



Network for Studies on Pensions, Aging and Retirement

Netspar PANEL PAPERS

Luc Bissonnette and Arthur van Soest

Retirement Expectations, Preferences, and Decisions

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PANEL PAPER 18



Netspar

Network for Studies on Pensions, Aging and Retirement

Colophon

Panel Papers is a publication of Netspar

June 2010

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Design

B-more Design

Bladvulling, Tilburg

Printing

Printing Office Tilburg University

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Netspar, Tilburg University

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CONTENTS

<i>Preface</i>	7
<i>Management summary</i>	12
1. <i>Introduction</i>	18
2. <i>Expectations and economics of aging</i>	23
3. <i>The Pension Barometer Survey</i>	42
4. <i>The economic crisis, financial decisions and retirement expectations</i>	49
5. <i>Pension system expectations and financial decisions</i>	74
6. <i>Conclusion</i>	88
<i>References</i>	91
A. <i>Aggregated debt and wealth definitions</i>	96

PREFACE

Netspar stimulates debate and fundamental research in the field of pensions, aging and retirement. The aging of the population is front-page news, as many baby boomers are now moving into retirement. More generally, people live longer and in better health while at the same time families choose to have fewer children. Although the aging of the population often gets negative attention, with bleak pictures painted of the doubling of the ratio of the number of people aged 65 and older to the number of the working population during the next decades, it must, at the same time, be a boon to society that so many people are living longer and healthier lives. Can the falling number of working young afford to pay the pensions for a growing number of pensioners? Do people have to work a longer working week and postpone retirement? Or should the pensions be cut or the premiums paid by the working population be raised to afford social security for a growing group of pensioners? Should people be encouraged to take more responsibility for their own pension? What is the changing role of employers associations and trade unions in the organization of pensions? Can and are people prepared to undertake investment for their own pension, or are they happy to leave this to the pension funds? Who takes responsibility for the pension funds? How can a transparent and level playing field for pension funds and insurance companies be ensured? How should an acceptable trade-off be struck between social goals such as solidarity between young and

old, or rich and poor, and individual freedom? But most important of all: how can the benefits of living longer and healthier be harnessed for a happier and more prosperous society?

The Netspar Panel Papers aim to meet the demand for understanding the ever-expanding academic literature on the consequences of aging populations. They also aim to help give a better scientific underpinning of policy advice. They attempt to provide a survey of the latest and most relevant research, try to explain this in a non-technical manner and outline the implications for policy questions faced by Netspar's partners. Let there be no mistake. In many ways, formulating such a position paper is a tougher task than writing an academic paper or an op-ed piece. The authors have benefitted from the comments of the Editorial Board on various drafts and also from the discussions during the presentation of their paper at a Netspar Panel Meeting.

I hope the result helps reaching Netspar's aim to stimulate social innovation in addressing the challenges and opportunities raised by aging in an efficient and equitable manner and in an international setting.

Henk Don

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Acknowledgements

This research was funded by Netspar. We are grateful to Rob Alessie, Adrie Moons and another (anonymous) member of the Netspar editorial board for useful comments.

RETIREMENT EXPECTATIONS, PREFERENCES, AND DECISIONS

Management Summary

A recent report of the Dutch Authority of Financial Markets (AFM)¹ claims that many Dutch residents have overly optimistic expectations concerning their pension income, and will be disappointed when they actually retire. Their biased expectations may lead to less-than-optimal decisions related not only to saving and retirement planning, but also to home ownership and type of mortgage. The AFM talks about an “expectations gap” that it wants to close, in cooperation with the Dutch pension sector. This is a good example of the relevance of expectations related to retirement and old age financial security for the policy debate on public and private pensions.

In economic models in which agents take account of the future consequences of their current decisions, expectations play a crucial role. In general, consumption, saving, and labor supply decisions of individuals and households depend not only on their current tastes and opportunities, but also on their (expected) future preferences for consumption and leisure, and on what they expect to be their future income, their future health, and so forth. For example, an important savings motive for individuals of working age may be a desire to retire early. Savings for retirement and other features of retirement planning, such as labor supply adjustments

¹ The report came out on January 20th 2010; see www.afm.nl/nl/professionals/afm-actueel/nieuws/2010/jan/rapportpensioeninzicht.aspx.

at older age or choices concerning home ownership and mortgages, depend not only on preference parameters (such as the rate of time preference), but also on expectations concerning retirement income, job characteristics, physical and mental health, and other factors determining an individual's ability to work and how attractive it will be to work in the future.

Future expectations are usually unobserved, and traditional macro- or micro-economic models typically make assumptions on how they are formed. For example, many studies assume rational expectations, which makes it possible to derive expectations ex post from observed outcomes. The conclusions from these models can be biased if the assumption that economic agents have rational expectations is not satisfied.

To solve the problem that expectations are unobserved, a recent strand in the empirical micro-economic literature aims at measuring expectations directly using survey questions. Many of these studies reject the rational expectations hypothesis, and indeed find that imposing rational expectations leads to biased estimates of preferences and decision rules. As a consequence, policy conclusions based upon economic models that impose rational expectations can also be biased. This demonstrates how important it is in order to get better insight in the possible consequences of policy measures, to collect data on the expectations of the economic agents, to use them to test assumptions like rational expectations, and, if necessary, to replace such assumptions by a mechanism of expectation formation based upon the information in the expectations data.

In the economics of aging, dynamic optimization under uncertainty is important – for example in such decisions as when to retire, how much to save for retirement, whether to invest in risk

free or risky assets, whether to transform retirement savings into annuities at the time of retirement or not, how much to invest in health, how much to invest in housing and what type of mortgage to choose, whether to buy (supplementary) health insurance or long term care insurance, and so forth. This probably explains why interest in survey questions on future expectations are particularly popular in this field. For example, the Health and Retirement Study, a large multi-purpose survey covering the 50+ population in the US, has questions on expected retirement age, expected old age social security income, expected length of life and future health, and the probabilities of receiving an inheritance or leaving a bequest.

Why is this relevant for public policy and for pension funds and insurance companies? As explained above, expectations play a crucial role in the models that policy makers use to analyze how people prepare for retirement. Better understanding how people form their expectations will make these models more realistic and will improve their predictive performance. Using data on expectations can therefore help to better predict people's retirement decisions, their savings and expenditure patterns, and their portfolio choices (including decisions to buy life insurance and other voluntary assets to save for retirement). Moreover, gaining insight in how expectations vary across socioeconomic groups and groups with different financial and economic knowledge will help in understanding why retirement planning varies across socioeconomic groups and how providing more or different information can help to improve the way in which people prepare for retirement by changing their expectations. Finally, analyzing how policy changes affect retirement related expected choices will also provide insight in the potential policy effects on the actual

choices. For example, a first step towards analyzing whether postponing the age at which state benefits (the AOW in the Netherlands) can be received leads to later retirement, is to investigate whether changes in expected AOW age are correlated with changes in the age at which the respondents expect to stop working.

This panel paper first surveys the literature on expectations related to retirement and income and well-being at an older age. We focus on how expectations are formed and whether or not they are in line with rational expectations. We also review the results on how expectations drive current decisions on, e.g., labor market behavior, savings and portfolio choice. This literature is mainly based upon US data, although there are also some studies for European countries (the UK, Italy, the Netherlands).

Part of the existing literature focuses on how to measure subjective expectations, tending to the conclusion that subjective probability questions (like "what are the chances that you will still work full-time any time after age 62?") are superior to more loosely formulated point expectations (like "do you still expect to work full-time at any time after age 62, yes or no?") A second strand of the literature focuses on analyzing the determinants of the expectations, showing, for example, that changes in financial incentives have an effect on the expected retirement age. Other studies compare expectations with realizations, which leads to the conclusion that the two are correlated, but there is heterogeneity in expectations formation and in many situations, specific groups do not have rational expectations. Many recent papers also show that expectations have an influence on actual decisions. For example, supplementary retirement savings are affected by people's expectations concerning the level of their state and

occupational pensions. Combining these findings implies that policies that change these expectations (such as providing more transparent information on future pension entitlements) can have serious consequences for actual behavior and, ultimately, for financial security of the elderly. Recent research has also started to use subjective expectations in the estimation of structural economic models, helping to improve the reliability of the model estimates and the policy conclusions based upon these.

The findings in the literature have direct policy implications, particularly in institutional settings in the Netherlands, among other countries where retirement savings are voluntary for everyone or for specific groups, such as the self-employed. The main findings are that 1) saving decisions are based upon individuals' subjective expectations rather than the objective expectations used in economic models, and 2) while, on average, expectations may not be unrealistic, there is substantial heterogeneity between and within socioeconomic groups, implying that some groups "get it wrong" and will consequently not make optimal decisions. Moreover, the literature on financial literacy suggests that the weaker socioeconomic groups also have more problems in forming correct expectations, so that they may be particularly vulnerable to inadequate planning for retirement. This will raise welfare inequality among the elderly the more the institutions allow for individual responsibility in retirement planning.

The second part of the paper reviews some studies on retirement and pension expectations of the Dutch population. Since the summer of 2006, survey data were collected once a month on the expectations of Dutch individuals aged 25 and older concerning occupational pensions, old age social security, retirement opportunities, and their own income position and labor market

status when they get older. We discuss how expectations concerning the Dutch pension system have changed over time, and how they depend on personal background characteristics. One finding in this context is that optimism about the future purchasing power of occupational pensions falls with income and educational level, suggesting that the lower income groups exhibit unwarranted optimism. This implies that retirement planning and (supplementary) retirement savings may be sub-optimal, particularly for the less educated and low income groups.

Pension expectations may have changed during the current economic and financial crisis, which has revived the discussion on reforming state pensions and has had large negative effects on the value of the assets held by occupational pension funds. In June 2009, a representative sample of the Dutch population answered some specific survey questions on how the Dutch perceive the crisis, how long they think it will last, and what the consequences of the crisis are for their retirement expectations and their current savings for retirement. The paper presents a descriptive analysis of these data, showing that expectations concerning the severity of the crisis have an impact on expected responses to the crisis in preparation for retirement, illustrating the usefulness of expectations data with a specific example. Many people in June 2009 thought the worst of the crisis was still to come, and the more pessimistic respondents indeed had a larger tendency to adjust their behavior. But overall, although people are concerned about the crisis, very few of them actually adjust how much they save or which assets they invest in.

The paper also presents some evidence that retirement savings behavior responds to expectations concerning the generosity of the pension system, in the sense that less generous expected benefits

increase savings for retirement. The evidence is mixed, however. Although some significant effects in the expected direction are found, more work is needed before we can definitively answer the question whether expectations concerning pension and social security generosity affect third pillar or general savings in the way that theory predicts.

1. Introduction

In models of life cycle behavior and inter-temporal decision making under uncertainty, expectations and preferences both play a crucial role. In order to make decisions concerning today's consumption, saving, and labor supply, individuals and households should take into account not only their current tastes and opportunities, but also their (expected) future preferences for consumption and leisure, as well as their expected future income, health, and other important factors. For example, an important savings motive for individuals of working age may be a desire to retire early. Savings for retirement and other features of retirement planning (such as labor supply adjustments at older age or choices concerning home ownership and mortgages) depend not only on preference parameters such as the rate of time preference, but also on expectations concerning retirement income, job characteristics, physical and mental health, and other factors that determine the future ability to work and the future attractiveness of working.

While, in principle, the economic theory of expected utility maximization does say little about how agents form their beliefs, the common practice in empirical literature is to rely on the assumption that economic agents form "rational expectations", a term first coined by Muth (1961), implying that while agents may not perfectly forecast the future, they are able to correctly construct the probability distribution of the relevant future outcomes given the available information. The use of this assumption raises questions. How can agents form these beliefs? Is there a rational way to explain heterogeneity in expectations of phenomena like inflation or asset returns? Is it reasonable to assume that agents may not have rational expectations, but act "as if" they did? The

absence of satisfactory answers to these questions seriously impairs the credibility of inference relying on it.

The reason why economists are so prone to use a rational expectations hypothesis is that expectations often remain unobserved, and traditional macro- or micro-economic models typically make assumptions on how they are formed. The conclusions from these models may be biased if the assumption that economic agents have rational expectations is not satisfied. A priori, one may surmise that testing whether individuals form rational expectations can be done with relative ease by assessing how "rational" their choices are. However, from a logical perspective, testing the hypothesis of rational beliefs poses a serious challenge to empirical analysts. In his book, *The Limits of Rational Expectations*, Pesaran (1987) presented the problem in this way:

In the absence of direct observations on expectations, empirical analysis of the expectations formation process can be carried only indirectly, and conditional on the behavioral model which embodies the expectation variables. This means that conclusions concerning the expectations formation process will not be invariant to the choice of the underlying behavioral model.
(p. 207)

The problem is actually quite simple. Take the example of how much retirement wealth someone accumulates. This will depend on preferences and on future expectations. For example, we could observe low accumulated wealth simply because an agent has a high rate of time preference, or because he expects to receive a large bequest before he retires. Usually, preferences and beliefs are not directly observed but are derived from observed choices under

additional assumptions. The latter are needed, since it may well be the case that various combinations of preferences and beliefs lead to similar choices, so that observing choices only is not enough to *identify* both preferences and beliefs (see Manski, 2002, for an example of this in a simple setting). An assumption on expectations formation (such as rational expectations) is then required to identify preferences from observed choices. In order to disentangle the effects of preferences and beliefs without making additional assumptions, an empirical analyst must have direct information on at least one of the two.

To solve the problem of expectations being unobserved, a recent strand in the empirical micro-economic literature aims at measuring expectations directly using survey questions (see Manski, 2004, for a general review of this topic). Many of these studies reject the rational expectations hypothesis and find that imposing rational expectations leads to biased estimates of preferences and decision rules. Survey questions on future expectations are particularly popular in the economics of aging. For example, the US Health and Retirement Study (HRS) has questions on expected retirement age, on expected old age social security income, on expected length of life and future health, and on the probability of leaving a bequest. This paper discusses findings concerning heterogeneity in beliefs in the field of economics of aging, focusing primarily on the role of expectations in decision making toward retirement and on the welfare implications of possibly erroneous beliefs. We also emphasize the implications of heterogeneity in beliefs for public policy and for providers of pension products.

For many researchers in the broad field of economics, rational beliefs have reached a dogmatic and indisputable status. For them, economic agents simply have rational beliefs. However, in the case

of various economic studies concerning aging and retirement, we believe that it is relatively uncontroversial to say that the rational expectations hypothesis was made in the name of simplicity rather than as an assumption aimed at mimicking the real world. When it comes to time horizons measured in decades, it is hard to accept that everyone is able to form rational expectations – or even to assume that everyone acts “as if” they had these rational beliefs.

As a matter of fact, such a harsh assumption is often explicitly acknowledged as undesirable but necessary (e.g. Rust and Phelan, 1997). Even among so-called experts and trained financial planners, there is no consensus about the future of retirement and saving. Given the actual state of research on financial literacy e.g. Lusardi and Mitchell, 2007b), assuming that the lay can form rational expectations seems even more dubious. The 2008–2009 financial crisis has provided new arguments in this debate. While in principle it is possible that those who have lost a large fraction of their pension wealth had rational expectations and took a deliberate risk with maximum expected returns, the more commonly held view seems to be that many individuals had no clue about the risky nature of their pension investments and did not have rational expectations.

This paper is written with four objectives, addressed in the five remaining sections. Section 2 offers a review of previous findings concerning retirement related expectations, which mainly concern the US or the UK. Section 3 discusses some Dutch studies, using a rich data set concerning retirement expectations from 2006 until 2009, and section 4 focuses on the expected effects of the 2008–2009 financial crisis on expectations and on savings and retirement behavior. Our third objective is to illustrate how the information on beliefs in the Dutch population can help to enrich

empirical models of decision making concerning retirement. For this purpose we use the same Dutch data to analyze the role of expectations concerning the future generosity of social security and occupational pensions for saving attitudes, wealth and debt. The final section discusses what we believe are important issues to be explored in the future and presents some concluding remarks.

