (2009).

who had previously left home but had since returned) may have had to return to work or increase their working hours as a result of the increased financial requirements of a larger household.

Those with responsibilities as a carer for their spouse or another household member are expected to be more likely to remain continuously out of the labour force, or to work part-time; and those who became a carer during the reference period are expected to be more likely to have reduced their working hours from full-time to part-time, or make an abrupt change from full-time employment to being out of the labour force.

It is expected that single men and women will be more likely than those with a partner to have a pattern of continuous full-time work, while partnered women are expected to have an increased likelihood of being continuously out of the labour force or to have participation patterns involving part-time work. It is assumed that those whose partner remained in employment for the entire reference period would be more likely to continue working themselves; those whose partner left the labour force during the reference period would be more likely to stop working in order to coordinate their retirement with that of their partner; and those whose partner re-entered the labour force after a period of retirement may do the same, either for financial reasons or because of a preference for spending leisure time with their partner.

Those in wealthier households and those who own their home outright are assumed to be less likely to need to continue working, and are expected to be more likely to have participation patterns involving part-time work or non-participation. Individuals with higher superannuation balances may be more likely to leave the labour force once they reach preservation age (55), or once they reach age 60 and superannuation becomes tax free. On the other hand, those with higher levels of superannuation may have a greater incentive to reduce their working hours, or take up a transition to retirement pension once they reach preservation age. Others may choose to use their superannuation to fund early retirement, and then rely on the Age Pension once their superannuation savings are consumed.[12] For some, and particularly for women, partner's superannuation may also be a consideration in how and when to retire, allowing them to reduce their working hours or retire completely. Other types of household wealth may also have an impact on the pathway to retirement. Those with a large amount of equity in the home that they live in may choose to downsize, or take out a reverse mortgage on their home in order to fund an early or partial retirement. Other savings, such as cash, shares or investment properties which can be used to generate income in retirement, or to fund an early or partial retirement are also likely to influence pathways to retirement. Indicators for those who owned their home outright in 2001 and those who paid off their home completely during the reference period are also included.

[12] It is important to note that among those who have already left the labour force, superannuation balances are likely to be lower. First, because superannuation may be already drawn down to fund retirement, and second, because those who have already left the labour force are likely to be older and have lower superannuation balances to begin with, due to the fact that they would have benefited from the superannuation guarantee for a smaller portion of their working lives.

The estimation results for men and women are reported in Tables 6 and 7 respectively. As the coefficients from the multinomial logit model are not straightforward to interpret, mean marginal effects are reported. For dummy variables, the marginal effects can be interpreted as the average change in the probability of being in a particular group if the value of that variable is changed from zero to one, and all other explanatory variables are held constant. For continuous variables, the marginal effect is the average change in the probability of being in a particular group when the value of that variable is increased by one unit, and all other explanatory variables are held constant.

Likelihood ratio tests for joint significance of explanatory variables indicate that for both men and women, age, health limitations, work experience, and partner's employment transitions are strong predictors of labour force participation patterns. For men, home ownership and the presence of resident children are also important factors determining how the retirement transition is made.

Table 6 shows that for men, the probability of making a gradual transition to retirement increases substantially with age. Compared to men who were not living with a spouse or partner in 2001, those whose partner had remained out of the labour force for the entire reference period were less likely to have made a gradual transition, while men whose partner had a more complicated pattern of labour force participation were more likely to have had a pattern of labour force participation involving a period of part-time employment prior to retiring completely. Health limitations, home ownership, education level and the presence of resident children are not significant factors in the decision to make a gradual transition to retirement. Furthermore, while household wealth other than superannuation and home equity has a small positive effect on the likelihood of this outcome, the superannuation level of the individual and his partner do not appear to have any significant effect on the likelihood of retiring gradually through part-time work.

As expected, the likelihood of having followed the traditional path of moving directly from full-time employment to retirement increases with age. Men who reported a work-limiting health condition in 2001 are more likely to have followed this path, as are men who owned their home outright in 2001 and those who had paid off their mortgage completely by 2008. The effects of superannuation on the likelihood of moving directly from full-time work to non-participation are statistically significant but quite small, with a $100,000 increase in superannuation increasing the likelihood of following the traditional pattern from full-time employment to non-participation by just over 1 percentage point. Compared to men who were not living with a spouse or partner in 2001, the likelihood of having moved directly from full-time employment to non-participation is 12 percentage points higher among men whose partner had also followed this pathway; and having a partner who had remained out of the labour force, stayed in part-time employment for the entire nine-year period, or moved from part-time employment to non-participation increased the likelihood of following the traditional path by approximately 6 percentage points.

Table 6: Multinomial Logit Estimates of Labour Force Patterns, Men Aged 45 to 64 in 2000 (Mean Marginal Effects)

	Continuous full-time	*Continuous NLF*	*Traditional FT to NLF*	*Gradual Transition (FP, P, PN or FPN)*	*Patterns involving a return to work*	*Other*
Age in 2000 (Control = 45-49)						
Age50-54	-0.097***	0.081**	0.049*	0.040	-0.003	-0.071**
	[0.024]	[0.033]	[0.029]	[0.027]	[0.027]	[0.029]
Age55-59	-0.264***	0.120***	0.050*	0.079***	0.042*	-0.028
	[0.029]	[0.031]	[0.029]	[0.027]	[0.026]	[0.031]
Age60-64	-0.358***	0.211***	0.078***	0.127***	0.077***	-0.136***
	[0.056]	[0.030]	[0.030]	[0.029]	[0.027]	[0.047]
Health (Control = No work-limiting health condition in 2001 or 2008)						
Health condition 2001	-0.131***	0.097***	0.035*	0.014	0.012	-0.027
	[0.033]	[0.019]	[0.021]	[0.022]	[0.020]	[0.031]
Health worsened	-0.006	0.013	0.030	0.014	-0.036	-0.016
	[0.03]	[0.025]	[0.021]	[0.021]	[0.026]	[0.032]
Highest level of Education (Control = Year 11 or below)						
Degree	0.025	-0.116***	-0.028	0.041	0.009	0.069*
	[0.039]	[0.034]	[0.031]	[0.027]	[0.029]	[0.042]
Certificate or Diploma	0.012	-0.018	-0.008	-0.025	-0.003	0.043
	[0.028]	[0.019]	[0.02]	[0.021]	[0.021]	[0.028]
Year 12	-0.062	-0.015	-0.0004	0.030	-0.051	0.099**
	[0.042]	[0.035]	[0.032]	[0.030]	[0.041]	[0.042]
Home Ownership Status (Control = Renting or Paying Mortgage in 2001 and 2008)						
Own home outright 2001	-0.114***	0.056**	0.053**	-0.004	0.030	-0.020
	[0.025]	[0.025]	[0.026]	[0.022]	[0.024]	[0.027]
Paid off mortgage	-0.055	0.013	0.067**	-0.002	0.055*	-0.078**
	[0.033]	[0.034]	[0.03]	[0.029]	[0.030]	[0.039]
Country of Birth (Control = Australian Born)						
MESB	-0.001	-0.001	0.041*	0.010	-0.032	-0.017
	[0.030]	[0.025]	[0.021]	[0.022]	[0.025]	[0.033]
NESB	-0.057	0.039	0.049*	-0.005	-0.102***	0.075**
	[0.036]	[0.026]	[0.025]	[0.027]	[0.037]	[0.033]
Components of Household Wealth						
Own Superannuation	-0.002	-0.0003	0.013***	0.001	-0.001	-0.011
	[0.006]	[0.006]	[0.005]	[0.004]	[0.005]	[0.008]
Partner's Super	-0.023*	0.006	0.007	-0.013	-0.003	0.025**
	[0.013]	[0.011]	[0.009]	[0.011]	[0.009]	[0.013]
Other Wealth	0.002	-0.001	-0.003*	0.003***	-0.001	0.0002
	[0.002]	[0.001]	[0.002]	[0.001]	[0.001]	[0.002]
Home Equity	0.005	-0.004	-0.007	-0.001	0.009***	-0.003
	[0.005]	[0.005]	[0.004]	[0.004]	[0.003]	[0.006]
Carer Status (Control = No caring responsibilities in 2001 or 2008)						
Carer in 2001	-0.081	0.062	-0.002	0.064	-0.018	-0.024
	[0.085]	[0.04]	[0.064]	[0.054]	[0.064]	[0.077]
Became a Carer	-0.144	0.057	0.033	0.027	0.072	-0.046
	[0.085]	[0.051]	[0.049]	[0.053]	[0.044]	[0.089]
Resident Children (Control = No Resident children in 2001 or 2008)						
Kids 2001 and 2008	0.080***	-0.038	-0.016	0.024	-0.046	-0.005
	[0.028]	[0.028]	[0.026]	[0.023]	[0.03]	[0.031]
Kids returned	-0.134*	0.037	0.032	0.009	-0.038	0.095
	[0.073]	[0.055]	[0.054]	[0.061]	[0.069]	[0.067]
Kids left home	0.011	-0.030	-0.023	-0.035	0.040*	0.036
	[0.028]	[0.027]	[0.023]	[0.025]	[0.022]	[0.030]
Occupational Status	0.001	0.0002	-0.0003	0.0001	0.001**	-0.002***
	[0.001]	[0.000]	[0.0004]	[0.0003]	[0.0004]	[0.001]
Experience	0.009***	-0.007***	0.006***	0.004***	-0.004***	-0.007***
	[0.002]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]
Major City	0.005	0.010	0.001	0.012	-0.039**	0.001
	[0.023]	[0.018]	[0.018]	[0.018]	[0.018]	[0.025]

Table 6 continued on next page

	Continuous full-time	*Continuous NLF*	*Traditional FT to NLF*	*Gradual Transition (FP, P, PN or FPN)*	*Patterns involving a return to work*	*Other*
Labour Force Transitions of Partner (Control = No partner in 2001)						
Continuous FT	0.077*	-0.062	-0.001	-0.013	0.0003	-0.003
	[0.04]	[0.044]	[0.041]	[0.038]	[0.038]	[0.045]
Continuous NLF	-0.031	0.055**	0.064**	-0.054*	-0.031	-0.003
	[0.042]	[0.02]	[0.027]	[0.020]	[0.028]	[0.041]
Continuous PT /PT to NLF	-0.003	-0.071*	0.058**	-0.020	-0.004	0.040
	[0.036]	[0.037]	[0.027]	[0.025]	[0.029]	[0.038]
Gradual Transition	0.089	-1.173	0.302	0.198	0.282	0.300
	[3.86]	[31.55]	[5.821]	[4.118]	[7.83]	[9.924]
Traditional FT to NLF	-0.171**	-0.003	0.117***	0.006	0.020	0.031
	[0.079]	[0.047]	[0.038]	[0.048]	[0.046]	[0.073]
Return to employment	-0.005	-0.089**	0.017	-0.013	0.071**	0.02
	[0.04]	[0.037]	[0.033]	[0.031]	[0.027]	[0.043]
Other	-0.020	-0.086***	0.022	0.049**	0.019	0.016
	[0.032]	[0.031]	[0.026]	[0.023]	[0.026]	[0.034]
Separated since 2001	-0.053	0.001	0.009	0.052	-0.032	0.023
	[0.054]	[0.040]	[0.046]	[0.035]	[0.044]	[0.053]
Partner's transition pattern unknown	0.010	0.001	0.008	-0.025	-0.040	0.046
	[0.039]	[0.043]	[0.044]	[0.038]	[0.045]	[0.044]
Number of observations = 1242		Log likelihood = -1542.1332			Pseudo R2 = 0.2709	

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. Standard errors in parentheses.

