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THE FINANCIAL CRISIS AND CONSUMERS' INCOME AND PENSION EXPECTATIONS

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The Financial Crisis and Consumers' Income and Pension Expectations

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Abstract

The expectations of economic agents play a crucial role in almost any inter-temporal economic model. A period of economic crisis may make consumer expectations more pessimistic and affect their saving or retirement plans and decisions. Using 2009-2012 panel data for a representative sample of the Dutch population, we analyze consumers' perception of the crisis and its expected impact on the household. Second, we analyze the deviations between short run income expectations and realizations, and how they are shaped by how people perceive the crisis. Finally, we study how crisis perceptions affect retirement age and income expectations.

Keywords: Subjective probabilities, Retirement, Replacement rates

JEL Codes: D84 , H55, J26

1 Introduction

The expectations of economic agents play a crucial role in almost any inter-temporal economic model. This certainly applies to the decisions of working age individuals that relate to pensions and retirement planning, which automatically require agents to be forward looking in a life-cycle context. This is probably one of the reasons why measuring individuals' expectations has become particularly popular in the context of the economics of ageing; see, e.g., Hurd (2009). With the recent and ongoing pension reforms in many countries, individual responsibility for pension planning increases, increasing the relevance of what drives consumers' pension related expectations and decisions and how this varies across socio-economic groups.

Expectations can also play an important role in understanding how people respond to a financial or economic crisis. A period of economic crisis may make consumer expectations more pessimistic and affect their saving intentions, retirement plans, and actual financial decisions, even if the crisis has no immediate effect on their current financial situation. For example, Christelis et al. (2011) find that among older Americans, the consumption drop during the crisis is larger for those who expect that the negative shocks to the asset markets are permanent than for those who expect them to be temporary.

While many studies analyze the effects of the recent crisis on the actual economic situation of private households, such as their wealth, their consumption, their portfolio choice, or their retirement behavior, Christelis et al. (2011) is one of the few papers explicitly considering the role of expectations. Hurd and Rohwedder (2012a) analyze how several probabilities in the HRS changed from 2008 to 2009, and conclude that the crises led to pessimism about house and stock price developments, to later expected retirement, and, in particular, to lower expected bequests. This pessimism is reflected in lower spending and higher saving. The pessimism concerning stock and housing markets is confirmed using data covering the complete adult population in the US from November 2008 until April 2010 in Hurd and Rohwedder (2010). Banks et al. (2013) find evidence that among the 50+ population in England, negative wealth shocks due to the crisis reduce the probability of leaving a bequest. On the other hand, Crawford (2013) finds no effect on the expected age of retirement among older UK workers.

In this paper we study the Dutch adult's population's subjective expectations on the crisis itself, on household income, on the retirement age, and on pension income, using household panel data with four waves administered in 2009, 2010, 2011 and 2012. We first analyze consumers' expectations of the development of the crisis and its financial and labor market impact on the household. Second, we study how these crisis expectations affect the subjective expectations of the adequacy of household income in the short run. Comparing expected changes in household income adequacy with realizations reported twelve months later, we also analyze the deviations between realizations and expectations, and how they are shaped by what people think about the nature of the crisis. Finally, we analyze how the crisis leads to changes in expected retirement ages and expected pension income replacement rates.

The remainder of this paper is organized as follows. Section 2 gives a brief overview of the development of the crisis and the debate on pension reforms in the Netherlands over the time period covered by the data. Section 3 describes the data used in the analysis. In Section 4, the variables describing the respondents' perceptions of the crisis are analyzed. Section 5 focuses on how the perception of the crisis relates to expectations of next year's income adequacy and deviations between expected and realized changes in income adequacy. Section 6 analyzes how the perception of the crisis and other factors determine retirement expectations. Section 7 concludes.

2 The crisis and pension debate in the Netherlands

Table 1 presents some macro-economic indicators for the Netherlands in the time period 2006 – 2013. It shows that the timing of the crisis is ambiguous. While the Amsterdam stock exchange index already went down in 2007, dropped dramatically in 2008, and partly recovered since 2009, GDP-growth remained positive until 2008, purchasing power started falling from 2009, and unemployment remained fairly stable until a dramatic increase in 2012. The subjective indexes in the bottom panel of the table confirm that consumers perceived the crisis as very serious in 2009. They saw some recovery in 2010 but are remarkably pessimistic in 2012 and 2013, a time period when other countries already seemed to have perceived the end of the recession. For example, Hurd and Rohwedder (2012b, p. 14) find that in the US, spending started recovering from the second quarter of 2010. Still, the notion that subjective indices of the perception of the crisis lag behind the objective crisis indices is in line with findings for the US, where the crisis formally ended in June 2009 but pessimism among private consumers remained large for a much longer time period (Hurd and Rohwedder, 2010 and 2012a).

Changes in pension and retirement expectations over this period were not only induced by the crisis, but also by an ongoing debate on pension reforms that already started much earlier. A sequence of reform plans and actual reforms in the Dutch pension system has taken place over the same time period; see, for example, Goudswaard (2013) for an overview.

The Dutch pension system is characterized by a flat rate pay-as-you-go state pension at the subsistence level for everyone who has continuously been a Dutch resident from age 15 until age 65, in combination with a relatively large second pillar of mandatory occupational pensions, covering more than 90 percent of Dutch employees (see, e.g., OECD, 2011). The large majority of occupational pensions have a defined benefit nature, with risk sharing across participating employees of several generations in the same firm or the same sector of industry. Compared to other countries, replacement rates of the combined first and second pillar are high. There is also substantial dispersion, but the subsistence level state pension helps to reduce poverty among the elderly. The Dutch system ranks second after Denmark according to the overall Melbourne Mercer Global Pension Index which ranks 20 countries in the world. It ranks first in pension adequacy, second in integrity (after

Table 1. Objective and subjective macro-economic indicators, 2006-2013.

Year	2006	2007	2008	2009	2010	2011	2012	2013
Objective measures								
GDP growth (%)	3.4	3.9	1.8	-3.7	1.5	0.9	-1.2	-0.8
Change in purchasing power (%)	3.0	3.1	1.4	1.7	-0.5	-0.8	-1.0	n.a.
Unemployment rate (%)	5.5	4.5	3.8	4.8	5.4	5.4	6.4	8.3
Change in consumer prices (%)	1.2	1.6	2.5	1.2	1.3	2.3	2.5	2.5
Change in house prices (%)	4.6	4.2	3.0	-3.4	-2.2	-2.4	-6.5	-6.6
Stock market index (AEX), December	718	673	289	383	424	393	438	508
Change in private consumption (%)	-0.3	1.8	1.3	-2.1	0.3	-1.1	-1.6	-2.1
Subjective measures								
Consumer confidence index Q1	-11	13	-7	-30	-11	-5	-36	-39
Economic climate index Q1	12	14	-39	-44	-18	-28	-57	-44
Willingness to purchase index Q1	-9	4	-7	-8	-9	-12	-21	-24

Notes:
Source: Statistics Netherlands, Statline; http://statline.cbs.nl

Consumer confidence index: based upon five subjective questions on own financial situation and economic situation in general

Economic climate index: based upon two subjective questions on economic situation in general

Willingness to purchase index: based upon three subjective questions on own financial situation and whether it is a good time for large purchases

Australia), and third in sustainability (after Denmark and Sweden); see Australian Centre for Financial Studies and Mercer (2013).