2. Expectations and economics of aging

This section reviews some major findings in retirement studies and discusses how the results depend on the assumptions concerning the formation of future expectations. We then focus our attention on studies dealing with subjective beliefs concerning retirement and on various studies hinting that individuals may not be able to form adequate beliefs concerning their retirement.² Another review concerning subjective beliefs in surveys of older population groups is Hurd (2009). This study focuses mainly on methodological issues concerning all probability questions in the US HRS (as discussed below). Our review on the other hand focuses on the use of expectations in explaining retirement-related decisions, not only in the US but also in European countries.

2.1 *Retirement studies without subjective expectations*

While increasing numbers of researchers in the field of aging are now interested in eliciting expectations through direct survey questions, there is still a large body of quality research that is written using a more traditional economic approach. This subsection reviews how expectations are incorporated in some seminal studies concerning retirement and pensions.

2 We review selected studies on subjective expectations and retirement and saving. It is impossible to review all of the related literature here. An excellent overview of the use of subjective expectations can be found in Manski (2004). Extensive reviews on the economics of aging and retirement are Hurd (1990, 1997), concerning individual behavior and Weil (1997) concerning population aging.

The seminal study of Feldstein (1974) laid the basis for the impact of social security on private saving in the context of life-cycle models, from both a theoretical and an empirical perspective. This led to a large number of subsequent articles by Feldstein and various collaborators (e.g. Feldstein, 1976, 1985; Feldstein and Pellechio, 1979). Feldstein was interested in the ambiguous effect of old age social security benefits on saving. In standard life-cycle models with an exogenous retirement date, the introduction of social security leads to an unambiguous decrease in personal saving: Being (or expecting to be) richer in the future implies redistributing this new wealth across all time periods. There are, however, some situations where an increase in social security could also have a zero effect – or even a positive effect – on saving. The first obvious case would be if an individual's decision making process is not correctly captured by a life-cycle model, if, for instance, individuals behave myopic instead of forward-looking (see Feldstein 1985, for example). A second case could lead to an increase in saving: if retirement is endogenous, an economic agent could decide to retire earlier given she will receive social security, and hence could wish to accumulate more wealth for retirement (leading to the so-called "extended life-cycle theory" discussed in Feldstein, 1976). In various articles published in the 70's, Feldstein actually showed that an increase in social security was accompanied by a decrease in personal saving, which supports the life-cycle theory and the notion of forward-looking behavior. He argued that this crowding out effect should be accounted for when evaluating the impact of old age social security policy.

A major element lacking in Feldstein's early models is the uncertainty faced by the agents toward retirement.³ While in principle a certain and an uncertain (but expected) change in social security will affect saving behavior in the same direction, the magnitude of the impacts may vary. In discussing the limitations of their models, Feldstein and Pellechio (1979) mentioned that "social security benefits are not contractual obligations of the government but are determined by legislation", so that "[pessimists] might therefore underestimate the value of social security wealth while optimists overestimate it" (p. 362). His acknowledgement of the uncertain nature of social security (and even possible heterogeneity in beliefs) is a sign that Feldstein was building a framework for further analysis rather than taking literally the hypothesis that agents know everything and make decisions with perfect information. The assumption of perfect fore cast was criticized by Leimer and Lesnoy (1982), who found that the results obtained in the articles referred to above were sensitive to the assumption concerning "perceptions", a term they coined to describe "how individuals form their expectations about the social security benefits they expect to receive and the social security taxes they expect to pay" (p. 606). Leimer and Lesnoy (1982), tested alternative ways of expectation formation and found that Feldstein's results were sensitive to this. In a reply, Feldstein (1982)

3 We will not discuss in detail here another strong assumption in life-cycle models: that every economic agent is able to successfully plan over a long horizon. In reality, self-control issues and limitations of cognitive skills may prevent many from performing such a daunting task. For a review of the literature addressing this problem in intertemporal choice; see Loewenstein and Prelec (1992). On the other hand, Browning and Crossley (2001) wrote in defense of the life-cycle model, addressing some of the irregularities on which much of the critique on the life cycle model is based.

argued that the different ways to model expectations used by Leimer and Lesnoy were wrong, and would simply induce measurement error, leading to an underestimation of the effect of social security wealth. The interesting thing about this quarrel is that both articles, while disagreeing on each other's conclusions, explicitly acknowledge that the core of the problem was that expectations are not observed. The problem was synthesized by Feldstein (1982), who, while disagreeing with the method used by his detractor to account for expectations, still acknowledged that:

The principal difficulty in any economic study of the effect of social security on private saving is measuring the level of benefits that individuals expect to receive in the future. For this purpose, the complicated actuarial calculation of social security wealth that I presented in my 1974 paper was both too complex and not complex enough. It was too complex to be a realistic description of the way individuals actually think about future benefits. It is an overly precise way of estimating individuals' intuitive judgments about the levels of benefits, on which decisions about saving and retirement are based. And at the same time, the algorithm used to calculate social security wealth was not complex enough because it did not take into account such things as the life-cycle variation of individual wages around the general growth trend, the remarriage of surviving spouses, the presence of dependent children, and so forth. (p. 637)

This problem is a recurring theme in the analysis of social security and retirement decisions. As a first step toward a more realistic model, many researchers who built on Feldstein's work

incorporated elements of uncertainty in their models and their analyses. One departure from the implicit "perfect forecast hypothesis" assumed that agents formed their beliefs by interpolating from the past (e.g. Fields and Mitchell, 1984). Another widespread way to model retirement decisions is to rely on stochastic dynamic programming models (e.g. Berkovec and Stern, 1991). However, the information needed to estimate such a model forces the researcher to rely on strong assumptions regarding the beliefs formation process. A commonly used alternative to this model is the reduced form model of Stock and Wise (1990), where some elements of the choice are stochastic, but where an agent decides everything in the base year, without taking into account new information that arrives later. An interesting comparison of the models used by Berkovec and Stern (1991) and by Stock and Wise (1990), estimated with the same data set, is presented by Lumsdaine, Stock, and Wise (1992). They showed that the differences in estimation results between the two methods are small, suggesting that there may not be much to be learned from the more complex model, given the available data.

Gale (1998) reexamines the extent to which households offset pension wealth with reductions in other wealth. He discusses systematic econometric biases in previous empirical studies that can explain the empirical finding of little offset between pensions and other wealth. Estimates that correct for the biases show substantially more offset (and a smaller impact of pensions on overall saving) than found in most previous studies.

These studies of retirement-related behavior rely on a specific assumption concerning expectations – mostly, the hypothesis of rational expectations: everybody correctly anticipates the distribution of future asset returns, wages, inflation and other

relevant variables. In order to relax this strong assumption, some researchers allowed for heterogeneity by modeling beliefs explicitly. One of the most complete examples can be found in Rust and Phelan (1997), who allowed heterogeneity in beliefs in many dimensions of retirement.⁴ They state:

Accurate modeling and estimation of individuals' beliefs about future mortality, health, marital status, wage earnings, health expenditures, and Social Security benefits is the key to obtaining successful predictions from the [dynamic programming] model. Beliefs clearly involve many unobservable, subjective aspects, and consequently a number of strong assumptions must be invoked to estimate them. (p. 798)

It is worthwhile to consider the merits and drawbacks of this approach. One merit is the explicit acknowledgment that the future is different for every individual, and that it is impossible for an econometrician to observe all of the factors relevant to explain it. A second virtue is that this approach allows modeling a reality with a high complexity using a sample of reasonable size. Without imposing structure, it is simply impossible to obtain enough observations to correctly identify how respondents react to new events and new information that changes their expectations. The approach also has major drawbacks, however. First, it implies that

4 Note that Rust and Phelan used the term "subjective beliefs" in a way that differs from ours. They explained that one of the restrictions they used in their estimation process is that "individuals' subjective probability measures coincide with the objectively estimable population probability measure" (p.798). In the terms we used above, such beliefs would still be objective. We basically allow individuals to be wrong, whereas Rust and Phelan did not.

“similar” individuals share identical beliefs. Second, as pointed out by the excerpt of Pesaran’s book cited in the introduction and explicitly discussed for the case of retirement by Bernheim (1989), identification of the parameters used in the beliefs equation relies on the choice of structural form. Suppose that the same elements that explain the formation of beliefs also determine the main variable of interest. In that case, disentangling the effects of these explanatory variables would be impossible without further information.

Is there hope that these drawbacks might be overcome, or are economists condemned to accept the shortcoming of the available economic model? A solution to this problem that many scholars have been studying in the last few years is to obtain additional information on the (subjective) beliefs held by the individuals. As suggested by Hurd (1997):

We need new and better data, in particular population representative data that integrate information on pensions and on Social Security. We need data that have observations on individual expectations of future events so that we can better estimate stochastic dynamic models. (p. 919)

The remainder of this section reviews the results obtained using such data.

2.2 Subjective expectations and the economics of aging

Given how researchers studying retirement planning often explicitly acknowledge that the Achilles’ heel of their models was the way in which they accounted for expectations, it is not surprising that in this field research on beliefs is particularly important. We discuss

some studies on expectations concerning social security, pensions plans and retirement, focusing on the question whether subjective expectations can help to settle the argument between Feldstein (1982) and Leimer and Lesnoy (1982) concerning the role of expectations in explaining the impact of social security, or, more generally, variation of future wealth, on private saving.⁵ We had to restrict ourselves considerably in this review. Indeed, while the idea of eliciting expectations in the field of economics of aging seems to have spread quite quickly in recent years, the concept is not exactly new. To our knowledge, the first paper to study a question related to beliefs concerning the economics of aging was Hall and Johnson (1980), who analyzed the determinants of the expected retirement age.⁶ A large number of related studies followed. For the sake of brevity, we omit the vast literature concerning health expectations and life expectancy that originated from the article of Hamermesh (1985), who studied subjective life-expectancy and its role in the life-cycle model (see Hurd and McGarry, 2002; Hurd, Smith, and Zissimopoulos, 2004, for additional examples).

Studies are reviewed in roughly chronological order, but it could also be said that we followed a theme-based approach, as research concerning expectations toward retirement can be divided in two categories, roughly over two time periods. In the 1980s, researchers such as Douglas Bernheim were mainly concerned with the validity of the elicited expectations. Then, mostly following methodological development by Charles Manski in the 1990s, the new millennium

5 An overview of many of these surveys on expectations toward aging appears in Dominitz (2006).

6 The term used by Hall and Johnson is “planned retirement”; the question was phrased as “At what age do you expect to stop working at a regular job?”

saw an increase in models trying to predict economic behavior using information on subjective expectations. No clear line can be drawn between these categories, as many studies discuss all of these aspects (e.g. Disney 1999). At the end of this review, we also discuss a related branch of the literature, which addresses the concern that individuals lack the financial education they need to form accurate expectations, let alone make rational choices.

The first question raised by the use of subjective expectations concerning retirement concerns the validity of the answers to such questions. The earliest example we could find is a technical note by Wolpin and Gonul (1985) comparing the predictive values of standard structural prediction of retirement age with the elicited subjective expectation. The note suggests that the authors never aimed at improving the traditional models by including a more precise measure of beliefs; rather they argue that using these data would waive the task of estimating the rational beliefs, leading to more efficient estimates of the parameters of interest of the relevant model. After some tangible disappointment, the authors finally came to the conclusion that the elicited and predicted expectations do not seem to correspond, and conclude with the following:

What is quite startling is the much more accurate predictions of retirement ages for those retired by 1981 using the reported expectations in 1971.

One interpretation of this result is that although the reported expectations are not consistent with the postulated labor supply model, they are in fact consistent with an optimizing model which more closely parallels labor supply behavior. Indeed, if individuals made use of all information available to them in

forming their expectations, the researcher could at best hope to duplicate them."

This conclusion suggests that the authors thought that the elicited expectations might provide a better estimate of the objective beliefs than the model. They did not go as far as saying that these expectations may not be rational – but such a statement would probably have been interpreted as heresy at the time. Accuracy of subjective expectations remained a major concern in the early literature. Luckily, one of the earliest sources of elicited expectations toward retirement, the Retirement History Survey (henceforth RHS), used in the research by Hall and Johnson (1980), came to an age where the respondents actually retired, providing a neat comparison of when respondents expected to retire to when they actually did so. For instance, Anderson, Burkhauser, and Quinn (1986) found that "retirement plans made by workers employed in 1969 were inaccurate more than 40 percent of the time" (p. 525), but also point out that this could be due to the major unexpected changes in social security in the 1970s.

There is, however, a methodological problem in studying the type of questions used so far. The fact that a respondent retired at 62 when he said earlier that he expected to retire at 65 does not mean that he did not have rational expectations. The age of 65 could have been the expected value, the median value or the mode of the distribution of his retirement age – and age 62 may well have been a possible realization. This issue was studied in detail by Bernheim (1987, 1989); Bernheim and Levin (1989), also using the RHS data. Bernheim (1989) carefully analyzed how respondents reported their expectations concerning the retirement age, assessing the validity of the answers and describing how respondents interpreted the

question. A conclusion that was important for subsequent research was that respondents tend to answer questions phrased in terms of “what do you expect” by giving what they perceived as the most likely outcome, rather than by giving mathematical expectations. This finding has major implications for the economic models using these answers, as the vast majority of the economic literature relies on expected utility, and not on utility at the mode.

Bernheim’s other two findings are even more directly relevant for the research at hand. He concludes that “most individuals are reasonably competent at forming relatively accurate expectations about the timing of retirement” (p. 336). Such a finding is comforting for those who use subjective expectations data – and even hints that respondents may form rational expectations, in the sense that outcomes match their predictions well.⁷ However, Bernheim’s third conclusion is that “the accuracy of expectations differs systematically by population subgroup.” This last finding is of particular interest, as it raises an important question: if some individuals cannot form accurate beliefs toward the future, then are there some groups that are vulnerable because of the decisions resulting from erroneous beliefs concerning the future? This would be the case under two conditions: people for whom these beliefs are particularly important are not able to form their beliefs correctly; and individuals act according to their subjective beliefs. We return to the first point below, focusing on evidence from our own work. As for the second point, we now review some important studies showing that individuals indeed act in accordance with their elicited subjective beliefs.

7 See Bernheim (1990) or Benítez-Silva and Dwyer (2005) for other tests of rationality based upon variation of beliefs in longitudinal data.

In the early 1990s, the direct study of expectations became an increasingly important field in economics, mostly due to the contribution of Manski (e.g. 1990, 1993). Interest in subjective expectations on aging started to grow considerably after the work of Dominitz, Manski, and Heinz (2002, 2003) and Dominitz and Manski (2006). An important part of their work is devoted to understanding the variation in expectations across different socioeconomic groups. They concluded, among other things, that younger Americans are more pessimistic about the future of social security than older Americans, and they even found signs that many of them believe in a complete collapse of social security. This obviously shows the limits of "rational expectations", as everybody in this case is asked to predict the same event. They also found that different demographic groups have different average beliefs, and hence may act on different premises when deciding how much to set aside for retirement. Heterogeneity in expectations is also emphasized in other studies, such as in Wong and Hardy (2009), who find substantial heterogeneity in women's retirement expectations (e.g. associated with age, race, marital status and job tenure). Expectations not only vary across respondents but also fluctuate over time for a given respondent (particularly if they change jobs), implying that retirement planning is a dynamic process.

