

Nolan, Anne; Barrett, Alan

Working Paper

The Role of Self-Employment in Ireland's Older Workforce

IZA Discussion Papers, No. 11663

Provided in Cooperation with:

IZA – Institute of Labor Economics

Suggested Citation: Nolan, Anne; Barrett, Alan (2018) : The Role of Self-Employment in Ireland's Older Workforce, IZA Discussion Papers, No. 11663, Institute of Labor Economics (IZA), Bonn

This Version is available at:

<https://hdl.handle.net/10419/185123>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

DISCUSSION PAPER SERIES

IZA DP No. 11663

**The Role of Self-Employment in Ireland's
Older Workforce**

Anne Nolan
Alan Barrett

JULY 2018

DISCUSSION PAPER SERIES

IZA DP No. 11663

The Role of Self-Employment in Ireland's Older Workforce

Anne Nolan

Economic and Social Research Institute and Trinity College Dublin

Alan Barrett

Economic and Social Research Institute, Trinity College Dublin and IZA

JULY 2018

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ABSTRACT

The Role of Self-Employment in Ireland's Older Workforce

A feature of employment at older ages that has been observed in many countries, including Ireland, is the higher share of self-employment among older labour force participants. This pattern of higher self-employment rates at the end of the labour market career may reflect lower rates of retirement among the self-employed compared to employees, as well as transitions into self-employment at older ages. In this paper, we use data from four waves of the Irish Longitudinal Study on Ageing (TILDA), spanning the period 2010-2016, to examine both the characteristics of the older self-employed in Ireland and the determinants of transitions in employment states at older age. We find that the higher proportion of self-employed people at older ages in Ireland results from lower retirement rates among the self-employed and not from transitions from employment to self-employment. This is in contrast to other countries such as the US where transitions into self-employment are more prevalent. We find that the self-employed are older, more likely to be male, and significantly less likely to have any form of supplementary pension cover than the employed. These lower retirement rates and lower degrees of pension cover suggest that standard approaches to pension provision may be less effective in proving attractive to the self-employed in Ireland.

JEL Classification: D14, H55, J14, J26

Keywords: retirement, self-employment, older workers, Ireland

Corresponding author:

Anne Nolan
Economic and Social Research Institute
Whitaker Square
Sir John Rogerson's Quay
Dublin 2
Ireland
E-mail: anne.nolan@esri.ie

1. Introduction

Pressures on public pension expenditure are partly explained by increases in life expectancy that have surpassed increases in the length of working lives. As a policy solution, extending working lives is potentially beneficial for a number of reasons. At a micro level, income from employment can help individuals to top up other sources of income in older age. There is also some evidence that continuing to work into older age has cognitive benefits (Clouston and Denier, 2017, Rohwedder and Willis, 2010, Emmerson and Tetlow, 2006, Mazzonna and Peracchi, 2012). At a macro level, older people make up a large and increasing share of the population and thus their labour supply fundamentally affects the productivity of a country (Chandler and Tetlow, 2014a, Ramnath et al., 2017).

In Europe and the US, the share of the older population in employment has been increasing in recent decades, although labour force participation in older age among men has not yet returned to the levels observed in the 1950s and 1960s (Chandler and Tetlow, 2014b, Maestas and Zissimopoulos, 2010). In Ireland, employment rates among older men and women have been increasing steadily over the last few decades (see Figure 1). For example, among men aged 55-64, employment rates increased from 59.3 per cent in 1996 to 65.7 per cent in 2016 (although the rates are not yet back at the level observed prior to the recession). The trends among women are even more striking, with the employment rate among women aged 55-64 increasing from just 21 per cent in 1996 to nearly 50 per cent in 2016, with no reduction during the recession. Employment rates among 55-64 year old men in Ireland are slightly higher than the EU-28 average and about average for women.¹

[insert Figure 1 here]

A feature of employment at older ages that has been observed in many countries is the higher share of older age employment that is accounted for by self-employment (Zissimopoulos and Karoly, 2007, von Bonsdorff et al., 2017, Wahrendorf et al., 2016, Halvorsen and Morrow-Howell, 2017). Employment at older ages in Ireland displays the same pattern. In Ireland in 2010, 18.3 per cent of men aged 50+ and 3.8 per cent of women aged 50+ described their current employment situation as

¹ In 2016, the EU-28 average employment rate for 55-64 year old men was 62 per cent (ranging from 45.1 per cent in Croatia to 77.5 per cent in Sweden), while for women the EU-28 average was 48.9 per cent (ranging from 26.3 per cent in Malta to 73.5 per cent in Sweden). See <http://ec.europa.eu/eurostat/web/lfs/data/main-tables> for details [last accessed 18 August 2017].

self-employed.² Compared with those in younger age groups, a higher proportion of older individuals are self-employed; for example, 33.2 per cent of men aged 50-64 in employment in 2010 were self-employed, rising to 70.3 per cent among those aged 75+ years (see Figure 2). A particular feature of this cohort is the high proportion of older self-employed men in Ireland that are farmers (over one-third) (see also Section 3).

[insert Figure 2 here]

This pattern of rising self-employment rates at the end of the labour market career may reflect higher rates of retirement out of employment compared to self-employment, as well as transitions into self-employment at older ages (Zissimopoulos and Karoly, 2007). Research by Karoly and Zissimopoulos (2004) for the US reveals that nearly one third of workers aged 51 and above who are self-employed made the transition to self-employment after the age of 50. Self-employment has thus been observed as being an alternative pathway to retirement, and also as a mechanism for facilitating more flexible forms of work in older age (von Bonsdorff et al., 2017, Department of Public Expenditure and Reform, 2016). From a pension policy perspective, self-employment at older ages may have a range of implications so it is important to have a clearer understanding of who the self-employed are and whether they have always been self-employed or have transitioned into self-employment from being employees. For example, if most of the self-employed have been employees previously, they may have built up pension entitlements in previous jobs thereby lessening concerns about any lack of pension cover in their current positions. On the other hand, entry into self-employment may require investment capital, potentially placing current or future retirement assets at risk (Zissimopoulos and Karoly, 2007).

In this paper, we use data from the Irish Longitudinal Study on Ageing (TILDA), a nationally-representative study of the population aged 50+ in Ireland, to contribute to this growing literature on self-employment at older ages. We first examine the prevalence of self-employment at older ages in Ireland and the characteristics of those who are self-employed. We then move on to consider transitions in employment status at older age in Ireland, focusing on the determinants of transitions into retirement and self-employment at older ages. A key concern here is the role that financial incentives, primarily pension cover, play in employment decisions at older ages. Inadequate financial

² Authors' calculations using data from wave 1 (2010) of the Irish Longitudinal Study on Ageing (TILDA).

provision for retirement may ‘force’ the self-employed to delay retirement and/or encourage movements into self-employment among the previously employed or retired. We find that the self-employed are older, more likely to be male, and significantly less likely to have any form of supplementary pension cover than the employed. The self-employed are also less likely to retire than the employed, even accounting for differential rates of pension cover between the two groups. This suggests that there are other (unobserved) factors that determine later retirement among the self-employed in Ireland. In contrast to evidence from other countries, we do not find evidence of substantial movements into self-employment at older age in Ireland.

The paper is structured as follows: Section 2 provides a brief overview of institutional context with regard to retirement and pensions in Ireland. Section 3 provides an overview of previous literature on self-employment at older ages. Section 4 describes the data and methods used in this paper. Section 5 outlines our empirical results while Section 6 discusses the results and draws out some implications for policy.

2. Retirement and Pensions in Ireland

The Irish pension system is a three-pillar system, comprising state, occupational and private pension elements. The first pillar comprises the state (contributory or non-contributory) pension, which is a flat-rate payment, payable from age 66. Entitlement to the state pension (contributory) is based on a complex set of rules, and is dependent on when the individual first entered employment, the number of social insurance contributions, and the average number of contributions per year. The state (non-contributory) pension is subject to a means test. Claiming benefits before the state pension age (SPA) of 66 is not permitted. There is no provision to defer claiming the state pension. Both pensions are subject to income tax, but in practice those relying on the state pension as their only source of income would not pay any tax.

The second pillar comprises voluntary occupational pensions, which cover a broad section of the population (approximately half of all employees are covered). Tax relief at the marginal rate is available for contributions to approved occupational pension schemes. It is generally not possible to contribute to an occupational pension scheme after the normal age of retirement. Along with New Zealand, Ireland is the only OECD country without a mandatory, second-tier pension provision (OECD, 2016). Finally, the third pillar is a voluntary savings pillar, typically comprised of long-term

personal savings and financial investments used to fund retirement over and above first and second pillar arrangements.

Currently, the SPA in Ireland is 66. Prior to 2014, the state pension (contributory) in Ireland was payable at age 65 to individuals who retired from insurable employment and satisfied certain social insurance contribution conditions. The qualifying age was increased to 66 years in 2014, with individuals born on or after the 1st of January 1949 qualifying at age 66 while those born before January 1949 still qualifying for the pension at age 65 (Redmond et al., 2017).³ For both the contributory and non-contributory state pensions, the SPA will further increase to 67 in 2021 and to 68 in 2028 (Government of Ireland, 2010). In 2014 in Ireland, the effective retirement age for men was 65.4, and 62.6 for women (OECD, 2016).

