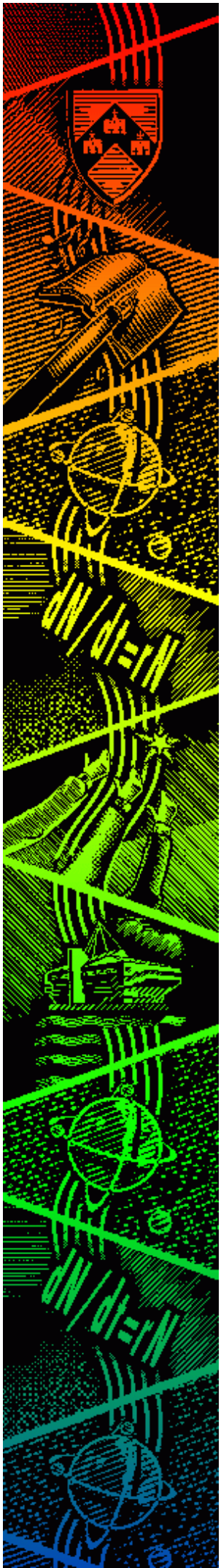

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Unretirement in England: An Empirical Perspective

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Abstract

Ageing populations place an increasing financial burden on governments. Retired older workers are a source of untapped economic capacity. Maestas (2010) finds 26% of Health and Retirement Study (HRS) sample respondent's 'unretire'. We estimate unretirement rates between 5.5 and 9.2 percent using The English Longitudinal Study of Ageing (ELSA). Earlier studies using US longitudinal data include Rust (1980), Gustman and Steinmeier (1984) and Hardy (1990) estimate similar rates. Results suggest: age, education, financial planning, unanticipated increases in debt, spouse and duration in retirement play an important role in the decision for a male to unretire.

JEL classification: J26.

Keywords: ELSA, Labour supply, Labour demand, Unretirement.

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1 Introduction.

Ageing populations are a common feature amongst advanced economies around the world. The fact that individuals are living longer has placed an increasing pressure on central government's resources, and in particular the Social Security system. This is particularly true for the UK, one of the main findings of the 2011 Census was that 1 in 6 individuals, or 16.4% of the population was aged 65 and over.[1] This has also been reflected in the dependency ratio, defined as the number of individuals aged over State Pension Age (SPA) relative to the working population aged between 16 and 65, which has increased 0.3 in 1971 and are projected to reach 0.5 by 2050 without any change in retirement legislation (ONS, 2009). In view of these trends the UK government has increased the Normal State Retirement Age (NSRA).[2]

Retirement has traditionally marked the cessation of a career job and a transition into leisure. However over the past thirty years individuals have changed their labour market behaviour as they approach retirement age. A significant proportion of older workers in the US tend to facilitate the winding-down from employment to retirement through a part time or 'bridge' job (see for example Honig and Hanoch (1985), Ruhm (1990) and Blau (1994)). The latter two studies also found that retirees re-entered the labour market i.e. unretired.[3] Gustman and Steinmeier (1984a) using the Retirement History Survey (RHS) report re-entry rates for older workers in the order of 16.6 percent.[4] Subsequently Berkovec and Stern (1991) using the National Longitudinal Survey (NSL) report re-entry rates ranging from 6.3 to 13.2 percent depending on age of first retirement. Hardy, Hayward & Liu (1994) using the same dataset restrict attention to those who are aged 55 and over when they first retire, and report an unretirement rate of 10.69 percent.[5] Hardy (1991) using a sample of nationally representative older workers in the US state of Florida, observes labour force re-entry rates of 6.89 percent.[6] A common finding amongst these studies is that younger retirees were more likely to unretire, and we too find a similar result in our analysis.

More recently Maestas (2010) using a sample of men and women from the Health Retirement Survey (HRS) shows that more than one quarter of sample respondents who are in employment subsequently exhibit unretirement behaviour.[7] Her findings indicate of the sample that unretired eighty percent expected to work post retirement, and the main motivation to unretire was that retirement did not conform to their a priori expectations, whilst the role of financial shocks or inadequate financial planning had a less significant role.[8] [9] Congdon-Hohman (2009) using the same dataset finds similar results and highlights the importance of private health insurance, and similar to this research uses duration analysis to model unretirement.[10]

In contrast little research has focused on the labour market behaviour of individuals who are initially in retirement, in particular paid work. Of the few which do, Peterrsson (2011) investigates unretirement in Sweden using register data, and models unretirement using a static framework. The former study estimates an unretirement rate in the region of 6 to 14 percent depending on

the definition of unretirement, and finds unretirement jobs is more common amongst: younger retirees, men, those with a spouse in the labour force and who tend to be more educated. Similar to Maestas (2010) the study suggests unretirement is a lifecycle decision and is not in general a response to negative financial shocks.

In this paper we consider unretirement in England.[11] In contrast to other papers the aim of our research is to focus on the shape of the hazard function for a sample of retired men. We use duration models which account for individual level unobserved heterogeneity, and to investigate the relationship between time spent in retirement and the hazard of moving back into paid work. We find a number of interesting results; similar to Peterrsson (2011) retired individuals with a spouse in the labour force are significantly more likely to subsequently return to paid work. Therefore despite females not unretiring themselves they play a role in the unretirement decisions of their husbands. It is likely this is linked to complementarity in shared leisure preferences.[12] There is no clear pattern in the hazard of unretirement, however it does tend to be higher in the first 5-10 years following initial retirement after which it diminishes. This is particularly important in terms of recognising a propensity to unretire, potential policies which encourage a return to paid work may be less effective if they too slow acting.[13]

We find some evidence of individuals who retire 'early' which we define as 60 or under, as being less likely to unretire. This could be due to relatively generous financial incentives available in early retirement schemes, available in particular professions. However we control for pension wealth and also unexpected changes in wealth and debt, and find little evidence that these variables determine the unretirement decision. Similarly we find only weak evidence of social class effects, those who self report themselves to have been in a professional or managerial occupation were marginally less likely to unretire than those who were unskilled.

We do however find strong evidence of education effects, those individuals with at least an A level or degree are likely to unretire. Finally, individuals with a medium term (1-3 years) and long term financial planning horizon (3+ years) are significantly more likely to unretire. Therefore on balance it seems individuals who are relatively well educated, in a variety of jobs and not necessarily those who had retired early, and so perhaps had some preference for work or shared preference for leisure were more likely to unretire.