Several more recent studies have showed that subjective expectations respond in a plausible way to economic or non-economic factors. For example, Honig (1998) showed that respondents with more generous social security and pension entitlements tend to report a lower expected retirement age; Michaud and van Soest (2008) showed that the probability of working full-time after age 65 increased when the rule that social

security benefits were reduced when working after age 65 (the “earnings test”) was abolished for the group that could benefit most from this policy change. Chan and Stevens (2004) found that financial incentives have the expected impact on the expected age of retirement. McGarry (2004) found a strong negative effect of health problems on the expected retirement age, dominating the effect of income or wealth. Benítez-Silva and Dwyer (2005) found that retirement age expectations adjust in a sensible way to new events, and that (on average) the hypothesis of rational expectations could not be rejected.

The direct study of survey questions concerning beliefs allowed researchers to address issues that were previously impossible to study, given the available data. Elicited subjective beliefs were used, for instance, to help understand the underlying causes of the sharp decline of consumption that usually occurs after retirement – the so-called Retirement Consumption Puzzle. Many explanations have been proposed to solve this puzzle. For instance, Banks, Blundell, and Tanner (1998) argued that it could be caused by an unexpected negative income shock at retirement. Bernheim, Skinner, and Weinberg (2001) interpreted this phenomenon as evidence that economic agents lack rational forward-looking behavior regarding saving. Observing only the choices of individuals does not allow disentangling the effect of expectations from those of, for example, preference shifts at retirement. Using data on beliefs allowed Hurd and Rohwedder (2003) to conclude that the explanations by Banks et al. (1998) and Bernheim et al. (2001) can be ruled out, as the drop in future consumption seems to be anticipated some years prior to retirement. They actually found that anticipated drops in consumption of future retirees were even larger than the actual drops in consumption at retirement of those

who had already retired. The Retirement Consumption Puzzle is part of the aforementioned problem concerning the adequacy of saving. A possible explanation for this problem is that individuals overestimate their income after retirement from social security or from other sources (second or third pillar pensions). Rohwedder and van Soest (2006) found that respondents who overestimated their retirement income usually face a larger drop of consumption after retirement and are more likely to report a status of lower subjective well-being.⁸ Another way to exploit subjective retirement expectations in this context is shown by Haider and Stephens (2007), who used them to construct instruments for actual retirement. Their analysis leads to the conclusion that the drop in consumption is smaller than is suggested by the standard approach, where retirement is not instrumented.

For policy makers, an important question is whether subjective beliefs concerning retirement⁹ help to predict actual behavior, such as saving. Haider and Stephens Jr. (2006) showed that answers to probability questions concerning expected savings at retirement have significant predictive power for actual savings. Bottazzi, Jappelli, and Padula (2006) showed that Italian workers with more

8 Rohwedder and van Soest (2006) also point out that individuals who underestimated their retirement income would over-save, and would also be better off if they had accurate information. This concern was already mentioned in Feldstein (1985), who tried to find an optimal social security system, taking this fact into account.

9 Similar evidence exists for subjective beliefs concerning length of life; for example, Delavande, Perry, and Willis (2006) showed that those who expect to live longer tend to delay social security claiming. As explained earlier, the literature on subjective life expectancy is too extensive to be included in the same review.

accurate expectations concerning the outcome of a given policy change adapt better to the new rules than do their peers who are less informed. In their conclusion, they argue in favor of a campaign to increase financial literacy, and highlight the fact that younger individuals, who will be more affected by the reform, are likely to under-save if they do not correctly adapt their expectations to the new reality. In this sense, their conclusions are in line with the problems we want to discuss in this paper.

Guiso Jappelli and Padula (2009) estimated the risk associated with pension benefits in Italy by eliciting subjective distributions of the replacement rate as a summary indicator of each individual's social security wealth. They found substantial heterogeneity of pension risk which was consistently related to observable features in the pension system. They also found that people tried to attenuate the adverse consequences of pension wealth uncertainty by increasing demand for targeted retirement saving and for insurance: those facing more pension wealth risk enrolled more often in private pension funds, invested in life insurance, and bought private health insurance.

An ambitious and innovative study is van der Klaauw and Wolpin (2008), which proposed a complex structural model of retirement and saving behavior, and controlled for various subjective probabilities. An obvious strength of such an approach, compared to the usual reduced form models, is that it allows for simulation of new policies.

Finally, Chan and Stevens (2008) were interested in the comparison of models using "objective" and subjective expectations. The subjective expectations were the self-reported beliefs concerning pension plan generosity, while the objective information was the employer provided pension plan description.

They concluded that respondents act in a manner consistent with their self-reported beliefs – even when these beliefs are wrong – and not on the objectively measured description. While this sentence may seem trivial for the uninitiated, it is a statement which is incredibly hard to defend with economists. If Chan and Stevens are right, there is little doubt that individuals with faulty beliefs run more risk of having inadequate saving for the future.

2.3 What about those who say they have no clue?

The fact that a substantial number of respondents often do not answer probability questions is a huge concern for researchers in this field – and has been so from the beginning. We already mentioned that the oldest article we could find using such data was that of Hall (1980). They originally planned to include expectations concerning the future generosity of private pensions and social security as control variables to explain the expected retirement age, but had a large non-response rate. It led the authors to conclude the following:

The lack of responses to the question on monthly amount imposed an unwelcome restriction on the estimated model [i.e. using dummy variables for non-missing vs. missing]. However, it may also indicate that a dummy variable may adequately capture the effect of Social Security. That is, the fact that individuals are unaware of the amount they will receive suggests that the amount may have little effect on behavior and that only a program effect is important (p. 247, footnote 17).

Disney and Tanner (1999) came to a similar conclusion about the role of missing values: "'don't know' may be a rational response

when individuals face greater uncertainty over their future retirement date." Lillard and Willis (2001) took another approach to the problem, and considered how precision with regard to answers to probability questions seems to explain portfolio composition. They showed that individuals who answer probability questions in a precise way are more likely to hold a portfolio with a large share of risky assets. This interesting finding provides a hint that agents facing larger ambiguity (see Ellsberg, 1961, for the first discussion of this concept) are less prone to risk taking – in a similar way as agents perceiving larger uncertainty in future payoffs.

These findings raise another question: Are individuals able to form beliefs concerning retirement, and do they even try? Several studies investigate the accuracy of knowledge of retirement related issues. The lack of pension-related financial literacy was studied intensely by Gustman and Steinmeier (2001, 2004, 2005). One of their striking findings is that about half of the respondents in the HRS were not able to correctly characterize the type of pension plan they subscribe to (DB, DC or none). Such a large number of mismatches makes it hard to believe that respondents have rational beliefs about their retirement income. Further evidence on financial literacy was reviewed by Lusardi and Mitchell (2007b). It is important to keep in mind that most of these papers reviewed so far assumed that agents were planning for retirement. While this assumption seems fairly standard for economists, some empirical evidence showed that it may not be valid. For instance, using data from the 2004 wave of the HRS in the US, Lusardi and Mitchell (2005, 2007a) showed that less than one third of the respondents aged 50 and over ever tried to devise a plan for retirement.

This obviously leads to a substantial concern when evaluating policies aimed at stimulating individuals to make optimal

retirement decisions. Can we simply educate individuals in order to help them in forming their expectations? Evidence thus far is fairly grim, as research tends to show that financial education may not be as efficient as desired. We won't review this literature in depth here, but refer to Choi, Laibson, and Madrian (2005), who present a staggering case study that shows individuals not seeming to react to correct an obvious economic mistake in the default choice, leading to a large fraction of their own employer's stock in their 401(k) retirement assets.

Do these findings imply that it is pointless to try to study saving behavior and retirement expectations? On the one hand, it seems that individuals don't educate themselves concerning economics and finance – or don't even plan for retirement. However, given the large body of evidence reviewed above, it seems that the subjective expectations elicited from the majority of respondents do contain some relevant information on retirement decisions. Therefore, instead of casting doubt on the relevance of studying subjective expectations, we believe that the illiteracy of respondents reinforces the idea that we should not use rational expectations. In the remainder of the text, we provide new evidence on the usefulness (or the lack thereof) of these subjective beliefs in economic modeling.

2.4 Policy implications

What is the policy relevance of the findings reviewed above? One conclusion is that subjective retirement expectations provide additional information that can be used to estimate econometric models used for policy analysis – and in this sense, subjective expectations are indirectly relevant for policy analysis. The best example is probably van der Klaauw and Wolpin (2008), already

discussed above. Other examples include the studies on the retirement consumption puzzle referred to above.

The findings also have direct policy implications, however, particularly in institutional settings where retirement savings are voluntary for everyone or for specific groups such as the self-employed. The main findings are that 1) saving decisions are based upon individuals' subjective expectations rather than the objective expectations used in economic models, and 2) while on average, expectations may not be unrealistic, there is substantial heterogeneity between and within socioeconomic groups, implying that some groups "get it wrong" and will consequently not make optimal decisions. Moreover, the literature on financial literacy suggests that the weaker socioeconomic groups also have greater difficulties in forming correct expectations, so that they may be particularly vulnerable to inadequate planning for retirement. This will raise welfare inequality among the elderly to the extent that institutions allow for individual responsibility in retirement planning.

The implications for public policy and the tasks of pension funds are clear. One possibility is to limit individual responsibility and to guarantee a decent pension income for everyone, thereby forcing people to save enough for retirement. Mandatory contributions to a pension scheme fit in this system. The alternative is to provide transparent and complete information on pension entitlements and independent advice on supplementary savings. This is necessary but not sufficient, since providing information does not mean that people use it appropriately. Even if people have correct expectations, many other grounds for suboptimal decisions remain. Deliberate selection of defaults and other lessons from behavioral economics seem to be necessary additional instruments to improve decision making, particularly for the weaker socioeconomic groups.

3. The Pension Barometer Survey

In 2006, Netspar took the initiative to start collecting survey data on pension and retirement expectations and on satisfaction with the Dutch pension system. Data collection started in the summer of 2006, making use of the already existing CentERpanel, a representative household survey administered by CentERdata, affiliated with Tilburg University. The sample is randomly drawn from the population in the Netherlands of ages 16 and older, and consists of over 2000 households in which one or more adults complete questionnaires at home every weekend over the Internet. Households without Internet are given access by CentERdata, so that the survey also covers households without Internet or without a personal computer. The specific survey on pension expectations works with a rotation period of three months: The total sample of respondents of ages 25 and older was randomly split into three sub-samples of about the same size. One sub-sample gets the questions in January, April, July and October; the second sub-sample in February, May, August and November, and so forth. This implies that there are observations for one third of the sample in each month.

This data set has already been used in several studies. Van der Wiel (2008) proposed a test of the life-cycle implications of subjective beliefs by analyzing the relation between expectations and saving decisions. She found a significantly positive effect of the subjective probability that the level of old age social security benefits (AOW) will be reduced on third pillar retirement savings. This is in line with the theory of the life cycle model and consumption smoothing: people who expect lower future income save more, assuming they do not adjust their retirement age. The

latter assumption seems plausible in this case since the reduction of benefit levels does not affect the mandatory retirement age. In the same study, van der Wiel found an even stronger positive effect of the subjective probability that the eligibility age for AOW will be raised on third pillar retirement savings. Here, the effect is theoretically ambiguous, since a rise in the eligibility age will probably also lead to a rise in the age of mandatory retirement. If people indeed would expect to work longer, this could compensate for the later AOW eligibility and actually reduce savings: later retirement implies that the annuity derived from the third pillar savings is needed for a shorter time period and can thus be higher. Van der Wiel's result therefore suggests that delaying AOW eligibility has little effect on the planned retirement age. Van der Wiel does not control for expectations concerning occupational pensions. In subsequent research (van der Wiel, 2009), she studied the effect of the number of newspaper articles on the volatility of social security expectations.

Expectations of Dutch households concerning occupational pensions, old age social security, and the average retirement age ten or twenty years from the time of the interview are analyzed in Bissonnette, Nelissen and van Soest (2009). They investigated how social security, occupational pension and average retirement age expectations have changed over time and how they vary with socioeconomic characteristics. They also consider the effect of the recent crisis (until the summer of 2009).

The first four questions they use are about old age social security benefit levels (AOW), worded as follows:

What do you think is the probability that 10/20 years from now the purchasing power of AOW benefits will on average be

- *Less than now?*
- *At least 10 percent less than now?*
- *More than now?*
- *At least 10 percent more than now?*

Please answer on a scale from 0 to 100 percent, where 0 means it will definitely not happen and 100 means it will certainly happen.

The sample was randomly split in respondents who got the questions with "10 years from now" or "20 years from now." The top panel of Figure 1 (an update of the figure in Bissonnette et al.) shows how the averages of each of the four answers developed over time. The figure reveals a general sense of "pessimism": the average probability that purchasing power will fall is much larger than the probability that it will rise; and the average probability that purchasing power will fall by at least 10% is much larger than the probability that it will rise by at least 10%. There seem to be no systematic differences between the "10 years from now" and the "20 years from now" probabilities. For this set of questions, we also do not see a clear time trend. Even during the crisis, it seems that respondents did not become more pessimistic.

The second, third and fourth sets of four questions have a similar set up, and explore related issues:

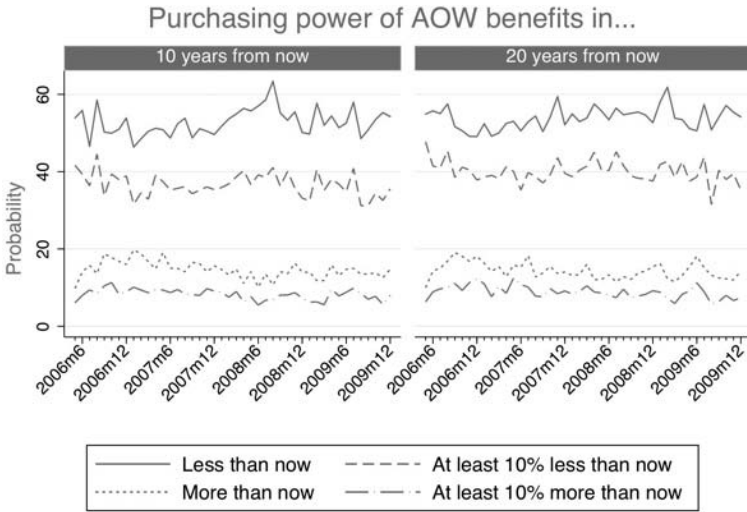
What do you think is the probability that 10/20 years from now the purchasing power of occupational pensions will on average be less than now? / at least 10 percent less than now? / more than now? / at least 10 percent more than now?

What do you think is the probability that 10/20 years from now the age at which people are entitled to AOW benefits will on average be less than now? / at least 10 percent less than now? / more than now? / at least 10 percent more than now?

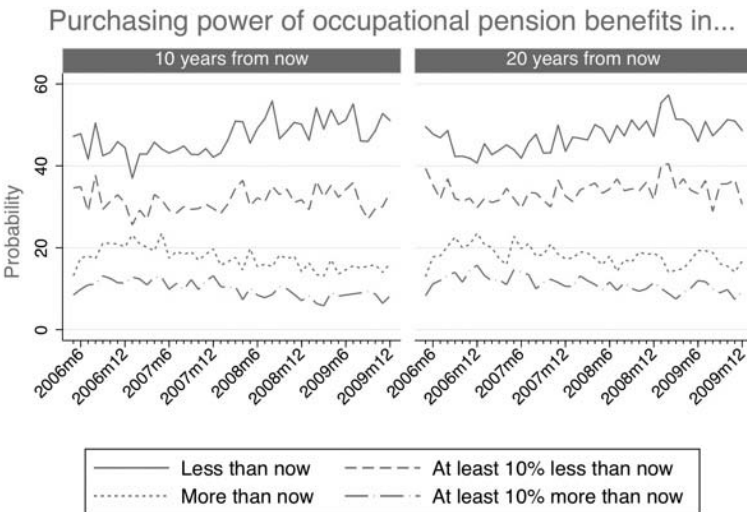
What do you think is the probability that 10/20 years from now the age at which people stop working will on average be less than now? / at least 10 percent less than now? / more than now? / at least 10 percent more than now?

