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Labour Market Engagement of Mature-Age Workers

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Abstract

Supporting those mature-age workers who wish to continue working is a key policy challenge arising from the Intergenerational Report 2010. As previous research indicates, there are many factors that influence labour market engagement of those approaching retirement. This paper examines those factors with a particular focus on the role of occupations and job characteristics. The analysis centres on the labour market transition of men and women aged between 55 and 64 years old over a time period of approximately one year. The data used for our analysis is drawn from the first 7 waves of the HILDA data and we utilise a multinomial logit (MNL) model to determine the characteristics associated with remaining in full-time employment, moving into full retirement and/or moving into partial retirement. Consistent with previous research, we find that certain household and financial factors such as the labour force status of a partner, wages and home ownership are associated with the retirement paths of mature-age people. Further the results indicate that certain occupations and job characteristics are significantly correlated with the employment engagement of mature-age workers.

JEL classification: J080; J260; J290

1. Introduction

According to the Intergenerational Report 2010, the proportion of Australia's population aged 65 and over is projected to almost double over the next 40 years. So, by 2050, nearly one-quarter of Australia's population will be aged 65 and over, compared with 13 per cent today. As a consequence, the total labour force participation rate is expected to fall. The projection is that it will fall from 65 per cent today to less than 61 per cent by 2049-50 (Australian Department of Treasury, 2010). To mitigate the impact of this downward pressure on the labour force participation rate, it is important

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to understand the factors that influence the retirement path taken by individuals to help inform policies to encourage mature-age workers to remain in the labour force for longer.

In light of the growing focus on mature-age employment we investigate the incidence and determinants of full and partial retirement in Australia using data from the first seven waves of the Household, Income and Labour Market of Australia (HILDA) survey. A broad body of international as well as Australian research on worker's retirement decisions exists. Studies concerning Australian retirement behaviour have mainly focused on financial aspects (see Woodland, 1987; Atkinson and Creedy, 1997; Headey *et al*., 2007; and Warren and Oguzoglu 2010). While acknowledging the importance of financial aspects as well as the significance of individual and household factors more generally in influencing the retirement decision, our research aims to extend this body of research by providing more focus on the influence of demand-side factors. More specifically, we examine the role that occupations and employment characteristics (i.e. job satisfaction, firm size, union membership and etc.) play in the retirement decisions of mature-age workers. As far as we are aware empirical evidence on the role of employment characteristics is rather limited in the Australian context.

Our research approach is similar to that conducted by Thomson (2007). Her research follows a cohort of individuals aged 50 years and over who are engaged in full-time employment in 2001. Their labour force engagement is examined three years later and individuals are categorised as having remained in full-time work, moved to partial retirement or being fully retired. We categorise mature-age workers into the same labour market transition categories. However, we record every transition over a one-year period instead of only observing people once over a three-year period. This provides us with a larger sample allowing us to conduct a broader and more robust analysis.

Continued full-time employment means that a person is full-time employed in subsequent periods while full retirement refers those who move from full-time employment into not in the labour force over a one-year period. We exclude those that move into unemployment as they are unlikely to consider themselves to be full-time retired. Measuring partial retirement accurately is somewhat more complex as people perceive the meaning of partial retirement differently. We have used a conventional measure of partial retirement, as employed by others (see Blau, 1994; Bacon, 1997 and Warren, 2008) as well as excluding those who are involuntarily working part-time as they are less likely to perceive themselves as partially retired.

The paper is organised as follows. The next two sections provide a theoretical framework and some empirical evidence regarding the factors that influence the retirement decisions of mature-age people. Section 4 provides a description of the data and some initial descriptive statistics illustrating the transition and characteristics of those in the sample. Section 5 affords a brief description of the methodology employed for this research. Section 6 presents the results of the regression analysis and discussed related policy implications. The last section provides a brief conclusion.

2. Theoretical Framework

The work-leisure choice theory can provide a theoretical framework for understanding people's retirement decision. According to the work-leisure choice model each

individual needs to decide on the optimal allocation of available time to different activities such as paid work, education, household production and leisure. Incentives to spend time in each activity will depend on the benefits associated with that activity relative to its' opportunity cost (Borland, 2003). This suggests that the retirement decision is a voluntary one in the sense that it is made entirely by the individual. However, evidence suggests that the demand side (employers) also plays a role in individual's retirement decision. Hatcher (2003) finds that approximately 10 per cent of people who retire did so because they were 'discouraged'. While this should be taken into consideration, it appears that the retirement decision is usually a result of personal choice and preferences.

With the retirement decision mostly resting with the individual, a basic (retirement) model is the single-period, work-leisure choice model described by equation (1) where H is the amount of time given to market work, P is the price of a unit of consumption (i.e. good or service), w is the per hour wage rate, V is non-wage income and Z is a vector of relevant personal characteristics that affect preferences such as gender, marital status and health. This equation states mathematically that the number of hours worked depends on the price of consumption goods, the wage rate, the amount of non-wage income available and personal preferences (Leonesio, 1996).

$$H = H(P, w, V, Z) \tag{1}$$

Retirement models share many of the properties and characteristics of labour supply models for younger workers, but they generally have two distinguishing features. First, public and private pension plans are institutional features that play unique and important roles in the labour market decisions of older workers and retirement models usually incorporate the relevant details. Secondly, the models for older workers are more likely to be cast in a life-cycle framework. This reflects the fact that people tend to plan their eventual withdrawal from the labour force over many years (Leonesio, 1996). In a life-cycle model, the individual formulates a long-term plan for work and consumption that maximises utility (satisfaction) over the expected lifetime (Headey *et al*., 2007). A life-cycle utility function can be written as:

$$U = U(X_1, L_1, X_2, L_2, ..., X_N, L_N, p, Z) \tag{2}$$

where utility (U) depends on the amounts of consumption (X_t), and leisure (L_t) enjoyed in each period, on the individual's rate of time preference (p) and a vector of personal characteristics (Z). The rate of time preference denotes the extent to which an individual prefers consumption and leisure now rather than in the future. A person with a high rate of time preference values the immediate enjoyment of a unit of consumption or leisure much more highly than their prospective enjoyment at some future date (Leonesio, 1996). The individual's objective is to plan a sequence of consumption and work activity from now (t=0) through period N that maximises equation (2) subject to a life-cycle constraint of the form:

$$\Sigma_{t=0}^{n}(1 + r)^{-t}P_tX_t \leq A_0 + \Sigma_{t=0}^{n}(1 + r)^{-t}P\,[w_t(T - L) + TR_t + PENS_t] \tag{3}$$

where the new variables defined are assets held at the beginning of the first period (A_0), wage rate (w), hours of work (T-L), transfer payments (TRt), taxes (TXt) and private pension income ($PENS_t$). The lifetime budget constraint simply says that the present value of remaining lifetime consumption cannot exceed the current value of assets plus the present value of all anticipated net income. The rate of interest (r) is used to convert all future income flows to present values. If equation (3) holds, then the individual consumes all assets and lifetime income. The utility-maximising desired amount of work (H_t) in each period can be stated as:

$$H_t = T\text{-}L_t(P_t, w_t, A_0, TR_t, TX_t, PENS_t, p, r, Z) \quad t=1, 2, ..., N \tag{4}$$

The model assumes that the future is always known with certainty. In reality, all planning occurs in an uncertain environment. In formulating long-range plans, individuals confront uncertainties such as their own life expectancy, future health status, and the security of various sources of future income (Leonesio, 1996). In addition to that, the nature of retirement has been changing over time. Traditionally, retirement has been defined as withdrawal from the workforce altogether or the end of a person's active working life. However, this implicit definition of retirement may no longer be workable as retirement is an increasingly complex process characterised by greater variability both in terms of the timing and in terms of the pathways out of the labour force (see Mitchell and Field, 1984 and Raymo *et al*., 2009).

