The Home, Pension Savings, and Risk Aversion: Intentions of the Defined Contribution Pension Plan Participants of a London-based Investment Bank at the Peak of the Bubble

*Gordon L Clark, +Stephen Almond, and #Kendra Strauss, Centre for Employment, Work and Finance, Oxford University Centre for the Environment, South Parks Road, Oxford OX1 3QY, United Kingdom. Also*Faculty of Business and Economics, Monash University, Caulfield VIC 3145, Australia; +Department of Statistics, Oxford University, South Parks Road, Oxford OX1 3TG; #Department of Geographical and Earth Sciences, Glasgow University, Glasgow G12 8QQ.

Abstract. In the lead-up to the peak of the financial bubble (and before the onset of the global financial crisis), UK newspapers regularly touted property as a ready-made alternative to private pensions. In this paper we explore the importance of the property in which respondents live for their retirement savings strategies. Based upon a unique survey of over 2,400 participants in the defined contribution pension scheme of a London-based international bank, we assess the statistical significance of respondents' socio-economic status and risk preference in predicting the significance or otherwise of their home for retirement saving. Relatively few respondents indicated that they were likely to rely on their hom. Those that indicated reliance were relatively older, higher paid, and married employees. The paper concludes with implications for understanding the connection between savings behaviour and housing before and after the global financial crisis.

Keywords. Home ownership, pensions, risk, social status

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Introduction

Each week in the "Money" section of The Sunday Times a minor celebrity is interviewed about his or her financial circumstances. The questions posed typically focus upon how much cash the celebrity has on hand, how much they earned over the past year, their investments including property, and their intentions regarding saving for retirement. More often than not, the celebrity is asked to choose between a pension and property (sometimes identified as the family home) when saving for retirement. In the lead up to the peak of the financial bubble (May 2007), many of those interviewed indicated that property was preferable to a pension. When respondents explained their choice of property over a pension, they often indicated that property is "easier to understand" than a pension.[1]

There is no doubt that UK property has been an attractive investment over the past two decades. Economic growth, limited supply and constraints on the planning approvals process, increasing household incomes, and the fact that housing has become a crucial instrumental variable for gaining access to high-quality social goods like education have conspired to accelerate the

[1]/. In this paper we are interested primarily in occupational and, to an extent, personal pensions. Those interviewed in the Money Section often confuse occupational pensions with personal pensions and, like many people, are probably also confused as to their differences (Clark and Strauss, 2008). We do not analyse individuals' attitudes vis-à-vis expected income from the British State Pension (BSP), although many current retirees rely on the public pension for a significant proportion of their income (Pensions Commission, 2004).

long-term trajectory of urban property prices. Property prices are also highly geographically differentiated not least because “bricks and mortar” and neighbourhood amenities are fixed non-divisible assets. Even so, it is apparent that there was a bubble in property prices over the first decade of the 21st century in a number of Western economies including the USA (Reinhardt and Rogoff, 2009, Fig. 13.2), Spain, and Ireland (Conefrey and Gerald, 2009). Elsewhere, we use time series techniques to show that UK property prices "took off" after 2001 in a manner consistent with a financial bubble. We also show that there was close correlation between the paths of property prices, earned incomes, and the prices of other financial assets like equities (Clark et al., 2010).

It is entirely plausible that people believe property is "easy to understand" because, if considered on a neighbourhood basis, “bricks and mortar” carry knowable location-specific risks. Moreover, the individualisation of welfare has created ‘investor subjects’ who increasingly recognise the fungibility of housing wealth (see Langley, 2006; Smith, 2007; Strauss, 2008), not least because of the promotion of equity release schemes and the prospect of paying for social care in old age (Terry and Gibson, 2010). We hypothesise that relying upon property and in particular one's home for future retirement income is consistent with risk aversion. However, it would appear that property investment and reliance on one's home for future retirement

income has been a risky strategy if we take into account the systemic risks correlated with global financial markets. If people are myopic about the scale and scope of the embedded risks, risk aversion at the 'local' level may be misleading about the true nature of risks faced by individuals and their families (Smith, 2009). The sophistication or otherwise of individual savers both with respect to understanding the scope of the risks associated with different retirement assets and with respect to understanding these risks in the context of market volatility are crucial issues. In any event, whether investing in property was, or is, more risky than relying upon an occupational or personal pension depends a great deal upon the nature of the pension: defined benefit (DB) versus defined contribution (DC).

In this paper, we look more closely at the preferred role of property and in particular respondents' homes for a group of participants in a defined contribution employer-provided pension plan. Elsewhere, we have considered the preferred role of investment property distinguishing that from the family home given the characteristics of the latter in relation to the former. Here, we are particularly interested in whether respondents, in relying upon the family home, could be characterised as more or less risk averse than those who would not rely upon the family home. Our data comes from a survey conducted at the peak of the bubble (May 2007) and before the on-set of the global financial crisis. Because respondents came

from an institution that was clearly "in the market", and were thus more knowledgeable of the costs of financial volatility, we assume that our respondents were more aware of the risks associated with housing than the average person. As such, our database provides insight into whether there is, in fact, a trade-off between contributive pensions and the home and whether those that choose the latter over the former can be characterised as more or less risk averse.

By exploring the link between pension saving and the home, we need to explain the significance or otherwise of this possible connection.[2] Readers may not be aware of the nature and significance of defined contribution pensions for UK private sector employees (especially the finance sector which dominates London). In the following section, we provide an explanation of the risks embodied in defined contribution pensions and how those risks appear to be correlated with other risks faced by employees (plan participants). The global financial crisis exposed the overlapping risks associated with current income and future income. In section three, we look more closely at the role of that property plays in retirement portfolios, distinguishing between property investment per se and the family home. This is followed in section four by an explanation of the survey instrument

[2]/. See also Pensions Policy Institute (2009) for an empirical analysis of the possible value of housing in underwriting retirement in the UK. They suggest, as we do, that a "holistic" approach is needed to retirement planning, recognise the diversity of assets that households may have at their disposal in funding retirement. They tend to emphasise equity release over other options.

used to elicit employee preferences especially as regards to their conception of risk. Sections five and six present respectively the results of statistical analysis and their interpretation. The final section draws implications for future research.

Three Pillars of Retirement Saving

Western societies arrange the retirement saving of their citizens through three pillars (World Bank, 1994): pillar one social security and insurance; pillar two occupational or employer-sponsored pensions; and pillar three individual or personal pension saving tax preferred or not. It is widely assumed that because first pillar social security is underwritten by the nation-state it is the least risky form of saving for retirement even if promised value is typically some premium on basic needs and welfare (Clark, 2003). Nonetheless, there are significant national differences between the expected value of government-sponsored social insurance (compare the UK with the USA and much of continental Europe; see De Deken et al., 2006). Traditionally underwritten by the employer, occupational pensions were conceived to top-up social security so as to bring retirement income close to final earned income. If less secure than social security, it was assumed that supplementary pensions were more secure than individual saving for retirement--the risk of the former being

borne by the employer whereas the risk of the latter is presumably borne by the individual.