There are a small number of public sector occupations that have statutory upper age limits but, in general, there is no rule which prevents individuals over the age of 65 from being employed or self-employed.⁴ The State pension (contributory) does not require the individual to retire and is not subject to an earnings test.⁵ However, most public sector pension schemes are subject to what is called *abatement* if the individual returns to work in the public sector, meaning that the pension is reduced in order to ensure that the individual does not earn more from the pension and the income from employment than they would if they had remained in employment. If an individual is getting a public service pension and goes to work in the private sector, their public sector pension is not affected.

3. Previous Literature

As noted by Halvorsen and Morrow-Howell (2017) and Zissimopoulos and Karoly (2007), much of the literature on the determinants of self-employment has focused on the self-employed workforce as a

³ The SPA for the non-contributory pension was always 66.

⁴ There is no statutory retirement age for employees in the private sector, but the Employment Equality Acts and Unfair Dismissals Acts do not prohibit the imposition of a compulsory retirement age in a company. In practice, the majority of private sector companies set out a retirement age in either contract form or on the basis of the pension date established in the relevant occupational pension documentation. Only a very small number of private sector companies have, to date, adjusted their retirement date to align with the new SPA of 66 (Department of Public Expenditure and Reform, 2016).

⁵ Prior to 2014, those reaching the age of 65 were paid the state pension (transition), which required the individual to retire. The abolition of the state pension (transition) in 2014 removed a significant disincentive to working past the SPA.

whole, with relatively few studies focusing specifically on older self-employed workers. The choice of self-employment is sometimes viewed as being driven by the positive benefits of being an entrepreneur, while on the other hand, the argument is sometimes put forward that individuals are 'pushed' into self-employment by poor prospects in wage-and-salary employment (Zissimopoulos and Karoly, 2007).

Focussing on the older population, Karoly and Zissimopoulos (2004) use data from the Health and Retirement Study (HRS) in the US to compare the characteristics of the employed and self-employed among the over 50s. They find that self-employed workers are older, more likely to be male, white, married, and college educated, more likely to be healthier but to have a condition that limits work, and wealthier but with fewer pension or health insurance benefits. They find that self-employed workers are also more likely to be working part-time and to have a family business or a spouse who is also self-employed; therefore, self-employed workers may be better able to accommodate their changing preferences for work versus leisure as they make the transition to retirement. Bell and Rutherford (2013) discuss previous findings from a number of countries documenting that age, sex, education, and marital status are consistently strong predictors of self-employment. They note that it is also the case that the self-employed are more likely to be drawn from the tails of the income distribution and suggest that this may reflect the self-employed being drawn from two populations, one of which is able to pursue novel opportunities, while the other enters self-employment due to unfavourable events or circumstances.⁶

Traditionally, workers transitioned from full-time work to full and permanent retirement. Increasingly, however, retirement is a process, often occurring in a series of steps over several years (Weir, 2017, van Solinge, 2014). For many individuals, 'retirement' is already a gradual process, perhaps entailing reductions in hours of work, a switch from employment to self-employment, and sometimes re-entry to the labour market after a period out of work (Chandler and Tetlow, 2014b). Looking at the 12-year job trajectories for those aged 50–59 in 2002–2003 from the English Longitudinal Study on Ageing (ELSA), Banks (2016) finds that the traditional model of older workers working in a single job after age 50, and then exiting the labour market entirely, applies to around 40 per cent of the cohort only. Cahill et al. (2006) finds that approximately 60 per cent of older workers

⁶ A study of 15-65 year old self-employed individuals in Germany and the Netherlands by Hershey et al. (2017) finds that those who are 'forced' into self-employment are significantly less prepared for retirement than those who voluntarily choose to engage in self-employment.

in the US with a full-time career job⁷ first move into some form of bridge employment rather than directly out of the workforce. Once retired, individuals may also reverse retirement decisions (Cahill et al., 2011). For example, Kanabar (2015) finds that ‘unretirement’ is relatively common in England. Using data from ELSA over the period 2002 to 2013, he finds that the probability of unretirement is highest when an individual is in their mid-late 60s. Evidence suggests that unretirement is more likely amongst individuals with a higher level of educational attainment, who have a spouse in the labour market and are in better health. He also finds the jobs tend to be part-time and provide a non-trivial source of income. These results suggest that unretirement in England is a lifestyle choice rather than due to credit constraints, a result also found by Maestas (2010) in her analysis of unretirement in the US using data from the HRS.

A large body of research from the US has used data from the HRS and other sources to examine transitions in employment status at older ages. One of the earliest pieces of research found that the increased prevalence of self-employment among older American men was due to shifts from wage-and-salary work into self-employment as well as a differential propensity to retire among wage-and-salary workers compared with the self-employed (Fuchs, 1982). In terms of the former, Fuchs (1982) found that self-employment facilitated partial retirement among US men. Men who transitioned into self-employment were more likely to have had some self-employment experience in the past, and to have occupations that allowed for discretion over hours, and pay tied to performance - characteristics that eased the transition to self-employment. Transitions to self-employment were also less likely for those who were expecting a pension from their current job.

Moulton and Scott (2016) examine entry into self-employment at older ages using the HRS. Motivated by concerns over job quality, they classify self-employment along two dimensions: one that divides along those with supervisory responsibilities or business asset ownership, and one divided into so-called ‘knowledge’ and ‘non-knowledge’ occupations. They highlight the ambiguous nature of self-employment. Both ‘push’ (e.g., unemployment, recessions, inadequate pension cover, lack of health insurance benefits, *etc.*) and ‘pull’ (e.g., wealth, experience, *etc.*) factors are associated with movements into self-employment at older ages. They find that job loss in the previous two years is associated with entering ‘less good’ forms of self-employment; that poor health is associated with a higher probability of entering non-knowledge, non-entrepreneurial self-employment; that

⁷ Defined as a job that has lasted for at least 10 years and consisted of 1,600 hours or more per year.

education is associated with both transitions into good (higher education) and worse (lower education) forms of self-employment; and that higher levels of risk aversion are associated with a lower probability of transitioning into any type of self-employment.

Using US administrative tax records, Ramnath et al. (2017) find that the probability of self-employment increases at popular retirement ages associated with Social Security eligibility, particularly for those with greater retirement wealth. Therefore, social security or pension receipt may provide the financial security needed to induce risk-taking, or pension eligibility may simply signal the start of a gradual process of retirement. Late-career transitions to self-employment are associated with a larger drop in income than similar mid-career transitions. They also find that transitions to self-employment are associated with a switch in occupation (i.e., individuals were not simply returning to their previous occupation as consultants). Data from the HRS suggest that hours worked also fall upon switching to self-employment. They suggest that self-employment at older ages may serve as a 'bridge job' allowing workers to gradually reduce hours and earnings along the retirement pathway. Similarly, von Bonsdorff et al. (2017), also using data from the HRS, find that those with higher levels of education are more likely to enter bridge employment as self-employed, and that this effect is independent of wealth, suggesting perhaps an effect of higher levels of human capital, which is important for operating a business independently, on the part of those with higher levels of education.

Also using data from the HRS, and focusing on transitions in employment over the recent recession, Biehl et al. (2014) find that unemployed respondents are more likely to enter self-employment and that these decisions are clearly affected by recessions, although the effects differ by recession and gender. Unlike men, women's self-employment decisions are very sensitive to other sources of household income, and women are less likely to become self-employed the deeper the recession. Cahill et al. (2013) finds that post-career transitions into and out of self-employment remained common in the face of the Great Recession, and that health status, occupation, and financial variables continued to be important determinants of switches from wage-and-salary career employment to self-employed bridge jobs.

Zissimopoulos and Karoly (2007) use five waves of HRS data (covering the period 1992 to 2000) to examine the determinants of transitions from wage-and-salary employment to self-employment,

retirement, and not in the labour force in the subsequent wave, and identify both push and pull factors that may drive the decision among older workers to become self-employed. They find that the probability of transitioning to self-employment is positively related to the level of education, especially for men. Higher levels of wealth are associated with an increased probability of transitioning to self-employment, although the relationship is non-linear. Access to pension cover, which captures another form of wealth and likely also captures an element of job quality, has an influence on self-employment transitions, with those with some form of pension plan significantly less likely to transition to self-employment. For men, an additional factor is inheritance; ever having received an inheritance is associated with an increased probability of self-employment. The only health variable that is important in explaining movements into self-employment is having a health condition that limits work, suggesting that health conditions that limit work may 'push' individuals into self-employment. The two job characteristics that have the strongest relationship with movements into self-employment are a measure of hours' flexibility and the occupation in the wage and salary job. Being able to reduce hours at a wage and salary job increases the likelihood of men moving to self-employment, which suggests that movements into self-employment are not partly due to those who are working in the wage and salary sector and want to reduce their hours. Men in executive, sales and labourer positions are much more likely to become self-employed compared to men in administrative support positions. For men, spousal characteristics are insignificant, while for women, having a working husband is associated with a significantly negative probability of moving into self-employment. In terms of transitions to retirement, increasing age, higher wealth and (for men) lower levels of education are associated with a higher probability of retirement. Interestingly, they find no effect of pension plan cover or type on retirement probabilities (although wealth is significant). Health is important, with poorer self-rated health, a higher number of limitations with activities of daily living (ADLs) and a work-limiting condition all increasing the probability of retirement. The only spousal characteristic that is important is the presence of a work-limiting condition for women (i.e., having a husband with a work-limiting condition increases the probability that the wife will retire).

