



## **ARC Centre of Excellence in Population Ageing Research**

### **Working Paper 2015/16**

#### **Health Status, Socio-economic Conditions and Retirement Decisions.**

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## **Health status, socio-economic conditions and retirement decisions\***

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May 2015

*\*The support of the Australian Government (the former Department of Families, Community, Housing and Indigenous Affairs, now the Department of Social Services) is gratefully acknowledged. However, views expressed in this paper are those of the authors, and do not necessarily reflect those of the Australian Government.*

# **1 Executive Summary**

Population ageing can contribute to a shortage in labour supply. An obvious and popular response to this is to encourage workers to delay their retirement.

While Australian labour force participation rates among older men are showing signs of increase recently after long term declines and rates among women have continued to increase gradually, these rates are still below the Organisation for Economic Co-operation and Development (OECD) average, and for most age groups they are lower than those in the USA and New Zealand and much lower than in South Korea and Japan. Delaying retirement in Australia is therefore a possible policy response to the ageing of the population.

## **1.1 Some issues in retirement research**

This study reviews past research in factors affecting labour force participation and the timing of retirement, and uses a large scale longitudinal data set—the Household, Income and Labour Dynamics in Australia (HILDA) Survey—to identify and quantify the relative importance of factors that affect retirement. There is a long history and substantial body of research into labour force participation and retirement and their relationship to various socio-economic conditions. However, the existing research has rarely addressed the joint effects of the various contributing factors and their relative importance is therefore not clearly identified. Further, much of the current research has relied on self reported reasons for retirement, and these self reported reasons may not be entirely reliable. This research uses the rich information of HILDA on retirement and retirement intention and in particular, the socio-economic conditions immediately before the time of retirement to understand the significant factors associated with the retirement decision and contribute to the current debate on retirement-related policies.

## **1.2 The HILDA sample and the early and later retirees**

This study uses the first nine waves (2001-2009) of the HILDA, and focuses on the first observed retirement incidence—self-reported retirement events in the past year—of people who were aged 45 to 75 years and who had not completely retired at the first interview . The estimation sample contains about 3,100 individuals and more than 20,000 observations.

In total, 748 retirement events were observed between 2001-2009. These were used to identify two groups of retirees and two groups of non-retirees: people who retired before the Age Pension Eligibility (APE) age, those who retired after the APE age, people who have not retired and were younger than the APE, and those who have not retired and were older than the APE. There are clear differences in the socio-economic characteristics between these four groups. As expected, younger retirees were more likely than older retirees to be females, born overseas in one of the six main English speaking countries, and poorer in health etc. However, comparing older retirees to older non-retirees, older non-retirees were on average older, had poorer health, and were more likely to have a chronic condition or disability. This implies that poor health and disability were not sufficient causes for retirement. Further, on average older non-retirees were not only richer in income but also much richer in

asset than older retirees. Thus, older non-retirees were attracted to continue to work in spite of their relative financial security.

### **1.3 Key findings**

A random effects logit model was developed to model retirement decisions against various individual and contextual factors.

Apart from age (especially approaching the APE age), health and disability are also found to be significantly associated with retirement, whereas the role of financial factors such as household income in retirement is limited.

Most of all, job related factors and contextual factors emerged as important determinants of retirement. Job satisfaction in particular is among the most significant factors, indicating that non-monetary benefits from work are perhaps more important than earnings for senior workers. National unemployment rate, as a contextual factor, is also an important factor in retirement, reflecting the fact that many people retire due to unfavourable macroeconomic conditions.

### **1.4 Discussion and conclusion**

While this study confirms that better health, age, and access to retirement income all contribute to retirement decisions, job satisfaction and national unemployment level are highlighted in the model as very significant factors influencing retirement. To encourage later retirement, work place reform to enhance job satisfaction, especially for older workers, should be considered as an important policy option.

## 2 Introduction

An obvious and popular labour force response to increased longevity and population ageing is to encourage worker to delay their retirement. A publication of the Organisation for Economic Co-operation and Development (OECD) in 2006 that analysed the disincentives and incentives to working longer in OECD countries, have very aptly entitled their publication, “Live longer - Work longer” (OECD 2006). In this publication, OECD has identified a range of policies, practices and attitudes that discouraged work at an older age and encouraged early retirement. Pull factors such as financial incentives embedded in many public and/or formal pension schemes as well as unemployment and sickness/disability benefits play important roles in retirement decisions. Early accessibility to pensions such as age and disability pensions, for example, is a factor in facilitating early retirement. Push factors such as health, technological changes, lack of on-the-job training, negative perception about capacities of older workers, job satisfaction, etc also influence early retirement (OECD 2006, pp 51- 83).

Past and more recent retirement literature has similarly confirmed the importance of age, health and disability, financial factors, eligibility to age pension, job characteristics, labour market opportunities, and lifestyle and other personal preferences for retirement (Merrilees 1983; Woodland 1987; Juhn 1992; Leonesio 1993; Blau 1994; Peracchi and Welch 1994; OECD 1998; Lumsdane and Mitchell 1999; Coile and Gruber 2000; Norris and Bradbury 2001; Blundell et al 2002; McGarry, 2002; Knox 2003; Borland 2005; Cai and Kalb 2005; Gilfillan and Andrews 2010; Warren and Oguzoglu 2010). Retirement is also found to be a joint decision of partners (e.g., Jimenez-Martin *et al.* 1999; Evans and Kelley, 2002a and 2002b; Gustman and Steinmeier 2002 and 2004). In addition, significant differences are found by gender, ethnicity and education (e.g., Custmand and Steinmeier 2002; Evans and Kelley 2002a and 2002b).

In Australia, work and retirement policies, practices and institutions have so far provided incentives to earlier retirement among men. Increases in life expectancy in the last few decades have been accompanied by a decline, until recently, in male labour force participation rates. Female participation rates, however, have steadily and consistently increased, in line with higher educational attainment and lower fertility rate, although they are still lower than males and have a higher proportion in part-time work.

This paper aims to review the current trends in labour force participation, retirement decisions, and to identify and quantify the impact and the relative importance of health, income, job satisfaction, living arrangements and other relevant socio-economic factors on retirement decisions through the use of longitudinal data from the HILDA survey.

### 2.1 Australian retirement and labour force participation trends

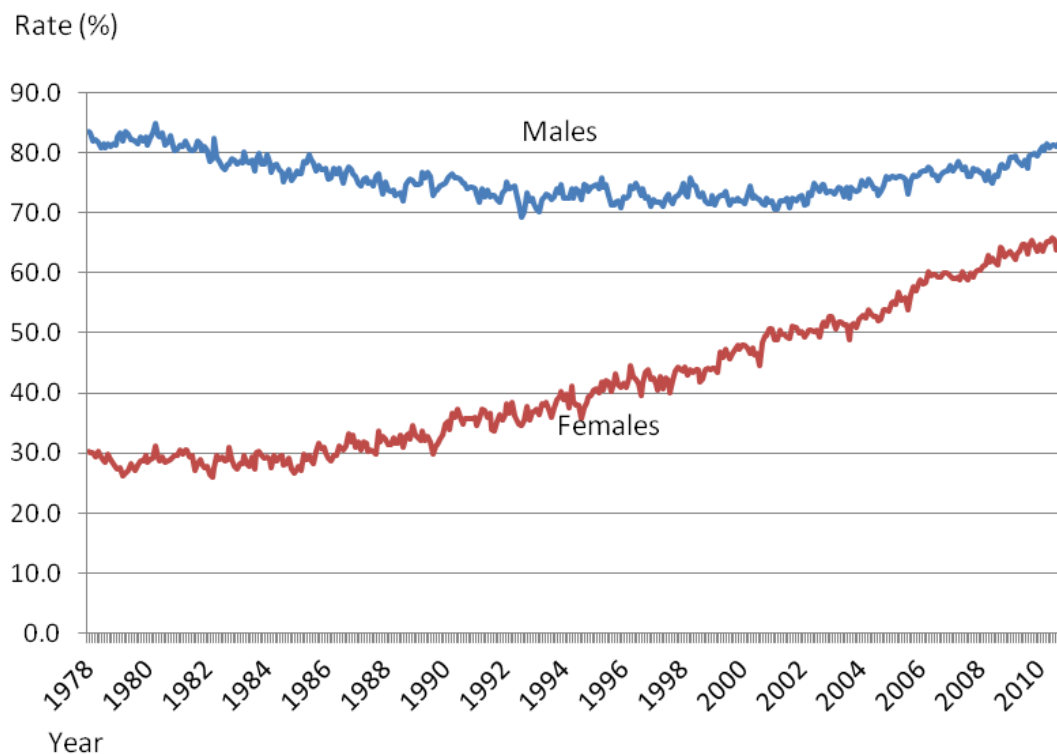
Age at retirement among Australian workers has fluctuated. Following a very long term decline in the age at retirement among men, the trend seems to have stabilised, and labour force participation rates among older men have been recovering and the age at retirement has increased moderately since the mid-1990s. Women’s labour

force participation rate and their age at retirement have continued to increase. The median age at retirement for men was 60.2 years in 2004-5, falling to 59.5 in 2006-7, recovered after that to 60.2 in 2008-9. For females, the increase has been more evident, from 51.3 years in 2004-5 to 54.2 in 2008-9 (calculated from Australian Bureau of Statistics (ABS) surveys of retirement and retirement intentions, various years). The actual age at retirement has so far been younger than the age Australians intend to retire. The median intended age at retirement was 65.6 years for males in 2004-5, and it rose to 66.7 years in 2008-09. For females, the intended age at retirement rose more quickly, from 61.9 years in 2004-5 to 64.7 years in 2008-9.