In combination, the three pillars of retirement saving were expected to provide successive generations with an adequate retirement income—a higher average standard of living than was the case prior to the Second World War. By the mid-1990s UK government believed it had produced a winning formula for funding retirement income superior to that of continental Europe. However, the demographic ageing of Western societies combined with global economic turmoil has undercut the capacity of nation-states to deliver on promised benefits to future retirees. Most important for the UK, private sector occupational pensions have come under sustained attack not only for the value of promised benefits but also for the assumption that employers can afford to underwrite promised benefits with automatic cost-of-living adjustment. Private sector occupational pension coverage rates have declined dramatically over the past 15 years. Furthermore, employers have forsaken defined benefit pension plans in favour of defined contribution plans (to the extent employers replaced closed DB plans; Clark, 2006).

Defined benefit pension plans promise a certain income upon retirement based on years of service and final earned income, and promise to protect

the real value of retirement income through cost-of-living adjustment. Should the plan not be able to fulfil its promises, the burden passes to the employer. If the employer by reason of bankruptcy is unable to meet those obligations, the UK government's Pension Protection Fund (PPF) is there to provide a formula-based discounted value of those benefits. By contrast, the value of a defined contribution pension is the product of employer and employee contributions and the accumulated investment returns on those assets. No promises are made about the final value of a defined contribution pension, the employer does not stand behind the real value of the accumulated assets, and no commitment is made to the income of plan participants through their retirement years. The employee bears the risks of pension saving including whether or not the accumulated pension is adequate through retirement.

In the years following the Second World War, private employers prompted by unions and government legislation outlawing certain types of workplace discrimination, effectively broadened the defined benefit franchise taking in large and small companies as well as high and less-well paid employees (Clark, 2000). Whether directly or by default, employees were enrolled into defined benefit pension plans through collective bargaining agreements and employment contracts; in many sectors, workers had neither the option to not enrol in the company pension scheme nor a choice about what level of

contribution to make to the scheme from weekly or monthly salaries. Enrolment, contribution rates, and eligibility were set by the scheme. By contrast, UK and US employees are typically given the option to enrol or not enrol in defined contribution schemes as well as some choice over the level of contributions to make from current incomes. As is widely noted, low-waged workers tend not to enrol in such schemes and, if they do so, they tend to choose low rates of contributions (compared to higher-waged employees) (Bernartzi and Thaler, 2001).

When enrolling in a defined contribution pension scheme, participants are often required to make decisions about the allocation of contributions to different asset classes and, within those asset classes, decisions about investment products and service providers. As is widely noted, however, the younger a plan participant the less likely he or she will reflect upon the significance of these decisions and the virtues or otherwise of alternate courses of action. The available evidence suggests that participants are quick to decide and once decided are very slow to change their initial allocations (see Madrian and Shea, 2000; Iyengar et al., 2004). Intuition and inertia dominate unless the plan sponsor provides information, decision tools relevant to participants' age, income, and gender, and the means by which participants can cut through the available choices to points of reference that are salient to the circumstances of participants (Clark, Knox-

Hayes and Strauss, 2009). In some jurisdictions, plan providers are permitted to offer so-called default settings such that if participants are unwilling or unable to make such choices they are automatically enrolled in a common investment fund.

Defined contribution pension plan participants are required to make decisions in the context of market risk and uncertainty. As such, the lessons of the behavioural revolution allied with Herbert Simon and Kahneman and Tversky (1979) apply with some force; that is, identified behavioural biases and anomalies can be shown to be especially relevant to the defined contribution domain. For example, the fact that many people are short-term oriented where in fact they are required in the defined contribution domain to act in terms of their long-term interests and the fact that many people are quite myopic where in fact they are required in the defined contribution domain to judge the significance of events in relation to the underlying process whereby pension contributions cumulate to retirement suggest that, when left to themselves, most people are quite poor at planning for an adequate retirement income (Strauss, 2009a). It is also obvious that many people are quite naïve when it comes to making decisions in the defined contribution domain where, in fact, a high level of sophistication is required by virtue of the uncertainties of financial markets. Since professional portfolio managers are, on average, unable to systematically 'beat the

market' (ie. provide consistently better returns through active allocation than are achieved by simply tracking stock markets), this gives some indication of the challenges individuals face when acting as portfolio managers in their own right.

This has been recognised by behavioural theorists and pension specialists (Thaler and Sunstein, 2008). Nonetheless, the design and structure of many defined contribution schemes remains firmly wedded to the ideal of the rational-actor. This can have implications for retirement planning and saving (Lusardi and Mitchell, 2007).

Retirement saving and housing

It seems likely that many of those who rely upon DC occupational pensions to meet their retirement income aspirations face the prospect of those aspirations not being realised. In part, this may be because defined contribution savings rates are typically too low and because many people simply do not appreciate the difference between defined benefit and defined contribution pension schemes including the significance of employer contributions (Clark and Strauss, 2008). For those that do come to terms with the discounted value of defined contribution plans, one implication is that other forms of saving may be needed to insure against not realising retirement income aspirations. The burden of assessing any shortfall in the

expected value of an occupational pension and any response to anticipated shortfalls in value are clearly the responsibility of individuals rather than institutions.

Just as government has discounted the future value of state pension entitlements, employers have effectively discounted their future commitment to occupational pensions. One implication is that third pillar retirement savings will have to compensate for the discounted values of pillars one and two, despite the fact that private pension wealth is extremely unevenly distributed in the UK (Pensions Commission, 2004). Another implication is that retirement saving should be seen as an exercise in portfolio management such that reliance on any one element such as the basic state pension or an occupational pension should be balanced against individuals' other options including savings accounts, insurance, ISAs, property and housing. At a time when academic research has revealed the limits of human cognition and reasoning in the context of risk and uncertainty, effective planning for future retirement income requires a high level of conceptual understanding and judgement about balancing the risks of various savings options. Portfolio management is one of the foundations of modern financial theory; it is also applicable to retirement saving albeit unlikely that most individuals are effective portfolio managers (Sharpe, 2007).

In previous papers, we explored a national, representative sample of the UK population drawing inferences about their risk propensities according to socio-demographic characteristics as well as measures of risk tolerance. To better understand the risk management strategies of individuals in relation to the various saving instruments they may have at hand, we acquired access to the participants of a defined contribution scheme—identified in a previous paper as sponsored by a large, multinational bank located in London with affiliates around the world (Clark et al., 2010). Specifically, given the lead-up to the peak of the global financial market bubble, we sought to determine whether participants in this scheme identified property and housing as important savings instruments when compared to their occupational pensions. In other words, we sought to determine whether other savings instruments complemented their current and past pension entitlements or were, in some sense, alternatives to these schemes. In the media, property and housing are touted as alternatives to occupational pensions.

