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Satisfaction with Pension Provisions in the Netherlands – A Panel Data Analysis

Satisfaction with Pension Provisions in the Netherlands - A Panel Data Analysis[1]

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Abstract

This paper analyzes satisfaction with aspects of pension provision of the Dutch population using longitudinal data collected between August 2006 and June 2009. It focuses on five self-reported satisfaction levels: satisfaction with the age at which the individual can retire, with the expected amount of pension income, with the knowledge about own pension provisions, with own pension provisions overall, and with the Dutch system of pensions and old age social security. It identifies the socio-economic determinants of each of these satisfaction levels such as age, gender, education, and occupational status, as well as the importance of satisfaction with aspects of pension provisions for overall satisfaction. It also looks at the association between pension satisfaction and expectations concerning future generosity of the system and opinions on how flexible a pension system should be. Moreover, the effects of the reversal of early retirement measures are investigated. Finally, it explores the consequences of the recent financial crisis for pension satisfaction.

1. Introduction

This paper analyses satisfaction with aspects of pension provisions of the Dutch population using longitudinal data collected between August 2006 and June 2009. The sustainability of pension schemes has been subject to lively debate, both among policy makers and academics, for at least two decades. Among academics little doubt remains that the demographic transition observed in developed countries creates a structural threat to the stability of pension systems. In many industrialized countries, the vulnerability of pensions to demographic change is a consequence of the peculiar design of pension plans, which is based on intentions of intergenerational income support that appear to be infeasible. A decline in fertility combined with increased longetivity is potentially problematic for these so-called pay-as-you-go (PAYG) schemes, since a shrinking population of employed people will have to cater to the income of a growing group of retirees. The consensus among economists is that current PAYG systems will require one of three reforms in the next two decades (Boeri et al., 2001). One possibility is a large increase in contributions by workers, in order to increase the amount of funds available for those entitled to pensions. Another would be to increase the level of general taxes. The third option put forth is to cut the generosity of pensions already promised. Each of these measures makes sense but runs into problems in the political process.

The Dutch system is interesting as an example of a European pension scheme, because it is rather typical for Western Europe.[3] For instance, it adheres to a PAYG-model for the first pillar public pension, which provides the minimum subsistence level to everyone who has been a resident in the country from age 15 to age 65. This makes the first pillar subject to the aforementioned unsustainability arising from the demographic transition and has led to government plans to postpone the eligibility age. On the other hand, second pillar occupational pensions are fully funded, and since this is the largest part of pension provisions, the vulnerability of the system is much less than in many other OECD countries. Henkens et al. (2008) find that the average (self-reported) expected replacement rate of Dutch workers in 2007 was about 67%, compared to 57% in their US sample, although perceived savings adequacy hardly differed between the two countries.

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[3] See Bovenberg and Gradus (2008) for a description of the Dutch pension system and its reforms.

Recently the debate on the provision of pensions has been reinforced by the financial crisis that unfolded during the second half of 2008. Indeed, searching the Internet for information on pension funds shows that most independent websites refer specifically to the effects the crisis might have on individual pension wealth. In the Netherlands, as in other countries, such interest seems to be well founded. Dutch public pension funds, for example, have invested approximately 40 percent of their funds in stock markets (Pensioenkijker, 2009) and it can therefore be expected that major negative shocks to share prices like those that occurred over the past months, severely affect the (second pillar) pension funds' solvency. These concerns have already been shown to affect public confidence in the Dutch pension system, as is reported in the "Nationale Pensioenkijker" (Pensioenkijker, 2008). The Dutch fear for the average purchasing power of occupational pensions. Moreover, more than half of them expect that 20 years from now, the minimum age for old age social security (the first pillar) will have increased with more than two years (Bissonnette et al, 2009).

Given the widespread conviction that reforms of current pension systems are unavoidable, popular opinion regarding such reforms is an important research topic. Opinions about reforms have been measured by Boeri et al. (2001), leading to the conclusion that the status quo is the majoritarian outcome. This study concerns European citizens, a rather heterogeneous group subject to a variety of different national pension systems. Very little research has been conducted on pension satisfaction at a national level. One of the few studies of satisfaction with current pensions and country specific attitudes towards pensions and pension reform is O'Donnell and Tinios (2003), who find that satisfaction with the Greek PAYG system varies by sector, and conclude that reform is blocked by conflicts of occupational groups due to the fragmented and nontransparent nature of the system. The importance of transparency and information campaigns is also emphasized by Litwin et al. (2009) who study public support for a reform that delays retirement in Israel.

