WHAT CAN WE LEARN FROM RETIREMENT EXPECTATIONS DATA?

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by

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Abstract

This paper analyses retirement expectations and outcomes using the two waves of the UK Retirement Survey, undertaken in 1988-89 and 1994. We argue that responses to questions on expectations are not straightforward to interpret where individuals are asked to report point expectations. As in the studies for the US by Bernheim, the evidence here suggests that individuals tend to report their most likely retirement date. About half of the sample retired when they expected. Men tend to retire earlier than expected on average, but with only two waves of data we cannot reject that this is caused by a common shock over the period. Changes in health and marital status are linked to divergences between expectations and realisations. We extend the analysis to consider 'don't know' responses, which we argue may be a rational response when individuals face greater uncertainty over their future retirement date. We provide evidence to support this hypothesis. Finally, we show that information on expectations can improve the accuracy of models of actual retirement behaviour, most likely because they provide a suitable proxy for unobserved tastes for income and leisure.

Key Words: retirement behaviour expectations
JEL Classification: D84 J26

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Executive summary

This paper uses data from the two waves of the Retirement Survey in 1988/89 and 1994 to analyse retirement expectations and outcomes.

We find that the distribution of reported expectations is very condensed: more than half of the sample expects to retire at the state pension age. Having an occupational pension, current health status and current and past employment have a significant effect on whether someone expects to retire before or after the state pension age.

We argue that answers to questions about retirement expectations are not straightforward to interpret when, as here, people are asked to give single point expectations. If individuals face uncertainty about their future retirement they will have to condense an underlying probability distribution into a single summary statistic. This means that the distribution of reported expectations is likely to be more condensed that the distribution of outcomes. We show that, as in the studies for the US by Bernheim, the evidence suggests that individuals tend to report their most likely retirement date.

About half of the sample retired when they said they expected to. Men were more likely to retire earlier than expected than later. However, with only two waves of data available we cannot reject that this is due to the presence of common macro shocks, particularly since there was a recession between the two waves of the survey. We find that changes in health and marital status between the two waves of the survey are linked to divergences between expectations and realisations.

We extend the analysis to consider the group of people who say that they don't know when they expect to retire. This is a sizeable group – nearly 15% of men and 30% of women. We argue that 'don't know' may be a rational response when individuals face greater uncertainty over their future retirement date. We provide evidence to support this hypothesis.

Finally, we show that information on expectations can improve the accuracy of models of actual retirement behaviour, most likely because they provide a suitable proxy for unobserved tastes for income and leisure.

WHAT CAN WE LEARN FROM RETIREMENT EXPECTATIONS DATA?

1 Introduction

This paper examines retirement expectations and retirement behaviour in Britain. It considers the role of previous expectations of retirement age in the retirement decision - both as an indicator of forward-looking retirement planning and as a plausible proxy for unobserved heterogeneity in retirement behaviour. To do so, it uses data from the Retirement Survey, which sampled a group of households in the UK that contained at least one individual aged between 55 and 69 in a period covering late 1988 and 1989.[1] Surviving individuals who could be followed-up were re-interviewed in 1994.[2]

Retirement behaviour is an important but under-researched topic in Britain. This is in spite of dramatic changes in the labour market behaviour of older workers. Participation rates for men aged 55-64 have fallen by around 20 percentage points over the last 25 years, and while there has been less of a fall in employment among older women this contrasts with rising levels of employment among women aged 25-54.[3] Yet the issue of retirement has been subjected to very little serious econometric research in Britain.[4] Undoubtedly one reason for this has been a lack of suitable data sets, in contrast to the United States.[5] The Retirement Survey, in part, redresses this.

The availability of two waves of data from the Retirement Survey allows us to match individuals' prior expectations of their retirement age, collected in the first wave, with their subsequent behaviour, observed by the second wave. Similar studies have

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[1] For further details on sampling procedures and some cross-tabulations from the first wave of the sample, see Bone *et al* (1992). On retirement behaviour, using the first wave of the Retirement Survey, see Disney, Meghir and Whitehouse (1994).

[2] See Disney, Grundy and Johnson (1997).

[3] For further details, see Disney, Meghir and Whitehouse (1994), and Tanner (1998). For international comparisons, see Disney (1996).

[4] Notable exceptions are Zabalza, Pissarides and Barton (1980) and Meghir and Whitehouse (1997)

[5] The economic theory of retirement behaviour is surveyed by Lazear (1986), who emphasises the forward-looking aspects of the retirement decision. In contrast, many early studies in the United States and, implicitly, Zabalza *et al* (1980) implicitly model retirement using a static labour supply model: for a survey of the US literature with greater emphasis on 'present value' calculations, see Quinn, Burkhauser and Myers (1990) and also the 'option value' approach of Stock and Wise (1990). Still fewer papers model retirement structurally as a forward-looking problem to be solved recursively, as

already been carried out in the US (see Bernheim (1989) and Hurd (1996)). While some scepticism has been expressed about the validity of expectations data (see Keane and Runkle (1990)), these studies have found that reported retirement expectations are not random, to the extent that they are correlated with the observable risk factors that are known to affect actual retirement behaviour (such as gender, wealth and pension status).

Considerable attention in empirical studies using expectations data has focused on whether individuals appear to form 'rational' expectations (see Wolpin and Gonul (1985), Bernheim (1989) and Das and van Soest (1997)). By rational is meant that individuals' expectations equate to the best prediction of future outcomes taking advantage of all currently available information. One implication of the rational expectations hypothesis is that, in the absence of common macro-shocks, the distribution of retirement expectations should correspond to the distribution of observed retirement outcomes. With several waves of panel data it may be reasonable to assume that macro-shocks average to zero over time. However this cannot be assumed with only two waves of data and the fact that people do not retire when they expected does not automatically lead us to reject the rational expectations hypothesis. This is particularly the case since there was a recession between the two waves of the Retirement Survey that may have been associated with a negative shock to employment prospects.[6]

More generally, however, we argue that the rational expectations hypothesis is not straightforward to test, particularly where individuals are asked to report point retirement expectations such as in the Retirement Survey. If individuals face uncertainty about their date of retirement they will have to condense an underlying probability distribution over a number of different expected retirement ages into a single measure. As Bernheim (1989) and Das (1996) have argued, there is no reason for assuming that individuals will make a prediction that corresponds to a mathematical 'expectation'. In fact, Bernheim (1989) suggests that respondents tend to report their most likely, rather than their mean expected retirement age. We show

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the data requirements in so doing are considerable. For examples of the structural approach, see Berkovec and Stern (1991), Gustman and Steinmeier (1986) and Rust and Phelan (1997).

that this is also the case in the UK. A related issue, not addressed in previous US studies, is how to interpret the responses of those who say that they don't know when they expect to retire. It is easy to dismiss such responses as uninformed and drop them from the analysis. Alternatively, a 'don't know' response may reflect a genuine degree of uncertainty about the timing of retirement, and we provide some support for this hypothesis here.

