Labour market engagement of mature-age workers

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July 2011

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[1] 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 to 64 years old over a (approximately) one year time period. 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 demographic characteristics such as age and relationship status as well as some financial factors such as wages, government benefits and house ownership influence the retirement paths of mature-age workers. Further the results indicate that certain occupations and job characteristics significantly influence the employment engagement of mature-age workers.

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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 labour force participation rates, it is important 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 decision exists. Studies concerning Australian retirement behaviour have extensively focused on financial aspects (see Woodland 1987; Atkinson and Creedy 1997; Heady, Freebairn, Mavromaras, Oguzoglu and Warren 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. In more specific terms, we examine the role that occupations and employment characteristics (i.e. contract type, firm size, union membership and etc.) play in supporting mature-age workers to remain in the workforce for longer. 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.

The paper is organised as follows. The next two sections provide a theoretical framework and some empirical evidence of the factors that influence the retirement decisions of mature-age workers. Section 4 provides a description of the data and some initial descriptive statistics illustrating the transition and characteristics of mature-age workers. Section 5 affords a brief description of the methodology employed for this research. Section 6 presents the results of the regression analysis revealing the factors that influence the retirement paths of mature-aged men and women. The last section states the key findings and implications.

2. Theoretical framework

The retirement decision is based on work-leisure choice theory, encompassing the notion of utility maximisation. 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 mostly 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 distinguished features. First, Social Security 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 workers 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:

$$\sum_{t=0}^{N} (1+r)^{-t} P_t X_t \ \leq A_0 + \sum_{t=0}^{N} (1+r)^{-t} [w_t(T-L) + TR_t - TX_t + PENS_t + SS_t] \tag{3}$$

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 (TR_t), taxes (TX_t), private pension income ($PENS_t$) and Social Security benefits (SS_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:

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

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 in both the timing and 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 workers, 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 (see Appendix 1 for a listing of factors influencing the retirement decision classified into supply, demand and institutional factors).

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).

3.1 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 for mature-age workers labour market engagement. A large amount of evidence have also shown that a number of institutional factors such as the eligibility of pension payments, the income taxation system (i.e. taper rate) and the workplace relation system significantly shape the retirement decision of mature-age workers.

Not surprisingly, previous studies have consistently shown that age is positively related to the likelihood of retirement. It has been found that few men continue working very long beyond the initial age of eligibility for a pension or superannuation annuity (see, Kim and DeVaney, 2005; and Parnes and Sommers, 1994). An Australian study found that the probability of retirement for an average man increases from about 15 per cent at age 55 years to 55 per cent at age 70 years. For an average women, the probability increases from below 10 per cent at age 55 years to 30 per cent at age 70 years (Thomson, 2007). On the eligibility of old age social security payments, cross-country evidence suggests that an increase in the pension age will raise the labour force participation rate (LFPR) of mature-age males. It was found that increasing the retirement age by one year raises the LFPR of males aged 55 to 64 years by about 1 percentage point (Blondal and Scarpetta, 1999).

Other aspects that significantly impact the labour force participation of mature-age workers are a person's health status, education and their partner's labour-market participation (Borland and Warren, 2006). In addition, wages and wealth have a substantial influence on mature-age

employment. 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).

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 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).

Since most mature-age workers are part of a couple or household, labour supply decisions are not made in isolation. 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 (Evans and Kelly, 2002). According to one regression analysis, those with working spouses are four percentage points less likely to retire, other things equal. On the other hand, the higher the spouse's wage, the more likely the individual is to have stopped work (Quinn *et al.*, 1998).

Often, however, a mature-age worker's own wages is found to be even more important than the earnings of a spouse in influencing labour force participation (Ruhm, 1990). Wages seem

to 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 to 59 years 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 workers. Wealth provides individuals with the necessary means for continuing to consume 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, 2002). Also, workers with more generous superannuation coverage have been found to retire earlier (see Leonseso, 1993; Lumsdane and Mitchell 1999; and Disney and Smith, 2002). Australian cross-section studies find that availability of superannuation has a negative effect on mature-age employment engagement (Borland, 2005).

In line with the importance of financial circumstances on the labour force participation of mature-age workers is the influence of institutional arrangements involving 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, Leoneso, 1993; and Disney and Smith, 2002). The international comparative literature shows that the higher a country's implicit

taxes on continued work, the lower its actual average age of retirement (see, Duval, 2004; and Gruber and Wise, 2002). There is also an increased belief in Australia that the higher marginal tax rate faced by those eligible for the Age Pension presents a significant disincentive to combine work with retirement (see, Harmer, 2009; and Spoehr *et al.*, 2009).[2]

Another important institutional determinant of retirement is the degree of labour protection through national laws. Employment protection and anti-age discrimination regulation by legislation can have an impact on mature-age employment by possibly influencing the hiring and firing decision. 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 workers 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 workers 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; Encel, 1998; and Bittman *et al.*, 2001).

3.2 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 context. That 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

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

to retire 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 the older workers' physical capabilities and the requirements of the job (Blekesaune and Solem, 2005).

Closely related to working condition are the characteristics associated with certain occupations. Certain 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 to retire (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 Heady *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 facing 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 for both men and women to move 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 (Dom and Souza-Poza, 2004). On the other hand, one could argue that larger firms are actually better placed to encourage mature-age workers 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 possible impact of firm size on mature-age employment, it 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 feel 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).

3.3 Partial retirement

One particular retirement pathway that seems to have 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). Studies show that part-time work rises dramatically with age. According to the U.S. Bureau of Labor Statistics, 16 per cent of men and about 33 per cent of women who were aged 60-64 years worked part-time, while 50 per cent of men and 60 per cent of women over 65 years did in 1999 (Kim and DeVaney, 2005).

The decision to retire partially is likely to be complicated, because employers may not be willing to offer bridging jobs with reduced hours of work or such jobs 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 for an equivalent job with full-time hours (Borland, 2005). Consequently, employees who are unable to reduce their hours of work with their current employer may have to switch to another job or occupation (Kim and DeVaney, 2005). One study found that out of the 110 individuals who partially retired, 40 per cent changed jobs compared with 20 per cent who remained working full-time (Thomson, 2007). Changing jobs may possibly result in loss of job-specific skills which may in turn lead to lower wages being paid to those workers (Gustman and Steinmeier, 1984).