The time trends in these questions are shown in the bottom panel of Figure 1a, 2a and 2b, respectively. They show similar pessimism, in the sense that respondents typically think state benefits and occupational pensions will become less generous and consider it very unlikely they will become more generous. In contrast to Figure 1a, the other three graphs do suggest that pessimism increases over time, particularly during the financial and economic crisis.

Bissonnette et al. (2009) then investigate how the expectations vary with socioeconomic characteristics. In line with the international literature, they find large heterogeneity in expectations. Male respondents are found to be more optimistic than female respondents, in accordance with findings of male over-optimism in other contexts, such as financial markets. They also find that pessimism increases with income but falls with age. From an economic policy perspective, they interpret these results under the assumption that pessimism is justified and that the more pessimistic respondents are also the most realistic. The fact that younger individuals are aware of the possible negative changes in pensions is good news, as long as they will adapt their savings behavior accordingly. The younger individuals, who are likely to

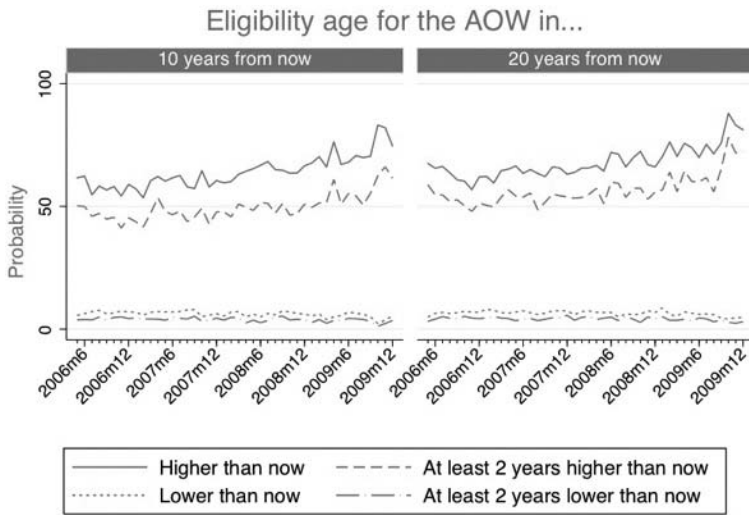


(a)

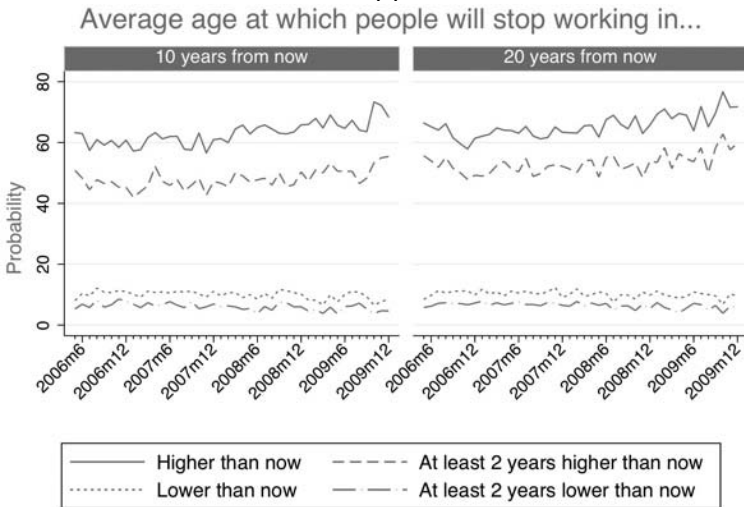


(b)

Figure 1: Time-series concerning average subjective probability with regard to generosity of the pensions plans.



(a)



(b)

Figure 2: Time-series concerning average subjective probability with regard to eligibility age to social security and retirement age in the Dutch population.

witness changes in the pension and social security system, have time and manoeuvring room to adapt their employment career and their life-cycle saving plans to this new reality, and can minimize an unwanted decline of well-being at retirement.

On the other hand, Bissonnette et al. interpret the fact that poorer individuals tend to be more optimistic as bad news. The poorer individuals depend more on the old age social security benefits than their richer counterparts, and are therefore more affected by a reduction in the generosity of these benefits. For the poorest among them, it might not make a lot of difference to anticipate the changes, as they are not able to save for retirement and their income will probably consist almost solely of social security, anyhow. However, not anticipating the policy changes could have a larger negative impact on the well-being of the middle class, who are likely to save too little under erroneous beliefs concerning the future. Bissonnette et al. (2009) argue that an unrealistic view of the future of public pensions could have important welfare effects for these socioeconomic groups, in particular.

This conclusion combines the four questions: income makes the expectations of the respondents more pessimistic in three of the four cases. If we look at the questions separately, however, their conclusion needs to be refined: higher income leads to more pessimism concerning the level of AOW benefits and occupational pensions, and to a higher expected average retirement age – but not to a higher expected eligibility age for AOW benefits. More pessimism concerning occupational pensions may be justified: the increase in life expectancy will make it harder for pension funds to guarantee complete indexation or will lead to lower or later benefits in another way, unless people would be willing to pay

higher premiums. For the AOW benefits, however, an increase in the eligibility age is very likely, but a decrease of the benefit level is much less likely (except in specific cases, due to abolishing the partner allowance for younger partners without paid work), since benefit levels are linked to the social minimum. In this case we can therefore not say that higher income groups have more realistic expectations than lower income groups.

For supplementary occupational pensions, the more pessimistic expectations of higher income groups seems to imply a greater dose of realism among those who will rely on these pensions more, and for whom the public pensions are only a limited share of their total pension income. For public pensions, the interpretation is not so clear. Higher and lower income groups have similar expectations concerning the future eligibility age, but why are higher income groups more pessimistic about levels? Perhaps the explanation is that they realize that abolishing the partner allowance will reduce the *average* benefit level.

De Bresser and van Soest (2009) analyze satisfaction with several aspects of pension provisions, also measured in the Pension Barometer. They consider satisfaction with the expected pension benefit level, with the expected age of retirement, satisfaction with knowledge of own pension provisions, with own pension provisions as a whole, and with the pension system in the Netherlands. Among other specifications, they look at models where satisfaction is driven by the subjective expectations considered above, as well as by standard demographics. They find that pessimism regarding the purchasing power of pensions (the second question of the four expectations questions) has a significant negative effect on all reported satisfaction levels. This implies that those who are more pessimistic about the future purchasing power of Dutch pensions

are also less happy with their own pension (both on the whole and with different aspects) and with the Dutch pension system in general. This seems plausible, since the pessimistic expectations concerning the system may also imply lower expectations about the future generosity of own pension provisions, which may lead to less satisfaction with these provisions. De Bresser and van Soest also find negative shocks of the crisis to average satisfaction with (expected) income during retirement, overall pension satisfaction, and satisfaction with the insight into one's pension.

4. The economic crisis, financial decisions and retirement expectations

We already mentioned in the introduction that the economic crisis of 2008–2009 had a major impact on retirement saving of many individuals around the globe. In the Netherlands, most retirement savings are mandatory contributions to second pillar occupational pensions, and the accumulated contributions are managed by occupational pension funds. Part of this pension wealth is invested in risky assets, and as a consequence of the financial crisis, the total value of the assets of all pension funds fell from 720.8 billion euros at the end of 2007 to 638.6 billion euros at the end of 2008.¹⁰ An interesting question is whether the economic crisis and the recurring bad news concerning people who lost their pension or their job, affected expectations and behaviors with regard to retirement. In June 2009, in a yearly survey of the Pension Barometer, some questions were included concerning the expected impact of the economic crisis on retirement expectations and on saving and portfolio choice. This section presents some findings based on these questions. First, we analyze how serious our respondents expect the crisis to become in the near future.

¹⁰ Source: J.L. Gebraad (2009), "Financiële crisis slaat gat in de beleggingen van institutionele beleggers in 2008," Statistics Netherlands, The Hague/Heerlen; preliminary figures for 2009 are 624.0 billion euros and 646.2 billion euros at the end of the first and second quarter, respectively. A less dramatic decline is observed for insurance companies, which also invested a large part of second and third pillar retirement savings: from 353.7 billion at the end of 2007 to 334.7 billion euros at the end of 2008, and 332.6 and 343.3 billion euros at the end of the first two quarters of 2009 (same source).

Then we discuss the ways in which they expect the crisis to affect themselves and their households. Finally, we look at expected and actual changes in behavior in response to the crisis.

4.1 Methodology

In most of the questions we discuss here, the respondents were asked to report to which extent they agreed with certain statements, using a scale from 1 (not at all) to 10 (completely). We tried to avoid inducing unwarranted pessimism by phrasing some questions in a positive manner. For instance, to inquire about the possibility of job loss, we asked respondents (with a job) to say to which extent they agreed with the statement "I am confident that I will keep my current job despite the economic crisis". The analysis below follows the same structure for the various questions. We first present histograms and descriptive statistics, followed by ordered probit estimates controlling for basic demographic variables and for some employment characteristics (see below for details).

The ordered probit is an extension of the traditional probit to a case where the dependent variable y_i can take a small number of ordered discrete values. As is the case for the probit, the model defines a latent variable y_i^* taking the form

$$y_i^* = \mathbf{x}_i' \boldsymbol{\beta} + u_i,$$

where u_i is an error term, assumed to be normally distributed with mean zero and independent of the regressors in the vector \mathbf{x}_i

Then, for a model with m possible outcomes ($m=10$, in our case),

$$y_i = j \text{ if } \alpha_{j-1} < y_i^* \leq \alpha_j.$$

We set $\alpha_0 = -\infty$ and $\alpha_m = \infty$, leading to $(m-1)$ α -parameters to be estimated. To fix the location, we omit the constant term; to fix the scale, the variance of the error term is set to 1. In some models, we use a bivariate ordered probit model, jointly explaining

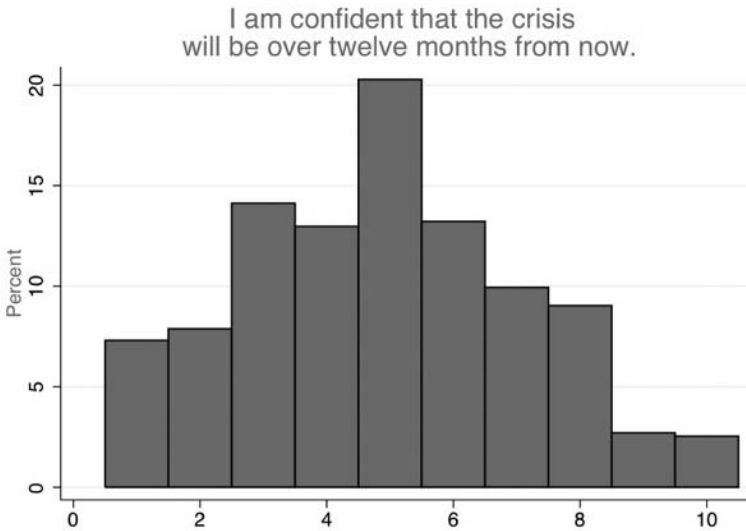
the answers to two questions. In this simple extension, we have two ordered probit equations and allow the error terms in these equations to be correlated (assuming that the vector of the two error terms follows a bivariate normal distribution) with correlation coefficient ρ to be estimated.

The independent variables included in the regression (in \mathbf{x}) are similar to the ones used in Bissonnette et al. (2009). We control for the usual socioeconomic and demographic characteristics (gender, living with partner or not, age and age squared, educational dummies), for the log of net income and a dummy for a missing value on income, and for occupational status (a set of dummies with doing paid work for an employer as a reference category, and with dummies for being self-employed (or employed in a family business), retired, on disability benefits, a homemaker, and unemployed; and a second series of dummies controlling for the sector where someone works or worked, with the manufacturing sector as the reference group and dummies for working in the public sector, the construction sector, financial services, other services, and "other"). In some models, we include more variables or exclude others on a case-by-case basis.

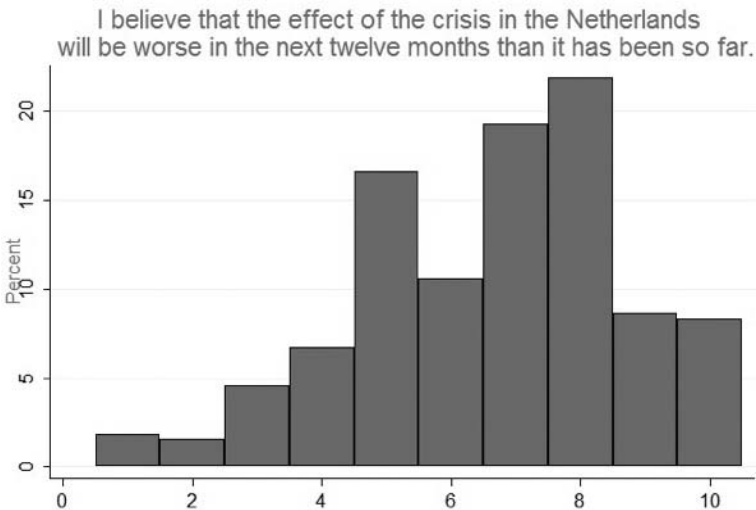
4.2 How serious will the crisis be?

We first analyze how serious the respondents believed that the current economic crisis would be in general, asking to which extent the following two statements applied:

- I am confident that the crisis will be over twelve months from now. (*Over in a year*)
- I believe that the effect of the crisis in the Netherlands will be worse in the next twelve months than it has been so far. (*Worse next year*)



(a)



(b)

Figure 3: Distribution of answers to the question "Please indicate how much the following statement applies to you on a scale from 1 (does not apply at all) to 10 (fully applies)." (N=1,245). (with statements in figure headings)

Both questions had the same ten-point answering scale, from 1 (does not apply at all) to 10 (fully applies). Figure 3 presents the two histograms with the distribution of answers to these questions. The histograms show that there is no consensus on the impact of the crisis during the year following June 2009. In panel (a), the answers range from completely disagreeing with the statement that the crisis will be over in one year (7.7% of respondents answered 1) to completely agreeing (2.7% of the respondents answered 10). Panel (b) reveals that most respondents agree to some extent with the statement that the crisis will be worse in the coming year.¹¹

To analyze whether some groups are more pessimistic concerning the crisis than others, we estimate a bivariate ordered probit model for the answers to both of these questions. The estimation results are presented in Table 1. The table reveals that many variables (gender, partnership status, education, income) are insignificant (at the 5% level). Age and age-squared are jointly significant, but the patterns are quite different from those in Bissonnette et al. (2009) discussed above. Younger individuals are more optimistic than older ones. For the question whether the crisis will be over in a year, the minimum optimism is reached at age 61. And as for thinking that the crisis will be worse next year, maximum pessimism is reached at age 60. These results are more in line with the existing literature on the relation between optimism and age than those in

¹¹ It is not clear yet whether the crisis is over or is still getting worse. It depends on which indicator is considered; see e.g. the graphical tools on the web-site of *Statistics Netherlands* (<http://www.cbs.nl>, available in Dutch and in English), specifically by using its *Business Cycle Tracer*. In May 2010, most of the economic indicators are still below trend, but some of them (e.g., producer confidence, exports, consumption) are progressing while others (e.g. GDP and employment-related measures) are still decreasing.