A final issue, from a practical point of view, is whether knowledge of individuals' retirement expectations can improve econometric models of individual retirement behaviour. The most plausible reason for thinking that expectations might improve the model is that the covariates of the retirement hazard comprise not just observables but also unobservables, such as preferences over income and leisure, for which expectations data might be a suitable proxy.

With these issues in mind, the outline of the remainder of the paper is as follows. The next section describes the Retirement Survey data that we use. Section 3 considers in more detail some of the methodological issues that arise in using expectations data. Section 4 compares expectations and outcomes for individuals while section 5 explores whether knowledge of expectations can improve the econometrician's model of actual retirement behaviour. Section 6 concludes.

2 Data

The data that we use in this study are drawn from the Retirement Survey. This is the first, large-scale panel data set in the UK to focus on individuals around the time of retirement. In this respect it is similar to the Retirement History Survey (RHS) and the Health and Retirement Survey (HRS) in the US. Like the two US surveys, the Retirement Survey contains detailed information on individuals' health, wealth, income and retirement behaviour, and a retrospective event history covering family composition and the main labour market events. It also contains information on individuals' expectations of retirement. Unlike the two US surveys, however, the Retirement Survey has only two waves. Wave 1, carried out in 1988/89, collected

[6] The rate of unemployment was 6.27% in 1989, 5.78% in 1990, 8.02% in 1991, 9.76% in 1992, 10.33% in 1993 and 9.37% in 1994.

information on 3543 'key respondents' who were then aged 55-69, together with 609 spouses outside this age range, a total of 4152 individuals. Wave 2 was collected in 1994. About two-thirds of the original sample of key respondents and spouses were re-interviewed. 11% of respondents are known to have died in this interval, while the residual attrition is a combination of non-response and (perhaps) unreported mortality.

In this paper we focus on a selected sample of individuals in the Retirement Survey. First, we select only those who appear in both waves of the Survey. Since the rates of (non-mortality) attrition between the two waves are not random, the sample of survivors is re-weighted to correct for known differential attrition rates by age, socio-economic status and gender.[7] A second selection we make is that, within the group of survivors, we look only at those who have not yet retired by the first wave of the sample, and who respond to the question on expected age of retirement (see Figure A1 in the Appendix).[8]

The definition of retirement that we use is a purely subjective one. Individuals are defined as retired if they say that they consider themselves to be retired. Many previous studies have adopted objective measures, such as the point of permanent departure from employment, if this is known (see Blau (1994), Disney, Meghir and Whitehouse (1994)), in order to avoid the problem of what subjectively-defined retirement actually means. Since this paper will be concerned with comparing individuals' expectations and realisations of retirement, this issue matters less. The main thing is that people refer to expectations and realisations of the same event in their minds, however defined.

On average, the group of individuals that we focus on is likely to retire later in life than the full sample. Table A1 in the Appendix gives the sample proportions for our selected group relative to the sample of all wave 2 survivors. Not only does the selected sample differ in observable characteristics (such as gender, age, health and whether or not they have a private pension) but also presumably in unobservable characteristics, such as preferences over work and leisure. Since, for the most part in

[7] A detailed description of the grossing factors used to re-weight the sample is given in the Appendix to Disney, Grundy and Johnson (1997)

[8] We also exclude people who do not consider themselves to be retired, but are not currently employed and do not intend returning to work.

this paper, we compare expectations and outcomes for the same people, the problem of unobserved heterogeneity is not a central issue. However, without controlling for selectivity, our later reduced form regression results for retirement age are likely to be biased. Since our aim is to examine the role of expectations, this is not a major problem, but we would emphasis that the results presented in this paper are not meant to be a reduced form model of retirement behaviour for the general population.

3 Methodological issues in the analysis of retirement expectations

Data concerning expectations are not straightforward to interpret. This section considers subjective retirement expectations in more detail; in particular how might respondents interpret a survey question concerning their retirement expectations? How might people respond when they have more than one expected age of retirement? And how do we handle people who give 'don't know' as an answer?

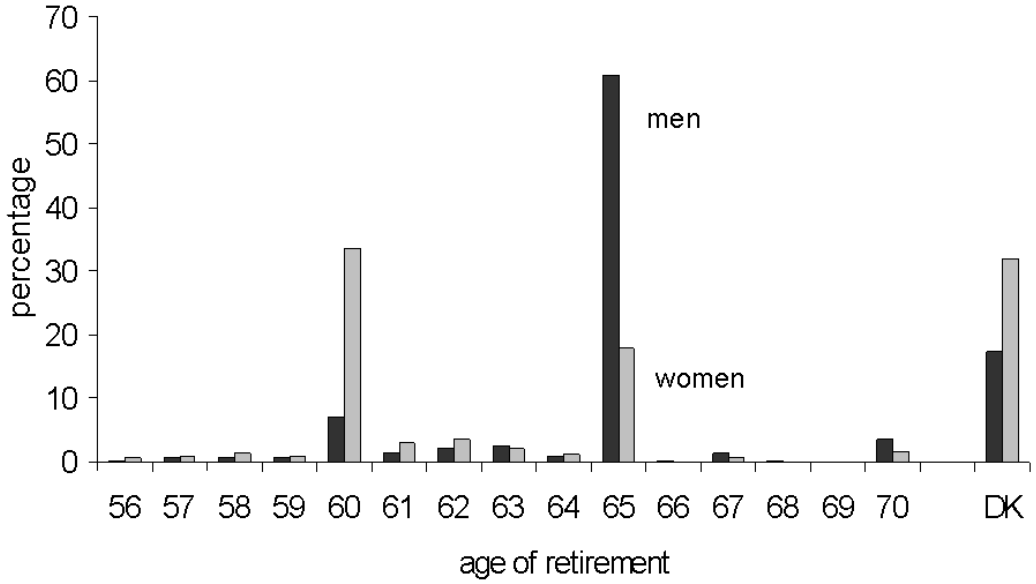
The distribution of expected retirement ages