In terms of the career preretirement job, we are able to exploit lifetime labour market history information available in ELSA. Estimates indicate that the average preretirement annual salary for our sample of unretirees was approximately £38,919.13 (2007 prices). Unretirement jobs themselves are similar in character to partial retirement jobs, both in terms of earnings and hours of work. Taken together with the results above this suggests unretirement is not due to financial constraints nor is it concentrated amongst the poor. Given the potential untapped economic capacity of retired men in England, these results are of importance to policymakers when attempting appropriate measures to incentivise a return to work.

The rest of this paper is set out as follows: Section 2 contains detailed information regarding ELSA and how we define unretirement. Section 3 outlines the regression specification and modelling approach. Section 4 presents our estimation results and tests for robustness.[14] Section 5 looks at characteristics of unretirees and unretirement jobs in England. Section 6 concludes and considers policy implications our work.

2 Data.

2.1 Sample and ELSA.

The sample used in this study is drawn from the English Longitudinal Study of Ageing (ELSA), a biennial longitudinal study aimed to investigate ageing in the UK.[15] We use the first four waves of data covering the period 2001-2008. We restrict attention to those individuals who are aged between 50 and 74 in their wave 1 interview, and who report being in full retirement at the time of interview.[16][17] We construct an unbalanced panel of 857 retired individuals and do not allow for reentry once an individual non responds in a particular wave. Appendix A contains information pertaining to sample construction and summary information. We test for attrition bias due to non response using a variable addition test proposed by Verbeek and Nijman (1992).

2.2 Definition of unretirement.

The definition of unretirement relies on observing the reentry date to the labour market. The ELSA data records the month and year of reentry and therefore using this we can only compute an unretirement date based on those individuals who give a positive response conditional on them being in retirement (and having not yet unretired). Using this information it is possible to compute the length of time an individual has spent in retirement before they return to work. Of our unbalanced sample of 857 men suitable for estimation purposes, 79 are defined as unretired under this definition, or approximately 9.21 percent.

An alternative definition could be based on the number of hours reported working in paid employment, if an individual is in receipt of a pension, or changes in the self reported economic status across waves. What is important for these definitions is the opportunity set available to the individual in a particular economic state. In England it is possible to retire and defer both state and/or private pension payments, although this is relatively uncommon (Coleman et al 2008). The focus of this research is the duration spent in retirement, and therefore we choose a measure appropriate of capturing this. Changes in self reported measures are at best reported biennially, and we control for pension wealth in our information set and therefore do need to consider whether an individual had deferred their pension. Table 1 gives an overview of potential retirement paths which feature unretirement.[18]

Table 1: Hypothetical retirement paths featuring unretirement.			
Wave 1	Wave 2	Wave 3	Wave 4
Retired→	Retired→	Employed→	Employed
Retired→	Unemployed→	Employed→	Retired
Retired→	Retired→	Retired→	Unemployed

2.3 Unretirement rates: ELSA.

Self reported labour force status definition. As noted, an alternative definition of unretirement would be to measure the changes in self reported labour market status across waves from retired back into employment. [19] Following this definition above we estimate an unretirement rate in the order of 5.86 percent for our sample of unbalanced panel men. This is substantially lower than the definition based on job start dates this is likely to be due to the difficulty in precisely defining retirement, individuals reporting themselves as retired may still engage in some form of paid work, but still consider themselves as 'retired' perhaps because they are claiming a state pension or social norms related to passing the state pension age (European Foundation for the Improvement of Work and Living Conditions). Maestas (2010) using the Health and Retirement Study (HRS) using a similar definition estimates an unretirement rate of 26%.[20] Clearly unretirement is more common in the US relative to the UK, however the rates reported for the UK rates are similar to those documented in the US using the Retirement and Health Survey (RHS) from the 1970's and 1980's see for example Rust (1987), Diamond and Hausman (1984) and Gustman and Steinmeier (1984,1986).

Due to the ELSA being a biennial study it is possible for individuals to exhibit short-term unretirement between surveys. We found 18 respondents exhibit such behaviour over the sample period including these episodes of unretirement, raises the unretirement rate to around 8 percent. However Maestas (2010) who computes a similar statistic, and finds her unretirement rates increase from 26 to 31 percent, similarly concludes that the majority of these short term unretirements report either zero or very low values of income and therefore 'given their trivial nature we do not include them in analysis to overstate the importance of unretirement' (Maestas, 2010 pp.28).

Hours based definition. We may also define unretirement rates based on wave by wave changes (from zero to positive) in the number of hours working in paid employment per week. Maestas (2010) follows a similar approach, the effect of using an hours based definition raises the unretirement rate due to unemployed individuals being included. Given our sample conditions on individuals to be in retirement at wave 1, very few individuals transition into unemployment.[21] This underpins the similarity in the unretirement rate estimated using the self reported and hours based definition.[22] Under the hours based definition we report an unretirement rate of 3.27 percent.

Sensitivity analysis As a sensitivity measure we test each definition of unretirement using a binary framework (not presented here) similar to Peterrsson (2011) and Cahill et al. (2010).[23] We construct 2 consecutive wave balanced panel logit models and find estimation results are broadly similar irrespective of the definition used. In light of this we choose to present results based on the labour market reentry date, given that under this definition we estimate the highest magnitude of unretirement.

2.3.1 Work environment for older workers in England.

Involuntary retirement. Until April 2011 UK retirement legislation meant employers could force employees to retire once they became eligible to claim state pension.[24] The sample period covered by our data spans 2002-2009, therefore an individual who wanted to continue to work past the State Retirement Age (SRA) against the will of their employer, would have to unretire by law. Dorn Sousa-Poza (2010) find evidence which suggests involuntary retirement increases the incidence of early retirement in selected EU countries, for Great Britain they found almost seventy percent of their sample respondents between the age of 45 and 69 took involuntary early retirement. At each wave of ELSA respondents were asked their main reason for taking (early) retirement, of these responses was 'made redundant/dismissed/had no choice', 4.43 percent of the sample responded as this being the case. However of the sample which subsequently unretired, roughly 2.5 percent cited involuntary retirement as their main reason for retirement. The reason cited most frequently was reaching retirement age, or in the case they retired early, that they were offered reasonable financial terms. Therefore whilst involuntary retirement did contribute to the flows into retirement, it did not contribute in the same way to unretirement.