3. Literature Review

Past research has paid extensive attention to the influence of individual demographic characteristics and institutional factors on the retirement decision of mature-age people, such as marital status, health status, educational attainment, pension eligibility age and the tax-transfer system. However, less focus has been directed towards the impact of employment and job characteristics. In providing a more complete overview of the literature, this section will examine the influence of personal characteristics and institutional factors as well as the impact of employment and job characteristics on the retirement probability of mature-age workers.

This section will also allude to the changing nature of retirement. In past research, retirement has often been defined in terms of full retirement meaning that the individual works zero hours. The retirement decision has become more complex with other pathways being increasingly pursued. A retirement pathway that has particularly gained in prominence is that of partial retirement. It often involves a reduction in hours, but it can also mean changing jobs and/or becoming self-employed (Thomson, 2007).

Labour Supply and Institutional Factors

The body of research on mature-age labour supply and retirement is a very extensive one. International and Australian studies have identified a number of individual and demographic characteristics that play a significant role in determining the labour market engagement of mature-age people. A large amount of evidence has also shown that a number of institutional factors such as eligibility for pension payments (which is based on asset and income tests), the income taxation system (i.e. taper rate) and the workplace

relation system significantly shape the retirement decision of mature-age workers.

Previous studies have consistently shown that age is positively correlated with the likelihood of retirement. The main reason for that is associated with becoming eligible for a pension or superannuation annuity. It provides a strong incentive to reduce labour supply because people who are eligible to collect a pension face a positive marginal tax rate if they choose to continue to work (Heady *et al*., 2007). The key idea is that a worker's gain in wage earnings is partially, or even mostly, offset by a loss in future pension benefits. The ratio of this loss to wage earnings (after tax) is often called the implicit tax rate on earnings (Gruber and Wise, 2002). The international comparative literature clearly shows that a higher implicit tax rate on continued work lowers the average age of retirement (see Duval, 2004 and Gruber and Wise, 2004).

Other factors that significantly impact the labour force participation of mature-age people include their health status and their level of education attainment (Borland and Warren, 2006). Many studies have shown that poor health and disability lower the probability of employment and labour force participation for the mature-age population (see Woodland, 1987; Honig, 1996 and Wilkins, 2002). A recent Australian study found that, a long-term health condition lowers the probability of employment for males by about 24 percentage points while the effect for females is about 17 percentage points (Borland and Warren, 2006).

In terms of education, while the vast majority of studies find that lower levels of education reduce labour force participation (Borland and Warren, 2006), the effect of education on retirement decisions is slightly more ambiguous. A recent Australian study finds that, the most educated (those with a university degree) and least-educated (those with no post-school qualifications) groups of workers are more likely to remain employed beyond age 65 years old than other groups. The explanation is that highly educated workers may find it more attractive to remain employed because of the better employment conditions they face, or the need to recoup their investment in education while less-educated workers may remain in the workforce for longer to secure a desired level of consumption after retirement (Ryan and Sinning, 2010).

In addition, wages and wealth have a substantial influence on mature-age employment. Wages determine the opportunity cost of leisure which means that higher wages provide a strong incentive to supply more labour. The empirical evidence shows that wages have a particularly substantial effect on women's labour market participation. Birch (2005) examined a number of Australian studies finding that the mean wage elasticity of labour force participation for Australian women of all ages was 0.75. Another study finds that a 10 per cent increase in market wage opportunities increased the probability of labour force participation for Australian women aged between 50 and 59 years of age by 9.6 per cent (Austen and Birch, 2005).

Related to wages is wealth which has been shown to significantly influence the labour supply behaviour of mature-age people. Wealth provides individuals with the necessary means to continue consuming goods and services during their retirement. Since higher wealth levels provide for greater and longer lasting consumption, it is reasonable to argue that wealth positively affects the labour force withdrawal of mature-age workers. Recent studies have supported this by showing that people with more assets and less debt are more likely to retire early (see Bryant, 1990 and Hatcher,

2003). Also, people with more generous superannuation coverage have been found to retire earlier (see Leonesio, 1993; Lumsdane and Mitchell, 1999 and Disney and Smith, 2002). Australian cross-sectional studies find that availability of superannuation has a negative effect on mature-age employment (Borland, 2005).

Since most mature-age people are part of a couple or household, labour supply decisions are not made in isolation. There appears to be compelling evidence that spouses place significant value on spending time with each other in retirement (Gustman and Steinmeier, 2002). Consistent with that is the repeated finding that the labour market participation of a mature-aged person is influenced by his/her partner's labour market participation. For example, older women are more likely to participate in the labour force if their husband works, and similarly, older men are more likely to participate if their wife is working (Evans and Kelly, 2002). According to one regression analysis, those with working spouses are four percentage points less likely to retire, other things equal (Quinn *et al*., 1998).

The labour force participation of mature-age people is also influenced by certain institutional arrangements such as income taxation and labour market regulations. In terms of income taxation, the evidence indicates that the rate at which social benefit entitlements are reduced is negatively correlated with the labour force participation of those that receive the payment. This is also observed in the context of pension payments that are reduced as pension recipients increase their labour market earnings (see Leonesio, 1993 and Disney and Smith, 2002). There is a belief that the higher marginal tax rate faced by those eligible for the Age Pension in Australia presents a significant disincentive to combine work with retirement (see Harmer, 2009; and Spoehr *et al*., 2009).[1] Data comparing New Zealand and Australia shows that New Zealand has a higher proportion of people aged 65 and over in employment compared to Australia with the former facing a lower marginal tax rate (Headey *et al*., 2007).[2]

In terms of labour market regulations, employment protection and anti-age discrimination regulation can have an impact on mature-age employment by influencing hiring and firing decisions. Commonly, employment protection laws provide for severance pay based on age or years of employment. These seniority rules protect mature-age workers or those with long service to the firm. Thus employers will be more reluctant to hire older individuals given the lower flexibility in firing older workers under seniority rules (Ebbinghaus, 2000). While age discrimination legislation exists, there is a variety of evidence that suggests older people in Australia feel and are discriminated against during the hiring process because employers believe their skills are outdated, they are harder to train, are less adaptable and have potential health problems (see Pickersgill *et al*., 1996; Bittman *et al*., 2001 and Encel, 2003).

Employment and Job Characteristics

The influence of employment and job characteristics on the labour force participation of mature-age workers has in the past only received limited attention in the Australian

[1] The Institute of Actuaries of Australia estimated the marginal tax rate for Age Pensioners to be 40 per cent.

[2] In New Zealand the pension is not reduced at all for pensioners undertaking any work, and earned income is taxed at the standard rate. According to 2005 data, 11 per cent of those aged 65 and over are employed in New Zealand compared to about six per cent in Australia.

context. This is despite clear links to the utility maximising decision and international evidence showing that demand-side factors may make it more or less attractive for mature-age workers to remain in the workforce. For example, research has shown jobs that are repetitive, physically demanding and offer low autonomy increase the probability of mature-age workers retiring early. On the other hand, workers that are involved in the entire job process are less likely to retire early. The correlation between hard physical work and retirement is well established in previous research and likely reflects a mismatch between physical capabilities of older workers and the requirements of these jobs (Blekesaune and Solem, 2005).

Closely related to working condition are the characteristics associated with certain occupations. Some occupations require heavy exertion or a great deal of dexterity and quick reflexes. Other occupations may require a high level of communication skills and technical capabilities. Hence, certain occupations may make continuing in employment unattractive in the sense that workers may have difficulties in meeting task demands or may find that there are few suitable work opportunities (Hayward and Grady, 1986). The empirical evidence on the influence of occupations on the retirement decision of older workers is mixed, with some studies finding that blue-collar workers retire significantly earlier compared to white-collar workers (Mitchell and Fields, 1984) while other studies report that differences among occupation groups are very small. Australian studies confirm that the significance and magnitude of the impact of occupations on the employment probability of mature-age workers is mixed (see Borland and Warren, 2006 and Thomson, 2007).