All people in the first wave of the Retirement Survey who have not retired are asked '*at what age do you expect to retire?*' The distributions of expected retirement ages for men and women are plotted in Figure 1 (including the proportions of men and women who say that they do not know when they expect to retire). The distribution of expected ages of retirement for men is dominated by a 'spike' at 65, the age at which men first become eligible to receive the state pension, with more than 60% of men saying that they expect to retire at this age. Around one-third of women say that they expect to retire at 60 (the state pensionable age for women), although nearly the same number say that they do not know when they expect to retire.

The dominance of the distribution by spikes at state pension age and 'don't knows' might suggest that little interesting information is provided by these responses. However, a plausible explanation for the concentration of responses may lie in the way the expectations questions in the Retirement Survey are framed. Individuals may expect to retire at a number of different ages, with differing probabilities but they are asked to report a single summary statistic of their underlying distribution. Even if the underlying probability distribution were the same as the distribution of outcomes, we would anticipate that the distribution of *reported* expected retirement ages would be

more heavily concentrated than the distribution of actual retirement ages.[9] Looking at Dutch income expectations, Das (1996) also finds that the dispersion in expected income changes is smaller than the dispersion in actual income changes. We will return to the issue of the interpretation of point expectations in the next section.

Figure 1: Distribution of expected retirement ages



[9] A simple illustration illuminates the point. Suppose I (and the rest of the population) think that the probabilities of retiring at 62, 63, 65 and 66 are respectively 0.1, 0.2, 0.5 and 0.2. When asked to give a single expected age of retirement a possible response is to say 65 since it is the mode and mean (to the nearest whole age) of the underlying probability distribution. In the absence of any shocks, 10 per cent of the population retires at 63, 20 per cent at 64, 50 per cent at 65 and 20 per cent at 66. In this case the observed distribution of actual retirement ages is more dispersed than the distribution of reported expected ages (which is a single spike at 65). Comparing outcomes to reported expectations we would conclude that half the population did not retire when they expected, and that more people retired earlier than expected than retired later than expected whereas in fact the subjective and the objective probability distributions are identical. More recent surveys seek to avoid this problem by asking questions about future events that more closely reflect the fact that individuals' expectations may be a distribution of probabilities over several possible outcomes. In the US Health and Retirement Survey, for example, individuals are asked to indicate the chances of various future events, such as retiring at 62 or 65, on a scale of 1 to 10. For attempts to build up probability distributions for expectational variables of this type, see *inter alia* Dominitz and Manski, 1997; Hurd and McGarry (1995), Juster and Smith (1997) and Manski (1990)

We can reject the hypothesis that reported retirement ages are purely random numbers since people do vary their expected age of retirement according to their individual circumstances in a plausible manner. The first (albeit obvious) difference is that, on average, women expect to retire at earlier ages than men. In addition, other observable characteristics which are known to be correlated with retirement age in practice co-vary with retirement expectations in the same way. We show this by means of an ordered probit regression. Given the importance of the state pension age in the distribution of retirement ages we define a dependent variable that takes the value 1, 2 or 3 if the individual expects to retire before, at or after the state pension age respectively. For the moment we exclude those who say they don't know when they expect to retire. On the right-hand-side we include a set of variables that reflect an individual's current characteristics and employment history (since age 25). Separate regressions are run for men and for women. Estimates of the marginal effects are reported in Table 1. A full set of results is given in the Appendix.

Table 1

Marginal effects on expected age retirement age (relative to state pension age)

		Men				Women		
		Before	At	After		Before	At	After
Individual characteristics								
Age in Wave 1	*	-0.080	0.074	0.007	*	-0.894	0.772	0.122
Ln(individual income) in W1		0.044	-0.040	-0.004		-0.521	0.450	0.071
No educational qualification		0.001	-0.001	0.000		-0.017	-0.102	0.118
Married in W1		0.073	-0.051	-0.022		0.023	0.205	-0.228
Divorced/ widowed in W1		0.073	-0.062	-0.012		0.050	0.162	-0.212
W1 severity score 2-3		0.075	-0.063	-0.012		0.009	0.047	-0.057
W1 severity score > 3		0.180	-0.161	-0.019	*	0.149	0.189	-0.338
Occupational pension	*	0.124	-0.089	-0.035		0.012	0.081	-0.093
Saved for retirement		0.061	-0.047	-0.014		-0.010	-0.061	0.071
Employment status and history								
Unemployed in W1		0.108	-0.094	-0.015		0.009	0.046	-0.055
Part-time employed in W1*	*	-0.178	0.074	0.105	*	-0.024	-0.219	0.243
Self-employed in W1		0.012	-0.009	-0.002	*	-0.032	-0.445	0.477
FT employed > 95% since 25	**	0.090	-0.071	-0.019		0.036	0.193	-0.229
% time not working since 25		0.123	-0.113	-0.010		-0.554	0.478	0.076

* Significant at 5% **Significant at 10%

For both men and women age enters positively as might be expected – the older the individual at the first wave the less likely they are to expect to retire before the state pension age. Conditional on age, men with an occupational pension are significantly more likely to expect to retire before the state pension age. This is consistent with evidence showing that men with occupational pensions tend to retire earlier than those without (see Disney, Meghir and Whitehouse (1995)). Also more likely to expect to retire before the state pension age are men who have spent more than 95 per cent of their working lives since age 25 in full-time employment. Men and women currently in part-time employment are significantly more likely to expect to retire after the state pension age. In the case of men this group is likely to comprise those who have left their main lifetime employment and returned to work part-time. Poor health, measured by the severity score at Wave 1, has a positive effect on the probability of

expecting to retire before the state pension age, which is significant in the case of women.