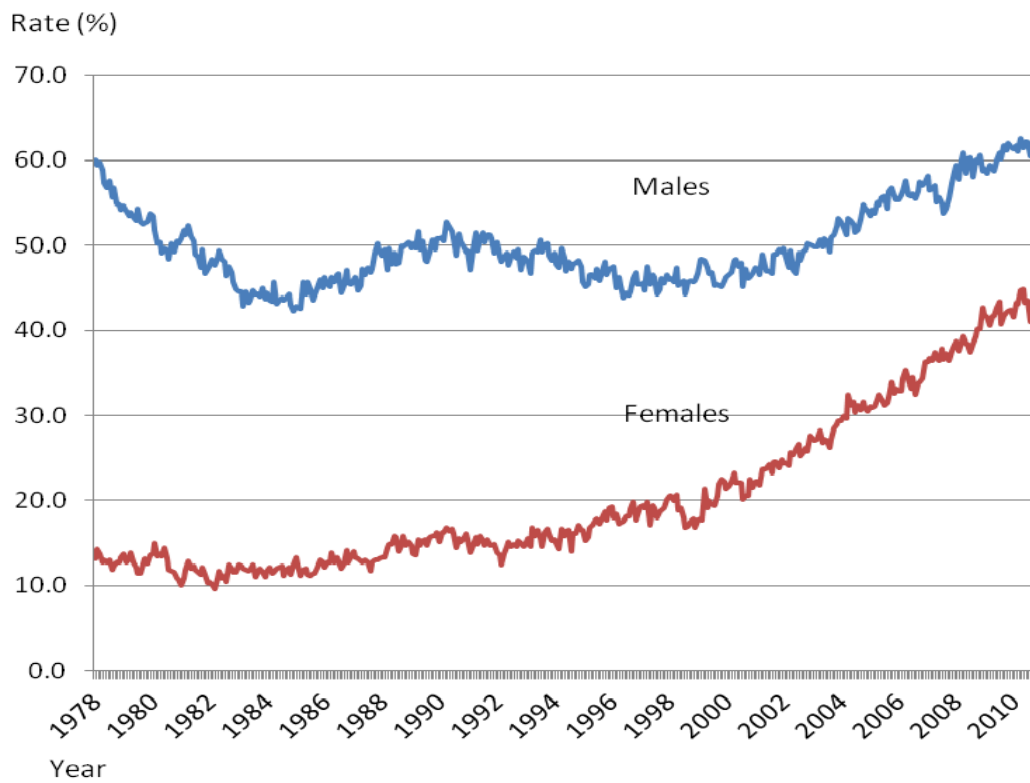
Unlike retirement data that are more recent, very long term data on labour force participation are available from the Australian Bureau of Statistics (see Graphs 1-3 below). For males, the long term trend in labour force participation rates before retirement age has been one of gradual decline. For those aged 55 to 59, the decline was from just above 80 per cent to just over 70 per cent in the late 1990s and early 2000s, thereafter recovering to around 80 per cent in the late 2000s and early 2010s .

For Australian females, the long term labour force participation rate before retirement has been a continued increase. For females aged 55 to 59, it doubled from just below 30 in the early 1980s to over 60 per cent in the early 2010s.

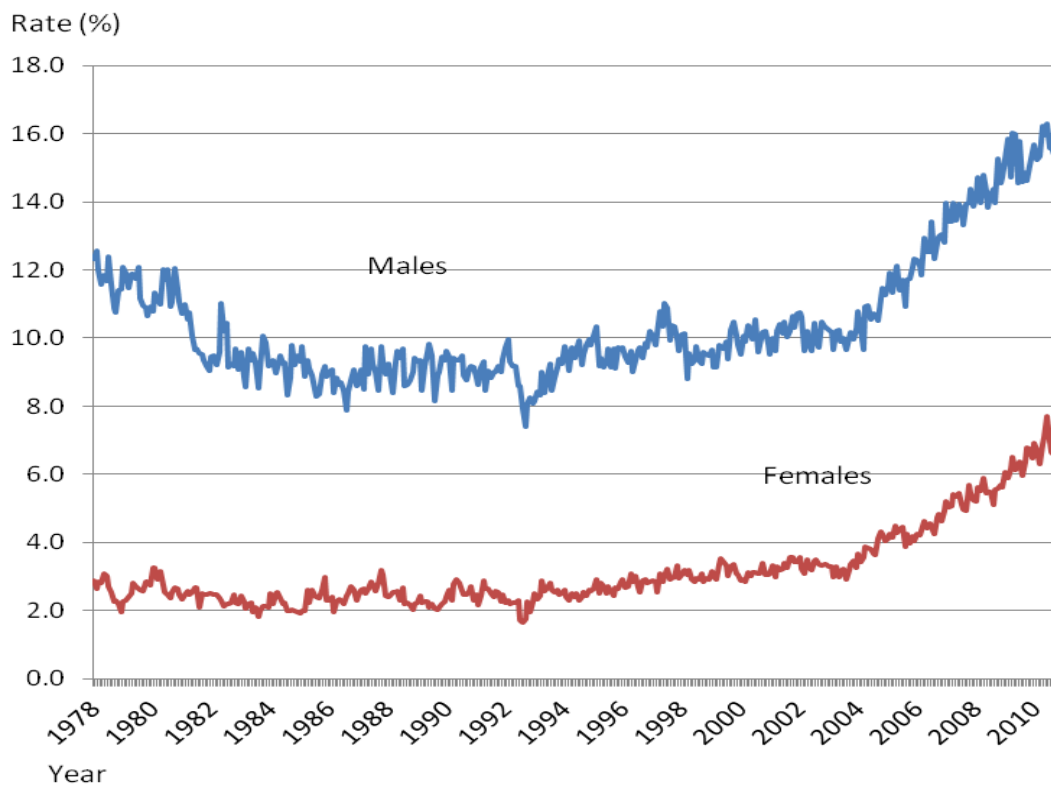
*Graph 1 –labour force participation rate, aged 55-59*



Graph 2 – labour force participation rates, aged 60-64



Graphs 3 – Male labour force participation rates, aged 65 and over



However, for ages just below and beyond the official age pension eligibility (APE) ages, the participation rates for both males and females have increased consistently since the early 1980s; although from a much lower base (see Graph 2). For males aged 60-64, the rates increased from below 50 per cent in the mid-1980s to above 60 per cent in the early 2010s and for those aged 65 and over from below 10 to around 16 per cent in the same period (see Graph 3). The increase was much faster for females. The rates for females aged 60-64 increased 4 times from around 10 per cent in the mid-1980s to over 40 per cent in the 2010s, and the rates for females aged 65 and over increased from a very low base of around 2 per cent to just below 6 per cent in the same period.

The above increases in participation rates, in particular since the year 2000, are encouraging, but they may not be sufficient to counter-balance the expected rapid ageing of the population in the next decades. These trends need to be maintained and strengthened.

## **2.2 Some international comparisons of labour force participation rates**

There is a large variation in the labour force participation rates among OECD countries (see Tables 1 and 2). South Korea has the highest rate for those aged over 65 years, but not for those less than 60 years of age. And this is true for both males and females. Japan has relatively high rates for males aged 55 years and over, but not for females. Some European countries, such as France and Italy, have lower rates, for both males and females.

Australia's labour force participation rates for these older age groups are just below the average of OECD countries. They are lower than those of the USA and New Zealand and much lower than those of South Korea and Japan.

It is interesting to note that in most OECD countries, the "effective" or actual age of retirement is lower than the "official" age at which full aged pensions are payable, indicating that workers withdraw from the labour force well before the "official" age of retirement. Australia is in this category for both males and females. The exceptions are Mexico, Korea, Japan and Greece where workers work beyond the "official" retirement age (OECD 2006, p 32). The "official" retirement age differs considerably between countries.

These international comparisons indicate that lifting Australia's labour force participation rates among older people is a viable policy option. Many OECD countries already have achieved much higher participation rates for people in these older age groups.



