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# State Pension eligibility age and retirement behaviour: evidence from the United Kingdom Household Longitudinal Study

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# State Pension eligibility age and retirement behaviour: evidence from the United Kingdom Household Longitudinal Study

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**Abstract**

We examine individuals' retirement behaviour in response to changes in the State Pension eligibility age introduced in various Pension Acts in the UK. Our findings show that the annual probability of retirement reduced significantly in response to a one-year increase in State Pension eligibility age, by 16 pp and 13 pp for men and women respectively. They also show that women adjusted their expected retirement age downwards in response to an increase in their SP eligibility age. These findings suggest that whilst an increase in the State Pension eligibility age induces individuals to postpone actual retirement, it does not lead to individuals revising their expected retirement age upwards, which could result in suboptimal retirement planning. The latter can be problematic for those who rely disproportionately on State Pension as their main source of income and, arguably, targeted communication campaigns are needed to improve retirement planning.

JEL classification: J26

Keywords: Retirement, Expectations, United Kingdom Household Longitudinal Study

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# 1. Introduction

Since the 1990s policymakers across OECD countries including the UK have sought to curb the long-term trend of early retirement among older workers (Blundell, Meghir & Smith, 2002; Banks, Emmerson & Tetlow, 2018). Retirement here refers to a gradual reduction or complete cessation of labour supply (Denton & Spencer, 2009). One policy lever which has been used to achieve this goal is increasing the State Pension eligibility age (SP-e age). A key question, then, is to understand how important SP-e age is for retirement behaviour. Due to the timing of the reforms and the cohorts affected, only limited empirical research exists on how men and women have responded or intend to respond in terms of their retirement behaviour to the recent higher SP-e ages in the UK. Notable exceptions include Cribb, Emmerson and Tetlow (2016) and Cribb, Emmerson and O'Brien (2022) who exploit changes in the SP-e age for certain groups of older men and women and find significant labour supply responses among affected cohorts.

Our study adds empirical evidence on retirement behaviour in response to SP-e age reforms in the UK. The reforms are characterised by, first, increasing SP-e age substantially and up to 67, second, speeding up the pace of the equalisation of SP-e age for men and women, and third, being announced and implemented in a relatively short period of time. We analyse the relationship between individual's annual retirement probability given the reform to their SP-e age and, separately, how reforms to SP-e age affect individual's expected age of retirement. For this, we use data from the United Kingdom Household Longitudinal Study, a large-scale household panel survey representative of the UK population.

The UK provides an interesting case study to address our two main research questions. First, whilst State Pension (SP) is an important source of income, replacing around 28% of preretirement net income (OECD, 2021), it is the lowest among all OECD countries. However,

this does not imply reforms to SP-e age will not lead to behavioural responses, which could be due to changes in economic incentives, signals, and cultural norms (Kohli, 1991; Cribb et al, 2016; Amin-Smith & Crawford, 2018). Second, the main source of retirement income for UK retirees comes from an occupational pension and individuals can typically receive this from age 55 onwards. However, recent evidence shows 78% of retirement income for the poorest pensioners comes from SP alone (Age UK, 2018).

Separately, research underlines the importance of financial planning for improving living standards in retirement (Lusardi, Michaud and Mitchell, 2017; Gubler and Pierce, 2014). Current labour supply and earnings are a key source of retirement savings, due to pension and formal saving. Therefore, it is of significant policy interest to understand retirement behaviour at older ages and how it is affected by changes to SP-e, in terms of planned age of retirement and actual retirement. From a lifecycle perspective, assuming perfect foresight individuals anticipate changes and adjust their labour supply, consumption and saving behaviour accordingly. However, evidence suggests real life behaviour deviates significantly from this ideal. In the context of retirement, which is typically a one-way process in the UK (Kanabar, 2015), if individuals do not adjust on one or more of these dimensions adequately this could lead to suboptimal outcomes, for example a recent study found women affected by SP-e age reforms were more likely to experience old age poverty compared to a slightly older unaffected cohort (Cribb & Emmerson, 2019).

To address our research questions, we utilise the 2007, 2011 and 2014 reforms to SP-e age in the UK (State Pension Acts) which increased the pace of equalisation of SP-e age between men and women (the latter was historically 5 years lower) and raised the SP-e age of men and women up to 66 or 67, depending on their date of birth. The magnitude of these reforms is non-trivial, women (men) born in certain cohorts saw their SP-e age increase by 2 (1) year(s) over

a relatively short period of time. We also consider whether financial situation proxied by factors such as individual pension membership, household income and housing tenure play a role in current and future retirement decisions. Recent evidence suggests anticipated reforms to SP-e age are important for retirement intentions (see inter alia Ciani et al., 2022, on evidence for Europe), we consider whether reform announcements in the UK prior to and post individual's survey interview affect retirement age expectations.

The rest of the is paper is set out as follows. Section 2 briefly discusses the academic and policy literature. Section 3 summarises the main features of the UK pension system. Section 4 describes the United Kingdom Household Panel Survey. Section 5 describes the methodology used and Section 6 presents estimation results. Section 7 discusses the implications of our findings and section 8 concludes.

## 2. Literature

SP-e ages have been shown to influence retirement decisions across a range of countries despite differences in the rules defining individual social security and taxes (Ciani et al. 2022). Cribb et al. (2022) analyse how a reform to SP-e age from 65 to 66 in the UK affected male and female labour supply. They find that among treated cohorts the employment rate increases by 7.4 percentage points (pp) for men and by 8.5 pp for women, and that full-time workers, the self-employed, lower educated, and those living in relatively more deprived areas responded more strongly.

Cribb and Emmerson (2019) consider how the reform to women's SP-e age affected living standards. Their findings show find that despite weekly income dropping by £32 per week and the absolute income poverty rate increasing by 6.4 percentage points (pp), affected individuals did not report higher levels of material deprivation and the risk of poverty did not persist once women became eligible for state pension, possibly because individuals smoothed their

consumption in response to the reform. The fall in income and rise in poverty even in the short run suggests individuals do not adjust sufficiently, especially given the policy was announced in 1995 - fifteen years before its introduction. Cribb and O'Brien (2022), carry out a similar exercise analysing the SP-e age increase among men from 65 to 66 and estimate that weekly income dropping by £108 per week among the affected cohort and the absolute income poverty rate increasing by 14 pp than it would have been had SP-e remained at 65. Thus, understanding whether individuals expect to adjust their retirement age given the reforms we consider, which legislate for even higher SP-e ages and with a much shorter period between the announcement and implementation date is an important research question.

Despite the need for policymakers to better understand how individuals respond to state pension age reforms, little empirical evidence is available. Expectation's data has been shown to play an important role in explaining major lifecycle decisions including the decision to retire (see inter-alia Bernheim, 1989 and Manksi, 2004). Disney and Tanner (1999), using the UK Retirement History Survey, compare expected versus actual retirement ages and find that most individuals reported their Expected Retirement Age (ERA) to be the SP-e age at the time. Moreover, these individuals subsequently retired at that age highlighting (i) the accuracy of expectations data in predicting subsequent retirement and (ii) the strong cultural norms associated with reaching SP-e age.