Table 1: Results of estimation of a bivariate ordered probit to model answers to questions concerning optimism or pessimism regarding the financial crisis. The parameter ρ denotes the correlation between the error terms in the two equations

	Over in a year	Worse next year
Male	0.008 (0.104)	0.123 (1.612)
Partner	0.089 (1.196)	0.040 (0.540)
Age	-0.053*** (-3.190)	0.036** (2.199)
Age-sq./100	0.043*** (2.743)	-0.030* (-1.906)
log(net income)	-0.045 (-0.750)	0.029 (0.484)
Income = 0	-0.254 (-0.609)	0.121 (0.289)
Unkn. Income	0.098 (0.189)	-0.475 (-0.920)
Educ. Med	-0.031 (-0.223)	0.086 (0.606)
Educ. High	-0.092 (-0.668)	0.083 (0.601)
Retired	-0.105 (-0.958)	0.171 (1.550)
Disabled	0.070 (0.496)	-0.048 (-0.339)
Homemaker	-0.243* (-1.870)	0.202 (1.554)
Unemployed	-0.789*** (-3.000)	0.268 (1.036)
Self-employed	0.177 (1.267)	-0.286** (-2.047)
Public sector	-0.297** (-2.423)	0.400*** (3.252)
Construction	-0.525*** (-2.720)	0.332* (1.724)
Financial services	0.232 (1.229)	-0.072 (-0.379)
Other services	-0.416*** (-2.640)	0.337** (2.138)
Other sectors	-0.220* (-1.787)	0.257** (2.090)
Sign of optimism	+	-
ρ	-0.426*** (17.075)	
N	1,213	

t-values in parentheses / * Significant at 10% level
 ** Significant at 5% level / *** Significant at 1% level

Bissonnette et al. (2009); possibly this is because beliefs concerning the economic crisis may be a better measure of pessimism than beliefs concerning social security. A young respondent may even see reduced old age social security as good news, since such a program has a smaller fiscal burden.

We see that many of the occupational sector variables are significant (at the 5% and sometimes even 1% level), implying that the self-employed, workers in the manufacturing sector, and those who work in the financial services sector are more optimistic than others that the crisis will be over in a year. The same groups are also most confident that the crisis will not get worse in the next 12 months. On the other hand, the unemployed and workers in the construction sector are the most pessimistic groups.

4.3 Do individuals expect the crisis will affect their own households?

People may be pessimistic concerning the general state of the economy without being concerned that the crisis will have an impact on their own family. For instance, we would expect public workers to be less concerned about losing their jobs due to the crisis than private workers. Several questions were devoted to how respondents believe the economic crisis will affect them, particularly focusing on two effects of the crisis that were widely covered by the media: the disastrous results of the stock markets and the increase in unemployment. Hence, we can divide the questions asked in this section into various categories: general, pension specific, job-loss specific. Given the focus of the current paper, we only consider the first two categories.

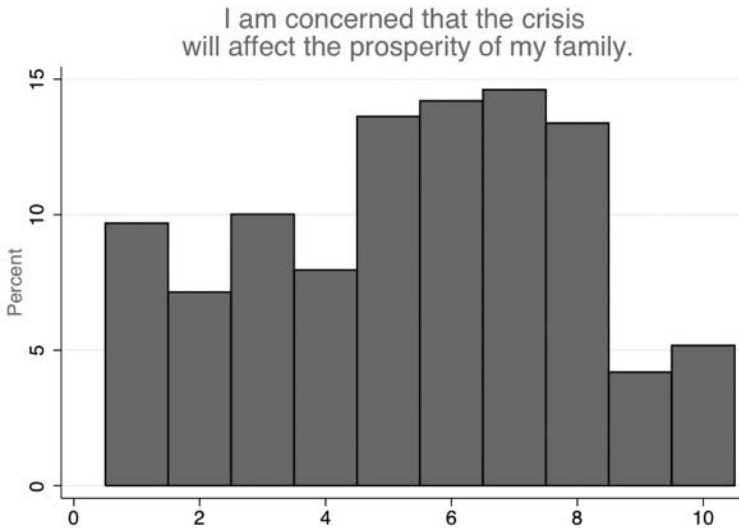


Figure 4: Distribution of answers to the question "Please indicate how much the following statement applies to you on a scale from 1 (does not apply at all) to 10 (fully applies)." (N = 1,245). (with statements in figure headings)

The first, very general, question asks the respondents to which extent the following statement applies to them (on the same ten-point scale as before):

- I am concerned that the crisis will affect the prosperity of my family. (*Family*)

A histogram of the answers is presented in Figure 4. Many respondents thought the statement applied to them to some extent, but there is a lot of variation. The modal answer is 7 (14.6%) and the majority of the answers is in the range from 5 to 8 (56.5%).

Again, we use an ordered probit in order to study the effect of various characteristics on the answer to this question. As independent variables, the same basic demographic variables are used as before, but we also include the answers to the two questions on the expected severity of the crisis in general studied in the previous subsection, allowing us to interpret the results as being conditional on the expected severity of the crisis. The result for the first question is presented in Table 2, column (a). The demographic variables included do not have a significant effect. As before, we see that most of the sector variables are significant and negative, showing that workers in the manufacturing sector are more afraid than are workers in the services sector or the public sector. The two questions concerning the duration of the crisis have the expected sign (and are significant at the 1% level). Those who believe that the crisis will be over next year are less concerned, and those who believe it will be worse in the next 12 months are more concerned.

The other questions are more specific on how the crisis may or may not affect households. We already mentioned that one of the most advertised aspects of the financial crisis was the meltdown of the stock market. One of the questions of interest is whether respondents are aware of the risk they take when investing in this market. To investigate this, we asked the respondents to which extent the following statement applied to them (on the same 10-point scale as before):

- Before the crisis, I underestimated the risk of investing in shares of stock or mutual funds. (*Under. risk*)

A histogram of the answers is presented in Figure 5. We see that 50% of the respondents completely disagreed with this statement. Probably, many respondents already did not participate in the stock

Table 2: Results of various estimations of univariate ordered probits to model answers to questions concerning how the economic crisis is expected to affect households.

	(a)		(c)					
	Family	Under. risk	Think more	Delay retirement	Lost conf. in experts	Difficult to predict	Need increase saving	Delay vs. save more
Male	0.001 (0.077)	0.027 (0.096)	-0.103 (0.096)	0.042 (0.096)	0.087 (0.093)	0.026 (0.094)	0.086 (0.094)	0.237** (0.096)
Partner	0.118 (0.075)	0.035 (0.091)	0.039 (0.096)	0.035 (0.097)	-0.052 (0.094)	-0.031 (0.095)	-0.033 (0.095)	-0.056 (0.097)
Age	0.002 (0.017)	0.009 (0.021)	-0.045 (0.041)	0.130*** (0.041)	0.012 (0.030)	-0.025 (0.040)	0.054 (0.041)	0.014 (0.041)
Age-sq./100	-0.006 (0.016)	0.001 (0.020)	0.078* (0.044)	-0.154*** (0.045)	0.012 (0.031)	0.037 (0.043)	-0.054 (0.043)	-0.026 (0.044)
Log net-inc. -0.109*	-0.109* (0.060)	-0.010 (0.075)	0.185** (0.087)	0.114 (0.090)	-0.108 (0.083)	0.035 (0.085)	0.047 (0.086)	-0.023 (0.087)
Income = 0	-0.511 (0.418)	0.241 (0.524)	1.636** (0.658)	1.101 (0.679)	-0.634 (0.625)	0.162 (0.646)	0.148 (0.649)	0.104 (0.660)
Unk. Income	-0.072 (0.517)	0.157 (0.690)	1.879*** (0.713)	1.224* (0.732)	-0.952 (0.682)	0.763 (0.700)	0.536 (0.703)	-0.083 (0.713)
EducMed	-0.022 (0.142)	0.035 (0.166)	0.253 (0.264)	0.289 (0.268)	0.203 (0.251)	0.382 (0.258)	0.511* (0.265)	-0.058 (0.264)
EducHigh	0.003 (0.139)	-0.045 (0.163)	0.215 (0.258)	0.244 (0.262)	0.110 (0.244)	0.312 (0.252)	0.428* (0.258)	-0.025 (0.257)
Unemployed	0.110 (0.259)	-0.476 (0.336)	-0.424 (0.275)	0.021 (0.284)	0.142 (0.275)	-0.120 (0.276)	-0.287 (0.280)	-0.644** (0.294)
Disabled	-0.033 (0.141)	-0.155 (0.172)	-0.039 (0.154)	-0.233 (0.159)	-0.088 (0.146)	0.115 (0.151)	-0.144 (0.152)	-0.286* (0.158)
Homemaker	-0.177 (0.130)	-0.479*** (0.167)						
Retired	-0.019 (0.110)	-0.298** (0.133)						
Public sector	-0.395*** (0.123)	-0.028 (0.148)	-0.307** (0.135)	-0.139 (0.135)	-0.404*** (0.134)	-0.429*** (0.134)	-0.355*** (0.134)	-0.009 (0.135)
Self-employed	-0.045 (0.141)	0.141 (0.178)	-0.227 (0.146)	-0.139 (0.146)	-0.112 (0.143)	-0.099 (0.143)	0.108 (0.143)	0.103 (0.144)
Construction	-0.176 (0.192)	0.336 (0.224)	0.131 (0.210)	0.126 (0.210)	-0.290 (0.211)	-0.142 (0.210)	-0.326 (0.210)	0.073 (0.210)
Financial services	-0.171 (0.190)	-0.166 (0.234)	-0.201 (0.212)	-0.282 (0.214)	-0.729*** (0.211)	-0.514** (0.211)	-0.492** (0.211)	-0.208 (0.214)
Other services	-0.313** (0.158)	0.099 (0.188)	-0.207 (0.169)	-0.212 (0.169)	-0.382** (0.167)	-0.243 (0.167)	-0.246 (0.167)	0.087 (0.168)
Other sectors	-0.264** (0.123)	-0.009 (0.148)	-0.222 (0.140)	-0.247* (0.140)	-0.336** (0.138)	-0.199 (0.138)	-0.156 (0.138)	-0.063 (0.140)
Over one year	-0.071*** (0.015)	-0.002 (0.018)	-0.039** (0.020)	-0.072*** (0.020)	-0.031 (0.019)	-0.074*** (0.019)	-0.055*** (0.019)	0.016 (0.020)
Worse next year	0.136*** (0.016)	0.003 (0.020)	0.038* (0.021)	0.087*** (0.021)	0.060*** (0.020)	0.087*** (0.021)	0.073*** (0.021)	0.046** (0.021)
Held stock in 2008		0.474*** (0.086)						
Sign of optimism	-	NA	NA	-	-	-	-	NA
N	1213	986	699	699	712	699	699	699

t-values in parentheses / * Significant at 10% level / ** Significant at 5% level / *** Significant at 1% level

market before the crisis, since they perceived it as too risky. To control for this, we added a variable indicating whether a respondent held stocks in his portfolio in 2008 to the ordered probit for this question.¹²

The result of an ordered probit estimation for this question is presented in Table 2, column (b). Only three variables are significant at the 5% level: being retired, being a homemaker, and, particularly, holding stock in 2008. Retired respondents and homemakers are less likely than workers to say they underestimated the risk of the stock market. Stock holders, on the other hand, are more likely to say they underestimated this risk. This last result is in line with our expectations.

Concerns about pensions

The following questions asked the respondents directly about the expected impact of the crisis on their pensions and retirement plans:

To which extent do the following statements apply to you (1=not at all, ..., 10= fully applies):

- Because of the economic crisis, I have started to think more about my retirement and my pension. (*Think more*)
- I think that due to the current crisis, I will delay my retirement. (*Delay retirement*)
- Due to the current crisis, I have lost my confidence in financial experts and advisors. (*Lost conf. in experts*)

¹² This variable comes from the *DNB Household Survey* (DHS), in which respondents answered a series of questions on assets and wealth. This information is not available for all respondents in our sample, leading to a loss of about one fifth of the sample.

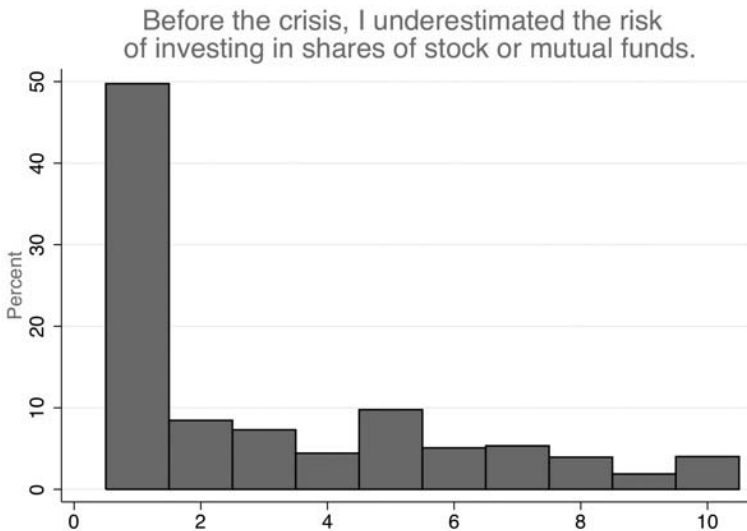


Figure 5: Distribution of answers to the question "Please indicate how much the following statement applies to you on a scale from 1 (does not apply at all) to 10 (fully applies)." (N = 1,245). (with statements in figure headings)

- Because of the crisis, it has become more difficult for me to say what my financial situation will be after retirement. (*Diff. predict*)
- In light of the recent events, I need to increase my savings for retirement. (*Need increase saving*)
- I would rather delay my retirement by a few years than put aside more money to save for my retirement. (*Delay vs. save*)

These questions were not asked to already retired individuals or to homemakers. Therefore, the following discussion relies on a sub-

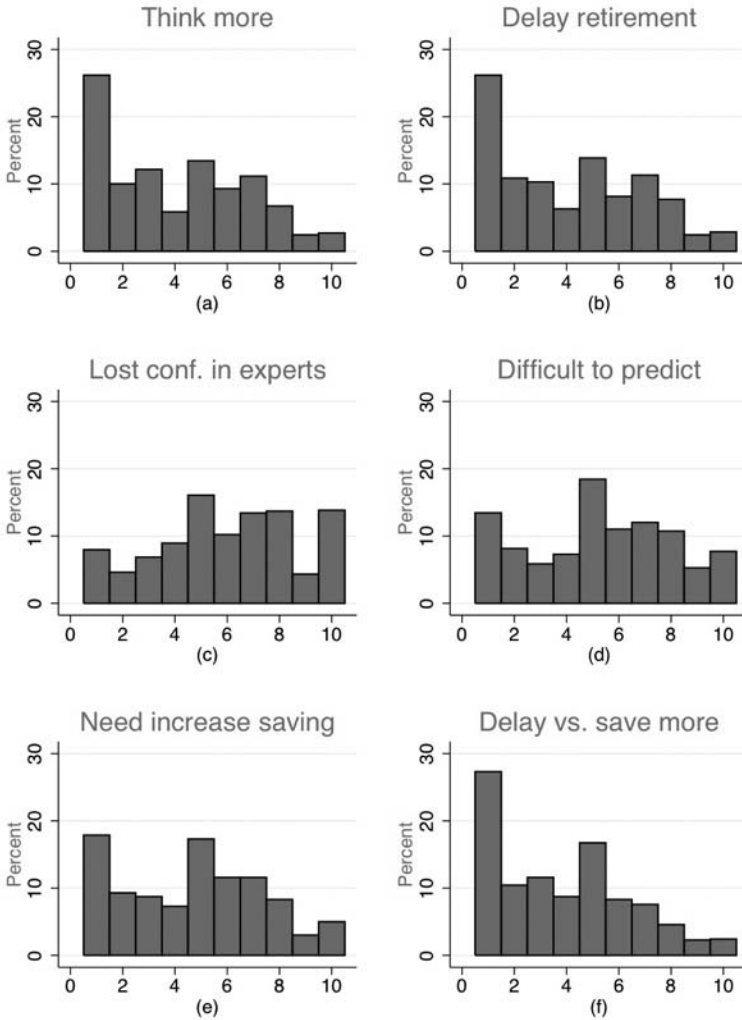


Figure 6: Distributions of answers to the question “Please indicate how much the following statement applies to you on a scale from 1 (does not apply at all) to 10 (fully applies).” (N = 739). (with statements in figure headings)

sample of 698 respondents.¹³ We present the histograms of these answers in Figure 6. As before, there is enormous variation in the answers across the sample. A minority of the respondents has started to think more about retirement because of the crisis, and another minority of similar size thinks the crisis will induce them to delay retirement. Many more people indicate that they have lost their confidence in financial experts and found it harder to forecast their financial situation after retirement. Most people do not see a strong need to increase their retirement savings – but even fewer people would rather delay retirement than increase savings.