The average defined contribution pension plan participant is likely to be, at best, a naïve financial planner and is thus probably unable or unwilling to conceptualise the risks associated with DC pension saving in relation to other savings vehicles. By focusing upon the participants of a plan sponsored by a large financial institution provides access to a group of

participants whose skills and competencies are relevant to investment management. In Clark et al (2010), we showed that there were, in fact, a number of younger, relatively lower income plan participants who apparently relied heavily upon investment property for their future retirement incomes. We were also able to show, however, that the majority of plan participants' savings portfolios were biased towards low risk financial instruments rather than property or equities. Importantly, we were able to show that to the extent older, higher income plan participants invested in property they did so in a manner that seemed to imply a quite sophisticated balance between property and other much less risky financial instruments. This suggests that certain groups – women, young people, those on low incomes – who self-report relatively high or low levels of risk tolerance are in fact those least able to hedge against losses or the risk of inadequate income in old age (Clark and Strauss, 2008).

By focusing upon property excluding the family home we sought to treat the available financial products as a set of complementary instruments that may generate a long-term retirement income. By contrast, the family home is a more complicated entity combining consumption and investment as well as cultural and social meaning that goes well beyond an instrumental conception of utility maximisation (Smith, 2008). Most obviously, property investment such as buy-to-let attracts significant tax benefits whereas the

mortgage interest paid on the family home does not. In any event, the family home represents a form of current consumption (shelter) essential to its occupants while being, simultaneously, a means by which family members gain geographical access to the workplace, social goods such as health and education, and cultural amenities. In urban Britain, where people live, the type of house they live in, and the social standing of neighbours carry a symbolic even emotional value partly capitalised in house prices and partly capitalised in cultural respectability (Munro and Smith, 2008). As such, the family home may be seen as a significant instance of conspicuous consumption and an important component of identity formation over the lifecourse.[3]

Retirees have to live somewhere; the family home is also a long-term commitment to a certain quality and quantity of housing. To the extent that life-cycle issues dominate the consumption of housing, retirement may mean rationalising the 'over-consumption' of housing through equity-release in exchange for a flow of income.[4] The family home is an investment in a number of ways. For those concerned about the possible

[3]/. This may go some way to explaining why many older people choose not to downsize, even when 'house rich' but cash poor. See Banks (2007), Disney et al (2002), and Venti and Wise (1990).

[4]/. See the Pensions Policy Institute (2009) and Terry and Gibson (2010) for reports on the virtues of such schemes and Parkinson et al. (2009) on the significance of equity release for Australia and the UK during the period 1999-2007. Whether equity release is actually translated into a flow of income (annuity) as opposed to simply consumed is more problematic.

costs of old-age nursing, holding and even enhancing the equity embedded in the family home is a means of self-insurance thereby ensuring independence from children and the state as long as possible. For those 'house-rich' relative to needs, the family home can also generate income through the rental of unused rooms. Closely related is the prospect that the family home may be a bequest to surviving family members should its value be protected from the financial costs of the last years of life. As Poterba (2006) noted, the bequest motive is a significant factor in explaining the resistance of retirees to annuities.

The home has been treated in the media as an important component of future retirement income. Typically, two types of arguments are made for its importance. For some, the home together with property including buy-to-let is believed to be a form of long-term investment that does not share with defined contribution pension investment the ups and downs of financial markets. This was the argument put forward in parts of the British media, bolstered by the popularity of real estate-themed television programmes, through much of the early part of the decade. However, as the most recent financial crisis demonstrated, there is actually a close correlation between the performance of property markets, the volatility of financial markets, and the performance of defined contribution pension fund investments (Clark et al., 2010). Indeed, Reinhart and Rogoff (2008) argue that discontinuities in

property markets often trigger market uncertainty and financial crisis. In this sense, the assumption of 'separability' reflects either a lack of understanding about the macro-performance of related markets and/or a lack of understanding about the correlated nature of the risks associated with property investment and defined contribution pension investment.[5]

A second argument is that the risks of property investment and in particular the home are more easily understood than the risks associated with defined contribution pension investment because the former are 'local' whereas the latter are 'global'. That is, it is assumed that property and house prices embody significant idiosyncratic factors (location, attributes, and architectural form) such that home owners may be justified in believing they are better able to take advantage of information asymmetries than others not so placed. There is, of course, a significant body of literature in economics and geography that would support the argument that property markets (more than other types of markets) are characterised by opaqueness and high costs of third-party information acquisition (Clark and O'Connor, 1997; Coval

[5]/. See also Khandani et al. (2009) on the ways in which the risks associated with US housing purchase and refinancing over the past decade were "vastly" amplified by a variety of factors including "near frictional-less refinancing options" creating an extraordinary situation where many households were exposed to systemic risks in the financial market that they neither understood or made provision against. Stango and Zinman (2009) provide evidence to the effect that in household finances, many people systematically under-estimate the costs of borrowing. While focused on the USA, this type of research is clearly relevant to the UK. See, for example, a recent comment in the Money Section of The Sunday Times (31 January 2010) on the pension-property choice to the effect that property is always preferable because pensions are (seemingly) much more vulnerable to the stock market.

and Moskowitz, 2001). Moreover, people may over-emphasize the value of their local knowledge and under-estimate the systemic global risks associated with property markets; over-confidence is a close correlate of financial naivety, especially if social status, location, and home ownership are reinforced by the media as valuable cultural capital (see generally Mellers and McGraw, 2004; Smith et al., 2009).

In these ways there is a close, even intimate, connection between the risks of property investment and the home in particular and the risks associated with pension investment. Here, we are concerned with the risk propensity of relatively sophisticated respondents who indicated that their home was an ingredient in retirement planning. Did they also recognise these overlapping risks and pursue a safety-first strategy or was a preference for the home as a form of retirement saving associated with risk tolerance?

Survey design and risk measures

Our survey, implemented at the peak of the bubble (May 2007), targeted more than 7,000 London-based employees of a large international investment bank. The questionnaire was administered online in May of 2007 and achieved a sample size of N=2,373 responses. One survey did not contain enough usable data to be counted, so the final sample size for the purposes of analysis was 2,372. The sample was compared with actual

population statistics on the company workforce and found to be broadly representative (even so, the sample was not intended to be representative of the general population, but rather to provide insight into the attitudes and behaviour of people working in the financial services industry).[6]

The survey was based upon a related national, representative survey developed with our project sponsor augmented with a series of questions that focused upon participants' savings portfolios wherein the employer-sponsored DC plan was identified as one source of saving for the future. A total of 31 questions were asked mixing together the collection of personal data with attitudes and prompted solutions to puzzles. A number of questions focused upon the role of property investment in savings portfolios, distinguishing between investment vehicles like buy-to-let and respondents' homes. The full survey is available from the authors.