Still, already in the years before the crisis the sustainability of state and occupational pensions has been under pressure. Population ageing has increased the costs of the pay-as-you-go state pension. After several proposals that for various reasons were never implemented, in 2012 the government implemented a reform that gradually increases the eligibility age for a state pension to 67 years in 2021. For younger cohorts, the eligibility age will be linked to life expectancy, which means that it will probably rise further. Moreover, occupational pension funds have experienced a deterioration of their financial position due to low interest rates and poor investment returns on the stock market during the financial crisis. This has prevented them from compensating the pension benefits for inflation, and has even in many cases made them cut nominal pension levels. The latter happened on a large scale for the first time in 2013, when many pension funds felt forced to reduce benefit levels of current and future retirees by up to 10 percent.[1] Further reductions are implemented by a smaller number of pension funds in 2014.

As in many other countries, already in the years before the crisis, pension funds cut down generous early retirement arrangements that made it possible to retire before the standard retirement age (then 65) without any reduction in annual pension benefits. As a consequence, labor force participation of the age group 55-65

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[1] See http://www.pensioenfederatie.nl/_downloads/Lijst_verlagingen_2013.pdf

has increased substantially over the past decade. The average retirement age of employees increased from 61.0 years in September 2006 to 63.9 years of age in September 2013.[2] In response to the increase in the state pension eligibility age, pension funds have started working with higher benchmark retirement ages, but there is a tendency towards flexibility, with occupational pension arrangements allowing for retirement in some age band and an actuarially fair reduction or increase in the pension benefit level in case of earlier or later retirement, and including opportunities for gradual retirement. Van Vuuren (2014) argues that for most workers, flexibility in retirement can be realized through the second pillar, even if there is no flexibility in the subsistence level state pension. There are no plans to replace DB by DC pensions at a large scale, but the nature of the DB pension is going to change (Goudswaard, 2013). The current DB contracts provide nominal guarantees, but due to inflation, these guarantees are not meaningful in the long run and may even misguide consumers due to money illusion. The general public is not well aware of the risk of incomplete indexation (i.e., incomplete compensation for wage or price inflation) for future purchasing power. The new plans involve making these risks more explicit and allow for a choice between nominal guarantees or a real "defined ambition" contract where part of the longevity and inflation risks are born by the consumers. In terms of purchasing power, these pensions involve about the same risk as existing DB plans with nominal guarantees (CPB, 2012, Figure 5.7).

The mandatory retirement age used to be 65. It will probably follow the state pension eligibility age and rise till 67 years and even further in the longer run. Opportunities to work beyond the mandatory retirement age are scarce but may increase in the future, in line with the tendency towards more flexibility. The extent to which employers will be willing to cooperate with the several forms of flexibility, however, is not yet clear. A promising sign is that, as shown by Van Vuuren (2014), there has been a substantial increase in the number of part-time jobs in the age group 65-69 (beyond the standard retirement age) from 1992 until 2008, accounting for almost the complete labor market participation increase in that age group.

3 Data

The data are taken from the Netspar Pension Monitor (NPM), a survey initiated and funded by Netspar (the Dutch Network for Studies on Pensions, Ageing and Retirement). This survey was administered to respondents who participate in the ongoing CentERpanel, an online panel survey administrated by CentERdata affiliated with Tilburg University.[3] The CentERpanel covers the population in the Netherlands of ages 16 and older and consists of households in which one or more adults are invited to complete questionnaires over the Internet every weekend. Households are randomly selected from the Dutch population registers, and those without prior

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[2] See   http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=80396NED&D1=9& D2=0&D3=0&D4=0&D5=1-2&D6=0-2,8,15&D7=0&D8=0,3,6-7,9-13&VW=T
[3] The CentERpanel has been used in numerous studies on many topics. See http://www.centerdata.nl/en/centerpanel for more information and a list of publications.

Internet access are given access and the necessary equipment. About 75 percent of all panel members respond to the questions in a given weekend. Panel attrition is compensated by an annual refreshment sample.

The questionnaires of the NPM are distributed to all CentERpanel members of ages 25 and older (since younger respondents were assumed not to think much about pensions or retirement). We use data from the period 2006–2012. The NPM consists of short monthly questionnaires including questions on expectations concerning pension reforms and on satisfaction with pension provisions and the pension system, which have been analyzed elsewhere (see, for example, Bissonnette and van Soest, 2012, and De Bresser and van Soest, 2014) and a longer annual survey (usually administered in June) including the questions on expected retirement and replacement rates, expected income changes, and, since 2009, the perceived importance of the crisis. The early waves of annual data on expected replacement rates have been analyzed in Van Santen et al. (2012) and De Bresser and van Soest (2013, 2014). In the current paper we reanalyze these data focusing on their relation to the perception on the crisis (the data on which have not been used in earlier studies). The data on income change expectations and realizations are similar to the older data used in earlier studies of, for example, Dominitz and Manski (1997) and Das and van Soest (1999). Here our main goal is to investigate whether systematic deviations between realizations and expectations are related to the perceived nature and impact of the crisis.

3.1 Perceptions of the effects of the crisis

We will use five variables on the perception of the crisis and its potential effect on retirement. They are the answers to the survey questions on how much respondents agree with five statements, on a scale from 1 (not at all) to 10 (completely). The first two questions refer to the influence of the crisis:

- *Cris_family*: I am afraid the crisis will affect my family in the next twelve months
- *Cris_job*: I am confident that I will keep my current job in the next twelve months

The other three questions refer to the (potential) effect of the crisis on retirement planning:

- *Cris_delay*: I would rather delay retirement for a few years than save more.
- *Cris_retage*: I do not think the crisis will affect when I retire
- *Cris_retinc*: I do not think the crisis will affect the level of my retirement income

Figures 1 and 2 show how the frequency distributions of the answers to the five questions developed over time.[4] The first panel in Figure 1 shows that many respondents think the crisis will affect their family in the next twelve months,

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[4] The way these figures are organized is based upon Schwabish (2014).

particularly in 2012 and 2009. People were somewhat less pessimistic in 2010 and 2011. This is in line with the 2012 drop of consumer confidence and the perception of the economic climate in Table 1. On the other hand, the respondents are generally not so concerned about losing their current job in the next twelve months (second panel of Figure 1). They are somewhat less optimistic about this in 2012 than in 2011, but differences between 2012 and 2009 or 2010 are very small.

The first panel of Figure 2 shows that the willingness to delay retirement instead of increasing savings for retirement has increased in 2011 and 2012. This may relate to the policy reforms, which at that time involved the decision to raise the future eligibility age for state pensions, with the idea that this also will also lead to a substantial increase of the retirement age. The clearest time trends are found in the two bottom panels: more and more respondents are convinced that the crisis will affect their retirement age and their retirement income. This is probably not only because the crisis in general appeared to be more serious than it seemed initially, but also because of the reforms of the state pension already mentioned above and the ongoing negative publicity on the financial problems of occupational pension funds. These financial problems implied that occupational pension funds could not compensate future and current pensioners for inflation and thus led to cuts in real pensions, though nominal pension cuts only came in the next year (see Section 2).