Linearity in the budget set. Current retirement legislation in the UK means that an individual is eligible to claim their State Pension once they reach NSRA, which until 2011 was 65 for men and 60 for women. Flexible working practices mean that an individual can choose to claim their pension and also continue working, they may also defer their pension for a later date and in return receive a considerable rate of return. In terms of the budget set an individual who unretires does not face a higher marginal tax rate, in this sense there is an absence of nonlinearity in the budget set.[25]

3 Specification and Modelling approach.

3.1 Information set.

We use a range of economic and sociodemographic variables available in the ELSA dataset which are likely to affect the hazard of unretirement, described below in table 3. We control for whether the individual has private health insurance and also the number of limiting illnesses. We do not include measures

for self reported health, due to this information only being asked to individuals who are employed.[26] We control for household characteristics such as whether an individual is married, 79% our sample report being married in wave 1. Importantly we also control for the labour force status of the spouse, Schirle (2008) estimates 25% of the labour supply of older UK married men can be explained by the labour force status of his wife. There may also be a preference for shared leisure time in which case a couple may wish to retire at the same point in time (Disney et al (2010), Cribb et al. (2013)).

We control for a range of economic variables.[27] These include dummy variables to control for the highest education level obtained, it is of particular interest to policy makers if certain types of individuals exhibit unretirement behaviour. We account for this in more detail by controlling for the social job class in the preretirement job. Following Maestas (2010) we wish to determine whether financial variables play a role in the retirement decision. The Institute for Fiscal Studies (IFS) derives a range of financial derived variables available with each release of ELSA.[28] Using these it is possible to construct measures for unanticipated shocks to debt and wealth, defined as a 25% change in the non housing net financial wealth or non housing net financial debt, in any two consecutive quarters. Given our sample comprises of initially retired individuals we control for private and public pension wealth.[29]

Table 2: Information set
Sociodemographic variables
Married at wave 1
Whether first retired between the age of 50 and 55
Whether first retired between the age of 56 and 60
Spouse in employment at wave 1
Whether has private health insurance
Whether has a limiting illness
Economic variables
Whether holds a degree
Whether has a qualification below degree but above A level
Whether holds an O-level or CSE
No/foreign qualification (base group)
Unanticipated debt shock *(IFS)*
Unanticipated wealth shock *(IFS)*
Log of total pension wealth in 2002
Non pension financial wealth quintile in 2002
Income quintile 2002
Opportunity to work past retirement age
Whether respondent feels they do not have enough income
1 day -1 year (short term) financial planning horizon (base group)
1-3 year (medium term) financial planning horizon
3+ year (long term) financial planning horizon
Self reported social class by preretirement job occupation

3.2 Specification

To inform model specification we first followed along the lines of Cahill et al. (2010) and Pettersson (2011) and modeled the unretirement decision using a static logit model (not presented). Similar to Maestas (2010) using a sample of individuals who are in employment at wave 1 we estimate multinomial logit model with three retirement paths: (1) unretirement, (2) partially retirement and (3) full retirement however due to sample size we choose not to present our results formally.[30] Moreover the focus of this paper is to establish the hazard of unretirement for individuals who are in retirement in wave 1, these individuals are clearly systematically different to those individuals who are employed in wave 1.[31] It clear that unretirement is a relatively low probability event, for these reasons it is natural to consider unretirement within a discrete time hazard framework.[32]

3.2.1 Discrete time hazards model.

Having both the retirement date and the return to paid employment information we are able to identify the exact interval in which unretirement occurred, conditional on being in retirement for a number of years.[33] We use a novel approach to modelling unretirement by estimating a discrete time Prentice-Gloeckler (1978) complementary log-log model. This is the analogous discrete time version of the continuos proportional hazards model, and is particularly useful given the relatively low probability of observing an episode of unretirement. We are interested in modelling the relationship between the survival time and our information set. Jenkins (1997) and Stewart (1996) present a detailed discussion of these estimators, we present only a brief description. In the discrete case the proportional hazard is given as:

$$\lambda_{i,t} = \lambda_0(t) e^{[x_{i,t}^{\cdot} \beta]} \tag{1}$$

Where $\lambda_0(t)$ is the baseline hazard. The discrete time hazard in the j^{th} interval is given by:

$$h_j\left(X_{i,j}\right) = 1 - e\{-e^{[X_{i,j}^{'} \beta + \tau_j]}\} \tag{2}$$

Where:

$$\tau_j = \log \int_{f_{j-1}}^{f_j} \lambda_0(\tau) d\tau \tag{3}$$

We specify a non parametric piece wise constant baseline hazard, given the relatively low number of unretirement episodes to allow for additional grouping, as suggested by Jenkins (1997). We reorganise our data such that the unit of analysis is changed from the individual to the time at risk of unretirement (Jones et al. 2010). We also estimate an extension to the basic model assuming a gamma mixture distributed error to summarise individual level unobserved

heterogeneity. In doing so we mitigate the effects of omitting a potential source of bias in the estimates of the duration dependence and time invariant covariates.[34] [35]

3.3 Duration in retirement before moving back into employment.

The ELSA questionnaire asks individuals to report the age they entered retirement, and also the year and month they entered paid employment. Using this information it is possible to determine the length of time the individual was in the state of retirement before they moved back into employment.[36] Modelling unretirement in a duration framework is important if we wish to establish whether the decision to unretire is made immediate following initial retirement i.e. the speed at which individuals reoptimise their behaviour. Duration analysis therefore goes beyond what we can infer from static or sequential models in terms of when an individual becomes 'at risk'.

4 Estimation results.

4.0.1 Non parametric retirement survival curves.

To infer more detail regarding the relationship between the time in retirement and the return to paid work, Figure 1 plots non parametric retirement survival curves for the whole sample and by age in wave 1. The unretirement hazard is defined as the slope of minus the log survival curve Maestas (2010) pp.9. The top left survival curve in Figure 1 indicates the unretirement hazard for the sample peaks in the first ten years following initial retirement, after which point it increases at a diminishing rate.[37]

Figure 1 here.