Given the importance of retirement expectations in determining future labour supply on the one hand, and the strong connection between reaching SP-e age and ceasing or reducing paid work on the other few studies have analysed how changes in SP-e age affect retirement expectations. An exception is Botazzi, Jappelli and Padula (2006) who find a series of reforms introduced in Italy during the 1990s to raise SP-e age by five years increased women's (men's) ERA by three (two) years. Similarly, De Grip, Fouarge and Montizaan (2013) find individuals

affected by the increased SP-e age from 65 to 66 in the Netherlands adjusted their ERA by 3.6 months while those who faced an increase in SP-e age from 65 to 67 adjusted their ERA by 10.8 months. Such changes in ERA were driven by highly educated females who have higher levels of pension wealth. However, the extent to which individuals adjusted their ERA was related their work capacity and insurance contribution history, suggestive of an income effect. Coppola and Wilke (2014) analyse a reform similar that evaluated by De Grip, Fouarge and Montizaan (2013), but in this case for Germany and find lower educated individuals did not adjust their expectations given the policy objective.

A recent set of studies investigate the channels which inform individual expectations. Ciani et al. (2022) using survey data spanning 10 European countries finds both official announcements as opposed to implementation and online search are both important for influencing individual beliefs. Alongside how individuals search for information the authors find proximity to the event of interest is important. Specifically, once an announcement has been implemented individuals' do not expect future reforms to SP-e age. In a separate paper using the same dataset Bucher-Koenen et al. (2019) also use the reform announcement date to understand the effect on future expected labour supply. Their findings suggest individuals make a partial adjustment, and, in this case, it is higher educated individuals who are more responsive.

Taken together, the existing evidence suggests (i) SP-e ages influence labour supply, (ii) certain groups such as the low educated who have lower pension wealth are likely to be disproportionately affected by such reforms which may lead to suboptimal outcomes such as old-age poverty, in the absence of adjusting on other margins, (iii) individuals do not fully adjust their ERA given the change in the SP-e age instead they make a partial adjustment and (iv) the timing and channels individuals use to learn about reform announcements is important.

## 3. Pension Policy in the UK

The UK pension system consists of three pillars. The first pillar, State Pension was introduced in 1948 and significantly reformed in April 2016. It is now a single tier flat rate scheme based on a Pay as You Go funding structure. Individuals who reached SP-e age prior to this date remain under the 'old' system which has two tiers: a flat rate basic pension and an additional pension related to earnings.[1] The older individuals in our sample are affected by the pre-2016 system whilst for younger individuals the new system applies. The level of state pension received depends on the number of years of National Insurance Contributions and an individual's date of birth.[2] Further, UK state pension is only available approximately ten years post receipt of occupational pension for members of Defined Contribution Schemes (age 55 rising to 57 in 2028). On the other hand, eligibility age for Defined Benefit pension members varies significantly across schemes.

In the 2018/19 tax year, the maximum state pension benefit an individual can receive under the new single tier system was £164.35 per week replacing around 28.4% of average pre-retirement earnings (OECD, 2021).[3] This figure is low by European standards, however expenditure on state pensions is non-trivial totalling £93.8 billion or just under 5% of GDP in the tax year 2017/18 (OBR, 2018). Moreover, evidence suggests around 1.1 (out of a total 11.81) million single pensioners aged 65+ rely on their State Pension as their sole source of income (Independent, 2017). Information relating to the second and third pillar of the UK pension system can be found in Online Appendix A.

[1] See Bozio et al. (2010) for a comprehensive description of system in place prior to April 2016.
[2] A recent OECD report showed that gaps in employment have limited impact on retirement income in terms of state pension accrual due to welfare policies in operation in the UK (OECD, 2015).
[3] In 2018-2019 the full basic state pension amounted to £125.95 per week under the old system, however the amount calculated is a function of numerous factors such as the 'class' of the contribution and whether an individual was 'contracted out' (see Bozio et al., 2010).

### 3.1 State Pension and Pension Acts in the UK

The basic structure and features of the UK State Pension system in operation until March 2016 were introduced in the Beveridge Report published in 1948. Between 1948 and 5th April 2010 the SP-e age for women (men) remained fixed at 60 (65). The 1995 Pension Act legislated to increase female SP-e age depending on individual's exact date of birth. For example, a woman born between 6th April 1950 and 5th May 1950 (6th August 1950 and 5th September 1950) would reach SP-e age on 6th May 2010 (6th January 2011). Thus, treatment intensity of the reform varied across individuals and the full reform was rolled out by March 2020 at which point female SP-e age would equal that of males.

The 2007 Pension Act raised the SP-e age for both men and women to 66 between 2024 and 2026, to 67 between 2034 and 2036 and to 68 between 2044 and 2046. Again, not all individuals saw their SP-e age increase by the same amount due to the way the policy was rolled out for example individuals born between 5th April 1959 and 5th May 1959 (6th March 1960 and 5th April 1960) reached SP-e age on 6th May 2024 (6th March 2026). Policymakers emphasised the reform was required given the rise in life expectancy in the UK among cohorts born post 1950 (ONS, 2015) which had not been matched by an equivalent or proportional increase in SP-e age.

The 2011 Pension Act bought forward the rise and equalisation of female SP-e age legislated in the 1995 Act to be completed by November 2018, 18 months earlier than initially planned. For example, a female born on 6th November 1953 reached SP-e age on 6th July 2017 under the 1995 State Pension Act, age 63 years and 8 months. Under the 2011 Act, the same individual reached SP-e age on 6th November 2018, aged 65 years. The increase in the SP-e age from 65 to 66 for men and women was also brought forward from 2024-2026 to between March 2019 and October 2020. For example, post implementation an individual born between 5th October

1954 and before 6th April 1968 reached SP-e age at age 66, under the 2007 Act this had only applied to individuals born post 5th April 1960 (and prior to 6th April 1968). The 2011 reforms were non-trivial in their scope and magnitude: estimates suggest 5 million individuals were affected (Thurley, 2017).

The 2014 Pension Act brought forward the planned increase in SP-e age to 66, post implementation an individual born between 5th October 1954 and before 6th April 1960 reached SP-e age at age 66, under the 2011 Act this had only applied to individuals born post 5th October 1954 and prior to 6th April 1968. The 2014 State Pension Act also bought forward the SP-e age from 66 to 67 by 8 years to between 2026 and 2028, compared to 2034-2036 as originally legislated in the 2007 Pension Act.[4] Hence, under the 2014 State Pension Act SP-e age increased to 67 for all individuals born post 5th March 1961 and prior to 6th April 1977. Under the 2007 State Pensions Act the SP-e age is legislated to increase from 67 to 68 between 2044 and 2046, this was left unchanged under the 2014 State Pension Act, however the 2014 State Pension Act did legislate to review SP-e age at least once every 5 years. In summary, the various Acts increased SP-e age in the UK over a relatively short period of time particularly for women.

Figures 1 and 2 visually summarise the 2007, 2011 and 2014 reforms by gender. The increase in SP-e age under each reform is not uniform by or within gender and depends on an individual's exact date of birth and date of survey interview. Online Appendix B contains permanent links to the original State Pension Acts (as enacted) detailing the changes made to SP-e age by gender.