3.2 Income adequacy expectations and realizations

The question on the realized change in income adequacy is the following:

- *Compared to one year ago, has the purchasing power of your household increased or decreased? (increased / decreased / stayed the same) NB: with the purchasing power of an income we mean how much can be bought for this income*

Two subjective probability questions on the expected adequacy of income change immediately follow after the question on the realized change:

- *What is the probability that one year from now, the purchasing power of your total household income will be larger than it is now? The probability that next year we can buy more for our household income is . . . . percent.*
- *What is the probability that one year from now, the purchasing power of your total household income will be smaller than it is now? The probability that next year we can buy less for our household income is . . . . percent.*

The first panel of Table 2 shows how realized purchasing power changes have developed over time. The negative effect of the crisis is clear and increases over time: The percentage of households reporting their purchasing power has decreased is much larger than the percentage reporting an increase, and the latter percentage increases over the years to more that 56 percent in 2012.

The second panel shows the expectations for the next twelve months. The average probabilities of an increase in purchasing power are rather small and do not change much over the four years. On the other hand, the probabilities of a reduction are

Crisis will affect my family

(Stacked bar chart by survey year 2009, 2010, 2011, 2012, segments labeled 1–10, x-axis 0 to 100.)

Confident to keep job

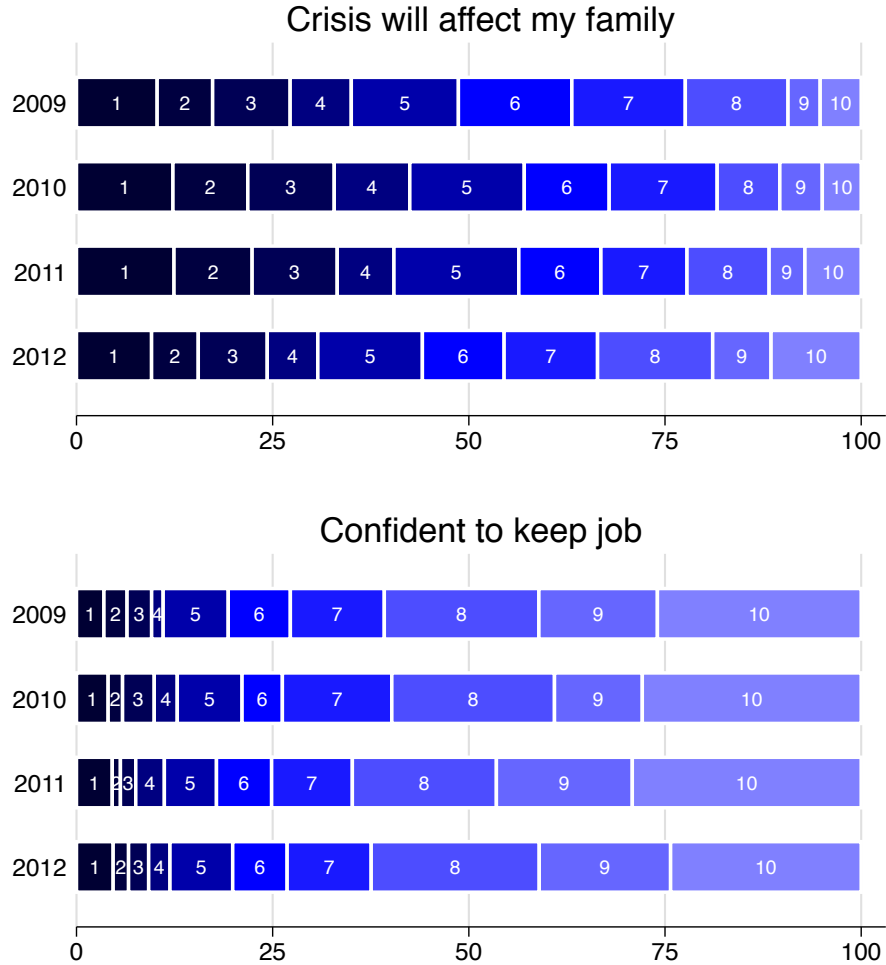(Stacked bar chart by survey year 2009, 2010, 2011, 2012, segments labeled 1–10, x-axis 0 to 100.)

Fig. 1. Frequency distribution of answers to the questions concerning the effect of the crisis on family and possibility of job loss by survey year.

much larger and increase substantially, particularly from 2011 to 2012. This is all in line with the notion that people perceived the crisis as more and more severe over time. Most people attach a low probability to a purchasing power increase, and this does not change much over time. The percentage of respondents who reported that the purchasing power of their household income would fall with 100% certainty rose from almost 11% in 2009 to almost 26% in 2012.

If all shocks are idiosyncratic and average out, if respondents have rational expectations, and if they use the same distinction between an increase, a decrease, and no change of purchasing power in the expectations and realizations questions, then we would expect the average subjective probabilities in the second panel to be similar to the realized percentages in the first panel concerning the same time period. In

Rather delay ret. than reduce spending

Crisis won't affect when I ret.

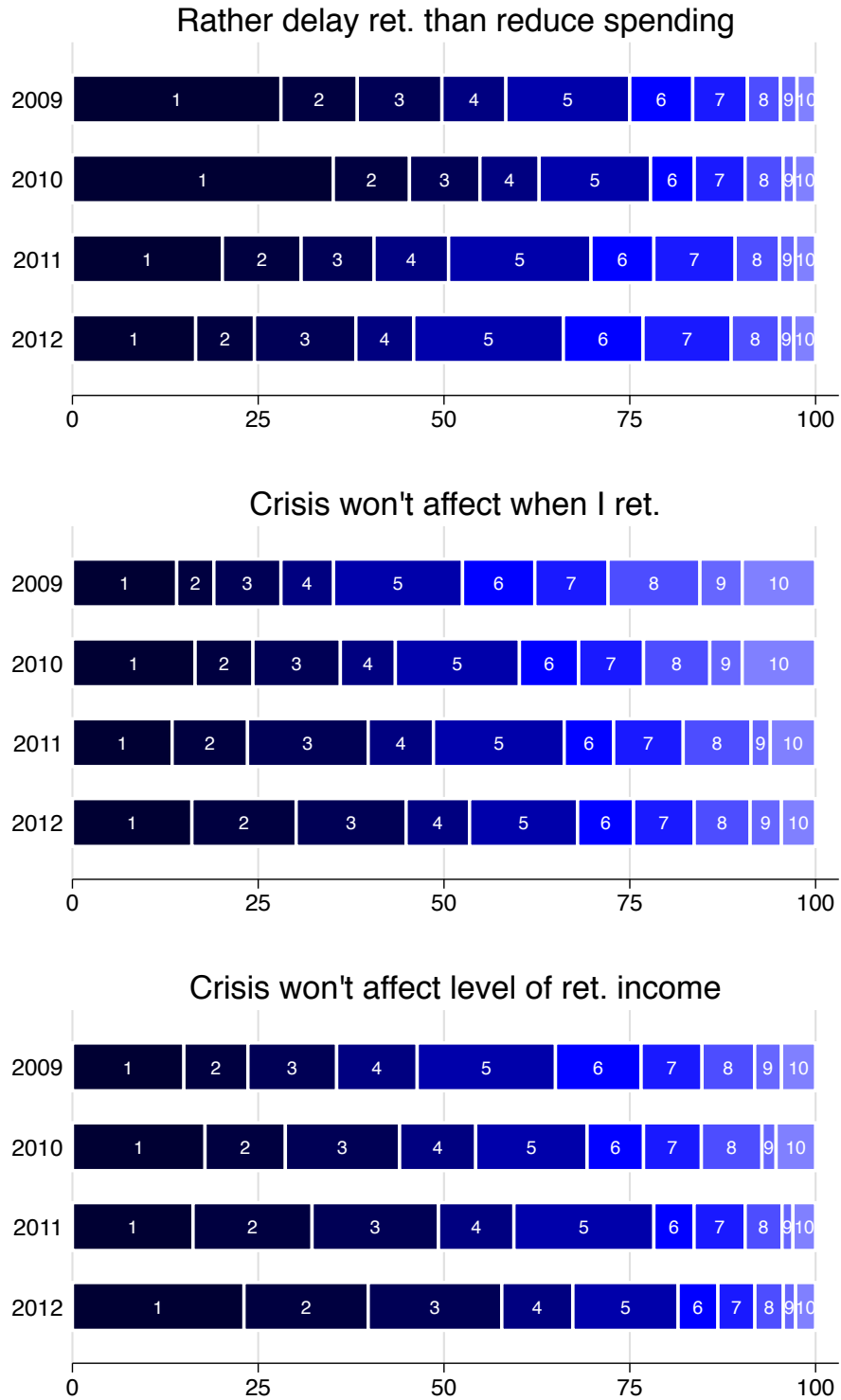
Crisis won't affect level of ret. income