The likelihood of returning to work after a period of non-participation is significantly higher among men who were aged between 60 and 64. Presumably this is because the likelihood of having initially moved out of employment is higher among older men. Men with a high occupational status, those whose children had left home, those who had paid off their mortgage since 2001, and those whose partner had returned to work after a period of non-participation were also more likely to have had a participation pattern involving a return to work. The probability of having a pattern of participation involving a return to work was significantly lower among men who were born not born in Australia.

Not surprisingly, the likelihood of having a continuous pattern of full-time employment decreases substantially with age, and the opposite is true for patterns of continuous non-participation. Men who reported a work limiting health condition in 2001 were also less likely to have had a pattern of continuous full-time employment and more likely to have remained out of the labour force, as were men who owned their home outright in 2001. Men who had children living at home in both years were more likely to have remained in full-time employment, while men with a degree qualification were much less likely to have had a pattern of continuous non-participation. Compared to men who were not living with a spouse or partner in 2001, those whose partner remained in full-time employment were more likely to do so themselves, but having a partner who had followed the traditional path from full-time work to retirement reduced the likelihood of continuous full-time employment by 17 percentage points. Similarly, the likelihood of having remained out of the labour force for the entire reference period was higher among men whose partner had done the same, and lower among men whose partner had returned to work after a period of non-participation, stayed in part-time employment for the entire reference period or moved from part-time work to non-participation.

Turning now to the results for women, Table 7 shows that compared to women who were in the 45 to 49 age group in 2001, the likelihood of having made a transition from full-time to part-time work or from full-time to part-time and then non-participation is higher among women who were between the ages of 50 and 54. Compared to women with no work-limiting health conditions in 2001 or 2008, the probability of making a gradual transition was 5 percentage points lower for women who reported a work-limiting health condition in 2001. Women from a non-English speaking background were also less likely to have made a gradual transition. On the other hand, women who had become a carer for a spouse or other family member since 2001 were 4 percentage points more likely to have made a gradual transition.

For women, the probability of moving directly from full-time employment to non-participation increased with labour market experience and, compared to women living in regional or remote areas, the likelihood of following this path was higher for women who lived in a major city. Compared to women who were not living with a spouse or partner in 2001, those whose partner had a participation pattern involving a direct move from full-time work to non-participation were more likely to have also chosen this path.

Many women choose to work part-time relatively early in their working lives because of family responsibilities, and the initial decision to change full-time work to part-time work may not necessarily one that is made as part of a transition to retirement. For mature age women, the likelihood of having been in continuous part-time employment, or making a transition from part-time work to non-participation increases substantially with age. Compared to women in households who are renting their home or paying off a mortgage, the probability of this outcome is 9 percentage points higher for women in households where the family home was owned outright at the start of the reference period.

Family considerations also appear to be an important factor in women's decisions to return to work after a period of retirement. Compared to women who had no children living at home in 2001 or 2008, those who had resident children in both years were more likely to have followed this pathway. Furthermore, compared to women who were not living with a spouse or partner in 2001, the likelihood of this outcome was 12 percentage points higher among women whose partner had a pattern of participation involving continuous full-time employment; 10 percentage points higher among women whose partner had either followed the traditional pathway from full-time employment to non-participation or made a gradual transition to retirement; and 9 percentage points higher among women whose partner had followed a similar pattern involving part-time employment.

Table 7: Multinomial Logit Estimates of Labour Force Patterns, Women Aged 45 to 64 in 2000 (Mean Marginal Effects)

	Continuous full-time	*Continuous NLF*	*Traditional FT to NLF*	*Gradual Transition (FP or FPN)*	*Patterns involving a return to work*	*Other*	*Continuous part-time work or PT to NLF*
Age in 2000 (Control = 45-49)							
Age50-54	-0.035*	0.02	0.031*	0.034**	-0.010	-0.079***	0.040*
	[0.018]	[0.028]	[0.016]	[0.010]	[0.024]	[0.024]	[0.024]
Age55-59	-0.084***	0.118***	0.019	0.008	-0.023	-0.092***	0.053**
	[0.026]	[0.029]	[0.017]	[0.017]	[0.027]	[0.03]	[0.026]
Age60-64	-0.275***	0.290***	0.023	0.006	0.013	-0.163***	0.105***
	[0.085]	[0.029]	[0.021]	[0.025]	[0.036]	[0.054]	[0.032]
Health (Control = No work-limiting health condition in 2001 or 2008)							
Health condition 2001	-0.074***	0.151***	-0.011	-0.051**	0.028	-0.010	-0.031
	[0.025]	[0.022]	[0.017]	[0.023]	[0.023]	[0.027]	[0.025]
Health Worsened	-0.034	0.0002	-0.0003	-0.005	-0.014	0.029	-0.0003
	[0.021]	[0.023]	[0.0004]	[0.0003]	[0.0004]	[0.025]	[0.0003]
Highest level of Education (Control = Year 11 or below)							
Degree	-0.012	-0.096***	-0.011	0.002	0.020	0.089***	0.007
	[0.024]	[0.035]	[0.017]	[0.017]	[0.030]	[0.033]	[0.030]
Cert/Diploma	0.023	-0.034	-0.0004	-0.009	-0.014	0.036	-0.007
	[0.021]	[0.025]	[0.013]	[0.015]	[0.025]	[0.027]	[0.023]
Year 12	0.040	0.017	-0.034	-0.005	-0.015	0.074**	-0.076*
	[0.028]	[0.035]	[0.030]	[0.025]	[0.036]	[0.036]	[0.041]
Home Ownership Status (Control = Renting or Paying Mortgage in 2001 and 2008)							
Own home outright	-0.024	0.001	0.005	0.012	-0.015	-0.063***	0.086***
in 2001	[0.019]	[0.025]	[0.016]	[0.015]	[0.023]	[0.024]	[0.024]
Paid off mortgage	-0.020	0.004	0.019	0.009	0.007	-0.066*	0.048
since 2001	[0.025]	[0.038]	[0.019]	[0.019]	[0.033]	[0.036]	[0.03]
Country of Birth (Control = Australian Born)							
MESB	-0.042	0.037	-0.011	0.013	0.024	-0.024	0.003
	[0.025]	[0.029]	[0.016]	[0.015]	[0.027]	[0.032]	[0.026]
NESB	0.0004	0.089***	0.001	-0.054**	0.030	-0.022	-0.012
	[0.024]	[0.028]	[0.021]	[0.027]	[0.029]	[0.032]	[0.029]
Components of Household Wealth							
Own super	0.014**	0.004	0.0002	0.001	0.005	-0.009	-0.015
	[0.006]	[0.009]	[0.004]	[0.003]	[0.007]	[0.011]	[0.01]
Partner's Super	-0.011*	0.025***	-0.0002	-0.006	-0.006	0.0002	0.005
	[0.006]	[0.001]	[0.003]	[0.003]	[0.006]	[0.008]	[0.005]
Other wealth	-0.002	-0.001	-0.001	0.001**	0.003	-0.001	-0.0001
	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]	[0.002]	[0.001]
Home equity	-0.005	0.002	0.001	-0.001	0.003	0.001	0.0001
	[0.004]	[0.004]	[0.002]	[0.002]	[0.004]	[0.005]	[0.004]
Carer Status (Control = No caring responsibilities in 2001 or 2008)							
Carer in 2001	0.019	0.139	0.034	-0.643	0.159	0.120	0.173
	[9.77]	[6.553]	[4.270]	[53.48]	[9.969]	[13.40]	[9.493]
Became a Carer	-0.070	-0.047	-0.025	0.042**	0.036	0.045	0.019
	[0.047]	[0.042]	[0.030]	[0.021]	[0.039]	[0.045]	[0.038]
Resident Children (Control = No Resident children in 2001 or 2008)							
Kids 2001 and 2008	0.010	-0.038	-0.013	-0.013	0.012	-0.007	0.089**
	[0.021]	[0.029]	[0.018]	[0.019]	[0.026]	[0.028]	[0.025]
Kids returned	0.041	0.044	-0.023	-0.007	-0.063	-0.027	0.035
	[0.06]	[0.054]	[0.044]	[0.046]	[0.074]	[0.07]	[0.056]
Kids left home	0.0001	-0.044	-0.004	0.021	0.005	-0.012	0.035
	[0.022]	[0.028]	[0.015]	[0.014]	[0.026]	[0.028]	[0.024]
Occupational Status	0.001***	-0.0003	0.001	0.0001	0.0001	-0.001**	-0.001
	[0.0004]	[0.001]	[0.0003]	[0.0003]	[0.001]	[0.001]	[0.001]
Experience	0.002***	-0.004***	0.001*	0.001*	-0.0001	0.0004	0.001*
	[0.0004]	[0.0003]	[0.0002]	[0.0003]	[0.0003]	[0.0004]	[0.0003]
Major City	0.005	-0.0003	0.025**	-0.005	-0.018	-0.023	-0.0004
	[0.017]	[0.02]	[0.013]	[0.012]	[0.020]	[0.022]	[0.018]