[4] The 2014 Pension Act also legislated that the SPA would be reviewed on a periodic basis. The March 2017 recommendation of the Cridland Review of bringing forward the increase of SPA from 67 to 68 does not affect our sample respondents.

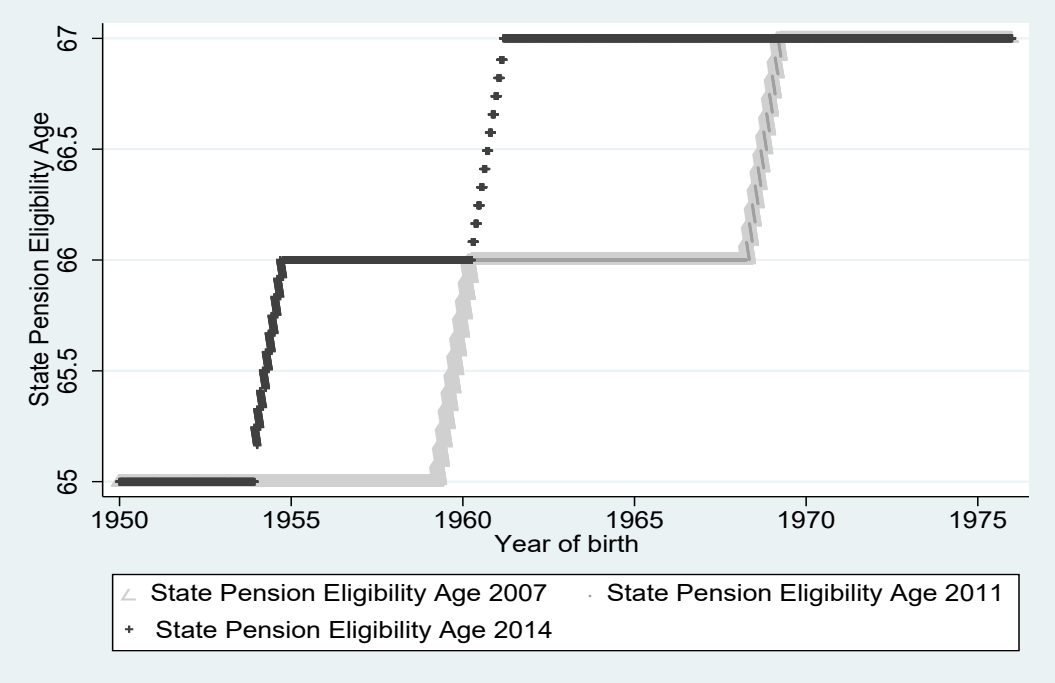


**Figure 1**: **UK State Pension Acts and Men's SP-e age.** SP-e age is the official State Pension eligibility age in the UK under the 2007, 2011 and 2014 State Pension Acts conditional on individual's date of birth.

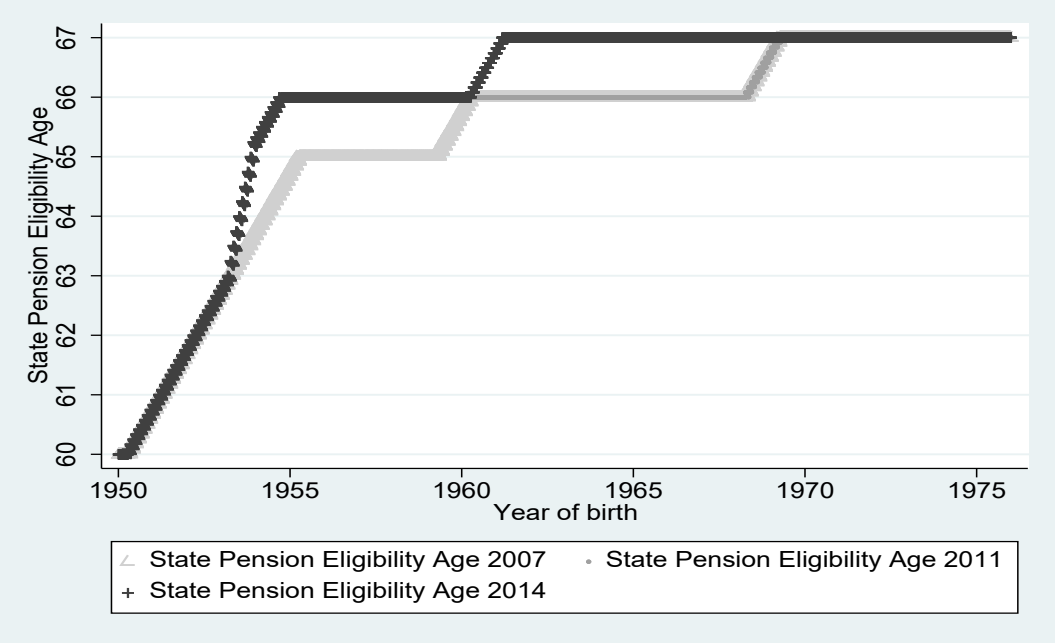


**Figure 2: UK State Pension Acts and Women's SP-e age.** SP-e age is the official State Pension eligibility age in the UK under the 2007, 2011 and 2014 State Pension Acts conditional on individual's date of birth.

### 3.2 Abolishment of the mandatory retirement age

Until October 2011 employees were required to request permission to work past age 65 and hence this became the 'default retirement age' (Lain et al., 2017). The Employment Equality Regulations (EER) introduced in 2011 reduced employer powers regarding retirement decisions and improving employee rights including addressing age related discrimination. This did not correspond with a sudden increase in employment rates among older workers, though there has been a general increase in labour force participation among those aged 65+ since the early 2000's (ONS, 2018c). On balance, we do not expect the 2011 EER to affect the impact SP-e age has on ERA in a systematic way, due to strong cultural norms, social security and (lack of) strong tax incentives between reaching SP-e age and reducing work hours or exiting the labour market in the UK (Kohli, 1991; Blundell, Bozio and Laroque, 2013). Moreover, the EER affected labour supply at age 65, which would affect relatively more men than women in our sample given the historic differences in SP-e age by gender. This contrasts with evidence from the US, which found a positive effect on participation rates following the introduction of a similar policy (von Wachter, 2009).

### 3.3 Other state benefits

Individuals may be eligible to receive state benefits depending on their individual and household circumstances. This includes support for living costs, care/disability costs and housing. If such benefits were increased in terms of their generosity this could offset behavioural changes to observed and planned future labour supply, consumption, or savings in response to SP-e age reforms. For this to be true such a change to benefit income would have to be perceived as permanent and similarly for reforms to SP-e age. Over the period covered by our sample data no such benefits have been adjusted upwards (above inflation) to offset the reduction in state pension wealth due to SP-e age reforms.

## 4. Data

The analysis uses the secure version of the United Kingdom Household Panel Study (UKHLS) covering the period 2010-2020 (waves 2-10) (University of Essex, 2022). UKHLS collects annual data on a range of individual and household economic and sociodemographic characteristics.