Most importantly, we sought to clarify how respondents conceptualised the risk of long-term savings strategies given evidence to the effect that employees/participants were faced by overlapping and reinforcing risks related to their current incomes and future prospects. How people cope with

[6]/. The survey was administered to all employees who were DC plan members. The sample therefore included staff at all levels, although it is worth noting that 87.5% of respondents possessed a higher education degree and 37% of the sample were in non-officer positions, as opposed to 63% who identified themselves as associate directors or above.

risk in the context of market volatility may provide us with insight about the heterogeneity of behaviour as well as the range of strategies deployed by participants to deal with current and expected market conditions. Based on the survey, we have shown that older, higher-income participants pursued rather sophisticated "safety-first" investment strategies seemingly designed to dampen risks across their savings portfolio (Clark et al., 2010). In this paper, we are particularly concerned with the issue of whether participants viewed their homes as instrumental variables in their retirement savings strategies. In the first instance, we sought to characterise their intentions in this regard according to their socioeconomic characteristics. As well, we sought to distinguish between respondents according to their relative sophistication as retirement planners, focusing upon their levels of expressed confidence, knowledge and understanding of the issues.

In the second instance, we also sought to test whether those that indicated that they would rely upon the home for their retirement needs had distinctive risk preferences when compared to those who did not, in fact, indicate such a commitment. Specifically, Question 8 asked respondents *"to what extent do you agree or disagree with the following statements"* where six statements were made beginning with *"planning for retirement is an important issue for me"* and the fourth statement which read *"the house that I live in will provide the majority of my retirement needs"*. This question

came after the Introduction to the questionnaire, where a series of seven questions were posed focusing upon age, income, marital status, job classification and educational qualifications. Following Question 8, we asked a series of questions so as to characterise respondents' retirement savings portfolios and their knowledge and understanding of retirement planning.

Most important for this paper, in Section 4 we asked four questions designed to elicit respondents' attitudes to risk in the context of "pensions and long-term savings". Each question related to risk preference is expressed somewhat differently and is based upon a particular conceptualisation of risk. For example, Question 17 asked *"When you are thinking about long-term savings and pensions, which of the following summarises your attitude: I aim to get the best possible growth in the value of my savings, even if that means taking the chance that I could lose money"* or *"I prefer to have safe and secure savings and investments, even if that means they do not grow in value as much as they could"*. Here, respondents face a seemingly simple choice between maximising the risk-adjusted rate of return and pursuing a safety-first strategy albeit with a lower rate of return over the long term. This question represents Roy's (1952, p. 432) argument to the effect that "real people" do not have "precise knowledge of all possible outcomes of a given line of action, together with their respective

probabilities" and are risk averse especially as regards the possibility that an economic disaster might wipe out their savings.

Questions 18 and 19 test whether respondents are risk averse in the manner suggested by Kahneman and Tversky's (1979) prospect theory. These two questions have much the same logic but focus separately on the components of their value function. In question 18, risk aversion is tested by reference to the certain receipt of a sum of money against the probability of winning a larger amount whereas in question 19 loss aversion is tested with the certain loss of a sum of money against the probability of loosing more. Specifically, question 18 asked *"If you were given the following choice, which option would you prefer? Please select one: receiving £3000 with certainty" or "a four in five (80%) chance of winning £4000"*. This is followed in question 19 with: *"if you were also given the following choice, which option would you prefer? Please select one: losing £3000 with certainty" or "a four out of five (80%) chance of losing £4000"*. See Baron (2008, 277) on the logic of prospect theory and Trepel et al. (2005) on the different weights attributed to the components of prospect theory.

Notice, in contrast to question 17, in questions 18 and 19 it is assumed that respondents are able to judge the probability of certain outcomes distinguishing between certainty on the upside and a possible downside. In

this case, it is reasonable to assume that respondents were able to deal with chance expressed in ratios and percentages since making such judgements is important to their everyday working lives in the finance industry. As has been shown elsewhere, this assumption of computational competence is not entirely plausible if considered in relation to the wider population (Oaksford and Chater, 2007).

A less sophisticated test of respondents' risk propensities was set-out in Question 20: "*When making decisions about your own finances are you prepared, if rewards could be large, to accept: a large degree of risk; a moderate degree of risk; a small degree of risk; a very small degree of risk, or I don't know?*" Here, we assumed people can and do make a distinction between how they would respond to different levels of risk. In a sense, this question tests whether people respond to risk in relation to the proffered reward or whether they, in fact, prefer certainty in their own finances if not in their jobs in the financial sector. Given these measures of risk, we also sought to test whether respondents were consistent in their responses and whether consistency was an indicator of respondents' likelihood of indicating that their home would be an element in retirement planning. Consistency of response is rarer than might be imagined: people are, more often than not, seduced by the framing of questions and tend not to

appreciate the commonalities between supposedly different tests of risk preference (Krueger and Funder, 2004).

Statistical analysis and results

Ordinal logistic regression models were developed to explain variation in attitudes to the statement *"The house that I live in will provide the majority of my retirement needs."* As noted by Hills (2010), amongst many others, the following sociodemographic variables are often important in distinguishing between individuals' attitudes and options as regards retirement planning:

- Gender
- Age
- Education (higher education; possession of professional qualification)
- Job type (level of responsibility)
- Marital status (including 'partnership')
- If married or cohabiting, whether their partner had an occupational pension
- Base salary (excluding bonuses).

Cross-tabulation of the data revealed low or zero cell counts for some combinations of levels of the dependent variable with levels of explanatory variables. To ensure consistent parameter estimates, some levels of these

factors (age, base salary and the dependent variable) were combined to ensure adequate cell counts.[7] The data on partner's occupational pension was also recoded to a binary variable with levels 'is/is not married or cohabiting with a partner with an occupational pension' in view of the minority of positive responses from respondents in the single and separated/divorced/widowed categories. An overview of the modified data set is presented in Appendix 1.

Candidate models were fitted under a proportional odds assumption using the R and SPSS statistical packages. A stepwise selection algorithm minimising AIC was used to find candidate models, with a model including only a constant used as a starting point in view of the sparse data set relative to the number of predictors.[8] The resulting model is presented in Table 1. Both the possession of professional qualifications and the pension status of partners are not included in the selected model minimising AIC. The remaining explanatory variables are each significant at the 1% significance level or above under a drop-in-deviance test. The coefficients for the levels

[7]/. For age, levels {50-59 years}, {60-65 years} and {Over 65 years} were merged into a single category; for base salary, levels {£15,000 or less} and {£15,001 - £25,000} were merged; and for attitudes to the statement 'The house that I live in will provide the majority of my retirement needs', levels {Agree} and {Strongly agree} were merged.