Research on transitions into retirement in the United States has produced different conclusions on the extent to which mature-age workers decide to move into partial retirement. Some studies have shown that partial retirement and bridging jobs are an important aspect of the transition of older workers to retirement. According to some studies, around 20 per cent of older workers are in partial retirement at any particular time. However, other studies find that the incidence of partial retirement is rather small with most workers moving directly from full-time employment to full retirement. An issue that arises from the findings of the latter set of studies is whether the small proportion of partial retirement is 'voluntary' or due to constraints on mature-age workers' capacity to choose their desired hours of work (Borland, 2005).

Australian research into partial retirement is rather limited. One exception is a recent Australian study investigating the incidence and determinants of partial retirement (Thomson, 2007). The author of the study finds that partial retirement is a common pathway for many older workers. She showed that, of those who left full-time employment within the three years examined, 54 per cent of women and 38 per cent of men shifted to partial retirement. In light of the apparent significance of partial retirement and the currently limited insight into it, we seek to enhance the knowledge of the determinants of partial and full-time retirement. The

particular focus is on the influence that certain employment and job characteristics have on mature-age worker's decision to elect a certain retirement pathway.

4. Data and descriptive statistics

We use the HILDA survey for our analysis which is a longitudinal household panel survey which began in 2001. The members of the initial sample of households formed the basis of the panel to be followed over an indefinite life. Its main focus is collecting information about economic and subjective well-being, labour market dynamics and family dynamics. To date, nine waves of the HILDA data have been released. The HILDA survey is suitable for this particular research because it provides detailed information on respondent's characteristics and labour market situation. The dataset allows us to determine people's employment status at different times, the occupation they work in and some of the job characteristics they encounter. Hence, the data permits us to investigate the role of occupations and job characteristics on the retirement paths of mature-age workers.

Our analysis utilises the first 7 waves of the HILDA data. The sample is restricted to men and women aged between 45 and 64 years old with a particular focus on those in the older age bracket of between 55 and 64 years old. We merge two waves together to observe the labour market transition over a one year time period (each wave is approximately one year apart). We then pool all of these merged datasets together to give us a pooled dataset providing us with more observations[3]. Mature-age workers are categorised as working full-time, working part-time or not being employed as we are interested in the following transition paths:

- Full-time employed in the initial wave (t) and full-time employed in the subsequent wave (t+1) – full-time employment

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

- Full-time employed in the initial wave (t) and part-time employed in the subsequent wave (t+1) – partial retirement

- Full-time employed in the initial wave (t) and not employed in the subsequent wave (t+1) – full retirement

Our classification of mature-age workers into the different labour market transition categories follows that employed by Thomson (2007). Coinciding with her approach, we are not looking at any other transitions including moving from part-time work to full-time retirement. However, contrary to her methodological approach 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 which should result in a more robust and reliable analysis. In addition to deriving our three transition paths, we derive a number of other variables, the names and description of which are listed in Appendix 2.

4.1 Descriptive statistics

Past data has shown that the participation rate of mature-age workers has increased over time with the main driver being the significant rise in the labour force participation of women of all ages. However, Australia's mature-age participation rate is lower than similar countries, such as the United States, United Kingdom, Canada and New Zealand (Australian Department of Treasury, 2010).

A substantial amount of transition out of employment occurs for those aged between 45 to 64 years old. Figure 1 shows that while only 17 per cent of those aged 45 to 54 years old are not in the labour force, 47 per cent of people between the ages of 55 to 64 years old are not in the labour force illustrating as expected that labour force participation reduces with age. Interestingly, the significant drop in employment seems to occur to full-time employment

which is about 26 percentage points higher for those aged 45 to 54 compared to those aged 55 to 64 years old while the proportion of people in part-time employment remaining fairly constant at around 20 per cent for both age groups.

Figure 1: Labour force status (LFS) of workers aged between 45 to 64 years old
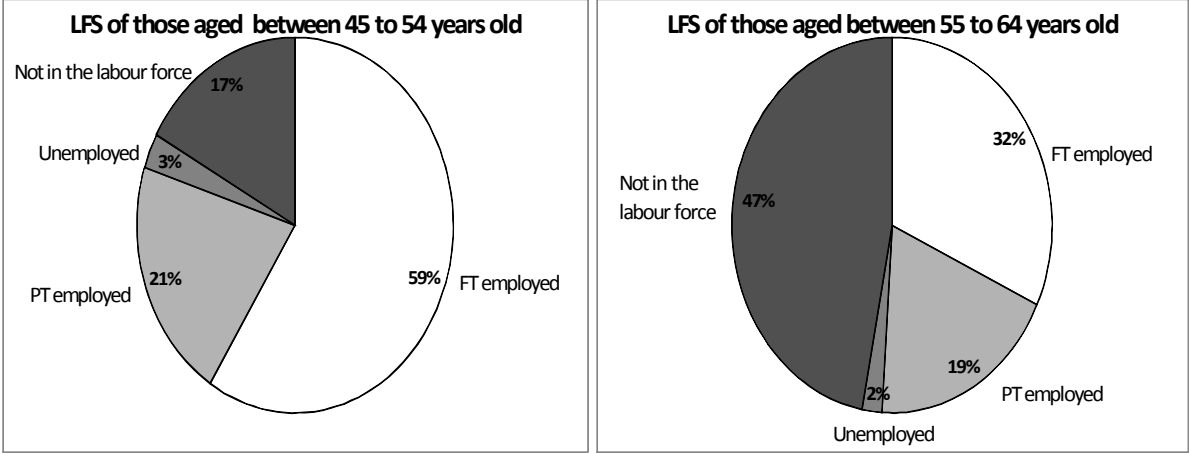
Source: HILDA Release 7.0, Note: The dataset has been pooled using wave 1 to wave 7 data

However, having a closer look at the transitions from full-time employment over a one year period reveals a somewhat different picture. Table 1 shows that a large proportion of people remain in full-time employment from one year to the next suggesting that being employed in one period is a good predictor of being employed in the next period. In addition, the table illustrates that the proportion of those transitioning into partial and full retirement are similar with 7 per cent of men and 11 per cent of women moving into partial retirement while 9 per cent of men and 7 per cent of women move into full retirement from one period to the next. In order to provide more of an insight into the factors that influence mature-age workers to remain in employment, Table 2 presents a descriptive analysis of some of the characteristics associated with those men and women who are employed and aged between 45 to 54 years old and 55 to 64 years old.