Our analysis is based on two samples, one to understand how individual's labour supply responds to reaching SP-e age and the other to analyse how individual's ERA responds to changes in SP-e age. We define retirement based on self-reported labour market status. For analysis purposes we follow individuals aged between 50 and below SP-e age at wave 2 of UKHLS. Individuals are followed over subsequent consecutive waves until they reach SP-e age or the first wave at which they attrit from the sample (if before SP-e age), they are then dropped from the sample. Hence, we do not allow for unretirement. Therefore, the sample used to model retirement behaviour is an unbalanced panel.

When analysing how ERA responds to changes in SP-e age, we follow previous research and assume that individuals perceive the term 'retirement' to correspond to a significant reduction in labour supply at the intensive or extensive margin (Banks & Smith, 2006; Blundell, Bozio & Laroque, 2013). UKHLS includes a 'retirement planning' module at each wave which contains a range of questions asking individuals for their subjective expectation of events associated with retirement. The question regarding expected retirement age is worded as follows:

"*There is a lot of policy interest in how people are planning for their long term future and retirement. At what age do you expect you will retire or will consider yourself to be retired*?"

Respondents provide an integer value or can respond 'don't know'. [5] The retirement planning module is age-triggered: only individuals aged 45, 50, 55, 60 and 65 at time of their survey interview and who consider themselves not retired are eligible to answer.[6] We exclude individuals aged 60-years-old when first observed and in employment from our sample due to issues related to self-selection and small sample size (we need to observe individuals in employment five years later). These individuals are likely to be systematically different in an unobservable, and possibly time varying way from the rest of our sample with respect to their taste for work. The sample used for this part of the analysis is constructed as follows: given the restricted ages covered in the retirement planning module we include all eligible individuals aged between 45 and 55 at waves 2,3,4 and 5 (2010-2015) who are also observed for a second time 5 waves later (2015-2020).[7] Identical to the approach used for the labour force exit analysis we restrict attention to individuals who report being employees at each of the two waves observed.[8]

Online Appendix C describes the key economic and sociodemographic characteristics used in the analysis. Online Appendix D provides summary statistics of these same characteristics by gender for the sample used in our analysis. After applying relevant sample restrictions there are 1364 men (1811 women) with a complete information set suitable for the labour force exit analysis and 834 men (1153 women) eligible to be included in the retirement expectations analysis.

[5] Based on our sample data these individuals are likely to report lower income and have lower levels of education. We drop individuals who respond 'don't know' to the ERA question and consistent with existing literature note such a response is non-random however cannot correct for this as has been done in past research (Kleinjans, K.J. & van Soest, 2014).
[6] An alternative way of eliciting expectations is using subjective probabilities (Manski 2004) such questions are not available in Understanding Society.
[7] The sample period ends prior to the first 'wave' of the Covid-19 pandemic.
[8] So we potentially short periods of unretirement if they did occur.

# 5. Empirical model

## 5.1 Modelling retirement

Our interest is in understanding how the likelihood of observing a transition from employment to retirement changes in response to increases in SP-e age. We estimate the following regression by gender using a fixed effects estimator:

$$(1) \qquad R_{it} = \beta_0 + \beta_1 SPA_{it} + \boldsymbol{\beta}_2 \boldsymbol{X}_i * SPA_{it} + \varphi_t + \theta_i + \epsilon_{it},$$

where $i$ denotes individual, $t$ the year of observation, and $SPA$ the SP-e age. Equation (1) states the probability an individual is retired or not in a given survey wave, is a function of their SPA (a continuous variable reflecting the SP-e age at the time of the survey interview), whose effect can vary with individual and household level covariates ($\boldsymbol{X}$), calendar year fixed effects ($\varphi$) and an individual fixed effects $\theta$. The covariates are measured in the first wave an individual is observed to avoid issues of simultaneity and/or reverse causation. The individual fixed effects control for initial age or any time-invariant covariate (including $\boldsymbol{X}$ separately) which may influence the retirement decision. Given social norms, income effects and low rates of state pension deferral (see Kanabar and Simmons, 2016), state pension is an important component of total retirement income. Thus, a priori we expect the SP-e age to negatively affect the probability of retirement. Standard errors are clustered at the individual level.

The covariates $\boldsymbol{X}$ are allowed to influence the effect of SP-e age on the probability of retirement decision. We focus on how individual's own SP-e and characteristics, such as whether they are members of an occupational pension plan, affect the retirement probability. Furthermore, studies have shown actual retirement is a household level decision and spousal characteristics can affect labour supply (in both directions) including at or around SP-e age (see Cribb et al. 2016; Cribb et al. 2022). We therefore also control for household level characteristics such as income and housing tenure.

### 5.2 Modelling expected retirement age

Figures 1 and 2 demonstrate the change to SP-e age is gradual and relatively small for some cohorts; whilst for others it is up to two years. The magnitude of the changes differs by date of birth in different calendar years. The complex relationship between SP-e age on the one hand and calendar time and birth cohort on the other, makes it difficult to use standard econometric frameworks typically used to estimate causal effects.[9] Similar to the approach taken to model retirement, we model changes in the expected retirement age ($ERA$) using a fixed effects approach. We estimate the following equation by least squares for each gender:

$$(2) \qquad ERA_{it} = \alpha_0 + \alpha_1 SPA_{it} + \boldsymbol{\alpha}_2 \boldsymbol{X}_i * SPA_{it} + \gamma_t + \eta_i + \xi_{it}$$

Our dependent variable is $ERA$ and $SPA$ is the SP-e age given individual's date of birth and date of their survey interview. We include an identical set of individual and household level controls ($\boldsymbol{X}$) used to model retirement.[10] For the same reasons discussed in the previous subsection we only include the values recorded at the initial wave an individual is observed and these are interacted with SP-e age. Time fixed effects are denoted by $\gamma$ and individual fixed effects by $\eta$.

The key effect of interest is the effect of SPA (SP-e age) on $ERA$ (which depends on $\boldsymbol{X}$). If the effect is positive (negative) this indicates that the expected retirement age rises (falls) for a given increase in the SP-e age. If individuals adjust their expected retirement age with exactly the same number of years as the rise in their SP-e age, then the effect is equal to one. If the effect is equal to zero, this would be consistent with individuals either having perfect foresight or being 'naïve' with respect to announced changes to SP-e age.

[9] One possibility is to analyse the SPA-ERA relationship around the kink and jump points separately, however the low number of observations around these points, as there are many, makes this impossible.
[10] In preliminary specifications, we controlled for an extensive set of individual and spousal characteristics however these were not statistically significant at conventional levels.

In order to understand whether individuals adjust their future labour supply behaviour ahead of the implementation date, due to the fact policies are announced prior to receiving Royal Asset (becoming official law), we also estimate lead specifications. We test for so-called anticipation effects one and two years ahead of the implementation date. It could also be the case individuals are slow to adjust their expectations in response to reforms, for example due to information asymmetries or lack of engagement with SP-e age issues (at least around the time the reform was implemented), hence we also estimate lag specifications, testing for reform effects one and two years post the implementation date and accounting for individual's survey interview (see online Appendix E for full results).