Union density or union membership is another factor that may influence the retirement paths of mature-age workers. Unions not only play a role in bargaining for higher wages but they also influence working conditions and arrangements. Unions may also affect the timing of retirement. In the past, unions have commonly supported early exit primarily as a means to reduce labour supply in times of high unemployment. This has led to lifelong working time reductions for union members (Ebbinghaus, 2000). Research that has accounted for union membership mostly shows that it significantly increases the likelihood of mature-age workers retiring (see Mitchell and Fields, 1984; Steward, 1997 and Pang *et al*., 2008). Recent Australian studies either do not account for union membership (see Borland and Warren, 2006 and Headey *et al*., 2007) or find it not to be significant (Thomson, 2007).

Another factor related to job and employment characteristics is contract type, with particular attention given to self-employment. Most of the evidence shows that self-employed workers are more likely to work longer and conversely are less likely to retire compared with wage-and-salary workers (see Fuchs, 1982; Parker and Rougier, 2007 and Pang *et al*., 2008). The negative correlation between self-employment and retirement can be explained by the fact that self-employed workers are faced with different working and institutional conditions and thus face different incentives to retire (Parker and Rougier, 2007). In that context, self-employment may provide more flexibility in hours and wages allowing a more gradual transition into retirement (Dorn and Souza-Poza, 2004). On the other hand, there might be certain barriers for a self-employed person entering retirement because of financial and emotional ties to their business and/or work. Thomson (2007) finds that self-employment decreases the likelihood of both men and women moving into (full) retirement.

Employment characteristics can also be captured by firm size. The size of the firm can convey information about the size of the internal labour market, working conditions and management structure. One study finds that working in large firms is positively associated with the probability of early retirement. This is attributed to the fact that large companies offer their own pensions, or 'golden handshake', to employees (Dorn and Souza-Poza, 2004). On the other hand, one could argue that larger firms are actually better placed to encourage mature-age people to remain working for longer as they may be better at accommodating changing preferences and being more flexible because of a larger variety of jobs and tasks available. Despite the potential impacts on mature-age employment, firm size has not been explored to a great extent in recent Australian studies.

A factor that has received more attention in relation to the retirement decision is how satisfied a person is with his or her job. Job satisfaction is 'a pleasurable or positive emotional state resulting from the appraisal of one's job experiences'. Workers derive job satisfaction in several ways, such as the meaningfulness of the work itself, pay, promotions, recognition, working conditions, and how the worker feels about co-workers, supervisors, and the company in general (Fisher and Herrick, 2002). The evidence is mixed on whether job satisfaction significantly influences the retirement behaviour of older workers. Some studies suggest that a high level of job satisfaction is associated with a reduced likelihood of early retirement (Mein *et al*., 2000). However, other studies do not find that job satisfaction is a significant predictor of actual retirement behaviours (Beehr *et al*., 2000). A recent Australian study shows that while job satisfaction increases mature-age women's (aged between 55 and 70 years old) likelihood to remain in the labour force it does not have a significant influence on men (Warren and Oguzoglu, 2010).

Partial Retirement

Traditionally retirement has been viewed as an abrupt change that consists of a move from working full-time to completely and permanently leaving the labour force. This view is changing with retirement pathways becoming more diverse, and with many more people expected to make a gradual transition into retirement (Warren, 2008). In this context, partial retirement is a pathway that often involves a reduction in hours, but can also mean a decline in responsibilities, or changing jobs, or becoming self-employed (see Borland, 2005; Thomson, 2007 and Warren, 2008).

As a pathway, partial retirement is becoming increasingly prominent, with a number of US studies showing that a significant proportion of mature-age workers transition into partial retirement rather than straight into full retirement. Among full time workers, for example, Blau (1994) found that 13 per cent of mature-age men moved into part-time work, and Kim and Devaney (2005) showed that 32 per cent of full-time workers entered partial retirement. Using a self-reported definition of partial retirement Ruhm (1990) found that over 40 per cent of households partially retired. Another study using a measure of annual work hours, found that 22 per cent of men made partial transitions to retirement (Rust, 1990).

The decision to retire partially is complicated by a number of factors. Employers may not be willing to offer bridging jobs with reduced hours of work, or else the jobs offered might not be attractive to workers. Team production may require

similar work schedules and hours of work for all employees in an organisation and the fixed costs of employment may cause the wage for a new part-time job to be lower than the wage for an equivalent job with full-time hours (Borland, 2005). Consequently, employees who are unable to reduce their hours of work with a current employer may have to switch to another job or occupation (Kim and DeVaney, 2005). Changing jobs can result in a loss of job-specific skills which may in turn lead to lower wages being paid to workers who partially retire (Gustman and Steinmeier, 1984).

Consistent with evidence showing that labour supply decisions vary by gender, research into the retirement pathways of mature-age people suggests gender differences. Ruhm (1990) found that men who take up bridging jobs often change into jobs in a different industry or occupation than their career job, while women who take up bridging jobs are more likely to remain in the same industry and occupation. Other studies have found that while men are more likely to make decisions about retirement based on financial considerations, women's retirement decisions are more commonly influenced by family factors such as caring responsibilities and the timing of their partner's retirement (see Ruhm, 1996; Disney *et al*., 1997 and Warren, 2006).

Currently, Australian evidence into the nature of retirement transitions is relatively limited but research activity into different retirement pathways has been growing (Warren, 2008). Borland and Warren (2005) found that around 20 per cent of workers aged 45 or older in 2003 reported that their current job was part of a transition to full retirement. Measuring partial retirement as a reduction in working hours to 30 hours or less per week, one study found that 54 per cent of women and 38 per cent of men aged 50 and over moved from full employment in 2001 into partial retirement in 2004. In addition, the study found that more women than men move into partial retirement and that several drivers of retirement pathways, such as education levels, household income, mortgage status and job tenure, vary by gender (Thomson, 2007).

The preceding discussion illustrates that the incidence of partial retirement differs significantly with movement into partial retirement ranging from around 10 to 40 per cent. Moreover, since the factors influencing transitional retirement arrangements are likely to vary according to the measure (or definition) of partial retirement, it is important that measures are as robust and comprehensive as possible. However, compiling a comprehensive measure of partial retirement is difficult because many types of transition - such as a move to a less demanding job, 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 move to retirement (Warren, 2008). With that in mind we elaborate on the measure of partial retirement used in the analysis that is to follow in the next section.

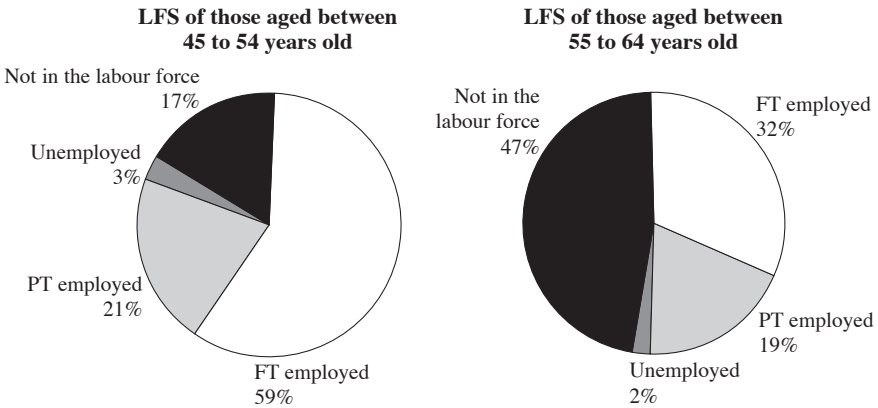
4. Data and Descriptive Statistics

To investigate the role of occupation, job characteristics and other factors on the retirement paths of mature-age workers we use the HILDA survey, a longitudinal household panel which began in 2001. Its main focus is on collecting information about individuals' economic and subjective well-being, labour market dynamics and family dynamics over time. The HILDA survey is suitable for our analysis because it provides detailed information on respondents' characteristics and their labour market situations, which allows us to determine people's employment status at different times.

It also provides some information about certain employment and job characteristics including occupational status.