Table 1: Labour market transitions of mature-aged workers aged 55 to 64 years old

	Men Full-time employed in t	Women Full-time-employed in t
Full-time employed in t+1	84%	82%
Partially retired in t+1	7%	11%
Fully retired in t+1	9%	7%

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

Table 2 suggests that employed men and women according to the two age groups are quite different in their characteristics. In terms of educational attainment, the numbers indicate that the proportion employed with a tertiary education is lower for both men and women aged between 54 to 64 years old compared to the younger age group[4]. A somewhat smaller proportion employed can also be observed for the older age group with vocational education. The proportion of people working with a health condition is higher for the older age group suggesting as one would expect that long-term health conditions increase with age. The proportion employed who are in relationships also differs between the two age groups, which is true particularly for women. The figures show that the proportion of women employed in the older age groups are 6 percentage points lower compared to the younger age group. This suggests that women without a partner are more likely to remain in the labour force for longer.

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[4] The younger age group refers to those aged 45 to 54 years old while the older age group refers to people aged 55 to 64.

Table 2: A selection of characteristics of employed men and women aged between 45 to 54 years old and aged between 55 to 64 years old

	Men		Women	
Variables	*45-54 years*	*55-64 years*	*45-54 years*	*55-64 years*
Tertiary qualification	27%	23%	29%	23%
Vocational qualification	43%	38%	26%	26%
Year 12 education	8%	9%	11%	8%
Health condition	16%	23%	16%	21%
In relationship	83%	86%	73%	67%
Part-time employed	9%	25%	44%	51%
Manager/Professionals	45%	47%	40%	40%
Technicians & Trades workers	20%	15%	4%	3%
Community & service workers	4%	3%	12%	12%
Clerical & administrative workers	8%	8%	26%	28%
Sales workers	4%	5%	8%	5%
Machinery operators & drivers	11%	11%	1%	1%
Labourer & related workers	8%	11%	9%	11%
Union membership	34%	25%	32%	33%
Self-employed	28%	39%	15%	25%
Casually employed	6%	13%	18%	19%
Permanent contract	59%	43%	58%	52%
In small firm (1 to 19 workers)	50%	59%	45%	52%
In medium firm (20 to 199 workers)	32%	27%	36%	31%
Hourly real wage rate	$23.10	$23.36	$19.88	$19.92
Job satisfaction	7.6	7.9	7.8	8.1
Household non-wage income	$48,862	$55,387	$63,546	$54,122
House ownership	42%	65%	46%	66%

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

Looking at employment characteristics, the table reveals that the proportion of those in part-time employment is substantially higher for those aged between 54 to 65 years old. Interestingly, the distinction is particularly substantial for men with the difference being 16 percentage points while for women the difference is about 7 percentage points. This supports other research showing that movement into partial retirement occurs as labour participants get older (Thomson, 2007). Turning to occupations, we see that overall there are no significant differences between the two age groups. One exception though is the technicians and trades

worker occupation where the proportion of males employed in this occupation is 5 percentage points lower for the older age group compared to the younger one. Another exception is the labourer and related workers occupation where interestingly the proportion of those employed in this occupation is 3 and 2 percentage points higher for older male and female workers respectively. One other thing to note is that consistent with other evidence, the numbers show a high level of gender segregation across occupations.

The table further reveals that while union membership is the same for women across age groups, for men the proportion is 9 percentage points lower for those in the older age group compared to the younger age group. The proportion of those in self-employment is higher for the older age group with 11 and 10 percentage points for men and women respectively. This coincides with the well-established observation that self-employed individuals remain in the workforce for longer (Parker and Rougier, 2007). The proportion in casual employment is also higher for men in the older age group (7 percentage points) but is relatively unchanged for women while the proportion on permanent contracts is substantially lower for both genders in the older age group. Looking at firm size, we see that the proportion employed in small firms are 9 and 7 percentage points higher for men and women in the older age group respectively.

Looking at the hourly real wage rate, it appears that it is fairly similar for the two age groups by gender which suggest that those earning higher wages are not more likely to remain in employment. However, job satisfaction differs and is slightly higher for men and women in the older age group suggesting a positive link between job satisfaction and workforce participation. Another intriguing finding is that household non-wage income is higher at around $6,500 for men but it is lower at around $9,400 for women in the older age group. This indicates that women who are employed at an older age are part of a lower income

household. Lastly, we see that a larger proportion of working women and men in the older age group have paid off their mortgage.

5. Methodology

For our analysis we use multinomial logit (MNL) models with the dependent variable taking 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 1.

$$P(y_i = j \mid x_i) = \frac{\exp(x'_i \beta_j)}{1 + \sum_{r=1}^{2} \exp(x'_i \beta_r)} \qquad j = 0,1,2,$$

(1)

Remaining in full-time employment over two periods is the reference category. The corresponding log-likelihood function used to estimate the model is shown in equation 2 where d_{ij} is a dummy variable equal to one when individual i follows the jth retirement path.

$$\log L_i = \sum_{i=1}^{n} \left[d_{i0} \log \frac{1}{1 + \sum_{r=1}^{2} \exp(x'_i \beta_r)} + d_{i1} \log \frac{\exp(x'_i \beta_1)}{1 + \sum_{r=1}^{2} \exp(x'_i \beta_r)} + d_{i2} \log \frac{\exp(x'_i \beta_2)}{1 + \sum_{r=1}^{2} \exp(x'_i \beta_r)} \right]$$

(2)

The model that we are estimating is presented in equation 3. The results obtained from the model are expected to illustrate how employment, job and individual characteristics affect the probability of choosing a particular retirement path.

$$RP_i = \delta_0 + \delta_1 X_i + \delta_2 O_i + \delta_3 Z_i + \delta_4 T_i + \varepsilon_i \qquad\qquad (3)$$

where RP_i is the retirement paths an individual chooses

X_i comprises the personal and household characteristics (age, education level, relationship status, health status, receipt of government benefits, housing and household income).

O_i consist of occupation dummies (according to ASCO classification)

Z_i includes a number of job and employment characteristics (hours of work, log hourly real wages, job satisfaction, union status, workforce experience, contract type and firm size).

T_i comprises time dummies (to account for the different waves)

ε_i is the error term (assumed to be independently and identically gumbel distributed)

Consistent with the approach followed in other studies, and the strong theoretical and empirical evidence indicating that the factors influencing labour market participation vary according to gender, we estimate separate models for men and women. In addition, our sample consists only of workers aged between 55 and 64 year olds because we observer a larger proportion of people in this age group to be not in the labour force. As this cohort increases as a share of the population, it becomes important to understand the factors that influence those in this age bracket to remain in employment.