When we control for the age at wave 1 figure 2 indicates the unretirement hazard is only slightly higher for those who retired younger, which could be due to generous occupational pensions which allowed early retirement (Jones et al 2010). Of our sample of 857 individuals, 628 or 73 percent retired prior to state pension age (65) suggesting significant evidence of early retirement behaviour for this particular cohort. Maestas (2010) finds a much sharper spike in unretirement hazard function estimated on her sample of HRS respondents. Such is the extent of early retirement in England that the average retirement age at wave 1 of a sample member in this study is identical to Maestas (2010) at 59.7 years. It is likely that there will be a fundamental difference in the labour market behaviour of a stock sample of individuals in retirement, versus those initially in employment, nonetheless it quite clear that given a roughly equal retirement age that unretirement is much more common in the US relative to the UK.

4.0.2 Discrete time hazard model.

To infer more detailed information regarding the duration dependence in the time to unretirement, we estimate a discrete time proportional hazards model.[38] The is the Prentice-Gloeckler (1978) complementary log-log model, and its extension assuming a gamma mixture distributed error (Meyer (1990)), to account for individual level unobserved heterogeneity. We specify a fully non parametric baseline hazard, which has the advantage of having complete non parametric flexibility in the duration dependence, and facilitates estimation given the relatively low number of unretirement episodes in our sample. Nicoletti & Rondinelli show that by allowing for unobserved heterogeneity and assuming non parametric baseline hazard mitigates the effects of potential biases in duration dependence and covariates. Additionally such a specification provides better validation for the detection and true extent of unobserved heterogeneity relative to a tightly constrained parametric model (Dolton and Van der Klaauw (1995)). We do not find evidence of unobserved heterogeneity, and therefore only present results for the preferred specification which assumes a Gaussian error term, for more details see Jenkins (1997).

Estimation results Our estimation results indicate the duration dependence of unretirement initially increases and then declines in the number of years spent in retirement, as indicated by figure 2 in the below. These coefficients indicate that the unretirement hazard peaks during the initial 10 years in retirement after which point it is diminishing. Such an inverted U shape may reflect the fact that individuals realise unretirement did not meet their a priori expectation. Human capital theory would suggest a swift return to work given that an individual's stock of skills depreciates the longer they stay in retirement.

Turning to our economic and sociodemographic information set, we find evidence little evidence of a social gradient in the hazard of unretirement. Relative to the base group of unskilled or semi skilled, those individuals who reported their social class to be either professional, managerial, or skilled non manual were no less likely to unretire. The exception were those reported being skilled manual workers, whose hazard of unretirement was 60% lower than that of the unskilled. Those individuals who were allowed to work past retirement age were 33% less likely to unretire relative to those who were not, which is intuitive given that they could simply allowed to continue working until they decided to retire, and were not forced to retire and then unretire as would have been the case under the retirement legislation at the time. In contrast the education variables indicate that relative to the base group of no qualifications those individuals with a degree were 183% more likely to unretire, similarly those with an A level were 206% more likely to unretire.

Likely to be related to the social class scale the early retirement indicators suggest the hazard of unretirement of those individuals who first retired between the ages of 50-55 (relative to those who retired after the age of 60) was 6% lower, whereas the hazard for those who first retired between the ages of 56-60 was 31% lower than the base group. It is clear from the size of the coefficients in the

duration dependence that individuals can spend sometime in retirement before they return to work, this could explain the difference in the unretirement hazard for those who retire in their early fifties relatively to their late fifties, nonetheless these variables were not significant at conventional levels.

The total of log private and public pension wealth measures the present value of total pension wealth in 2002 (assuming individuals retired at NSRA), our results suggest those with higher levels of total pension wealth are less likely to unretire, perhaps because they have more financial security and prefer to consume leisure. We also control for the total non-pension financial wealth in 2002 which indicates relative to the base group of being in the top quintile, the hazard of unretirement is not significantly different for those lower down the wealth distribution in 2002. However it should be noted that almost one third of our sample reporting being in the top wealth quintile, therefore this maybe due to a lack of variation in our sample. In addition to pension wealth and non pension financial wealth, we also control for the income quintile in 2002. This measure controls for possible income streams derived from a variety of assets for more information see Oldfield (2009). Our estimation results indicate relative to being in the fifth income quintile, those individuals lower down the income distribution have an unretirement hazard which is between 78% and 35% lower. However similar to our non-pension wealth measure, roughly one third of our sample is in the top income quintile.

Turning to our financial planning variables those individuals with a longer financial planning horizon, medium (1-3 years) or long term (3 years+), relative to the base group of short term are 239% and 241% more likely to unretire. We also include a measure for whether a retired individual felt they did not have enough income at the time of their wave 1 interview. The unretirement hazard for those who responded positively relative to those who did not was 164%, taken with the results on the duration dependence this may suggest some evidence that unretirement could be due to financial constraints and could possibly be a planned event.

We also include two measures which control for debt or wealth shocks. These are binary variables which take the value one if an individual experiences a 25% change in their net debt or wealth respectively, at any point over the observation period. Our estimation results suggest that wealth shocks have a marginal impact act to reduce the hazard of unretirement, by around 3% relative to those who do not report a shock. Whereas those individuals who experienced a unexpected shock increase in their debt were 136% more likely to unretire, however our financial derived variables were not statistically significant at conventional levels.

Those individuals who report being married were not significantly more likely to unretire than those who are not. A priori it could be hypothesised those individuals who are single or divorced, may prefer to work due to preferences for social interaction for example, our estimation results suggest this is not the case. However we do find some evidence for shared preferences amongst couples, the hazard of unretirement for those men who had wives in employment when they were in retirement was 252% higher than for those whose wife was not

in employment. This does suggest there is some role for preferences for leisure amongst couples, or perhaps for social interaction possible through work.

Finally we control for any limiting illnesses an individuals reports, and find having at least one limiting illness reducing the hazard of unretirement by nearly 30% relative to the base group who do not experience any limiting illnesses. This is expected given that it is less likely these individuals will be able to return to work. We also control for the presence of private health insurance, the hazard for those individuals who report they have private medical healthcare is 31% higher than for those who do not, however these variables are not statistically significant at conventional significance levels.[39]

Test for attrition bias We test for attrition bias using a variable addition test as proposed by Verbeek and Nijman (1992). The is carried out by including a variable which corresponds to the number of waves an individual responded, which is regressed with the full information set on the hazard of retirement. We find no evidence of attrition bias, whilst the coefficient estimates on our information set change only very marginally to those reported in table 3 below.