To date, nine waves of the HILDA data have been released, of which we use the first seven waves. The sample is restricted to men and women aged between 55 and 64 years old, as this is an age group with high rates of exit from the labour force. Figure 1 shows, for example, that while only 17 per cent of those aged 45 to 54 years are not in the labour force, 47 per cent of people aged 55 to 64 years are not in the labour force. As this age group is expected to represent a large share of the population in the future (Australian Treasury, 2010), it is increasingly important to understand the factors that influence this group to either remain in employment or transition to retirement.

Figure 1 - Labour Force Status (LFS) of Individuals Aged 45 to 54 and 55 to 64 Years



Source: HILDA Release 7.0.
Note: The dataset has been pooled using wave 1 to wave 7 data.

To derive this group's labour market transition patterns we merge two waves together (each wave being approximately one year apart) and then pool all of those merged datasets to give us a pooled dataset. Contrary to other studies, we record every transition over a one-year period instead of only observing people once over a three or four year period (see Thomson, 2007 and Warren, 2008). This provides us with a larger sample which should result in a more robust and reliable analysis.[3]

The transition paths that we are interested in include: 1) remaining in full-time employment, 2) moving from full-time into part-time employment (partial retirement), and 3) transitioning from full-time employment into full retirement (full retirement). Individuals in the full-time employment category are those who are full-time employed in the initial wave (t) as well as in the subsequent wave (t+1). Table 1 shows that 84 per cent of individuals aged between 55 and 64 years remain in full-time employment over a one year period.

[3] The standard errors are clustered to account for the possibility that individuals are being observed more than once in the pooled dataset.

Table 1 - Labour Market Transitions of Mature-aged Individuals Aged 55 to 64 Years Old

	Labour Force Status in t+1			
Labour Force Status in t	*Full-time Employed*	*Part-time Employed*	*NLF*	*Total*
Full-time employed	84%	9%	7%	100%
Part-time employed	10%	72%	18%	100%
NLF	1%	5%	94%	100%

Source: HILDA Release 7.0.
Note: The dataset has been pooled using wave 1 to wave 7 data. We have excluded the unemployment category because it is very small and does not feature in the subsequent analysis.

Partial retirement is measured in terms of transitioning from full-time employment in the initial wave (t) to working part-time in the subsequent wave (t+1). According to this definition, nine per cent of individuals appear to be partially retired (see table 1). However, moving into part-time employment does not necessarily mean that people consider themselves as partially retired. Movement back into full-time retirement may occur if part-time employment was not voluntary. Table 1 shows that on average about 10 per cent of people aged 55 to 65 move from part-time to full-time employment over a one year period. In addition, we find that about nine per cent of those in this age bracket are involuntarily employed part-time as they report preferring full-time work.[4] In light of this, we exclude those in our partial retirement measure who report working part-time because they could not find full-time work. As discussed earlier, compiling a comprehensive measure of partial retirement is difficult, but we are comfortable with our definition of partial retirement as other studies employ similar measures (see Blau, 1994; Bacon, 1997 and Warren, 2008).

Lastly, we class those who are employed full-time in the initial wave (t) and not in the labour force in the subsequent wave (t+1) as fully retired. Table 1 shows that seven per cent of people aged 55 to 64 years move into full retirement while only one per cent move from not in the labour force into full-time employment over a one year period. Since the movement from full retirement back into full-time work is too small to influence results we have not excluded these individuals from the sample. A second group – those who move out of part-time employment into full retirement (not in the labour force) – constitute a substantial proportion (18 per cent) of people engaging in this transition, but these individuals are outside the scope of our analysis. We focus only on those who are full-time employed in the initial period, because a more homogenous employment category allows us to be clearer about the factors that influence the decisions of 'similar' employed people to either move into partial or full retirement.

In addition to deriving different transition paths, we create a number of variables to include in our regression analysis. All of the variables relate to the initial wave (t). A full list of the variables including their description can be found in Appendix 1. Table 2 provides some insight into the characteristics associated with

[4] This is based on a question in the HILDA survey asking people who report working part-time for the reason why they are working part-time.

the three different transitional paths for men and women, and the proportion of each gender undertaking them. The table illustrates two things: one is that those in the three transition paths have quite different characteristics and the other is that there are substantial differences associated with gender.

Table 2 - Some Characteristics of Men and Women in the Three Different Transition Paths – Aged 55 to 64 Years Old

	Men			*Women*		
Variables	*Full-time Employed (84%)*	*Partial Retired (7%)*	*Fully Retired (9%)*	*Full-time Employed (82%)*	*Partial Retired (11%)*	*Fully Retired (7%)*
Age	58	59	60	58	58	58
Tertiary qualification	21%	28%	12%	30%	25%	27%
Vocational qualification	40%	37%	47%	27%	28%	23%
Health condition	20%	24%	35%	19%	23%	30%
Partner is employed	62%	59%	50%	44%	53%	55%
Partner is not employed	23%	30%	39%	10%	8%	30%
Home ownership	62%	70%	75%	58%	76%	58%
Hours usually worked	49	43	46	44	42	45
Job satisfaction	7.9	7.8	7.9	8.0	7.6	7.3
Hourly real wage rate	$23	$23	$22	$19	$17	$17
Household non-wage income	$54,584	$63,318	$44,097	$46,778	$63,779	$55,494
Manager/Professionals	52%	54%	36%	47%	55%	29%
Technicians & Trades workers	16%	12%	18%	3%	3%	2%
Machinery operators & drivers	11%	9%	17%	2%	1%	2%
Community & service workers	3%	4%	4%	10%	7%	17%
Clerical & admin. workers	7%	10%	10%	28%	20%	23%
Labourer & related workers	7%	9%	10%	6%	9%	14%
Union membership	30%	24%	42%	46%	27%	36%
Self-employed	39%	49%	22%	22%	37%	31%
Permanent contract	53%	28%	65%	69%	50%	61%
In small sized firm	54%	65%	51%	45%	62%	50%
In medium sized firm	30%	18%	29%	32%	31%	28%

Source: HILDA Release 7.0.
Note: The dataset has been pooled using wave 1 to wave 7 data.

5. Methodology

For our analysis multinomial logit (MNL) models are used where the dependent variable takes on three unordered and independent outcomes. The outcomes are remaining in full-time employment (j=0); moving from full-time employment into full retirement (j=1); and moving from full-time employment into partial retirement from one period to the next (j=2). The probability that an individual belongs to any of the three categories conditioned on a set of factors is given by the conditional probability model in equation 5.

$$P(y_i = j \mid x_i) = \frac{\exp(x_i'\beta_j)}{\sum_{r=0}^{2}\exp(x_i'\beta_i)} \qquad j=0, 1, 2, \tag{5}$$

Remaining in full-time employment over two periods is the reference category. For purpose of identification, one set of parameters need to be normalised to be zero. We choose to normalise β_0 to equal zero. The corresponding log-likelihood function used to estimate the model is shown in equation 6 where dij is a dummy variable equal to one when individual i follows the jth retirement path.

$$logL_i = \sum_{i=1}^{n}[d_{i0} log \frac{1}{1 + \sum_{r=1}^{2} \exp(x_i'\beta_i)} + d_{i1} \frac{\exp(x_i'\beta_1)}{1 + \sum_{r=1}^{2} \exp(x_i'\beta_i)} + d_{i2} \frac{\exp(x_i'\beta_2)}{1 + \sum_{r=1}^{2} \exp(x_i'\beta_i)}] \quad (6)$$

X_i is a vector of factors assumed to be related to an individual's labour force participation decision and β_i are vectors of parameters to be estimated. X_i comprises of personal and household characteristics (age, education level, relationship status, health states, housing, household income), occupational dummies (according to the ASCO classification), job and employment characteristics (hours of work, log hourly real wages, job satisfaction, union status, workforce experience, contract type and firm size) and time dummies (to account for different waves).[5]

An argument can be made that the outcomes specified for the purpose of this analysis should be treated as ordered outcomes rather than unordered ones as continued full-time work implies more hours worked than hours worked when partially retired, which in turn is more than no hours worked in the case of full retirement. Hence, it might be argued that it is more appropriate to estimate an Ordered Logistic Regression (OLR) model. This functional form is regarded as more efficient than the MNL model provided that the assumption of parallel regression holds. That is, the coefficients for the variables in the equations would not vary significantly if they were estimated separately.