Fig. 2. Frequency distribution of answers to the questions concerning potential effect of the crisis on retirement planning by survey year.

Table 2. Mean probabilities of decrease and increase in purchasing power over the next year and realizations one year later.

	Realization reported in a given survey year		
Year	Decrease	Remained the same	Increase
2009	39.44	49.24	11.33
2010	43.03	46.97	10.00
2011	46.67	44.32	9.00
2012	56.27	36.50	7.23

	Average probability (in %) of increase/decrease in the next year	
Year	Pr(Decrease)	Pr(Increase)
2009	41.12	17.35
2010	42.14	16.17
2011	49.70	18.37
2012	62.15	15.08

Probability of increase/decrease (in %) by realization reported one year later

	Decrease		Remained the same		Increased	
Year	Pr(Decrease)	P(Increase)	P(Decrease)	P(Increase)	P(Decrease)	P(Increase)
2009	50.54	10.98	33.39	19.12	38.16	38.64
2010	55.36	9.50	29.89	17.97	32.01	42.78
2011	58.86	13.20	40.28	20.02	27.11	49.98

fact, there are some deviations, but they are not very large. They suggest that respondents *ex post* were not pessimistic enough – income changes turned out worse than expected. For example, the realized percentages with an increase and decrease from 2011 to 2012 are 7.2 and 56.3, while the average probabilities reported in 2011 were 18.4 and 49.7. Compared to their expectations, fewer people than expected actually experienced an increase, and more people than expected actually experienced a fall. We cannot say here whether this is due to an unanticipated common shock or non-rational expectations.

The bottom panel of the table compares expectations and realizations concerning the same twelve months periods. It shows a clear but imperfect positive relation between expectations and realizations, as expected. For example, those who reported their purchasing power had fallen in the twelve months between summer 2011 and 2012 had given an average reported probability of a decrease of 59 percent twelve months earlier, while for those who reported an increase, the average probability was much smaller (27 percent).

3.3 Retirement expectations

The expected (earliest) retirement age is the answer to the question: "What is the earliest age at which you think you can retire?" The answer has to be in the range 50-75.[5] The frequency distributions of the answers are given in Figure 3. The mode

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[5] There is also a question about the latest age at which the respondent has to retire. We do not use it since it has too many missing values - many respondents think there is no such age.
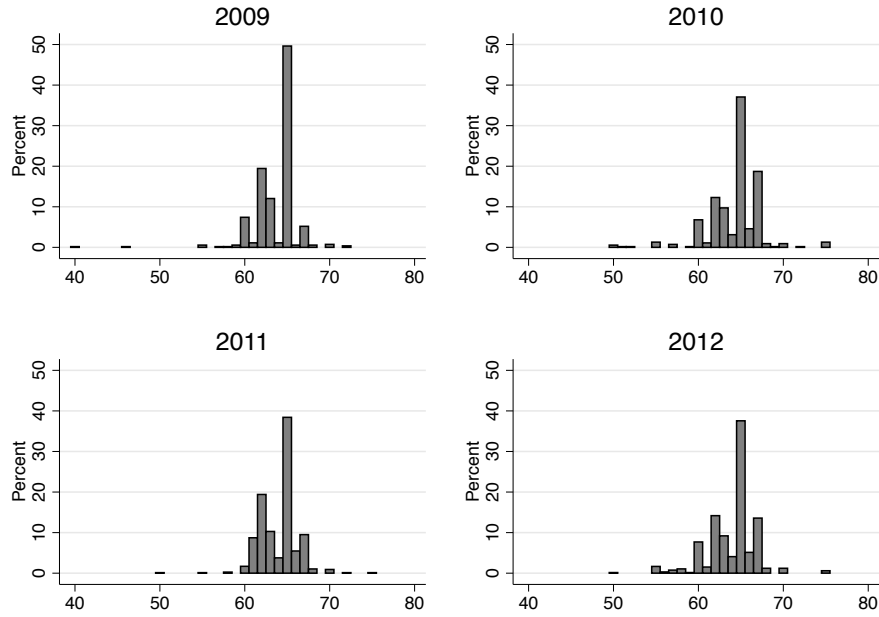
Fig. 3. Frequency distribution of the minimum retirement age by survey year

is age 65 in all years, although the size of the peak at 65 decreases somewhat from 2009 till 2010. Still, the distribution is surprisingly stable over time, with sample means equal to 63.9 in 2009, 64.3 in 2010, and 64.0 in 2011 and 2012. It seems that the tendency towards later retirement is compensated by a tendency towards more flexibility, so that the average hardly changes.[6]

Retirement replacement rate expectations are measured using a set of subjective probability questions. Since this has been described extensively in Van Santen et al. (2012) and De Bresser and van Soest (2013, 2014), we explain it only briefly here. We use six questions asked to all employees, and phrased as follows (where the part in brackets is the reported earliest retirement age discussed above):

If you would retire at [earliest retirement age], please consider your net total pension income including public pension, relative to your present net wage or salary. What would you think is the probability that your net total pension income in the year after retirement will be worth in terms of purchasing power ... Less than 100 percent of your present net wage? ... Less than 90 percent of your present net wage? ... ... Less than 50 percent of your present net wage?

Following Bellemare et al. (2012) and De Bresser and van Soest (2014), the answers to these questions are used to non-parametrically estimate a subjective distribution of the future retirement income replacement rate for each observation.

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[6] This is confirmed by the increasing latest age of retirement. The mean of this variable (ignoring missing values) rises from 64.9 years in 2009 to 66.5 years of age in 2012.

The distribution function is obtained by linking the six points corresponding to the reported probabilities using splines, imposing monotonicity. The variables used for further analysis are the medians and the interquartile ranges (IQR, the difference between the 75th and 25th percentile) of these subjective distributions. How their distributions develop over time is illustrated in Figure 4.