6. Discussion of regression results

Table 4 shows the marginal effects from the multinomial models by gender (see Appendix 3 for the detailed results of the marginal effects analysis). Consistent with previous research, we find that the retirement paths of mature-age men and women are influenced by different factors. However, there are a few factors such as hours of work, job satisfaction and hourly

wages that impact both genders in similar ways. For instance, higher working hours significantly reduce the transition into partial and full retirement for both men and women. This could be seen as reflecting some state dependence, with current hours of work of full-time employees a good predictor of the preference for mature-age workers to remain fully attached to the labour force.

Job satisfaction and log hourly real wages also reduce the probability of moving into retirement for both genders with the effect being particularly strong for women.[5] One unit increase from the mean of job satisfaction decreases the probability of women to move into partial and full retirement by 0.9 and 0.7 percentage points respectively. An increase in the wage rate has an even more significant effect on the retirement probability of women, with a one per cent increase in the wage rate translating into a 5.4 and 1.6 percentage points reduction in the probability of moving into partial and full retirement respectively. On the other hand, household non-wage income is not significant in influencing either gender in their retirement paths. While this is contrary to the view that household finances matter in labour supply decisions, more recent studies have found similar results (Birch, 2005).

Contrary to other research we find that the impact of education on the retirement paths of mature-age workers is less significant. Nevertheless, a couple of the educational coefficients are significant indicating that for mature-age men, a tertiary qualification as compared to a year 12 is positively associated with movement into partial retirement while no qualification is negatively correlated with full retirement. To some degree, this supports the finding of a recent study showing that both less-educated and more-educated workers are more likely to

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[5] 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. Applying logs to the real hourly wages is a common practice. It accounts for the exponential nature of the variable and allows the coefficients to be interested as percentage changes.

remain employed compared to those with intermediate levels of education (such as year 12 and vocational qualifications) (Ryan and Sinning, 2010).

The results further reveal that there are a number of other demographic factors that significantly influence the retirement paths of mature-age workers. Age is found to be significantly positively correlated with men's transition into full retirement and women's movement into partial retirement. This is reflective of institutional arrangements governing the eligibility of pension and superannuation payments. Relationship status is another factor influencing the retirement paths of mature-age workers. Being in a relationship opposed to not being in a relationship increases the probability of men moving into partial retirement by 2.4 percentage points and women are 3.2 percentage points more likely to move into full retirement. This finding demonstrates the importance of the household in the decision making process. A person's health status seems to be less influential in the retirement path with the results showing that only mature-age men with a health condition when compared to those without a health condition are 2.4 percentage points more likely to move into full retirement. The reason for that is likely to be associated with the fact that the people we observe here are generally healthier as they are still in the workforce and working full-time in the initial period.

Table 4: Marginal effects for partial and full retirement transitions of men and women aged between 55 to 64 years old

| Variables | Men (N=1493) | | | | Women (N=828) | | | |
| | Partial Retirement | | Full Retirement | | Partial Retirement | | Full Retirement | |
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Age	-0.0001	0.0025	0.0055**	0.0029	0.0124*	0.0047	0.0026	0.0038
Tertiary	0.0562**	0.0336	-0.0204	0.0143	0.0354	0.0520	0.0376	0.0345
No qualification	0.0164	0.0220	-0.0259*	0.0125	0.0472	0.0468	-0.0176	0.0178
Health condition	-0.0032	0.0098	0.0238**	0.0133	0.0190	0.0245	0.0215	0.0156
Relationship status	0.0240*	0.0094	-0.0022	0.0148	-0.0033	0.0200	0.0315*	0.0129
Hours of work	**-0.0032***	0.0006	**-0.0013***	0.0006	**-0.0038***	0.0014	**-0.0016***	0.0008
Manager	0.0016	0.0187	0.0037	0.0192	-0.0326	0.0290	-0.0271*	0.0119
Professionals	0.0186	0.0223	-0.0125	0.0173	-0.0014	0.0390	-0.0507*	0.0180
Community and personal workers	0.0264	0.0393	0.0154	0.0303	-0.0414**	0.0250	-0.0015	0.0190
Tradespersons	-0.0276*	0.0111	-0.0070	0.0159	-0.0034	0.0500	-0.0215	0.0160
Machinery Operators and drivers	-0.0273*	0.0111	0.0006	0.0170	-0.0231	0.0575	-0.0032	0.0311
Clerical and administrative worker	-0.0069	0.0215	-0.0090	0.0164	-0.0500**	0.0278	-0.0265**	0.0141
Union	**-0.0412**	0.0100	**0.0204****	0.0118	**-0.0491***	0.0220	**-0.0269***	0.0133
Job satisfaction	**-0.0020**	0.0023	**-0.0052***	0.0025	**-0.0092***	0.0045	**-0.0068***	0.0025
Log wages	**-0.0114***	0.0030	**-0.0063**	0.0090	**-0.0538***	0.0200	**-0.0157***	0.0119
Log government payments	0.0061**	0.0020	0.0029	0.0025	-0.0013	0.0045	-0.0050	0.0035
House ownership	0.0112	0.0129	-0.0010	0.0140	0.0546**	0.0275	-0.0321**	0.0168
Work experience	0.0237	0.0017	0.0043**	0.0023	-0.0047**	0.0028	0.0033	0.0029
Employer tenure	0.0005	0.0004	0.0012*	0.0004	-0.0002	0.0010	0.0012*	0.0006
Self employment	-0.0030	0.0176	-0.0764*	0.0114	0.0069	0.0486	-0.0195	0.0161
Casual	0.1058*	0.0580	-0.0224**	0.0133	0.0921	0.0940	-0.0116	0.0239
Small firm (1 to 19 employees)	0.0015	0.0124	0.0209	0.0134	0.0725*	0.0372	-0.0104	0.0131
Medium firm (20 to 199 employees)	-0.0157	0.0112	-0.0004	0.0113	0.0924*	0.0383	0.0024	0.0130
Predicted Probability	0.0383		0.0424		0.0738		0.0332	

Source: HILDA Release 7.1. 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. A number of variables included in the model are not listed due to insignificance.