Estimating separate OLR models for men and women aged between 55 to 64 years reveal that the signs and variable significance are consistent with the results obtained from the MNL models. However, testing the parallel regression assumption using a proportional odds test (the Brant test) shows that the assumption is violated for both models (see Appendix 2 for a summary of the results from the OLR including the Brant test).[6] Hence, we view the MNL as a more valid and flexible specification and therefore estimate separate MNL models for men and women respectively.[7]

6. Discussion of Regression Results

A summary of regression results are reported in table 3 for men and women, respectively (see Appendix 3 for a comprehensive presentation of the regression results). The results are presented as marginal effects at the mean to assist in interpreting the coefficients obtained from the multinominal logit model.[8] Consistent with previous research, we

[5] Net wealth is not included as an explanatory variable because it reduces the sample by about 30 per cent. Instead we include household non-wage income and home ownership in the regression analysis as proxies for household wealth.

[6] The Brant test employed here is based on a command/program written by Long and Freese, 2005.

[7] Estimating separate models for men and women is consistent with the approach followed in other studies and strong theoretical and empirical evidence indicating that the factors influencing labour market participants vary according to gender.

[8] For dummy variables, marginal effects are interpreted as the change in the predicted probability of being in a particular group if the value of that variable is changed from zero to one, with all other explanatory variables held constant at the mean value. For continuous variables, the marginal effect is the change in the predicted probability of being in a particular group when the value of that variable is increased by one unit, with all other explanatory variables held constant at the mean value.

find that different factors are associated with the retirement paths of mature-age men and women. The following discussion will focus on those that are related to household and financial factors and employment and job characteristics.

The analysis reveals that certain household and financial factors are correlated with the retirement path of mature-age people such as the labour force status of a partner, home ownership and the hourly wage rate. For men, having a partner who is not employed is significantly positively associated with partial retirement. Women's labour-leisure decision is also influenced by their partner's labour force status, but in a slightly different way. For women, having a partner employed is significantly positively correlated with full retirement, suggesting that women with working partners have the necessary financial resources to withdraw from the labour force.

For women, home ownership is another aspect that is significantly correlated with their retirement decision. Owning a home (having paid off the mortgage) as compared to renting increases the probability for women to move into partial retirement and decreases their likelihood of moving into full retirement. This is an interesting result as it suggests that women will remain attached to the labour market either fully or partly despite their apparently superior financial situation compared to other women. This result is contrary to other studies where increased home loan affordability is associated with women leaving the labour force (Connolly and Spence, 1996).

The real hourly wage rate is also a significant factor associated with the retirement pathway of mature-age workers. The results suggest that a one unit increase in the log hourly real wage rate decreases the probability of men moving into partial retirement by about 1.5 percentage points and reduces the likelihood for women moving into full retirement by about 2.5 percentage points.[9] The significance of the wage rate on the labour supply decision for women in particular is well established in the literature (Birch, 2005).

The analysis further reveals that factors related to employment are significantly associated with individual's retirement decisions. Increasing hours of work is significantly negatively correlated with partial retirement for both genders as well as with full retirement for men. In addition, being on a permanent contract is significantly negatively associated with both partial and full retirement for men. Together these results suggest that men who work more hours and are on permanent contracts are highly attached to the labour force.

Despite the positive relationship between hours of work and continuing employment, preferring to work fewer hours is significantly positively correlated with partial retirement for men and with full retirement for women. This suggests that the labour market is sufficiently flexible that allows mature-age workers who want to work fewer hours to adjust their working hours according to their (changing) preferences.

Contrary to expectation, occupations appear to have little influence on the retirement paths of mature-age men, as only the tradespersons and technicians occupation is significantly negatively correlated with partial retirement.[10] For mature-age women the influence of occupation is more complex in that retirement decisions

[9] Applying logs to the real hourly wages is a common practice. It accounts for the exponential nature of the variable.
[10] The reference group consists of those in the labourer and related worker occupations.

vary by occupation. For example, the community and personal workers occupation is significantly negatively correlated with partial retirement while the manager, professional or clerical and administrative workers occupation is negatively correlated with full retirement.[11]

Lastly, we find that factors indicative of workplace structure and practices, such as job satisfaction, union membership, and firm size, are relevant for the retirement paths for men and women.[12] In relation to job satisfaction, the results suggest that a one unit increase above the mean decreases the probability of women moving into partial and full retirement by 0.9 and 0.7 percentage points, respectively. So, while previous research into the relevance of job satisfaction to retirement behaviour is mixed (see Mein *et al*., 2000 and Beehr *et al*., 2000), our results indicate that job satisfaction is important in encouraging women to remain attached to the labour force.

For union membership the results show that it is positively associated with full retirement for men while it is significantly negatively correlated with movement into either partial or full retirement for women. This appears to suggest that unions influence working conditions in a way that encourages women to remain in employment, while discouraging men's attachment to the labour force. Based on this analysis alone, it is difficult to isolate the role of unions from the impact of other workplace characteristics that may be correlated with union density.

Finally, firm size is significantly associated with the retirement paths of mature-age workers, albeit with different impacts on the decisions of men and women. Compared to a large firm, working in a small firm is positively associated with full retirement for men while, for women, working in a small or medium size firm is significantly positively correlated with partial retirement. This indicates that men working in small firms and women working in large firms may have fewer opportunities to move into partial retirement.

Sensitivity Analysis

These results are fairly robust when considering broader age groups such as the 50 to 64 years old and the 45 to 64 years old (see Appendix 4). In relation to partial retirement of mature-age men, the results show that preferring to work fewer hours and log real hourly wages are significant factors for all age groups.[13] However, there are a couple of differences which relate to the labour force status of partners and occupation. While having a partner not in employment and being employed in the technicians and tradesperson worker occupation is significantly associated with partial retirement for men aged between 55 to 64 years, it is not significant for those in the two broader age brackets. Furthermore, looking at the probability of partial retirement for the different age groups suggests that age increases the probability for men to move into partial retirement as the probability to be in this state is highest for those in the 55 to 64 age bracket.

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[11] The reference group consists of those in the labourer and related worker occupations.

[12] Job satisfaction is measured as a continuous variable to better ascertain the impact that a unit change has on the probability that a mature-age man or a mature-age women will follow a particular retirement path.

[13] All age groups refers to those in the 55-64 age bracket, 50-64 age bracket and 45-64 age bracket.

Table 3 - Marginal Effects at the Mean for Partial and Full Retirement Transitions of Men and Women Aged Between 55 to 64 Years Old