How should we treat 'don't knows'?

A further issue is the significant number of people in the sample who say that they do not know when they expect to retire. In previous studies, such as Bernheim (1989), those who give 'don't know' responses are dropped from the sample. It is possible that 'don't know' responses simply reflect lazy or uninformed responses. Alternatively, 'don't know' responses may constitute rational responses by those who face greater uncertainty over their future labour market behaviour, where they are asked to give point retirement expectations. This idea was first put forward by Carlson and Parkin (1975) in their seminal use of banded inflation expectations data, where they suggest that individuals are using the following response strategy to a question concerning expectations:

Respond with outcome j if $pr(outcome\ j) \geq 0.5$

Respond with 'don't know' if $pr(outcome\ j) < 0.5 \in outcomes$

To explore this further, we run a probit regression on a dummy variable that takes the value one if someone says that they don't know when they expect to retire. On the right hand side we include, in addition to variables reflecting the individual's current characteristics and employment history, the number of years until the individual actually retires.

The results, summarised in Table 2, provide some support for the view that a 'don't know' response reflects genuinely greater uncertainty over future retirement. The first key finding is that the further away actual retirement is, and hence the less compressed the individual's underlying probability distribution is likely to be, the more likely is a 'don't know' response. Where the age of retirement, reported at Wave 2, fell within the same year or in the year after Wave 1 ('one year or less'), individuals were significantly more likely to have given an expected retirement date in Wave 1. On the other hand, individuals who had not retired by Wave 2, by which time over 5 years had elapsed since Wave 1, were more likely to have given a 'don't know' response at Wave 1. A plausible interpretation of the positive significant effect

of the individual liking their current job on the probability of giving a don't know response is that these people tend to retire later on average. Further evidence that event distance is associated with greater uncertainty is given by the fact that when asked the same expectations question in the second wave if they have still not retired, the majority of don't knows do give an expected age of retirement.

The results also suggest that individuals with a more variable employment history are more likely to answer 'don't know' to the retirement expectation question. In general, the greater the individual's involvement with the labour market in full-time employment during their working lives, the less likely it is that they give a 'don't know' response. Men who have spent more than 95% of their time since age 25 in full-time employment are less likely to give a don't know response. Among women, the greater the proportion of time spent not working, the more likely it is that they give a don't know response, although this is not significant. However, for women being employed part-time at Wave 1 is associated positively and significantly with a 'don't know' response. For men, having an occupational pension has a significant, negative effect on the 'don't know' response probability. Occupational pensions are typically associated with career jobs and this result backs up the '95%+ full time' result. But it can also be argued that pension plans focus the mind on the retirement decision and, like the variable 'has saved for retirement', which is also significant for men, should reflect a greater individual propensity to think about retirement date.

Table 2

Probit regression on expected age of retirement

Dependent variable

1 = gives don't know response, 0 = gives point expectation

	Men		*Women*	
	Marginal effect	*Standard Error*	Marginal effect	*Standard Error*
Individual characteristics				
Age in Wave 1	.0148	*.0054**	.0194	*.0109***
Ln(individual income) in W1	-.0184	*.0165*	-.1582	*.0531**
No educational qualification	.0088	*.0296*	-.0948	*.0678*
Married in W1	.0530	*.0402*	-.1641	*.1965*
Divorced/ widowed in W1	.2330	*.1516**	.0077	*.1765*
W1 severity score 2-3	.1007	*.0947*	.3180	*.1946***
W1 severity score > 3	.2025	*.1590***	-.0470	*.1493*
Occupational pension	-.1337	*.0441**	-.0097	*.0697*
Saved for retirement	-.0569	*.0313***	-.0400	*.0580*
Likes current job	.0476	*.0281***	.1233	*.0586**
Employment status & history				
Unemployed in W1	-.0358	*.0647*	-.0118	*.1595*
Part-time employed in W1	-.0053	*.0674*	.1940	*.0762**
Self-employed in W1	-.0094	*.0429*	.1839	*.2024*
FT employed > 95% since age 25	-.0961	*.0467**	.0772	*.1919*
% time not working since age 25	-.3030	*.2966*	.2175	*.1549*
Distance from actual retirement				
One year or less	-.0848	*.0231**	-.1893	*.0571**
Not retired Wave 2 (>5 years)	.1282	*.0437**	.1064	*.0724*
Number of observations	426		270	
Log likelihood	-132.85		-122.64	
Pseudo R^2	0.2737		0.2520	
LR $\chi^2(27)$	100.15*		82.63*	

Notes to Table:

* Significant at 5% **Significant at 10%

Tests of significance of inclusion of regional dummies (accepted at 5%):

Men: $\chi^2 = 19.35$ $Pr > \chi^2 = 0.036$
Women: $\chi^2 = 19.69$ $Pr > \chi^2 = 0.032$

Tests of significance of inclusion of lagged and current labour market states (accepted at 10%):

Men: $\chi^2 = 9.50$ $Pr > \chi^2 = 0.091$
Women: $\chi^2 = 9.78$ $Pr > \chi^2 = 0.082$

Some individual characteristics are also significant. Inability to provide a forecast is not associated with lower educational attainment *per se* although, as Carlson and Parkin (1975) point out, low educational attainment may be correlated with other factors such as interrupted career history. However, women with higher levels of income (which may also reflect higher educational attainment) are less likely to give a 'don't know' response. Poor health (measured by severity scores) is also associated with a higher probability of giving a 'don't know' response. For men, being divorced or widowed in Wave 1 also means a higher probability of a 'don't know' response although there is no clear interpretation of this result.

Given the small sample size and the proxy nature of many of these variables, these results are not conclusive. But they do lend support to the argument that 'don't know' responses to the retirement expectations questions may not simply be lazy or uninformed, but may reflect genuinely greater uncertainty about retirement. At the very least, these results show that the probability of giving 'don't know' responses is not random across the population and that, where the group of people who give 'don't know' responses is large, as here, excluding them altogether from the analysis may lead to misleading results.