In addition, we find that certain financial and household factors such as the receipt of government benefits[6] and having paid off the mortgage have some influence on the retirement probability of mature-age workers. The results show that a one per cent increase in the receipt of government payments increases mature-age men's probability to move into partial retirement by 0.6 percentage points. While government payments do not appear to be a significant factor in women's retirement path, house ownership does appear to be. The results show that owning a house (having paid off the mortgage) as compared to renting increases the probability for women to move into partial retirement but it 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 being in an apparent superior financial situation compared to other women[7]. This is contrary to other studies that find increased home loan affordability causes women to leave the labour force (Connolly and Spence, 1996).

Turning now to the influence of occupations, the results for males generally show that their impact on the retirement paths of mature-age people is limited (after controlling for individual and workplace characteristics). Occupational status makes no statistically significant difference to the likelihood of full-time retirement and only two occupations influence partial retirement. The results reveal that the technicians and trades persons occupation and machinery operator and drivers occupation relative to the labourer and related worker occupation reduce men's probability of moving into partial retirement by 2.8 and 2.7 percentage points respectively. For females, occupational status seems to have a more significant influence. The results reveal that working in the community and personal workers or clerical and administrative worker occupations as compared to working in the labourer

[6] In this context, government benefits refer to Australian pensions and benefits received in a financial year. It may or may not include income support received over the financial year.
[7] That is compared to mature-age women who are renting or still paying off their mortgage.

occupation reduces the probability of mature-age women moving into partial retirement by 4.1 and 5 percentage points respectively. In addition, the results suggest that working in the manager, professional or clerical and administrative worker occupations as opposed to working in the labourer and related worker occupation reduces women's probability of moving into full retirement by 2.7, 5.1 and 2.6 percentage points respectively.

In addition to the results discussed so far, we also find that a number of job characteristics, such as union membership, contract type and firm size, influence the retirement paths of mature-age men and women. An interesting finding is that union membership affects both genders, but in very different ways. The results indicate that men who belong to a union are 2 percentage points more likely to move into full retirement while it decreases women's probability to both enter partial and full retirement by 4.9 and 2.7 percentage points respectively. This suggests that unions influence working conditions in a way that encourages women to remain in employment, while they seem to discourage men's attachment to the labour force. However, it is difficult to isolate the role of unions from the impact of other workplace characteristics that may be correlated with union density. It is therefore necessary to further investigate the role that unions play in the retirement decision of mature-age workers before attributing this effect to union membership.

The contract type is found to be relevant for the retirement path of mature-age men. The results show that being on a casual contract as opposed to being on a fixed contract increases the probability of partial retirement for men by 10.6 percentage points while it reduces their probability of moving into full retirement by 2.2 percentage points. We also find that self-employment substantially decreases the probability for men to move into full retirement. The results suggest that mature-age men who are self-employed compared to those on fixed contracts are 7.6 percentage points less likely to move into full retirement. This is likely to be

due to the attractiveness and emotional investment in self-employment on the one hand and the possible reliance on continued business success for an adequate retirement income on the other hand. Lastly, the analysis reveals that firm size is of relevance to women's retirement path. We find that mature-age women who work in small to medium size firms opposed to those working in large firms are 7.3 and 9.2 percentage points more likely to move into partial retirement.

6.1 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). However, there are some differences and it is worth discussing a few of them here. In relation to partial retirement of mature age men, we find that while relationship status is significantly positively associated with movement into partial retirement of those aged between 55 to 64 years old we do not find it significant for either those aged between 50 to 64 years old or those aged between 45 to 64 years old. This may be indicative of their partners being younger and less likely to be retired since they (those in the two broader age brackets) themselves are younger on average. Another difference relates to time spent not employed. The relationship is positive but insignificant for those aged between 55 to 64 year olds, but is significant for the other two broader age groups. This may suggest that those in the older age group are quite homogenous in the way that they have not spent a substantial amount of time not in employment.

In relation to full retirement of mature-age men, the differences are associated with education, occupation, household non-wage income and government payments. While tertiary education and professional occupation is not significantly correlated with full retirement in the case of those aged 55 to 64 years old, it is significantly negatively correlated for those aged 45 to 64 and those aged 50 to 64 years old suggesting that human capital becomes unimportant in

influencing the probability of moving into full retirement as men become older. Household non-wage income and government payments are two other factors that show up to be significant for the two broader age groups. In the case of government payments, the results show that they are significantly positively correlated with the probability of moving into full retirement for those aged between 45 to 64 and those aged 50 to 64 years old. This suggests that financial considerations are not very significant in influencing the full-time retirement decision of older men.

Turning now to differences associated with partial retirement of mature-age women we find that union membership and job satisfaction is not significant for the broader age groups while both of those factors are significantly negatively correlated for those aged 55 to 64 years old. This suggests that working conditions are particularly important for (on average) older workers in remaining in full employment. A further difference worth mentioning relates to house ownership. It increases the probability of those aged 55 to 64 years old to move into partial retirement, but it does not have a significant effect on both of the younger age groups. This indicates that having paid off the mortgage provides older women with the opportunity to move into partial retirement.

In relation to full retirement of mature-age women, the differences are associated with health condition, self-employment as well as house ownership. While a health condition is not significant for those aged 55 to 64 years old, it is positively significant for the broader age groups. This suggests that women in the older age group are on average healthier because those of inferior health have already moved out of full-time employment before reaching their mid-50s. Self employment is also not significant for those 55 to 64 years old, but is significantly negatively correlated for the two broader age groups. The results suggest that self-employment reduces the probability for women aged 50 to 64 and 45 to 64 years old to

move into full retirement. This finding is consistent with other Australian research (Thomson, 2007). Lastly, we find that house ownership is significantly negatively correlated with movement into full-retirement for those aged 55 to 64 years old, while it is not significant for those in the two broader age groups. This is an interesting finding as so far as it contradicts the expectations that those in a superior financial position would be able to afford to move into full retirement.

7. Conclusion

Consistent with previous research we find that demographic and personal characteristics such as age, relationship status and household factors influence the retirement paths of mature-age workers. In line with theoretical and empirical evidence we find that the wage rate significantly decreases the probability of moving into retirement for both genders with the effect being particularly significant for women. In addition, we find that certain financial and household factors, such as the receipt of government benefits and house ownership, have some influence on the retirement probability of mature-age workers. The results show that an increase in the receipt of government payments increases the probability of mature-age men moving into partial retirement while owning a house increases the probability of women moving into partial retirement but it decreases their probability of moving into full retirement.