[8]/. AIC, or Akaike's information criterion, is a measure of goodness of fit which describes the trade off between bias and variance in model construction, and is thus used as a tool for model selection. When minimising AIC models are ranked and the one with the lowest AIC is considered the best fit.

of these factors, together with corresponding standard errors and estimated odds ratios, are also to be found in Table 1.

The model is formulated such that the interpretation of the coefficients β_i is as follows: e^{β_i} is the ratio of the odds for someone who falls into the set indicated (e.g. women, those with higher education degrees) of being in a group which agrees more with the statement *"The house that I live in will provide the majority of my retirement needs"* relative to the corresponding odds for the reference group, *ceteris paribus*. The reference group is set to include males of age 29 years or younger, without a higher education degree, of non-officer job type, single, and with base salary less than £25,000. For example, considering possession of higher education, $\beta_i < 0$ indicates that a person who possesses a higher education degree (but otherwise shares the characteristics of the reference group) is less likely to have a positive attitude to the above statement than a person from the reference group.

It can be seen from Table 1 that with increasing age, respondents were more likely to have more positive attitudes to home ownership as a form of retirement saving, with the odds of being in a more positive group increasing by a factor 2.008 (95% confidence interval (CI): 1.340, 3.008) from between the 29 years and under group and the over 50 age group, *ceteris paribus*. Holding all other variables constant, the odds of being in a

more positive group decrease with possession of higher education by a factor of 0.751 (95% CI: 0.619, 0.912). The odds of being in a more positive group increase for respondents who were married or cohabiting relative to those who were single by a factor of 1.369 (95% CI: 1.136, 1.652). The magnitude of the standard errors for the other coefficients prevents a definitive interpretation of the relationship between the remaining factors and attitudes to home ownership as a form of retirement saving, although each factor itself is significant at a 1% level or greater.

Assessment of the adequacy of model fit is complicated by the fitting of the model to a large number of factors, some with several levels. With sparse data, assumptions regarding the approximate distribution of the deviance statistic may not hold (Wrigley, 2002). Hence we examined the adequacy of the model in other ways:

- A likelihood ratio test of the drop in deviance between the saturated model including possession of professional education and partner's pension status and the model presented above found no evidence to reject the simplification to the above model (p-value = 0.88).
- A score test of the proportional odds assumption found no evidence (p-value = 0.24) to reject the null hypothesis that the assumption holds.

To examine the sensitivity of our results to potential sparse data effects, we refitted the model by (i) collapsing categories of the response variable (to {Agree}, {Neither agree nor disagree}, {Disagree}) and (ii) converting age and base salary to continuous variables. In both cases, models including the above six factors only were found to minimise AIC. Furthermore, the magnitude and direction of the coefficients for levels of gender, age, job type, marital status and possession of higher education were all found to be broadly similar under the different parameterisations.

With the model selected above, we considered four additional variables for inclusion in the model. As noted earlier, three variables were concerned with risk aversion, while the fourth was related to loss aversion (in a manner consistent with Kahneman and Tversky's, 1979 prospect theory). Drop-in-deviance tests found extremely strong evidence in each case (p-value $<1\times10^{-4}$) to reject the null hypothesis that the smaller model (excluding the risk variable) was sufficient. The effects on AIC of the addition of each risk variable separately to the above model are found in Table 2. In the interests of parsimony, however, only the risk variable with the greatest associated drop in AIC was selected for inclusion in the model—the scaled risk preference measure.

Having tested for the contribution that respondents' risk preferences make to the estimated model, we also considered the extent to which the various risk measures were related—the extent to which respondents could be thought consistent across the risk measures in their conceptualisation of risk aversion. Here, we can make a number of observations based upon pair-wise comparison. The simplest comparison was made between the scaled risk preference option (from a small degree of risk to a large degree of risk) and the categorical distinction made between a preference for "safe and secure savings" and aiming for the "best possible growth in the value of my savings". It was found that scaled risk preferences were weighted towards a small degree of risk when paired with "safe and secure" and weighted towards moderate to large risk when paired with "best possible growth". Likewise, risk preferences were weighted towards small and moderate risk when paired with the preference for "receiving £3000 with certainty" and weighted towards moderate and large risk when paired with "a 4 in 5 (80%) chance of winning £4000".

However, we could not identify a pattern between scaled risk preferences and loss aversion whether "losing £3000 with certainty" or "a 4 out of 5 chance of losing £4000" nor could we discern a pattern in responses when pairing "safe and secure" with loss aversion. A chi-squared test of independence of respondent answers to the two questions found no

association between responses to "safe and secure" and the loss aversion questions (p-value 0.502). That is, in these instances it can be said that respondents' scaled risk preferences were unrelated to loss aversion. Nonetheless, when "receiving £3000 with certainty" and "a 4 in 5 (80%) chance of winning £4000" were paired respectively with "safe and secure" and "best possible growth" it was also noted that there was a strong relationship between the first pair but no relationship between the second pair. We also considered whether there was a pattern in responses to the pairing of "receiving £3000 with certainty" and "a 4 in 5 chance of winning £4000" with respectively "losing £3000" and "a 4 out of 5 chance of losing £4000". If respondents were consistent with Kahneman and Tversky's (1979) prospect theory, responses would link "receiving £3000" and "a 4 out of 5 chance of losing £4000". Of the 2240 records used, just 50% were consistent with prospect theory.[9]

The results for the refitted model including the scaled risk preference variable (Question 20) are shown in Table 3. Each of the variables in the fitted model is significant at a 5% level or below. The inclusion of the risk variable results in a drop in AIC of 157 (to 5210). The odds of being in a more positive group with respect to the home as a form of retirement saving,

[9]/. Testing for loss aversion is more problematic than may be thought: see Tom et al. (2007) for an experimental procedure that raises issues as to the testing procedures and proper levels of loss that may be needed to fully calibrate human predisposition to loss aversion.

decrease with an increasing preference for risk. Relative to a respondent prepared to accept only a very small amount of risk when making decisions about their own finances, the odds of being in a more positive group to the home decrease by a factor of 0.326 (95% CI: 0.204, 0.522) for a respondent prepared to accept a large amount of risk, holding all other variables constant.

With the exception of the coefficients for levels of base salary, the magnitude and direction of the estimated parameters remain comparable to those in the model without the included risk variable. Again, with increasing age, respondents were more likely to view the home as providing the majority of their retirement needs, with the odds of having a more positive attitude to the statement increasing by a factor of 1.982 (95% CI: 1.316, 2.985) from the youngest group (29 years and under) to the oldest group (over 50), when holding other variables constant. Possession of a higher education degree was associated with a decrease in the odds of having a more positive attitude to the statement by a factor of 0.779 (95% CI: 0.638, 0.950), *ceteris paribus*, whilst the odds of agreement for a respondent who was married or cohabiting increased by a factor of 1.331 (95% CI: 1.100, 1.612) relative to a single person.