Table 5: Discrete time hazard model with Gaussian frailty.

	hazard
Time spent in retirement	
1 year	2.59
	(3.58)
2 years	3.12
	(4.28)
3 years	1.82
	(2.57)
4 years	3.79
	(5.18)
5 years	3.48
	(4.78)
6 years	3.63
	(4.98)
7 years	4.98
	(6.78)
8 years	4.16
	(5.69)
9 years	3.47
	(4.82)
10 years	3.88
	(5.39)
11 years	0.90
	(1.49)
12 years	3.13
	(4.48)
13 years	6.06
	(8.38)
14 years	1.48
	(2.44)
15 years	1.84
	(3.03)
16 years	2.17
	(3.57)
17 years	6.65
	(9.85)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Discrete time hazard model with Gaussian frailty (continued).

	hazard
Financial and income variables	
Total pension wealth in 2002	0.57***
	(0.07)
1st income quintile in 2002	0.22***
	(0.13)
2nd income quintile in 2002	0.36**
	(0.16)
3rd income quintile in 2002	0.40***
	(0.15)
4th income quintile in 2002	0.65
	(0.20)
1st wealth quintile	0.95
	(0.64)
2nd wealth quintile	0.96
	(0.45)
3rd wealth quintile	1.36
	(0.45)
4th wealth quintile	1.15
	(0.35)
1-3 year (medium term) financial planning horizon	2.39**
	(0.93)
3 years+ (long term) financial planning horizon	2.41**
	(0.96)
Experienced a 25% unanticipated increase in wealth	0.97
	(0.24)
Experienced a 25% unanticipated increase in debt	1.36
	(0.45)
Occupation dummies	
Professional job occupation	0.81
	(0.42)
Managerial job occupation	0.85
	(0.37)
Skilled / nonmanual job occupation	0.41*
	(0.21)
Skilled / manual job occupation	0.41
	(0.20)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Discrete time hazard model with Gaussian frailty (continued).	
	hazard
Socio-demographic characteristics	
Whether has private health insurance	1.31
	(0.39)
Opportunity to work past retirement age	0.67
	(0.27)
Socio-demographic characteristics	
First retired between the age of 50 and 55	0.94
	(0.29)
First retired between the age of 56 and 60	0.69
	(0.20)
Married at wave 1	1.55
	(0.57)
Has a limiting illness	0.70
	(0.16)
Respondent feels they do not have enough income	1.65
	(0.79)
Spouse in employment at wave 1	2.52***
	(0.72)
Education dummies	
Holds a degree	1.83
	(0.71)
Has a qualification below degree but above A level	2.07**
	(0.68)
Holds an O-level or CSE	1.13
	(0.42)
Number of person-year observations	9617
Number of failures	79
Wald $chi^2(45)$	1513.19
Prob > chi^2	0.00

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Discussion. Central governments in many economies are concerned about the demographic structure of their domestic population, due to the ageing and longevity and low fertility rates (reference). The retired population count for a large proportion of the total population and are a potential source on untapped economic capacity. Figure 2 below plots the predicted hazard of unretirement using the estimated probabilities from the complementary log-log model, similar to figure 1 both indicate there is some evidence to suggest unretirement occurs

within the first 10 years following initial retirement.

Figure 2 here.

Our analysis shows that in addition to length of time in retirement, there are a number of factors such as relative income position, log pension wealth, financial planning horizon, spouse's employment status and education which affect the likelihood of a return to work. It is likely that these factors are interlinked, for example those who are better educated to tend on average to have higher lifetime earnings (Nickell, 1979). These individuals are hence more likely to be in occupations which offer flexible retirement policies in terms of access to company pension, and early retirement practice (Smith, 2006).

Interestingly we also find evidence of preferences for shared leisure, event amongst unretirees. A line of research has focused on the determinants of initial retirement behaviour and found that couples tend to retire at a similar time (Schirle, 2008 Cribb et al., 2013). Our results indicate these complementarity in leisure extend into retirement for men with a working spouse. Indeed, in terms of going recent changes in the NSRA for women mean that on average more men who were in retirement, are more likely to have a partner in work ceterus paribus. Therefore it maybe the case knowing this those who are already retired may return to work, or if they themselves are still in employment may retire later.

The results in section 4.0.2 also highlights that certain occupational sectors of the population are less likely to unretire. If it is the case that these individuals are not working later and delaying initial retirement, then it is important to identify what affects the decision to return to work for these particular groups. Policy should look to tackle early retirement in terms of generous early retirement pension schemes, indeed the reduction in the availability of defined benefit pension schemes is likely to change the retirement behaviour of future generations.

Another important policy implication of unretirement is that given that nearly 10% of our sample exhibit unretirement behaviour, then it is important to establish the characteristics of the types of jobs these individuals are going into. The types of employers who are willing to employ such workers has clear demand side implications. Equally, in terms of the supply side if only certain types of individuals, such as those who are more skilled can access these jobs then it important to determine how to broaden this potential pool of workers. Part of the legacy of the financial crisis has been a rise in the number of unemployed individuals, including a rising trend in the number of young individuals Not Employed in Education or Training (so called NEET's) and also unemployed graduates (ONS, 2013). The implications of this is that unretirees could be potentially vying with these individuals for jobs, which could potentially cause a slack in certain sectors of the labour market. ELSA records job characteristic information on all those in employment, we use this to investigate the characteristics of unretirement jobs in more detail.

5 Characteristics of unretirement jobs.

Similar to Maestas (2010) we find unretirement jobs are very similar in character to partial retirement jobs. Unretirement jobs typical entail an individual working on average 20 hours per week, average monthly income earned from an unretirement job is £700 per month or £8500 per annum.[40] Third, the majority of individuals who unretire self report themselves to be in the top three deciles of the social class ladder and finally in terms of job activity the majority of individuals who unretire are in sedentary or standing jobs, with a small proportion engaging themselves with work which involves standing or some physical aspect. [41] In terms of lifetime occupation characteristics a significant proportion of our unretired sample contained individuals who reported being in supervisory or managerial professions. Taken together with the estimation results from section 4.0.2 suggests whilst unretirement jobs span a large section of the occupational ladder; it is concentrated more so amongst those who are better educated, higher up the income distribution and tend to have a longer term financial planning horizon. This could feed into supply and demand side factors, employers are only willing to hire retired individuals who embody a sufficiently high skill set, or it is these same individuals who have a taste or preference for work. In terms of a theoretical framework their marginal value of leisure is sufficiently low such that they wish to engage in the labour market at the prevailing market wage.