We further find that certain occupations and job characteristics significantly influence mature-age men's and women's retirement decision. The technicians and trades persons and machinery operators and drivers occupations are associated with a reduced probability for mature-age men to move into partial retirement while mature-age women in the manager, professional or clerical and administrative worker occupations are less likely to move into full retirement. We also find that belonging to a union increases the probability for men to move

into full retirement while it decreases women's likelihood to both enter partial and full retirement. The contract type also has some relevance for the retirement path of mature-age men as being on a casual contract increases their probability of partial retirement while being self-employed substantially decreases their likelihood of moving into full retirement. Lastly, we find that job satisfaction reduces the probability of moving into retirement for both genders, but similar to the wages effect, the impact is particularly large for women.

According to our results, there are significant differences in the factors that influence the retirement paths of mature-age men and women. 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. It is therefore important to be aware of how policy initiatives may influence mature-age men and women differently. In relation to this it appears that mature-age men face more barriers to move into partial retirement and thus discouraging them to remain in the workforce. Our analysis also provides an interesting but preliminary insight into the influence of job characteristics on the retirement paths of mature-age workers suggesting that workplace practices and arrangements may be important in encouraging mature-age workers to remain in the labour force for longer.

It is be important to conduct further sensitivity analysis and research into the influence that job characteristics have on the retirement path. Currently, the Australian evidence is rather limited. Future research into job characteristics and workplace factors should aim to reveal more about the underlying drivers that influence mature-age workers to follow a particular retirement path. A better understanding of those drivers would be valuable in assisting policy makers, not only to retain mature-age workers but also other labour market participants (i.e. women of child-bearing age, people with disabilities etc.) in the workforce.

Appendix 1: Factors influencing mature-age workers labour market participation

Labour supply factors	Labour demand factors	Institutional factors
• Individual factors such as a person's health condition, education attainment, spouse's employment status and care responsibility significantly impact on a mature-age worker willingness to participate in the labour force.	• Relative ability to undertake required production tasks – Firms will have a required set of production tasks for workers to complete. Those production tasks will require workers to have skills necessary to be able to complete the tasks.	• Income taxes and payroll taxes affect respectively the incentives for an individual to engage in paid work, and for employers to use labour in the production process.
• Superannuation/Wealth – An increase in an individual's wealth will increase the 'non-labour market income' available at any time. This increase in income would be expected to induce the individual to seek to 'consume' more leisure/ reduce labour supply.	• Relative productivity and wages – Workers from different ages may all be able to complete a given production task, but may differ in their productivity. Other things equal, the higher a worker's productivity, and the lower the wage cost, the more likely that the labour services of that type of worker will be demanded by an employer.	• Social security pensions/allowances – An increase in the level of income from these sources, will raise the opportunity cost of paid work which is expected to decrease labour supply.
• Higher earnings per hour from paid work will raise the value of working compared to leisure. Hence it would generally be expected that labour supply is positively related to labour market earnings	• Hiring and training costs – A firm that hires a new worker will incur fixed costs. The firm will seek to amortise those costs, or to gain the benefits from the investment, over as long a future period as possible.	• Labour market regulations such as miniumum wage regulation prohibit employers from paying wages below a specific level.
• Labour market conditions - The probability of obtaining a job, as well as expected earnings if employed. A lower probability of obtaining employment will lower the benefits of seeking paid work, and hence lower labour supply.	• Attitudinal/Discrimination – In making a decision on which type(s) of labour to hire an employer does not have perfect information about factors such as the relative productivity of workers by age, or the costs of training.	• Anti-discrimination regulations specify rules that must be followed by employers in choosing between applicants for any job.
• A higher disutility of work will lower the value of work relative to leisure. Hence it would be expected that labour supply is negatively related to disutility.	• Degree of flexibility in employment options – The types of job offered and the extent of flexibility may induce different types of labour force participants to seek those jobs.	
• Social norms – Individuals may adapt their behaviour to social norms about early retirement and retirement age.		

Appendix 2: List of variables included in regression(s)

Variable name	Variable Description
Age	=respondent is between the age of 15 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
Relationship	=1 if respondent has is in a relationship (married or de-factor)
Prefers to work fewer hours	=1 if respondent prefers to work fewer hours
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)
Hourly wage rate	=calculated hourly real wage rate for every respondent
Household non-wage income	=calculated non-wage income for every respondent
Government payments	=amount of government pension & benefits received by 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
Work experience	=Self-reported work experience (years)
Work experience squared	=Self-reported work experience squared (years)
Employer tenure	=Self-reported employer tenure (years)
Employer tenure squared	=Self-reported employer tenure squared (years)
Occupational tenure	=Self-reported occupational tenure (years)
Occupational tenure squared	=Self-reported occupational tenure squared (years)
Time spent not employed	=Respondent's time spent unemployed and not in the labour force
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 is in a firm that employees 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 3: Comprehensive summary of the marginal effects from the multinominal model