This study on pension satisfaction fits in with the literature on satisfaction with life and specific aspects of life (see, e.g., Van Praag and Ferrer-i-Carbonell, 2008, or Clark et al., 2008). Such subjective well-being measures have been found to be relatively reliable, in the sense that questions repeated two weeks apart yield highly correlated

answers (Krueger and Schkade, 2008). Perhaps unsurprisingly, income, poor health, divorce, unemployment and a lack of social contacts are identified in a recent review as important determinants of subjective well-being (Dolan et al., 2008). Moreover, it is emphasized that traditional approaches, relying primarily on cross-sectional data, might suffer from endogeneity of several explanatory variables. The potential of panel-data to aid identification of causal effects is regarded as an important improvement (Van Praag et al., 2003; Dolan et al., 2008). In addition to the analysis of general well-being, part of the subjective well-being literature is concerned with satisfaction with aspects of life, such as job satisfaction. One central conclusion from the job satisfaction literature is that random effects (RE) specifications are rejected against fixed effects (FE) models, suggesting that unobserved, time-invariant heterogeneity is correlated with the covariates included in models (D'Addio et al., 2007). Income is found to be a primary determinant of job satisfaction, as is hours of work (D'Addio et al., 2007). Furthermore, it has been found that having a high income relative to some reference group (usually defined as colleagues or those geographically proximate) has a strong positive effect on job satisfaction (Clark et al., 2008). Moreover, job satisfaction scales appear to pick up feelings with consequences for actual behavior: they have predictive power for job quits, even after controlling for wages (Clark et al., 2008).

Several studies analyze the interplay between satisfaction with aspects of life and general well-being (Ferrer-i-Carbonell and Van Praag, 2002; Van Praag et al., 2003; Van Praag and Ferrer-i-Carbonell, 2008). The evidence suggests that general satisfaction is the product of complex interactions between satisfactions with various domains of one's life. For instance, analysis of German panel data showed that finance, health and job satisfaction are the most significant determinants of general satisfaction. In a similar vein, this paper analyzes overall pension satisfaction and satisfaction with aspects of personal pension provisions.

A number of research questions will be addressed. First, we try to uncover which socioeconomic characteristics drive pension satisfaction. Our focus lies in particular on the role of such variables as income, occupational status and gender. Second, we address how overall satisfaction with one's pension relates to satisfaction with various aspects of pensions, in particular the retirement age, the (expected) post-retirement income and the

knowledge of one's own pension provisions. Third, we look into the relation between pension satisfaction and expectations regarding the future generosity of pensions and welfare, as well as between satisfaction and attitude towards increasing pension flexibility (interpreted here as dependence of the level of benefits on the age of retirement). Fourth, we explore the effects of abolishing generous early retirement measures, popularly known as the "VUT". Finally, we investigate the effects of the recent financial crisis on pension satisfaction.

Data are drawn from the above mentioned "Pensioenkijker" between August 2006 and June 2009. This is a monthly rotating panel, with a rotation time of three months, providing us with a random sample of the Dutch population of age 25 and older. We apply both fixed and random effects ordered logit models in order to mitigate endogeneity through time-invariant unobservables, such as personality types affecting both independent variables and satisfaction scales. Hausman tests reject the random effects specifications, confirming the general finding in the literature. Still, the random effects models give insight in the associations between satisfaction levels and time invariant characteristics.

One of our main findings is that income is an important determinant of all aspects of pension satisfaction. In addition, we find significant differences in satisfaction across different sectors of the economy. The strongest predictor of overall pension satisfaction is satisfaction with the expected level of post-retirement income. Moreover, those eligible for early retirement are more satisfied with their expected retirement age, but less satisfied with the knowledge they have of their pension. General pessimism regarding the future purchasing power of pensions is negatively correlated with personal satisfaction and those who are more satisfied with their pension are more in favor of making pension benefits dependent on the retirement age. We find an immediate effect of the financial crisis on satisfaction with (expected) income during retirement. If the crisis affected the other scales, this effect was delayed and occurred in January 2009.

The structure of the paper is as follows. Section 2 outlines and motivates the empirical strategy to be followed. Section 3 describes the data; the results are presented in sections 4 (baseline models) and 5 (extensions). Section 6 concludes.