Table 7 Continued on next page

	Continuous full-time	*Continuous NLF*	*Traditional FT to NLF*	*Gradual Transition (FP or FPN)*	*Patterns involving a return to work*	*Other*	*Continuous part-time work or PT to NLF*
Labour Force Transitions of Partner (Control = No partner in 2001)							
Continuous FT	0.010	-0.073**	-0.023	-0.023	0.018	-0.026	0.118***
	[0.023]	[0.035]	[0.023]	[0.02]	[0.031]	[0.031]	[0.03]
Continuous NLF	0.109	0.221	0.067	-0.647	0.095	0.050	0.106
	[6.386]	[4.279]	[2.794]	[34.92]	[6.511]	[8.758]	[6.199]
Continuous PT or PT to NLF	0.010	-0.068	-0.022	0.020	0.032	-0.058	0.087**
	[0.061]	[0.056]	[0.042]	[0.030]	[0.055]	[0.078]	[0.042]
Gradual Transition	-0.054	-0.161**	0.030	0.025	-0.025	0.079	0.104**
	[0.046]	[0.07]	[0.025]	[0.024]	[0.062]	[0.054]	[0.049]
Traditional FT to NLF	-0.062	-0.015	0.037**	0.018	0.008	-0.089*	0.103***
	[0.043]	[0.038]	[0.017]	[0.019]	[0.042]	[0.051]	[0.034]
Return to employment	-0.018	-0.07*	0.003	-0.012	0.117***	-0.086*	0.065*
	[0.037]	[0.039]	[0.022]	[0.023]	[0.035]	[0.049]	[0.037]
Other	-0.005	-0.088***	0.007	-0.002	0.035	-0.032	0.085***
	[0.025]	[0.034]	[0.018]	[0.018]	[0.031]	[0.033]	[0.029]
Separated	-0.085**	-0.002	0.006	-0.033	0.0003***	0.040	-0.015
	[0.042]	[0.035]	[0.022]	[0.032]	[0.033]	[0.039]	[0.04]
Partner's transition pattern unknown	0.0004	-0.071*	-0.023	0.001	0.055	-0.040	0.078**
	[0.030]	[0.041]	[0.030]	[0.021]	[0.035]	[0.040]	[0.036]
Number of observations = 1402			Log likelihood = -1895.4714			Pseudo R2 = 0.2332	

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. Standard errors in parentheses.

Compared to women who were not living with a spouse or partner in 2001, the likelihood of returning to work after a period of non-participation is significantly higher among those who were partnered in 2001 but had separated, divorced or become widowed by 2008. However the magnitude of this effect is very small, increasing the likelihood of returning to work by only 0.03 percentage points. For mature age women, the main factor affecting the likelihood of this outcome is their partner's pattern of labour force participation. Among women whose spouse or partner was not in the labour force in 2001, but who had (re)entered the labour force since that time, the likelihood of re-entering the workforce is 12 percentage points higher than for women who were not partnered in 2001. This may be due to a preference for spending leisure time in retirement with their spouse, or possibly due to financial difficulties. For example, the couple may have underestimated the amount of savings needed to maintain their pre-retirement standard of living, or expected a higher level of return on their retirement savings.

As was the case for men, the likelihood of having a continuous pattern of full-time employment decreases substantially with age, and the opposite is true for patterns of continuous non-participation. Women who reported a work limiting health condition in 2001 were also less likely to have had pattern of continuous full-time employment and more likely to have remained out of the labour force; and compared to women who had not completed high school, women with a degree qualification were less likely to have had a pattern of continuous non-participation.

For mature age women, their own superannuation balance has a small positive impact on the likelihood of continuous full-time employment, possibly because women with a substantial superannuation balance are more likely to respond to financial incentives to remain in the workforce.

Alternatively, this result may be simply because those who have had a pattern of continuous full-time employment are likely to have had a preference for full-time employment during their entire working life, and this has resulted in a higher superannuation balance. Conversely, partner's superannuation balance reduces the likelihood of having been in continuous full-time employment and increases the likelihood of continuous non-participation; possibly because those whose partners have a substantial superannuation balance are able to rely on their partner's superannuation savings in retirement.

There also appear to be some cultural differences in the patterns of labour force participation of mature age women. Compared to women who were born in Australia, the likelihood of having a pattern of continuous non-participation is 9 percentage points higher for women born in non-English speaking countries.

Compared to women who were not living with a spouse or partner in 2001, those whose partner had a pattern of continuous full-time employment were less likely to have remained out of the labour force for the entire reference period, as were women whose partner had made a gradual transition to retirement, returned to work after a period of non-participation or had a more complicated pattern of labour force participation. While changes in marital status do not appear to have a significant impact on the labour force participation patterns of mature age men, for mature age women, having been separated, divorced or widowed reduces the likelihood of continuous full-time employment by almost 9 percentage points.

In summary, there is strong evidence of persistence, or state dependence, in the labour force states of mature age men and women in Australia. The behavioural evidence makes it clear that gradual transitions to retirement are still comparatively uncommon, but those with higher levels of household wealth, long work experience and partners who work, are more likely than others to make a gradual transition. For both men and women, partners' labour force status and labour force transitions appear to be very important predictors of participation patterns. For example, men whose spouse or partner had remained out of the labour force for the entire reference period were less likely to have made a gradual transition, while men whose partner had a more complicated pattern of labour force participation were more likely to have had a pattern of labour force participation involving a period of part-time employment prior to retiring completely. For women, but not for men, having become a carer since 2001 increased the likelihood of making a gradual transition from full-time to part-time work. A likely explanation for this difference is the fact that men are more commonly the main breadwinner for the household. Therefore, the impact on household income if the husband reduces his working hours, or retires completely, to care for his wife is likely to be much larger than if the wife retires to care for her husband.

4.2 Approach 2: A Dynamic Multinomial Logit Model with Random Effects

In the model below, the transition probabilities between full-time employment, part-time employment, unemployment and non-participation from period *t-1* to period *t* are estimated assuming a first order Markov process. The latent propensity *E** of individual *i* to be in state *j* in period *t* can be written as:

$$E^*_{ijt} = X_{it}\beta_j + Y_{it-1}\gamma_j + \alpha_{ij} + \varepsilon_{ijt} \tag{2}$$

Where X_{it} contains individual observed characteristics in *t* and Y_{it-1} contains the lagged state, consisting of dummy variables which indicate the labour force status in period *t-1* with full-time employment as the base category. The vector $\alpha_{ij} = \{\alpha_{i1}, \alpha_{i2.}, \alpha_{i3}, \alpha_{i4}\}$ describes the individual specific unobserved heterogeneity and ε_{ijt} is the error term, which is assumed to be independent from the observable and unobservable individual characteristics and to follow a value distribution.

Then, the probability that individual *i* is in state *j* at time *t* can be expressed as:

$$\Pr(Y_i = j \mid X_{it}, Y_{it-1}, \mu_i) = \frac{\exp(X_{it}\beta_j + Y_{it-1}\gamma_j + \mu_{ij})}{\sum_{k=1}^{j} \exp(X_{it}\beta_k + Y_{it-1}\gamma_k + \mu_{ik})} \tag{3}$$

Because the observation period of transitions does not coincide with the start of the stochastic process generating individuals' employment dynamics, the initial condition problem needs to be taken into account when modeling transition probabilities. That is, if past labour supply decisions were influenced by the same unobserved component of the error term (μ), then estimates of the association between these variables and current decisions cannot be given a causal interpretation (Blau, 1994). Rather than specifying explicit models for the initial conditions at the first observed point in time as in Heckman (1981), the problem is dealt with here by specifying unobserved heterogeneity conditional on the first period outcome following Wooldridge (2002). The probability that individual *i* is in state *j* at time *t* then becomes:

$$\Pr(Y_i = j \mid X_{it}, Y_{it-1}, Y_{i1,}\mu_i) = \frac{\exp(\beta_j X_{it} + \alpha_j Y_{i1} + \gamma_j Y_{it-1} + \mu_{ij})}{\sum_{k=1}^{j} \exp(\beta_k X_{it} + \alpha_k Y_{i1} + \gamma_k Y_{it-1} + \mu_{ik})} \tag{4}$$

For identification purposes, β_1, γ_1 and γ_{i1} of the base category, which in this case is full-time employment, are set to zero.

The only restrictions to the sample used for estimating this model are that individuals must be between 50 and 70 years of age, that they have valid information about individual and household wealth from either wave 2 or wave 6, and that for each observation, labour force status in the previous year is available.[13] This gives a total of 20620 observations from 3160 individuals.

Apart from labour force status in the previous period and the initial period, the explanatory variables used in this model are similar to those used in Approach 1. That is, indicators of age, health, education, work experience, occupational status, cultural background, and caring responsibilities are included; as well as household characteristics such as the presence of resident children, partner's labour force status, home ownership and components of household wealth. A list of the explanatory variables included, along with short descriptions and summary statistics, is provided in Appendix Table A.2.[14]

To determine the importance of unobserved heterogeneity, and hence the extent of spurious state dependence, the models are estimated with and without random effects.[15] The estimation results for men and women are presented in Tables 8 and 9 respectively. As in Approach 1, mean marginal effects are presented.[16] The main difference between the two sets of results is the magnitude of the marginal effects of the one-period lagged labour force states, which are considerably larger when unobserved heterogeneity is ignored. This result implies that, for both men and women, observed state dependence in labour market states is due partly to unobserved heterogeneity as well as true state dependence.[17] For example, when unobserved heterogeneity is not accounted for, the results in Table 8 suggest that, compared to men who were in full-time employment one year earlier, the probability of being in part-time employment is 43 percentage points higher for those who were in part-time

[13] As information about household wealth is only available for 2002 and 2006, for years when wealth information is not available, all components of household wealth are assumed to increase at a real rate of 6% per annum. Reasonable changes to this rate do not substantially affect the size or significance of the estimates.