	Men (N=1493)				Women (N=828)			
	Partial Retirement		*Full Retirement*		*Partial Retirement*		*Full Retirement*	
Variables	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
Age	-0.0010	0.0024	0.0055**	0.0029	0.0124*	0.0047	0.0026	0.0038
Vocational qualification	0.0210	0.0194	-0.0186	0.0137	0.0464	0.0531	-0.0014	0.0206
Tertiary	0.0562**	0.0336	-0.0204	0.0143	0.0354	0.0520	0.0376	0.0345
No qualification	0.0164	0.0220	-0.0259*	0.0125	0.0472	0.0468	-0.0176	0.0178
Health condition	-0.0032	0.0098	0.0238**	0.0133	0.0190	0.0245	0.0215	0.0156
Relationship status	0.0240	0.0094	-0.0022	0.0148	-0.0033	0.0200	0.0315*	0.0129
Hours of work	**-0.0032***	0.0006	**-0.0013***	0.0006	**-0.0038***	0.0014	**-0.0016***	0.0008
Prefer to work few hours	-0.0034	0.0200	0.0333	0.0331	-0.0618	0.0644	-0.0474	0.0366
Prefer to work same hours	-0.0162	0.0206	0.0185	0.0266	-0.0716	0.0719	-0.1007**	0.0600
Manager	0.0016	0.0187	0.0037	0.0192	-0.0326	0.0290	-0.0271*	0.0119
Professionals	0.0186	0.0223	-0.0125	0.0173	-0.0014	0.0390	-0.0507*	0.0180
Community and personal workers	0.0264	0.0393	0.0154	0.0303	-0.0414**	0.0250	-0.0015	0.0190
Tradespersons	-0.0276*	0.0111	-0.0070	0.0159	-0.0034	0.0500	-0.0215	0.0160
Machinery Operators and drivers	-0.0273*	0.0111	0.0006	0.0170	-0.0231	0.0575	-0.0032	0.0311
Clerical and administrative worker	-0.0069	0.0215	-0.0090	0.0164	-0.0500**	0.0278	-0.0265**	0.0141
Sales workers	0.0014	0.0231	-0.0013	0.0229	-0.0287	0.0357	-0.0126	0.0174
Union	**-0.0412**	0.0100	**0.0204****	0.0118	**-0.0491***	0.0220	**-0.0269***	0.0133
Job satisfaction	**-0.0020**	0.0023	**-0.0052**	0.0025	**-0.0092***	0.0045	**-0.0068***	0.0025
Log wages	**-0.0114***	0.0030	**-0.0063**	0.0090	**-0.0538***	0.0200	**-0.0157***	0.0119
Log household non-wage income	0.0021	0.0036	-0.0027	0.0030	0.0093	0.0064	-0.0010	0.0030
Log government payments	0.0061**	0.0020	0.0029	0.0025	-0.0013	0.0045	-0.0050	0.0035
House ownership	0.0112	0.0129	-0.0010	0.0140	0.0546**	0.0275	-0.0321**	0.0168
Mortgage holder	0.0066	0.0171	-0.0143	0.0141	0.0370	0.0401	-0.0166	0.0128
Work experience	0.0237	0.0017	0.0043**	0.0023	-0.0047**	0.0028	0.0033	0.0029
Employer tenure	0.0005	0.0004	0.0012*	0.0004	-0.0002	0.0010	0.0012*	0.0006
Time not employed (years)	0.0026	0.0023	0.0045	0.0029	-0.0035	0.0028	0.0044	0.0029
Self employment	-0.0030	0.0176	-0.0764*	0.0114	0.0069	0.0486	-0.0195	0.0161
Casual	0.1058*	0.0580	-0.0224**	0.0133	0.0921	0.0940	-0.0116	0.0239
Permanent	-0.0365	0.0230	-0.0305	0.0203	0.0055	0.0344	-0.0044	0.0214
Small firm (1 to 19 employees)	0.0015	0.0124	0.0209	0.0134	0.0725*	0.0372	-0.0104	0.0131
Medium firm (20 to 199 employees)	-0.0157	0.0112	-0.0004	0.0113	0.0924*	0.0383	0.0024	0.0130
Time dummies	yes		yes		yes		yes	
Predicted Probability	0.0383		0.0424		0.0738		0.0332	

Source: HILDA Release 7.1. 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 base categories are year 12, prefer to work more 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

	Variables	55-64 years	50-64 years	45-60 years
P a r t i a l R e t i r e m e n t	Age	-0.0001	0.0012	0.0010
	Tertiary	0.0562**	0.0220	0.0069
	No qualification	0.0164	0.0014	-0.0011
	Health condition	-0.0032	0.0022	0.0038
	Relationship status	0.0240*	0.0084	0.0061
	Hours of work	*-0.0032**	*-0.0021**	*-0.0018**
	Professionals	0.0186	0.0091	0.0093
	Tradespersons	*-0.0276**	*-0.0186**	*-0.0068*
	Machinery Operators and drivers	*-0.0273**	*-0.0177**	*-0.0113**
	Union	-0.0412	-0.0026	0.0000
	Overall job satisfaction	-0.0020	-0.0018	-0.0019*
	Log hourly real wages	*-0.0114***	*-0.0100**	*-0.0096**
	Log household non-wage income	0.0022	0.0005	0.0014
	Log government payments	*0.0061**	*0.0023***	*0.0015*
	Work experience	0.0237	0.0017**	0.0010
	Employer experience	0.0005	0.0002	0.0000
	Time not in employment	0.0026	*0.0025**	*0.0017**
	Self employment	-0.0030	0.0134	0.0134
	Causal	*0.1058***	*0.1081**	*0.0668**
	Permanent	-0.0365	-0.0076	-0.0086
	Predicted Probability	*0.0383*	*0.0281*	*0.0222*

Variables **not** included because of insignificance: Vocational, prefer to work fewer hours, prefer to work same hours, manager, community and personal worker, sales worker, mortgage holder, house owner, firm 1 to 19 employee, firm 20 to 199 employees.

	Variables	55-64 years	50-64 years	45-60 years
F u l l R e t i r e m e n t	*Age*	*-0.0055***	*0.0052**	*0.0028**
	Tertiary	-0.0204	*-0.0169***	*-0.0118***
	No qualification	*-0.0259**	*-0.0188**	*-0.0094***
	Health condition	*0.0238***	*0.0213**	*0.0166**
	Relationship status	-0.0022	-0.0056	-0.0092
	Hours of work	*-0.0013**	*-0.0007**	*-0.0004**
	Professionals	-0.0125	*-0.0195**	*-0.0143**
	Tradespersons	-0.0070	-0.0113	-0.0087
	Clerical and administrative worker	-0.0090	-0.0103	-0.0104**
	Machinery Operators and drivers	0.0006	-0.0060	-0.0100**
	Union	0.0204**	0.0082	0.0038
	Overall job satisfaction	*-0.0052**	*-0.0045**	*-0.0032**
	Log hourly real wages	-0.0063	-0.0062	-0.0036
	Log household non-wage income	-0.0027	*-0.0032***	*-0.0024***
	Log government payments	0.0029	*0.0034**	*0.0020**
	Work experience	0.0043**	0.0007	0.0007
	Employer experience	*0.0012**	*0.0008**	*0.0003**
	Time not in employment	0.0045	0.0017	0.0019**
	Self employment	*-0.0764**	*-0.0406**	*-0.0293**
	Causal	-0.0224**	-0.0061	-0.0082
	Permanent	-0.0305	-0.0136	-0.0182*
	Predicted Probability	*0.0424*	*0.0341*	*0.0257*

Variables **not** included because of insignificance: Vocational, prefer to work fewer hours, prefer to work same hours, manager, community and personal worker, sales worker, mortgage holder, house owner, firm 1 to 19 employee, firm 20 to 199 employees.