Final preretirement salary. We exploit the life history survey information collected at wave 3 of the ELSA survey. This contains detailed information regarding the lifetime labour force attachment, using this we can establish the final salary of the lifetime career job, and compare it relative to the unretirement job.[42] [43] We estimate an inflation adjusted gross average annual salary (2007 prices) from the final preretirement career job of £38,919.13. Thus reenforcing our earlier conclusions that unretirement jobs are not generally sought by those in poverty, but those who (given the cohort) had a relatively high final income occupation and were likely to have tastes for work. Expressed as a fraction, unretirement jobs replace around just over 20 percent of the individuals preretirement annual salary income.[44]

5.1 Voluntary work.

We have established the prevalence of unretirement is similar to that observed in selected EU economies, and these together are relatively uncommon as compared to the US. This does not mean when individuals fully retire they are completely separated from the labour market. ELSA contains information regarding the activities individuals undertake, in particular, whether an individual engages in voluntary work. A recent report by nfpSynergy (2011) estimated around 30 percent of individuals aged between 50 and 65 did informal or formal volunteering at least once a month.[45] Based on our sample of men we find that approximately 23 percent of those individuals who report being in full retirement, undertake voluntary work at least twice a month.[46] It is clear that despite the relatively

low rate of unretirement, retirees maintain some attachment to the labour force albeit at the voluntary level.

6 Conclusion and policy implications.

In this paper we establish the unretirement rate and the determinants which are related to the unretirement decision, for a sample of older males in England. By modelling the unretirement decision using a duration framework, we find the likelihood of unretirement is highest in the first 5-10 years immediately following retirement. In addition to the time spent in retirement we find: (1) having a wife in the labour force, (2) having at least an A-level, (3) financial planning horizon, (4) being in the top quintile of the 2002 income distribution and (5) having lower levels of total pension wealth, increase the hazard of unretirement.

Contrary to economic theory and in support of results found previously in the literature, individuals who report having a financial planning horizon of greater than 1 year are more likely to unretire, suggesting that unretirement is likely to be related to lifestyle and preference factors and at the very least is not linked to poor financial planning, which is usually associated with those who are lower educated and further down the wealth distribution (Dow and Jin 2013).

We suspect that both demand and supply side forces are at work. On the supply side our results indicate individuals who have at least an A-level education are more likely to unretire, for example through preferences such as tastes for work. Moreover given the changing labour market conditions in England (and more generally in all advanced economies) over the past thirty years, high skill individuals embody a skill set such that it can allow them to secure paid employment. On the demand side employers seek individuals who have an advanced specialised skill set, which cannot be substituted for by younger less skilled individuals.

This has important implications for retired individuals who are considering re-entering the labour force in search of paid employment in England. Despite the incidence of unretirement being lower in England than the US, our research suggests that the opportunity to work is not equal across older individuals in England. Low skilled retired workers face greater barriers to work relative to their high skilled counterparts. This may go some way in explaining the difference in unretirement rates, given the average educational attainment in the US is higher than that in the UK, and particularly given the cohort and sample used in this study. In addition the importance of lower labour market regulation and of private health insurance in the US should not understated, these factors make it not only easier but more important for all working age individuals in the US to be in employment.[47]

Given the cohort and the education effects we have found we know future generations will have on average higher educational attainment, and prior to retirement are more likely to be in sedentary career occupations. It is likely these sedentary career occupations will better facilitate work at older ages or

post retirement. Recent changes to UK retirement legislation in 2011 mean employers can no longer lay off individuals because they have reached State Retirement Age (SRA), moreover in the UK individuals can choose to claim their State Pension and also continue to work. This will affect how individuals plan their retirement, if they plan to retire at all. Individuals who have strong preferences for work no longer need to unretire, instead they may simply reduce hours and continue to work. Flexible retirement options are becoming increasing common in advanced economies. This will clearly affect the extent to which we observe unretirement in the future in England, it will also change the level of labour market activity amongst older workers in the UK which until recently had been in decline.

Notes

[1] Figures based on data for England and Wales.
See Office for National Statistics website: http://www.ons.gov.uk/ons/dcp171778_270487.pdf pp. 2.

[2] The UK coalition government has increased the age at which individuals are eligible to claim state pension, by April 2020 men and women will be eligible for state pension if they are aged 66. In addition they have abolished the compulsory retirement age which was set at age 65 for both men and women.

[3] Both studies reported an identical unretirement rate of 25%. These longitudinal studies using the Social Security Administration Retirement History Longitudinal Survey (RHLS) , followed a random sample of men and unmarried women aged between 58 and 63 at the baseline interview in 1969, with respondents re-interviewed biennially up to and including 1979.

[4] Ruhm (1990) notes the significant difference between his results and that of Gustman and Steinmeier (1984) who also use the RHLS. Ruhm (1990) concludes the discrepancy between their results (the first study reports unretirement rates of 24.9%, whilst the latter reports unretirement rates of 16.6%) is due to the time window of observation. Gustman and Steinmeier (1984) only use one and two year windows to observe re-entry, whereas Ruhm (1990) uses a ten year window and therefore increases the probability in observing an episode of unretirement.

[5] Hayward et al define 'exposure intervals' which relates to labour force experiences for an individual for a single year, with a full set of accompanying covariates. The authors observe 6263 intervals and observe 670 episodes of unretirement.

[6] Hardy (1991) sample consisted of 2103 respondents of which 145 unretired. Hardy (1991) finds that 11.7% of 'unretirees' stated they initially retired involuntarily.

[7] This figure increases to 35% if analysis is restricted to those individuals who first reported being retired at age 53 or 54.

[8] Maestas (2010) specifies a pre/post retirement multinomial logit for alternative retirement paths and supplements her model with expectations data. Benítex-Silva and Dwyer (2003) formally test whether the rational expectations hypothesis hold in the HRS sample, and conclude that on average individuals do exhibit rationality, in particular with respect to forming retirement expectation. Their findings are similar to those found by Mastrogiacomo (2003), who uses non parametric methods to focus on the discrepancies between expectations and realisations for the case of the Netherlands. Mastrogiacomo (2002, 2003) finds similar results to Maestas (2010) for the case of Italy.

[9] Cahill, Giandrea & Quinn (2010) also use the HRS to analyse unretirement rates for those who in their baseline interview were in full time career jobs, and find that 15% of their sample exhibit an episode of unretirement.