## 6. Estimation results

We present our results in two parts, the first focuses on how variation in SP-e age affects the probability of retirement and the second on how SP-e age affects the expected retirement age. These effects are identified due to the SP-e age reforms discussed in section 3.

Table 1, columns 1 and 3, show higher SP-e age is associated with a lower probability of retirement. For men the magnitude of this effect, for a one-year increase in SP-e age is -8.2 pp and for women it is -6.4 pp for the base specification. After controlling for individual occupational pension membership, household income and housing tenure (all interacted with SP-e age), columns 2 and 4 of Table 1 show that for a one-year increase in SP-e age the probability of retirement decreases by 15.6 pp for men and by 13.3 pp for women who belong to the reference group (those in the bottom income tertile, rent their home and are not active members of their employers' occupational pension plan).

The results of the extended specifications (columns 2 and 4) provide empirical support for interaction effects of SP-e age with income, occupational pension, and housing tenure (F-test

reported bottom row of Table 1). For men, the findings show that the effect of SP-e age on the probability of retirement is lower (in absolute terms) for individuals who report being active members of their employer's pension scheme. For women we also find such a moderating effect when they participate in an occupational pension membership, though this effect is only marginally significant. Further, for women, the findings support that the effect of SP-e age on the probability of retirement (in absolute terms) is higher among women who report owning their home outright (relative to women belonging to renter households). A similar moderating effect is found for women belonging to households higher up the household income distribution (the top tertile of the income distribution relative to the bottom tertile).

Table 2 shows the estimates for equation (2). Like Table 1 we estimate two versions per gender, a basic and extended specification. Column 1 shows that in the case of men we do not find any adjustment to ERA in response to reforms to SP-e age. On the other hand, we find that women reduce their ERA by 0.91 years for a one-year increase SP-e age (column 3). Column 4 of Table 2 shows that after controlling for interactions between SP-e age and income, occupational pension membership and housing tenure, the direct effect of the reform remains for the reference group of women. The ERA for women without an occupational pension is not affected by a one-year increase in SP-e age: the interaction effect equals 0.97 years which about nullifies the negative effect of -1.05 years for women belonging to the reference category (with an occupational pension). Whilst we also find some marginally significant effects between the interaction effects between income and housing, and SP-e age, the relatively large standard errors estimated imply these effects are not indistinguishable from zero relative to the base group (renters with an active employer pension and belonging to the lowest income tertile).

**Table 1: Retirement and SP eligibility effects**

| | Men (basic) | Men (full) | Women (basic) | Women (full) |
|---|---|---|---|---|
| State Pension eligibility (SP-e) | -0.082*** | -0.156*** | -0.064*** | -0.133*** |
| | [0.010] | [0.034] | [0.007] | [0.020] |
| Equivalized real monthly household income (interacted with SP-e) | | | | |
| Middle tertile | | -0.019 | | 0.013 |
| | | [0.023] | | [0.016] |
| Top tertile | | -0.002 | | 0.036** |
| | | [0.023] | | [0.016] |
| Occupational pension (interacted with SP-e) | | 0.060*** | | 0.0275* |
| | | [0.022] | | [0.015] |
| Housing tenure (interacted with SP-e) | | | | |
| Own home outright | | 0.055* | | 0.071*** |
| | | [0.031] | | [0.019] |
| Own home with mortgage | | 0.017 | | 0.015 |
| | | [0.029] | | [0.018] |
| Observations | 12,024 | 8,707 | 15,663 | 11,698 |
| (unique individuals) | (1,856) | (1,364) | (2,425) | (1,811) |
| Hausman test (FE vs RE; $H_0$: RE) | Reject $H_0$ | Reject $H_0$ | Reject $H_0$ | Reject $H_0$ |
| $H_0$: No interactions covariates and SP-e | N/A | Reject $H_0$ | N/A | Reject $H_0$ |

Notes: ***,**,*,[1] refers to significance at 0.1%, 1%, 5% and 10% level respectively. Base categories: 2010, bottom tertile of income distribution, renter (and other), and individuals who are not a member of their current employer pension scheme, all interacted with state pension eligibility (SP-e). Year fixed effects are controlled for. F test results refer to test outcome at the 1% level.

**Table 2: Determinants of the Expected Retirement Age for men and women**

| | Men (basic) | Men (full) | Women (basic) | Women (full) |
|---|---|---|---|---|
| State Pension eligibility Age (SP-e age) | -0.310 | 0.360 | -0.913*** | -1.050** |
| | [0.260] | [0.508] | [0.240] | [0.498] |
| Equivalized real monthly household income (interacted with SP-e age) | | | | |
| Middle tertile | | 0.048 | | -0.711** |
| | | [0.349] | | [0.359] |
| Top tertile | | 0.151 | | -0.593* |
| | | [0.354] | | [0.356] |
| No occupational pension (interacted with SP-e age) | | -0.127 | | 0.970*** |
| | | [0.459] | | [0.394] |
| Housing tenure (interacted with SP-e age) | | | | |
| Own home outright | | -0.547 | | 0.782 |
| | | [0.553] | | [0.502] |
| Own home with mortgage | | -0.888** | | 0.564 |
| | | [0.440] | | [0.456] |
| Observations | 2,154 | 1,668 | 2,960 | 2,306 |
| (unique individuals) | (1,077) | (834) | (1,480) | (1,153) |
| Hausman test (FE vs RE; $H_0$: RE) | Cannot reject $H_0$ | Reject $H_0$ | Reject $H_0$ | Reject $H_0$ |
| $H_0$: No interactions covariates and SP-e age | N/A | Reject $H_0$ | N/A | Reject $H_0$ |

Notes: ***,**,*,ˡ refers to significance at 0.1%, 1%, 5% and 10% level respectively. Base categories: 2010, bottom tertile of income distribution, renter (and other) and individuals who are a member of their current employer pension scheme interacted with state pension eligibility age (SP-e age). Year fixed effects are controlled for. F test results refer to test outcome at the 1% level.

## 7. Discussion

Among female employees we find a downward adjustment is made in the expected age of retirement in response to an increase in SP-e age, but only for those with an occupational pension scheme. For men there is no evidence of such an adjustment. Separately, we find empirical support is found for SP-e age on the likelihood of retiring, we next discuss potential reasons which may explain these contrasting results.

Individuals may not adjust their labour supply until closer to the date of retirement or actual SP-e age. Geyer and Welteke (2021) analyse a reform to early retirement age (from 60 to 63) in Germany and find that despite the reform being announced 13 years ahead of implementation

individuals did not adjust their labour supply or put another way, were not forward looking. Research also suggests differences in behaviour across groups, for example Brucker and Leppel (2013) find women and those with low financial net wealth displayed behaviour consistent with procrastination or inertia when it came to retirement planning. For policymakers this is a concern. Delaying labour supply decisions or not responding at all to future reforms without adjusting on other margins such as savings or consumption will lead to suboptimal outcomes from a lifecycle perspective.