The top panel of this figure shows that over the four year time period, the distribution of the median expected replacement rate shifts to the left: the respondents become less optimistic over time, in particular after 2010. The average of the median replacement rate falls from almost 80 percent in 2009 and 2010 to 70 percent in 2012. In particular, it seems that the group with a very high median has shrunk substantially, and the distribution of the medians has become much less skewed. The bottom panel shows that at the same time, uncertainty has increased. In particular, the size of the group with very high uncertainty has become larger.

4 Perceptions of the crisis

In this section, we analyze which factors are the best predictors of how respondents perceive the economic crisis and how this affect their pension planning. To do so, we estimate ordered response models explaining the questions presented in Section 3.1. As all other econometric models used in this paper, the basis of the model will be an unobserved linear index of the following form:

$$y_{it}^* = \boldsymbol{x'_{it}}\boldsymbol{\beta} + \alpha_{hh} + \alpha_{ind} + \varepsilon_{it} \tag{1}$$

where $\boldsymbol{x_{it}}$ is a set of regressors for individual i in year t, α_{hh} and α_{ind} are household-specific and individual-specific effects, respectively, and ε_{it} is an idiosyncratic error term. We treat the individual and household specific effects as random effects, independent of each other, regressors $\boldsymbol{x_{it}}$ and error terms ε_{it}, and following normal distributions with mean zero and variances σ_{hh}^2 and σ_{ind}^2, respectively. The error terms are also assumed to be independent of each other and normally distributed, with mean zero and variance σ_{ε}^2).[7]

The independent variables in $\boldsymbol{x_{it}}$ are standard socioeconomic and demographic characteristics (gender, living with partner or not, age and age squared, educational dummies), log of net income (set to 0 whenever income was missing or 0), dummies for occupational status (taking paid work as an employee as the reference category, with dummies for being self-employed (or Working in a family business), retired, on disability benefits, homemaker, and unemployed), dummies controlling for the sector where someone works or worked (public sector, the construction sector, financial services, other services, "other" sectors being the reference group). Yearly dummies were also included (using 2009 as the reference year).

Depending on the nature of the dependent variable of interest, we will use standard econometric models based upon this index. For the categorical answers on the

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[7] We experimented with (quasi) fixed effects models but the within respondent variation in most time varying variables is too small to get meaningful results.

Subjective replacement rates
Statistics based on the estimated subjective distributions
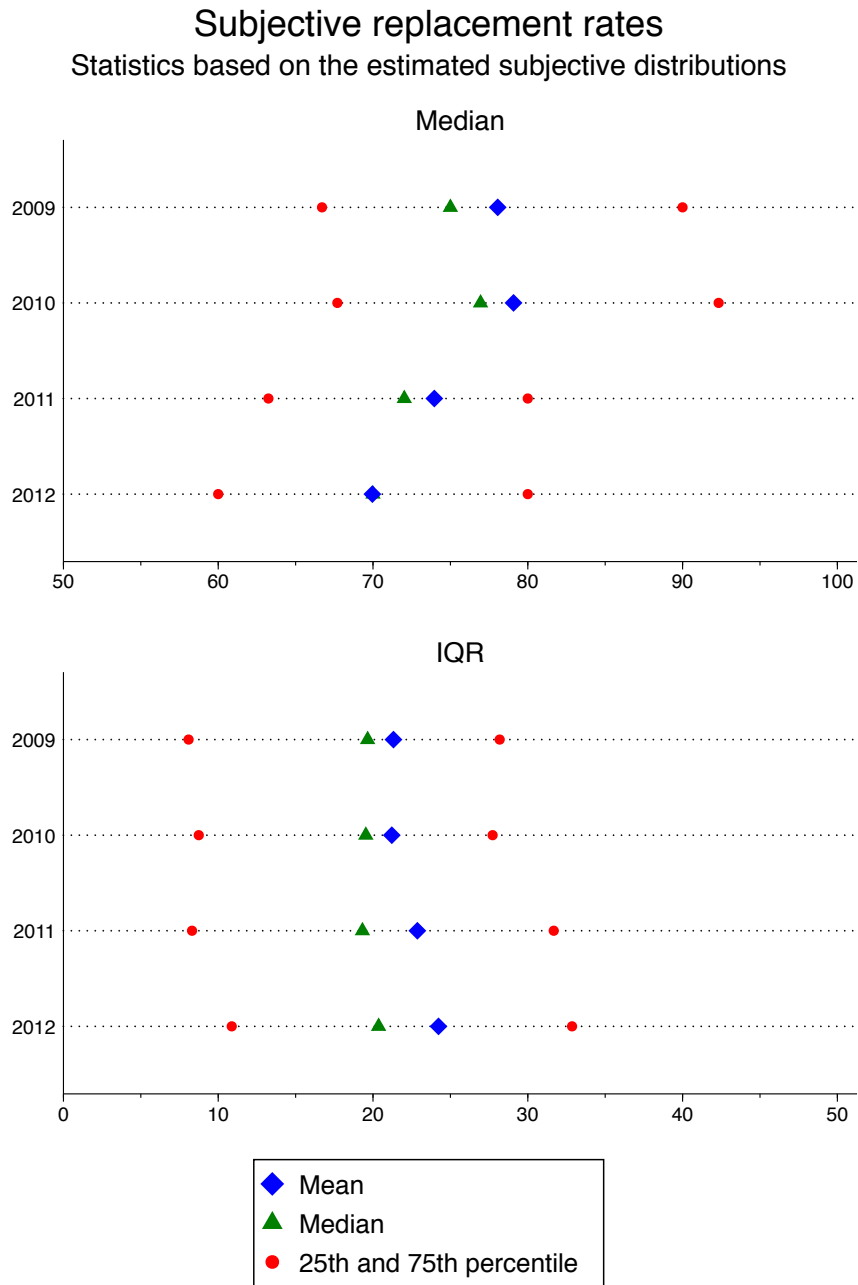
Fig. 4. Mean and quantiles of median and IQR of subjective replacement rate distributions

1-to-10 scale concerning perception of the crisis, the ordered probit seems a natural choice, assuming that the observed dependent variable y_{it} is given by

$$y_{it} = j \text{ if } \gamma_{j-1} < y_{it}^* \leq \gamma_j \tag{2}$$

where $\gamma_0 = -\infty$, $\gamma_1 = 0$, and $\gamma_{10} = \infty$, leaving nine cutoff parameters to be estimated. The Location of y_{it}^* is fixed by setting the constant term in the equation for y_{it}^* to zero. Moreover, we fix the scale by normalizing the parameters σ_ε to 1.

The first column of Table 3 presents the estimation results for the question whether the crisis will affect the family in the next twelve months (*Cris_family*). Few variables are significant. Keeping other characteristics constant, respondents with high education level are less concerned that the crisis will affect them than those with lower levels of education. It is not so clear why. The strongest effects are found for some of the labor force status dummies: respondents on disability or unemployment benefits are particularly concerned that they will be affected. This could be because in the policy debate on required budget cuts, lowering unemployment and disability benefits played an important role. Moreover, these respondents may be most concerned about not being able to find or keep a job due to the crisis. The other significant variables are the year dummies, revealing a pattern that is similar to that in Figure 1. Both household and respondent specific effects are significantly present, but the former are much more sizeable than the latter. The two unobserved heterogeneity terms together capture 52.4% of the total unsystematic variation in the answers, somewhat more than the error terms.