2. Empirical strategy

When analyzing subjective well-being, the economic approach is to think in terms of utility maximization. In order to understand the importance of this point, one should distinguish between satisfaction as indicated on a response scale (such as the ten point scale 1,…,10 in our case) and the underlying concept of welfare the researcher is actually interested in. In general, the following three main assumptions can be made regarding the relationship between reported satisfaction and welfare, in order of increasing restrictiveness (Ferrer-i-Carbonell and Frijters, 2004):

1) Satisfaction (S) is a positive, monotonic transformation of the metaphysical welfare concept (W): $S_{it} > S_{is}$ implies $W_{it} > W_{is}$.

2) Satisfaction is interpersonally ordinally comparable: $S_i > S_j$ implies $W_i > W_j$.

3) Satisfaction is interpersonally cardinally comparable: $W_i - W_j = \varpi(S_i, S_j)$, where $\varpi(\cdot)$ is a function known up to a multiplicative constant.

Though this is usually not discussed explicitly, most of the psychological literature relies on the third, cardinal, interpretation of wellbeing scales. The cardinal interpretation means that the difference between a satisfaction answer of 3 or 4 is equally large as that between an 8 and a 9. This notion is evident in the use of linear models and least-squares techniques to analyze the data. The common cardinal approach with an even-spaced welfare difference between satisfaction answers can be supported theoretically by agents trying to maximize the information given in a questionnaire (Van Praag, 1991). Most economists, on the other hand, tend to see satisfaction as ordinal rather than cardinal, like utility, and therefore apply ordered response models rather than linear models, with the latent index corresponding to actual subjective wellbeing. In this study we will therefore follow the ordinal approach and use ordered response models.[4] We report estimates of fixed effects (FE) and random effects (RE) ordered logit models of the following form:

$$y_{it} = j \text{ if } \gamma_{j-1} < y_{it}^* \leq \gamma_j, j = 1,...,10$$

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[4] Results from linear models are available from the authors upon request. They lead to very similar conclusions. This is in line with the robust findings of Ferrer-i-Carbonell and Frijters, (2004) for linear and non-linear models explaining satisfaction with life.

with

$$y_{it}^* = x_{it}^{'}\beta + \alpha_i + \varepsilon_{it}$$

Where α_i is an individual-specific unobserved effect, assumed to be standard normally distributed, and ε_{it} is an idiosyncratic shock to wellbeing that is assumed to be independently and identically distributed with a standard logistic distribution.

Previous research indicates that FE approaches yield results that differ sharply from those found in RE frameworks (Ferrer-i-Carbonell and Frijters, 2004). Therefore both FE and RE versions are estimated for all preferred equations. Random effects ordered logit models are estimated by integrating out the unobserved effect α_i. To estimate the fixed effects models, we apply the Das and Van Soest (1999), methodology of estimating binary FE logit models for different cutoffs of the 10-point scale (e.g., $y_{it} \leq 5$ versus $y_{it} > 5$, $y_{it} \leq 6$ versus $y_{it} > 6$ etc.) and combining these in a minimum distance-like step.[5] This estimator is consistent and is the asymptotically efficient combination of FE logit estimators (Das and Van Soest, 1999).

As explained in the introduction, our dependent variables are overall satisfaction, satisfaction with the expected retirement age, with expected post-retirement income and with the insight one has into his or her pension situation. Moreover, we include a scale describing satisfaction with the Dutch system of income provision for the elderly in general. Each of these satisfaction variables is explained from a variety of explanatory variables. A separate model relates overall satisfaction with own pension provisions to satisfaction with the three aspects and background variables.

For the vector of independent variables, x_{it}, we used various background and occupational characteristics, such as gender, age, education level, family composition, employment and occupational status, sector, and income, as well as, in some specifications, opinions and expectations concerning the pension system. A complete list of all variables featuring in the regressions with baselines for dummy variables is presented in Appendix 1.

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[5] We are grateful to Paul Frijters for kindly sharing his code for this estimator with us.

3. Data description

All data used in this study are taken from the "Pensioenkijker," given to members of the CentERpanel. The CentERpanel, administrated by CentERdata at Tilburg University, covers the population in the Netherlands of ages 16 and older and is composed of over 2000 households in which one or more adults are invited to complete questionnaires at home every week over the Internet. Households are randomly selected and those without Internet access are provided with Internet access by CentERdata; they are given a set-top box that can be connected to their television set and phone line if they do not have a personal computer – and households without a television set are also given a portable TV. About 75% of all panel members respond to the questions in a given weekend. Attrition is low, making longitudinal research possible. Rich background information about the panel respondents is available from previous interviews.