[14] In principal, fluctuations in macroeconomic conditions during the period of observation can be expected have an impact on labour force status. That is, whether or not an individual is unemployed and also the number of hours worked is likely to be affected by changes in the demand for labour. However, macroeconomic conditions were relatively stable during the period of observation. When measures such as the unemployment rate and annual percentage change in Gross Domestic Product are included as explanatory variables, the results presented do not change, except for the fact that the likelihood of being unemployed increases with the unemployment rate for both men and women.

[15] The random effects model is estimated using the gllamm procedure in STATA. The coefficient estimates for the models with and without unobserved heterogeneity are presented in Appendix 5C. The multinomial logit model is only identified by choosing one of the possible outcomes as the base category, and setting the corresponding coefficients to zero. Hence, only three sets of coefficients are reported. The base outcome is full-time employment.

[16] For the random effects models, the average marginal effects are calculated using the "method of recycled predictions" (StataCorp, 1995). For dummy variables, the average marginal effect is mean of the difference between the predicted probability of being in a particular labour force state when the value of the variable is set to 0 for all individuals in the sample, and the predicted probability of being in a particular labour force state when the value of the variable is set to 1 for all individuals in the sample, and all other explanatory variables are held constant. For continuous variables, the average marginal effect is the average of the change in the predicted probability of being in a particular labour force state when the value of the variable is increased by one unit, and all other explanatory variables are held constant. Because the marginal effects are calculated manually for the random effects model, it is not possible to estimate confidence intervals for the average marginal effects. Because these models take several days to run, it is not feasible to derive bootstrap confidence intervals. However, the marginal effects can be simply thought of as a different representation of the underlying coefficient estimates. Hence, for statistical significance of included variables, one can refer to standard errors of the raw coefficient estimates in Tables A.6 and A.8.

[17] The coefficients on the one-period lagged labour force states are positively signed and large in magnitude, indicating that labour market choices of mature age men involve a considerable amount of state dependence. Furthermore, the log-likelihood indicates that the model which accounts for unobserved heterogeneity outperforms the simpler model.

employment in the previous year; and the likelihood of being out of the labour force is 52 percentage points higher for men who were already out of the labour force one year earlier. When unobserved heterogeneity is controlled for, these figures drop to 17 and 28 percentage points respectively. This indicates that a reasonable proportion of observed state dependence is in fact true state dependence, but persistence in labour force states due to unobserved individual characteristics is also an important factor.

The results in Table 8 confirm that, for men, part-time employment is likely to be part of a gradual transition to retirement. Compared to men who were employed full-time in the previous year, the likelihood of having left the labour force one year later is 6 percentage points higher for men who had been working part-time. There is also some evidence that once a man has either moved into a job involving part-time employment or left the labour force completely, returning to full-time employment is very unlikely. The probability of being in part-time work, which is presumably part of a gradual transition to retirement, increases substantially with age. Men with a degree qualification are more likely to be working part-time than those who had not completed high school, and those with responsibility as a carer for a spouse or other relative are also more likely to be in part-time employment. The likelihood of being in part-time employment also increases, by a small amount, with other household income and partner's superannuation. Presumably, the more income and superannuation the wife is able to contribute to the household, the less the husband needs to contribute, and this reduces the necessity for the husband to work full-time. Compared to men who do not have a spouse or partner, those whose partner is not employed are less likely to be in part-time employment and more likely to be out of the labour force, possibly due to the fact that many couples have a preference for joint leisure time in retirement.

As one would expect, the likelihood of a man being in full-time employment decreases with age and the likelihood of non-participation increases with age. Having a work-limiting health condition or disability reduces the likelihood of being in full-time employment by almost 10 percentage points and increases the likelihood of being out of the labour force by approximately the same amount. While the results using Approach 1 suggest that caring responsibilities have no significant impact on patterns of labour force transitions for mature age men, the results from the dynamic multinomial logit model indicate that men who have responsibility as a carer for a spouse or other relative are less likely to be in full-time employment and more likely to be out of the labour force. Conversely, men with children still living at home are more likely to be in full-time employment and less likely to be out of the labour force, presumably due to the extra income needed to support a larger household.

Table 8: Multinomial Logit Estimates of Labour Force Status, Men Aged 50 to 70 (Mean Marginal Effects)

	Without Unobserved Heterogeneity				*With Unobserved Heterogeneity*			
	FT	*PT*	*UNE*	*NLF*	*FT*	*PT*	*UNE*	*NLF*
Age (Control = 50-54)								
Age 55-59	-0.042***	0.011	-0.005	0.035***	-0.054	0.017	-0.006	0.043
	[0.008]	[0.008]	[0.004]	[0.009]				
Age 60-64	-0.081***	0.021**	-0.011**	0.071***	-0.119	0.034	-0.015	0.100
	[0.010]	[0.010]	[0.005]	[0.010]				
Age 65-70	-0.128***	0.028**	-0.025***	0.125***	-0.207	0.048	-0.028	0.187
	[0.014]	[0.012]	[0.005]	[0.013]				
Partner's Employment Status (Control = No Partner)								
Partner Employed	0.062***	-0.012	-0.003	-0.047***	0.063	0.015	-0.015	-0.063
Full-time	[0.011]	[0.011]	[0.006]	[0.011]				
Partner Employed	0.041***	0.018	-0.013***	-0.046***	0.094	-0.023	-0.005	-0.066
Part-time	[0.010]	[0.011]	[0.004]	[0.011]				
Partner	-0.010	-0.017*	-0.001	0.029***	-0.010	-0.028	-0.003	0.042
not Employed	[0.010]	[0.009]	[0.005]	[0.009]				
Long-term Health	-0.070***	0.009	0.003	0.058***	-0.096	0.008	0.006	0.082
Condition	[0.008]	[0.007]	[0.003]	[0.007]				
Experience	0.001	0.001	-0.0001	-0.002***	0.003	0.001	-0.0001	-0.003
	[0.001]	[0.001]	[0.000]	[0.001]				
Occupational Status	0.001	0.001	0.001	0.001	0.0001	-0.0003	-0.0001	0.0002
	[0.000]	[0.000]	[0.000]	[0.000]				
Highest Level of Education (Control = Year 11 or Below)								
Degree	-0.005	0.037***	0.005	-0.037***	-0.014	0.059	0.006	-0.060
	[0.01]	[0.011]	[0.005]	[0.01]				
Certificate	0.005	-0.005	0.006*	-0.005	0.006	-0.008	0.006	-0.008
	[0.007]	[0.007]	[0.003]	[0.007]				
Year 12	-0.020*	0.024*	0.002	-0.006	-0.031	0.032	0.005	-0.008
	[0.011]	[0.013]	[0.005]	[0.012]				
Carer	-0.038*	0.033*	-0.029**	0.034**	-0.054	0.022	-0.017	0.046
	[0.020]	[0.019]	[0.013]	[0.016]				
Resident Children	0.029***	-0.005	-0.001	-0.023***	0.038	-0.009	-0.0001	-0.032
	[0.007]	[0.008]	[0.003]	[0.007]				
Other Household Income	-0.0003***	0.0002***	0.0001	0.0001**	-0.0004	0.0002	0.0001	0.0002
	[0.000]	[0.000]	[0.000]	[0.000]				
Own Superannuation	-0.004***	0.0001	-0.001	0.005***	-0.006	0.0003	-0.001	0.007
	[0.001]	[0.001]	[0.001]	[0.001]				
Partners Superannuation	-0.005**	0.006***	-0.001	-0.0004	-0.007	0.008	-0.001	-0.001
	[0.002]	[0.002]	[0.001]	[0.002]				
Home Equity	0.001	0.001	-0.0003	-0.001	0.0003	0.001	-0.0003	-0.001
	[0.001]	[0.001]	[0.001]	[0.001]				
Other Household Wealth	0.001*	0.0002	-0.0002	-0.001*	0.0006	0.0004	-0.0001	-0.001
	[0.000]	[0.000]	[0.001]	[0.000]				
Own Home Outright	-0.027***	0.005	-0.002	0.024***	-0.034	0.006	-0.002	0.030
	[0.007]	[0.007]	[0.003]	[0.007]				
Country of Birth (Control = Australian Born)								
MESB	0.001	-0.009	0.001	0.007	-0.001	-0.009	0.002	0.008
	[0.008]	[0.008]	[0.004]	[0.008]				
NESB	-0.016*	-0.008	0.010**	0.014	-0.019	-0.009	0.012	0.016
	[0.009]	[0.009]	[0.005]	[0.009]				
Major City	0.009	-0.004	0.0003	-0.006	0.013	-0.007	0.001	-0.007
	[0.006]	[0.006]	[0.003]	[0.006]				
Labour Force Status in the Previous Year (Control = Employed Full-time)								
Prev. PT	-0.475***	0.430***	-0.004	0.048**	-0.228	0.172	-0.008	0.064
	[0.028]	[0.024]	[0.005]	[0.023]				
Prev. UNE	-0.392***	0.078***	0.104***	0.211***	-0.203	0.031	0.047	0.142
	[0.041]	[0.028]	[0.024]	[0.038]				
Prev. NLF	-0.549***	0.016	0.011	0.522***	-0.317	0.023	0.014	0.281
	[0.038]	[0.016]	[0.008]	[0.037]				
Labour Force Status in 2000 (Control = Employed Full-time)								
2000. PT	-0.076***	0.091***	0.011*	-0.026**	-0.191	0.225	0.016	-0.049
	[0.014]	[0.013]	[0.006]	[0.011]				
2000. UNE	-0.122***	0.085***	0.044***	-0.008	-0.236	0.153	0.078	0.005
	[0.031]	[0.026]	[0.015]	[0.018]				
2000. NLF	-0.065***	0.009	0.002	0.054***	-0.172	-0.010	-0.003	0.160
	[0.019]	[0.017]	[0.005]	[0.014]				

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. Standard Errors in brackets.