Using data from the Netherlands Interdisciplinary Demographic Institute Work and Retirement Panel, van Solinge (2014) examines the factors associated with entry into self-employment post-retirement, after a worker has left a regular salaried position. Compared with those who remained fully retired, they find that those who entered self-employment were more likely to be male, with higher levels of education, a higher psychological attachment to work and more 'sensation-seeking'.

They find that the decision to pursue self-employment is primarily taken by retirees with relatively high levels of financial and human capital (wealth and educational attainment), those possessing entrepreneurial attitudes (higher self-efficacy scores) and those who perceive their retirements to be completely involuntary. They suggest that these results support the idea that self-employment is selected as a post-retirement path through opportunity rather than necessity. Also for the Netherlands, Li et al. (2016) examine whether wealth affects transitions from wage-employment to self-employment using a large administrative panel dataset. To isolate the causal effect of wealth, they rely on a reform of the pension system that abolished preferential tax treatment of early retirement for cohorts born after January 1, 1950. This exogenous reduction in pension wealth has a significant negative effect on the transition into self-employment. They estimate that the average reduction of net future pension wealth by €16,000, triggered by the reform, reduces the transition rate into self-employment by 38 per cent.

Using data from the ELSA, Banks (2016) examines labour force transitions for all those observed working at the baseline wave, and finds that those in self-employment at baseline are significantly less likely to move jobs and also significantly less likely to exit the labour force. Bell and Rutherford (2013) use longitudinal data from the UK Labour Force Survey over the period 2001 to 2008 to examine the probabilities of individual workers switching state from employment and self-employment. Only 6.3 per cent of those employed at wave 1 switch within a year to be self-employed, retired or unemployed, with retirement the most common transition. A greater percentage of the self-employed (10.2 per cent) switch out of self-employment, with paid employment the most common destination. Fuchs (1982) emphasises the importance of the flow of older workers from employment to self-employment in explaining the observed increase in self-employment rates, at least for older workers aged under 60 in the US. However, Bell and Rutherford (2013) suggest that size of the flow of older workers in the other direction – from self-employment to employment – is of a similar magnitude, at least in the UK.

4. Data and Methods

In this paper, we use data from the Irish Longitudinal Study on Ageing (TILDA). TILDA is a nationally representative sample of community-dwelling individuals aged 50 years and over, and their spouses or partners of any age (i.e., individuals living in nursing homes or other institutions were excluded at baseline). The study is harmonised with other international longitudinal studies of ageing, such as

the US Health and Retirement Study (HRS), the Survey of Health, Ageing and Retirement in Europe (SHARE) and the English Longitudinal Study on Ageing (ELSA). Data collection for the first wave took place over the period October 2009 to February 2011, when 8,504 individuals were sampled, of which 8,175 were aged 50+ years (Barrett et al., 2011). The second wave of TILDA was carried out between April 2012 and March 2013, when 87.5 per cent of participants in wave 1 were successfully followed up (Nolan et al., 2014). Wave 3 was conducted between March 2014 and October 2015, with an 85 per cent response rate, and wave 4 between January 2016 and December 2016 (McGarrigle et al., 2017).⁸ Data collection for wave 5 will begin in 2018, and so data from the first four waves are employed in this paper. Further information on the sample design is available in Whelan and Savva (2013).

The dataset contains a rich set of variables on the demographic, health and socio-economic circumstances of older people in Ireland. Data are collected primarily via computer-aided personal interviewing (CAPI). Altogether, we have 27,126 observations from an unbalanced sample of 8,372 individuals aged 50+ available for analysis. For most of the econometric analyses in this paper, we exclude those that are not retired, employed or self-employed from our analyses. This leaves a sample size of 20,707, representing 7,186 individuals observed at least once over the period 2010 to 2016. The majority (63 per cent) of these 7,186 individuals are observed for at least three waves.

This paper investigates patterns of self-employment in the older population in Ireland from both a cross-sectional and longitudinal perspective. As a first step, we examine the prevalence of self-employment at older ages in Ireland and the characteristics of those who are self-employed, using data from wave 1 (2010). We then move on to consider transitions in employment status at older age in Ireland over the period 2010-2016. We begin with a descriptive analysis, where we examine transitions in employment states between successive waves of TILDA. This allows us to ascertain the extent to which the growth in self-employment at older ages is due to lower rates of retirement among the self-employed in comparison with the employed, and/or due to relatively higher rates of movement into self-employment over employment at older age. The unit of analysis is the person observed in two adjacent waves. As our respondents may be observed for up to four waves, a respondent may be present in our data on transitions up to three times (e.g., wave 1 to wave 2, wave 2 to wave 3, wave 3 to wave 4).

⁸ At time of writing, the final response rate for Wave 4 has yet to be released by TILDA.

Focusing then on the retirement decision, we estimate a binary probit model of retirement, conditional on being employed/self-employed in the previous wave, as follows:

$$\Pr(R_{it}) = f(E_{t-1}, X_{t-1}, \mu_{it}) \quad (1)$$

where R_{it} is a dummy variable indicating whether individual i was retired in time t , E_{t-1} represents employment status (i.e., employed or self-employed) in time $t-1$, X_{t-1} represents other demographic, socio-economic, health and financial variables, again measured at time $t-1$. This specification will allow us to ascertain the extent to which the self-employed are less likely than the employed to retire, controlling for other correlates of retirement such as age, health status, education level or supplementary pension cover. To account for the existence of multiple observations per respondent in this analysis, we also adjust the standard errors for clustering at the individual level.

In defining employment status, we combine responses to two questions in the CAPI. The first asks individuals to 'best describe' their 'current situation', with seven possible mutually exclusive responses: retired; employed⁹; self-employed¹⁰; unemployed; permanently sick or disabled; looking after home or family; in education or training; and 'other'. For those that are not employed or self-employed, they are asked if they nonetheless did any paid work, for at least one hour, in the previous week. We reclassify any individuals who report that they worked for pay for at least one hour in the previous week as 'employed'.¹¹

5. Results

a. Cross Sectional Analysis

⁹ This category includes unpaid work in family business, temporarily away from work, or participating in apprenticeship or an employment programme, such as Community Employment.

¹⁰ This category includes farmers.

¹¹ This is a common classification of employment, and is also used by Eurostat in classifying individuals' labour market status from the EU Labour Force Survey: <http://ec.europa.eu/eurostat/web/lfs/methodology/main-concepts> [last accessed 18 August 2017]. Overall, across the four waves of TILDA, from a total sample size of 26,860 with valid information on employment status, this reclassification results in 713 individuals being classified as employed, rather than retired, unemployed, permanently sick or disabled, looking after home or family, or in education or training.

Table 1 illustrates the proportion of the over 50s population in each employment status in wave 1 (2010), disaggregated by age and sex. Clear differences are apparent between men and women. Substantially higher proportions of women than men report 'looking after home or family' as their main status. The proportion that is retired jumps sharply after age 65 for both men and women. Overall, 18.3 per cent of men are self-employed, in contrast with just 3.8 per cent of women, although the proportions of men and women employed are similar at all ages.

[insert Table 1 here]

Focusing on the self-employed, Figure 2 confirms the international pattern of higher proportions of the self-employed in total employment in older age groups in Ireland.¹² For both men and women, there is a significantly higher proportion of self-employed in the age group 65-74, compared to the 50-64 year age group. In the Irish context, it is important to recognise the importance of farming as a form of self-employment in this cohort (for example, 39 per cent of men aged 50+ who are self-employed are farmers). This proportion increases with age; as illustrated in Figure 3, 79 per cent of self-employed men aged 75+ are farmers. Among the farming group, just 13 per cent also had an 'off-farm' job, and the median number of hours usually worked per week is 50 (even among the over 75s engaged in farming, the median number of hours worked per week is 35).

For those that are not farmers, the most common industries for men are 'construction' (22.9 per cent), 'other service activities' (19.1 per cent) and 'transportation and storage' (8.8 per cent), while for women, the most common industries are 'other service activities' (15.6 per cent), 'human health and social work' (13.4 per cent) and 'accommodation and food service' (11.6 per cent).¹³ Among the non-farming group, approximately 60 per cent have no employees (and a further 32 per cent have between 1 and 5 employees). The majority (nearly 83 per cent) of the self-employed non-farming group had established their business before the age of 50.¹⁴

[insert Figure 3 here]

¹² Overall, 40.6 per cent of men over 50 in employment are self-employed in 2010 (the corresponding figure for women is 12.2 per cent). Data from the Living in Ireland Survey 2000 show that of those aged 50-69 in employment in Ireland, 38.3 per cent of men were self-employed, and 11.2 per cent of women were self-employed (Russell and Fahey, 2004).

¹³ For those not engaged in farming, the nature of their business or activity is classified according to the NACE Rev. 2 industry classification.

