Happy to Stay: Job Satisfaction and Retirement*

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Abstract

We use long-run panel data to investigate the dynamic link between work and retirement in Australia and the UK. In particular, we ask whether job dissatisfaction affects future retirement decisions. The results in both countries indicate that, relative to satisfied workers, those reporting job dissatisfaction are significantly more likely to retire in the next period, although their retirement probability is not as high as those who are unemployed or not in the labour force in the current period. These large-scale panel results thus show that self-reported job satisfaction not only affects the decision to quit the job, but also the extensive margin of labour supply: the decision to leave the labour market altogether.

Keywords: Job satisfaction, Retirement, Labour Supply.

JEL Classification Codes: J26, J28.

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1. INTRODUCTION

Population ageing affects most countries in the world. As the baby-boom generation (those born between 1946 and 1964 inclusive) moves into the age of retirement, countries will increasingly face serious challenges not only with respect to the financing of public pensions and health care but also from potential shortages of skilled labour. The retaining of older workers in the workforce has thus become a major part of labour-market policy in many countries. In Australia, the 1993 pension reform gradually increased every other year the eligibility age at which women could access the state pension from 60 to 65, with the complete equalisation of male and female retirement eligibility reached on January 1st 2014. Two recent reforms further increased the eligibility age to 67 by 2023 and 70 by 2035 (the latter is still subject to the passage of proposed legislation). In the UK, the default retirement age (which was 65) is being phased out. In addition, the age at which individuals can claim a State Pension has been rising, to mimic the rise in life expectancy. The State Pension Age is planned to rise to 66 for both men and women by 2020, with further rises planned for the future (67 by 2026, and 68 by the mid-2030s).

There is a long literature on the determinants of retirement, which identifies the key determinants in the retirement decision as being financial incentives (Mitchell and Fields, 1984; Gustman *et al*. 1994; Samwick, 1998; Vanderhart, 2003; Hanel 2010), health (Dwyer and Hu 2000; Garcia-Gomez *et al*. 2010; Maurer *et al*., 2011) and joint household decisions (Blau 1998; Gustman and Steinmeier, 2000; Kapur and Rogowski, 2007).

A more recent literature has appealed to a variety of subjective well-being measures to predict future behaviour in panel data, with the broad idea being that individuals are more likely to discontinue activities that are associated with lower well-being. One strand of this literature has considered the role of job satisfaction in predicting future job quits (even conditional on wages and hours of work): examples include Akerlof *et al*. (1988), Clark (2001), Clark *et al*. (1998), Dickey *et al*. (2011) Freeman (1978), Kristensen and Westergaard-Nielsen (2006), Scott *et al*. (2006) and Shields and Ward (2001). The same type of analysis has also been carried out with respect to the duration of self-employment (Georgellis *et al*., 2007) and unemployment following job loss (Clark, 2003).

Most of the job satisfaction and quit literature implicitly assumes that quits are from one job to the other, so that worker well-being determines the sequences of matches that the worker makes on the labour market, rather than labour supply itself. It is this latter dimension that we wish to investigate here: Does job satisfaction determine the extrinsic margin of labour-force participation? One way of approaching this question would be to ask whether expected job satisfaction helps to determine whether individuals enter the labour market.[1] This would require information on the expected well-being return from work, which seems *a priori* quite difficult to collect.[2] Alternatively, as in the current paper, we can consider the retirement decision of those who are currently active in the labour market. If current job satisfaction does indeed determine participation, then greater job satisfaction amongst older workers is one useful way of improving workforce retention at both the firm and industry level.

The relationship between job satisfaction and retirement has, however, probably not attracted the attention that it warrants, especially in the economic literature. There is a considerable amount of work in psychology, most often using samples from particular occupations. Some of this work has looked at retirement intentions (the expected retirement age), finding that

[1] As suggested in Clark (1997) as a potential explanation for women's higher reported job satisfaction in British Household Panel Survey data.

[2] Although some kind of hypothetical-choice scenario including job satisfaction as one of the characteristics of the choices under consideration can be imagined. This is arguably similar to the approach in Benjamin *et al*. (2012).

those who are satisfied at work say that they will retire later (see, for example, Kautonen *et al*., 2012, for a sample of Finnish white-collar professionals, and Topa *et al*., 2009, for a meta-analysis). Other work has considered the actual retirement decision. Smith *et al*. (2011) find no effect of job satisfaction on retirement in a military sample, in a regression that conditions on a number of other job-related attitudes (organisational commitment and job-embededness). Topa *et al*. (2009) also suggest that job satisfaction is not significantly correlated with the retirement decision, even though it is significantly correlated with retirement planning (which perhaps suggests that intended retirement age and job satisfaction are jointly caused by a third common factor, whereas this is less the case for actual future retirement decisions). Mein *et al*. (2000) consider civil servants in the Whitehall II study and find that early retirement is more likely amongst those who had previously reported dissatisfying jobs. A recent paper by Clark and Fawaz (2014) considers retirement amongst the general population (using American data from the Health and Retirement Survey), but using a measure of psychological well-being (a depression score based on the CESD). The main subject of interest in Clark and Fawaz (2014) is whether the size of the relationship between well-being and income affects the retirement decision.