Ordered probit estimates for all of these variables are presented in Table 2, part (c). The only variables that are almost systematically significant (at the 5% level and often also at the 1% level) are the ones related to the severity of the crisis, illustrating the value of measuring expectations directly. Respondents who are more pessimistic about the severity of the crisis in the (near) future have a larger tendency to respond to it, as expected. Higher income individuals started to think more about retirement, possibly because they can make more retirement-related decisions, and have more flexibility on how much to save and when to retire. The quadratic trend in age implies that respondents aged 42 are the ones who are most likely to say that the crisis will lead them to delay retirement. Keeping expectations about the general nature of the crisis (and other explanatory variables) constant, public sector workers are less pessimistic than are private sector workers in the manufacturing sector on several aspects of how the crisis will affect their own households. Workers in the financial services sector are

¹³ We also excluded a few respondents who reported they were not retired but were 65 years of age or older, except for the question concerning confidence in financial planners and experts (for which we have 712 respondents).

also quite optimistic in some questions, and are less likely to have lost confidence in financial experts and advisors.

We asked the respondents directly about the expected impact of the economic crisis on their retirement, using the following questions:

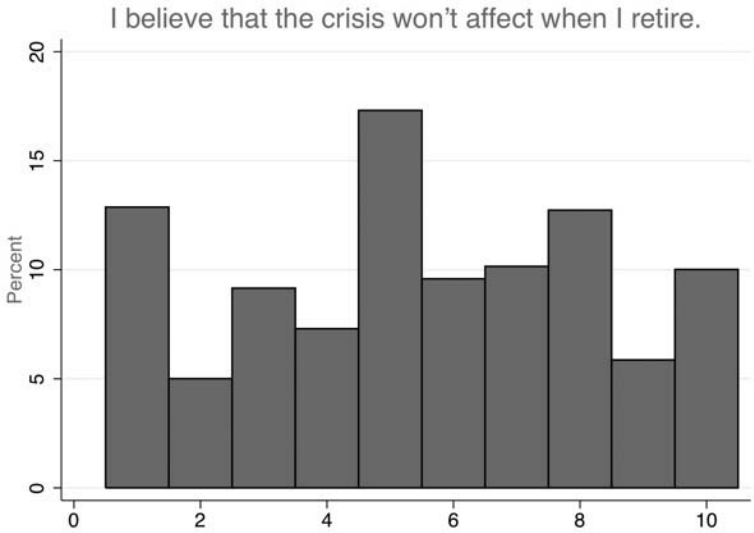
To which extent do the following statements apply to you?

(0: does not apply at all, ..., 10: fully applies)

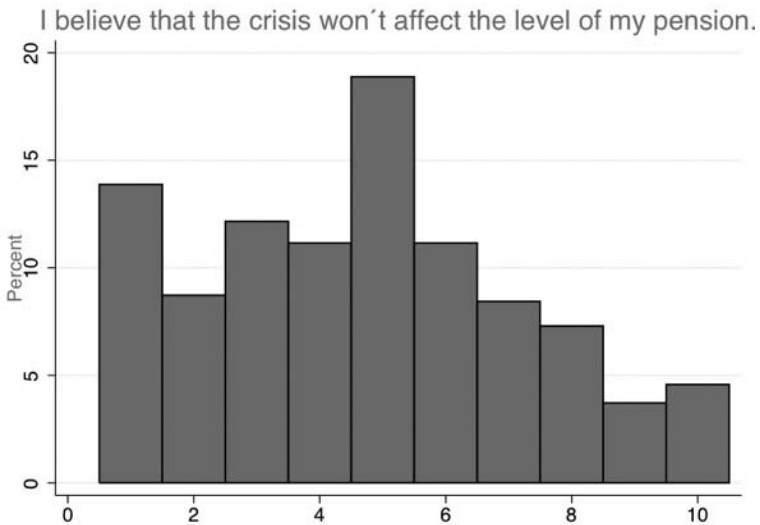
- I believe that the crisis won't affect when I retire. (*Not affect when*)
- I believe that the crisis won't affect the level of my pension. (*Not affect level*)

These questions can be compared with the probability questions on pensions and social security in general discussed in the previous section, but here they refer to the situation specific to the respondents and not the general situation in the Netherlands. The distribution of the answers is shown in Figure 7. Respondents are on average more confident that the crisis will not affect when they retire than that it will not affect their level of retirement income. In fact, 298 respondents out of 739 expressed higher agreement with the first statement while only 112 agreed more with the last one. The others used exactly the same answer for both. As a consequence, the answers to these probability questions are highly correlated, with a correlation coefficient of 0.513.

Bivariate ordered probit results for these two questions are presented in Table 3. Gender, partnership status, education and income have no significant effect. For the question whether the crisis will not affect timing of retirement, we find a quadratic age pattern reaching maximum optimism at age 46. The unemployed



(a)



(b)

Figure 7: Distribution of answers to the question "Please indicate how much the following statement applies to you on a scale from 1 (does not apply at all) to 10 (fully applies)." Panel (a) concerns the timing of retirement. Panel (b) concerns the level of retirement income. (N=739)

Table 3: Results of estimation of a bivariate ordered probit to model answers to questions concerning the expected consequences of the crisis for the timing of retirement and the level of pension income. The parameter ρ denotes the correlation between the error terms in the two equations

	Not affect when	Not affect level
Male	-0.014 (-0.149)	-0.054 (-0.575)
Partner	-0.031 (-0.331)	0.047 (0.503)
Age	0.065** (2.147)	-0.031 (-1.029)
Age-sq./100	-0.070** (-2.219)	0.033 (1.066)
log(net income)	0.047 (0.567)	-0.085 (-1.022)
Income = 0	0.075 (0.118)	-0.569 (-0.906)
Unkn. Income	-0.079 (-0.114)	-1.000 (-1.454)
Educ. Med.	0.236 (0.926)	0.087 (0.346)
Educ. High	0.247 (0.999)	-0.031 (-0.128)
Disabled	0.100 (0.679)	0.090 (0.616)
Unemployed	-0.215 (-0.777)	-0.597** (-2.140)
Public Sector	0.030 (0.226)	-0.057 (-0.425)
Self-Employed	0.017 (0.119)	0.190 (1.341)
Construction	-0.041 (-0.194)	0.063 (0.303)
Financial services	0.088 (0.420)	0.252 (1.206)
Other services	0.208 (1.247)	0.000 (0.000)
Other sectors	0.012 (0.089)	-0.204 (-1.479)
Over next year	0.098*** (5.073)	0.103*** (5.395)
Worse next year	-0.036* (-1.767)	-0.038* (-1.885)
Sign of optimism	+	+
ρ	0.514*** (16.865)	
N	712	

t-values in parentheses / * Significant at 10% level
 ** Significant at 5% level / *** Significant at 1% level

disagree more than others with the statement that the crisis will not affect their level of retirement income. This may be due to the fact that finding a new job will be harder given the current situation. Financial workers are more confident that the crisis will not affect their level of retirement income. For both questions, one of the significant variables (at the 1% level) concerns the possibility that the crisis will be over within a year. These estimates have the expected sign: those who think the crisis will be over soon expect a smaller impact on their retirement age or retirement income.

4.4 How does the crisis affect retirement savings behavior?

The following question directly asks about changes in retirement savings:

- Do you save specifically for your retirement?(Here you can think about savings accounts, life insurance, etc. that you want to use after your retirement; do not include your occupational pension, if you have one)
 1. No, not before the crisis and not now;
 2. Not before the crisis but now, yes;
 3. Before the crisis, yes, but not now;
 4. Yes, both before the crisis and now.

If the respondent chose answer 4, this question was followed by

- Did you change how much you save for retirement because of the crisis?
 1. No;
 2. Yes, I am saving more now;
 3. Yes, I am saving less now.

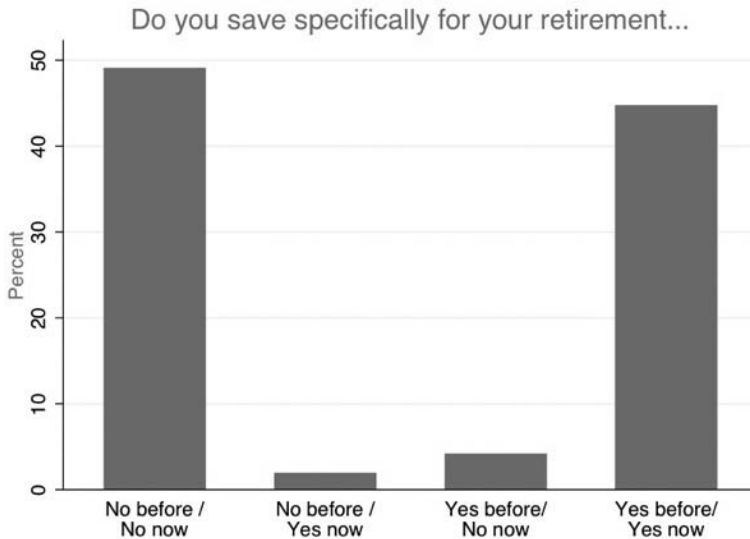
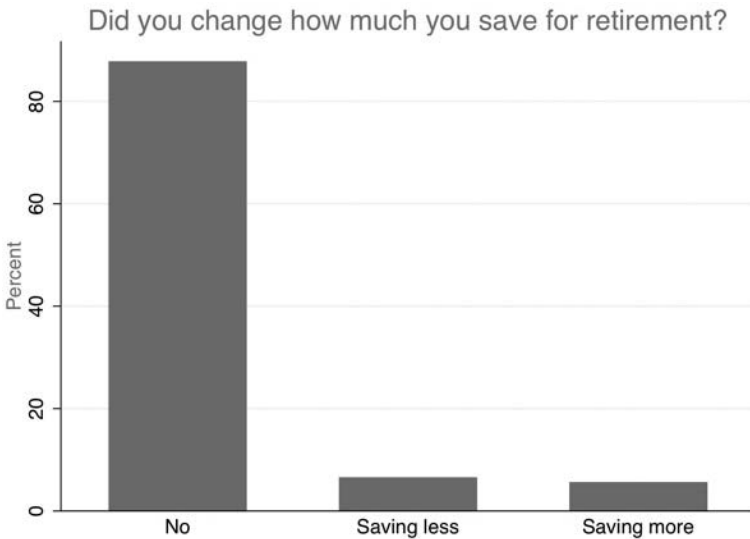


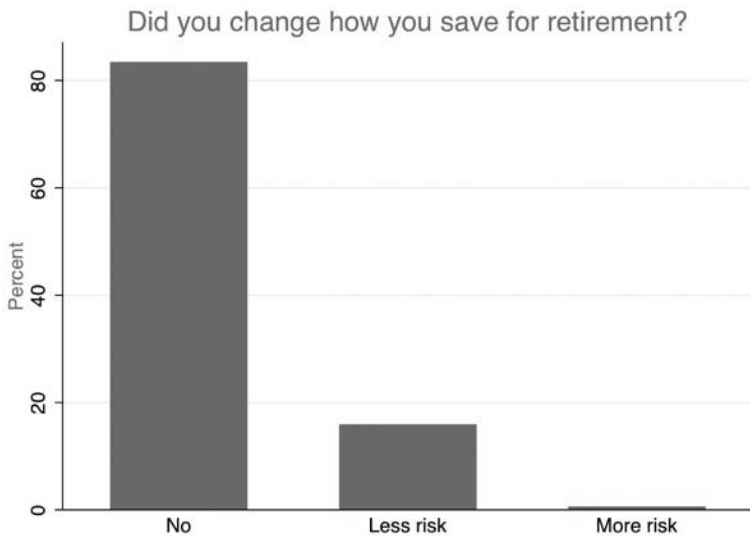
Figure 8: Distributions of answers to question concerning saving for retirement before and after the economic crisis (N = 712).

- Did you change how you save for retirement because of the crisis?
 1. No;
 2. Yes, I invest more in low-risk assets such as savings accounts;
 3. Yes, I invest more in risky assets like stocks or stock mutual funds.

Figure 8 presents the distribution of the answers to the first question. The distributions of the two follow-up questions are presented in Figure 9. The first figure shows that the economic crisis affected the saving behavior of a small fraction of households only. At least in the short run, most people do not prepare for an eventual problem with their pension that might result from the crisis. The lack of variation makes it hard to estimate models to



(a)



(b)

Figure 9: Distributions of answers to follow-up questions concerning changes in saving behavior due to economic crisis, conditional on declaring saving for retirement both before and after the crisis (N = 320).

explain how respondents respond to the crisis; we tried to estimate a probit on the probability of starting to save after the crisis conditional on not saving before, but this did not lead to insightful results. The second figure confirms that most of the respondents who save for retirement before and after the onset of the crisis do not have the intention of changing their saving behavior due to the economic crisis.

We jointly model the answers to the two follow-up questions concerning saving more or less and saving with riskier or safer assets, using a bivariate ordered probit. Results are presented in Table 4. As we might expect (due to the small number of observations), only few variables are significant. Workers in the financial services sector are less likely to save more, and more likely to save less, than other groups. Those who believe the crisis will be over next year are more likely to go for risky assets. Given the previously obtained results, both results make sense.

4.5 What did we learn on the beliefs about the crisis and response to the crisis?

So what can be said about the perceptions and expectations of the Dutch population concerning the financial and economic crisis? It seems that they were aware of the crisis and were, to some extent, concerned about its consequences. However, the answers show no sign of panic or excessive pessimism. In general, our estimates indicate that there is substantial heterogeneity in answers, even when we control for various demographic characteristics, employment status, and the employment sector.

It seems that many respondents believe that the crisis will affect their retirement age or the level of retirement income. It is puzzling why many respondents believe more strongly that the crisis will

Table 4: Results of estimation of bivariate ordered probits to model answers to questions concerning behavioral responses to the crisis. The parameter ρ denotes the correlation between the error terms in two equations estimated jointly.

	Save more now	Take less risk
Male	-0.314 (-1.486)	-0.167 (-0.794)
Partner	-0.073 (-0.366)	0.026 (0.130)
Age	-0.027 (-0.306)	0.032 (0.341)
Age-sq./100	0.032 (0.363)	-0.001 (-0.007)
log(net income)	0.207 (0.994)	0.033 (0.151)
Income = 0	0.679 (0.432)	-0.558 (-0.329)
Unkn. Income	0.495 (0.288)	0.451 (0.244)
Educ. Med.	0.388 (0.550)	-1.086* (-1.856)
Educ. High	0.178 (0.258)	-0.406 (-0.739)
Disabled	0.416 (1.215)	-0.118 (-0.348)
Unemployed	-0.324 (-0.476)	-0.585 (-0.685)
Self-Employed	0.237 (0.800)	0.454 (1.611)
Public	0.029 (0.124)	-0.155 (-0.652)
Construction	-0.098 (-0.208)	-0.071 (-0.153)
Financial	-1.158*** (-2.714)	-0.047 (-0.099)
Service	-0.117 (-0.381)	-0.358 (-1.169)
Manufacturing	0.217 (0.714)	-0.256 (-0.795)
Over in a year	0.033 (0.745)	-0.094** (-2.081)
Worse next year	0.084* (1.786)	0.008 (0.165)
Sign of optimism	-	-
ρ	-0.023 (-0.225)	
N	320	

t-values in parentheses / * Significant at 10% level
 ** Significant at 5% level / *** Significant at 1% level

affect their level of retirement income rather than the timing of retirement. It seems many respondents see this timing as an exogenous event over which they don't have much power. Only very few of them respond to this by increasing their retirement saving. There is general concern that the crisis will affect prosperity, but not specifically after retirement. It would be worthwhile to investigate how true this statement is, as flexibility of retirement is important for retirement savings, as we discussed in Section 2. Nevertheless, there is strong evidence that respondents do not intend to change their behavior in the short run, even if they often acknowledge that they should do more.