¹⁴ This contrasts with evidence for the US, where Karoly and Zissimopoulos (2004) show that nearly one third of workers aged 51 and above who are self-employed had made the transition to self-employment after the age of 50.

Table 2 presents descriptive statistics on the demographic, socio-economic and health characteristics of the retired, employed and self-employed at wave 1 (2010). Reflecting the importance of farming as a form of self-employment in Ireland, particularly among older men, we also present descriptive statistics separately for both the non-farming and farming self-employed groups separately. In comparison with those who are employed, the self-employed are on average older, with self-employed farmers in turn significantly older than self-employed non-farmers. In contrast to both the retired and employed groups, a significantly higher proportion of the self-employed (and particularly self-employed farmers) are male. The self-employed are more likely to be married than either the retired or employed. While they have higher levels of education than the retired on average, but lower levels of education than the employed, there are large and significant differences in educational attainment between the self-employed farming and non-farming groups. The self-employed non-farming group have a similar level of education to the employed. In terms of self-assessed mental health, the self-employed do not differ significantly from the employed. On average, the self-employed are slightly less likely than those that are employed to report a chronic illness, although this effect is driven by the significantly lower rates of chronic illness among the self-employed farming group.¹⁵ While the proportions reporting a disability that limits the kind or amount of work are higher in the retired group (as expected), there are no significant differences in the proportion reporting a disability that limits work between the employed and the self-employed.

[insert Table 2 here]

In terms of pension cover, there are a number of ways of analysing the data. First, we examine pension provision among the non-retired (in TILDA, those who are retired are not asked about their type of pension cover directly) (see Table 3).¹⁶ Second, we examine sources of pension income (i.e., occupational, PRSA¹⁷, private, state, *etc.*) for all three groups, retired, employed and self-employed (see Table 4).

Looking first at private pension cover for the self-employed, we can see that just under 16 per cent of the self-employed have a PRSA pension plan, and 25 per cent have a private pension plan.

¹⁵ This is perhaps surprising given that there is no significant difference in self-assessed mental (or physical) health between the self-employed and employed groups (data on self-assessed physical health not presented here).

¹⁶ In TILDA, retired individuals are not asked any of the questions in the 'preparing for retirement' module. In addition, the occupational pension cover question is not asked of those who are self-employed, and the private retirement savings account (PRSA) pension cover question is not asked directly of those who are employed.

¹⁷ A personal retirement savings account (PRSA), first introduced in Ireland in 2002, is a long-term personal retirement savings account. Employers that do not provide an occupational pension scheme for their employees are obliged to provide access to at least one PRSA.

Significant differences are observed in PRSA and private pension cover between the self-employed farming and non-farming groups, with the non-farming groups having significantly lower levels of private pension cover in particular. Aggregating all forms of supplementary pension cover (occupational, PRSA and private), the self-employed have significantly lower levels of pension cover than the employed, with self-employed farmers having the lowest pension cover.

[insert Table 3 here]

Turning to sources of income in Table 4, the retired are much more likely to be receiving pension income from any source, which is not surprising as they are no longer working. However, comparing the employed and self-employed, while a significantly higher proportion of the employed have occupational pension income, the self-employed are more likely to have income from a private pension, and from a state pension.¹⁸

[insert Table 4 here]

Before moving on to consider transitions between these various employment states, another dimension of self-employment that is worth considering is whether self-employment differs from wage and salary employment in terms of working history (e.g., length of career). While TILDA does not contain a full work history module, limited information is available on the age at which individuals first started work (as an employee or self-employed), and on the proportion of their working life spent in work. The data, presented in Table 5, reveal that the self-employed first started work at the age of 17 on average, a half a year younger than the average age for the employed. The self-employed (and self-employed farmers in particular) have also spent a significantly higher numbers of years working, and a greater proportion of their working life working than the employed. While the analysis is descriptive (i.e., not controlling for age, sex or other correlates of working history), taken with the results above in relation to pension cover, this suggests that the poorer pension provision on the part of the self-employed cannot be explained in part by their proportionately shorter working lives.¹⁹ Unfortunately, our data do not allow us to disaggregate working life into periods spent in employment from those spent in self-employment. Finally, the

¹⁸ Focusing on those aged 65+ (i.e., past the contributory SPA in 2010), a significantly higher proportion of those who are in employment have occupational pension income than those who are self-employed. In terms of private pension income, there is no difference in the proportions of the employed and self-employed reporting this source of income after the age of 65. However, the self-employed farming group are significantly less likely than the self-employed non-farming group to be reporting such sources of income.

¹⁹ The pension cover information we employ reflects cover, not generosity or type (i.e., defined benefit or contribution).

data reveal that substantial proportions of the self-employed do not intend to ever retire; overall, over 50 per cent of the self-employed reported that they do not intend to retire (and among farmers, the proportion was higher again, at 67 per cent), in contrast to 16 per cent of the employed.

[insert Table 5 here]

b. Longitudinal Analysis

In this section of the paper, we examine the extent to which higher prevalence of self-employment at older ages is due to differential probabilities of retirement from wage and salary work compared to self-employment, and/or to shifts into self-employment from either retirement or wage and salary work. In other words:

- Are the self-employed less likely to retire?
- And are movements into self-employment at older ages proportionately greater than movements into employment?

We present transition matrices for each pair of TILDA waves (i.e., wave 1 to wave 2, wave 2 to wave 3, *etc.*). The approach allows us to examine individuals in a given state at time t , and to determine the fraction remaining in the same state versus those that transition to another state in time $t+1$. We then move on to estimate econometric models of these transitions, which allow us to control for baseline characteristics and thereby determine whether certain transitions are more likely for certain groups (e.g., is the lower probability of retirement among the self-employed partly due to poorer pension provision?). Individuals are included in the sample if they are observed for at least two consecutive waves, and all pairs of consecutive waves are included (standard errors are adjusted for clustering on individuals). Thus, individuals who drop out of the survey (e.g., due to death) are not included for the last wave that they are observed. Similarly, for individuals who skip a wave, the wave prior to their non-response is not included, but any pairs of past or future waves for these individuals are included.

Beginning with the summary of transitions in Table 6, we can see that over the full period from wave 1 to wave 4 (2010 to 2016), which encompasses nearly 13,000 pairs of transitions, over 900 individuals retired, and 305 individuals who were previously retired returned to work (either as an employee or self-employed). Broadly similar numbers of the employed moved to self-employment, or from self-employment to employment, in a subsequent wave. The vast majority of observations

(87 per cent) do not change their employment status from one wave to the next. Similar patterns, albeit with fewer transitions across states, are observed for those over the age of 65.

Looking at the employed and self-employed in each given pair of waves (Table 7), the data suggest that higher proportions of the employed than the self-employed retire at a subsequent wave (for example, between wave 1 and wave 2, 17 per cent of the employed retired in comparison with 9 per cent of the self-employed). This provides descriptive evidence in favour of one explanation for rising rates of self-employment with age, i.e., the self-employed are less likely to retire. However, we do not find any evidence of substantially greater moves into self-employment rather than employment at older age; for example, roughly similar proportions make the transition from employment to self-employment (1.8 per cent) as from self-employment to employment (1.7 per cent), and greater proportions of the retired transition to employment rather than self-employment in each time period (see Table 6).^{20,21}

[insert Tables 6 and 7 here]

Table 7 provided descriptive evidence in favour of one explanation for rising rates of self-employment with age, i.e., the self-employed are less likely to retire. Next, we investigate the determinants of retirement among these two groups in greater detail. Table 8 presents results from probit models of retirement at time t , conditional on being employed or self-employed at time $t-1$. We should note that there is potential for endogeneity in the relationship between labour supply decisions and individual characteristics such as pension cover, health and socio-economic status (SES) and hence no strict causal interpretations may be drawn from our estimates.

Column (1) includes controls for wave, age, sex and previous employment status only, while column (2) adds controls for marital status, highest level of education completed, and various indicators of

²⁰ Movements into self-employment may also be used as a mechanism to reduce hours, a step in the transition to full retirement. Zissimopoulos and Karoly (2007) showed, using data from the HRS, that transitions to part-time work are greater for self-employed workers than for workers in the wage sector. This suggests that there may be greater flexibility among the self-employed to reduce hours of work rather than move to complete retirement. Unfortunately TILDA does not collect data on hours of work for the non-farming self-employed.

²¹ While the data in Table 7 refer to transitions between retirement, employment and self-employment only, other transitions (e.g., from unemployment to self-employment) were also examined (and these data are available on request from the authors). In all cases, transitions into self-employment were much less common than transitions into employment (e.g., from wave 1 to wave 2, 5.4 per cent of the unemployed transitioned into self-employment, while 17.2 per cent transitioned into employment).

physical and mental health status. Column (3) adds a control for supplementary pension cover (i.e., occupational, PRSA, private). All controls (with the exception of age, sex and wave) are measured at time $t-1$. Results are presented in the form of marginal effects, and standard errors are adjusted for clustering on individuals.