*Table 1: Male labour force participation rates for selected OECD countries, 2009*

	<i>Age 55-59 (%)</i>	<i>Age 60-64 (%)</i>	<i>Age 65+ (%)</i>
South Korea	82.7	68.8	41.5
Japan	92.4	76.3	29.4
USA	78.0	60.9	21.9
Norway	83.0	64.5	21.5
New Zealand	87.0	77.7	21.1
Sweden	87.6	68.9	18.4
<b>Australia</b>	<b>78.2</b>	<b>59.4</b>	<b>15.1</b>
Canada	76.4	57.4	15.1
United Kingdom	81.5	59.3	10.5
Germany	84.1	50.8	5.9
Italy	66.1	30.2	5.8
France	69.2	20.3	2.1
OECD Average	78.1	55.0	17.5

Source: [http://stats.oecd.org/Index.aspx?DatasetCode=LFS\\_SEXAGE\\_I\\_R](http://stats.oecd.org/Index.aspx?DatasetCode=LFS_SEXAGE_I_R)

*Table 2: Female labour force participation rates for selected OECD countries, 2009*

	<i>Age 55-59 (%)</i>	<i>Age 60-64 (%)</i>	<i>Age 65+ (%)</i>
South Korea	51.9	42.0	22.2
USA	68.5	49.9	13.6
Norway	75.2	54.7	13.6
Japan	62.5	44.6	13.1
New Zealand	74.6	57.7	11.5
Sweden	81.6	59.4	9.2
Canada	67.1	43.8	6.6
<b>Australia</b>	<b>63.3</b>	<b>41.1</b>	<b>5.9</b>
United Kingdom	67.2	34.8	5.6

Germany	68.9	32.9	2.7
Italy	39.6	12.2	1.3
France	59.4	15.9	1.0
OECD Average	57.7	35.1	8.4

Source: [http://stats.oecd.org/Index.aspx?DatasetCode=LFS\\_SEXAGE\\_I\\_R](http://stats.oecd.org/Index.aspx?DatasetCode=LFS_SEXAGE_I_R)

### 2.3 Reported reasons for retirement

Reported reasons for retirement have changed over time, and differ greatly between reasons given before retirement and reasons given after retirement. Reported reasons for retirement also differ between surveys (see a later section comparing HILDA with the ABS survey results.). These changes and differences may be quite reasonable and can be explained, but research in Australia and overseas have shown that reported reasons may be subject to a range of errors (see below). Nevertheless, the following data from the ABS serve as a guide for the choice of variables for the multivariate analysis taken in this project.

ABS surveys of retirement and retirement intentions have shown that for people who have retired, financial security and health are the two most important reasons for retirement (see Table 3). But their reported relative importance has changed. In 1997, 23% of males and 7% of females nominated financial security as the main reason for retirement, and this increased to over 40% for males, and nearly 30% for females in the later surveys of 2006/7 and 2010/1. Conversely, health (both own health and health of partner) was reported by 33% of males and 12% of females in 1997, and this declined to below 30% for males, but increased to around 20% for females in the 2006/7 and 2010/1 surveys.

While the HILDA survey also has shown that financial security and health were also reported by respondents as the two most important reasons, the order of importance is reversed. Health, rather than financial security, is reported by HILDA respondents as the most important reasons for retirement. The HILDA data will be reported later in the paper.

The ABS surveys also asked respondents who have not yet retired to nominate the factors that would influence their future retirement. These reasons are similar to those nominated by those who have retired, but the importance of financial security was even more pronounced. Over 50% of males and nearly 50% of females reported that financial security would influence their decision to retire (Table 4). Health was nominated by only 25% of both sexes as an influencing factor in the 2010/1 survey, compared with much higher proportions (37% of males and 36% of females) in the 2006/7 survey.

*Table 3: Main reason for retirement (for those who have retired) in the ABS surveys*

	<i>Males</i>			<i>Females</i>		
	<b>1997</b>	<b>2006/7</b>	<b>2010/11</b>	<b>1997</b>	<b>2006/7</b>	<b>2010/1</b>
Financial security (reach retirement age, eligible for pension etc.)	23%	42%	44%	7%	28%	27%
Job related (redundancy, dismissal, business closing)	14%	17%	19%	8%	21%	17%
Job related (compulsory retirement)	20%	n/a	n/a	5%	n/a	n/a
Job related (declining interest, job pressure, pay, no part-time work)	2%	1%	1%	4%	3%	3%
Health (Own health, health of partner)	33%	29%	26%	12%	19%	21%
Family and life style	7%	5%	5%	61%	19%	20%
Other	2%	6%	4%	3%	11%	12%

Note: n/a = not available.

Source: ABS (1997, 2007, 2011). Survey of retirement and retirement intentions, Cat No 6238.0.

*Table 4: Factors that influence retirement intentions (for those not yet retired) in the ABS surveys*

	<i>Males</i>		<i>Females</i>	
	<b>2006/7</b>	<b>2010/1</b>	<b>2006/7</b>	<b>2010/1</b>
Financial security (reach retirement age, eligible for pension)	52%	55%	46%	48%
Job related (redundancy, dismissal, business closing)	n/a%	1%	n/a	1%
Job related (compulsory retirement)	n/a	n/a	n/a	n/a
Job related (declining interest, job pressure, pay, no part-time work)	9%	5%	10%	5%
Health (own health, health of partner)	37%	25%	36%	25%
Family and life style	2%	7%	8%	12%
Other	n/a	7%	n/a	8%

Source: ABS (2006, 2009). Survey of retirement and retirement intentions, Cat No 6238.0.

## 2.4 Some issues in Australian retirement research

There is a long history and substantial body of research in Australia and overseas on labour force participation and retirement. Much of the research has been focussed on the relationship between labour force participation and retirement on the one hand, and financial factors on the other hand, such as income, tax structures, government age benefits, insurance, superannuation (Samwick 1998; Campolieti 2004; Gruber and Wise 2004). Other important areas of research are health, disability and labour force participation (Bound 1991; Disney, Emmerson and Wakefield 2006; Chen and van der Klaauw 2008; Cai 2010), and employment policies and occupational health. For a comprehensive review of Australian literature on retirement intentions and contributing factors, see Jackson et al (2006).

There are many Australian studies on the relationship between health and labour force participation. These studies identified the possibility of two-way relationships between health status and labour force participation as well as other factors that influence both health status and labour force participation simultaneously. They confirm the positive correlation between health status and labour force participation, suggesting that improving health status would increase labour force participation. These studies, however, do not deal with retirement directly and the relationship between health and retirement decisions is often not analysed.

In addition, most retirement research studies do not address the joint effects of the various influencing factors and the relative importance of each of these contributing factors is not known (Borland 2005; Cai and Kalb 2006; Laplagne et al 2007).

This paper uses longitudinal data to relate the actual health and socio-economic situations immediately before or at the time of retirement to the timing of retirement and to quantify the relative importance of these factors. The use of such longitudinal data would overcome biases inherent in self-reported reasons for retirement, and allow the simultaneous analysis of the relative importance of contributing factors.

Previous research also suggests that labour force participation and some socio-economic conditions (in particular health) may be both a cause and an effect (Cai 2010; McAlister et al 2005), and that retirees may use poor health as a justification for retirement as poor health may be considered to be a more socially acceptable reason for early retirement in many cultures (Disney et al 2006; McGarry 2002; Zhang et al 2009). These issues are not fully addressed in this paper. However, by using measures of health and other socio-economic conditions before or at the time of retirement should help to reduce the problems inherent in endogenous relationships.

A recent publication of Warren and Oguzoglu (2010) is particularly relevant to this current research. It also uses the longitudinal HILDA data and current information to model retirement decision but mainly focuses on the evaluation of financial incentives for retirement. It restricted its sample to the 55-70 years old who were employed at the first wave of the HILDA Survey. Consequently, people who had retired at and before age 55 were excluded, which accounted for a fairly large proportion of total retirement cases (nearly 20% for men and 30% for women who were retired recently

in the HILDA sample).<sup>1</sup> Most of its explanatory variables (including health and partner's employment) except for job satisfaction were measured at the same wave as when retirement was identified. Consequently, some of the variables were likely to be measured after retirement and thus may be affected by retirement, in other words, potentially endogenous. In addition, that paper did not consider demand side factors, which are likely to be important for retirement in theory and also as reported by people themselves (see Table 4 for the results in the ABS surveys and Table 5 for HILDA). This current research tries to improve the results by using more waves of the HILDA data and tries to address these issues.

### **3 The HILDA Survey**

HILDA is a longitudinal household survey in Australia. It was first conducted in 2001 and repeated annually afterwards, comprising a nationally representative sample of 13,969 individuals (aged 15 years or older) from 7,683 households in the first wave (see Watson and Wooden 2004 for details of the survey). This research uses the first nine waves of the HILDA survey data (2001-2009).

While the HILDA data contains a few variables indicating people's retirement status, they all have limitations. In particular, most of them were only available at selected waves; for instance, time of retirement (for those who were retired) was not asked at Waves 3, 4 and 7. One relatively good option is using the employment status recorded on the household form of the survey, which includes a category of retirement and is available at all waves except for Wave 2. However, for two main reasons this variable is not used in this research. First, the corresponding question for this variable was answered by an adult household member, not necessarily the person in question, and some inconsistency was found between this variable and other retirement variables based on self-report. Second, and more importantly, the time of retirement was not provided along with the status, so it is hard to identify the circumstances when the retirement decision was made, which is of particular interest.

Instead, this research uses the self-reported retirement event in the past year to identify retirement. It is not perfect either. For instance, it was not available at Wave 1 and the question was asked in the Self Completion Questionnaire, where the response rate was not as high as in the face-to-face interview. Nonetheless, compared with all other retirement related variables in the HILDA data it serves our purpose best. In particular, we suppose people know their own situations better than others, and they are less likely to make recall errors for the recent significant life events like retirement.