Marginal effects – Mature-age women

<table>
<tr><td rowspan="23">P a r t i a l R e t i r e m e n t</td><td>Variables</td><td>55-64 years</td><td>50-64 years</td><td>45-60 years</td></tr>
<tr><td>Age</td><td>0.0124</td><td>0.0040</td><td>-0.0007</td></tr>
<tr><td>Health condition</td><td>0.0190</td><td>0.0232</td><td>0.0291*</td></tr>
<tr><td>Relationship status</td><td>-0.0033</td><td>0.0066</td><td>0.0127</td></tr>
<tr><td>Hours of work</td><td>-0.0038*</td><td>-0.0047*</td><td>-0.0043*</td></tr>
<tr><td>Managers</td><td>-0.0326</td><td>-0.0345**</td><td>-0.0272**</td></tr>
<tr><td>Professionals</td><td>-0.0014</td><td>-0.0131</td><td>0.0001</td></tr>
<tr><td>Community and personal workers</td><td>-0.0414**</td><td>-0.0007</td><td>0.0077</td></tr>
<tr><td>Clerical and administrative workers</td><td>-0.0500**</td><td>-0.0301</td><td>-0.0365*</td></tr>
<tr><td>Machinery operator and drivers</td><td>-0.0231</td><td>-0.0315</td><td>-0.0520*</td></tr>
<tr><td>Union</td><td>-0.0491*</td><td>-0.0213</td><td>-0.0100</td></tr>
<tr><td>Overall job satisfaction</td><td>-0.0092*</td><td>-0.0034</td><td>-0.0027</td></tr>
<tr><td>Log hourly real wages</td><td>-0.0538*</td><td>-0.0433*</td><td>-0.0465*</td></tr>
<tr><td>Log household non-wage income</td><td>0.0093</td><td>0.0061</td><td>0.0063**</td></tr>
<tr><td>House ownership</td><td>0.0546**</td><td>0.0126</td><td>0.0030</td></tr>
<tr><td>Work experience</td><td>-0.0047**</td><td>-0.0014</td><td>0.0017</td></tr>
<tr><td>Employer experience</td><td>-0.0002</td><td>0.0003</td><td>0.0002</td></tr>
<tr><td>Time not in employment</td><td>-0.0035</td><td>-0.0006</td><td>0.0028</td></tr>
<tr><td>Self employment</td><td>0.0069</td><td>-0.0080</td><td>0.0214</td></tr>
<tr><td>Causal</td><td>0.0921</td><td>0.0642</td><td>0.0936*</td></tr>
<tr><td>Small firm (1 to 19 employees)</td><td>0.0725*</td><td>0.0462*</td><td>0.0518*</td></tr>
<tr><td>Medium firm (20 to 199 employees)</td><td>0.0924*</td><td>0.0558*</td><td>0.0410*</td></tr>
<tr><td>Predicated Probability</td><td>0.0738</td><td>0.0729</td><td>0.0736</td></tr>
</table>

Variables **not** included because of insignificance: tertiary, vocational, no qualifications, prefer to work fewer hours, prefer to work same hours, tradespersons, sales worker, mortgage holder, permanent.

<table>
<tr><td rowspan="25">F u l l R e t i r e m e n t</td><td>Variables</td><td>55-64 years</td><td>50-64 years</td><td>45-60 years</td></tr>
<tr><td>Age</td><td>0.0026</td><td>0.0041*</td><td>0.0016</td></tr>
<tr><td>Health condition</td><td>0.0215</td><td>0.0194**</td><td>0.0158*</td></tr>
<tr><td>Relationship status</td><td>0.0315*</td><td>0.0152*</td><td>0.0055</td></tr>
<tr><td>Hours of work</td><td>-0.0016*</td><td>-0.0010*</td><td>-0.0007*</td></tr>
<tr><td>Prefer to work same hours</td><td>-0.1007**</td><td>-0.0059</td><td>0.0026</td></tr>
<tr><td>Managers</td><td>-0.0271*</td><td>-0.0160**</td><td>-0.0054</td></tr>
<tr><td>Professionals</td><td>-0.0507*</td><td>-0.0287*</td><td>-0.0195*</td></tr>
<tr><td>Tradespersons</td><td>-0.0215</td><td>-0.0245*</td><td>-0.0056</td></tr>
<tr><td>Clerical and administrative worker</td><td>-0.0265**</td><td>-0.0235*</td><td>-0.0159*</td></tr>
<tr><td>Machinery Operators and drivers</td><td>-0.0069</td><td>-0.0032</td><td>0.0066</td></tr>
<tr><td>Union</td><td>-0.0269*</td><td>-0.0194*</td><td>-0.0141*</td></tr>
<tr><td>Overall job satisfaction</td><td>-0.0069*</td><td>-0.0068*</td><td>-0.0051*</td></tr>
<tr><td>Log hourly real wages</td><td>-0.0279*</td><td>-0.0157*</td><td>-0.0111*</td></tr>
<tr><td>Log household non-wage income</td><td>-0.0010</td><td>0.0012</td><td>0.0012</td></tr>
<tr><td>House ownership</td><td>-0.0321**</td><td>-0.0079</td><td>-0.0072</td></tr>
<tr><td>Work experience</td><td>0.0033</td><td>0.0011</td><td>0.0015</td></tr>
<tr><td>Employer experience</td><td>0.0012*</td><td>0.0003</td><td>-0.0001</td></tr>
<tr><td>Time not in employment</td><td>0.0044</td><td>0.0015</td><td>0.0019**</td></tr>
<tr><td>Self employment</td><td>-0.0195</td><td>-0.0198*</td><td>-0.0142*</td></tr>
<tr><td>Causal</td><td>-0.0116</td><td>-0.0041</td><td>0.0029</td></tr>
<tr><td>Small firm (1 to 19 employees)</td><td>-0.0104</td><td>-0.0131</td><td>-0.0048</td></tr>
<tr><td>Medium firm (20 to 199 employees)</td><td>0.0024</td><td>-0.0024</td><td>-0.0025</td></tr>
<tr><td>Predicated Probability</td><td>0.0332</td><td>0.0311</td><td>0.0252</td></tr>
</table>

Variables **not** included because of insignificance: tertiary, vocational, no qualifications, prefer to work fewer hours, community and personal workers, sales worker, mortgage holder, permanent.

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