Focusing on column (1), the results confirm that the self-employed are significantly less likely than the employed to retire. Relative to those aged 50-54, all other age groups are significantly more likely to retire, with the marginal effect increasing with age. The probability of retirement is significantly lower at wave 4 (2016), in comparison with wave 2 (2012).²² Adding marital status and highest level of education to the models in column (2) makes no difference to the estimated marginal effect for being self-employed at wave $t-1$, and neither marital status nor education is significant in determining the probability of retirement. As illustrated in column (3), having a work disability that limits the extent or nature of work in a previous period is associated with a significantly higher probability of retirement in a subsequent wave. Column (4) adds a control for having supplementary pension cover (i.e., at least one of an occupational, PRSA or private pension). As expected, we find that not having a supplementary pension is associated with a significantly lower probability of retirement. As illustrated in Table 3, the self-employed have lower levels of pension cover than the employed and we might have expected that this could partly explain their lower probability of retirement. However, we find that the addition of the control for supplementary pension cover in Column (4) does not eliminate the significant association between self-employment and retirement probability, suggesting that there are further (unobserved) characteristics that are associated with self-employment and a lower probability of retirement.

[insert Table 8 here]

A number of robustness checks are carried out on the final specification of the model. As illustrated in Tables 3, 4 and 5, the self-employed farming and non-farming groups differ along a number of key dimensions of relevance to the retirement decision, including type of pension cover. As illustrated in

²² In May 2009, in response to the rapidly deteriorating public finances, an Incentivised Scheme for Early Retirement (ISER) in the public service was introduced. It allowed public servants of 50 years of age to retire early and receive a pension based on their actual service. A second, more targeted, early retirement and voluntary redundancy scheme was introduced in the public health sector in 2010. In addition, in 2012, a further incentive to retire early for public servants was announced whereby the pensions of public servants who retired on or before 29 February 2012 was based on pay levels prevailing before the introduction of public service pay cuts in that year (Department of Public Expenditure and Reform, 2014). In addition, the abolition of the state pension (transition) in 2014 reduced the disincentive to work past the age of 65. While it is possible that these policy changes could have increased the probability of working in later waves, it is also possible that the unbalanced nature of the panel means that those observed in 2016 could also contain younger sample members who became eligible for sample inclusion over the period 2010-2016.

column (5) of Table 9, disaggregating the self-employed into farming and non-farming sectors reveals similar results, with the self-employed non-farming group still significantly less likely than the employed to retire. Focusing just on the 'retirement' decision may not tell the whole story; in column (6) we show the results of a robustness check that broadens the definition of retirement to consider any status that is not employment or self-employment. It is possible that the self-employed may transition into states such as 'looking after home or family' rather than 'retirement', a distinction that is not captured by our main definition. Broadening the definition does not change the main conclusions from this analysis, i.e., that the self-employed are significantly less likely to move out of self-employment than the employed are to move out of employment. Column (7) adds a control for income (proxied by individual income when employed/self-employed) to the model and finds consistent results. Columns (8) and (9) test the robustness of the results to alternative definitions of employment status and supplementary pensions cover respectively. Using the strict definition of employment status (i.e., that does not incorporate hours of work information) results in a similarly negative, albeit smaller, effect of self-employment on retirement probability.²³ Redefining supplementary pensions cover to include information on receipt of supplementary pension income (in addition to supplementary pension cover) results in a smaller, albeit still statistically significant, negative effect of self-employment on retirement probability. Restricting the analysis to those over the age of 65 (i.e., excluding early retirees) results in an even larger negative effect for self-employment. In column (11), we consider the possibility that not all employees are a valid comparison group as a proportion of the employed will be subject to a mandatory retirement age as part of their employment contract. While we cannot observe the usual retirement age for the individual's job, we do know their expected age of retirement; restricting the employed group to those planning to retire above the age of 66, we still see a significantly lower probability of retirement among the self-employed, although the magnitude of the effect is now considerably smaller.

Finally, we also stratify the sample by SES (as proxied by highest level of education completed). We do this to test the hypothesis that the lower probability of retirement among the self-employed may be more marked at the tails of the SES distribution (as suggested by (Bell and Rutherford, 2013)). Analysing the results for the non-farming group, while the magnitude of the marginal effects suggests that the lower probability of retirement among the self-employed non-farming group is

²³ This is likely due to the fact that retired now include some people who are actually still employed.

larger at the lower and higher ends of the SES distribution, the marginal effects do not differ significantly from each other (see Table 10).²⁴

[insert Tables 9 and 10 here]

6. Discussion and Policy Implications

In Europe and the US, the share of the older population in employment has been increasing in recent decades. A feature of employment at older ages that has been observed in many countries, including Ireland, is the higher share of older age employment that is accounted for by self-employment. In countries such as the US, this pattern of rising self-employment rates at the end of the labour market career also reflects transitions into self-employment at older ages. One goal in this paper was to see if these two phenomena applied in Ireland also, and to assess the policy implications arising from these findings. More broadly, we wanted to learn more about this group, including pension cover, retirement patterns and the interaction between them in the context of self-employment.

Drawing on data from the first four waves of the Irish Longitudinal Study on Ageing (TILDA), we found that among the over 50s in Ireland, the self-employed were older, more likely to be male, married, with lower levels of education, but less likely to have a chronic illness, than the employed. Compared with the employed, the self-employed were significantly less likely to have any type of supplementary pension cover. Examining transitions in employment states, it is clear that at every wave of TILDA, higher proportions of the employed than the self-employed retire. Controlling for other correlates of the retirement decision, the self-employed were significantly less likely to retire than the employed. Pension cover was an important predictor of retirement (with those with supplementary pension cover, i.e., occupational, PRSA or private pension, significantly more likely to retire), but even after controlling for supplementary pension cover, the self-employed were still significantly less likely to retire than the employed. However, in contrast to findings from the US, there was no evidence that movements into self-employment were greater than movements into employment at older age. Thus, rising rates of self-employment in the Irish context were due primarily to lower rates of retirement for the self-employed in comparison with the employed.

²⁴ Very few farmers are in the higher SES (i.e., highest education) category, so we concentrate on the non-farming results here.

Inevitably, there are a number of limitations that need to be recognised in interpreting the results from this study. First, the focus here has been on the supply side, with no analysis of the factors affecting the demand for older workers that may have contributed to the patterns we observe. Second, it is not possible to separate age, cohort and time effects using TILDA data (which has not yet added a new cohort to the study); therefore, the higher rates of self-employment that we observe by age may also reflect higher rates of self-employment among the particular cohort followed by TILDA. Third, there is potential for endogeneity in the relationship between labour supply decisions and individual characteristics such as pension cover, health and SES, which means that no casual interpretations may be drawn from our estimates. In particular, it is possible that unobserved characteristics that jointly determine supplementary pension cover and working status (e.g., risk preferences) explain the lower probability of retirement among the self-employed.

Notwithstanding these limitations, a number of implications flow from these findings. First, unlike their peers in the US, Ireland's older self-employed people are generally not transitioning from positions as employees and so are less likely to have built up occupational pension cover and this is evident in the data. While this would typically drive lower rates of retirement, the second significant finding in the paper is the fact that Ireland's older self-employed people are less likely to retire regardless of whether they have supplementary pension cover or not. This is suggestive of some form of anti-retirement bias, with the suggestion being strengthened by the finding that the self-employed are more likely to report that they do not plan on retiring (Table 5). One picture that can be distilled from the findings (although others are also possible) is of a group who see their businesses and continued work as being a substitute for pension cover. While this may be a rational approach to financial management in later life, a question arises over the capacity of this group to withstand financial shocks arising from either business or personal circumstances. More broadly, the findings with respect to the growing number of self-employed older workers and their characteristics should prompt renewed thought on how the pensions system might need to be developed to cater for the particular circumstances of this group.

7. Acknowledgements

This research was funded under the ESRI/Pensions Authority Research Programme 'TILDA and the Financial Dimensions of Retirement'. The authors thank The Irish Longitudinal Study on Ageing (TILDA) for access to the data.