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<sup>1</sup> Warren and Oguzoglu (2010) defined retirement as exit from employment, which includes being unemployed and moving out of the labour force. Although this a common practice in the retirement literature, and unemployment and not being in the labour force are potential pathways to retirement, they are conceptually different (especially for younger seniors). According to the latest ABS statistics on main activities when not in the labour force, among those not in the labour force in 2011 only 7.2% of those aged 45-54 years reported being retired or voluntarily inactive, and the proportions for older age groups 55-59, 60-64, and 65-69 are respectively, 19.8%, 32.0%, and 49.5% (ABS 2012). Even among those aged 70 years and over who were not in the labour force, only 58.9% said to be retired or voluntarily inactive.

The study focuses on people who were aged 45 to 75 years and who had not completely retired at the first interview.<sup>2</sup> In order to obtain pre-retirement information (as a proxy of the situation when the retirement decision was made), the sample is restricted to those who participated in at least two waves of the survey. The estimation sample contains about 3,100 individuals and more than 20,000 observations.

In total, 748 retirement events were observed between 2001 and 2009, including 396 events among males. The men and women in the sample were subject to different Age Pension Eligibility (APE) age, which is 65 years for men, and 60-65 years for women depending on their date of birth. A person who was younger than the APE age immediately before retirement was termed as an early retiree in this research. Those who retired at or after the APE age are called later retirees. In the sample, there were 541 early retirees and 207 later retirees. Among those who did not retire between 2001 and 2009, 2,065 were younger than the APE age and 283 were older than the APE age at their second last interview in the survey.<sup>3</sup>

Graph 4 shows the distribution of age at retirement for those recently retired in the HILDA survey. There are shared patterns for both genders in retirement age (e.g., generally bell shaped distributions), but differences between males and females are also clear. For males, 65 was the most popular age for retirement, followed by ages around 60 and then around 55; for females, the largest spike was at age 55, followed by 61 and 62, and then 59 and 60. The distributions indicate that the APE age (i.e., 65 for males and 60-65 for females) may have a role to play in people's retirement decisions.

Table A.1 and Table A.2 in the Appendix, respectively, define key concepts and variables used in this research and compare selected characteristics of early retirees, later retirees, non-retirees younger than the APE age, and non-retirees older than the APE age.

Generally, in comparison to the later retirees, the early retirees on average were, as expected, younger in age, and were also more likely to be female, born overseas in one of the six main English-speaking countries (i.e., Canada, Ireland, New Zealand, South Africa, the United Kingdom and the United States), poorer in health, with work-limiting disability, in full-time employment, partnered, less satisfied with job, richer in household disposable income but poorer in household net worth per head.

In contrast, older non-retirees were more likely than older retirees to be male, immigrants, older in age, partnered, poorer in health, with a chronic condition or

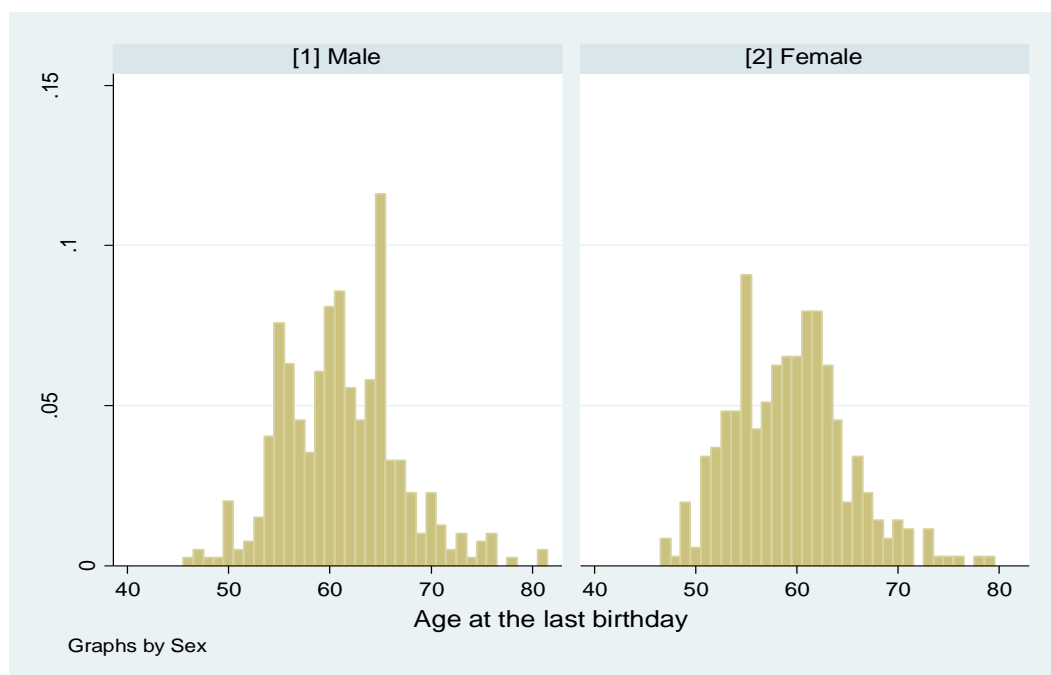
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<sup>2</sup> Retirement is not a once in a life decision. People may return to work after they have retired for a while, and the influencing factors are likely to be different from the first retirement decision; for instance, the retirement experience may be an important influencing factor. Some evidence of the United States shows that one time complete retirement only accounts for about half of retirees (Mestas 2007). For simplicity, this research only focuses on the first retirement.

<sup>3</sup> As age is time varying, to define early and later retirees the age immediately before the observed retirement was used. Correspondingly, to identify younger and older non-retirees the age at the second last interview was used.

disability, more satisfied with (previous) job, richer in both income and net worth, with a retired partner, and living in other urban or rural balance areas.

*Graph 4: Distribution of age at retirement*



There are several points to note regarding older non-retirees.

First, in comparison to older retirees, older non-retirees on average were older, had poorer health, and were more likely to have a chronic condition or disability. This implies that poor health and disability were not sufficient causes for them to retire.

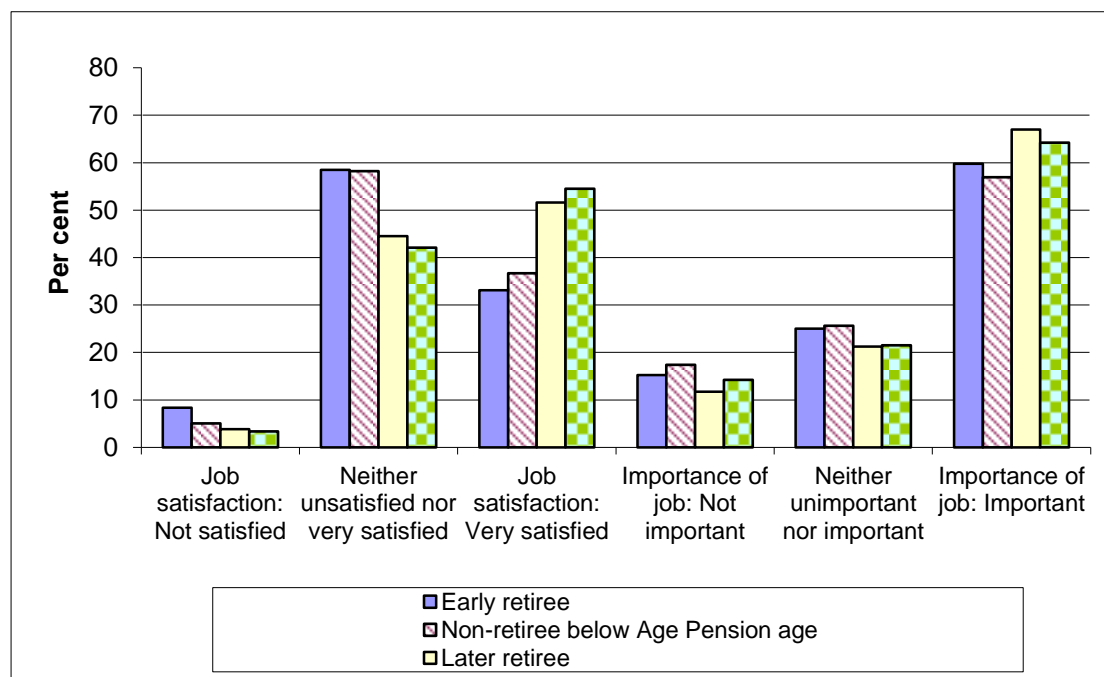
Second, on average older non-retirees were not only richer in income but also much richer in asset than older retirees, so lack of financial security was unlikely to be an important reason for their non-retirement, either.

Then, why were they not retired after the APE age? Graph 5 compares job satisfaction and attitude about job by age and retirement status. It shows that older non-retirees on average were the most satisfied with their job, followed by people retired after the APE age, and the early retirees were the least satisfied with their previous job. As such, job satisfaction seems to provide a plausible explanation for non-retirement.

The picture for attitude about work is more complex: generally older people more than younger ones viewed job as important to having a happy life; surprisingly, non-retirees generally attached a lower level of importance to job than retirees.

It should also be noted that older non-retirees were not a homogenous group. For instance, although as a group on average they were the richest in both income and net worth, a large proportion of them were income poor—nearly 40 per cent in the bottom income quintile (highest in the sample).