5. Pension system expectations and financial decisions

This section investigates whether expectations concerning the generosity of the system of public and private pensions affect financial decisions. Section 3 introduced the *Pension Barometer Survey*, where respondents report their expectations concerning the future of the Dutch pension system.

If households make financial decisions in an intertemporal framework in which expectations concerning future incomes affect current decisions on saving and portfolio choice, then the elicited beliefs should have predictive power for pension-related saving decisions. We investigate this using the information contained in another survey, administered to the same respondents, the *DNB Household Survey*. Each year, this survey provides rich and detailed information on, among other things, household assets and debts, and attitudes towards savings. We analyze whether the subjective probability questions on the future generosity of public and private pensions in the *Dutch Pension Barometer* have explanatory power for the motivation to save for retirement, for wealth and debt accumulation, and for portfolio choices.

Our work in this section is related to several other papers. The first two used previous waves of the DNB Household Survey. Euwals, Eymann, and Börsch-Supan (2004) analyzed within-household decision processes concerning saving and portfolio choice and found among other things, that the wife has a higher say in household saving decisions the higher her share is in household income. Our research question is quite different, but we use the same measures of saving and assets. A second related study is Van der Wiel (2008), described in Section 3, which analyzed the effect of

subjective beliefs concerning the future generosity of old age social security on the decision to use third pillar saving for retirement.

Brown, Garino, Taylor, and Price (2005) found a significant effect of expectations concerning the own household's future financial situation on asset accumulation in the United Kingdom. They used a measure of expectations that was quite different from the ones we use, based upon the question "Looking ahead, how do you think you will be financially a year from now?" Respondents had to select either "Better off", "Worse off than you are now", "About the same", and "Don't know." Finally, Guiso et al. (2009), discussed in Section 2, found that Italian households tried to attenuate the adverse consequences of pension wealth uncertainty by increasing demand for targeted retirement saving and for insurance.

We look at the effects of the subjective beliefs on third pillar pension products and on total wealth, but also on debt accumulation. What do we expect to find, based on some intuition from the life-cycle theory? As discussed in Sections 2 and 3, the effect of future changes in social security on saving is ambiguous if they can also lead to changes in the age of retirement. If respondents plan to postpone retirement so that they can increase their life-time income, they may actually need less saving in the future. In other words, therefore, we cannot unambiguously say whether changes in pension policy should lead to an increase or decrease in saving, according to theory. It depends on the nature of the policy change and its implications for the retirement age. All else kept constant, respondents who expect lower benefit levels in the future, but no change in the age of (mandatory) retirement, should save more, in order to smooth consumption. Moreover, we would then also expect optimistic respondents to hold riskier portfolios, as richer individuals are usually found to invest larger

shares of their wealth in risky assets (see, e.g., Alessie, Hochgürtel, and van Soest (2002) for the Netherlands). More optimism then leads to lower amounts in safe assets (saving accounts, bonds, some types of life insurance), but the effect on stocks is ambiguous.

The effect is less straightforward if the retirement age changes. If the increase in the retirement age is the same as that of the age of pension eligibility (thereby forcing an individual to work longer), life-time income may increase and retirement savings may actually fall. On the other hand, if the retirement age is flexible and leisure is a normal good, then a reform reducing the generosity of the pension system will probably lead to later retirement and higher life-time income, but it is not clear whether this will compensate for the negative effect keeping the retirement age constant. This shows that *a priori*, the sign of the effect of a policy change reducing the generosity of old age social security or occupational pensions on saving is ambiguous.

5.1 Construction of variables and sample selection

As already mentioned, this section relies on two surveys. The *Pension Barometer Survey* is a rotating monthly survey in which each respondent participates once every three months. The *DNB Household Survey* is a yearly survey. To combine these two data sources, we took the probabilities reported at the point in time closest to the annual measurement of asset holdings or saving attitudes. To select the relevant sample for the benchmark estimations, we used the following criteria:

1. Respondent is younger than 65 (or not older than 55).
2. Respondent is head of the household.
3. Respondent has paid work as an employee or is self-employed.

The age 65 criterion seems evident, since almost no one retires after age 65. We will also consider estimates for respondents not older than 55 only, because respondents older than 55 may not be concerned by changes in eligibility age or changes in the generosity of social security that only take place ten years from now, as they would already be retired by the time of the policy change. Respondents aged 55 to 65 may be more concerned by lack of indexation of their occupational pensions. Motivating the selection of household heads only is our expectation that most financial decisions are made at the household level. Moreover, we do not always observe the respondent's partner in our sample. The third condition implies that we do not include unemployed individuals. This is because their unemployment may be temporary, in which case the observed accumulated assets will reflect more a short-run reality than long-run planning.

The explanatory variables are similar to those used in the previous section, but we add the subjective beliefs concerning the future of the pension system. We focus on the beliefs concerning changes in the public pension system, as these were directly relevant in the recent policy debate, but also consider the beliefs concerning generosity of occupational pensions and the average retirement age.

We also control for individual health, since different health levels may have implications for life-expectation and health care costs. We do this by including dummy variables for self-assessed health ("good", "fair", and "not so good/bad"; "very good" is the benchmark).

Finally, we already discussed problems related to income. Given that we only consider individuals who have paid work, we dropped

individuals reporting zero income. We also dropped respondents reporting a monthly income of more than 8,000 Euros.

5.2 Attitude toward saving for old age

The first variable of interest here concerns the attitude toward saving for old age, also used in Euwals et al. (2004, section 4). That study uses one of the questions on motives for saving in the DNB Household Survey:

People have many different reasons for saving money for a short or for a longer time. Please indicate your opinion about each statement mentioned below.[...] Please indicate on a scale from 1 to 7 how important it is to you, where 1 means 'very unimportant' and 7 means 'very important'.

Motive: To save to supplement my general old-age pension.

A histogram of the answers is presented in Figure 10; all respondents are included once here – with the answers they gave the first time they got this question. Many people consider "saving to supplement old-age pension" as an important motive for saving, but there is substantial heterogeneity.

We use an ordered probit model to explain the answers to this question (see the previous section), including a random individual effect to capture unobserved heterogeneity, assumed to follow a normal distribution with mean zero and standard deviation σ_u , independent of the explanatory variables. Estimation results are presented in the first and third columns of Table 5 for the at-most-55 and the younger-than-65 groups, respectively.

Few variables are significant. Males attach less importance to saving for retirement than females, perhaps because they tend to

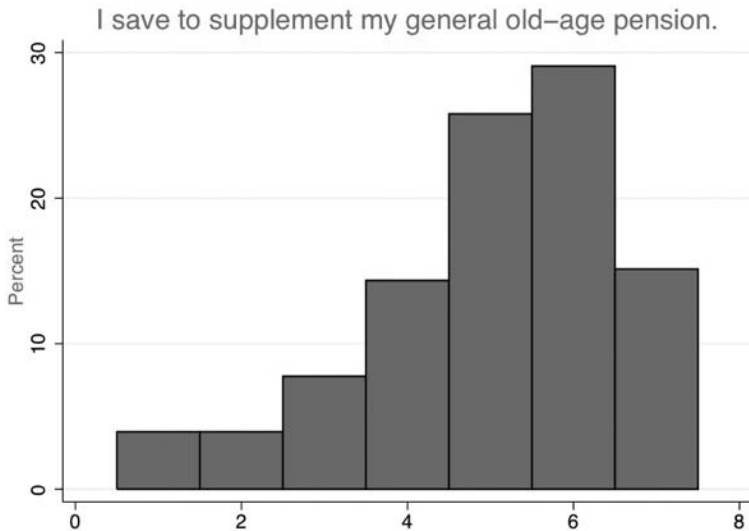


Figure 10: Importance of saving to supplement general old-age pension (N = 760).

have uninterrupted full-time working histories, leading to higher occupational pensions. This also explains why self-employed individuals are more likely to find saving for retirement important than private sector workers, whereas public sector workers find it less important.

Respondents who believe that the AOW benefits will be less generous in ten years time, attach a higher importance to (private) saving for retirement, though the effect is significant (at the two-sided 5% level) only if we do not include the age group 55–65. For this age group, the situation ten years from now will not matter much if they expect that the reforms will not apply to people like themselves who reach age 65 earlier. The effect of beliefs concerning later eligibility to AOW benefits is also positive but quite small and

Table 5: Estimation results of Random-Effect Models Explaining Motive to Save for Retirement and Log Net Wealth.

	Aged 55 and less		Aged 65 and less	
	Motive RE O. Probit	Log-Net Wealth RE Reg.	Motive RE O. Probit	Log-Net Wealth RE Reg.
Male	-0.626*** (-4.334)	1.334* (1.862)	-0.645*** (-4.584)	1.214* (1.860)
Partner	-0.082 (-0.692)	1.716*** (2.885)	-0.062 (-0.539)	1.559*** (2.902)
Age	-0.090 (-1.249)	1.306*** (3.505)	-0.060 (-1.204)	0.787*** (3.106)
Age-sq./100	0.133 (1.557)	-1.355*** (-3.054)	0.096* (1.728)	-0.702** (-2.453)
Log net-inc.	0.173 (0.921)	2.944*** (3.664)	0.159 (0.963)	2.531*** (3.714)
Educ. Med	-0.062 (-0.169)	-1.696 (-0.849)	-0.001 (-0.004)	-1.430 (-0.915)
Educ. High	0.138 (0.394)	-0.596 (-0.312)	0.088 (0.278)	-0.320 (-0.211)
Self-employed	0.682*** (3.276)	-0.258 (-0.251)	0.439** (2.263)	-0.484 (-0.522)
Public sector	-0.296* (-1.891)	0.158 (0.201)	-0.317** (-2.138)	-0.231 (-0.330)
Construction	0.034 (0.140)	2.452* (1.896)	0.002 (0.007)	1.900* (1.647)
Financial services	-0.404 (-1.645)	0.985 (0.761)	-0.374 (-1.574)	0.099 (0.085)
Other services	-0.276 (-1.515)	0.327 (0.353)	-0.234 (-1.329)	-0.011 (-0.013)
Other sectors	0.097 (0.587)	0.322 (0.402)	0.088 (0.564)	0.067 (0.093)
Health - good	0.172 (1.388)	-0.004 (-0.007)	0.079 (0.681)	-0.111 (-0.219)
Health - fair	0.109 (0.626)	0.501 (0.629)	-0.019 (-0.123)	0.423 (0.601)
Health - not so good	-0.245 (-0.773)	-2.060 (-1.489)	-0.251 (-0.867)	-1.929 (-1.549)
Year 2007	0.148** (1.992)	-0.271 (-1.198)	0.156** (2.267)	-0.150 (-0.766)
Year 2008	0.091 (1.125)		0.090 (1.231)	
Prob. less generous AOW	0.297** (1.972)	-0.360 (-0.587)	0.165 (1.230)	-0.037 (-0.071)
Prob. delayed AOW	0.066 (0.394)	-0.155 (-0.216)	0.105 (0.687)	-0.333 (-0.545)
Constant		-44.795*** (-4.833)		-31.620*** (-4.411)
Number Ind.	652	561	760	641
Number Obs.	1,377	882	1,661	1,033
σ_u	1.188	6.009	1.336	5.780
σ_e		2.853		2.726

t-values in parentheses / * Significant at 10% level
 ** Significant at 5% level / *** Significant at 1% level

insignificant, possibly because those expecting later eligibility also expect to work longer.

5.3 Net wealth

The *DNB Household Survey* contains detailed information on various types of household assets and debts. We used this information to construct various measures of net household wealth, gross household wealth, and household debts, including or excluding owner-occupied housing and mortgage debt. We focus on the results for log (*net wealth*), the log of the difference between the total value of financial and housing assets minus financial debt including mortgages.¹⁴

The distribution of log net wealth is shown in Figure 11. Here, all respondents are included only once, the first time they are in the sample during the time period considered. The mean value of net wealth is 155,800 euros, and the median value is 98,200 euros.

We model log net wealth with a linear random-effects model. Results are presented in the second and fourth columns of Table 5 for the at-most-55-year-olds and for everyone younger than 65, respectively. As expected, we see that higher income and having a partner have a positive effect on net (household) wealth. We find a significant age pattern, with a quadratic trend, increasing along most of the age range (the maximum is at age 48 (column 2) or age 56 (column 4)). There are no significant differences across sectors or years.

¹⁴ If *net wealth* is zero, the log is set to zero; if it is negative, the log is replaced by $-\log(-\textit{net wealth})$. See the Appendix for a list of the included financial assets and debts.

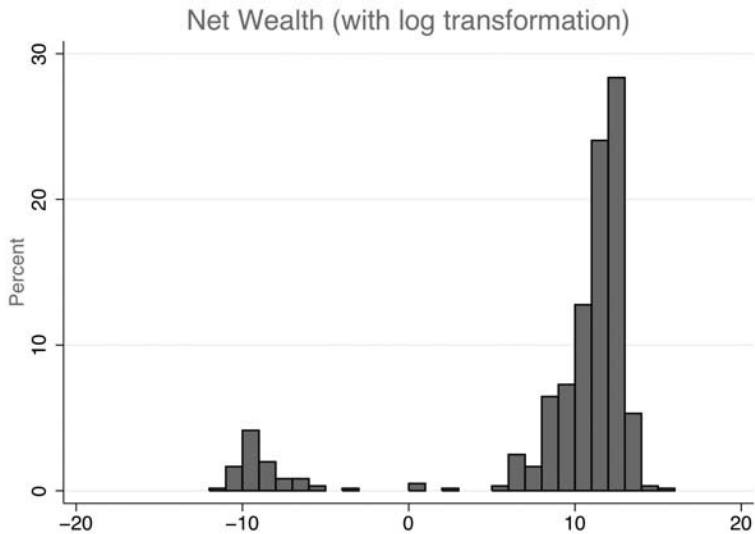


Figure 11: Distribution of net wealth (with log-transformation); first observations only (N=641).

We do not find significant effects of the subjective probabilities concerning the future generosity of social security for either age group.

We checked how these results changed when using different pension expectations or different wealth measures, but we do not present the details to save space. Using the probabilities that AOW benefits will be worth “more than 10% less than now” instead of simply “less than now,” and that the eligibility age “will be postponed with at least two years” instead of just “postponed,” hardly changes the estimates. Taking net financial wealth excluding mortgage debt instead of net wealth including housing and mortgage debt, or ignoring debts altogether, does not change much either: the public pension expectations remain insignificant. We

also do not find the expected negative effect of pessimistic expectations on debt. This seems to contradict results of Brown et al. (2005), but it may be the case that debt is a short-run concept, so that beliefs concerning next year are more important in explaining debt-holding than are long-run beliefs such as pension-related expectations.

Moreover, we found no evidence that pessimistic expectations concerning the future purchasing power of occupational pensions or the average age at which people will stop working would lead to more saving. Unlike the public pension expectations, the occupational pension expectations do not even have the expected effect on the attitude towards saving for retirement.

5.4 Portfolio composition

As there are many motives to save, we would expect many other factors than beliefs concerning pensions to drive the accumulation of financial and housing wealth. Specific assets related to financial security in old age may be more affected than other types of assets. Given that the *DNB Household Survey* offers a detailed view of a respondent's portfolio composition, we can estimate models separately for different types of assets. We consider three types of assets that were part of the aggregate measure of wealth used in the previous subsection.