This paper contributes to this literature by investigating the determinants of retirement in a sample of older respondents from general population panels in Australia and the UK. We consider a general dynamic relationship between labour-force statuses over time, among which we distinguish between high- and low-satisfaction employment. In particular, we estimate a random-effects dynamic model in order to evaluate how the current experience of job dissatisfaction affects actual future retirement decisions.

Our results suggest that relative to satisfied workers, those with high levels of job dissatisfaction are significantly more likely to retire in the next period, although their retirement probability in the next period is not as high as those who are unemployed or not in the labour force in the current period. The effect of job satisfaction on retirement, while significant for both males and females, is slightly stronger for females.

2. DATA AND METHODOLOGY

The paper uses two long-run household panel datasets. The first is the confidentialised unit record file from the first twelve waves of the Household, Income and Labour Dynamics in Australia (HILDA) survey. Modelled on household panel surveys undertaken in other countries, the HILDA survey began in 2001 (Wave 1) with a large national probability sample of 7,800 Australian households and their members.[3] Our sample is restricted to an unbalanced panel of individuals aged between 51 and 74 who provide complete information on the variables of interest. Our estimation sample covers approximately 3,500 observations (individuals) per wave over twelve waves of data.

The second dataset is the British Household Panel Survey (BHPS), a general survey initially covering a random sample of approximately 10,000 individuals in 5,500 British households per year with this figure rising to around 15,000 individuals in 9,000 households in later waves. There is both entry into and exit from the panel, leading to unbalanced data. The BHPS is a household panel: all adults in the same household are interviewed separately. The wave 1 data were collected in late 1991 - early 1992, the wave 2 data were collected in late 1992 - early 1993, and so on. This paper uses data from the first eighteen waves covering the

[3] See Watson and Wooden (2004) for a detailed description of the HILDA data.

1991-2008 period. We again focus on the unbalanced panel of respondents aged 51 to 74, which produces around 3,700 observations per wave in the regression sample.

The HILDA survey asks all employed respondents how satisfied or dissatisfied overall they are with their main job using a scale that runs from 0 (least satisfied) to 10 (most satisfied). In the BHPS, respondents are asked "*All things considered, how satisfied or dissatisfied are you with your present job overall*", with answers on a one to seven scale, where one corresponds to "not satisfied at all" and a value of seven corresponds to "completely satisfied".[4] As underlined in Conti and Pudney (2011), the change in job satisfaction labels from Wave 1 to subsequent waves seems to have had quite a sharp effect on the distribution of responses: we therefore drop BHPS Wave 1 data from our analysis.

Tables 1*a* and 1*b* summarise the distribution of job satisfaction for the older respondents in HILDA and the BHPS respectively. As is often found, most answers are towards the top end of the satisfaction scale. About 85 per cent of older HILDA respondents report a job satisfaction score of 7 or more; in the BHPS, about two-thirds of older respondents report job satisfaction of 6 or 7 on the 1-7 scale. These numbers may be higher than those that would pertain for the whole sample of workers, if we believe that job satisfaction is U-shaped in age (Blanchflower and Oswald, 2008, Clark *et al*., 1996)

Tables 1a and 1b here

We wish to estimate a dynamic model for being retired in the next observed period. This will include on the right-hand side the following current labour-force statuses: (i) retired; (ii) not

[4] This question is asked separately for the employed and the self-employed in the BHPS; our analysis here includes both groups in the category "in employment".

retired but not in the labour force; (iii) unemployed; (iv) in dissatisfying work; and (v) in satisfying work. The latter two statuses refer to both the employed and the self-employed, and are defined according to the level of job satisfaction that the individual reports when in work. We distinguish between satisfying and dissatisfying work by converting the ordered job satisfaction variable in each dataset into a binary variable. In HILDA, we define low job satisfaction (dissatisfying work) as corresponding to job satisfaction values between 0 and 6 and high job satisfaction (satisfying work) as satisfaction values between 7 and 10; in the BHPS data, these partitions refer to overall job satisfaction of 1 to 5 and 6 to 7 respectively. Sensitivity analysis suggests the qualitative results do not change much according to the exact division of job satisfaction into the two categories.

For the first labour-force status above, we adopt a strict definition of retirement where an individual is defined as retired if they are not in the labour force (NILF) and they also report that they are retired. Table 2 describes the transitions in labour-force status over time. We can see that dissatisfying work is not an absorbing state in either panel dataset: in HILDA, 44.2% of those who were dissatisfied in *t-1* have satisfying work in the following period. A small proportion of the retired return to employment and in general report high job satisfaction when they do so (this is of course a selected sample, and we may imagine that potential job satisfaction drives the decision to return to work). Over a third of those not retired and not in the labour force (NR) in *t-1* declare themselves as retired at *t*. The same broad patterns pertain in the BHPS, albeit with somewhat lower levels of mobility between statuses (33.1% of the work dissatisfied transit to satisfied, and about a quarter of the NR are retired one year later).