Evidence suggests individuals with higher measured levels of financial literacy are more likely to engage in financial planning for retirement, are less likely to experience a sharp fall in living standards later in life and have better health outcomes (Lusardi, Michaud and Mitchell, 2017; Gubler and Pierce, 2014). Whilst the UKHLS does not contain measures of financial literacy recorded at the time ERA is measured, we allow for differential adjustment based on, e.g., income and our lack of support for differential adjustment is therefore concerning. Separately, by gender, we also test (not reported) for whether partners total income including that from earnings interacted with SP-e age affects ERA, and find no such effect. In order to determine whether there was a lag in responding to announced changes in SP-e age, we re-estimated equation (2) which controlled for SP-e age one and two years prior to survey interview, respectively, and found effects similar to those in Table 2 (full results can be found online appendix E).

Johnson (2001) analyses female saving behaviour in response to the 1995 State Pension Act and concludes the lack of adjustment observed in household saving rates for women affected by the reform, relative to those unaffected, is suggestive of myopic behaviour. He concludes that women could not have anticipated the reform and the way it was phased in, instead,

suggesting the lack of adjustment was due to individuals perceiving the event to be sufficiently 'far off'. In the reforms we analyse, the period between the announcement and implementation date is much shorter compared to the 1995 reform implying that, ceteris paribus, individuals be more likely to adjust on some margin, particularly older age groups who are closer to SP-e age. Next, using purely descriptive methods we verify whether this holds based on our sample data.

**Table 3:** Average ERA for selected state pension eligibility ages.

| **Average ERA in first period observed** (waves 2-5, 2010/11-2013/14) | **Men** | **$N_{men}$** | **Women** | **$N_{women}$** |
|---|---|---|---|---|
| SP-e age=65 | 64.09 | 64 | 64.14 | 72 |
| SP-e age=66 | 63.91 | 655 | 63.59 | 876 |
| SP-e age=67 | 64.36 | 44 | 64.73 | 55 |
| **Average ERA in second period observed** (waves 6-10, 2014/15-2017/18) | **Men** | | **Women** | |
| SP-e age=66 | 64.73 | 219 | 64.86 | 329 |
| SP-e age=67 | 63.44 | 553 | 62.95 | 708 |

Notes: figures correspond to mean expected retirement age (ERA) for two specific SP-e ages in the first and second period an individual is observed in the balanced panel.

Table 3 shows that the level and change in ERA observed across our sample period and hence successive State Pension Acts in place is below the SP-e age itself. Given we have a balanced panel we split responses by each point an individual is observed in the data. In the first period the majority of responses were recorded when either the 2007 or 2011 Pension Act was in operation, whereas in the second period the 2014 Pension Act was in operation. Irrespective of time period, those with lower SP-e age refer to older cohorts. Based on these selected common SP-e ages, our sample data highlight the lack of or downward responsiveness in ERA to changes in SP-e age. However we also note, irrespective of gender, individuals with a lower SP-e age (and hence older sample members), generally report a higher ERA compared to younger individuals in both time periods (with the exception of those whose SP-e age is 67 in

the first period). So this could tentatively suggest individuals adjust their ERA albeit very slowly and closer to actual time of retirement. We also find that the difference in ERA for a given SP-e age is not dissimilar by gender.

These patterns align with the findings reported in Table 2 and suggest those further away from SP-e age in the absence of adjusting on other margins are not making adequate changes in terms of their ERA given changes to SP-e age. Indeed, for many of individuals in our sample the change in SP-e age is approximately one year, for the older cohorts (whose SP-e age increases from say 65 to 66 across the two periods) we do observe a small increase in ERA across the two periods, around 0.6 and 0.7 years for men and women respectively. Whereas for younger cohorts whose SP-e age increases from 66 to 67 (so born during 1960s) we observe a decrease in ERA of around 0.5 and 0.6 years respectively. For individuals whose SP-e age is 67 in both periods, so again the youngest in our sample (age 45), the average ERA in the two time periods we consider (5 years apart), show that for men the decrease in ERA is around one year and for women their ERA declines by almost 1.8 years. We note that given the historic nature of SP-e age difference and the reforms, it is the females with an SP-e age equal to 65 (so born during mid 1950s) who have been affected most recently compared to men with the same SP-e age, and these individuals report an ERA not dissimilar to their SP-e age (64.14) in the first period of observation. This is consistent with existing research showing affected cohorts respond to the reform by increasing their labour supply closer to the date they actually reach SP-e age (Ludovico et al. 2020).

We next consider the role of state pension and other income sources in retirement given our findings. State Pension replaces approximately 28% of pre-retirement net earnings (OECD, 2021). Therefore, whilst an important source of income for individuals with lower lifetime

earnings and wealth, the bulk of retirement income especially for wealthier households is likely to come from occupational pensions, and thus the extent to which individuals adjust their expected future labour supply in response to SP-e age reform may be limited. It is important to note in this context that across successively younger cohorts female labour market participation and educational attainment has increased in the UK, hence an increasingly higher proportion of women in successively younger cohorts will be members of an occupational pension scheme, in addition to national reforms to improve pension coverage such as auto enrolment (Ginn and MacIntyre, 2013). For example, the proportion of women (men) in our sample born in the 1950s who report not being active member of their employers pension is 19% (13%), for those born in the 1960s the equivalent statistic is 11% (10%). Private pension wealth holdings are highly unequal in Great Britain**,** aggregate total private pension wealth holdings among the ninth (first) decile is £1288bn (£4bn) or 322 times larger (ONS, 2019). Similarly, from an income perspective, recent figures show median occupational pension income in 2018/19 equalled £181 per week whereas the top 8% of pensioners received at least £750 per week (ONS, 2020).

Table 2 shows that active membership to a workplace pension scheme is important for understanding intended future labour supply in response to changes in SP-e age. On the other hand, whilst symbolically important for determining labour force participation at or around actual retirement, the contribution of State Pension *itself* to total retirement income is relatively low compared to occupational pensions and thus individuals may be slower, especially if the event is sufficiently 'far off' to adjust their expected retirement age upward consistent with the policy objective. Our results suggest the presence, type and level of occupational pension wealth is then important, in the UK Defined Contribution pensions can be claimed at age 55 whereas more generous Defined Benefit schemes vary in terms of eligibility ages albeit are

generally higher. Crawford et al. (2020) find for a cohort of individuals born in England during the 1950s current DB scheme members report on average an ERA 0.8 years lower than individuals who have no private pension arrangement. Whereas members of DC pensions do not report an ERA which is statistically different from the latter group. Unfortunately, in the UKHLS it is not possible to identify the type of pension an individual has. Conditional on the type of occupational pension held (if any), Crawford et al. (2020) finds individuals in the top household financial wealth quintile report on average an ERA over 2 years lower relative to those in bottom quintile. These findings underline the importance of occupational pension membership and wealth more generally in influencing ERA.

Individuals may adjust on other margins such as increasing their current labour supply and/or savings rate (conversely decreasing consumption) to keep ERA fixed. One reason why such an adjustment may not be needed for a given reduction in state pension wealth is oversaving. Crawford and O'Dea (2014) using the English Longitudinal Study of Ageing show that cohorts born in England in the 1940s,so slightly older than the cohorts analysed in this paper, typically hold levels of wealth far higher than optimal from a lifecycle perspective even after excluding housing wealth. Taken together, given the fact DC pension members can access this income source over 10 years prior to SP-e age and evidence showing individuals typically over-save for retirement suggests state pension income can be thought of as a *supplementary* rather than primary source of retirement income in the UK. However, whilst this may hold true on average, it is important to note that among the bottom fifth of the pensioner income distribution in Great Britain approximately 80% of total gross mean income is state benefit income including State Pension (ONS, 2020).