For mature age men, the likelihood of being out of the labour force is higher, and the likelihood of being in full-time employment is lower, if their home is owned outright. However, the value of home equity appears to have no significant effect on labour force state. That is, it is the fact that the home is completely paid for and there is no longer a mortgage to pay, rather than the amount of equity in the home, that influences men's retirement decisions. Other types of wealth do have a small but significant effect on men's labour market outcomes. For example, a $100,000 increase in their own superannuation balance increases the likelihood of being out of the labour force by less than 1 percentage point, and reduces the likelihood of full-time employment by a similar amount. The value of one's partner's superannuation also reduces the likelihood of full-time employment by a small amount.

There is also further evidence to suggest that many couples prefer to retire at around the same time. Compared to men with no spouse or partner, those with a partner who is working full-time are more likely to be in full-time employment and less likely to be out of the labour force; those with a partner who works part-time are also more likely to be in full-time employment and less likely to be unemployed or out of the labour force; and those whose partner is not employed are more likely to be out of the labour force.

For women, being in part-time employment is not necessarily part of a gradual transition to retirement, and is commonly a decision made earlier in life in order to achieve a satisfactory work-family balance. Compared to women who were in full-time employment in the previous year, the likelihood of being out of the labour force is not significantly different for women who were in part-time employment one year earlier; and age has no significant effect on the likelihood of being in part-time work. However, the results concerning the likelihood of a return to full-time employment after moving to part-time work or non-participation are similar to those for men — compared to women who were in full-time employment in the previous year, the probability of working full-time is approximately 20 percentage points lower among women who were either working part time or out of the labour force.

For mature age women, as was the case for men, the likelihood of being in full-time employment decreases with age, and the probability of non-participation increases with age. The effect of poor health on the labour force outcomes of mature age women is also similar to that for men. That is, women with a work-limiting health condition or disability are less likely to be in full-time employment and more likely to be out of the labour force.

Table 9: Multinomial Logit Estimates of Labour Force Status, Women 50-70 (Mean Marginal Effects)

	Without Unobserved Heterogeneity				*With Unobserved Heterogeneity*			
	FT	*PT*	*UNE*	*NLF*	*FT*	*PT*	*UNE*	*NLF*
Age (Control = 50-54)								
Age 55-59	-0.015***	-0.007	-0.008**	0.030***	-0.024	-0.007	-0.008	0.040
	[0.005]	[0.007]	[0.003]	[0.007]				
Age 60-64	-0.049***	-0.008	-0.012**	0.068***	-0.084	-0.007	-0.012	0.103
	[0.008]	[0.01]	[0.004]	[0.009]				
Age 65-70	-0.067***	-0.016	-0.017**	0.100***	-0.124	-0.020	-0.018	0.162
	[0.012]	[0.012]	[0.004]	[0.012]				
Partner's Employment Status (Control = No Partner)								
Partner Employed	-0.008	0.041***	-0.002	-0.031***	-0.007	0.068	-0.0002	-0.061
Full-time	[0.007]	[0.010]	[0.004]	[0.009]				
Partner Employed	-0.025**	0.045**	-0.007*	-0.013	-0.043	0.076	-0.006	-0.027
Part-time	[0.01]	[0.013]	[0.004]	[0.012]				
Partner	-0.040***	-0.011	-0.005	0.056***	-0.059	-0.016	-0.003	0.078
not employed	[0.008]	[0.009]	[0.003]	[0.009]				
Long-term Health	-0.028***	-0.019**	0.001	0.046***	-0.041	-0.027	0.002	0.066
Condition	[0.007]	[0.008]	[0.002]	[0.006]				
Experience	0.001***	0.0003**	0.0001	-0.001***	0.001	0.0003	0.0001	-0.002
	[0.000]	[0.000]	[0.000]	[0.000]				
Occupational Status	0.0003**	0.0001	0.0001	-0.0003**	0.0003	0.0001	0.0001	-0.0003
	[0.000]	[0.000]	[0.000]	[0.000]				
Highest Level of Education (Control = Year 11 or Below)								
Degree	0.007	-0.003	0.013***	-0.016*	0.024	0.003	0.015	-0.043
	[0.008]	[0.010]	[0.005]	[0.010]				
Certificate	0.004	0.001	0.004	-0.009	0.013	0.006	0.005	-0.023
	[0.007]	[0.008]	[0.003]	[0.007]				
Year 12	0.017	-0.0002	0.002	-0.018	0.030	-0.001	0.002	-0.031
	[0.011]	[0.013]	[0.004]	[0.011]				
Carer	-0.018	0.016	0.0006	0.001	-0.027	0.013	0.001	0.013
	[0.013]	[0.013]	[0.005]	[0.011]				
Resident Children	0.013**	0.009	-0.001	-0.021***	0.016	0.018	-0.001	-0.033
	[0.006]	[0.008]	[0.003]	[0.007]				
Other Household Income	0.0001	-0.0001	0.0001	0.0001*	0.0001	-0.0001	0.0001	0.0001
	[0.000]	[0.000]	[0.000]	[0.000]				
Own Superannuation	-0.001	-0.001	-0.003*	0.005***	-0.002	-0.002	-0.003	0.006
	[0.001]	[0.001]	[0.002]	[0.001]				
Partners Superannuation	-0.002*	0.001	-0.002	0.003**	-0.003	0.002	-0.002	0.003
	[0.001]	[0.002]	[0.001]	[0.002]				
Home Equity	0.001	0.001	-0.001	-0.001*	0.001	0.001	-0.001	-0.001
	[0.001]	[0.001]	[0.000]	[0.001]				
Other Household Wealth	0.0004**	0.0003	-0.001**	0.0002	0.0004	0.0003	-0.001	0.0002
	[0.000]	[0.000]	[0.000]	[0.000]				
Own Home Outright	-0.020***	-0.003	0.002	0.022***	-0.027	-0.006	0.003	0.031
	[0.005]	[0.007]	[0.003]	[0.006]				
Country of Birth (Control = Australian Born)								
MESB	-0.013*	0.004	0.001	0.009	-0.023	0.009	0.001	0.013
	[0.008]	[0.01]	[0.003]	[0.009]				
NESB	-0.001	-0.009	0.002	0.008	0.002	-0.018	0.002	0.014
	[0.009]	[0.01]	[0.003]	[0.009]				
Major City	-0.002	-0.001	-0.003	0.006	-0.003	-0.004	-0.002	0.009
	[0.005]	[0.007]	[0.002]	[0.006]				
Labour Force Status in the Previous Year (Control = Employed Full-time)								
Prev. PT	-0.425***	0.435***	-0.0004	-0.009	-0.186	0.210	-0.006	-0.018
	[0.022]	[0.019]	[0.004]	[0.02]				
Prev. UNE	-0.403***	0.053	0.087***	0.262***	-0.163	0.006	0.033	0.124
	[0.035]	[0.038]	[0.022]	[0.042]				
Prev. NLF	-0.466***	-0.055***	0.004	0.517***	-0.205	-0.018	0.002	0.222
	[0.025]	[0.017]	[0.006]	[0.026]				
Labour Force Status in 2000 (Control = Employed Full-time)								
2000. PT	-0.063***	0.073***	-0.002	-0.008	-0.178	0.170	0.002	0.006
	[0.009]	[0.011]	[0.004]	[0.009]				
2000. UNE	-0.054***	0.016	0.015*	0.023	-0.181	0.037	0.035	0.110
	[0.021]	[0.023]	[0.008]	[0.018]				
2000. NLF	-0.096***	0.008	0.001	0.087***	-0.243	-0.018	0.003	0.258
	[0.015]	[0.015]	[0.005]	[0.013]				

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. Standard Errors in brackets.

As was the case for men, labour market experience has a small but significant effect on women's labour force participation, reducing the likelihood of non-participation by approximately 0.1 percentage points for every 1% increase in the proportion of time spent in employment since leaving full-time education. For women, occupational status is also significant, increasing the likelihood of being in full-time employment and reducing the likelihood of non-participation. However, education levels appear to have very little impact on the labour force status of mature age women. The only significant result in terms of education is that, compared to those who did not complete Year 12, women with a degree qualification are more likely to be unemployed and less likely to be out of the labour force. One possible explanation for this result is that women with a degree qualification are likely to have a higher earning capacity than those who did not complete high school, and therefore may persist in searching for a new job if they become unemployed, while those with lower levels of human capital may be more likely to leave the labour force in the event that they become unemployed.

For mature age women, the presence of resident children increases the likelihood of being in full-time employment by approximately 1 percentage point and reduces the likelihood of non-participation by approximately 2 percentage points. This is a similar result to that for men, but the marginal effect is smaller in magnitude. Presumably some mature age women also remain in full-time employment because of the extra income needed to support children still living at home.

Partner's employment status also has a significant effect on the labour force status of mature age women. However, the results are somewhat different to those for men. Compared to single women, women with a spouse or partner in full-time employment are more likely to work part-time and less likely to be out of the labour force; while women with a partner who works part-time are less likely to work full-time and more likely to work part-time, and those whose partner is not employed are less likely to be in full-time employment and more likely to be out of the labour force. These results suggest that for women, a preference for joint leisure with their partner affects not only the decision to continue in employment or leave the labour force, but also the number of hours they choose to work.

The income of other household members appears to have no significant impact on labour force decisions of mature age women in Australia. Furthermore, the effects of household wealth, while significant, are very small in magnitude. For example, a $100,000 increase in their own superannuation is predicted to increase the likelihood of non-participation by approximately 0.5 percentage points.

The results of the models estimated for men and women indicate the existence of both true state dependence and spurious state dependence. However, it is important to know precisely how much of this state dependence is true state dependence. Table 10 compares the predicted probability of

transitions between each of the labour force states for the models with and without unobserved heterogeneity.