Graph 5: Job satisfaction and attitude about job by age and retirement status



#### 4 The choice of variables for modelling

Retirement is a significant and complex decision in life, which is affected by many factors. Generally, the retirement decision can be viewed as a utility maximising issue subject to various constraints including financial and non-financial ones (Gustman and Steinmeier 1986).

However, utility is not directly observable, and we can only observe people's retirement activity. So in this research we use a simple logistic model to model people's retirement decision with the unobserved utility as a latent variable. Intuitively, people would decide to retire if they could gain more utility than postponing retirement. The model can be expressed as:

$$Y^* = X B' + e$$

$$Y = 1 \text{ if } Y^* > 0; 0 \text{ otherwise}$$

Where  $Y^*$  refers to the unobserved utility gain of retirement,  $X$  refers to various individual characteristics and contextual factors,  $B$  refers to a set of coefficients to be estimated,  $e$  is random error, and  $Y$  is observed retirement decision (1 refers to retirement and 0 otherwise).

In this research the  $X$  variables are selected mainly for three considerations: what people said to be important in the interview; what the retirement literature (both theoretical and empirical) suggests to be significant; and the availability of a good measure in the HILDA data.



As shown in Tables 3 and 4, according to the ABS surveys, people consider health, financial security, reaching the eligibility age for an age or service pension or superannuation, job characteristics (e.g., stress), personal preferences, caring responsibility, and retirement of partner to be important factors for their retirement decision.

Table 5 lists the main reasons of retirement provided by participants of the HILDA Survey. Health appears to be the most common reason for retirement for both men and women. For men job related reasons are the second most common reasons, followed by financial reasons and then family and lifestyle reasons. For women, the second most common reasons are family and lifestyle reasons, followed by job related reasons and then financial reasons. One point to note is that superannuation has a relatively minor role to play in the retirement decision, especially for women. By contrast, the high incidence of ‘made redundant / dismissed / had no choice’ and ‘could not find another job’ being listed as the main reason for retirement implies a significant impact of demand side factors on retirement for both men and women, but especially for men.

A notable difference from the ABS surveys is that health is more emphasised by the HILDA respondents than financial security, although both factors are listed as the main reasons for retirement in HILDA and the ABS surveys.

*Table 5: Main Reason for retirement (for those already retired) in the HILDA Survey (%)*

	Males		Females	
	2003/4	2007/8	2003/4	2007/8
<b><i>Financial reasons:</i></b>				
Became eligible for the old age pension	4.4	4.1	3.1	2.9
Offered reasonable financial terms to retire early or accept a voluntary redundancy	4.9	4.2	0.4	0.7
Superannuation rules made it financially advantageous to retire at that time	3.4	3.4	0.5	1.0
Could afford to retire / Had enough income	6.6	8.8	3.8	5.3
Spouses / partners income enabled me to retire	0.3	0.2	3.5	2.9
<b><i>Job related reasons:</i></b>				
Made redundant / Dismissed / Had no choice	10.3	10.2	9.2	6.6
Reached compulsory retirement age	5.0	3.7	1.4	1.2
Could not find another job	3.0	1.4	0.9	1.1
Fed up with working / work stresses, demands	8.5	7.9	8.3	8.1

Pressure from employer or others at work	1.8	1.8	1.4	1.2
<b><i>Health reasons:</i></b>				
Own ill health	34.2	34.1	19.6	19.3
Ill health of spouse / partner	2.5	2.4	5.8	6.2
Ill health of other family member	0.8	1.1	2.8	3.7
<b><i>Family and lifestyle reasons:</i></b>				
Partner had just retired or was about to retire	0.2	0.6	4.6	5.2
Spouse / partner wanted me to retire	0.7	0.5	2.7	3.6
To spend more time with spouse / partner	1.6	2.6	3.8	2.5
To spend more time with other family members	0.7	0.9	9.5	10.1
To have more personal / leisure time	7.2	8.0	6.7	7.0
<b><i>Other reasons:</i></b>				
To have children/ start family/ to care for children	0	0.1	5.2	4.6
Other	4.0	4.2	7.0	6.7
<b>No. of Obs.</b>	1,307	1,332	1,644	1,547

Source: Waves 3 (year 2003/4) and 7 (year 2007/8), HILDA Release 9.0

Note: Responding weights applied; the sum of a column may not equal to 100 due to rounding up.

The importance of these factors for retirement as well as the differences between men and women have been well documented in the retirement literature (e.g., Blau 1994; Lumsdane and Mitchell 1999; Blundell et al 2002; Gustman and Steinmeier 2004; Borland 2005; Gilfillan and Andrews 2010). The HILDA Survey provides a measure or a proxy of most of these factors.

This research has considered the following explanatory variables in the multivariate analysis.

(1) Socio-demographic variables: Age, partnering status, country of birth, Indigenous status, and education.

(2) Health related variables: General health (SF36), disability status, and chronic health conditions.

(3) Job related variables: Employment status, experiences in paid work and unemployment, job satisfaction, and importance of having a job to be happy in life.

(4) Financial situation: Equivalised household disposable income (including or excluding own earnings), earnings, hourly wage, household net worth (total or per head), and homeownership.

(5) Partner characteristics and caring responsibilities: retirement and employment status of partner, partner's health and disability status, and caring for other family members.

(6) Contextual variables: Monthly national unemployment rate, location, the ABS Social Economic Indicators for Areas (SEIFA) disadvantage index, and wave dummies.

In the estimation, we start with a baseline model, only including a few socio-demographic variables—gender, age and partnering status—then we add other sets of variables in stages: health and disability variables; employment related variables; financial variables; and partner characteristics. Finally, in the full model, location and unemployment rate are included. A random effects method is applied to deal with individual level unobserved heterogeneity.

As discussed above, retirement decision shows a clearly gendered pattern. Therefore, the multivariate analysis is conducted separately for females and males and also using the pooled sample of both. For brevity the paper only reports results of the baseline and the full models for each gender (see Tables 6 and 7); results of other models can be provided on request.

## **5 The results**

Estimated odds ratios of the baseline and full models for each gender are reported in Table 6; values larger than 1 indicate positive effect and values smaller than 1 indicate negative effect.

Table 7 provides the estimated marginal effects of the statistically significant variables in four models reported in Table 6; Models F1 and F2 for women, and Models M1 and M2 for men, respectively. For the continuous variables, such as health (values ranging from 0 to 100), the marginal effect refers to estimated change in the probability of retirement for one unit change of the variable in question, holding all other covariates at their sample means; For binary variables, such as partnered, the marginal effect is for discrete change from zero to one. To help understand the size of the effects of these factors, the retirement probability of an average person—with the mean values of the sample—is also reported at the bottom row of the table.

### **5.1 Socio-demographic factors**

On average, females and especially partnered females are more likely to retire early than males in the sample (based on results using the pooled sample, not reported in Tables 6 and 7). As shown in Table 6, the odds of retirement for partnered women are nearly two times as high as for otherwise similar single women, but the difference between partnered and single men are not statistically significant.

Age generally shows an inverse U-shape effect on retirement likelihood. Since Figure 1 reveals a few spikes in the distribution of age of retirement, which appear to be

different for men and women, several age dummies are included along with age and age squared in the separate estimations for each sex. The results of multivariate analysis confirm this observation.

For men, four ages significantly stand out of the general age pattern (i.e., the inverse U-shape curve)—age 54, 55, 60 and particularly 64 years. Note that the values of the explanatory variables refer to the wave before a retirement event is reported; hence, in many cases the age here equals to the age at retirement minus 1, and thus for men the estimate of age 64 basically shows the effect of approaching the APE age.

For women, as the APE age varies by their date of birth, two more dummy variables of the APE age and APE age minus 1 are included in the model. The variable of APE age minus 1 (i.e., approaching the APE age) consistently shows a large effect, while it becomes less significant in the full model after controlling for other factors. Instead, age 54, which is not statistically significant in the baseline model, becomes significant in the full model.

The estimated marginal effects reported in Table 7 indicate that the effects of the statistically significant socio-demographic variables on retirement are also considerable in size. For instance, partnering is associated with a retirement probability of 1.41 percentage points higher for women; that is, 54.23% higher than an average woman in the sample (average probability of retirement being 2.60%).

Some other socio-demographic variables such as country of birth and education are mostly not statistically significant, so they are omitted from the final models reported in this paper.

## **5.2 Health factors**

Several health variables are considered in the estimation, including general health (SF 36), mental health (SF 36), disability, and chronic health conditions.

As shown in Tables 6 and 7, general health is a significant predictor of retirement for both genders. An improvement/decline of 10 points in the 0-100 health scale, which is about the average change of the variable across two consecutive waves in the sample, is associated with a retirement probability of about 7-9% lower/higher for an average person.

Disability also significantly increases the probability of retirement, but the effects vary by gender. Men with work-limiting disability are most likely to retire, while women with non-work-limiting disability are most likely to retire. If pooling the males and females together, work-limiting disability is associated with a significantly higher probability of retirement (not reported in Table 6).

The marginal effects of disability are large; having a not-work-limiting disability is associated with a retirement probability of 48.1% higher for females, and having a work-limiting disability is associated with a retirement probability of 41.7% higher for males.

Other health variables such as chronic health conditions and mental health are mostly not statistically significant.