Evidence suggests after a period of decline pensioner poverty is increasing in the UK (DWP, 2021; JRF, 2022). Certain groups such as women, single/widows, those with low lifetime attachment to the labour market, low lifetime earners, disabled, ethnic minorities and divorcees are more likely to experience poverty in old age (Cribb and O'Brien, 2022). Some of these groups have been shown to be more responsive to SP-e age reforms, for example single women adjusted their labour supply more strongly relative to women with a partner (Cribb et al. 2016; Giusta & Longhi, 2021). The fact we do not find evidence of individuals who face financial constraints (proxied by housing tenure and income) of adjusting their ERA relatively more for a given change to SP-e age is concerning. Particularly if this is due to suboptimal behaviour such as lack of engagement with financial matters and retirement planning more generally or myopia and this leads to a higher risk of poverty in retirement as has been shown for certain cohorts of women and men affected by SP-e age reforms (Cribb and Emmerson, 2019; Cribb and O'Brien, 2022). For example, sudden revisions to labour supply close to planned retirement may not be feasible due to health conditions related to main lifetime occupation and sector of work (Chan and Stevens, 2004; Banks and Tetlow, 2008; Round, 2017).[11]

We test for anticipation effects with respect to ERA and its relationship with SP-e age. We estimate an identical regression specification to that estimated in Table 2 but set individuals SP-e age to be equal to the SP-e age (given their date of birth) one or two years ahead of their survey interview (we run two separate specifications), given the State Pension Act in operation at that time. It is typical for there to be a period of time when policies are first announced and publicly debated before they become law. For example, reforms to SP-e age (which subsequently became the 2011 State Pension Act) were first announced by UK government in

[11] We cannot empirically test whether retirement expectations match realisations for a subsample of the data due to the fact reforms take place in quick succession and ERA is only measured every 5 years. However, it may well be that this cohort is not representative of the entire sample and the average effect we estimate is based on individuals who are significantly younger, in some cases by 10-15 years.

2010. However, were first discussed in the House of Lords in January 2011 before becoming enshrined in law on 3rd November 2011. Thus, individuals may have revised their ERA by the time their survey interview took place considering this information. In contrast to recent studies using European data (see inter-alia Ciani et al. 2022) however, we find a downward revision to ERA among women when varying the 'announcement period' between 1 and 2 calendar years ahead of the survey interview and the respective State Pension Act in place at the time (see online Appendix E).

## 8. Conclusion

Our results confirm that the SP-e age strongly influences the likelihood of retiring, despite the absence of an earnings test for SP eligibility or significant financial incentives to remain in work. Hence, SP-e age remains closely aligned with social or cultural norms regarding the timing of retirement. However, our results also show that individuals do not upwardly adjust their expected age of retirement given the legislated increase in SP-e age either prior to, at or post the implementation of the reforms. The findings suggest this is likely due to the fact that in the UK for most households state pension is an important source of *supplementary* rather than main income source. In addition, given existing evidence it is likely that individuals adjust their labour supply much closer to SP-e age itself, precisely because with a large number reforms being implemented over a relatively short period of time individuals do not know what their 'actual' SP-e age will be.

Our findings suggest policymakers in the UK need to improve communication to raise awareness of SP-e ages for cohorts approaching retirement years and among younger prime age workers. Recent developments such as the midlife MOT and forthcoming Pensions Dashboard Programme aim to address some these issues, however a key concern here is

engaging individuals to use such tools and improving financial education in the context of retirement saving and planning in the UK, especially among younger cohorts.

## Conflict of interest statement/declaration of competing interests

The authors declare that they have no conflict/declarations of interest. No funding was sought for this project.

We confirm this article is not being considered for publication elsewhere.

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**Online Appendix A: Occupational and personal pensions in the UK (Second and Third Pillars).**

## Occupational pensions.

Occupational pensions are a voluntary form of retirement saving and make up the second pillar of the UK pension system. These have traditionally been Defined Contribution (DC) or Defined Benefit (DB) type pension schemes; individuals are taxed on receipt of income from their occupational pension not at time of contribution. Occupational pensions (and personal pensions) play an important role in providing income in retirement, given that the level of state pension is relatively low in the UK (OECD, 2021). For example, average net replacement rates increase from 28 percent (state pension alone) to 62.2 percent after accounting for the presence of an occupational pension (OECD, 2017). Since April 2002 individuals have been able to claim their occupational pension from the age of 55 (up from 50); highlighting the significant age gap between claiming occupational and state pension in the UK for both men and women. A recent DWP report highlights that 62 percent of pensioners expect to receive income from an occupational pension (DWP, 2015).

To increase occupational pension coverage and retirement saving (but not retirement age *per se*), the UK government in April 2012 introduced Auto Enrolment (AE) a policy whereby employees are automatically enrolled into a workplace pension. Evidence shows that such 'nudge' behaviour has been effective in terms of changing individuals behaviour in a particular way (in this case minimising opt out) given the policy objective (Cribb and Emmerson, 2016).[12] Early evidence from the introduction of AE suggests it has been largely successful in terms of

[12] Auto enrollment was gradually phased in starting with larger employers before moving on to smaller employers, note that it does not cover the self-employed and we do not include such individuals in our sample for analysis purposes due to the way the UK pension system has historically treated self-employed versus employees, in addition to issues such as selection and unobserved heterogeneity.

coverage but issues such as increasing contribution rates conditional on participation still remain (Cribb et al. 2016; DWP 2017).

The UK government has also made significant changes to the way in which contributions to DC pensions can be drawn and used. Until March 2015 individuals could draw down up to 25 percent (tax free) as a lump sum and annuitize the remainder, following the introduction of the Pensions Schemes Act 2015; individuals are free to use their retirement savings as desired. A priori it is not clear how this policy change may influence retirement expectations. One possibility is that given it came into effect soon after the 2014 state pension act, which introduced further increases to SP-e age, the 2015 Pensions Schemes Act (PSA) could have mitigated upward revisions to ERA. For example, if individuals were likely to be liquidity constrained, the policy reform meant this would no longer be the case and *ceteris paribus* induce individuals to retire earlier or at the same age as initially planned.

Thurley (2017) summarises the impact of the 2015 PSA on individuals and shows that the introduction of the reform led to significantly more individuals drawing down their pension pot early (before age 65), that most of these early withdrawers had relatively small pension pots (<£30,000) and the number of annuities being taken out falling sharply, drawdown becoming the norm. Evidence suggests most individuals did not consider their DC pension as their main source of retirement income (the majority reported DB and State Pension) and that it was common for individuals to access their pension pots whilst still in employment (FCA, 2018). The research also suggested the reforms did not lead individuals 'squandering' their retirement savings and instead choosing to invest in alternative forms of saving (Thurley, 2017).