Table 10: Predicted Probability of Transitions Between Labour Force States (%)

	Multinomial Logit without Random Effects				*Multinomial Logit with Random Effects*			
	FT	PT	UNE	NLF	FT	PT	UNE	NLF
Men								
Actual data	44.49	12.98	1.93	40.60	44.49	12.98	1.93	40.6
Predicted Probability	46.55	13.31	1.89	38.24	46.49	12.66	1.98	38.87
Predicted Probability of Transition								
From FT	68.86	8.64	1.83	20.67	57.81	10.99	2.06	29.13
From PT	21.40	51.65	1.46	25.49	35.01	28.16	1.29	35.54
From UNE	29.67	16.41	12.19	41.72	35.79	14.11	6.76	43.33
From NLF	13.97	10.24	2.96	72.83	26.08	13.29	3.41	57.21
Women								
Actual data	21.70	21.48	1.23	55.58	21.70	21.48	1.23	55.58
Predicted Probability	22.91	22.46	1.22	53.41	22.28	22.23	1.28	54.21
Predicted Probability of Transition								
From FT	51.32	15.85	1.26	31.58	33.38	18.72	1.61	46.29
From PT	8.80	59.34	1.22	30.64	14.79	39.75	0.99	44.47
From UNE	11.02	21.18	9.99	57.81	17.07	19.31	4.94	58.68
From NLF	4.71	10.35	1.66	83.27	12.87	16.9	1.8	68.43

Both models slightly over-predict the proportion of men in full-time employment and under-predict the proportion that are out of the labour force, but overall, they predict the actual averages reasonably well. Looking at the predicted probabilities conditional on labour force status in the previous year, it is clear that the probability of being in any of the four labour market states is substantially higher if the individual was in that state in the previous year. However, when unobserved heterogeneity is not controlled for, transitions between labour force states are under-predicted. For example, in the model where unobserved heterogeneity is not accounted for, the predicted probability of a transition from full-time to part-time employment is for women is 16%. In the model which controls for unobserved heterogeneity, the corresponding predicted probability is 19%.

The transition probabilities in Table 10 can be used to decompose the estimated state dependence into true and spurious state dependence, following the approach used by Hansen et al. (2006). The probability that a man will remain in the full-time employment in two consecutive years decreases from 69% when unobserved heterogeneity is not controlled for, to 58% when unobserved heterogeneity is accounted for in the model. This result implies that 84% (58/69) of persistence in full-time employment is due to true state dependence, and the remaining 16% is due to unobserved heterogeneity. There is also a very high degree of true state dependence among men who have left the labour force, with 79% of persistence in this state being attributed to true state dependence. Compared to full-time employment and non-participation, unobserved heterogeneity accounts for a larger

proportion of persistence in part-time employment, with 55% of persistence in this state due to true state dependence.

True state dependence accounts for a very large proportion (82%) of persistence in non-participation among mature age women. Compared to mature age men, the degree of true state dependence in full-time employment is smaller, but still considerable, with 65% of persistence in this state attributable to true state dependence. However, the degree of true state dependence in part-time employment is higher for women than for men, accounting for 67% of persistence in part-time employment.

5. Conclusion

During the period from 2000 to 2008, many older Australians claimed that they were in transition to retirement, or intended to make a gradual transition in the future. However, the behavioural evidence indicates that while many individuals are in principle in favour of a gradual retirement transition, rather few clearly changed from full-time work to part-time work before finally exiting the labour force. One possible explanation for the apparent lack of responsiveness to incentives such as transition to retirement pensions is a lack of awareness of the financial benefits available to older people who continue to do at least some paid work. Perhaps Government agencies could work more effectively with financial planners, accountants, and others who give financial advice, with the aim of persuading these intermediaries to convince their clients of the financial benefits of delaying retirement.

Both estimation approaches confirm the well-established findings that age, health and human capital are important determinants of retirement behaviour and provide new evidence about the different effects of specific components of household wealth on how the transition to retirement is made. While superannuation, home equity and other household wealth have very little impact on the labour force participation decisions of mature age women, for mature age men, their own superannuation balance and also the superannuation balance of their partner were important factors in their decisions about labour force participation. For couples, a preference for spending leisure time together results in a significant increase in the likelihood of having a similar transition pattern to that of their spouse. For women, but not for men, a preference for joint leisure with their partner affects not only the decision to continue in employment or retire, but also the number of hours they choose to work.

Controlling for unobserved heterogeneity in the dynamic multinomial models confirms the existence of both true state dependence in the labour force states of mature age men and women. The existence of true state dependence in labour market states has significant policy implications. First, it implies that policy changes away from the status quo are likely to have more modest effects than the Government might hope. It also implies that when a Government wants to increase mature age labour force participation, it should mainly concentrate on discouraging individuals from leaving the labour force in the first place. Attempts to attract people back into the labour force once they have retired are unlikely to succeed.

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APPENDIX

Table A.1: Variables Included in Multinomial Logit Analyses, Method 1

		Men		*Women*	
		Mean	S.E.		S.E.
Age in 2000 (Control = 45-49)					
Age50-54	Age 50 to 54 in 2000	0.282	0.013	0.286	0.012
Age55-59	Age 55 to 59 in 2000	0.244	0.012	0.228	0.011
Age60-64	Age 60 to 64 in 2000	0.189	0.011	0.187	0.010
Highest level of Education (Control = Year 11 or below)					
Degree	Bachelor, honours or postgraduate degree	0.208	0.012	0.179	0.010
Certificate	Trade certificate or diploma	0.401	0.014	0.216	0.011
Year 12	Year 12	0.085	0.008	0.083	0.007
Occstat	Occupational Status (0 to 100 scale)	47.726	0.684	46.290	0.649
Experience	Percentage of years in paid work since leaving full-	92.115	0.368	66.139	0.729
Wlhealth	Has a work-limiting health condition or disability	0.246	0.012	0.216	0.011
Healthwrs	No long-term health condition or disability in 2001,	0.159	0.010	0.215	0.011
Resident Children (Control = No Resident Children in 2001)					
Kidsstill	Resident children in 2001 and 2008	0.208	0.012	0.187	0.010
Kidsleft	Children left home since 2001	0.174	0.011	0.170	0.010
Kidsback	Children returned home since 2001	0.022	0.004	0.024	0.004
Country of Birth (Control = Australian Born)					
MESB	Born in a mainly English speaking country	0.152	0.010	0.131	0.009
NESB	Born in a non-English speaking country	0.143	0.010	0.135	0.009
Carer	Has responsibility as a carer for spouse or other	0.029	0.005	0.054	0.006
Carernow	Became a carer for spouse or other family member	0.024	0.004	0.051	0.006
Partner's Employment Pattern (Control = No Partner in 2001)					
PrtFT	Continuous Full-time employment	0.090	0.008	0.141	0.009
PrtNLF	Continuous non-participation	0.188	0.011	0.150	0.010
PrtTRAD	Traditional full-time to NLF (FN)	0.032	0.005	0.071	0.007
PrtGRAD	Gradual transition (FP pr FPN)	0.039	0.006	0.034	0.005
PrtRET	Returned to work after a period of non-participation	0.101	0.009	0.070	0.007
PrtOTH	Other patterns of labour force participation	0.176	0.011	0.124	0.009
PrtPPN	Continuous part-time employment or transition	0.115	0.009	0.030	0.005
PrtUNK	Labour force participation patter not able to be	0.091	0.008	0.076	0.007
Sepdiv	Separated, divorced or widowed after 2001	0.047	0.006	0.071	0.007
Components of Household Wealth					
Individual Super	Own superannuation balance in 2002	1.280	0.057	0.557	0.035
Partner's Super	Value of partners superannuation in 2002 (0 if not	0.385	0.025	0.841	0.045
Home Equity	Value of home in 2002, less mortgage outstanding	2.342	0.072	2.449	0.074
Other Wealth	Total household wealth in 2002, excluding	2.969	0.186	2.714	0.172
Home Ownership Status					
Own Home	Owns home outright	0.579	0.014	0.619	0.013
Mortgage Paid	Paid off mortgage since 2001	0.134	0.010	0.103	0.008
Major City	Living in a major city	0.568	0.014	0.587	0.013
N		1242		1402	

Table A.2: Variables Included in the Dynamic Multinomial Logit Analysis

		Men		*Women*	
		Mean	S.E.	Mean	S.E.
Age (Control = 50-54)					
Age55-59	Age 55 to 59	0.282	0.005	0.278	0.004
Age60-64	Age 60 to 64	0.237	0.004	0.232	0.004
Age65-70	Age 65 to 70	0.224	0.004	0.229	0.004
Health	Work-limiting health condition or disability	0.277	0.005	0.262	0.004
Experience	Percentage of years in paid work since leaving full-	90.343	0.135	64.045	0.262
Occstat	Occupational Status (0 to 100 scale)	47.196	0.245	45.915	0.228
Highest level of Education (Control = Year 11 or below)					
Degree	Bachelor, honours or postgraduate degree	0.207	0.004	0.176	0.004
Certificate	Trade certificate or diploma	0.408	0.005	0.229	0.004
Year12	Year 12	0.078	0.003	0.077	0.003
Reskids	Has children still living at home	0.272	0.005	0.236	0.004
Carer	Has responsibility as a carer	0.027	0.002	0.064	0.002
Country of Birth (Control = Australian Born)					
MESB	Born in a mainly English speaking country	0.160	0.004	0.138	0.003
NESB	Born in a non-English speaking country	0.141	0.004	0.133	0.003
Partner's Employment status (Control = no partner)					
PrtFt	Partner employed full-time	0.194	0.004	0.259	0.004
PrtPT	Partner employed part-time	0.213	0.004	0.082	0.003
PrtNEMP	Partner not employed	0.392	0.005	0.352	0.005
Otherinc	Income of other household members in last financial year	28.509	0.384	37.957	0.566
Super	Own superannuation balance in 2002	1.666	0.028	0.839	0.019
Prtsuper	Value of partners superannuation (0 if not partnered)	0.492	0.012	0.926	0.019
Homeeq	Value of home, less mortgage outstanding	3.064	0.036	3.120	0.035
Othwealth	Total household wealth excluding superannuation and home equity	4.084	0.107	3.650	0.098
Own home	Owns home outright	0.627	0.005	0.662	0.005
Major city	Living in a major city	0.552	0.005	0.578	0.005
Labour Force Status in Previous year (Control = full-time employment)					
Prev.PT	Employed part-time in previous year	0.130	0.003	0.231	0.004
Prev.UNE	Unemployed in previous year	0.021	0.001	0.014	0.001
Prev.NLF	Not in the labour force in previous year	0.356	0.005	0.512	0.005
Labour Force Status in 2000 (Control = full-time employment)					
2000.PT	Employed part-time in 2000	0.106	0.003	0.251	0.004
2000.UNE	Unemployed in 2000	0.033	0.002	0.026	0.002
2000.NLF	Not in the labour force in 2000	0.275	0.005	0.439	0.005
N		9712		10908	