Tables 2a and 2b here

Following Stewart (2007) and Buddelmeyer *et al*. (2010), we appeal to a random-effects dynamic probit model to estimate the likelihood of retirement. The outcome variable is dichotomous: 1 if retired and 0 if not retired. The associated latent equation can be written as

$$y_{it}^{*} = \gamma_1 y_{i\,t-1} + \gamma_2 LSAT_{i\,t-1} + \gamma_3 UEMP_{i\,t-1} + \gamma_4 NR_{i\,t-1} + X_{it-1}^{'}\beta + \alpha_i + u_{it} \quad (1)$$

where *i=1,…,N* denotes the individuals who are observed over *t=2,…,T* periods. The latent dependent variable for being retired is y_{it}^{*}, with the observable outcome $y_{it} = 1\ if\ y_{it}^{*} \geq 0$, and $y_{it} = 0$ otherwise. In equation (1), $y_{i\,t-1}$ represents the lagged dependent outcome variable and $LSAT_{i\,t-1}$, $UEMP_{i\,t-1}$ and $NR_{i\,t-1}$ are three dummy variables denoting the three lagged labour-force statuses of dissatisfying work, unemployment, and not retired and NLF, respectively (high job satisfaction, $HSAT_{i\,t-1}$, is the omitted reference category). The set of control variables X_{it} are both time-variant and time-invariant (and include age, gender, education level, health status, marital status, household income per head, age of children, socio-economic background, ethnic origin and geographic location).[5] Last, α_i is the individual-specific random component capturing the effect of time-invariant individual unobserved heterogeneity, and u_{it} is an idiosyncratic error term that is distributed $N(0, \sigma_u^2)$.

We adopt the method of Wooldridge (2005) which we combine with the Mundlak (1978) method, in order to control for both initial conditions and individual unobserved heterogeneity, respectively. We then estimate the following equation:

[5] The relevant variables and their summary statistics are listed in Appendix Table A1. There are other determinants of retirement that are measured irregularly, or not at all, in HILDA and the BHPS, such as the financial-planning horizon and individual risk-aversion. These are arguably captured in the individual-specific random component.

$$y_{it}^{*} = \gamma_1 y_{i\,t-1} + \gamma_2 LSAT_{i\,t-1} + \gamma_3 UEMP_{i\,t-1} + \gamma_4 NR_{i\,t-1} + X_{it-1}^{'}\beta + \bar{X}_i^{'}\delta + \theta y_{i1} + \varepsilon_i + u_{it} \quad (2)$$

where y_{i1} represents the first observation of the binary dependent variable in the dataset, and $\bar{X}_i^{'}$ denotes the means over time of each time-varying explanatory variable for individual *i*.

3. REGRESSION RESULTS

We start by estimating the model on the whole sample, followed by estimations on sub-samples by gender. For each regression we not only present the estimated coefficients but also calculate five predicted probabilities, together with two indicators of marginal effects, following the counter-factual post-estimation approach used by Stewart (2007) and Buddelmeyer *et al*. (2010). One indicator is the average partial effect (APE), which is defined as the difference between predicted probabilities; the other is the predicted probability ratio (PPR), which reflects the ratio between the predicted probabilities. The latter is particularly useful in this context as the reference for comparison, *i.e.* the predicted probability of retirement at *t* if in satisfied employment at *t-1*, is relatively small (0.163 for the whole sample in HILDA; 0.211 in the BHPS).

3.1 Main Results

The results obtained from the whole sample and for men and women separately are reported in Tables 3*a* and 3*b* for HILDA and the BHPS respectively. The results from both surveys confirm what is already known in the literature, that retirement is a fairly absorbing state: the fact of being retired at *t-1* is associated with a very much higher likelihood of also being retired in year *t*. In particular, relative to the job-satisfied workers, the probability of retirement in HILDA is higher by 0.361 (or 3.2 times as likely) for those who were retired in *t-1*. The analogous APE and PPR figures in the BHPS are 0.486 (3.3 times as likely).

Tables 3a and 3b here

The regression results also show the importance of the initial condition, corresponding to the variable y_{i1} above ("initially retired"), which is positive and significant in both regressions, even controlling for lagged labour-force status. Women retire somewhat less than men in HILDA, but not in the BHPS, whereas there is a positive relationship between education and the retirement probability in the BHPS, but less so in HILDA. In both datasets, there is a marked hump-shaped relationship between age and the probability of retirement.

Our new and perhaps more interesting finding is about the comparison of the probability of retirement in *t* between those who were in satisfying and dissatisfying employment in *t-1*. Our coefficient on the dissatisfying employment variable in the retirement equation is positive and statistically significant at the 1% level in both tables. We thus cannot reject the hypothesis that, relative to those in more-satisfying employment, dissatisfied workers are significantly more likely to retire from the labour force in the next period.

The estimated APE and PPR figures show that those in dissatisfying employment are more likely by 0.027 (16 per cent more likely) to retire in HILDA (with figures of 0.032 and 15 per cent in the BHPS). On average 19 per cent of those in dissatisfying employment at *t-1* will be retired at time *t* in this age group in HILDA (24 per cent in the BHPS): this percentage remains much lower than the figure for those who were unemployed, not retired and NLF, or retired at *t-1* (these figures are 29, 43 and 52 per cent, respectively in HILDA; 44, 44 and 70 per cent in the BHPS). In the separate regressions by sex in Table 3*a*, the effect of dissatisfying employment on retirement probability in HILDA is significant at the 10% level for men and at the 5% level for women, with the effect being somewhat larger in size for women (as reflected in the figures for the APE and the PPR at the foot of the table). With respect to the BHPS in Table 3*b*, the estimated coefficient is significant for both men and women at the 1% level; again the estimated effect of job dissatisfaction on retirement is slightly larger for women than it is for men.

3.2 Robustness and Other Results

In this section we check the robustness of our main results in Tables 3*a* and 3*b* to changes in the regression specification; we also discuss the results in a number of sub-samples.