Both studies use the same baseline (HRS respondents aged 51-61 in their first interview) Maestas (2010) includes all individuals who are observed working part time and full time. In addition she specifies a sample observation period between 1992 and 2002 (6 waves), whilst Cahill et al use a panel spanning 1992-2008 (9 waves).

[10] The role of private healthcare is likely to be less important in the case of England, due to the state provided healthcare.

[11] Early work regarding the British retirement experience, which mentions unretirement can be found in Parker (1980), 11% of his sample respondents indicated they would consider looking for work in the future. This is despite the fact that at the time prohibitively high taper rates existed on earnings after reaching state retirement age and claiming a state pension, this has now been concequently abolished for more information see Bozio et al. (2010). Individuals were also asked to cite the main reasons about what they would miss most about work (prior to retirement), 78% of men (aged over 65) responded it would be because of not feeling useful anymore. Interestingly of the entire sample (N=960), 24% of men and women did not look forward to retirement.

[12] See for example Schirle (2008) who find 25% of UK males labour supply can be explained by the labour force status of his wife. Disney et al finds strong evidence for UK couples to retire simultaneously, for example due to shared leisure preferences.

[13] This is what Maestas and Li (2007) refers to a 'burnout effect'. Individuals retire for a short period after their main career job due to a burnout effect, before subsequently returning to work.

[14] We also use static econometric frameworks to model unretirement, these are available on request.

[15] We do not include additional booster samples which were made available at specific waves.

[16] Despite there existing an additional wave of data known as wave 0, from which the original ELSA sample were constructed this wave of data has little socioeconomic data compared to wave 1 onwards.

[17] Given our interest is to investigate the unretirement behaviour of only full retired men, we choose not to include to partially retired individuals as their underlying behaviour maybe somewhat different, additionally only a very small sample of wave 1 ELSA respondents self report themselves as being in partial retirement.

[18] The ELSA questionnaire does not differentiate between part-time and full-time employment in the self reported labour force status. Therefore we use number of hours reported in paid work per week in addition to the self reported status.

[19] Survey respondents were asked their Labour Force Status (LFS) in each wave of ELSA. Respondent's are asked 'Which one of these, would you say best describes your current situation?'. Interviewers are only allowed to code one response from the following categories: Retired, Employed, Self-employed, Unemployed, Spontaneous (semi retired), Permanently sick or disabled, Looking after home or family, Other (specify).

[20] Maestas (2010) defines unretirement in two ways; the first is based on self reported economic status and hours worked, whilst the second is based on hours of work only. Maestas (2010) includes both men and women, and uses only those individuals who are in employment in wave 1.

[21] We include individuals who move from self reported retirement to unemployment.

[22] Maestas (2010) follows a similar method. Both the self reported and hours based definition may underestimate the rate of unretirement reported because people may return to work, but in doing increase the probability of survey non response. We test for the pattern of non response and find that does not bias our results.

[23] We construct consecutive 2 wave logit models.

[24] This law held for both men and women, despite their default state retirement age differing.

[25] This has not always been the case. Between 1948 and 1989, if an individual wanted to claim their state pension within five years of retiring they had to terminate regular employment. Specifically, an individual was not allowed to claim state pension if they worked more than 12 hours per week. Even if they worked less than this threshold, and earned above a certain higher limit (similar to the Higher Earnings Limit), their state pension was reduced accordingly. Between 1948-1958 the taper rate was 100%, between 1958 and 1989 it was reduced to 50%, and increased to 100% for earnings over the HEL. This was seen as very detrimental to work incentives for older people. In 1989 the earnings rules described above were abolished. Pension income and earnings from employment whilst in retirement are now taxed at a rate similar to that of the general working age population (there are some earnings rules still in place but these refer to dependents additions, pensions may also be available to increase their tax free allowance). For more information see Bozio et al (2010).

[26] There is controversary of using self reported and it has been argued stock measures may reflect a better measure of an individuals health (Jones et al (2006)).

[27] The education level and social class variables use imputed information from wave 1. The social class is on a 7 point system in wave 1, from professional through the unskilled. We estimate logit models using robust standard errors. We do not include self reported health status because almost half of the final sample for estimation report their SRH to be not applicable, however we do cross tabulate self reported health in wave 1 with our unretired sample. We find a positive correlation, that is to say unretirement episodes were concentrated amongst those reported they were in very good or excellent health. ELSA also has information regarding if an individual was in receipt of their state pension at the time of taking retirement, however half the estimation sample responded with not applicable.

[28] Variables in table 3 which were used from the FDV dataset are highlighted by the *(IFS)* label.

[29] Pension wealth is calculated such that we assume individuals retire at state pension age. We choose pension wealth instead of pension income to allow for individuals who may choose to defer their pension. For more information regarding the construction of the pension wealth variables see Banks et al (2005).

[30] We find a number of interesting results using a static and sequential framework to model unretirement, interested readers should contact the author.

[31] Maestas (2010) notes that these two groups cannot be compared directly as their retirement behaviour may be somewhat different.

[32] We also model unretirement within a competing risks framework, coefficient estimates are similar to the discrete time hazard model. We compute the estimate of the cause specific subhazard to be around 7%. Interested readers should contact the author.

[33] We use the xtclogclog and pgmhaz8 package in Stata (the latter) written by Stephen Jenkins. Our sample is such that we have a stock sample of individuals who self report being in retirement at wave 1. To account for this we reorganise our data such that it accounts for such event history data, where each individual has a corresponding number of rows representing how many periods he is at risk (for more information see for example Jones et al. (2010) and Jenkins (1997)). Given that we have detailed information regarding the time period since individuals have entered the state of retirement, we use this to organise our data and to ensure the duration dependence is defined correctly.

[34] The description presented here draws heavily from Jenkins (1997). The starting values for the estimation of the vector of parameters β in model 2, are taken from (1). The proportional hazard in this case is: $\lambda_{i,t} = \lambda_0(t)e^{[x_{i',t}\beta + \log(v_i)]}$. Where v_i is a random variable which follows a gamma distribution such that $v_i \sim (1, \sigma^2)$. The hazard rate changes accordingly for more information see Jenkins (1997). All estimation is carried out using the Jenkins Stata routine pgmhaz8.

[35] For a good overview of the literature and effects of omitting or misspecification of the distribution of unobserved heterogeneity see Nicoletti and Rondinelli (2006).