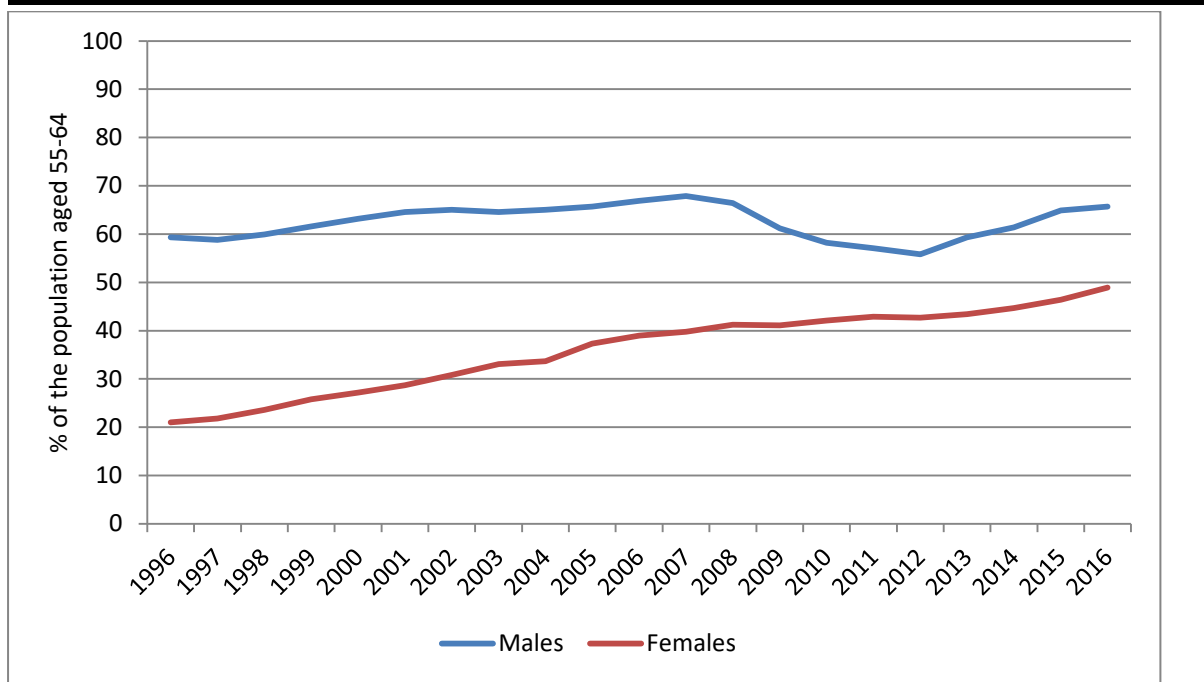
8. References

- BANKS, J. (2016) Employment and labour market transitions at older ages in England, 2002–03 to 2014–15. IN BANKS, J., BATTY, D., NAZROO, J. & STEPTOE, A. (Eds.) *The Dynamics of Ageing: Evidence from the English Longitudinal Study on Ageing 2002-2015* London, Institute for Fiscal Studies.
- BELL, D. & RUTHERFORD, A. (2013) Older workers and working time. *The Journal of the Economics of Ageing*, 1, 28-34.
- BIEHL, A., GURLEY-CALVEZ, T. & HILL, B. (2014) Self-employment of older Americans: do recessions matter? *Small Business Economics*, 42, 297-309.
- CAHILL, K., GIANDREA, M. & QUINN, J. (2006) Retirement Patterns From Career Employment. *The Gerontologist*, 46, 514-523.
- CAHILL, K., GIANDREA, M. & QUINN, J. (2011) Reentering the Labor Force after Retirement. *Monthly Labor Review*, 134, 34-42.
- CAHILL, K., GIANDREA, M. & QUINN, J. (2013) New Evidence on Self-Employment Transitions Among Older Americans with Career Jobs. *Working Paper 463*. Washington, Bureau of Labor Statistics.
- CHANDLER, D. & TETLOW, G. (2014a) Employment of Older People in England: 2012-2013. *IFS Briefing Note BN153*. London, Institute for Fiscal Studies.
- CHANDLER, D. & TETLOW, G. (2014b) Retirement in the 21st Century. *IFS Report R98*. London, Institute for Fiscal Studies.
- CLOUSTON, S. & DENIER, N. (2017) Mental retirement and health selection: Analyses from the U.S. Health and Retirement Study. *Social Science & Medicine*, 178, 78-86.
- DEPARTMENT OF PUBLIC EXPENDITURE AND REFORM (2014) The Cost of the Public Service. Dublin, Department of Public Expenditure and Reform.
- DEPARTMENT OF PUBLIC EXPENDITURE AND REFORM (2016) Report of the Interdepartmental Group on Fuller Working Lives. Dublin, Stationery Office.
- EMMERSON, C. & TETLOW, G. (2006) Labour Market Transitions. IN BANKS, J., BREEZE, E., LESSOF, C. & NAZROO, J. (Eds.) *Retirement, health and relationships of the older population in England: The 2004 English Longitudinal Study on Ageing (Wave 2)*. London, Institute for Fiscal Studies.
- FUCHS, V. (1982) Self-Employment and Labor Force Participation of Older Males. *Journal of Human Resources*, 17, 339-357.
- GOVERNMENT OF IRELAND (2010) National Pensions Framework. Dublin, Stationery Office.
- HALVORSEN, C. & MORROW-HOWELL, N. (2017) A Conceptual Framework on Self-Employment in Later Life: Toward a Research Agenda. *Work, Aging and Retirement*, 3, 313-324.
- HERSHEY, D., VAN DALEN, H., CONEN, W. & HENKENS, K. (2017) Are “Voluntary” Self-Employed Better Prepared for Retirement Than “Forced” Self-Employed? *Work, Aging and Retirement*, 3, 243-256.
- KANABAR, R. (2015) Post-Retirement Labour Supply in England. *The Journal of the Economics of Ageing*, 6, 123-132.
- KAROLY, L. & ZISSIMOPOULOS, J. (2004) Self-Employment among Older U.S. Workers. *Monthly Labor Review*, 127, 24-47.
- LI, Y., MASTROGIACOMO, M., HOCHGUERTEL, S. & BLOEMEN, H. (2016) The role of wealth in the start-up decision of new self-employed: Evidence from a pension policy reform. *Labour Economics*, 41, 280-290.

- MAESTAS, N. (2010) Back to Work. *Journal of Human Resources*, 45, 719-748.
- MAESTAS, N. & ZISSIMOPOULOS, J. (2010) How Longer Work Lives Ease the Crunch of Population Aging. *Journal of Economic Perspectives*, 24, 139-60.
- MAZZONNA, F. & PERACCHI, F. (2012) Ageing, cognitive abilities and retirement. *European Economic Review*, 56, 691-710.
- MOULTON, J. & SCOTT, J. (2016) Opportunity or Necessity?: Disaggregating Self-Employment and Entry at Older Ages. *Social Forces*, 94, 1539-1566.
- OECD (2016) Pensions at a Glance 2015. Paris, OECD.
- RAMNATH, S., SHOVEN, J. & SLAVOV, S. (2017) Pathways to Retirement through Self-Employment. *NBER Working Paper No. 23551*. Washington DC, NBER.
- REDMOND, P., KELLY, E. & MCGUINNESS, S. (2017) Did Increasing the state pension age in Ireland affect the overall retirement rate of 65 year olds? . *QEC Research Note*. Dublin, Economic and Social Research Institute.
- ROHWEDDER, S. & WILLIS, R. (2010) Mental Retirement. *Journal of Economic Perspectives*, 24, 119-138.
- RUSSELL, H. & FAHEY, T. (2004) Ageing and Labour Market Participation. Dublin, The Equality Authority.
- VAN SOLINGE, H. (2014) Who opts for self-employment after retirement? A longitudinal study in the Netherlands. *European Journal of Ageing*, 11, 261-272.
- VON BONSDORFF, M., ZHAN, Y., SONG, Y. & WANG, M. (2017) Examining Bridge Employment From a Self-employment Perspective - Evidence From the Health and Retirement Study. *Work, Aging and Retirement*, 3, 298-312.
- WAHRENDORF, M., AKINWALE, B., LANDY, R., MATTHEWS, K. & BLANE, D. (2016) Who in Europe Works beyond the State Pension Age and under which Conditions? Results from SHARE. *Journal of Population Ageing*.
- WEIR, D., (ED.) (2017) Aging in the 21st Century: Challenges and Opportunities for Americans. *The Health and Retirement Study*. Michigan, University of Michigan.
- ZISSIMOPOULOS, J. & KAROLY, L. (2007) Transitions to self-employment at older ages: The role of wealth, health, health insurance and other factors. *Labour Economics*, 14, 269-295.