Whilst the size of standard errors for other coefficients prevents a conclusive interpretation, it may be noted that increasing seniority of job type was associated with a decrease in the odds of responding positively to the statement. In contrast, females were more likely to respond positively than males. The effects of base salary on attitudes to the statement were less clear, however, and more subject to variation between fitted models.

Synthesis and interpretation

In sum, just 250 of the 2256 useable responses agreed with the statement leaving 1429 that either strongly disagreed or disagreed with the statement. Considering the statement is framed with reference to the "majority of my retirement needs" as opposed to relying exclusively upon the family home, being a relatively open statement with scope for ready agreement at the margin, it would seem that respondents appeared not to fit the profile of many of the celebrities interviewed in The Sunday Times. This is surprising given the media attention devoted to the topic in the lead-up to the 2007 financial crisis.

It was found that of those that tended to agree/strongly agree with the statement tended to be older than younger, were more likely married or cohabitating than single, less likely to have a higher education degree, more likely to have a higher income (but not the highest income), and less likely

to be senior executives in the company. It is tempting to combine these results into 'representative' individuals, notwithstanding the fact that the results hold constant the effects of the other independent variables. Even without doing so, we can make a number of observations based on these results that can help better understand their implications. For example, it is possible that as higher income individuals these respondents may be those who could afford to pursue such a strategy. Likewise, the fact that older respondents tended to agree suggests that they are from the generation that have done well out of the long-term run-up in property and home prices enabling reliance upon such a strategy.

It is clear from interviews with London-based defined contribution sponsors that it is widely believed that those in the 20-29 and 30-39 age brackets tend to be house-poor notwithstanding their relatively high incomes and bonuses. This may be reflected in another of the variables used to clarify the significant correlates of agreement with the reference statement: characteristic of the finance industry has been the increasing educational credentials of the average employee and the use of higher education to shift-out lower qualified applicants for jobs. This process of shifting has been in train for at least the past twenty years. Finding that those with higher education tended not to agree with the statement could represent the fact that higher education is actually a proxy for being younger rather than

older—notwithstanding the inclusion of age in the model, this could represent a generation of employees under pressure to save for a home albeit with a low equity share in any home they 'own' (in conjunction with the bank providing the mortgage). Note, however, in Clark et al. (2010) we show that these types of respondents tended also to be (more than older, higher paid respondents) investors in property (buy-to-let). In this respect, it is possible that the tax benefits associated with investment property enabled younger, lower paid respondents to claim a share of the property market but remain relatively under-invested in their home.

Of note is the significance of the measures of risk preference in predicting agreement with the proposition that respondents' homes were important in underwriting retirement income. The stronger respondents' risk aversion the more likely they were to indicate, holding constant the socio-demographic independent variables, they would rely upon the family home for their retirement income. Here, we can accept the hypothesis that respondents tended to believe that the family home was a relatively low-risk investment in their future income. Whether they were justified in that assessment is harder to determine without detailed knowledge of their circumstances before and after the financial crisis.

Since our respondents were likely more savvy than the average defined contribution participant, and certainly more aware of the costs of irrational exuberance characteristic of financial bubbles (Shiller, 2000), it is possible that older respondents saw their homes as relatively safe-havens in an uncertain world. If so one implication is that they must have believed that the location-specific value associated with their homes out-weighed the possible downside of being caught-up in the financial bubble. A less generous interpretation is that they failed to appreciate the ways in which house prices were implicated in the paths of global equity markets and earned income. Alternatively, it is entirely possible that those that responded in the affirmative were simply naïve about the *nature* and *scale* of risks in housing.

The most useful measure of risk preference in terms of its contribution to explanation was the simplest measure dependent, as it is, on a scaled risk measure rather than on a test of reasoning. The next best measure tested respondents' preference for certainty of reward, followed by safe and secure, and then certainty of loss. While we were not able to interview respondents to clarify their understanding of the relationship between these measures of risk preference, a preference for low risk would seem to be closely related with a preference for certainty of reward and a preference for a safe and secure return over a risk-related rate of return. Even so, the scaled measure

of risk preference would appear to require less deliberation than tests of preference that requires respondents to judge the value of alternative courses of action with different potential payoffs. Unfortunately, we were not able to frame tests of risk preference with potential rewards and possible payoffs at payoff levels that our respondents may have found particularly salient to their particularly circumstances. It is possible that £3000 and £4000 were not taken seriously by our respondents, given their current and expected incomes and the prices of their preference home. Elsewhere, we have shown that some people are quite willing to take a financial gamble on £10,000 and £100,000 considering their age and family circumstances (Clark, Caerlewy-Smith and Marshall, 2009; see also Tom et al., 2007 on the scale of bet in gambling).

Conclusions

In the aftermath of the 9/11 attack on the Twin Towers, the TMT bubble burst and western financial markets recorded two consecutive years of negative returns. Shiller (2000) anticipated the turmoil, arguing that financial markets are subject to recurrent episodes of irrational exuberance unjustified by any rational assessment of the fundamentals. For defined contribution pension plan participants on both sides of the Atlantic, the run-up in financial markets on the back of a promised 'new world' of technology had seen account balances grow by as much as 35 per cent over

the period 1995 to 2001. However, the TMT bubble exacted a price: many defined contribution pension plan participants saw their account balances shrink by 25 per cent over just a couple of years reinforced by a gloomy assessment of the near future (through to 2005). Yet, markets recovered underwritten by the loose money policies of the Fed and the Bank of England and the leverage applied to credit instruments that promised a 'new' era in house ownership and investment returns (Lee et al., 2009). Riding the roller-coaster, many defined contribution pension plan participants recovered their losses and saw their account balances dramatically grow year-on-year through exceptional returns.

When we implemented our survey of DC plan participants, the subprime bubble had carried markets into uncharted territory just as the subsequent bust carried the global economy into a crisis that threatened to turn the credit debacle into a depression. For our respondents, employed in the finance industry that dominates London, house-price inflation, equity market performance, and the path of earned incomes including bonuses were closely inter-related and highly correlated (Clark et al., 2010). And yet, public comment about the respective virtues of property including housing and pension contributions as forms of retirement saving would have had it that these savings instruments are alternatives rather than complements wherein the former is supposed, by some, to be superior to the latter. It is

arguable that the pricing of property and especially housing has such a significant 'local' component that it is reasonable to suppose that one's own home is a means of insuring retirement welfare against the ups and downs of (defined contribution) pension saving.