### 5.3 Job related factors

The significance of job related factors in retirement decision is highlighted by the results of the research.

In comparison to full-time employment, a part-time job is associated with a significantly higher probability of retirement when the males and females are pooled together (not reported in Tables 6 and 7). One possible explanation is that people use part-time employment as a stepping stone towards complete retirement.

Indeed, both men and women are more likely to work part-time as they age. For men the proportion of part-time employment increases steadily from 7.6% at age 45 to 35.7% at age 70 and continues to go up with fluctuation. For women the proportion increases more slowly but from a much higher level of 34.3% at age 45 to 38.3% at age 62, and then the increase continues with an accelerating pace until reaching peak of 64.3% at age 69.

In the multivariate analysis, part-time working men are slightly more likely to retire than full-time working men, while the difference is not statistically significant. By contrast, for women the effect of part-time working is highly significant (at the 1% level) and the effects are also large in size (odds ratio=1.593 and marginal effect=0.0124).

Generally older people tend to be less active in the labour force participation as they age further, either voluntarily or involuntarily, but being inactive does not necessarily imply a permanent retreat from employment or complete retirement.<sup>4</sup> Therefore, in this current research people who were not in paid work at the first interview are not excluded as long as they did not consider themselves as having been retired then.

A strong and persistent finding of this research is that job satisfaction makes a significant difference in retirement decision and happy workers are much more likely to keep working. The estimate is not sensitive to the inclusion of other variables, and the effects are very similar for both genders—in the full model, a one unit increase in the 11 point scale of job satisfaction is associated with a retirement probability of 12.7% lower.

Attitude about work (importance of job for being happy in life), however, turns out to be always not statistically significant after controlling for job satisfaction. In addition, past experiences in paid work and unemployment are also mostly not statistically significant in the preliminary analysis, so they are excluded from the final models.<sup>5</sup>

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<sup>4</sup> In the estimation sample of this research, about 46% of the unemployed and about 28% of those not in the labour force moved into employment in the next wave.

<sup>5</sup> If restricting the sample to people in paid work, the coefficient of hourly wage appears to be highly significant and positive. The result is not consistent with the opportunity cost theory, where higher hourly wage is associated with a higher opportunity cost for quitting a job and thus should predict a lower probability of retirement. The estimate of hourly wage, which is highly correlated with household income, may mainly reflect an income effect here.

## 5.4 Financial factors

With respect to people's retirement decision, financial factors are often reported to be important by people themselves and are also considered to be a key constraint by researchers. In this study various financial variables are considered, including equivalised household income (disposable and gross), household income other than own earnings, household net worth (total and per head), and homeownership.

The results only provide weak evidence about the role of financial factors in retirement (see Table 6). The deciles of equivalised household disposable income, representing people's pre-retirement standard of living, are jointly significant for the pooled sample (not reported) and also the male sub-sample, but the differences mainly exist between the top and bottom deciles. For the retirement of women, household income is not a significant factor. Other variables regarding people's financial situation such as household income other than own earnings and net worth are not statistically significant in most models estimated. It should be noted that wealth information is only available in two of the nine waves of HILDA used in this research, which may partly explain the statistical insignificance of wealth on retirement.

## 5.5 Contextual factors

While supply side reasons are often the focus of research on retirement, the role of demand side factors cannot be ignored. As shown in Table 5, being made redundant or dismissed is listed as a main reason for retirement by many retirees. Although hiring and firing are the activity of specific firms, they are very much affected by macroeconomic conditions and other contextual factors.

In the multivariate analysis, national unemployment rate is included as a measure of macroeconomic conditions in the retirement model. SEIFA disadvantage index, state of residence, remoteness, and wave dummies are also included as controls for location and time specific effects.

The relationship between individual retirement and national unemployment level is always positive and persistently significant. An unemployment rate of one percentage point higher is associated with a retirement probability of about 16% higher for both genders. This indicates that generally older people are more likely to retire in worse macroeconomic conditions.<sup>6</sup>

Rural residents generally are the least likely to retire, followed by major urban residents, holding other factors the same. Other location related variables such as SEIFA and state of residence are mostly not statistically significant.

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<sup>6</sup> It is noteworthy that in the full model, in particular, once unemployment rate is included, a likelihood-ratio test fails to reject the null hypothesis of rho equals zero ( $\rho = 0$ ) even at a significance level of 10%, indicating that the individual level unobserved heterogeneity (case-specific random error term) is not significant in the full model.

Table 6: Results of Logit models with random effects (odds ratios)

Dependent variable: to be retired in the next 12 months

<i>Variable</i>	<i>Females</i>		<i>Males</i>	
	<i>Model F1</i>	<i>Model F2</i>	<i>Model M1</i>	<i>Model M2</i>
<b><i>Socio-demographic variables:</i></b>				
Partnered	2.028***	1.846***	0.906	0.833
Age	2.228***	2.485***	2.661***	2.727***
Age squared	0.995***	0.993***	0.993***	0.993***
Age 54 years	1.510	1.679*	2.034***	2.137***
Age 55 years	0.669	0.685	1.595*	1.619*
Age 59 years	1.025	1.019	1.435	1.216
Age 60 years	1.050	1.020	1.760**	1.862**
Age 64 years	0.675	0.699	3.587***	3.675***
Age 65 years	1.544	1.410	1.041	0.873
APE age – 1	2.141*	1.462	Omitted	Omitted
APE age	1.589	1.094	Omitted	Omitted
<b><i>Health variables:</i></b>				
Health (0-100)		0.993*		0.991**
<i>Disability: no (reference)</i>				
Disability: with no work limitations		1.515*		0.927
Disability: with work limitations		1.135		1.452*
<b><i>Employment related variables:</i></b>				
<i>Working full-time (reference)</i>				
Working part-time		1.593**		1.037
Unemployed		0.280*		0.237**
Not in the labour force		0.554		0.265***
Job satisfaction (0-10)		0.876***		0.880***
<b><i>Financial situation:</i></b>				
<i>Deciles of equivalised household income:</i>				

(1) 1 <sup>st</sup> decile (reference)				
(2) 2 <sup>nd</sup> decile		1.323		0.580*
(3) 3 <sup>rd</sup> decile		1.203		0.947
(4) 4 <sup>th</sup> decile		1.379		0.768
(5) 5 <sup>th</sup> decile		1.126		0.903
(6) 6 <sup>th</sup> decile		0.973		0.783
(7) 7 <sup>th</sup> decile		1.446		1.078
(8) 8 <sup>th</sup> decile		0.881		1.042
(9) 9 <sup>th</sup> decile		1.587		1.454
(10) Top decile		1.696		1.404
<b><i>Partner characteristics:</i></b>				
Partner retired		0.963		1.617**
<b><i>Contextual factors:</i></b>				
<i>Location: major urban (reference)</i>				
Location: other urban		1.393*		1.157
Location: bounded locality		1.264		1.509
Location: rural balance		0.905		0.736*
Unemployment rate		1.176*		1.179**
Log likelihood	-1,321.47	-1,216.10	-1,464.19	-1,315.28
<b>No. of observations</b>	<b>7,900</b>	<b>7,337</b>	<b>9,027</b>	<b>8,420</b>

Note: \* significant at 5%; \*\* significant at 1%; \*\*\* significant at the 0.1% level. A few other variables have been tested in the preliminary analysis and are mostly not statistically significant (at the 5% level); hence they are not included in the final models reported in the paper. These variables include: country of birth, education, chronic conditions, mental health, importance of job to a happy life, years in paid work and years being unemployed, homeownership, State of residence, SEIFA index, and some partner's characteristics including employment status, health and disability status. The wave dummies are significant in many model specifications, but once unemployment rate is controlled, they become not significant.



Table 7: Marginal effects of the statistically significant variables from random effects logit regression

<i>Variable</i>	<i>Models using female sub-sample</i>		<i>Models using male sub-sample</i>	
	<i>Model F1</i>	<i>Model F2</i>	<i>Model M1</i>	<i>Model M2</i>
<b><i>Socio-demographic variables:</i></b>				
Partnered	0.0136 (0.0031)	0.0141 (0.0036)		
Age	0.0171 (0.0046)	0.0231 (0.0059)	0.0237 (0.0046)	0.0239 (0.0034)
Age squared	-0.0001 (0.0000)	-0.0002 (0.0001)	-0.0002 (0.0000)	-0.0002 (0.0000)
Age 54 years		0.0164 (0.0087)	0.0234 (0.0098)	0.0252 (0.0094)
Age 55 years			0.0138 (0.0083)	0.0132 (0.0083)
Age 60 years			0.0177 (0.0085)	0.0197 (0.0085)
Age 64 years			0.0575 (0.0162)	0.0584 (0.0161)
Age 65 years	0.0115 (0.0119)	0.0103 (0.0124)	0.0010 (0.0082)	-0.0031 (0.0073)
APE age – 1	0.0237 (0.0170)			
<b><i>Health variables:</i></b>				
Health (0-100)		-0.0002 (0.0001)		-0.0002 (0.0001)
<i>Disability: no (reference)</i>				
Disability: with no work limitations		0.0125 (0.0073)		
Disability: with work limitations				0.0102 (0.0050)
<b><i>Employment related variables:</i></b>				
Working full-time (reference)				
Working part-time		0.0124 (0.0040)		

Unemployed	-0.0191 (0.0059)	-0.0192 (0.0035)		
Not in the labour force		-0.0194 (0.0030)		
Job satisfaction (0-10)	-0.0033 (0.0010)	-0.0031 (0.0008)		
<b><i>Financial situation:</i></b>				
<i>Deciles of equivalised household income:</i>				
(1) 1 <sup>st</sup> decile (reference)				
(2) 2 <sup>nd</sup> decile		-0.0107 (0.0041)		
<b><i>Partner characteristics:</i></b>				
Partner retired		0.0140 (0.0057)		
<b><i>Contextual factors:</i></b>				
<i>Location: major urban (reference)</i>				
Location: other urban	0.0093 (0.0048)			
Location: rural balance		-0.0067 (0.0031)		
Unemployment rate	0.0041 (0.0026)	0.0039 (0.0015)		
<b>Predicted probability of retirement for a person with the mean values of all the covariates</b>	0.0219	0.0260	0.0249	0.0244

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Note: \* significant at 5%; \*\* significant at 1%; \*\*\* significant at the 0.1% level. Marginal effects are estimated holding all other covariates at the mean values and assuming zero random effects. Standard errors in brackets.