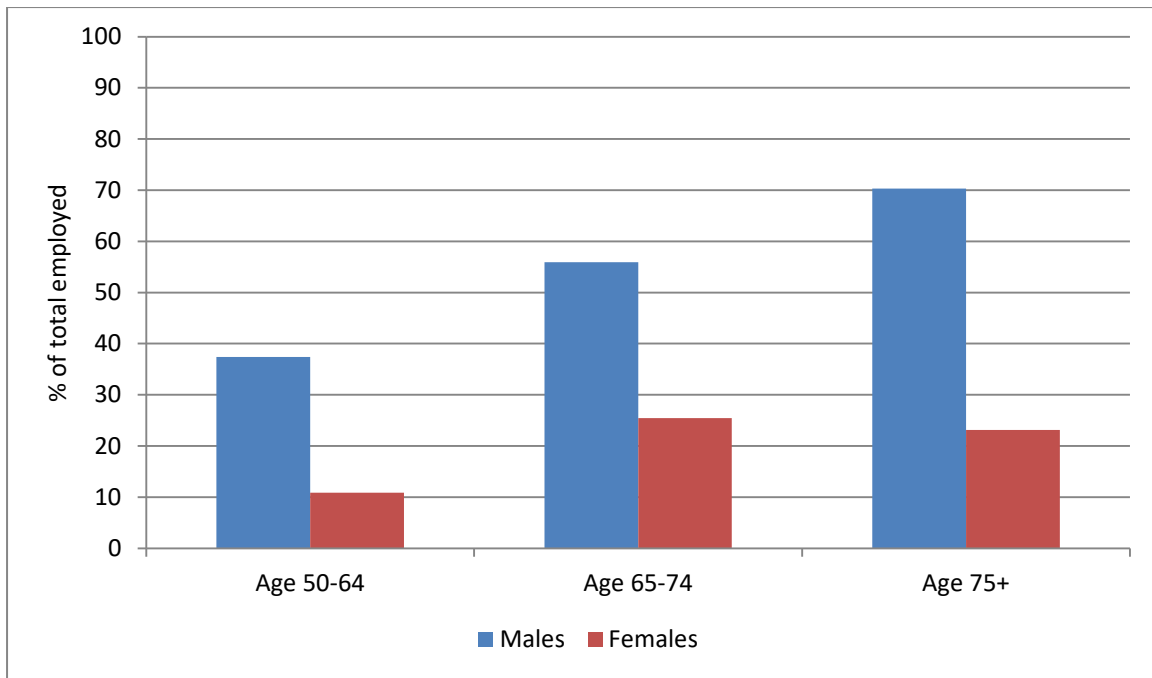
9. Figures and Tables

FIGURE 1 Employment Rates, 55-64 year olds, Ireland, 1998-2016



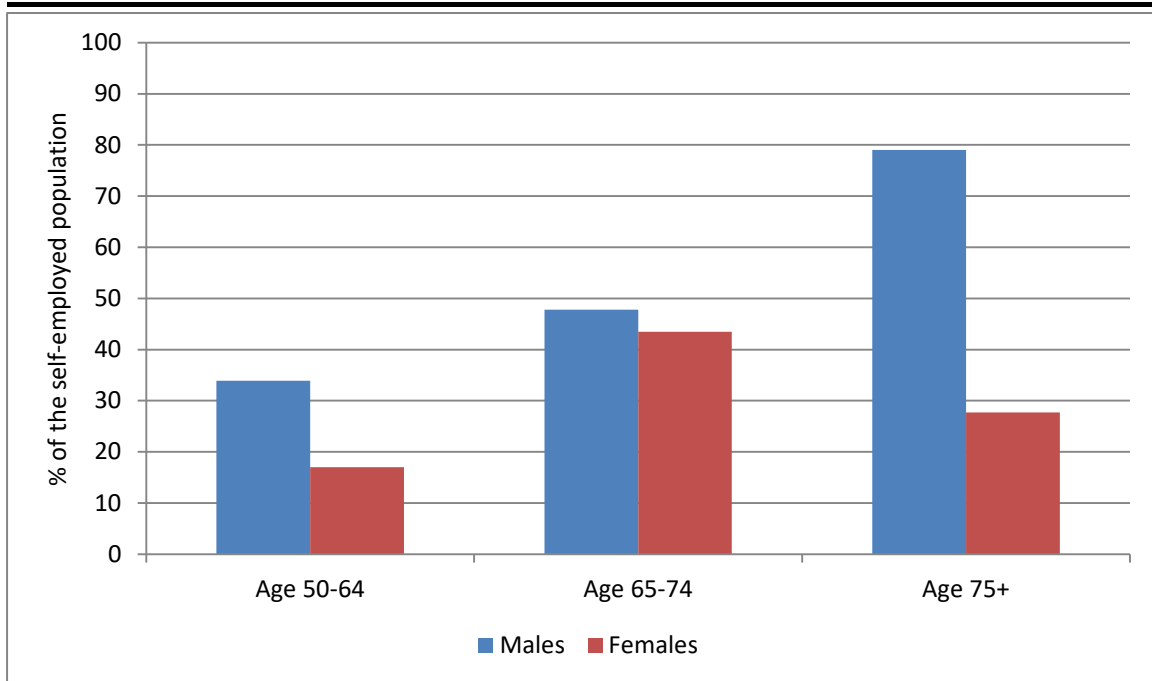
Source: Eurostat (EU Labour Force Survey) 'Employment rate of older workers'

FIGURE 2 Proportion of Self-Employment in Total Employment, by Age and Sex, 2010



Note: Population weights are employed.
 Source: TILDA, wave 1 (2010)

FIGURE 3 Proportion of Self-Employed engaged in Farming, by Age and Sex, 2010



Note: Population weights are employed.
 Source: TILDA, wave 1 (2010)

TABLE 1 Current Employment Status, by Age and Sex (% of the population), 2010

	Males				Females			
	Age 50+	Age 50-64	Age 65-74	Age 75+	Age 50+	Age 50-64	Age 65-74	Age 75+
Retired	40.1	12.1	78.3	87.7	31.3	11.1	52.6	61.5
Employed	27.5	41.4	8.8	3.5	28.3	46.2	8.8	2.0
Self-employed (includes farming)	18.3	24.0	11.1	7.9	3.8	5.4	2.7	0.6
Unemployed	7.5	12.3	0.4	0.0	3.2	5.5	0.3	0.1
Permanently sick or disabled	5.5	8.4	1.2	0.8	5.3	7.8	2.2	1.8
Looking after home or family	0.8	1.2	0.2	0.1	27.7	23.0	33.3	34.1
In education or training	0.3	0.5	0.0	0.0	0.5	0.9	0.0	0.0
<i>N</i>	<i>3,708</i>	<i>2,052</i>	<i>1,064</i>	<i>592</i>	<i>4,359</i>	<i>2,546</i>	<i>1,079</i>	<i>734</i>

Note: Population weights are employed. The category 'employed' includes those in other categories who undertook paid work for at least one hour in the previous week.
Source: TILDA, wave 1 (2010)

TABLE 2 Demographic, Socio-Economic and Health Characteristics by Employment Status, 2010

	Retired	Employed	Self-Employed All	Self-Employed Non-Farming	Self-Employed Farming
Age	72.0 [71.7 – 72.3]	56.8 [56.6 – 57.1]	59.4 [58.9 – 59.9]	58.0 [57.4 – 58.5]	61.8 [60.8 – 62.8]
% Male	54.6 [52.7 – 56.4]	47.7 [45.6 – 49.7]	82.0 [79.4 – 84.5]	77.9 [74.5 – 81.3]	89.1 [85.7 – 92.6]
% Married	56.8 [55.0 – 58.6]	70.6 [68.7 – 72.5]	75.3 [72.5 – 78.2]	80.1 [76.8 – 83.4]	66.7 [61.5 – 71.9]
% Third Level Education	19.8 [18.4 – 21.3]	33.5 [31.6 – 35.5]	25.7 [22.8 – 28.5]	35.1 [31.1 – 39.0]	8.9 [5.8 – 12.0]
% Excellent Mental Self-Assessed Health	24.9 [23.4 – 26.5]	30.6 [28.7 – 32.5]	29.3 [26.3 – 32.3]	31.3 [27.5 – 35.1]	25.9 [21.0 – 30.7]
% No Chronic Illness	55.3 [53.5 – 57.1]	70.8 [68.9 – 72.6]	76.1 [73.3 – 78.9]	73.8 [70.2 – 77.5]	80.1 [75.7 – 84.5]
% No Work Disability	72.4 [70.8 – 74.0]	92.1 [91.0 – 93.2]	91.4 [89.5 – 93.2]	91.7 [89.4 – 94.0]	90.7 [87.5 – 93.9]

Note: Population weights are employed. 95% confidence intervals are presented in parentheses.

Source: TILDA, wave 1 (2010)

TABLE 3 Type of Pension Cover by Employment Status, 2010

	Retired	Employed	Self-Employed All	Self-Employed Non-Farming	Self-Employed Farming
% Occupational Pension	-	54.2 [52.2 – 56.3]	-	-	-
% PRSA Pension	-	-	15.9 [13.5 – 18.4]	18.0 [14.8 – 21.2]	12.2 [8.6 – 15.9]
% Private Pension	-	9.5 [8.3 – 10.7]	24.8 [22.0 – 27.7]	28.6 [24.9 – 32.4]	18.2 [13.9 – 22.4]
% Any Private Pension (PRSA or private)	-	9.6 [8.4 – 10.8]	36.8 [33.6 – 40.0]	41.9 [37.8 – 45.9]	27.9 [22.9 – 32.8]
% Any Supplementary Pension (occupational, PRSA or private)	-	58.1 [56.0 – 60.1]	36.8 [33.6 – 40.0]	41.9 [37.8 – 45.9]	27.9 [22.9 – 32.8]

Note: Population weights are employed. 95% confidence intervals are presented in parentheses. Retired individuals are not asked any of the 'preparing for retirement' module, which includes questions on pension provision. In addition, the occupational pension cover question is not asked of those who are self-employed, and the PRSA pension cover question is not asked of those who are employed.

Source: TILDA, wave 1 (2010)

TABLE 4 Sources of Pension Income by Employment Status, 2010

	Retired	Employed	Self-Employed All	Self-Employed Non-Farming	Self-Employed Farming
% receiving occupational pension income	44.8 [43.0 – 46.6]	9.6 [8.4 – 10.8]	5.6 [4.1 – 7.1]	6.4 [4.4 – 8.4]	4.2 [2.0 – 6.4]
% receiving private pension income	4.8 [4.0 – 5.5]	0.8 [0.4 – 1.1]	2.6 [1.5 – 3.6]	3.3 [1.8 – 4.8]	1.3 [0.0 – 2.5]
% receiving state pension income	64.1 [62.4 – 65.9]	6.1 [5.1 – 7.1]	14.8 [12.5 – 17.2]	9.8 [7.4 – 12.3]	23.7 [19.0 – 28.4]

Note: Population weights are employed. 95% confidence intervals are presented in parentheses.