4 Do people retire when they expect to retire?

This section looks explicitly at whether people retire when they expect to. Our analysis is based on the sub-sample of individuals who gave an expected retirement age in Wave 1 and who had actually retired by the Wave 2 (see Figure A1 in the Appendix). Table 3 gives the proportions of this group who retired at, before or after their expected age of retirement (Panel A) and those who retired within one year of their expected age of retirement, or before or after, respectively (Panel B). Nearly one half of individuals retire when they expect to (and nearly two-thirds retire within a year of when they expect). Clearly, given the dominance of the state pensionable ages in the distribution of expected retirement ages, much of this may simply reflect people

retiring at these ages. In fact, a fairly high proportion of those who report expected retirement ages other than the state pensionable age also retire when they expect.[10]

Table 3

Retirement Expectations and Outcomes

Panel A: At expected age

	Retired before Retirement age	retired at expected age	retired after expected age	No. obs
Whole sample	37.2%	46.8%	16.0%	421
Men	43.5%	44.2%	12.4%	265
Women	26.7%	51.2%	22.1%	156

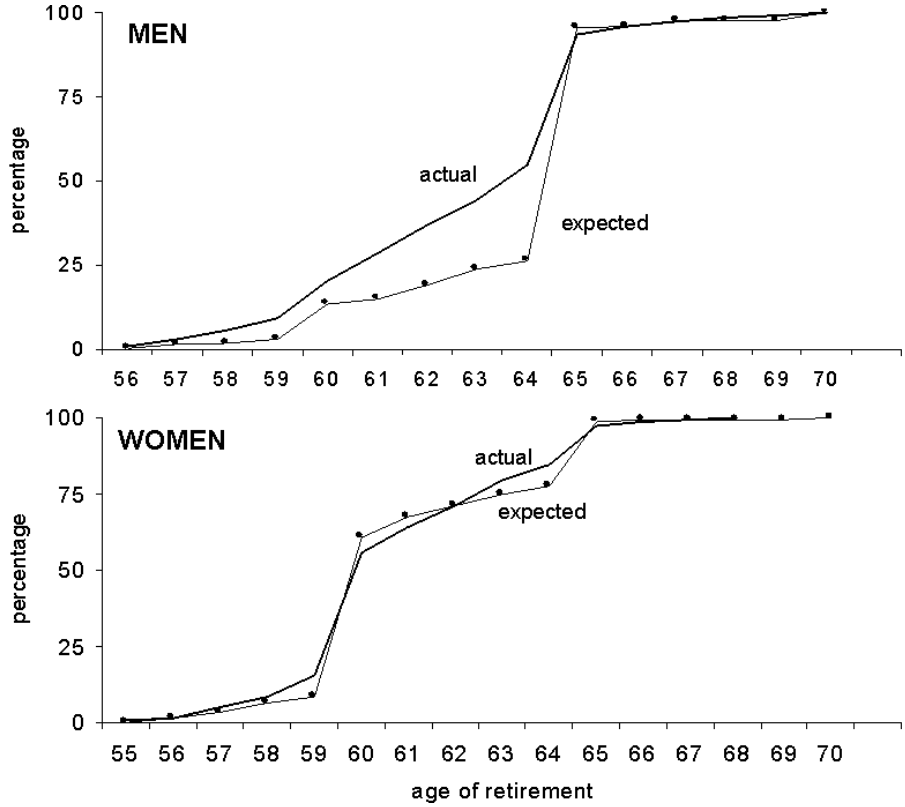
Panel B: Within one year of expected age

	Retired before Retirement age	retired at expected age	retired after expected age	No. obs
Whole sample	25.8%	65.5%	8.7%	421
Men	31.4%	62.4%	6.2%	265
Women	16.3%	70.9%	12.8%	156

Figure 2 plots the cumulative distributions of actual and expected retirement ages. For women, the 'fit' is surprisingly good; for men, however, it is apparent that the actual cumulative retirement probability distribution is much smoother than the distribution of expected probabilities and, in particular, that the 'spike' at age 65 is much smaller. Also, in the case of men, the distribution of actual retirement ages is skewed around the reported expectations. Unlike women, men are more likely to retire earlier than they expected than later.

[10] Just half of women who expect to retire at 60 actually retire at the date. Less then 30% of men who report 65 actually retire at 65, although 38% are still not retired by the second Wave.

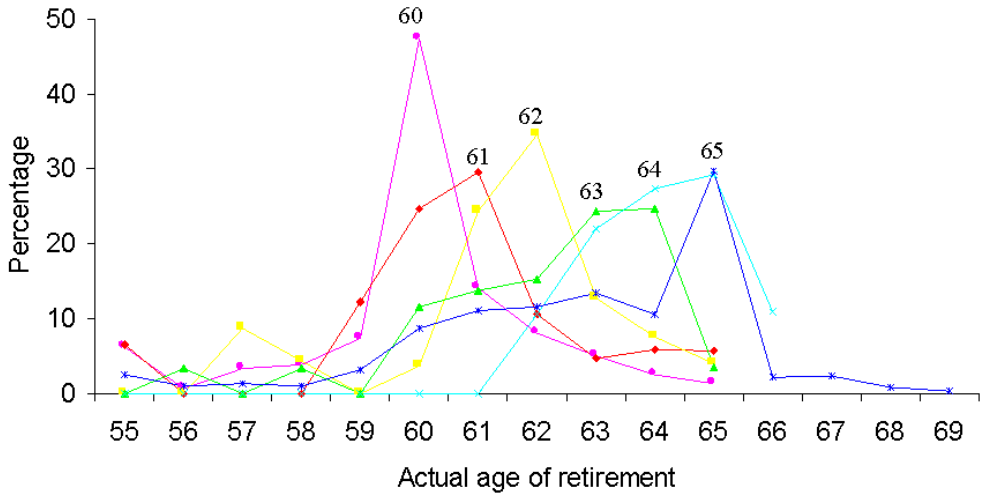
Figure 2: Cumulative distribution of expected and actual retirement ages



As has already been argued above, differences between the overall distribution of realisations and expectations may simply reflect the fact that individuals are being asked to report a single point expectation. A more appropriate question is whether reported expectations have predictive power as a measure of central tendency of actual outcomes. Rather than looking at the overall distribution of expectations and realisations, therefore, we focus on the distribution of actual retirement ages among people with the same expected age of retirement and examine whether the expected age corresponds to a measure of central tendency of this distribution.