	Men (N=1411)				*Women (N=780)*			
	Partial Retirement		*Full Retirement*		*Partial Retirement*		*Full Retirement*	
Variables	*Mean*	*S.E.*	*Mean*	*S.E.*	*Mean*	*S.E.*	*Mean*	*S.E.*
Age	-0.0025	0.0018	0.0082*	0.0018	0.0067*	0.0033	0.0065*	0.0021
Health condition	0.0003	0.0113	0.0380*	0.0128	0.0277	0.0248	0.0132	0.0149
Partner employed	0.0204	0.0159	-0.0074	0.0120	0.0028	0.0208	0.0445*	0.0181
Partner not employed	0.00548**	0.0285	0.0065	0.0132	0.0246	0.0362	0.0507	0.0333
Home ownership	0.0083	0.0143	-0.0008	0.0125	0.0492**	0.0256	-0.0368*	0.0180
Log wages	-0.0145**	0.0076	-0.0083	0.0061	-0.0268	0.0202	-0.0247*	0.0108
Hours of work	-0.0029*	0.0007	-0.0012*	0.0005	-0.0026*	0.0013	-0.0012	0.0008
Prefer to work fewer hours	0.0187*	0.0106	0.0095	0.0075	-0.0008	0.0177	0.0308*	0.0130
Permanent	-0.0545**	0.0281	-0.0302**	0.0182	0.0073	0.0300	-0.0063	0.0213
Casual	0.0673	0.0493	-0.0194*	0.0092	0.1071	0.1058	-0.0142	0.0172
Self employment	-0.0111	0.0181	-0.0644*	0.0111	0.0212	0.0479	-0.0145	0.0144
Manager	0.0074	0.0233	-0.0222	0.0206	-0.0142	0.0342	-0.0264*	0.0101
Professionals	0.0280	0.0272	0.0071	0.0186	0.0283	0.0441	-0.0469*	0.0170
Community and personal workers	0.0345	0.0472	0.0353	0.0375	-0.0428**	0.0233	0.0061	0.0207
Tradespersons	-0.0249**	0.0137	0.0061	0.0164	-0.0302	0.0293	-0.0158	0.0162
Clerical and administrative worker	0.0263	0.0317	0.0135	0.0215	-0.0433	0.0273	-0.0264*	0.0129
Percentage time spent in employment	-0.0202	0.0648	0.0428	0.0494	-0.0451	0.0484	-0.0483**	0.0257
Employer tenure	0.0006	0.0005	0.0011*	0.0003	-0.0004	0.0008	0.0012*	0.0005
Job satisfaction	0.0002	0.0030	-0.0028	0.0022	-0.0094*	0.0005	-0.0055*	0.0022
Union	-0.0006	0.0102	0.0195*	0.0095	-0.0515*	0.0191	-0.0205**	0.0126
Small firm (1 to 19 employees)	-0.0001	0.0138	0.0220**	0.0112	0.0880*	0.0388	-0.0144	0.0119
Medium firm (20 to 199 employees)	-0.0135	0.0126	-0.0013	0.0084	0.0872*	0.0404	-0.0036	0.0131
Predicted Probability	0.0390		0.0298		0.0609		0.0292	

Source: HILDA Release 7.0.
Notes: * and ** stands for 5 and 10 per cent significance levels respectively. The analysis relies on a pooled dataset including observations from wave 1 to wave 7. The standard errors are clustered by the personal identifier (xwaveid). A number of variables included in the model are not listed due to insignificant.

For full retirement the results are very similar for all three age groups of mature-age men. There are only a couple of differences that are worth pointing out which relate to job satisfaction and the hourly wage rate. Both job satisfaction and the log hourly real wage rate are negatively associated with partial retirement for those aged 45 to 64 and for those aged 50 to 64 years old while neither factor is significant for those in the 55 to 64 age bracket. As expected, the comparison of different age groups shows that the probability of full retirement increases with age.

For mature-age women, we find that a few factors vary among the age groups in relation to partial retirement. Union membership, while significant for those in the 55 to 64 age bracket, it is not significant for any of the broader age groups. On average, preferring to work fewer hours is significantly positively correlated with partial retirement for the two broader age groups but not for the older age group (the 55 to 64 age group). This suggests that slightly younger women are better able to match preferred with actual hours by moving into partial retirement. There are also differences associated with job satisfaction and hourly wages. While job satisfaction is significant in partial retirement for those aged 55 to 64 years, it is not significant for those in the two broader age categories. On the other hand, the log hourly wage rate is significantly (negatively) correlated with partial retirement for these two age groups (50 to 64 years and 45 to 64 years), but not for those in the older age bracket. Another notable observation is that, for women, the probability of partial retirement is fairly similar across age groups, in contrast to men's probability of partial retirement (which varies among age groups).

Lastly, the incidence of mature-age women's full retirement is fairly similar for the three age groups. For example, preferring to work more hours is significantly positively related to full retirement, while the relationship with job satisfaction and union membership is significantly negative. The only noteworthy difference is associated with home ownership. Looking at the results for the different age groups, home ownership is significantly negatively correlated with full retirement for those aged 55 to 64 years old, but is not significant for those in the two broader age brackets. As for the probability of full retirement this is higher for women aged between 55 to 64 years compared to those in the 50 to 64 and 45 to 64 age groups.

Policy Implications

Measures to increase labour market engagement of mature-age people tend to focus on the pension age and superannuation rules. Whilst these are still important, the analysis in this paper indicates a key future policy direction for mature-age workers is supporting transitions into partial retirement. For example, preferring to work fewer hours is significantly positively associated with partial retirement for men as well as for women except for those in the 55 to 64 age group. In general, this suggests that the labour market affords mature-age workers the opportunity to match their desired hours of work with their actual hours of work. This is a desired outcome as it provides older people with the flexibility to combine their workforce participation with activities outside the labour market such as leisure, volunteering, caring for grandchildren or family members.

Other results suggest that workplace flexibility, and more broadly workplace practices and arrangements, are important in encouraging mature-age workers to

remain in the labour force for longer. For example, we find that job satisfaction is positively associated with remaining in full-time employment for women and men.[14] Job satisfaction is likely to be related to workplace flexibility as well as certain workplace practices such as job autonomy, a cooperative working environment and managerial practices. In addition, we find that union membership is positively correlated with full retirement for men while being negatively associated with partial and full retirement for women. As unions not only negotiate wages but also working conditions, it appears that the working conditions and arrangements that are negotiated encourage women to remain in the labour force for longer, while on the other hand discouraging men's labour force attachment.

The results relating to union membership may reflect that workplace arrangements are designed according to the assumptions that men prefer to fully retire after having worked full-time for most of their lives while women are assumed to prefer more flexible working arrangements and retirement paths. However it is unclear that this is the case, as preferring to work fewer hours is associated with partial retirement for men, not full retirement. It could be that men who are union members and fully retire would prefer more flexible arrangements that allow for more transitional retirement transitions, but that there are characteristics associated with their jobs that make flexible arrangements less likely.

While our analysis is quite preliminary, it suggests that the role of workplace arrangements and practices should receive more attention. The main responsibility for creating suitable workplace arrangements and practices lies with employers, unions and employees. However, Government has a role to play in providing labour market participants with information to improve awareness of what works to maintain attachment to employment, as well as leading initiatives to help firms implement 'better' workplace practices. To further inform this role, this study indicates more research into the influence of workplace arrangements and practices on retirement should be conducted. An important extension to the current body of research would involve looking at the interaction between firms and employees. This however is likely to require more comprehensive data on firm and employee characteristics than is currently available.

7. Conclusion

With an ageing population placing pressure on future economic growth rates and Government fiscal sustainability, we have sought to extend the body of literature on the labour market engagement of mature-age workers. Our contribution consists of investigating the incidence and determinants of full and partial retirement with a particular focus on the influence that employment and job characteristics have on the retirement path of mature-age workers. It is important to understand the factors that influence the retirement path taken by individuals to help inform policies to encourage them to remain in the labour force for longer.

Consistent with previous research, we find that certain household and financial factors are significantly associated with the retirement path of mature-age workers. We

[14] Job satisfaction is significantly negatively correlated with full retirement for men in the 50 to 64 years age group and for those in the 45 to 64 years age group.

also find that there are significant differences between mature-age men and women in relation to the factors that influence their retirement path. This is consistent with the evidence in the broader labour supply literature and reflective of the way societal and cultural factors impact on genders differently. Further, we find that indicators of workplace and job characteristics, such as job satisfaction, union membership and firm size are significantly associated with the retirement paths of mature-age workers.

Our findings suggest that workplace practices and arrangements are important in encouraging mature-age workers to remain in the labour market for longer. Hence, particularly where there are difficulties finding adequate labour supply, it is important for different stakeholders in the labour market to pay more attention to the influence of workplace practices and arrangements. While the onus for this lies mainly with industry, employers and unions, the Government has a role in terms of assisting employers, particularly in small and medium-sized firms, to implement arrangements with their workforce that improve engagement and job satisfaction for mature-age workers. This role is supported by a workplace relations framework that facilitates labour market flexibility as well as effective negotiation between employers and employees on workplace arrangements that meet their respective needs.