Table A.3: Multinomial Logit Estimates of Labour Force Status, without Lagged Dependent Variable and Labour Force Status in 2000 (without Random Effects), Men Aged 50 to 70

	Part-time		*Unemployed*		*NLF*	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Age 55-59	0.686***	[0.126]	0.656***	[0.232]	1.329***	[0.179]
Age 60-64	1.494***	[0.165]	0.856***	[0.299]	2.431***	[0.200]
Age 65-70	2.167***	[0.206]	-0.034	[0.643]	3.706***	[0.219]
Partner Employed Part-time	-0.986***	[0.218]	-1.291***	[0.440]	-1.569***	[0.240]
Partner Employed Full-time	-0.466**	[0.199]	-1.909***	[0.396]	-1.348***	[0.209]
Partner not Employed	-0.212	[0.192]	-0.108	[0.295]	0.401**	[0.182]
Long-term Health Condition	1.015***	[0.144]	1.085***	[0.229]	1.882***	[0.142]
Experience	-0.066***	[0.014]	-0.118***	[0.016]	-0.162***	[0.017]
Occupational Status	-0.009***	[0.003]	-0.007	[0.007]	-0.004	[0.003]
Degree	0.458**	[0.226]	-0.002	[0.495]	-0.954***	[0.244]
Certificate	-0.116	[0.169]	0.380	[0.325]	-0.072	[0.160]
Year 12	0.587**	[0.288]	0.315	[0.428]	0.228	[0.251]
Carer	0.924**	[0.389]	-1.335	[0.989]	1.044***	[0.352]
Resident Children	-0.251	[0.160]	-0.467*	[0.263]	-0.680***	[0.169]
Other Household Income	0.005***	[0.002]	0.007***	[0.003]	0.004**	[0.002]
Own Superannuation Balance	0.042	[0.032]	-0.064	[0.099]	0.120***	[0.027]
Partners Superannuation	0.108**	[0.051]	-0.046	[0.104]	0.053	[0.050]
Home Equity	-0.005	[0.018]	-0.073	[0.051]	-0.020	[0.020]
Other Household Wealth	-0.008	[0.005]	-0.058	[0.082]	-0.026***	[0.006]
Own Home Outright	0.412***	[0.136]	0.218	[0.249]	0.873***	[0.156]
MESB	-0.152	[0.199]	0.017	[0.321]	0.019	[0.179]
NESB	-0.058	[0.224]	0.644**	[0.316]	0.154	[0.210]
Major City	-0.072	[0.144]	-0.171	[0.235]	-0.218	[0.141]
Constant	4.33***	[1.346]	8.208***	[1.571]	12.532***	[1.587]
Log pseudolikelihood = -6385.2683	Pseudo R2	= 0.3861				

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. Standard Errors in brackets.

Table A.4: Multinomial Logit Estimates of Labour Force Status, without Lagged Dependent Variable and Labour Force Status in 2000 (without Random Effects), Women Aged 50 to 70

	Part-time		*Unemployed*		*NLF*	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Age 55-59	0.101***	[0.096]	-0.333***	[0.245]	0.491***	[0.112]
Age 60-64	0.766***	[0.158]	0.078	[0.357]	1.833***	[0.166]
Age 65-70	1.530	[0.245]	0.038	[0.524]	3.393	[0.245]
Partner Employed Part-time	0.364**	[0.165]	-0.55***	[0.375]	-0.574***	[0.194]
Partner Employed Full-time	0.646	[0.212]	-0.357	[0.556]	-0.072**	[0.239]
Partner not Employed	0.630	[0.185]	0.436	[0.365]	1.326	[0.183]
Long-term Health Condition	0.576***	[0.137]	1.151***	[0.273]	1.642***	[0.146]
Experience	-0.019***	[0.004]	-0.036	[0.005]	-0.055	[0.004]
Occupational Status	-0.013**	[0.003]	-0.019	[0.006]	-0.020***	[0.003]
Degree	0.057	[0.193]	1.092	[0.361]	-0.244	[0.220]
Certificate	-0.145**	[0.161]	0.243	[0.314]	-0.286	[0.181]
Year 12	-0.289	[0.245]	0.121	[0.444]	-0.340	[0.259]
Carer	0.817	[0.264]	0.370	[0.576]	0.770	[0.287]
Resident Children	0.021***	[0.136]	-0.456***	[0.298]	-0.570**	[0.158]
Other Household Income	0.002	[0.001]	0.003	[0.003]	0.003	[0.001]
Own Superannuation Balance	-0.039**	[0.029]	-0.313	[0.161]	0.051	[0.034]
Partners Superannuation	0.072	[0.031]	-0.099	[0.105]	0.133	[0.037]
Home Equity	-0.007	[0.016]	-0.102	[0.058]	-0.041***	[0.023]
Other Household Wealth	-0.004	[0.005]	-0.115	[0.046]	-0.019	[0.008]
Own Home Outright	0.443	[0.123]	0.403*	[0.275]	0.561***	[0.140]
MESB	0.290	[0.190]	0.352**	[0.346]	0.650	[0.210]
NESB	0.063	[0.224]	0.618	[0.374]	0.553	[0.232]
Major City	-0.090	[0.133]	-0.398	[0.256]	0.069	[0.149]
Constant	1.196	[0.352]	0.954	[0.667]	3.581***	[0.353]
Log pseudolikelihood = -8034.9139	Pseudo R2	= 0.3085				

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. Standard Errors in brackets.

Table A.5: Multinomial Logit Estimates of Labour Force Status (Coefficients), Dynamic MNL without Random Effects, Men Aged 50 to 70

	Part-time		*Unemployed*		*NLF*	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Age (Control = 50-54)						
Age 55-59	0.501***	[0.125]	0.316	[0.200]	0.810***	[0.149]
Age 60-64	0.937***	[0.146]	0.390	[0.247]	1.532***	[0.166]
Age 65-70	1.358***	[0.172]	-0.516	[0.559]	2.350***	[0.179]
Partner's Employment Status (Control = No Partner)						
Partner Employed Part-time	-0.243	[0.162]	-1.419***	[0.350]	-0.978***	[0.181]
Partner Employed Full-time	-0.721***	[0.177]	-0.849**	[0.332]	-1.192***	[0.192]
Partner not Employed	-0.076	[0.158]	0.068	[0.259]	0.382***	[0.163]
Long-term Health Condition	0.812**	[0.130]	1.011***	[0.222]	1.480***	[0.142]
Experience	-0.010***	[0.013]	-0.023	[0.016]	-0.038***	[0.017]
Occupational Status	-0.001	[0.003]	0.001	[0.005]	0.001	[0.003]
Highest Level of Education (Control = Year 11 or Below)						
Degree	0.356**	[0.174]	0.212	[0.369]	-0.407**	[0.188]
Certificate	-0.116	[0.128]	0.315	[0.249]	-0.106	[0.133]
Year 12	0.414**	[0.192]	0.261	[0.364]	0.127	[0.203]
Carer	0.759**	[0.336]	-1.414	[0.881]	0.769**	[0.332]
Resident Children	-0.357***	[0.128]	-0.424*	[0.228]	-0.609***	[0.138]
Other Household Income	0.005***	[0.001]	0.004*	[0.002]	0.005***	[0.001]
Own Superannuation Balance	0.040*	[0.022]	-0.014	[0.076]	0.097***	[0.022]
Partners Superannuation	0.102***	[0.031]	-0.007	[0.074]	0.040	[0.043]
Home Equity	-0.001	[0.013]	-0.029	[0.042]	-0.022	[0.018]
Other Household Wealth	-0.004	[0.003]	-0.021	[0.048]	-0.015***	[0.005]
Own Home Outright	0.332***	[0.116]	0.188	[0.215]	0.575***	[0.131]
Country of Birth (Control = Australian Born)						
MESB	-0.093	[0.137]	0.090	[0.298]	0.079	[0.153]
NESB	0.065	[0.158]	0.738***	[0.243]	0.346**	[0.171]
Major City	-0.129	[0.110]	-0.080	[0.200]	-0.169	[0.119]
Labour Force Status in Previous Year (Control = Full-time Employment)						
Prev. PT	3.565***	[0.151]	1.491***	[0.295]	2.322***	[0.159]
Prev. UNE	2.048***	[0.280]	3.449***	[0.345]	2.740***	[0.269]
Prev. NLF	2.646***	[0.226]	3.075***	[0.323]	4.865***	[0.224]
Labour Force Status in 2000 (Control = Full-time Employment)						
2000. PT	1.222***	[0.150]	0.975***	[0.288]	0.366**	[0.175]
2000. UNE	1.473**	[0.318]	2.204***	[0.401]	0.944***	[0.330]
2000. NLF	0.618**	[0.262]	0.703**	[0.330]	1.078***	[0.217]
Constant	-2.615**	[1.272]	-2.465	[1.514]	-0.508	[1.651]
Log pseudolikelihood = -4060.2714	Pseudo R2	= 0.6082				

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. Standard Errors in brackets.