Figure 3 plots the distributions of actual retirement ages for each expected age of retirement between 60 and 65, for men and women aggregated together. It shows a positive monotonic relationship between expected age of retirement and the bulk of the distribution of actual ages of retirement with most people retiring when (or close to when) they expected to retire at each given expected age of retirement.

Figure 3: Distribution of actual retirement ages, by expected age



This preliminary evidence indicates that the expected age corresponds to a measure of central tendency. To see which measure of central tendency corresponds most closely, Table 4 considers the relationship between expected retirement age and the mean, mode and median of actual retirement ages. Within the age range 56-65, reported expectations appear reasonably consistent with all three measures, although none is a perfect match. A simple performance measure, $\sum_{i=1}^{N}\left|E_i - \hat{R}_i\right|$, where E_i is the individual's expected retirement age and $\hat{R}_i$ is the measure of central tendency, shows that the median is associated with the lowest expectation error for both men and women, and the mean with the greatest. This result is consistent with Bernheim's finding for the US that individuals' reported expectations do not appear to correspond to a mathematical 'expectation', but some other measure of central tendency. [11]

[11] The truncation of the distribution of actual retirement ages imposed by the two waves of the UK Retirement Survey makes a definitive test of the mean value hypotheses difficult. The closer the expected retirement age to an individual's age at the first wave, the more likely he or she is to retire later than expected and the higher the mean actual retirement age relative to the expected. Not surprisingly, the highest proportions of individuals retiring after they expect at younger expected

Table 4

What do people report: mean, median or mode?

Expected Age	N	Average of actual retirement ages: Men Mean	Men Mode	Men Median	Women Mean	Women Mode	Women Median
56	3	58	58	58	56	55	55.5
57	5	58	58	58	60	63	60
58	6	57	57	57	59	58	58
59	6	60	65	59	60	60	60
60	106	60	60	60	60	60	60
61	13	62	60	60.5	62	61	61
62	17	62	62	62	62	62	62
63	18	63	63	63	63	64	63
64	10	64	64	64	65	65	64.5
65	199	64	65	65	64	65	65
$\sum_{i=1}^{N}\left\|E_i - \hat{R}_i\right\|$		191	27	7	52	33	15
No. obs		235	235	235	148	148	148

Explaining errors in expectations

The rational expectations hypothesis implies that in the absence of common shocks, there should be no systematic errors between expectations and outcomes. With only two waves of information we cannot test this explicitly since we cannot rule out the possibility of common macro shocks, particularly since there was a recession in the UK between the first and second waves. Instead we focus on whether differences between expectations and realisations are related in a systematic way to individuals' characteristics. This is motivated by a second implication of the rational expectations hypothesis which is that expectation errors should be unpredictable. Hence deviations between expectations and outcomes should not be correlated with an individual's observable characteristics at the time the expectations are formed since it would imply that individuals have not used all available information to form their future retirement

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retirement ages. The truncation of the distribution is also likely to present similar problems in testing

expectations. However, this interpretation does have two important *caveats.* One possibility is that certain characteristics may be (*post hoc*) correlated with shocks that occur between the two waves of the survey which cause expectations and realisations to diverge. For example the recession that occurred between the two waves of the Survey may have impacted differently across regions and employment sectors. A second possibility is that the same variables that were associated with a greater likelihood of a 'don't know' response may also be correlated with individuals not retiring when they said they expected to. Individuals with less compact probability distributions over expected future retirement ages are more likely to give a don't know response or, if they do give a point expectation, not to retire at that age. However, while such characteristics may be correlated with a higher probability of not getting it right, they should equally be correlated with retiring earlier or later than expected.

With this in mind we estimate an ordered probit regression on a dependent variable that takes the value 1, 2 or 3 according to whether individuals retire before, when or after they expected to. The estimates marginal effects are presented in Table 5 while a full set of results is reported in the Appendix. As before, we include variables that reflect household characteristics, including the respondent's age, and education, and a set of variables reflecting labour market status at the time of the first wave and previous employment history. We include the number of years until expected age of retirement as a conditioning variable since the sooner the expected age of retirement, the less likely it is that individuals will retire before they expected to.

We also include possible shocks that may have occurred between the two waves, namely the change in the individual's severity score from Wave 1 to Wave 2 and a dummy variable which takes the value one if the individual's marital status has changed (typically widowhood). We find that an increase in severity score between the two waves of the survey is associated with individuals being more likely to retire earlier than expected. Of course, in a full model of health and labour market behaivour we would wish to instrument health status, but this is beyond the scope of

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the modal value hypothesis, although less so if individuals have a compact probability distribution.

the current analysis. We also find that change in marital status is significant for men, who are more likely to retire earlier than expected as a result.