The second column analyzes how confident respondents are about keeping their job in the next twelve months (*Cris_job*). It shows that respondents with a partner are more confident than singles, perhaps because they have selected into more stable jobs. The most salient finding here is the strong positive coefficient on the dummy for working in the public sector – public sector jobs are considered to be much less at risk than private sector jobs. Even though government budget cuts have led to a large loss of public sector jobs in recent years, most of this was achieved by not filling up vacancies when people retired or found another job. Compared to the jobs lost in the private sector due to bankruptcies and reorganization, only few public sector workers were fired, most of them on temporary contracts. Workers in the construction sector, which suffered most from the crisis, are less optimistic than workers in other sectors, but this difference is not significant. Again, the two heterogeneity terms capture just more than half of the total unsystematic variation. Unlike in the first equation, individual heterogeneity is slightly more important than heterogeneity at the household level. This makes sense because employment is an individual issue.

The third column shows who is willing to delay retirement rather than save more in response to less generous pension benefits (*Cris_delay*). The self-employed are more often willing to delay retirement than others. This makes sense since they will typically have more flexibility in determining their own retirement age (and more opportunities to work beyond the standard retirement age) than employees. Respondents on disability benefits are least inclined to delay retirement, probably because they expect that health problems will limit their ability to work at higher

Table 3. Estimation results: perception of the crisis and effect of the crisis on retirement planning.

	Cris_family	*Cris_job*	*Cris_delay*	*Cris_retage*	*Cris_retinc*
Sign of optimisim	−	+	NA	+	+
Male	-0.041	0.066	0.203***	-0.011	-0.019
	(0.053)	(0.082)	(0.067)	(0.052)	(0.058)
Partner	0.063	0.225**	-0.185**	0.044	0.068
	(0.064)	(0.091)	(0.079)	(0.060)	(0.064)
Age	0.018	-0.014	0.026	-0.067***	-0.081***
	(0.014)	(0.031)	(0.031)	(0.024)	(0.026)
Age-sqr./100	-0.018	0.011	-0.047	0.075***	0.082***
	(0.013)	(0.033)	(0.033)	(0.026)	(0.028)
Log. net-inc.	-0.008	0.032	0.028	0.018	0.010
	(0.013)	(0.025)	(0.018)	(0.015)	(0.016)
Educ. Med.	0.034	0.130	0.025	0.083	-0.092
	(0.067)	(0.107)	(0.091)	(0.070)	(0.076)
Educ. High	-0.140**	0.029	0.102	0.072	-0.223***
	(0.067)	(0.105)	(0.091)	(0.070)	(0.075)
Public sector	-0.007	0.432***	0.034	-0.027	0.056
	(0.073)	(0.104)	(0.087)	(0.068)	(0.073)
Retired	0.001				
	(0.084)				
Disabled	0.292**		-0.409***	-0.172*	-0.006
	(0.122)		(0.134)	(0.103)	(0.110)
Home maker	-0.022				
	(0.104)				
Unemployed	0.357**		-0.069	-0.096	0.033
	(0.149)		(0.157)	(0.131)	(0.140)
Self-employed	-0.051	0.240*	0.350***	0.148	0.201**
	(0.109)	(0.132)	(0.115)	(0.091)	(0.097)
Construction	0.004	-0.253	0.030	0.009	0.040
	(0.148)	(0.186)	(0.167)	(0.131)	(0.141)
Manufacture	0.005	0.134	-0.039	-0.023	0.089
	(0.101)	(0.131)	(0.115)	(0.090)	(0.097)
Financial services	-0.162	0.034	0.152	0.131	0.400***
	(0.150)	(0.186)	(0.169)	(0.132)	(0.141)
Other services	0.088	-0.133	0.164	0.021	0.104
	(0.106)	(0.132)	(0.115)	(0.090)	(0.097)
2010	-0.183***	-0.004	-0.148**	-0.195***	-0.149**
	(0.046)	(0.071)	(0.067)	(0.062)	(0.063)
2011	-0.109**	0.058	0.275***	-0.312***	-0.326***
	(0.043)	(0.068)	(0.059)	(0.055)	(0.056)
2012	0.306***	-0.081	0.400***	-0.437***	-0.536***
	(0.045)	(0.070)	(0.062)	(0.058)	(0.059)
σ_{hh}	0.928	0.677	0.830	0.560	0.474
σ_{ind}	0.532	0.777	0.490	0.181	0.481
N	5317	2519	2918	2918	2918

ages. Males and single respondents are more inclined to adjust the timing of their retirement than females and respondents with a partner. Perhaps this relates to joint retirement planning: married women may adjust their retirement plans to when their partners retire rather than independently adjusting their retirement age if their pension turns out to be lower than expected. The fact that in this equation

household specific effects play a much larger role than individual specific effects is also suggestive of joint retirement planning.

Column 4 explains how much respondents agree with the statement that the crisis will not affect when they retire ($Cris\_retage$). This is the first question where we find a significant age pattern, implying a minimum at about 45 years of age. This suggests that the younger age groups and the age groups approaching retirement age more often tend to think that their retirement age will not be affected than the age group 40-50. Policy reforms are indeed accompanied by transition measures that imply that the standard retirement age does not change as much for those who already approach retirement. For the younger age groups, it may be reasonable to argue that the effects of the current crisis will be dominated by new developments after this crisis and before their retirement. Unobserved heterogeneity in $Cris\_retage$ is less important than in the other questions, capturing only 35% of the total unsystematic variance. Since the systematic variance is also quite limited, with few significant regressors, this means that much of the variation in the answers is idiosyncratic.

The final column presents the results for the equation explaining whether respondents agree that their pension income will not be affected by the crisis ($Cris\_retinc$). The age pattern is similar as in the previous question, with a minimum at 49.4 years, suggesting that those around age 50 are most concerned about the effect of the crisis on their pension income. Respondents with high education are more concerned than others, even though they are less concerned that the crisis will affect their family (first column). Perhaps this is because they realize more than others that occupational pensions will be affected by the crisis, in spite of the current nominal guarantees (see Section 2). On the other hand, the self-employed and respondents working in the financial services sector are more confident than other groups that their pension income is not affected by the crisis. The latter result seems surprising since one would expect that those who work in the financial services sector should be most exposed to the information on the risk induced by incomplete indexation, and nominal pension cuts.