We first reconsider equation (2) where the *X*s on the right-hand side of the equation are measured not at time *t-1* (i.e. the year before the labour-force outcome which is the dependent variable), but at time *t*. This latter is the typical specification in the literature (although in terms of causality we often rather think of income when in the job as being a factor predicting retirement). The results of this re-estimation appear in Table A2 in the Appendix. A comparison with the figures in Tables 3*a* and 3*b* shows only small movements in the size of the estimated coefficients on the key right-hand side variables, and no change in their statistical significance.

We estimate dynamic random-effects probit models. Doing so requires us to transform the ordinal job satisfaction variable in both surveys into a dummy. The job-satisfaction response scales in BHPS and HILDA are not the same. In addition, all response categories in the BHPS are labelled (at least since Wave 2), while in HILDA only the bottom category (completely dissatisfied = 0) and the top category (completely satisfied = 10) are labelled. In the text, we have cut the HILDA responses 0-6 vs. 7-10, and the BHPS responses 1-5 vs. 6-7.

The differential response scales and labelling (and potentially differences between the two countries in the relationship between satisfaction and subsequent action) mean that we do not know exactly how to divide the scales up. As a check, we have re-estimated the HILDA regressions comparing 0-7 vs. 8-10: this gives similar qualitative results (available on request) but smaller marginal effects. For the HILDA job satisfaction scores, the "best" split does therefore seem to be the one that we made in Table 3*a*. We can also split BHPS job satisfaction 1-4 vs. 5-7, producing a smaller percentage of dissatisfied workers. The estimated coefficients are remarkably similar to those in Table 3*b*, with now a slightly larger marginal effect of job dissatisfaction on the probability of retirement.

The results that we show in the regression tables are averages over the whole sample aged 51-74. Yet we might expect the relationship between satisfaction and retirement to be larger in size for those who are around the "normal" retirement age. To investigate, we ran our Table 3 specification initially only on individuals aged 51-56. We then added individuals who were aged 57 and 58 and re-estimated the regression, and so on up until we reached the full sample of those aged 51-74. If job satisfaction affects retirement more around age 60-65, say, then we would expect the marginal effect to first rise, and then start to fall again with age. The results appear in Table 4. The marginal effect rises with age up to around age 70 in the BHPS before tapering off. In HILDA the marginal effect continues to rise (albeit at a diminishing rate) up until the early 70's.[6] This likely reflects the different retirement rules in the two countries.

Table 4 here

[6] We can also estimate the marginal effects by age as produced by Stata: these appear in Table A3. Their age profile is very similar to that found for the APE.

We last ask whether the relationship between job satisfaction and retirement is the same by level of education. Governments may arguably be relatively more interested in keeping higher-educated workers active in the labour market. When we carry out separate regressions only on higher-educated workers, we find marginal effects in both datasets that are very similar to those for the whole sample in Tables 3*a* and 3*b*. Job satisfaction predicts retirement just as much for the higher-educated as for the less-educated.

4. CONCLUSION

This paper has used long-run panel data from HILDA and the BHPS to consider the relationship between reported job satisfaction and retirement timing in both Australia and UK. In particular, we consider whether current job satisfaction can predict future retirement decisions.

We find that, relative to satisfied workers, those with more dissatisfying jobs are significantly more likely to retire in the next period, although their retirement probability in the next period is still not as high as those who are currently unemployed or not in the labour force in the current period. The adverse effect of job dissatisfaction on labour-force participation is significant for both men and women in both countries, with the effect being somewhat larger for women.

Existing work has suggested that workers' self-reported job satisfaction is correlated with a number of indicators and behaviours in the labour market, such as productivity[7] and quitting. The work here has shown that job satisfaction is not only correlated with observable behaviours in the labour market, it also determines the decision to be active in the labour

[7] See Ostroff (1992) for survey analysis on the relationship between well-being and productivity at work, and Oswald *et al*. (2015) for recent experimental evidence.

market in the first place. As such, poorer quality jobs (as perceived by the workers themselves and recorded in the data through their reported lower job satisfaction) discourage labour supply. This has two arguably important implications. First, all empirical work using panel data to predict future labour-market behaviour from current job satisfaction is based on a selected sample (which might be thought to bias the estimated job satisfaction coefficient towards zero). Second, from the point of view of policy, retaining older workers in the workforce is likely to become an increasingly important policy goal. Our results here suggest that improving worker job satisfaction may well play a significant role in helping to achieve this aim.

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Table 1*a*: Overall job satisfaction (percentage) of workers aged 51-74 by gender: HILDA

Job satisfaction	*Males*	*Females*	*Total*
0	0.24	0.42	0.32
1	0.43	0.44	0.44
2	0.78	0.95	0.86
3	1.22	1.13	1.18
4	1.73	1.63	1.69
5	4.60	4.79	4.69
6	5.76	5.00	5.41
7	16.46	14.60	15.61
8	32.31	28.33	30.49
9	21.64	24.24	22.83
10	14.83	18.46	16.49
Total	100	100	100
Mean job satisfaction	7.87	7.98	7.92
Standard deviation	1.68	1.77	1.72
Cases	12,290	10,370	22,660

Note: In the regression analysis, high satisfaction is defined as a job satisfaction score of 7 or above.