Table 5

Marginal effects on actual retirement age (relative to expected age)

		Men				Women		
		Before	At	After		Before	At	After
Individual characteristics								
Age in Wave 1		0.022	-0.017	-0.004		0.010	-0.006	-0.005
Ln(individual income) in W1		-0.072	0.058	0.015		0.178	-0.102	-0.077
No educational qualification	*	-0.179	0.140	0.039		-0.056	0.011	0.045
Married in W1		0.116	-0.085	-0.030	**	-0.313	0.153	0.160
Divorced/ widowed in W1	**	0.283	-0.245	-0.038		-0.169	-0.061	0.231
W1 severity score 2-3		0.028	-0.022	-0.006	*	0.429	-0.277	-0.152
W1 severity score > 3		0.006	-0.005	-0.001		0.045	-0.013	-0.032
Occupational pension		0.000	0.000	0.000		-0.082	0.021	0.061
Saved for retirement		0.031	-0.025	-0.006		-0.031	0.006	0.024
Likes current job		-0.103	0.074	0.029		0.038	-0.007	-0.031
Employment status & history								
Unemployed in W1	*	0.444	-0.400	-0.044		0.087	-0.030	-0.056
Part-time employed in W1		-0.267	0.170	0.097		0.024	-0.005	-0.018
Self-employed in W1		0.002	-0.001	0.000	*	-0.235	-0.243	0.478
FT employed > 95% since 25		-0.090	0.069	0.020		0.014	-0.003	-0.011
% time not working since 25		-0.594	0.473	0.121		0.081	-0.046	-0.035
'Shocks'								
Change in severity score	**	0.126	-0.100	-0.026	**	0.223	-0.127	-0.096
Change in marital status	**	0.320	-0.282	-0.038		-0.020	0.003	0.017
Number of years until expected age of retirement	*	0.174	-0.139	-0.036	*	0.199	-0.113	-0.086

* Significant at 5% **Significant at 10%

The results show that there are certain characteristics that are correlated with 'getting it wrong' and, moreover, that these characteristics are associated with individuals getting it systematically wrong. It is interesting that none of the employment history variables, which affected whether or not individuals could form any point expectation, affect whether they retire when they expected to. However, employment status in Wave 1 does have a significant effect on 'getting it right' (or wrong). One possibility is that this is correlated with shocks that occurred between the two waves of the survey in a way that was not anticipated at the first wave. We find, for example, that men who were unemployed at the first wave of the survey are significantly more

likely to retire earlier than expected. It is plausible that this result reflects an impact of the recession on the offer of wages which caused men to decide to exit the labour market permanently at a younger age than than they had previously anticipated. We would argue, therefore, that this result is not evidence against the rational expectations hypothesis. It is, however, an interesting finding suggesting a genuine shock which impacted on a particular group of people causing them to alter their retirement plans.

In the case of other wave 1 variables that are linked to systematic expectations error such as marital status in Wave 1 (for men and women) and education (for men) such an interpretation is harder to rationalise and these results are more likely to constitute evidence against the rational expectations hypothesis.

5. Using expectations data to improve retirement modelling

Finally we examine the potential for using individuals' retirement expectations to improve modelling of retirement behaviour. At this stage we simply see whether there is additional co-variation between actual and expected retirement age than is present through common co-variation with the factors that would typically be included in a model of retirement behaviour (gender, pension status etc). Because of the highly selected nature of our sample, our retirement age regressions do not constitute a proper reduced form model of retirement. We regress individuals' actual age of retirement on the full set of economic and demographic variables that we have been using in our previous regressions and include individuals' expected age of retirement as an additional explanatory variable. Note that we include only variables that are known at Wave 1. The aim is to see whether knowing individuals' expected age of retirement can improve predictions of actual retirement behaviour.

The coefficient on expected retirement age (summarised in Table 6) is positive and significant for both men and women. This result suggests that expectations information has a role to play in modelling actual retirement behaviour. Even if individuals have an identical retirement model in respect of observables to the researcher, one might imagine that modelling actual retirement behaviour can be improved by inclusion of expectations insofar as the latter proxy unobservables such as preferences, or tastes, for leisure.

Table 6: Including expected retirement age – men and women

Dependent variable: Actual age of retirement

	Men		*Women*	
	Coeff	*SE*	Coeff	*SE*
Expected retirement age	.3421	*.0467**	.3015	*.0629**
No. observations	245		150	

Note to Table:

* Significant at 5%

A full set of variables reflecting individual's age, income, employment etc is also included in the regression.

6 Conclusions

This paper has considered the role of retirement expectations data, using the two waves of the Retirement Survey in the UK. In this survey individuals are asked to give point expectations of their expected retiremrent age, and interpreting the responses requires considerable care. The distribution of expected retirement ages is dominated by the state pension ages, while a high proportion of individuals say that they don't know when they expect to retire. On this basis it would be easy to dismiss the expectations data as uninformative. However, our analysis shows that the expectational data do contain information. First, expected ages of retirement vary plausibly in line with covariates which implies that individuals do not simply report random numbers. More importantly from the point of view of modelling actual retirement behaviour, we find that reported expectations have additional predictive power for actual retirement behaviour above their correlation with observable characteristics.

Secondly, we argue that 'don't know' responses do not simply reflect uninformed or lazy responses. Our results show that the probability of giving 'don't know' responses is not random across the population, but is linked to factors which reflect the degree of uncertainty about the timing of retirement, such as number of years until retirement or membership of occupational pension schemes. A particularly important result in this respect is that the majority of individuals who responded don't know in the first wave of the survey do give point expectations in the second wave at which point some uncertainty may have been resolved.

Finally, we address the issue of whether individuals' retirement expectations are rational, in the sense of being the best prediction of actual behaviour given all available information. One implication of this is that, in the absence of shocks, individuals' expectations should correspond on average to their actual behaviour. We argue that when individuals are asked to give point expectations, interpretation of responses is not straightforward when transitions to retirement are probabilistic. Our results are consistent with Bernheim's finding that individuals appear to report their most likely retirement age or the median of the underlying distribution, rather than the mathematical expectation.

We find that just under half the sample retired when they said they expected to. We argue that the probability of 'getting it wrong' is linked to similar factors that affect whether or not individuals give a don't know response, factors that affect the degree of uncertainty around the time of retirement, although these factors should not be associated with individuals making systematic expectations errors. In fact, we do find evidence of systematic deviation between individuals' reported expectations and their actual retirement ages, with men retiring earlier than expected on average. With only two waves of data, however, we cannot reject the possibility of a common shock, particularly since a recession occurred between the two waves of the survey. We do find that changes in reported health and changes in marital status between the two waves of the survey are both linked to individuals retiring earlier than they expected.