## 5.6 Younger and older retirees

Considering the noticeable differences between younger and older retirees (as shown in Table A.2 in the Appendix), it is of interest to assess whether the determinants of retirement are systematically different for them. For this purpose, interaction terms of an APE age dummy (taking the value of one if at or above the APE age and zero otherwise) and a few other explanatory variables are included in some models specifications (see Table A.3 in the Appendix).

The results reported in Table A.3 show significant interaction terms between the dummy variable of past APE age and several other variables, including health,

income, location, and unemployment rate. The results indicate differences in the determinants of retirement between senior people younger and older than the APE age.

First, better health is associated with a lower probability of retirement for people (both men and women) younger than the APE age, but this association is weak for people (especially men) older than the APE age.

Second, men younger than the APE age in the top income decile are significantly more likely to retire than men in the bottom several deciles, but for people older than the APE age, it is just the opposite—the richest are less likely to retire than the poorest. One hypothesis is that the latter are unlikely to work for income but for other benefits.

Third, women younger than the APE age living in other urban areas have a significantly higher probability of retirement than those living in major urban areas, but for women past the APE age the differences between major urban and other urban residences are not statistically significant. By contrast, younger women living in rural balance areas are slightly more likely (not statistically significant) to retire than those living in major urban areas, but women past the APE age living in rural balance areas are significantly less likely to retire.

Fourth, a higher unemployment rate significantly increases the retirement probability of younger senior people (both men and women), but its effects for older men are counterbalanced by a significant and negative interaction term between unemployment rate and the dummy of past APE age. On balance the probability of retirement of the older men is not significantly affected by changes in the unemployment rate.

## **6 Discussion and conclusion**

This research uses the HILDA Survey data (2001-2009) to model retirement decisions. As HILDA contains a nationally representative sample of Australian population and the research focuses on the retirement events that happened between 2001 and 2009, the results can help understand the contemporary determinants of retirement in Australia. This should help inform policy development regarding the labour force participation of older Australians.

Australia's labour force participation rates among older age groups are somewhat lower than the OECD average. They are much lower than those for South Korea and Japan. To address future problems in labour supply caused by population ageing, policies are needed to encourage labour force participation and defer retirement. The results of this research suggest that increasing the Age Pension Eligibility (APE) age is likely to be effective (but mainly for men). This policy is already being adopted in Australia.

What has been particularly highlighted in this research is the significance of health, intrinsic factors such as job satisfaction and demand side factors such as unemployment level, in contrast to personal financial factors.

In particular, for people who have reached an age that allows them to claim government pension or to draw down their own private superannuation funds, the factor that would attract them to continue to work seems to be the availability of a satisfying job. A satisfying job for older people involves not simply monetary remuneration, but also non-monetary factors such as flexible working hours, work stress and respect from supervisors and colleagues. Age discrimination is considered to be a main barrier to mature age labour force participation (Australian Human Rights Commission 2010). A less than satisfying job offers no attraction to people who have the resources to retire. Even for people who have not reached retirement age, a personally satisfying job is important to the person's wellbeing and his/her desire to enter or remain in the labour force. A recent study on the mental health for unemployed people who returned to work or who remained unemployed reported that "bad jobs" have a worse effect on some mental health issues than "no job" (Butterworth et al 2011).

To encourage later retirement, work place reforms to enhance job satisfaction, especially for mature age workers should be considered as a policy option.

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## Appendix

*Table A.1: Definition of key variables and concepts*

<i>Variable / concept</i>	<i>Definition</i>
Retirement	Life events in past year: Retired from the workforce (0. No; 1. Yes).  Available in all waves but Wave 1.
Age Pension Eligibility (APE) age	Minimum age to be eligible for Age Pension. Currently it is 65 for men and 60-65 for women depending on their date of birth.
Approaching APE age	To be APE age next year.
Past APE age	At or above APE age next year.
Early retiree	A person who retired before the APE age.
Later retiree	A person who retired at or after the APE age.
Country of birth	Country of birth is put into three categories: 1. Australia; 2. Main-English-speaking countries, including Canada, Ireland, New Zealand, South Africa, the United Kingdom, and the United States; 3. Other countries.
Education	Highest education level achieved: 1. Bachelor or above degree; 2. Post-school qualifications (certificate or diploma); 3. Year 12; 4. Year 11 or below education.
General health	SF-36 general health – transformed, values ranging from 0 to 100.
Self-assessed health	Self-assessed general health categories: 1. Excellent; 2. Very good; 3. Good; 4. Poor or fair.
Mental health	Average score of five variables regarding how people feel and how things have been with them during the past four weeks: (1) Been a nervous person; (2) Felt so down in the dumps nothing could cheer you up; (3) Felt down; (4) Felt calm and peaceful; (5) Been a happy person.  These five variables can take one of the six values: 1. All of the time; 2. Most of the time; 3. A good bit of the time; 4. Some of the time; 5. A little of the time; 6. None of the time. For the last two variables (i.e., felt calm and peaceful and been a happy person) the values are reversely coded; i.e., one refers to none of the time and six refers to all of the time.  Therefore, value ONE of the average score used in this research indicates poorest mental health, while value SIX indicates best mental health.
Disability	Disability refers to any long-term health condition, impairment or disability that restricts one's everyday activities, and has lasted or is likely to last, for six months or more. If the disability limits the type or amount of work people can undertake, it is classified as work-limiting; otherwise, non-work-limiting.  The variable has three categories: 0. No disability; 1. Not-work-limiting disability; 2. Work-limiting disability.
Chronic health	Have you ever been told by a doctor or nurse that you have any of the long-



conditions	<p>term health conditions: arthritis; asthma; cancer; chronic bronchitis or emphysema; depression or anxiety; diabetes; high blood pressure or hypertension; heart or coronary disease; and other circulatory conditions.</p> <p>The variable takes the value of one if any of the conditions present, zero otherwise.</p> <p>It is only available at Waves 3, 7 and 9.</p>
Employment status	1. Full-time working; 2. Part-time working; 3. Unemployment; 4. Not in the labour force.
Past work experiences	Years in paid work.
Past unemployment experiences	Years in unemployment.
Job satisfaction	How satisfied are you with your work: 0. Very unsatisfied – 7. Very satisfied.
Importance of job to a happy life	<p>How strongly you agree or disagree with the statement: In order to be happy in life it is important to have a paying job.</p> <p>The values of the variable range from 1. Strongly disagree to 7. Strongly agree.</p> <p>The variable is only available at Wave 1.</p>
Equivalent household disposable income	Household financial year disposable income adjusted for household structure using the modified OECD equivalence scale and measured in 2001 Australian dollars. The modified OECD equivalence scale was first proposed by Haagenars et al (1994). It assigns a value of 1 to the household head, of 0.5 to each extra adult and of 0.3 to each child.
Income deciles	Weighted decile of equivalent household disposable income at a wave.
Net worth per head	<p>Household net worth adjusted for household size and measured in 2001 Australian dollars.</p> <p>The variable was only available at Waves 2 and 6 at the time of the current research.</p>
Net worth deciles	Weighted decile of net worth per head at a wave. Available at Waves 2 and 6.
Homeowner	Own or currently paying off mortgage: 0. No; 1. Yes.
Partner retired	Partner retired as reported by self or another household member: 0. No; 1. Yes.
Partner's health	General health of partner: SF-36 general health – transformed, values ranging from 0 to 100.
Partner having disability	Partner has any disability (working limiting or not) as defined above: 0. No; 1. Yes.
Partner working	Partner working full-time or part-time: 0. No; 1. Yes.