Table 1*b*: Overall job satisfaction (percentage) of workers aged 51-74 by gender: BHPS

Job satisfaction	*Males*	*Females*	*Total*
1	1.47	1.10	1.30
2	2.64	1.95	2.32
3	5.78	4.91	5.37
4	7.27	4.61	6.03
5	19.73	17.20	18.55
6	47.42	48.19	47.78
7	15.70	22.05	18.66
Total	100	100	100
Mean job satisfaction	5.46	5.68	5.56
Standard deviation	1.29	1.22	1.26
Cases	13,347	11,595	24,942

Note: In the regression analysis, high satisfaction is defined as a job satisfaction score of 6 or above.

Table 2*a*: Transitions between work and retirement: HILDA

Status at *t-1*	Status at *t*					
	High Job satisfaction	Low Job satisfaction	Unemployed	Not retired and NILF	Retired	Total
High Job satisfaction (HSAT)	83.1	7.3	0.8	3.0	5.8	100.0
Low Job satisfaction (LSAT)	44.2	42.5	3.1	4.8	5.5	100.0
Unemployed (UEMP)	28.9	8.4	25.5	23.2	13.9	100.0
Not Retired and NILF (NR)	5.5	1.0	1.5	55.5	36.6	100.0
Retired (R)	2.7	0.3	0.4	14.0	82.7	100.0
Total	**40.5**	**6.5**	**1.3**	**15.6**	**36.1**	**100.0**

Table 2*b*: Transitions between work and retirement: BHPS

Status at *t-1*	Status at *t*					
	High Job satisfaction	Low Job satisfaction	Unemployed	Not retired and NILF	Retired	Total
High Job satisfaction (HSAT)	73.1	17.5	1.0	1.3	7.1	100.0
Low Job satisfaction (LSAT)	33.1	56.7	2.0	1.7	6.4	100.0
Unemployed (UEMP)	12.0	7.8	38.1	21.4	20.6	100.0
Not Retired and NILF (NR)	1.6	0.7	2.2	71.7	23.8	100.0
Retired (R)	1.0	0.2	0.4	4.8	93.6	100.0
Total	**25.2**	**12.8**	**1.8**	**13.3**	**46.9**	**100.0**

Table 3*a*: A dynamic model of job satisfaction and retirement: HILDA

	All sample		Males		Females	
	Coef.	*S.E.*	*Coef.*	*S.E.*	*Coef.*	*S.E.*
Retired at *t-1*	1.613***	(0.04)	1.619***	(0.05)	1.583***	(0.05)
Job dissatisfied at *t-1*	0.158***	(0.06)	0.142*	(0.08)	0.188**	(0.08)
Unemployed at *t-1*	0.658***	(0.09)	0.639***	(0.12)	0.688***	(0.14)
Not Retired at *t-1*	1.232***	(0.04)	1.201***	(0.06)	1.227***	(0.05)
Initial retirement	0.724***	(0.05)	0.873***	(0.08)	0.622***	(0.06)
Female	-0.077**	(0.03)	-	-	-	-
Only completed school	0.028	(0.06)	0.019	(0.09)	0.029	(0.08)
Certificates III/IV	0.098**	(0.04)	0.112*	(0.06)	0.049	(0.06)
Diplomas	0.027	(0.06)	-0.011	(0.08)	0.054	(0.08)
University graduates	0.035	(0.05)	0.100	(0.07)	-0.013	(0.06)
Migrants (ESB)	0.014	(0.04)	-0.051	(0.07)	0.084	(0.06)
Migrants (NESB)	-0.051	(0.04)	-0.003	(0.07)	-0.099*	(0.06)
ATSI	-0.192	(0.15)	-0.194	(0.23)	-0.188	(0.21)
Father with a professional job	0.007	(0.05)	0.032	(0.08)	-0.030	(0.07)
Married	-0.141*	(0.07)	-0.016	(0.12)	-0.233**	(0.09)
Age	0.385***	(0.05)	0.256***	(0.09)	0.471***	(0.07)
Age-squared/100	-0.218***	(0.04)	-0.106	(0.07)	-0.293***	(0.05)
Disability	0.039	(0.03)	0.062	(0.05)	0.028	(0.04)
Urban	0.016	(0.11)	-0.113	(0.16)	0.115	(0.15)
Children aged under 5	-0.190	(0.28)	-0.220	(0.30)	0.616	(0.98)
Children aged [5, 14]	0.014	(0.13)	0.168	(0.17)	-0.251	(0.21)
Income	0.000**	(0.00)	0.000**	(0.00)	0.000	(0.00)
m(married)	0.223***	(0.08)	-0.001	(0.14)	0.331***	(0.10)
m(age)	0.442***	(0.08)	0.566***	(0.13)	0.389***	(0.11)
m(age-squared)	-0.372***	(0.07)	-0.468***	(0.10)	-0.332***	(0.08)
m(disability)	-0.002	(0.05)	0.001	(0.08)	-0.021	(0.07)
m(urban)	0.126	(0.12)	0.256	(0.17)	0.034	(0.16)
m(children aged under 5)	0.444	(0.44)	0.455	(0.46)	-1.356	(2.12)
*m(*children aged [5, 14])	-0.908***	(0.18)	-0.802***	(0.23)	-0.988***	(0.30)
m(income)	-0.000***	(0.00)	-0.000***	(0.00)	-0.000**	(0.00)
Constant	-29.870***	(2.00)	-30.182***	(3.17)	-30.607***	(2.61)
No. of observations	36,450		17,249		19,201	
Log-likelihood	-11809.9		-4783.2		-6975.0	
Prob(R*t*|R*t-1*)	0.524		0.519		0.523	
Prob(R*t*|NR*t-1*)	0.427		0.419		0.428	
Prob(R*t*|UEMP*t-1*)	0.290		0.294		0.294	
Prob(R*t*|LSAT*t-1*)	0.190		0.200		0.189	
Prob(R*t*|HSAT*t-1*)	0.163		0.177		0.156	
APE						
Prob(R*t*|R*t-1*)-Prob(R*t*|HSAT*t*)	0.361		0.342		0.367	
Prob(R*t*|NR*t-1*)-Prob(R*t*|HSAT*t*)	0.264		0.242		0.272	
Prob(R*t*|UEMP*t-1*)-Prob(R*t*|HSAT*t-1*)	0.127		0.117		0.138	
Prob(R*t*|LSAT*t-1*)-Prob(R*t*|HSAT*t-1*)	0.027		0.023		0.033	
PPR						
Prob(R*t*|R*t-1*)/Prob(R*t*|HSAT*t-1*)	3.212		2.933		3.353	
Prob(R*t*|NR*t-1*)/Prob(R*t*|HSAT*t-1*)	2.618		2.370		2.748	
Prob(R*t*|UEMP*t-1*)/Prob(R*t*|HSAT*t-1*)	1.779		1.662		1.883	
Prob(R*t*|LSAT*t-1*)/Prob(R*t*|HSAT*t-1*)	1.164		1.132		1.211	