Appendix

Table A1: Sample characteristics

	Whole sample	Sub-sample used in analysis
Average age in Wave 1	61.7	58.6
Proportion who are female	54.4%	38.2%
Proportion with no educational qualifications	57.0%	52.0%
Proportion who are married in Wave 1	74.9%	79.4%
Proportion who are divorced/ widowed in Wave 1	18.3%	12.9%
Average severity score	0.86	0.41
Proportion who are working full-time in W1	24.2%	66.6%
Proportion who are working part-time in W1	13.1%	26.2%
Proportion who are self-employed in W1	9.4%	14.5%
Proportion with an occupational pension	47.0%	55.2%
No. of observations	2488	764

Severity scores

Severity scores are measures of self-assessed health status. They are based on the international classification of impairments, disabilities and handicaps (ICDIH). Separate scales are constructed for areas of locomotion, reaching and stretching, dexterity, seeing, hearing, continence, communication, personal care, behaviour, intellectual functioning, consciousness, digestion and disfigurement. The severity score is constructed as a weighted average of the three highest severity scores from the 13 areas: Highest + 0.4(second highest) + 0.3(third highest).

Figure A1: Sampling

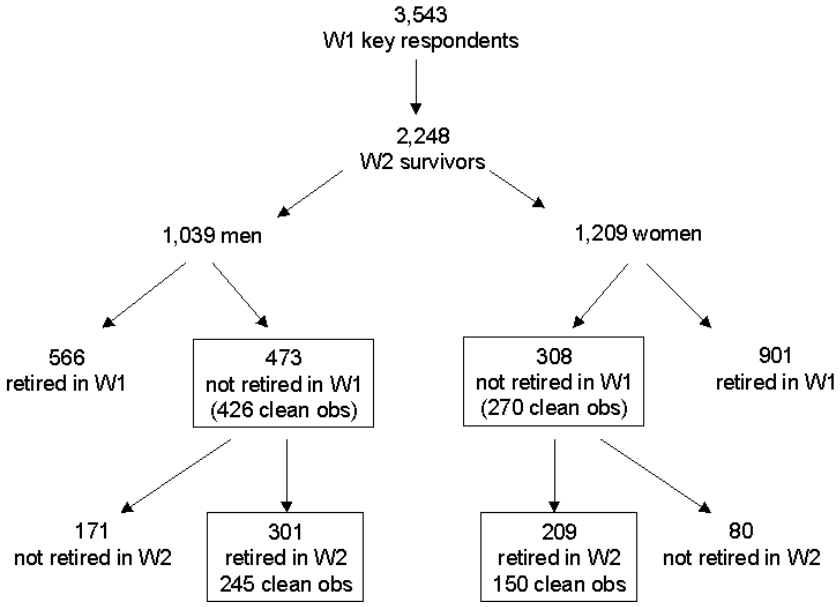

Table A1: Ordered Probit results

Dependent variable

1 = expects to retire before state pension age

2 = expects to retire at state pension age

3 = expects to retire after state pension age

	Men		Women	
	Coeff	SE	Coeff	SE
Individual characteristics				
Age in Wave 1	.1247	.0271*	.3086	.0500 *
Ln(individual income) in W1	-.0681	.1053	.1800	.2194
No educational qualification	-.0048	.1542	.3003	.2101
Married in W1	-.3293	.2775	-.5811	.4629
Divorced/ widowed in W1	-.2693	.3705	-.5741	.4847
W1 severity score 2-3	-.2701	.3124	-.1445	.5127
W1 severity score > 3	-.5803	.5289	-1.0652	.4762*
Occupational pension	-.5394	.1927*	-.2359	.2392
Saved for retirement	-.2502	.1556	.1811	.1954
Employment status and history				
Unemployed in W1	-.3782	.3759	-.1412	.5880
Part-time employed in W1	1.0053	.4292*	.6207	.2646*
Self-employed in W1	-.0464	.2969	1.3922	.5727*
FT employed > 95% since age 25	-.3583	.2161**	-.5899	.4914
% time not working since age 25	-.1910	.9942	.1911	.5524
Cut1	4.9830	1.690*	16.599	3.161*
Cut2	7.9577	1.733*	18.720	3.202*
Number of observations	362		193	
Log likelihood	-213.42		-130.80	
Pseudo R^2	0.166		0.240	
LR $\chi^2(24)$, men; LR $\chi^2(14)$, women	84.96*		82.62*	

* Significant at 5% **Significant at 10%

Regression for men includes a set of 10 regional dummies which are jointly significant at 5% $\chi^2(10) = 20.99$. Regional dummies are not significant in the case of women, and are excluded.

Table A2: Ordered Probit results

Dependent variable

1 = retires before expected age

2 = retires at expected age

3 = retires after expected age

	Men		Women	
	Coeff	SE	Coeff	SE
Individual characteristics				
Age in Wave 1	-.0535	.0399	-.0192	.0515
Ln(individual income) in W1	.1763	.1256	-.3270	.2412
No educational qualification	.4630	.1806	.1908	.2375
Married in W1	-.3071	.2981	.9196	.4789**
Divorced/ widowed in W1	-.7261	.4382	.7640	.5042
W1 severity score 2-3	-.0792	.3422	-1.176	.5610*
W1 severity score > 3	.2757	.5423	-.1450	.5559
Occupational pension	-.0715	.2425	.2707	.2665
Saved for retirement	-.0151	.1821	.1046	.2130
Likes current job	-.0000	.1713	-.1300	.2031
Employment status & history				
Unemployed in W1	-1.231	.4071	-.2726	.7224
Part-time employed in W1	.7614	.4726	-.0790	.2838
Self-employed in W1	-.0039	.3429	1.414	.6976*
FT employed > 95% since 25	.2320	.2386	-.0486	.5024
% time not working since 25	1.450	.9850	-.1478	.5782
'Shocks'				
Change in severity score	-.3063	.1813	-.4080	.2413**
Change in marital status	-.8305	.4790	.0712	.3322
Number of years until expected age of retirement	-.4249	.0529		
Cut1	-4.5316	2.6868	-3.687	3.311
Cut2	-2.5308	2.6778	-1.867	3.306
Number of observations	245		150	
Log likelihood	171.034		122.298	
Pseudo R^2	.2828		0.2110	
LR $\chi^2(18)$	134.9		65.42	

* Significant at 5% **Significant at 10%

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