In this paper, we surveyed the entire London workforce of a large bank, involving about 7000 people and about 2400 responses. We have suggested elsewhere that this group of respondents had the advantage (over the average plan participant) of 'being in the market' (re-working Gertler's, 2001 argument about the value of tacit knowledge). As such, it is arguable that they were more likely sophisticated investors rather than naive investors even if opportunistic rather than long-term investors (see Clark, Knox-Hayes and Strauss, 2009 explaining these distinctions and their implications for expected behaviour). The first question was about how many of our respondents intended to rely upon the family home for their retirement welfare. Only about 10 per cent indicated that this was their intention. The next question was whether those that would do so could be characterised as risk averse, exploiting the suggestion made in UK media to the effect that property is 'more understandable' than pension savings. There is strong evidence to the effect that those that expressed an intention to rely upon the family home for a 'majority of their retirement needs' were highly risk

averse, reinforcing previous findings on gender differences in risk tolerance (Clark and Strauss, 2008).

When we looked for socio-demographic predictors of this preference, it was noted that older rather than younger employees, higher rather than lower income people, and married/with partner rather than single/separated were more disposed to indicate reliance upon the family home for the 'majority' of their retirement needs. Based upon previous research that sought to characterise the planning intentions of a representative sample of UK pension plan participants, it would seem that the salience of the issue (future retirement) combined with the available asset (given their incomes and marital status) were likely relevant factors in 'explaining' these findings. Put in the negative, younger, lower income, either never married or divorced people were less likely to agree with the statement suggesting a lack of salience of the issue relative to other considerations as well as a less significant claim on such as asset (home). These findings highlight the fact that many people may not have a significant claim on such a resource and, as such, may be less well-off that others so endowed. As Hills (2010) has noted, UK disparities in wealth and earned income are growing with significant implications for the retirement welfare of the baby boom generation and, especially, the generations to come.

Of course, given the small numbers involved, it is entirely possible that those who indicated reliance upon their home did so because they had been the beneficiaries of the acceleration in house prices over the 2001-2007 period (and for older participants, earlier periods of house price inflation) and they expected that whatever the costs of the looming 'correction' their home would be insulated from the downturn in the market. Perhaps by virtue of age, income, and status they lived in London neighbourhoods that had effectively weathered past financial turmoil compared to the ups and downs of pension balances—they were, or are, actually very savvy investors. Equally, it is possible that they treated the family home as a low-risk investment for their future wellbeing while treating their pension account as a risky option on the future value of global stock markets. In other words, respondents may have believed their pension account was subject to greater market volatility than the value of their home given its location and that while the upside of financial markets are highly correlated with house prices, the downside of markets are not so correlated for their *particular home and its neighbourhood*. In this sense, our respondents may have been risk averse balancing the risks found in their retirement portfolio.

If plausible, these types of sophisticated retirement planners do not appear in the Money section of The Sunday Times. Rather, it seems that they have strong views justified, more often than not, by simple statements of belief

and past success and failures. More research is needed to understand how people manage the risks of different savings instruments, separately and together, placing them in context—that is, in the world in which they live with its various advantages and disadvantages by virtue of who they are and where they live (Strauss, 2009b).

Several important issues are raised but not addressed in this study. First, it is unclear the degree to which those who claim an intention to rely on housing assets in retirement will in fact do so, and by what means (e.g. downsizing, equity release). If DC pensions are unlike any other form of financial product by dint of the complexity involved in making rational investment decisions over the long time horizon and the complexity of hedging against exogenous risk, a home is quite unlike any other financial asset by virtue of the complex cultural, social and emotional associations it embodies. Thus, older employees who state that they intend to draw on their home for retirement may, in the end, have adequate resources and choose not to (because of the bequest motive, for example). On the other hand, younger workers who claim not to rely upon their home to fund retirement may end-up in a position where inadequate pension savings force them to access the equity built up in a property. What is certain is that the pensions 'time bomb' has not been diffused and low levels of occupational pension

income for future retirees, along with changing demographics, are likely to affect housing markets in significant ways.

Second, the study suggests interesting differences in attitudes to risk and housing, but looks only at a select group of 'in the know' employees. More research is needed to flesh out differences in risk propensity among groups differentiated by gender, ethnicity, income, and urban and regional geography. Elsewhere, differences in attitudes to the purchase of annuities have been demonstrated to have a regional component (Clark and Knox-Hayes, 2007). Differences in attitudes to housing assets could have implications both for the composition of local and regional housing markets, and for national-level policy aimed at encouraging older people to use housing equity to fund the costs of retirement.

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Appendix 1: Overview of data

Base proposition	The house that I live in will provide the majority of my retirement needs			
Response options	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree *or* Strongly Agree
Number of respondents	468	961	586	250
Gender				
Male	21.5%	42.5%	25.8%	10.2%
Female	18.8%	43.0%	25.3%	12.9%
Age				
29 years or under	27.9%	41.9%	23.3%	6.9%
30-39 years	19.2%	44.7%	25.5%	10.7%
40-49 years	16.3%	39.4%	29.1%	15.2%
Over 50 years	15.5%	35.7%	30.2%	18.6%
Possession of higher education degree (BA, MA, MSc, etc.)				
No higher education degree	14.6%	40.7%	29.7%	14.9%
Higher education degree	23.1%	43.1%	24.4%	9.5%
Possession of professional qualification (CFA, CPA, FIA, ACA/FCA, etc.)				
No professional qualification	20.6%	41.3%	26.5%	11.6%
Professional qualification	20.8%	45.9%	23.9%	9.3%
Job type				
Non-officer	22.3%	39.0%	28.0%	10.6%
Associate Director	17.5%	43.2%	27.1%	12.2%
Director	19.9%	44.9%	22.6%	12.6%
Executive Director	22.5%	45.9%	24.3%	7.3%
Managing Director	28.7%	47.1%	17.2%	6.9%
Marital status				
Single	27.1%	41.8%	22.9%	8.2%
Married/cohabiting	17.9%	42.7%	27.1%	12.3%
Separated/divorced/widowed	19.0%	42.9%	28.6%	9.5%
Has a partner with an occupational pension				
No	22.8%	42.3%	24.4%	10.5%
Yes	17.3%	42.6%	28.2%	12.0%
Base salary				
£25,000 or less	22.0%	34.1%	31.7%	12.2%
£25,001 - £40,000	21.4%	38.9%	28.3%	11.3%
£40,001 - £65,000	20.9%	42.4%	25.9%	10.8%
£65,001 - £100,000	17.2%	45.3%	26.1%	11.5%
Over £100,000	27.5%	42.7%	19.8%	9.9%
When you are thinking about long-term savings and pensions, which of the following best summarises your attitude:				
I prefer to have safe and secure savings and investments, even if that means they do not grow in value as much as they could	17.7%	41.2%	28.6%	12.5%
I aim to get the best possible growth in the value of my savings, even if that means taking the chance that I could lose money	25.6%	44.0%	21.5%	8.9%