Notes: The dependent variable is the probability of retirement at *t*; all control variables are measured at *t-1*; m(.) denotes the Mundlak correction terms; *** p<0.01, ** p<0.05, * p<0.1.

Table 3*b*: A dynamic model of job satisfaction and retirement: BHPS

	All sample		Males		Females	
	Coef.	*S.E.*	*Coef.*	*S.E.*	*Coef.*	*S.E.*
Retired at *t-1*	2.216***	(0.04)	2.508***	(0.06)	2.045***	(0.05)
Job dissatisfied at *t-1*	0.170***	(0.04)	0.181***	(0.06)	0.228***	(0.06)
Unemployed at *t-1*	1.069***	(0.07)	1.229***	(0.09)	1.041***	(0.11)
Not Retired at *t-1*	1.086***	(0.04)	1.292***	(0.07)	1.015***	(0.05)
Initial retirement	0.753***	(0.05)	0.665***	(0.08)	0.758***	(0.06)
Female	0.051*	(0.03)	-	-	-	-
Medium education	0.129***	(0.04)	0.131**	(0.06)	0.122**	(0.05)
High education	0.215***	(0.04)	0.192***	(0.05)	0.223***	(0.05)
Afro-Caribbean	0.012	(0.24)	-0.163	(0.35)	0.287	(0.32)
Asian-subcontinent	-0.142	(0.17)	-0.347	(0.24)	-0.084	(0.24)
Married	-0.038	(0.08)	-0.054	(0.13)	-0.074	(0.10)
Age	0.728***	(0.05)	0.277***	(0.09)	0.993***	(0.07)
Age-squared/100	-4.663***	(0.43)	-1.008	(0.73)	-6.804***	(0.56)
Disability	0.074*	(0.04)	0.023	(0.07)	0.104**	(0.05)
Children aged under 5	0.208	(0.14)	0.197	(0.22)	0.190	(0.19)
Children aged [5, 15]	-0.025	(0.09)	-0.115	(0.13)	0.072	(0.14)
Children aged above 15	-0.161	(0.14)	-0.007	(0.17)	-0.439*	(0.23)
Income	0.000*	(0.00)	0.000**	(0.00)	0.000	(0.00)
m(married)	0.089	(0.08)	0.288**	(0.14)	-0.014	(0.11)
m(age)	0.532***	(0.09)	0.165	(0.14)	0.642***	(0.11)
m(age-squared)	-4.565***	(0.69)	-1.372	(1.13)	-5.567***	(0.88)
m(disability)	-0.357***	(0.06)	-0.408***	(0.09)	-0.355***	(0.07)
m(children aged under 5)	-0.247	(0.28)	-0.169	(0.41)	-0.309	(0.36)
m(children aged [5, 15])	-0.292**	(0.13)	-0.023	(0.18)	-0.580***	(0.19)
m(children aged above 15)	-1.130***	(0.28)	-0.890**	(0.36)	-1.350***	(0.44)
m(income)	-0.000**	(0.00)	-0.000	(0.00)	-0.000***	(0.00)
Constant	-43.694***	(2.24)	-19.848***	(3.50)	-54.414***	(2.93)
No. of observations	43,989		19,953		24,036	
Log-likelihood	-10959.8		-4076.4		-6724.0	
Prob(R*t*|R*t-1*)	0.697		0.729		0.686	
Prob(R*t*|NR*t-1*)	0.444		0.458		0.455	
Prob(R*t*|UEMP*t-1*)	0.440		0.444		0.461	
Prob(R*t*|LSAT*t-1*)	0.243		0.229		0.275	
Prob(R*t*|HSAT*t-1*)	0.211		0.199		0.229	
APE						
Prob(R*t*|R*t-1*)-Prob(R*t*|HSAT*t-1*)	0.486		0.530		0.458	
Prob(R*t*|NR*t-1*)-Prob(R*t*|HSAT*t-1*)	0.233		0.259		0.226	
Prob(R*t*|UEMP*t-1*)-Prob(R*t*|HSAT*t-1*)	0.229		0.245		0.232	
Prob(R*t*|LSAT*t-1*)-Prob(R*t*|HSAT*t-1*)	0.032		0.031		0.046	
PPR						
Prob(R*t*|R*t-1*)/Prob(R*t*|HSAT*t-1*)	3.301		3.671		3.003	
Prob(R*t*|NR*t-1*)/Prob(R*t*|HSAT*t-1*)	2.103		2.306		1.990	
Prob(R*t*|UEMP*t-1*)/Prob(R*t*|HSAT*t-1*)	2.084		2.235		2.017	
Prob(R*t*|LSAT*t-1*)/Prob(R*t*|HSAT*t-1*)	1.152		1.154		1.203	