To extend this work, it is important to conduct further research into the influence of workplace practices and arrangements on the labour market engagement of mature-age people utilising linked data on firm and employee characteristics. This would allow a greater control over firm-specific effects and enhance our understanding of the impact of workplace practices. A better understanding of the workplace practices and arrangement that encourage mature-age workers to remain in the labour force would not only be valuable in seeking to boost labour market participation of mature-age people but also other labour market participants (i.e. women of child-bearing age, people with disabilities).

Appendix 1

List of Variables Included in Regression(s)

Variable Name	*Variable Description*
Age	=respondent is between the age of 55 to 64
Tertiary	=1 if respondent's highest qualification is a degree or higher
Vocational	=1 if respondent's highest qualification is a vocational education
Year 12	=1 if respondent's highest qualification is year 12
No qualification	=1 if respondent's highest qualification is no qualification
Health condition	=1 if respondent has a long-term health condition
No partner	=1 if respondent has no partner (married or de-factor)
Partner is employed	=1 if respondent has a partner that is in employment
Partner is not employed	=1 if respondent has a partner who is not in employment (either unemployed or not in the labour force)
Hours of work	= hours usually worked in all jobs
Prefers to work fewer hours	=1 if respondent prefers to work fewer hours

Appendix 1 (continued)

List of Variables Included in Regression(s)

Variable Name	*Variable Description*
Prefers to work same hours	=1 if respondent prefers to work same hours
Prefers to work more hours	=1 if respondent prefers to work more hours
Manager	=1 if respondent's occupation is Manager
Professional	=1 if respondent's occupation is Professionals
Technicians & trade workers	=1 if respondent's occupation is Technicians & trade workers
Community & personal service workers	=1 if respondent's occupation is Community & administrative workers
Clerical & administrative workers	=1 if respondent's occupation is Clerical & administrative workers
Sales workers	=1 if respondent's occupation is Sales workers
Machinery operators & drivers	=1 if respondent's occupation is Machinery operators & drivers
Labourers	=1 if respondent's occupation is Labourers
Overall job satisfaction	= Self-reported overall job satisfaction (1-10)
Log hourly real wage rate	=calculated hourly log real wage rate for every respondent
Log household non-wage income	=calculated log non-wage income for every respondent
Mortgage	=1 if respondent is paying off a mortgage
House owner	=1 if respondent has paid off a mortgage
Renter	=1 if respondent is renting
Trade union	=1 if a trade union member
Percentage of time spent employed	=calculated the percentage of time spent employed since leaving full-time education for each respondent
Employer tenure	=Self-reported employer tenure (years)
Self-employed	=1 if respondent is self-employed
Fixed contract	=1 if respondent is on fixed contract
Casual contract	=1 if respondent is on casual contract
Permanent contract	=1 if respondent is on permanent contract
Small firm	=1 if respondent's firm employs 1 to 19 people
Medium firm	=1 if respondent's firm employs 20 to 199 people
Large firm	=1 if respondent's firm employs over 200 people
Dependent variable	=1 if full-time employed in t & t+1 =2 if full-time employed in t but part-time employed in t+1 =3 if full-time employed in t but not employed in t+1

Appendix 2

Results from the Ordered Logit Regression Models

	Men (1411) *Coefficient*	*Women (780)* *Coefficient*
Age	0.1906*	0.1630*
Tertiary	0.0678	0.8537**
Vocational	0.1122	0.4613
Year 12	-0.0978	0.4487
Health condition	0.6165*	0.3847
Partner is employed	0.1724	0.5634**
Partner is not employed	0.7321*	0.6657**
Hours of work	-0.0564	-0.0455*
Prefers to work fewer hours	0.3173**	0.4196**
Prefers to work more hours	-0.0911	1.4968**
Manager	0.3893	-0.7717
Professional	0.4522	-0.5947
Technicians & trade workers	-0.2192	-0.7847
Community & personal service workers	0.7838	-0.3709
Clerical & administrative workers	0.5150	-1.0231*
Sales workers	0.2537	-0.4704
Machinery operators & drivers	0.0954	-0.2817
Overall job satisfaction	-0.0556	-0.1798*
Log hourly real wage rate	-0.3372*	-0.6510*
Log household non-wage income	0.0123	0.0500
Mortgage	-0.1421	-0.1725
House owner	-0.0113	-0.0081
Trade union	0.4119*	-0.8033*
Percentage of time spent employed	0.8902	-1.0651
Employer tenure	0.0278*	0.0137
Self-employed	-1.6040*	-0.0860
Casual	-0.0240	0.4283
Permanent contract	-1.015*	0.0234
Small firm	0.3753	0.3480
Medium firm	-0.1975	0.4959
/cut1	10.78	6.64
	(2.63)	(2.93)
/cut2	11.60	7.73
	(2.62)	(2.94)

Source: HILDA Release 7.0.
Notes: * and ** stands for 5 and 10 per cent significance levels respectively. The figures in brackets are standard errors.

Brant Test of Parallel Regression Assumption

	Men		*Women*	
	chi2	p>chi2	chi2	p>chi2
All variables	89.18	0.000	94.24	0.000

A significant test statistic provides evidence that the parallel regression assumption has been violated.

Appendix 3 - Comprehensive Summary of the Marginal Effects from the Multinominal Model

	Men (N=1411)				*Women (N=780)*			
	Partial Retirement		*Full Retirement*		*Partial Retirement*		*Full Retirement*	
Variables	*Mean*	*S.E.*	*Mean*	*S.E.*	*Mean*	*S.E.*	*Mean*	*S.E.*
Age	-0.0025	0.0018	0.0082*	0.0018	0.0067*	0.0033	0.0065*	0.0021
Tertiary	0.0307	0.0270	-0.0116	0.0111	0.0380	0.0473	0.0389	0.0316
Vocational qualification	0.0159	0.0187	-0.0050	0.0107	0.0402	0.0529	0.0028	0.0201
No qualification	0.0096	0.0206	-0.0078	0.0095	0.0582	0.0480	-0.0062	0.0169
Health condition	0.0003	0.0113	0.0380*	0.0128	0.0277	0.0248	0.0132	0.0149
Partner is employed	0.0204	0.0159	-0.0074	0.0120	0.0028	0.0208	0.0445*	0.0181
Partner is not employed	0.00548**	0.0285	0.0065	0.0132	0.0246	0.0362	0.0507	0.0333
Hours of work	-0.0029*	0.0007	-0.0012*	0.0005	-0.0026*	0.0013	-0.0012	0.0008
Prefer to work few hours	0.0187*	0.0106	0.0095	0.0075	-0.0008	0.0177	0.0308*	0.0130
Prefer to work more hours	0.0151	0.0292	-0.0121	0.0187	0.1222	0.1830	0.0798	0.0982
Manager	0.0074	0.0233	0.0222	0.0206	-0.0142	0.0342	-0.0264*	0.0101
Professionals	0.0280	0.0272	0.0071	0.0186	0.0283	0.0441	-0.0469*	0.0170
Community and personal workers	0.0345	0.0472	0.0353	0.0375	-0.0428**	0.0233	0.0061	0.0207
Tradespersons	-0.0249**	0.0137	0.0061	0.0164	-0.0302	0.0293	-0.0158	0.0162
Machinery Operators and drivers	-0.0214	0.0142	0.0161	0.0187	-0.0103	0.0531	-0.0019	0.0361
Clerical and administrative worker	0.0263	0.0317	0.0135	0.0215	-0.0433	0.0273	-0.0264*	0.0129
Sales workers	0.0028	0.0287	0.0130	0.0290	-0.0173	0.0350	-0.0106	0.0202
Union	-0.0006	0.0102	0.0195*	0.0095	-0.0515*	0.0191	-0.0205**	0.0126
Job satisfaction	0.0002	0.0030	-0.0028	0.0022	-0.0094*	0.0005	-0.0055*	0.0022
Log wages	-0.0145**	0.0076	-0.0083	0.0061	-0.0268	0.0202	-0.0247*	0.0108
Log household non-wage income	0.0052	0.0044	-0.0017	0.0025	0.0064	0.0056	-0.0016	0.0029
Home ownership	0.0083	0.0143	-0.0008	0.0125	0.0492**	0.0256	-0.0368*	0.0180
Mortgage holder	0.0038	0.0186	-0.0032	0.0131	0.0158	0.0340	-0.0154	0.0113
Percentage time spent in employment	-0.0202	0.0648	0.0428	0.0494	-0.0451	0.0484	-0.0483**	0.0257
Employer tenure	0.0006	0.0005	0.0011*	0.0003	-0.0004	0.0008	0.0012*	0.0005
Self employment	-0.0111	0.0181	-0.0644*	0.0111	0.0212	0.0479	-0.0145	0.0144
Casual	0.0673	0.0493	-0.0194*	0.0092	0.1071	0.1058	-0.0142	0.0172
Permanent	-0.05454**	0.0281	-0.0302**	0.0182	0.0073	0.0300	-0.0063	0.0213
Small firm (1 to 19 employees)	-0.0001	0.0138	0.0220**	0.0112	0.0880*	0.0388	-0.0144	0.0119
Medium firm (20 to 199 employees)	-0.0135	0.0126	-0.0013	0.0084	0.0872*	0.0404	-0.0036	0.0131
Time dummies	yes		yes		yes		yes	
Predicted Probability	0.0390		0.0298		0.0609		0.0292	