Source: TILDA, wave 1 (2010)

TABLE 5 Employment History, by Employment Status, 2010

	Retired	Employed	Self-Employed All	Self-Employed Non-Farming	Self-Employed Farming
Age first employed/self-employed	17.2 [17.1 – 17.3]	17.7 [17.5 – 17.8]	17.2 [17.1 – 17.4]	17.8 [17.6 – 18.1]	16.2 [15.9 -16.5]
Years spent employed/self-employed	38.4 [37.9 – 39.0]	33.7 [33.3 – 34.1]	40.2 [39.5 – 40.8]	37.7 [37.0 – 38.5]	44.5 [43.4 – 45.7]
% working life employed/self-employed	72.0 [71.1 – 73.0]	86.5 [85.7 – 87.4]	95.4 [94.4 – 96.3]	94.0 [92.8 – 95.2]	97.8 [96.5 – 99.0]
Expected retirement age, for those planning to retire	-	57.0 [56.1 – 58.0]	65.7 [65.2 – 66.2]	65.3 [64.8 – 65.9]	67.0 [65.7 – 68.3]
% not planning to retire	-	16.0 [14.3 – 17.6]	53.0 [49.3 – 56.6]	46.1 [41.6 – 50.6]	66.6 [60.6 – 72.6]

Note: Population weights are employed. 95% confidence intervals are presented in parentheses.
 Source: TILDA, wave 1 (2010)

TABLE 6 Transitions between Employment States, 2010-2016

	All Ages	65+
Retired – retired	6,168 (47.5)	5,162 (80.1)
Employed – employed	3,553 (27.2)	215 (3.3)
Self-employed – self-employed	1,556 (12.0)	360 (5.6)
Retired – employed	210 (1.6)	127 (2.0)
Retired – self-employed	95 (0.7)	68 (1.1)
Employed – retired	763 (5.9)	250 (3.9)
Self-employed – retired	182 (1.4)	133 (2.1)
Employed – self-employed	239 (1.8)	63 (1.0)
Self-employed – employed	236 (1.8)	69 (1.1)
Total	12,982 (100.0)	6,447 (100.0)

Note: Data refer to the proportion of the sample in a given state at time t that transition to the same or another state in time $t+1$. Each observation is one person observed in two adjacent waves. For example, among all those aged 50+, there were 12,982 pairs of transitions over the period 2010 to 2016, of which nearly 50 per cent comprised individuals who were retired in two adjacent waves.

Source: TILDA, wave 1 (2010), wave 2 (2012), wave 3 (2014), wave 4 (2016).

TABLE 7a Transitions between Employment States, Wave 1 (2010) – Wave 2 (2012)

		Wave 2		
		Retired	Employed	Self-Employed
Wave 1	Retired	1,993 (94.7)	72 (3.4)	41 (1.9)
	Employed	312 (17.0)	1,436 (78.0)	93 (5.0)
	Self-Employed	66 (9.3)	72 (10.1)	573 (80.6)

Note: Data refer to the proportion of the sample in a given state at wave 1 (2010) who transition to the same or another state in wave 2 (2012). For example, of those retired in wave 1 (2010), nearly 95 per cent were also retired in wave 2 (2012), while 3.4 per cent transitioned to employment, and 1.9 per cent transitioned to self-employment.

Source: TILDA, wave 1 (2010), wave 2 (2012).

TABLE 7b Transitions between Employment States, Wave 2 (2012) – Wave 3 (2014)

		Wave 3		
		Retired	Employed	Self-Employed
Wave 2	Retired	2,045 (95.4)	68 (3.2)	30 (1.4)
	Employed	254 (17.2)	1,142 (77.2)	84 (5.7)
	Self-Employed	61 (9.2)	93 (14.0)	512 (76.9)

Note: Data refer to the proportion of the sample in a given state at wave 2 (2012) who transition to the same or another state in wave 3 (2014).

Source: TILDA, wave 2 (2012), wave 3 (2014).

TABLE 7c Transitions between Employment States, Wave 3 (2014) – Wave 4 (2016)

		Wave 4		
		Retired	Employed	Self-Employed
Wave 3	Retired	2,130 (95.8)	70 (3.1)	24 (1.1)
	Employed	197 (16.2)	955 (78.7)	62 (5.1)
	Self-Employed	55 (9.2)	71 (11.9)	471 (78.9)

Note: Data refer to the proportion of the sample in a given state at wave 3 (2014) who transition to the same or another state in wave 4 (2016).
 Source: TILDA, wave 3 (2014), wave 4 (2016).

TABLE 8 Probit Model of Retirement (Marginal Effects)

	(1)	(2)	(3)	(4)
Employed	ref	ref	ref	ref
Self-Employed	-0.127 (0.008)***	-0.127 (0.008)***	-0.127 (0.008)***	-0.123 (0.008)***
Male	ref	ref	ref	ref
Female	0.009 (0.009)	0.008 (0.009)	0.008 (0.009)	0.011 (0.009)
Age 50-54	ref	ref	ref	ref
Age 55-59	0.062 (0.007)***	0.062 (0.007)***	0.063 (0.007)***	0.062 (0.007)***
Age 60-64	0.205 (0.011)***	0.204 (0.011)***	0.203 (0.011)***	0.206 (0.011)***
Age 65-69	0.348 (0.021)***	0.345 (0.021)***	0.342 (0.021)***	0.367 (0.022)***
Age 70-74	0.435 (0.031)***	0.428 (0.032)***	0.428 (0.032)***	0.453 (0.032)***
Age 75+	0.445 (0.035)***	0.432 (0.036)***	0.424 (0.036)***	0.456 (0.037)***
Wave 2 (2012)	ref	ref	ref	ref
Wave 3 (2014)	-0.002 (0.010)	-0.001 (0.010)	-0.003 (0.010)	-0.000 (0.010)
Wave 4 (2016)	-0.029 (0.010)***	-0.029 (0.010)***	-0.030 (0.010)***	-0.027 (0.010)***
Married		ref	ref	ref
Never married		0.019 (0.016)	0.015 (0.016)	0.011 (0.016)
Separated/divorced		-0.001 (0.015)	-0.006 (0.015)	-0.004 (0.015)
Widowed		0.021 (0.017)	0.021 (0.017)	0.017 (0.017)
Primary or less education		0.003 (0.012)	-0.001 (0.012)	0.004 (0.012)
Secondary education		-0.004 (0.009)	-0.004 (0.009)	-0.000 (0.009)
Third level education		ref	ref	ref
Excellent mental health			ref	ref
Very good mental health			-0.004 (0.010)	-0.004 (0.010)
Good mental health			-0.008 (0.011)	-0.008 (0.011)
Fair/poor mental health			0.016 ref	0.019 ref
No chronic illness			ref	ref
Chronic illness			0.015 (0.010)	0.014 (0.010)
No work disability			ref	ref
Work disability			0.049 (0.018)***	0.054 (0.018)***
No supplementary pension(s)				-0.037 (0.009)***
Supplementary pension(s)				ref
N	6,828	6,823	6,810	6,750

Note: Models the probability of being retired at time t , conditional on being employed or self-employed in the previous wave ($t-1$). All other controls, with the exception of age, sex and wave, are measured at time $t-1$. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

TABLE 9 Robustness Checks

	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Employed	ref	ref	ref	ref	ref	ref	ref
Self-Employed		-0.132 (0.010)***	-0.117 (0.009)***	-0.096 (0.009)***	-0.115 (0.008)***	-0.236 (0.030)***	-0.035 (0.011)***
Self-Employed (Non-Farming)	-0.117 (0.010)***						
Self-Employed (Farming)	-0.135 (0.010)***						
<i>N</i>	6,750	6,983	5,573	6,245	6,746	1,112	3,522

Note: Marginal effects for self-employed only presented (all other controls as per model (4) in Table 8 are included).
 Model 5: distinguishing between non-farming and farming sectors for the self-employed
 Model 6: re-defining 'retirement' to include all those not in employment or self-employment
 Model 7: including individual income from employment/self-employment
 Model 8: using a more restricted definition of employment status that does not incorporate information on hours of work
 Model 9: including a more comprehensive definition of supplementary pension cover which includes information on whether the respondent was receiving income from a supplementary pension
 Model 10: including those aged 65+ only
 Model 11: excluding those who plan to retire before the age of 66
 * p<0.10; ** p<0.05; *** p<0.01

TABLE 10 Stratification by Education

	(10)		(11)		(12)	
	Primary or less education		Secondary education		Third level education	
Employed	ref	ref	ref	ref	ref	ref
Self-Employed	-0.184 (0.024)***		-0.104 (0.013)***		-0.147 (0.018)***	
Self-Employed (Non-Farming)		-0.120 (0.036)***		-0.100 (0.015)***		-0.147 (0.020)***
Self-Employed (Farming)		-0.217 (0.025)***		-0.113 (0.016)***		-0.151 (0.038)***
<i>N</i>	1,073	1,073	2,817	2,817	2,860	2,860

Note: Marginal effects for self-employed only presented (all other controls as per model (4) in Table 8 are included).
 * p<0.10; ** p<0.05; *** p<0.01