If you were given the following choice, which option would you prefer?				
Receiving £3,000 with certainty	19.2%	42.0%	27.1%	11.7%
A 4 in 5 (80%) chance of winning £4,000	25.3%	42.8%	22.8%	9.1%
If you were also given the following choice, which option would you prefer?				
Losing £3,000 with certainty	22.9%	42.4%	23.8%	10.9%
A 4 out of 5 (80%) chance of losing £4,000	19.6%	42.3%	27.0%	11.1%
When making decisions about your own finances are you prepared, if the rewards could be large, to accept:				
A very small degree of risk	19.3%	25.0%	40.0%	15.7%
A small degree of risk	14.6%	45.2%	28.3%	11.8%
A moderate degree of risk	21.3%	44.2%	23.9%	10.6%
A large degree of risk	39.4%	34.4%	20.0%	6.3%

Table 1: Results of ordinal logistic regression for attitudes to property as a form of retirement saving

Intercepts

	$\hat{\alpha}_j$	$\widehat{SE}(\hat{\alpha}_j)$
'Strongly disagree'|'Disagree' or above	-0.988	0.334
'Disagree' or below|'Neither agree nor disagree' or above	0.974	0.334
'Neither agree nor disagree' or below|'Agree' or above	2.547	0.338

Coefficients

	$\hat{\beta}_i$	$\widehat{SE}(\hat{\beta}_i)$	Odds ratio ($\exp(\hat{\beta}_i)$)	95% confidence interval for odds ratio	
				Upper	Lower
*Gender***					
Male (baseline)	0.000				
Female	0.131	0.092	1.140	0.952	1.364
*Age****					
29 years or under (baseline)	0.000				
30-39 years	0.379	0.111	1.461	1.176	1.817
40-49 years	0.701	0.142	2.016	1.526	2.666
Over 50 years	0.697	0.206	2.008	1.340	3.008
*Possession of higher education degree (BA, MA, MSc, etc.)***					
No higher education degree (baseline)	0.000				
Higher education degree	-0.286	0.099	0.751	0.619	0.912
*Job type****					
Non-officer (baseline)	0.000				
Associate Director	0.008	0.123	1.008	0.792	1.284
Director	-0.242	0.166	0.785	0.567	1.087
Executive Director	-0.309	0.215	0.734	0.481	1.118
Managing Director	-0.479	0.291	0.619	0.350	1.096
*Marital status****					
Single (baseline)	0.000				
Married/cohabiting	0.314	0.096	1.369	1.136	1.652
Separated/divorced/widowed	0.004	0.253	1.004	0.611	1.646
*Base salary****					
£25,000 or less (baseline)	0.000				
£25,001 - £40,000	0.141	0.321	1.151	0.614	2.169
£40,001 - £65,000	0.095	0.327	1.100	0.581	2.093
£65,001 - £100,000	0.157	0.349	1.170	0.590	2.327
Over £100,000	-0.183	0.386	0.832	0.391	1.778

Residual deviance: 5330.98 AIC: 5366.98 n=2118

Strength of significance: *** $p< 0.001$; ** $p< 0.01$; * $p< 0.05$; . $p< 0.1$

Table 2: Reduction in AIC upon inclusion of variables related to attitude to financial risk

Included risk variable	Reduction in AIC
When you are thinking about long-term savings and pensions, which of the following best summarises your attitude: *I prefer to have safe and secure savings and investments, even if that means they do not grow in value as much as they could/I aim to get the best possible growth in the value of my savings, even if that means taking the chance that I could lose money*	63.6
If you were given the following choice, which option would you prefer? *Receiving £3,000 with certainty/A 4 in 5 (80%) chance of winning £4,000*	74.2
If you were also given the following choice, which option would you prefer? *Losing £3,000 with certainty/A 4 out of 5 (80%) chance of losing £4,000*	52.8
When making decisions about your own finances are you prepared, if the rewards could be large, to accept: *A very small degree of risk/A small degree of risk/A moderate degree of risk/A large degree of risk*	156.6

Table 3: Results of ordinal logistic regression for attitudes to property as a form of retirement saving, including attitude to financial risk as a predictor

Intercepts

	$\hat{\alpha}_j$	$\widehat{SE}(\hat{\alpha}_j)$
'Strongly disagree'|'Disagree' or above	-1.628	0.384
'Disagree' or below|'Neither agree nor disagree' or above	0.362	0.383
'Neither agree nor disagree' or below|'Agree' or above	1.953	0.385

Coefficients

	$\hat{\beta}_i$	$\widehat{SE}(\hat{\beta}_i)$	Odds ratio (exp($\hat{\beta}_i$))	95% confidence interval for odds ratio	
				Upper	Lower
*Gender***					
Male (baseline)	0.000				
Female	0.036	0.096	1.037	0.860	1.251
*Age****					
29 years or under (baseline)	0.000				
30-39 years	0.390	0.113	1.477	1.184	1.844
40-49 years	0.699	0.145	2.011	1.513	2.676
Over 50 years	0.684	0.209	1.982	1.316	2.985
*Possession of higher education degree (BA, MA, MSc, etc.)**					
No higher education degree (baseline)	0.000				
Higher education degree	-0.250	0.101	0.779	0.638	0.950
*Job type****					
Non-officer (baseline)	0.000				
Associate Director	-0.007	0.125	0.993	0.777	1.270
Director	-0.216	0.169	0.806	0.578	1.123
Executive Director	-0.312	0.218	0.732	0.478	1.122
Managing Director	-0.481	0.294	0.618	0.347	1.100
*Marital status****					
Single (baseline)	0.000				
Married/cohabiting	0.286	0.097	1.331	1.100	1.612
Separated/divorced/widowed	-0.047	0.256	0.954	0.577	1.574
*Base salary****					
£25,000 or less (baseline)	0.000				
£25,001 - £40,000	-0.005	0.339	0.995	0.512	1.938
£40,001 - £65,000	0.001	0.344	1.001	0.510	1.968
£65,001 - £100,000	0.054	0.367	1.056	0.515	2.171
Over £100,000	-0.244	0.402	0.783	0.356	1.725
*Amount of risk prepared to accept when making decisions about own finances, if rewards could be large****					
A very small amount of risk (baseline)	0.000				
A small amount of risk	-0.343	0.181	0.709	0.498	1.011
A moderate amount of risk	-0.556	0.179	0.573	0.404	0.814
A large amount of risk	-1.119	0.239	0.326	0.204	0.522

Residual deviance: 5166.45 AIC: 5210.45 n=2068

Strength of significance: *** $p<0.001$; ** $p<0.01$; * $p<0.05$; . $p<0.1$