All in all, background characteristics only explain a small part in the variation of these crisis perception variables. In four of the five cases, year dummies are significant and explain more than the respondent characteristics, with patterns in the year dummies similar to the patterns in Figure 1.[8]

5 Income adequacy

In this section we analyze how crisis perceptions and socio-demographic characteristics relate to the realized and expected changes in income (see Section 3.2). We use similar models as in the previous section – an ordered response model with

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[8] As expected, respondents who think that the crisis will affect their family (high $Cris\_family$) or consider themselves at risk of losing their job (low $Cris\_job$) are also more likely to think it will make them retire later or reduce their retirement income. Conditioning on these variables or not makes no difference for the significance of the other variables. (Detailed results available upon request.)

three outcomes (decreased, remained the same, increased) for the realized income change, and two-limit tobit models for the subjective probabilities of an increase or decrease in the next twelve months, accounting for censoring at the minimum and maximum probabilities of 0 and 100.[9]

The results are presented in Table 4. As expected, the respondents who think their family will be affected by the crisis are also more likely to expect a fall in household income and less likely to expect an increase. Moreover, they are more likely to actually experience an income fall in the next twelve months. Similarly, the respondents who are confident that they will keep their job in spite of the crisis less often expect and experience an income fall and more often expect and experience an income rise. Whereas the plausible associations with the subjective probabilities of an increase and a decrease could be due to the fact that a common tendency to be optimistic or pessimistic affects crisis perceptions and income expectations in the same way, the association with realizations makes this less plausible – they show that the crisis perceptions are meaningful and have predictive value for what happens to the respondent's household income in the next twelve months.

The effects of socio-demographics are often insignificant, and the significant variables show less consistency across the three questions. Keeping other variables (including crisis perceptions) constant, men more often expect an income increase than women, in line with the literature saying that men are more optimistic in general, but there is no significant gender difference in the subjective probability of an income fall, or in the realized income change. Similarly, the difference between partnered and single respondents is significant in only one case – those with a partner report a higher probability of an income reduction. Respondents with high education give a particularly high probability of an income fall, but also of an income rise, suggesting that their subjective income uncertainty is higher. A consistent finding across columns is the difference between self-employed respondents and employees (the benchmark): self-employed have more optimistic expectations, and this also appears to be justified according to the reported realization one year later.

The time dummies confirm what we already saw in the figures: pessimism increases over time, and the realizations show that this was justified *ex post*. Unfortunately data collection stopped in 2012 so that we cannot see whether the particularly pessimistic expectations in 2012 were justified. Finally, the estimates of the standard deviations of the unobserved heterogeneity terms suggest that unobserved heterogeneity is more important at the household level than at the individual level, which seems plausible given that the dependent variables refer to household income.

6 Retirement replacement rate expectations

In Section 3 we explained how the survey answers to subjective probability questions on the level of the retirement income replacement rate (RIRR) were used to

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[9] The observed probability y_{it} is given by $y_{it} = max(0, min(y_{it}^*, 100))$ where y_{it}^* is defined as in the previous section.

Table 4. Estimation results: expectations and realizations concerning income adequacy in twelve months time

	Higher	Lower	Realization
Cris_family	-3.023***	4.988***	-0.128***
	(0.315)	(0.369)	(0.016)
Cris_job	1.271***	-1.644***	0.045***
	(0.330)	(0.378)	(0.016)
Male	5.423***	-0.926	0.119
	(1.869)	(2.194)	(0.089)
Partner	2.872	8.435***	0.073
	(2.194)	(2.564)	(0.103)
Age	-0.963	0.380	-0.045
	(0.775)	(0.892)	(0.039)
Age-sqr./100	-0.302	0.261	0.027
	(0.824)	(0.942)	(0.041)
Log. net-inc.	0.831	0.747	0.070*
	(0.621)	(0.725)	(0.036)
Educ. Med.	2.616	2.639	-0.168
	(2.539)	(2.985)	(0.121)
Educ. High	5.850**	7.308**	0.166
	(2.516)	(2.948)	(0.119)
Public sector	-4.510*	-0.096	-0.186
	(2.457)	(2.893)	(0.118)
Self-employed	11.003***	-6.414*	0.408**
	(3.163)	(3.726)	(0.173)
Construction	-1.602	-5.112	-0.115
	(4.424)	(5.187)	(0.217)
manufacture	-4.138	-3.198	-0.150
	(3.115)	(3.666)	(0.150)
Financial services	-6.748	0.999	-0.019
	(4.439)	(5.242)	(0.204)
Other services	-0.730	-0.284	-0.163
	(3.194)	(3.735)	(0.158)
2010	-3.655*	-0.639	-0.325***
	(1.970)	(2.313)	(0.086)
2011	-0.427	7.629***	-0.568***
	(1.861)	(2.194)	(0.090)
2012	-4.718**	18.250***	
	(1.959)	(2.295)	
Constant	64.452***	-10.265	
	(18.579)	(21.559)	
σ_{hh}	9.527	11.508	0.699
σ_{ind}	19.451	22.753	0.000
σ_{ε}	28.219	34.363	
N	2519	2519	1376

derive, for each wage earner or self-employed worker in the sample in each wave, a subjective distribution of the individual's future RIRR. In this section we analyze how the median and the interquartile range of these subjective distributions vary with individual characteristics and with crisis perceptions. We use linear models with household specific and individual specific random effects, assumed to be independent of the explanatory variables. (In other words, the observed outcome y_{it} is modelled as y_{it}^* in Section 3.2.) We also estimate a similar linear model for the expected age at which someone can retire.

The results are presented in Table 5. The first column refers to the expected retirement age. We find a significant relation with the crisis perceptions: those who think their household will be affected by the crisis expect to be able to retire later, and those who are more confident that they will not lose their job in spite of the crisis expect to retire earlier than others. The largest effect, however, is that of education: Respondents with high education level expect to be able to retire about five months earlier than otherwise similar low educated respondents. Other socio-economic characteristics are not significant at the 5% level. The only significant time dummy is for 2010 - for the later years, the upward trend in the expected retirement age is apparently explained by the changes over time in the other regression, such as the more pessimistic perception of the crisis.

The second and third columns concern the models explaining the mean and median of the subjective distributions of the retirement income replacement rates (RIRR). The main finding is that, keeping everything else constant including the expected retirement age and the time dummies that reflect the actual status of the crisis, there is a negative association between the expected or median RIRR and the perceived effect of the crisis on the respondent's household (*Cris_family*). Respondents who think the crisis will affect their family are also more pessimistic about their retirement income. This may be a causal effect if respondents think the crisis will affect the accumulation of their second pillar pensions, by reducing earnings or the financial position of their occupational pension fund. On the other hand, we cannot exclude the possibility that it might also simply mean that people who are pessimistic in general are more pessimistic about the crisis as well as about their own future income.[10]

On the other hand, the final column shows that being pessimistic about the effect of the crisis has no effect on the subjective uncertainty (IQR) of the retirement income replacement rate. Here what matters is confidence in keeping the job, in spite of the crisis (Cris_job): Respondents perceiving a larger risk that they will lose their job due to the crisis are significantly more uncertain about their retirement income. To interpret the magnitude of the estimate, note that a change in (Cris_job): from 6 to 10 (the 25th and 75th percentiles of the distribution on the 10 point scale) increases the IQR by about 2.2 percentage points, which is about 10 percent of the average IQR (22.6, see Figure 4). So the effect is substantial but not huge.

The effects of the other variables are largely in line with the results of Van Santen et al. (2012) and De Bresser and van Soest (2013) who estimated similar models using the earlier waves of the same data. The earlier respondents expect to be able to retire, the lower the mean or median RIRR, but the expected retirement age is not related to RIRR uncertainty. As always, males are more optimistic than females. They are also less uncertain, but this difference is not significant. The higher income groups and those with higher education level are substantially more pessimistic concerning their RIRR level than lower income and lower education groups. A possible explanation is that respondents with low earnings rely to a

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[10] As mentioned in Section 3.2, including fixed effects to control for time-invariant pessimism does not lead to useful results since the explanatory variables vary too little over time.