Remoteness	<p>Derived from the Accessibility / Remoteness Index of Australia (ARIA) scores from the 2001 Census. ARIA scores are assigned based on the Census Collection District (CD) code.</p> <p>The variable has six categories: 0. Major city; 1. Inner regional Australia; 2. Outer regional Australia; 3. Remote Australia; 4. Very remote Australia; 5. Migratory.</p>
Location	<p>It is based on population counts from the 2001 Census to class CDs. It differs from Remoteness index which is based on the distance from certain specified services. For example, Darwin is classified as outer regional under the Remoteness index but would be classified as major urban or other urban under the Section of State classification due to its population size.</p> <p>The variable has five categories: 0. Major urban; 1. Other urban; 2. Bounded locality; 3. Rural balance; 4. Migratory.</p>
SEIFA disadvantage index	<p>ABS's socio-economic indicators for areas (SEIFA) from the 2001 census. Refer to ABS (2003) for more details of SEIFA.</p>
Unemployment rate	<p>Monthly unemployment rate (%).</p>

Note: unless otherwise specified in the table, all variables are available in all waves.

Table A.2: Characteristics of younger and older retirees and non-retirees

<i>Variable</i>	<i>Non-retirees younger than APE Age</i>	<i>Non-retirees older than APE Age</i>	<i>Early retirees</i>	<i>Later retirees</i>	<i>Total</i>
<b><i>Socio-demographic variables:</i></b>					
Female (%)	45.81	41.34	48.24	43.96	45.7
Age (years)	54.92	67.69	56.55	66.17	57.12
<b><i>Country of birth:</i></b>					
Australia (%)	70.83	74.47	73.38	76.33	71.98
Main English-speaking countries (%)	14.39	10.64	15.71	13.04	14.19
Other countries (%)	14.78	14.89	10.91	10.63	13.83
Partnered (%)	76.22	77.39	82.26	75.85	77.36
<b><i>Education:</i></b>					
Bachelor/above (%)	24.5	20.92	24.77	21.26	24.01
Diploma/certificate (%)	36.46	34.4	29.94	33.82	34.96
Year 12 (%)	9.35	6.38	9.98	5.31	8.92
Year 11/below (%)	29.69	38.3	35.3	39.61	32.12
<b><i>Health variables:</i></b>					
General health (0-100)	69.57	67.86	65.74	70.07	68.74
Self-assessed health – poor/fair (%)	14.99	16.29	21.65	15.66	16.38
Any chronic conditions (%)	55.97	68.32	59.31	67.8	58.49
Mental health (1-6)	4.82	5	4.75	4.97	4.83
No disability (%)	75.45	64.66	66.73	68.12	72.45
Disability with no work limitations (%)	9.15	17.67	9.61	15.46	10.43
Disability with work limitations (%)	15.4	17.67	23.66	16.43	17.12
<b><i>Employment related variables:</i></b>					
Working full-time (%)	66.59	34.98	54.71	41.55	59.95
Working part-time (%)	23.34	38.87	33.46	46.38	28.07
Unemployed (%)	2.62	1.06	1.66	0.97	2.2
Not in the labour force (%)	7.46	25.09	10.17	11.11	9.79
Job satisfaction (0-10)	7.82	8.38	7.48	8.25	7.83
Unsatisfied with job (job satisfaction 0-4) (%)	5.06	3.35	8.39	3.85	5.43
Importance of job to a happy life (1-7)	5.29	5.57	5.45	5.69	5.38
Importance of job to a happy life (1-7) – not important (1-3) (%)	17.37	14.23	15.23	11.7	16.25
Years in unemployment	0.66	0.39	0.57	0.36	0.6
Years in paid work	33.35	43.96	35.01	43.26	35.36
<b><i>Financial situation:</i></b>					
Equivalised household income (2001\$)	40,160.9	43,768.4*	39,724.7	32,441.9	39,891.8
<b><i>Income deciles (%):</i></b>					
Decile 1	9.65	24.39	10.19	20.29	11.8
Decile 2	10.88	14.64	9.26	10.63	10.92
Decile 3	10.63	10.71	8.52	13.53	10.46
Decile 4	8.76	6.79	8.52	11.59	8.73
Decile 5	10.73	8.93	7.78	10.63	10.04
Decile 6	10.78	10.71	9.63	2.9	10.04

Decile 7	9.84	5.71	9.07	6.76	9.12
Decile 8	9.6	6.43	9.81	4.83	9.02
Decile 9	10.33	6.07	12.22	10.14	10.26
Decile 10	8.81	5.71	15	8.7	9.61
Net worth per head (2001\$)	811,805	1,517,140	847,106	858,738	886,461
<i>Net worth deciles (%):</i>					
Decile 1	12.19	8.86	8.33	5.45	10.73
Decile 2	10.8	3.32	7.39	5.94	9.16
Decile 3	10.18	6.27	8.14	8.91	9.36
Decile 4	9.5	6.27	7.77	8.42	8.82
Decile 5	11	5.17	8.33	9.9	9.91
Decile 6	8.94	9.59	9.66	6.93	8.99
Decile 7	9.92	10.33	11.36	13.86	10.49
Decile 8	9.56	10.33	10.42	14.36	10.11
Decile 9	9.25	13.65	14.96	9.9	10.73
Decile 10	8.68	26.2	13.64	16.34	11.71
Homeowner (%)	83.2	87.28	87.62	87.92	84.66
<b><i>Partner characteristics:</i></b>					
Partner retired (%)	6.59	31.1	13.68	26.57	11.4
Partner working (%)	54.38	33.92	31.1	55.27	51.42
Partner's health (0-100)	44.11	44.84	51	43.93	45.37
Partner with disability (%)	18.31	27.92	22.18	24.15	20.25
<b><i>Contextual factors:</i></b>					
<i>Location (%):</i>					
Major urban	60.4	52.3	55.8	59.9	58.8
Other urban	20	21.9	24.4	16.9	20.7
Bounded locality	3.2	2.1	4.4	2.4	3.3
Rural balance	16.5	23.7	15.3	20.8	17.2
SEIFA disadvantage index (574.7 – 1193.6)	1015.4	1017.5	1017	1026.5	1016.6
<b>No. of individuals</b>	2,065	283	541	207	3,096

Source: Waves 1-9, HILDA Release 9.0

Note: For the time-varying variables like age, the values refer to the interview immediately before retirement for retirees and to the second last interview for non-retirees, respectively.

\* Note that although the older non-retirees have a higher average income than the other three categories, they comprised more low income people (39.0% in the bottom quintile)—that is, younger non-retirees as well as early and later retirees (19.5-30.9% in the bottom quintile)—and had the fewest in the top decile (5.7% vs. 8.7-15%). The richest (in the top income decile) of the older non-retirees (mean annual income being about \$260,000) are much richer than the richest of the other three categories (mean annual income of \$82,000-\$95,000).

*Table A.3: Estimated differences between younger and later retirees (logit model with random effects, odds ratios)*

Dependent variable: to be retired in the next 12 months

<i>Variable</i>	<i>Male</i>	<i>Female</i>
Age	2.547***	2.224***
Age squared	0.993***	0.995***
Age 54	2.198***	1.704**
Age 55	1.651*	0.683
Age 59	1.215	0.955
Age 60	1.836**	0.917
Age 64	4.134***	0.773
Age 65	0.921	1.642
APE age	Omitted	1.164
APE age - 1	Omitted	1.948
Past APE age	12.197	3.059
Partnered	0.846	2.038***
Partnered and past APE age	0.741	0.721
Health	0.988***	0.992*
Health among those at or older than APE age	1.017*	1.003
Disability: No disability (reference)		
Disability with no work limitations (DN)	0.951	1.268
Disability with work limitations (DW)	1.584*	1.272
DN and past APE age	1.008	1.672
DW and past APE age	0.622	0.524
Employment status: full-time working (reference)		
Part-time working (PW)	1.098	1.647***
Unemployed (UNEMP)	0.187**	0.356
Not in the labour force (NILF)	0.345**	0.544
PW and past APE age	0.722	0.730
UNEMP and past APE age	2.832	0.000
NILF and past APE age	0.285	0.836
Job satisfaction	0.869***	0.872***
Job satisfaction and past APE age	0.997	1.013
Income decile: bottom (reference)		
Income decile 2	0.831	1.359
Income decile 3	0.990	1.276
Income decile 4	1.033	1.161
Income decile 5	0.944	1.200
Income decile 6	1.324	1.158
Income decile 7	1.417	1.545
Income decile 8	1.437	1.059
Income decile 9	1.992*	1.913*
Income decile 10	2.301**	1.942*
Income decile 2 and past APE age	0.375	0.983
Income decile 3 and past APE age	0.994	0.795
Income decile 4 and past APE age	0.499	1.581

Income deciles 5 and past APE age	1.014	0.743
Income decile 6 and past APE age	0.126**	0.398
Income decile 7 and past APE age	0.490	0.812
Income decile 8 and past APE age	0.420	0.400
Income decile 9 and past APE age	0.470	0.333
Income decile 10 and past APE age	0.154***	0.423
Partner retired	1.915***	1.194
Partner retired and past APE age	0.827	0.520
Location: major urban (reference)		
Other urban	1.348	1.561**
Bounded localities	1.619	1.293
Rural balance	0.770	1.112
Other urban and past APE age	0.560	0.468*
Bounded localities and past APE age	0.557	0.770
Rural balance and past APE age	0.840671	0.301**
Unemployment rate	1.282963***	1.266**
Unemployment rate among those past APE age	0.637034**	0.907
Log likelihood	-1288.061	-1198.234
No. of obs.	8,420	7,337

Note: \* significant at 5%; \*\* significant at 1%; \*\*\* significant at the 0.1% level.