Source: HILDA Release 7.0.
Notes: * and ** stands for 5 and 10 per cent significance levels respectively. The analysis relies on a pooled dataset including observations from wave 1 to wave 7. The standard errors are clustered by the personal identifier (xwaveid). The base categories are no partner, year 12, prefer to work same hours, labourer, renters, fixed contract and large firm (over 200 employees).

Appendix 4

The Marginal Effects for Different Age Groups - 55-64, 50-64 and 45-64

Marginal effects – Mature-age men: Partial Retirement

Variable	*55-64 Years*	*50-64 Years*	*45-64 Years*
Age	-0.0025	0.0028*	0.0019*
Health condition	-0.0003	0.0019	0.0027
Partner is employed	0.0204	0.0035	0.0020
Partner is not employed	0.0548**	0.0179	0.0090
Hours of work	-0.0029*	-0.0021*	-0.0019*
Prefer to work fewer hours	0.0187**	0.0132*	0.1198*
Prefer to work more hours	0.0151	0.0103	-0.0034
Tradespersons	-0.0249**	-0.0131	-0.0047
Union	-0.0006	-0.0021	0.0003
Overall job satisfaction	-0.0002	-0.0005	-0.0010
Log hourly real wages	-0.0145**	-0.0115*	-0.0100*
Employer experience	0.0006	0.0003	0.0001
Self employment	-0.0111	0.0092	0.0107
Causal	0.0673	0.0672**	0.0396*
Permanent	-0.0545*	-0.0123	-0.0099
Small firm	-0.0001	0.0022	0.0002
Predicted Probability	0.0390	0.0254	0.0193

A number of variables are not included because they are insignificant – all of the educational variables, most of the occupational variables, log household non-wage income, mortgage holder, home ownership, percentage of time spend employed and medium sized firm.

Marginal effects – Mature-age men: Full Retirement

Variable	*55-64 Years*	*50-64 Years*	*45-64 Years*
Age	-0.0082*	0.0048*	0.0026*
Health condition	0.0380*	0.0243*	0.0195*
Partner is employed	-0.0074	-0.0084	-0.0092*
Partner is not employed	0.0065	0.0020	0.0008
Hours of work	-0.0012*	-0.0008*	-0.0005*
Prefer to work fewer hours	0.0095	0.0037	0.0020
Prefer to work more hours	-0.0121	-0.0149*	-0.0100*
Tradespersons	0.0061	-0.0042	-0.0014
Union	0.0195*	0.0100*	0.0044
Overall job satisfaction	-0.0028	-0.0026*	-0.0018*
Log hourly real wages	-0.0083	-0.0077*	-0.0067*
Employer experience	0.0011	0.0006*	0.0003*
Self employment	-0.0644*	-0.0313*	-0.0202*
Causal	-0.0194*	-0.0139*	-0.0100*
Permanent	-0.0302**	-0.0156**	-0.0118*
Small firm	0.0220*	0.0103**	0.0032
Predicted Probability	0.0298	0.0225	0.0154

A number of variables are not included because they are insignificant – all of the educational variables, most of the occupational variables, log household non-wage income, mortgage holder, home ownership, percentage time spent not employed and medium sized firm.

Marginal effects – Mature-age women: Partial Retirement

Variable	*55-64 Years*	*50-64 Years*	*45-64 Years*
Age	0.0067*	0.0026	0.0014
Partner is employed	0.0028	0.0196	0.0284*
Partner is not employed	0.0246	0.0204	0.0057
Hours of work	-0.0026*	-0.0036*	-0.0035*
Prefer to work fewer hours	0.0008	0.0282*	0.0207*
Managers	-0.0142	-0.0248	-0.0274
Professionals	0.0283	0.0014	-0.0017
Community and personal workers	-0.0428**	-0.0051	0.0137
Clerical and administrative workers	-0.0433	-0.0246	-0.0338*
Machinery operator and drivers	-0.0103	-0.0248	-0.0456*
Union	-0.0515*	-0.0190	-0.0092
Overall job satisfaction	-0.0094*	-0.0039	-0.0030
Log hourly real wages	-0.0268	-0.0294*	-0.0313*
House ownership	0.0492**	0.0284	0.0124
Percentage of time spent employed	-0.0451	-0.0206	-0.0335
Employer experience	-0.0004	0.0000	-0.0001
Causal	0.1071	0.0508	0.0693*
Small firm (1 to 19 employees)	0.0880*	0.0561*	0.0445*
Medium firm (20 to 199 employees)	0.0872*	0.0438*	0.0339*
Predicated Probability	0.0609	0.0664	0.0664

A number of variables are not included because they are insignificant – all of the educational variables, health condition prefer to work more hours, technicians and trade worker occupation, sales worker occupation, log household non-wage income, mortgage holder, self-employment and permanent contract.

Marginal effects – Mature-age women: Full Retirement

Variable	*55-64 Years*	*50-64 Years*	*45-64 Years*
Age	0.0065	0.0045*	0.0028*
Partner is employed	0.0445*	0.0175*	0.0048
Partner is not employed	0.0507	0.0556*	0.0355*
Hours of work	-0.0012	-0.0006	-0.0004
Prefer to work fewer hours	0.0308*	0.0198*	0.0108*
Managers	-0.0264*	-0.0135	-0.0070
Professionals	-0.0469*	-0.0194**	-0.0142*
Community and personal workers	0.0061	-0.0012	-0.0032
Clerical and administrative worker	-0.0264*	-0.0231*	-0.0150*
Machinery Operators and drivers	-0.0019	-0.00017	-0.0041
Union	-0.0204**	-0.0161*	-0.0086**
Overall job satisfaction	-0.0055*	-0.0047*	-0.0031*
Log hourly real wages	-0.0247*	-0.0120	-0.0098*
House ownership	-0.0368*	-0.0121	-0.0075
Percentage of time spent employed	-0.0483**	0.0185	0.0153
Employer experience	0.0012*	0.0005	0.0002
Causal	-0.0142	-0.0122	-0.0093
Small firm (1 to 19 employees)	-0.0144	-0.0117	-0.0041
Medium firm (20 to 199 employees)	-0.0036	-0.0024	-0.0044
Predicated Probability	0.0292	0.0246	0.0182

A number of variables are not included because they are insignificant – all of the educational variables, health condition prefer to work more hours, technicians and trade worker occupation, sales worker occupation, log household non-wage income, mortgage holder, self-employment and permanent contract.

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