Notes: The dependent variable is the probability of retirement at *t*; all control variables are at *t*-1; m(.) denotes the Mundlak correction terms; *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Predicted probabilities and marginal effects by age group

	Age									
	51-56	51-58	51-60	51-62	51-64	51-66	51-68	51-70	51-72	51-74
					HILDA					
Prob(R*t+1*|R*t*)	0.223	0.277	0.313	0.343	0.383	0.428	0.466	0.494	0.515	0.524
Prob(R*t+1*|NR*t*)	0.164	0.190	0.222	0.261	0.301	0.333	0.368	0.392	0.417	0.427
Prob(R*t+1*|UEMP*t*)	0.066	0.081	0.118	0.150	0.190	0.216	0.243	0.260	0.279	0.290
Prob(R*t+1*|LSAT*t*)	0.041	0.048	0.064	0.081	0.105	0.125	0.146	0.163	0.182	0.190
Prob(R*t+1*|HSAT*t*)	0.026	0.033	0.046	0.064	0.085	0.107	0.124	0.138	0.155	0.163
Prob(R*t+1*|R*t*)-Prob(R*t+1*|HSAT*t*)	0.197	0.244	0.267	0.279	0.298	0.322	0.342	0.356	0.360	0.361
Prob(R*t+1*|NR*t*)-Prob(R*t+1*|HSAT*t*)	0.138	0.157	0.177	0.197	0.216	0.226	0.244	0.254	0.262	0.264
Prob(R*t+1*|UEMP*t*)-Prob(R*t+1*|HSAT*t*)	0.040	0.048	0.073	0.086	0.105	0.110	0.119	0.122	0.124	0.127
Prob(R*t+1*|LSAT*t*)-Prob(R*t+1*|HSAT*t*)	0.014	0.014	0.018	0.018	0.020	0.019	0.022	0.025	0.027	0.027
Prob(R*t+1*|R*t*)/Prob(R*t+1*|HSAT*t*)	8.495	8.337	6.850	5.378	4.512	4.020	3.763	3.571	3.327	3.212
Prob(R*t+1*|NR*t*)/Prob(R*t+1*|HSAT*t*)	6.247	5.724	4.870	4.084	3.544	3.123	2.973	2.837	2.693	2.618
Prob(R*t+1*|UEMP*t*)/Prob(R*t+1*|HSAT*t*)	2.513	2.434	2.594	2.355	2.241	2.032	1.960	1.879	1.804	1.779
Prob(R*t+1*|LSAT*t*)/Prob(R*t+1*|HSAT*t*)	1.542	1.436	1.399	1.277	1.232	1.176	1.181	1.179	1.172	1.164
					BHPS					
Prob(R*t+1*|R*t*)	0.374	0.389	0.475	0.518	0.556	0.617	0.648	0.727	0.690	0.697
Prob(R*t+1*|NR*t*)	0.100	0.131	0.189	0.236	0.287	0.332	0.368	0.405	0.431	0.444
Prob(R*t+1*|UEMP*t*)	0.086	0.130	0.195	0.241	0.299	0.337	0.370	0.419	0.428	0.440
Prob(R*t+1*|LSAT*t*)	0.033	0.045	0.077	0.097	0.134	0.162	0.185	0.210	0.233	0.243
Prob(R*t+1*|HSAT*t*)	0.018	0.028	0.054	0.072	0.107	0.131	0.153	0.171	0.201	0.211
Prob(R*t+1*|R*t*)-Prob(R*t+1*|HSAT*t*)	0.356	0.361	0.421	0.446	0.449	0.486	0.495	0.556	0.490	0.486
Prob(R*t+1*|NR*t*)-Prob(R*t+1*|HSAT*t*)	0.082	0.103	0.135	0.164	0.180	0.201	0.215	0.235	0.230	0.233
Prob(R*t+1*|UEMP*t*)-Prob(R*t+1*|HSAT*t*)	0.068	0.102	0.141	0.169	0.192	0.206	0.217	0.248	0.227	0.229
Prob(R*t+1*|LSAT*t*)-Prob(R*t+1*|HSAT*t*)	0.015	0.017	0.023	0.025	0.027	0.031	0.033	0.040	0.032	0.032
Prob(R*t+1*|R*t*)/Prob(R*t+1*|HSAT*t*)	21.216	13.833	8.820	7.197	5.195	4.710	4.246	4.261	3.437	3.301
Prob(R*t+1*|NR*t*)/Prob(R*t+1*|HSAT*t*)	5.666	4.658	3.505	3.287	2.687	2.534	2.409	2.375	2.145	2.103
Prob(R*t+1*|UEMP*t*)/Prob(R*t+1*|HSAT*t*)	4.863	4.632	3.616	3.356	2.791	2.573	2.422	2.455	2.129	2.084
Prob(R*t+1*|LSAT*t*)/Prob(R*t+1*|HSAT*t*)	1.859	1.597	1.423	1.346	1.251	1.234	1.214	1.233	1.159	1.152