For comparison, we first present the amount in *saving accounts* – which, arguably, should probably not be affected much by retirement expectations. Following the definition of Euwals et al. (2004), this measure includes the value of saving accounts, deposit books and saving certificates. Then we consider *single-premium annuities* and *endowment insurance*, two types of assets that should be particularly affected by beliefs toward retirement, as

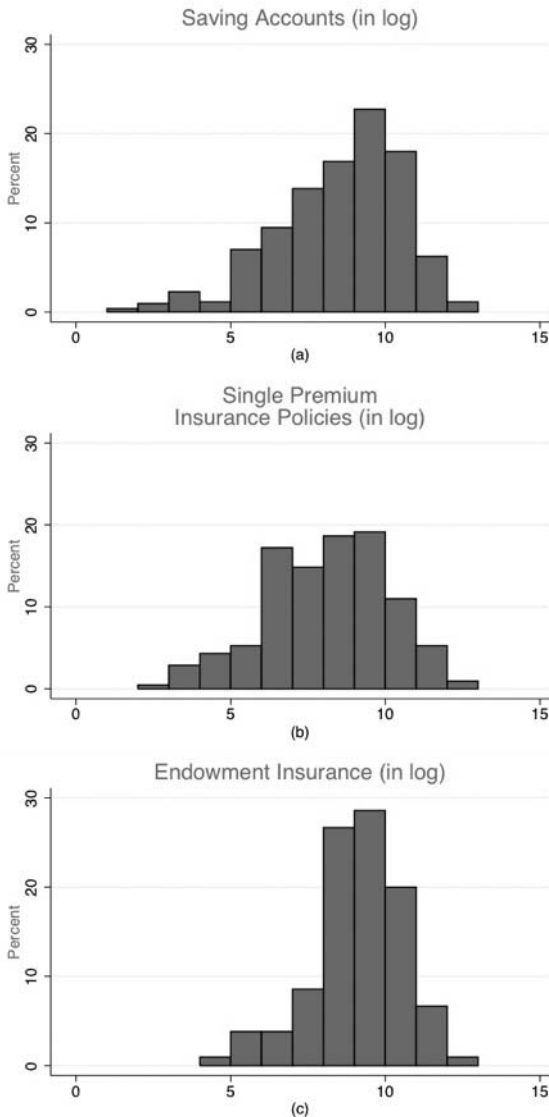


Figure 12: Distribution of non-mortgage wealth and debts (both in log). We consider the answers given by respondents the first time they answered the survey ($N = 641$). Only the non-zero answers are reported here, leading to different observations in each panel ($N = 528$ for panel (a), $N = 209$ for panel (b), and $N = 105$ for panel (c)).

Table 6: Estimation results of random-effects models for portfolio allocation.

	Aged 55 and less			Aged 65 and less		
	Sav Acc. Tobit	S.P. Ann. Tobit	End. Ins. Tobit	Sav Acc. Tobit	S.P. Ann. Tobit	End. Ins. Tobit
Male	0.142 (0.301)	-0.387 (-0.278)	3.246 (1.186)	-0.089 (-0.199)	-0.644 (-0.496)	3.089 (1.208)
Partner	0.557 (1.362)	1.144 (0.973)	0.778 (0.363)	0.603 (1.539)	1.442 (1.292)	1.590 (0.790)
Age	-0.273 (-1.251)	1.449* (1.936)	2.123 (1.587)	-0.215 (-1.316)	1.309** (2.518)	1.134 (1.246)
Age-sqr./100	0.307 (1.177)	-1.393 (-1.575)	-2.463 (-1.553)	0.246 (1.310)	-1.191** (-2.037)	-1.262 (-1.241)
Log net-inc.	2.058*** (3.931)	5.386*** (3.045)	5.620* (1.930)	1.833*** (3.906)	4.478*** (2.960)	7.460*** (2.783)
Educ. Med	0.943 (0.675)	-5.178 (-1.628)	-7.408 (-1.428)	1.206 (1.072)	-6.554** (-2.352)	-7.468* (-1.907)
Educ. High	1.350 (1.008)	-2.383 (-0.794)	-6.275 (-1.292)	1.307 (1.191)	-2.598 (-0.984)	-7.643** (-2.109)
Self-employed	0.306 (0.499)	-0.694 (-0.321)	-10.233*** (-2.740)	-0.052 (-0.087)	-0.357 (-0.181)	-9.201*** (-2.826)
Public sector	0.123 (0.261)	-3.546** (-2.474)	-4.278 (-1.565)	0.048 (0.109)	-2.461* (-1.803)	-4.487* (-1.769)
Construction	0.527 (0.662)	-2.731 (-1.067)	5.324 (1.539)	-0.068 (-0.086)	-0.781 (-0.349)	4.871 (1.468)
Financial services	-1.251 (-1.281)	-3.736* (-1.668)	0.609 (0.141)	-1.209 (-1.393)	-2.681 (-1.292)	2.187 (0.576)
Other services	-0.182 (-0.308)	-1.633 (-0.995)	4.861* (1.714)	-0.044 (-0.082)	-1.120 (-0.694)	5.752** (2.201)
Other sectors	0.286 (0.544)	-1.462 (-0.981)	-3.827 (-1.370)	0.105 (0.220)	-0.580 (-0.400)	-1.926 (-0.756)
Health - good	0.642 (1.342)	1.715 (1.136)	0.200 (0.083)	0.463 (1.027)	1.411 (0.993)	0.746 (0.331)
Health - fair	0.990 (1.631)	0.655 (0.314)	-3.594 (-1.021)	1.112** (2.036)	0.442 (0.229)	-0.781 (-0.257)
Health - not so good	0.285 (0.287)	0.213 (0.063)	0.556 (0.097)	-0.244 (-0.236)	-0.470 (-0.136)	3.137 (0.596)
Year 2007	-0.049 (-0.309)	-0.692 (-1.522)	-0.551 (-0.708)	0.027 (0.197)	-0.567 (-1.392)	-0.646 (-0.896)
Prob. less generous AOW	0.893* (1.659)	1.490 (0.904)	3.792 (1.404)	0.792 (1.633)	1.233 (0.831)	2.818 (1.149)
Prob. delayed AOW	-0.695 (-1.175)	3.998** (2.233)	-2.888 (-0.950)	-0.553 (-0.997)	4.424*** (2.697)	-2.945 (-1.052)
Constant	-4.681 (-0.840)	-79.594*** (-4.260)	-94.762*** (-2.843)	-3.969 (-0.806)	-71.034*** (-4.623)	-88.783*** (-3.394)
Number Ind.	561	561	561	641	641	641
Number Obs.	882	882	882	1,033	1,033	1,033
σ_e	3.716	9.254	13.815	3.698	9.405	13.732

Clustered SE used. / t-values in parentheses / * Significant at 10% level
 ** Significant at 5% level / *** Significant at 1% level

discussed by van der Wiel.¹⁵ The text defining the latter two financial assets is presented in Appendix A. Histograms of the three measures (zeros excluded) are presented in Figure 12. In each case, a large fraction of actual observations are actually zero (18% for the saving accounts, 67% for the single-premium annuities, and 84% for the endowment insurance).

The results of Tobit models explaining the amounts held in these three assets are presented in Table 6.¹⁶ There are several significant parameters to explain portfolio allocation, and most of them have the expected sign. As expected, there is no significant effect of pension beliefs on the amount held in saving accounts. Individuals who believe that the AOW eligibility age will be increased are more likely to buy single-premium life insurance, but the effect on endowment policies is insignificant and negative. Unexpectedly, there is also no significant effect of the beliefs concerning purchasing power of future AOW benefits. To illustrate the magnitude of the belief effects: an increase of 10%-points of the belief that the social security eligibility age will be increased leads to an increase of the expected amount invested in single-premium insurance policies by about 13% ($0.1 \cdot 0.33 \cdot 3.998$; column 2). This effect is about the same as that of a net household income rise by 7.4%. If we replace the AOW expectations by expectations concerning the generosity of occupational pensions or the age at

15 Van der Wiel (2008) refers to these two assets under the names "life-interest" and "lump sum-life interest," respectively.

16 The model is given by $y_{i,t} = \max(x'_{i,t}\beta + u_{i,t}, 0)$, where $y_{i,t}$ is the log amount (zero if the amount is zero), $x_{i,t}$ are the explanatory variables, β a vector of parameters and $u_{i,t}$ a normally distributed error term, independent of $x_{i,t}$. We allow for correlation between error terms in different time periods of the same household.

which people will stop working in the future, none of the expectation variables is significant (details not presented).

All in all, we find some evidence of effects of public pension expectations on attitudes towards saving for retirement in the expected direction, but not on actual wealth or debt. We also find some evidence of an effect on a typical retirement savings product in the expected direction, but only for one of the two products considered – and not for the purchasing power expectations but for the expectation concerning the eligibility age. Still, more work seems needed here before final conclusions can be drawn: for example, because of measurement error in expectations or wealth and debt variables. Moreover, we could impose more structure on the models in order to better exploit the longitudinal nature of the data.

It is also possible that respondents do not strongly respond to their beliefs when it comes to saving behavior. Most of the literature reviewed in Section 2 focused on retirement timing. This concept is arguably easier to predict and to conceptualize than questions concerning purchasing power and pension and social security generosity. A final possibility is that our models of saving and portfolio choice lack structure. To obtain firm conclusions concerning saving behavior, we may need to look more closely at the results and correct for potential biases in the reduced-form estimates, in the spirit of Gale (1998), or go beyond the reduced form equations analyzed in this section and, for example, estimate structural models à la van der Klaauw and Wolpin (2008). Alternatively, it might be possible to build expectations into empirical studies that use pension policy reforms, like Attanasio and Rohwedder (2003) or Attanasio and Brugiavini (2003).

6. Conclusion

This *Panel Paper* has outlined the current state of research concerning the use of elicited subjective expectations in the economics of aging and presented some recent work in explaining who seems to form accurate beliefs, how the current economic crisis has affected these beliefs, and how the information on individuals' expectations can be used in econometric modeling of retirement-related decisions. We conclude the paper by summarizing some important messages we have tried to convey and by pointing to further research that could be pursued in the future.

Section 2 focused on reviewing the literature on the topics of subjective beliefs and aging. We described how researchers considered expectations in their models prior to asking probability questions in surveys. We showed that they first modified their original perfect-forecast models to include rational expectations (hence, taking the uncertainty into account), and then started modeling unobserved beliefs with econometric models. Then, mostly following the elicitation of retirement expectations in the *Health and Retirement Study*, researchers started to directly measure how individuals perceived their future. A first trend in the literature consisted of assessing how accurate these elicited expectations were, and led to the conclusion that individuals were usually reasonably good at predicting their own future. The following trend in research, an ongoing one, consisted of including these elicited expectations directly in economic modeling.

The objective of Sections 3 and 4 was to model heterogeneity in beliefs, to ascertain whether specific socioeconomic or demographic groups are forming biased beliefs that put them in a vulnerable status at risk of financial insecurity after retirement. Section 3

focused on how individuals were able to forecast a policy change that was discussed for a few years in Dutch newspapers. This ongoing work also allows analyzing how long it will take before the news of the policy change becomes well-known by the population. Section 4 was mostly concerned about the 2008–2009 (and maybe 2010) economic financial crisis and its impact on various types of beliefs. We surveyed respondents concerning their fear of losing their job, the impact of the crisis on their retirement, and their expected changes in behavior. In principle, such an *a priori* analysis would allow policymakers to predict individuals' responses to an economic crisis and allow them to detect inadequate responses before it is too late to react. In the example of the Dutch population, we see that the respondents are aware of the problems to some extent, but do not see a need to change their retirement-related behavior.

Finally, Section 5 of this paper analyzed how expectations concerning the future of public and private pensions influence attitudes towards retirement savings and actual saving decisions, showing some effects in the expected direction – but sometimes also no effect at all. More work seems needed here to obtain definitive conclusions.

Where to go from here? There are various possible ways to extend this research. First, most of the work presented here relied on relatively simple economic and econometric modeling. Developing more accurate structural models, for instance, would allow researchers and policymakers to assess in a more convincing way the expected effect of policy changes. Consider again the results from Section 3, where we showed that respondents were not able to perfectly forecast a policy change. The transitory path of observed expectations could be directly included in a structural model to

predict the impact of these changes. A second field of studies using beliefs consists in improving the methodology used to elicit expectations and reduce measurement error. To some extent, beliefs data will always contain some measurement error, since nobody can express with absolute precision how they perceive the future. It is therefore important to make sure that respondents give answers representing their thoughts as accurately as possible, devoting particular attention to the impact of the use of focal answers (mostly fifty-fifty). Last but not least, research on how financial literacy affects beliefs formation would allow us to obtain deeper insight in how biases in beliefs correlate with lack of knowledge and lack of skills in making financial decisions. Finding ways to improve the belief-formation process with these individuals or to insure that they act in an "optimal" way would be important for policymaking.

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A. Aggregated debt and wealth definitions

Aggregate wealth, used in Section 5, is the sum of the total amounts of the following elements:

1. Checking account w. negative balance
2. Employer-sponsored saving plan
3. Savings accounts
4. Deposit books
5. Savings certificates
6. Single-premium insurance policies
7. Endowment insurance policies
8. Growth funds
9. Bonds
10. Shares
11. All kinds of options
12. Real estate not used for housing
13. Money lent to family
14. Investment not mentioned before
15. Stocks for substantial holding
16. Business equity

Aggregate debt is the sum of the total amounts of these elements:

1. Private loans
2. Extended lines of credit
3. Debt with mail-order firms
4. Hire-purchase contracts
5. Loans from family and friends
6. Study loans
7. Credit card debts
8. Loans not mentioned before

The DHS questionnaire provides detailed information to respondents on what these products are. The single-premium annuity is described in the following manner:

By taking out annuity insurance the insured is entitled to periodic payments, the so-called annuity. The ANNUITY is paid out periodically (for example, annually) as of a certain date until the time of death of the insured. PENSION INSURANCE is a specific type of annuity insurance. SINGLE-PREMIUM INSURANCE is also a specific type of annuity insurance, which involves (as the name indicates) a one-time premium. Other types of annuity insurance involve periodical (for example, annual) premium payments. Under certain conditions, these premium payments are income tax deductible.

[Then, if the respondent declares holding such assets:]

How much is the guaranteed minimum final payment of your SINGLE-PREMIUM INSURANCE POLICIES or ANNUITIES on 31 December 2007?

Then, the endowment insurance is described thus:

ENDOWMENT INSURANCE is a kind of life insurance that pays out a lump sum (so, this is not an annuity) to the insured at the maturity of the insurance policy (or, in some cases, at the time of death of the insured, whichever comes first). The premium payments cannot be deducted from the taxable income, but the lump-sum payment is under certain conditions tax free. The life insurance that is connected to an improved traditional life insurance mortgage is an example of an endowment insurance. With certain kinds of endowment insurance policies, the insured can decide upon the way in which his premium payments will be invested (for example, in deposits, shares or bonds).

[Then, if the respondent declares holding such assets:]
How much was the total sum that you had saved through your
SAVINGS ORENDOWMENT INSURANCE POLICIES on 31 December 2007?

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Luc Bissonnette and Arthur van Soest

Retirement Expectations, Preferences, and Decisions

A recent report of the Dutch Authority of Financial Markets (AFM) claims that many Dutch residents have overly optimistic expectations concerning their pension income, and will be disappointed when they actually retire. Many economic models assume rational expectations, which make it possible to derive expectations ex post from observed outcomes. Luc Bisonette and Arthur van Soest (both UvT) survey in this Panel Paper the literature on expectations related to retirement and income and well-being at an older age. They focus on how expectations are formed and whether or not they are in line with rational expectations.