Table 5. Estimation results: expected minimal retirement age and expected, median and IQR of the subjective distribution of retirement income replacement rate expectation

	Early ret. Age	Expected	Median	IQR
Cris_family	0.106***	-0.523***	-0.553***	-0.163
	(0.024)	(0.182)	(0.188)	(0.156)
Cris_job	-0.061**	0.260	0.199	-0.548***
	(0.025)	(0.192)	(0.198)	(0.165)
Earliest ret. age		0.773***	0.761***	0.001
		(0.185)	(0.191)	(0.158)
Male	0.083	2.565**	2.441**	-1.500
	(0.135)	(1.101)	(1.137)	(0.959)
Partner	-0.307*	-1.879	-2.105	-1.481
	(0.162)	(1.257)	(1.287)	(1.061)
Age	0.063	-1.784***	-1.825***	-0.146
	(0.057)	(0.451)	(0.463)	(0.384)
Age-sqr./100	-0.085	1.692***	1.743***	-0.389
	(0.061)	(0.477)	(0.490)	(0.406)
Log. net-inc.	0.012	-0.763**	-0.873**	-0.518
	(0.049)	(0.380)	(0.390)	(0.323)
Educ. Med.	-0.229	-3.076**	-3.403**	-1.525
	(0.195)	(1.539)	(1.581)	(1.314)
Educ. High	-0.437**	-7.448***	-7.463***	-1.714
	(0.192)	(1.516)	(1.556)	(1.291)
Public sector	-0.257	0.661	0.876	0.587
	(0.184)	(1.461)	(1.501)	(1.248)
Self-employed	0.276	1.630	1.593	2.315
	(0.243)	(1.901)	(1.957)	(1.624)
Construction	-0.575	-2.179	-1.007	3.278
	(0.361)	(2.846)	(2.923)	(2.425)
Manufacture	-0.288	0.672	0.736	0.845
	(0.235)	(1.854)	(1.904)	(1.580)
Financial services	-0.364	2.035	2.270	-4.029*
	(0.333)	(2.620)	(2.688)	(2.229)
Other services	0.085	-1.500	-1.530	3.041*
	(0.235)	(1.852)	(1.902)	(1.578)
2010	0.313**	0.935	0.967	-0.155
	(0.153)	(1.164)	(1.211)	(1.007)
2011	0.212	-3.790***	-3.426***	2.302**
	(0.142)	(1.081)	(1.123)	(0.933)
2012	0.105	-6.724***	-6.797***	4.049***
	(0.148)	(1.126)	(1.169)	(0.972)
Constant	63.274***	83.720***	87.063***	48.341***
	(1.413)	(16.102)	(16.597)	(13.758)
σ_{hh}	1.423	9.806	9.612	6.945
σ_{ind}	0.264	6.234	6.673	6.612
σ_{ε}	1.879	14.168	14.790	12.30
N	1733	1733	1733	1733

larger extent on the flat rate state pension, which may be expected to be more stable than the supplementary occupational pension – because the state pension is aimed at providing a subsistence income and this is not expected to change. There is surprisingly little variation across sectors, particularly concerning the level of RIRR (mean and median). There are more differences in the IQR, significant at the 10 percent level, suggesting that self-employed workers and workers in the sector other

(than financial) services are more uncertain than employees in the manufacturing sector, while employees in the financial services sector are less uncertain about their retirement income than those in manufacturing. The latter may well be due to the fact that employees in the financial services sector are more knowledgeable about their pensions than others. In spite of adding all these controls, the time dummies are all very significant, and in line with the time patterns that we discussed in Section 3: The retirement income expectations become more pessimistic and more uncertain over the four years period.

Most of the variation in median replacement rates or in the interquartile ranges is not explained by the regressors. The unsystematic variance is captured by individual effects, household specific effects, and idiosyncratic errors. Household specific effects are slightly more important than individual effects, and together these two unobserved heterogeneity terms capture more than half of the total unsystematic variance. The importance of the household specific effects may seem surprising, since the replacement rates concern personal pension income. One explanation is that optimistic people typically find an optimistic spouse; another would be that common omitted variables affect both partners in the same way. (For example, both partners may work in the same industry or firm and therefore have similar supplementary pensions (often organized at the industry level).

7 Conclusion

We have analyzed longitudinal data on crisis perceptions, income expectations, retirement planning, and expected income during retirement for a representative sample of the Dutch population interviewed in the summers of 2009, 2010, 2011 and 2012. Our first main finding is that the perceptions of the crisis become more pessimistic over the years, in line with subjective indexes of the state of the Dutch economy such as the consumer confidence index. We also find substantial heterogeneity in crisis perceptions at a given point of time, with, for example, more pessimism amongst the high educated and fewer concerns about losing their job amongst public sector employees.

In line with the perceptions on the crisis as well as the ongoing debate about pension reforms, the number of people expecting an increase in the retirement age or a fall in the value of their pensions is also increasing. The higher educated are more particularly concerned about a fall of their pension income. The self-employed, who do not participate in the occupational pension system which is mandatory for employees, are less concerned about pension income and more willing to work longer than employees.

Crisis perceptions are associated with expected income changes for the next twelve months in a plausible way. They also help to predict actual changes in income reported twelve months later. The latter strongly suggests that the relation between crisis perceptions and income expectations is not merely due to the fact that general optimism or pessimism affects crisis perceptions and income expectations in a similar way - crisis perceptions contain private information that reflects genuine heterogeneity in how the crisis affects different families in different ways.

Retirement income replacement rate expectations have dropped substantially from 2010 to 2012, from an average median of almost 80 percent in 2010 to 70 percent in 2012. In particular, the group with very optimistic replacement rate expectations has shrunk substantially. Respondents who strongly think the crisis will affect their family report later expected retirement ages as well as lower expected replacement rates. Respondents who are more concerned about losing their job are more uncertain about their retirement income. Higher income and higher education groups have lower expected replacement rates than the lower socio-economic groups. This may be realistic since the low income groups depend to a larger extent on the state pension, which can be expected to be more stable (at the minimum subsistence level) than supplementary pensions. On the other hand, Bissonnette and van Soest (2012) found that the higher socioeconomic status groups are also more pessimistic concerning the Dutch pension system in general rather than their own provisions, which suggests that their larger pessimism may reflect a more realistic view on the future development of pensions.

A series of pension reforms is reducing the income replacement that most employees will get if their pension savings are limited to the pay as you go state pensions and the mandatory supplementary occupational pensions. Voluntary additional pension savings will play a larger role, implying an increasing responsibility for the employees themselves. A necessary condition for optimal pension planning and decision making is that consumers have unbiased expectations of the pensions what pension they are accumulating. The results in this paper suggest that these expectations have become more pessimistic over the years of the crisis and associate in plausible ways with individual perceptions of the expected crisis impact. At least on average, consumers' expectations adjust to the new reality. On the other hand, heterogeneity is substantial, implying that the expectations of large groups of people may be unrealistically positive. Particularly for the lower income groups, this may be a source of concern for policy makers. These groups not only are more optimistic on their pension income replacement rate, but are also likely to have fewer possibilities to adjust their life style or rely on other resources when their pension appears to be less.

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