Appendix

Table A1*a*: Descriptive statistics: HILDA

	Mean	Standard deviation
Female	0.525	0.499
Only completed school	0.083	0.275
Certificates III/IV	0.202	0.402
Diplomas	0.098	0.297
University graduates	0.193	0.395
Migrants (ESB)	0.145	0.352
Migrants (NESB)	0.150	0.357
ATSI	0.012	0.109
Father with a professional job	0.104	0.306
Married	0.731	0.443
Age	60.839	6.750
Age-squared/100	37.470	8.358
Disability	0.396	0.489
Urban	0.850	0.357
Children aged under 5	0.005	0.070
Children aged [5, 14]	0.046	0.210
Household annual gross income/(No. of persons)^0.5	52,999	60,908

Note: Pooled data from HILDA 2001-2012 on 46,521 observations.

Table A1*b*: Descriptive statistics: BHPS

	Mean	Standard deviation
Female	0.544	0.498
Medium education	0.219	0.414
High education	0.286	0.452
Afro-Caribbean	0.004	0.061
Asian-subcontinent	0.007	0.084
Married	0.705	0.456
Age	61.460	6.907
Age-squared/100	3.825	0.859
Disability	0.251	0.433
Children aged under 5	0.009	0.095
Children aged [5, 15]	0.055	0.227
Children aged above 15	0.019	0.136
Household annual gross income/(No. of persons)^0.5	16,196	12,524

Note: Pooled data from BHPS 1992-2008 on 62,793 observations.

Table A2: A dynamic model of job satisfaction and retirement: HILDA & BHPS

	HILDA		BHPS	
	Coef.	*S.E.*	*Coef.*	*S.E.*
Retired at *t-1*	1.609***	(0.04)	2.148***	(0.04)
Job dissatisfied at *t-1*	0.158***	(0.06)	0.139***	(0.04)
Unemployed at *t-1*	0.645***	(0.09)	1.074***	(0.07)
Not Retired at *t-1*	1.231***	(0.04)	1.058***	(0.04)
Initial retirement	0.725***	(0.05)	0.779***	(0.05)
No. of observations	36,447		41,397	
Log-likelihood	-11812.8		-10340.6	
Prob(R*t*|R*t-1*)	0.524		0.687	
Prob(R*t*|NR*t-1*)	0.428		0.450	
Prob(R*t*|UEMP*t-1*)	0.288		0.453	
Prob(R*t*|LSAT*t-1*)	0.190		0.253	
Prob(R*t*|HSAT*t-1*)	0.163		0.227	
APE				
Prob(R*t*|R*t-1*)-Prob(R*t*|HSAT*t-1*)	0.360		0.461	
Prob(R*t*|NR*t-1*)-Prob(R*t*|HSAT*t-1*)	0.264		0.223	
Prob(R*t*|UEMP*t-1*)-Prob(R*t*|HSAT*t-1*)	0.124		0.227	
Prob(R*t*|LSAT*t-1*)-Prob(R*t*|HSAT*t-1*)	0.027		0.026	
PPR				
Prob(R*t*|R*t-1*)/Prob(R*t*|HSAT*t-1*)	3.203		3.033	
Prob(R*t*|NR*t-1*)/Prob(R*t*|HSAT*t-1*)	2.615		1.985	
Prob(R*t*|UEMP*t-1*)/Prob(R*t*|HSAT*t-1*)	1.761		2.001	
Prob(R*t*|LSAT*t-1*)/Prob(R*t*|HSAT*t-1*)	1.165		1.116	

Notes: The dependent variable is the probability of retirement at *t*; all control variables are measured at *t*; *** p<0.01, ** p<0.05, * p<0.1.

Table A3: Marginal effects of job dis-satisfaction on retirement (as reported by STATA)

Age	dy/dx	S.E.	p-value	Mean(dis-satisfaction)
		BHPS		
51-56	0.013	0.00	0.001	0.268
51-58	0.015	0.00	0.000	0.252
51-60	0.026	0.01	0.000	0.234
51-62	0.035	0.01	0.000	0.214
51-64	0.045	0.01	0.000	0.196
51-66	0.060	0.01	0.000	0.178
51-68	0.067	0.01	0.000	0.163
51-70	0.083	0.02	0.000	0.145
51-72	0.067	0.02	0.000	0.139
51-74	0.067	0.02	0.000	0.135
		HILDA		
51-56	0.009	0.00	0.029	0.129
51-58	0.012	0.01	0.019	0.122
51-60	0.018	0.01	0.006	0.114
51-62	0.019	0.01	0.013	0.106
51-64	0.025	0.01	0.011	0.098
51-66	0.027	0.01	0.024	0.091
51-68	0.036	0.01	0.011	0.085
51-70	0.042	0.02	0.008	0.079
51-72	0.048	0.02	0.006	0.075
51-74	0.049	0.02	0.007	0.073