### Personal pensions.

Personal pensions are another type of voluntary retirement saving, between an individual and a provider (usually an insurance firm); and make up the third tier of the UK state pension

system. Personal pensions are usually a DC type scheme and are treated in the same way as occupational pensions from a taxation perspective.[13] Individuals must be aged at least 55 before they are eligible to claim their personal pension; the 'Pension Freedom' reforms introduced in 2015 affected personal pensions in the same way they did occupational pensions.

The widespread availability and uptake of occupational pensions since the 1950s and the fact that the UK labour market has historically been made up of employees means the proportion of individuals who have a personal pension is higher among the self-employed, a group of individuals who we do not consider in this study.[14] This also means that when analysing retirement age expectations among employees it is relatively more important to control for the presence of an occupational pension rather than a personal pension.

[13]An individual can have an occupational and personal pension although certain limits exist in terms of total contributions made within a tax year. a tax year runs from 6th April each year to 5th April the following year. The annual pension contribution allowance on a personal pension is set by government; in the 2018-19 tax year it is £40,000.

[14] Self-employment rates have increased in the period after the Financial Crisis; nonetheless the self-employed still only make up 15% of the labour force in the UK (ONS, 2018a).

**Online Appendix B: Summary of the UK State Pension Acts.**

***For reference: 1995 Pension Act***

https://www.legislation.gov.uk/ukpga/1995/26/schedule/4/part/I/enacted

***Period 1: 2007 Pension Act.***

Law from beginning of sample period until November 2, 2011

https://www.legislation.gov.uk/ukpga/2007/22/schedule/3/enacted

***Period 2: 2011 Pension Act.***

Law between November 3, 2011 and May 13, 2014

https://www.legislation.gov.uk/ukpga/2011/19/section/1/enacted

***Period 3: 2014 Pension Act.***

Law between May 14, 2014 –and end of sample period

https://www.legislation.gov.uk/ukpga/2014/19/part/3/enacted

## Online Appendix C: Variable defintions

### Table C1:Variable definitions.

| Variable | Definition & Categories |
|---|---|
| Dependent variable | |
| ERA | Individuals expected age of retirement |
| Retired | Individual self-reports their economic status as retired |
| Covariates | |
| *Individual level covariates* | |
| SP-e age | Age at which individual is eligible to claim their state pension according to State Pension Act in operation at time of respondent's survey interview and his or her date of birth. |
| Member of an employer's pension scheme | Yes=0; No=1 |
| *Household level covariates* | |
| Housing tenure | Housing tenure of household individual resides in at the time of survey interview: Owned outright, owned with mortgage, rent and other |
| Household income tertile | Total post –tax equivalized household net income (of all household members) which has been adjusted for inflation (2015 prices) and household size using the OECD scale. |

## Online Appendix D: Descriptive statistics

## Table D1: Descriptive characteristics by gender

| | ERA sample | | Retirement sample | |
|---|---|---|---|---|
| Variable | Men | Women | Men | Women |
| Dependent variable | | | | |
| ERA (in full years) | 63.81 | 63.56 | | |
| Proportion retired | | | 0.06 | 0.06 |
| Covariates | % | % | % | % |
| *Individual level covariates* | | | | |
| SP-e age | 66.33 | 66.29 | 65.61 | 65.02 |
| Member of an employer's pension scheme | | | | |
| Yes | 0.84 | 0.82 | 0.80 | 0.77 |
| No | 0.16 | 0.18 | 0.20 | 0.23 |
| Other/ don't know | | | | |
| *Household level covariates* | | | | |
| Housing tenure | | | | |
| Owned outright | 0.18 | 0.22 | 0.31 | 0.48 |
| Owned with mortgage | 0.69 | 0.65 | 0.58 | 0.50 |
| Rented | 0.13 | 0.13 | 0.11 | 0.35 |
| Household income tertile | | | | |
| Top income tertile | 0.31 | 0.36 | 0.39 | 0.41 |
| Middle income tertile | 0.38 | 0.32 | 0.38 | 0.34 |
| Bottom income tertile | 0.32 | 0.32 | 0.23 | 0.25 |
| N*T (N unique) | 1668 (834) | 2306 (1153) | 8707 (1364) | 11968 (1811) |

Sample descriptives refer to data used to estimate extended expected retirement age equation. Sample descriptives refer to data used to compute extended labour force exit equation. Proportions may sum over 1 due to rounding.

**Online Appendix E: One year lag and lead regression specifications.**

**Table E1: Expected Retirement Age (ERA) and SP eligibility lag effects**

| | Men (full) | Women (full) |
|---|---|---|
| State Pension eligibility Age (SPA) | 0.70* | -0.40 |
| | [0.395] | [0.366] |
| Middle tertile | 0.040 | -0.87*** |
| | [0.334] | [0.355] |
| Top tertile | 0.166 | -0.71** |
| | [0.348] | [0.352] |
| No occupational pension | -0.170 | 0.834** |
| (interacted with SPA) | [0.458] | [0.384] |
| Housing tenure (interacted with SPA) | | |
| Own home outright | -0.640 | 0.328 |
| | [0.501] | [0.412] |
| Own home with mortgage | -0.922*** | 0.090 |
| | [0.352] | [0.347] |
| Observations | 1,666 | 2,304 |
| (unique individuals) | (834) | (1,153) |
| Hausman test (FE vs RE; $H_0$: RE) | | |
| | Reject $H_0$ | Reject $H_0$ |
| $H_0$: No interactions covariates and SPA | Reject $H_0$ | Reject $H_0$ |

Notes: base categories for year (2010). ***,**,* refers to significance at 0.1%, 1% and 5% level respectively. Sample refers to two period balanced panel controlling for individual fixed effects.

Table E1 refers to regressions of ERA on SPA one year prior to the survey interview to detect the presence of lag effects. No empirical support for such effects is found.

**Table E2: Expected Retirement Age (ERA)and SP eligibility anticipation effects**

| | Men (full) | Women (full) |
|---|---|---|
| State Pension eligibility Age (SPA) | -0.328 | -0.821*** |
| | [0.344] | [0.330] |
| Middle tertile | 0.153 | -0.881*** |
| | [0.33] | [0.352] |
| Top tertile | 0.231 | -0.689** |
| | [0.343] | [0.353] |
| No occupational pension | -0.035 | 0.870** |
| (interacted with SPA) | [0.460] | [0.384] |
| Housing tenure (interacted with SPA) | | |
| Own home outright | -0.281 | 0.503 |
| | [0.485] | [0.397] |
| Own home with mortgage | -0.563 | 0.347 |
| | [0.335] | [0.352] |
| Observations | 1,666 | 2,304 |
| (unique individuals) | (834) | (1,153) |
| Hausman test (FE vs RE; $H_0$: RE) | | |
| | Reject $H_0$ | Reject $H_0$ |
| $H_0$: No interactions covariates and SPA | Reject $H_0$ | Reject $H_0$ |

Notes: base categories for year (2010). ***,**,* refers to significance at 0.1%, 1% and 5% level respectively. Sample refers to two period balanced panel controlling for individual fixed effects.

Table E2 refers to regressions of ERA on SPA one year ahead of the survey interview to detect the presence of anticipation effects. Empirical support for such effects is found for women.