[36] Maestas (2010) reports unretirement estimates as a proportion of the sample over 6 years, i.e. unretirement could be at any time. She also estimates Kaplin-Maeier survival curves and finds there is a spike in the probability of unretirement in the first 2 years following initial retirement.

[37] By construction we assume the hazard between observed unretirement episodes is constant. Given we have a balanced panel and there is no loss of observations we do not encounter any truncation or right censoring problems. In this instance the Kaplin Meier survivor function is equivalent to the empirical distribution function.

[38] We use the Jenkins module pgmhaz8 available for Stata.

[39] Ideally we would like to control for self reported health, or a stock measure of this variable. However the routing of the ELSA questionnaire is such that half of all retired respondents respond as not applicable.

[40] These figures are not inflation adjusted, however they correspond to amounts reported in 2004 and 2009, and therefore unlikely to distort results significantly. Figures are estimated based on gross incomes from main employment and net of tax for secondary jobs. ELSA does not contain information regarding gross income figures for secondary jobs.

[41] The income figure for unretirement jobs is not inflation adjusted, however given that in wave 1 all individuals are retired, the earliest they can unretire is by 2004, and the latest is 2008. Therefore the inflation adjusted figures would not be too dissimilar to those reported.

[42] We are unable to determine the occupation of the final career job.

[43] The majority of our sample (circa 98%+ were paid in New English currency (decimalisation took place on the 15^{th} February 1972), for our sample of unretired individuals only one individual was paid in Old English money for this reasons we do not include them for this section of analysis. We adjust final career incomes to 2007 prices (the year of the wave 3 history survey), using the Bank of England Inflation calculator. Note that 3 individuals had final career income of more than £100,000 however we choose not to includes these in the histogram, to give a better representation of the final income distribution for the majoirty of our unretirees.

[44] We find only weak evidence of a correlation between inflation adjusted final career job income and time spent in retirement before unretirement.

[45] Estimates were obtained using data from the Citizenship Survey, National Statistics April-September 2010. Sample size: 10,000 with minimum participation age of 16. For more information see Saxton (2011).

[46] We take the average response based over the four waves of data. There is no information available about the number of hours worked in the voluntary sector in the ELSA data.

[47] State medical aid is provided for those aged 65 and over through medicaid, however it is not as comprehensive as private or employer health insurance. Whilst in England but there is universal access to healthcare.

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7 Appendix.

7.1 Appendix 1: Data and sample construction: ELSA.

Our sample is derived from all individuals who are aged between 50 and 75 in wave 1, who report being in retirement.[48] The final sample at wave 1 contained 857 individuals who could be used for estimation purposes, below we detail their sample characteristics[49]:

Sample characteristics		
Variable	Obs.	Mean
Age at wave 1	857	66.59
Married at wave 1	857	0.79
Whether first retired between the age of 50 and 55	857	0.20
Whether first retired between the age of 56 and 60	857	0.299
Spouse in employment at wave 1	857	0.11
Whether has private health insurance	857	0.16
Whether has a limiting illness	857	0.58
Whether holds a degree	857	0.18
Whether has a qualification below degree but above A level	857	0.21
Whether holds an O-level or CSE	857	0.23
No/foreign qualification (base group)	857	0.38
Bottom income quintile	857	0.15
2^{nd} income quintile	857	0.20
3^{rd} income quintile	857	0.23
4^{th} income quintile	857	0.21
Top income quintile	857	0.21
Log present value of pension income in 2002	857	11.91
Bottom non pension net financial wealth	857	0.10
2^{nd} non pension net financial wealth	857	0.15
3^{rd} non pension net financial wealth	857	0.19
4^{th} non pension net financial wealth	857	0.25
Top non pension net financial wealth	857	0.31
Experienced a 25% fall in net financial wealth over sample period	857	0.66
Experienced a 25% increase in net financial wealth over sample period	857	0.11
Opportunity to work past retirement age	857	0.13
Whether respondent feels they do not have enough income	857	0.07
1 day -1 year (short term) financial planning horizon (base group)	857	0.29
1-3 year (medium term) financial planning horizon	857	0.40
3+ year (long term) financial planning horizon	857	0.31
Self reported social class: professional	857	0.11
Self reported social class: managerial	857	0.36
Self reported social class: skilled non manual	857	0.12
Self reported social class: skilled manual	857	0.27
Self reported social class: non skilled/foreign qualification (base group)	857	0.14

8 Figures

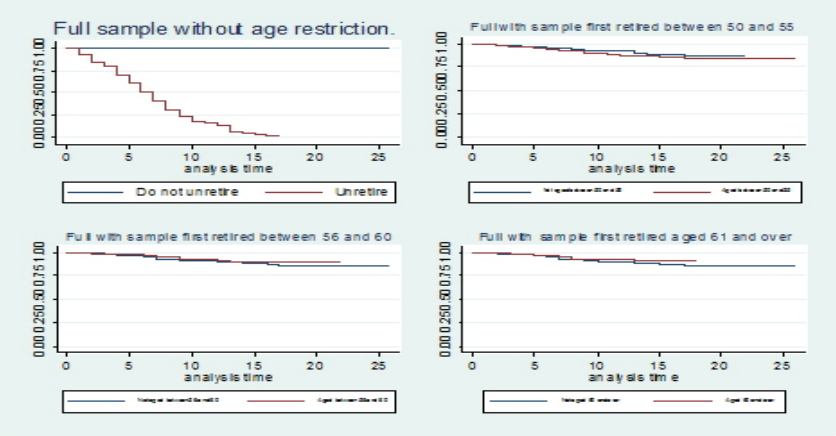

Figure 1: Kaplin-Meier survival curves of unretirement by age.

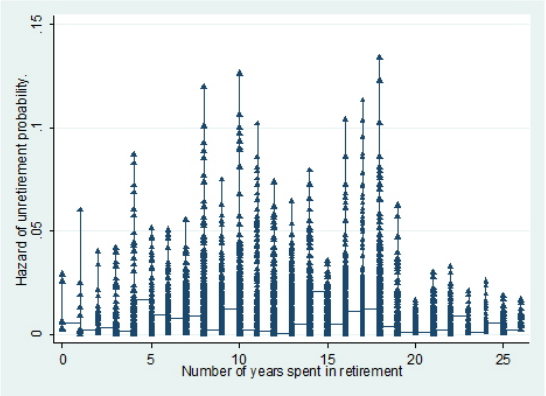

Figure 2: Predicted hazard of unretirement.