Table A.6: Multinomial Logit Estimates of Labour Force Status, Dynamic MNL with Random Effects, Men Aged 50 to 70

	Part-time		*Unemployed*		*NLF*	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Age (Control = 50-54)						
Age 55-59	0.643***	[0.155]	0.361	[0.239]	0.963***	[0.184]
Age 60-64	1.328***	[0.192]	0.583*	[0.300]	2.080***	[0.223]
Age 65-70	2.122***	[0.273]	-0.009	[0.526]	3.466***	[0.304]
Partner's Employment Status (Control = No Partner)						
Partner Employed Part-time	-0.446**	[0.215]	-1.633***	[0.379]	-1.332***	[0.241]
Partner Employed Full-time	-1.110***	[0.237]	-1.205***	[0.366]	-1.658***	[0.266]
Partner not Employed	-0.201	[0.204]	-0.003	[0.283]	0.493**	[0.206]
Long-term Health Condition	0.936***	[0.154]	1.253	[0.232]	1.743***	[0.155]
Experience	-0.018*	[0.010]	-0.036	[0.012]	-0.066***	[0.010]
Occupational Status	-0.004	[0.003]	-0.001	[0.006]	0.001	[0.004]
Highest Level of Education (Control = Year 11 or Below)						
Degree	0.730***	[0.252]	0.336	[0.393]	-0.586**	[0.274]
Certificate	-0.114	[0.187]	0.323	[0.271]	-0.143	[0.188]
Year 12	0.654**	[0.286]	0.568	[0.429]	0.220	[0.310]
Carer	0.771	[0.475]	-1.524	[1.181]	1.006**	[0.458]
Resident Children	-0.442***	[0.161]	-0.424	[0.270]	-0.784***	[0.183]
Other Household Income	0.006***	[0.002]	0.004	[0.004]	0.006***	[0.002]
Own Superannuation Balance	0.057**	[0.028]	0.003	[0.067]	0.148***	[0.031]
Partners Superannuation	0.157***	[0.043]	0.017	[0.114]	0.063	[0.053]
Home Equity	0.010	[0.019]	-0.023	[0.047]	-0.019	[0.022]
Other Household Wealth	-0.002	[0.005]	-0.015	[0.020]	-0.018**	[0.007]
Own Home Outright	0.400***	[0.143]	0.288	[0.238]	0.705***	[0.160]
Country of Birth (Control = Australian Born)						
MESB	-0.089	[0.207]	0.134	[0.312]	0.112	[0.215]
NESB	0.076	[0.230]	0.863***	[0.311]	0.408*	[0.240]
Major City	-0.201	[0.150]	-0.074	[0.234]	-0.211	[0.158]
Labour Force Status in Previous Year (Control = Full-time Employment)						
Prev. PT	2.502***	[0.177]	0.807**	[0.367]	1.927***	[0.213]
Prev. UNE	1.587***	[0.351]	2.678***	[0.426]	2.460***	[0.351]
Prev. NLF	2.203***	[0.235]	2.606***	[0.340]	3.957***	[0.231]
Labour Force Status in 2000 (Control = Full-time Employment)						
2000. PT	2.705***	[0.283]	1.812***	[0.418]	1.009***	[0.300]
2000. UNE	2.733***	[0.482]	3.482***	[0.567]	1.928***	[0.496]
2000. NLF	1.381***	[0.366]	1.526***	[0.477]	2.633***	[0.384]
Constant	-2.425**	[0.987]	-1.808	[1.155]	1.378	[0.941]

log likelihood = -3975.957

var(1): 2.220 (0.440) cov(2,1): 1.289 (0.440) cor(2,1): 0.677

var(2): 1.630 (0.646) cov(3,1): 1.162 (0.388) cor(3,1): 0.501

var(3): 2.420 (0.533) cov(3,2): 1.152 (0.462) cor(3,2): 0.580

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. Standard Errors in brackets.

Table A.7: Multinomial Logit Estimates of Labour Force Status, Dynamic MNL without Random Effects, Women Aged 50 to 70

	Part-time		*Unemployed*		*NLF*	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Age (Control = 50-54)						
Age 55-59	0.174*	[0.094]	-0.162	[0.227]	0.516***	[0.121]
Age 60-64	0.658***	[0.145]	0.109	[0.323]	1.400***	[0.156]
Age 65-70	0.863***	[0.199]	-0.516	[0.500]	1.914***	[0.213]
Partner's Employment Status (Control = No Partner)						
Partner Employed Part-time	0.330**	[0.129]	-0.186	[0.315]	-0.252***	[0.161]
Partner Employed Full-time	0.599***	[0.185]	-0.400	[0.501]	0.195***	[0.229]
Partner not Employed	0.521***	[0.153]	0.307	[0.312]	1.136***	[0.161]
Long-term Health Condition	0.320**	[0.131]	0.677***	[0.262]	1.100***	[0.147]
Experience	-0.007***	[0.003]	-0.012**	[0.005]	-0.021***	[0.003]
Occupational Status	-0.004	[0.003]	-0.008	[0.006]	-0.008	[0.003]
Highest Level of Education (Control = Year 11 or Below)						
Degree	-0.134	[0.152]	0.829***	[0.320]	-0.249**	[0.187]
Certificate	-0.062	[0.125]	0.267	[0.274]	-0.161	[0.147]
Year 12	-0.249	[0.209]	-0.116	[0.417]	-0.467	[0.221]
Carer	0.359	[0.251]	0.305	[0.540]	0.289**	[0.286]
Resident Children	-0.147	[0.115]	-0.412	[0.280]	-0.462***	[0.138]
Other Household Income	0.001	[0.001]	0.002	[0.002]	0.002***	[0.001]
Own Superannuation Balance	0.005	[0.020]	-0.246*	[0.145]	0.056***	[0.024]
Partners Superannuation	0.041	[0.023]	-0.096	[0.088]	0.066	[0.028]
Home Equity	-0.004	[0.013]	-0.073*	[0.042]	-0.032	[0.017]
Other Household Wealth	-0.003	[0.004]	-0.092**	[0.037]	-0.007***	[0.005]
Own Home Outright	0.283***	[0.104]	0.586**	[0.254]	0.581***	[0.122]
Country of Birth (Control = Australian Born)						
MESB	0.221	[0.146]	0.224	[0.302]	0.307	[0.183]
NESB	-0.049	[0.172]	0.221	[0.330]	0.111**	[0.184]
Major City	0.021	[0.103]	-0.236	[0.224]	0.087	[0.122]
Labour Force Status in Previous Year (Control = Full-time Employment)						
Prev. PT	3.513***	[0.133]	2.111***	[0.337]	2.414***	[0.144]
Prev. UNE	2.369***	[0.389]	4.294***	[0.488]	3.438***	[0.368]
Prev. NLF	2.701***	[0.203]	3.526***	[0.380]	5.258***	[0.223]
Labour Force Status in 2000 (Control = Full-time Employment)						
2000. PT	1.057***	[0.119]	0.485	[0.313]	0.657**	[0.143]
2000. UNE	0.681**	[0.324]	1.448***	[0.464]	0.875***	[0.322]
2000. NLF	1.165***	[0.221]	1.346***	[0.393]	1.903***	[0.223]
Constant	-2.098***	[0.293]	-3.349***	[0.580]	-2.078	[0.318]

Log pseudolikelihood = -4549.813

Pseudo R2 = 0.6071

Wald chi2(87) = 5137.91

Prob > chi2 = 0.0000

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. Standard Errors in brackets.

Table A.8: Multinomial Logit Estimates of Labour Force Status, Dynamic MNL with Random Effects, Women Aged 50 to 70

	Part-time		*Unemployed*		*NLF*	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Age (Control = 50-54)						
Age 55-59	0.287**	[0.129]	0.046	[0.263]	0.729***	[0.164]
Age 60-64	1.143***	[0.194]	0.691*	[0.359]	2.227***	[0.232]
Age 65-70	1.736***	[0.326]	0.677	[0.576]	3.394***	[0.363]
Partner's Employment Status (Control = No Partner)						
Partner Employed Part-time	1.001***	[0.255]	0.030	[0.535]	0.318	[0.303]
Partner Employed Full-time	0.419**	[0.188]	0.166	[0.363]	0.594***	[0.240]
Partner not Employed	0.761***	[0.213]	0.778**	[0.354]	1.623***	[0.242]
Long-term Health Condition	0.447***	[0.160]	0.963***	[0.270]	1.340***	[0.180]
Experience	0.016***	[0.004]	0.022***	[0.007]	0.037***	[0.005]
Occupational Status	0.005	[0.004]	0.008	[0.006]	-0.006	[0.004]
Highest Level of Education (Control = Year 11 or Below)						
Degree	0.347	[0.228]	0.562	[0.403]	0.811***	[0.290]
Certificate	0.168	[0.187]	0.146	[0.331]	0.454***	[0.232]
Year 12	0.444	[0.289]	-0.307	[0.502]	0.799**	[0.359]
Carer	0.470	[0.289]	0.520	[0.501]	0.565*	[0.329]
Resident Children	-0.142	[0.151]	0.442	[0.294]	-0.639***	[0.193]
Other Household Income	0.001	[0.001]	0.002	[0.003]	0.002	[0.001]
Own Superannuation Balance	0.018	[0.034]	0.218	[0.171]	0.089**	[0.041]
Partners Superannuation	0.064*	[0.037]	0.090	[0.114]	0.076*	[0.044]
Home Equity	0.002	[0.019]	0.102	[0.066]	0.023	[0.023]
Other Household Wealth	0.004	[0.006]	-0.088*	[0.046]	0.007	[0.007]
Own Home Outright	0.357***	[0.139]	0.750***	[0.281]	0.777***	[0.176]
Country of Birth (Control = Australian Born)						
MESB	0.397*	[0.235]	0.459	[0.397]	0.506*	[0.288]
NESB	0.126	[0.245]	0.171	[0.399]	0.148	[0.298]
Major City	0.030	[0.152]	0.111	[0.275]	0.153	[0.186]
Labour Force Status in Previous Year (Control = Full-time Employment)						
Prev. PT	2.595***	[0.166]	1.248***	[0.392]	1.733***	[0.213]
Prev. UNE	1.599***	[0.436]	3.021***	[0.561]	2.638***	[0.450]
Prev. NLF	2.023***	[0.234]	2.592**	[0.404]	3.843***	[0.252]
Labour Force Status in 2000 (Control = Full-time Employment]						
2000. PT	2.415***	[0.249]	1.843***	[0.434]	1.844***	[0.294]
2000. UNE	1.975***	[0.527]	3.402***	[0.705]	2.759***	[0.605]
2000. NLF	2.705***	[0.400]	3.390***	[0.566]	4.787***	[0.469]
Constant	1.797***	[0.421]	3.394***	[0.741]	1.650***	[0.499]

log likelihood = -4441.155

var(1): 2.293 (0.508) cov(2,1): 2.362 (0.622) cor(2,1): 0.843

var(2): 3.423 (0.997) cov(3,1): 2.186 (0.571) cor(3,1): 0.677

var(3): 4.554 (0.814) cov(3,2): 3.119 (0.759) cor(3,2): 0.790

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. Standard Errors in brackets.