Every respondent of 25 years or older gets the "Pensioenkijker" questions once every three months, but the sample is divided in three groups that get the questions in three different months. In that way there are observations for one third of the sample in each month. We draw on data collected between August 2006 and June 2009. The survey asks questions on the respondents' personal retirement situations and on the confidence they have in the Dutch pension system in general. The most important questions for our purposes are the subjective scales on which respondents indicate how satisfied they are with their pensions. The wording of these questions is straightforward, with formulations along the lines of "All in all, how satisfied are you with your pension?" (see Appendix 1 for a complete description of all satisfaction measures). In addition, information is collected on a number of personal characteristics of the respondents, such as their income, age, education level, family situation, etc. (see Appendix 1).

Table 1 indicates that the univariate distribution of the answers seems rather stable across time.[6] A large minority of respondents report that they are fairly happy with their pension (they rate their satisfaction with a 7). A majority of around 70 percent of respondents rate their satisfaction with grades between 5 and 8. The apparent reluctance of Dutch respondents to give extreme answers is often observed in subjective scale-based methods (see, for example, Kapteyn et al., 2007).

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[6] Similar tables are available for the other measures of pension satisfaction and show similar results.

Overall satisfaction	Quarter											
	2006 3	2006 4	2007 1	2007 2	2007 3	2007 4	2008 1	2008 2	2008 3	2008 4	2009 1	2009 2
No. observations	1,028	1,536	1,498	1,410	1,256	1,287	1,291	1,184	1,107	1,278	1,310	1,129
1 Not at all	4.1	3.8	3.7	3.6	3.3	4.0	2.6	3.0	3.6	2.8	4.3	3.5
2	2.4	3.5	2.9	2.8	3.4	2.2	3.3	2.6	3.1	3.3	3.0	2.8
3	5.7	4.5	5.2	4.8	4.5	4.7	4.3	4.7	4.7	4.1	5.0	5.0
4	7.0	7.0	7.1	7.3	5.7	6.1	7.3	7.6	7.1	6.1	5.7	5.8
5	13.0	12.5	12.8	12.6	12.8	11.1	12.0	11.4	10.7	12.3	11.5	12.8
6	17.8	18.8	16.8	17.9	18.4	20.1	17.7	17.6	17.4	18.7	18.2	19.1
7	24.7	22.4	23.9	26.4	24.8	24.0	23.2	24.7	22.6	24.7	24.6	23.8
8	17.5	18.1	18.3	16.5	19.6	19.8	20.3	18.8	21.3	19.7	18.9	19.4
9	5.2	6.5	6.8	6.0	5.1	6.1	6.9	6.8	6.5	6.3	6.3	6.1
10 Completely	2.5	2.9	2.5	2.3	2.4	1.9	2.4	2.8	3.0	2.0	2.5	1.8

Table 1: Univariate frequencies (%) of the overall satisfaction - scale

Appendix 2 presents histograms for all five pension satisfaction measures, pooled over all waves. Satisfaction with the system of income provision for the elderly in general (top left panel) is rather peaked with almost 30 percent of respondents rating their satisfaction with 7. Less than 20 percent of the sample evaluates their satisfaction with more than 8 or less than 5. A similar pattern emerges for the other scales, with more than a fifth of the sample rating their satisfaction with 7 and few respondents on the extreme ends of the distribution. The only exception is satisfaction with the age at which one expects to retire, with a more dispersed distribution than the others. In particular, around 19 percent of the sample rates their satisfaction with their retirement age with a 7 and a similar fraction with an 8. Also, relatively many people (7-8 percent) rate their retirement age with a 10.

To illustrate the development over time of the various measures of pension satisfaction, Figures 1 and 2 present graphs of their means and standard deviations across the quarters included in the sample, for men and women separately. The panels of Figure 1 suggest that the means of all measures follow slight upward trends across the sampling period, but the size of this trend is small, with the difference between the minimum and maximum being no larger than approximately 0.3 points (for general, knowledge and income level satisfaction the pattern is almost horizontal). It seems that men are on average more satisfied with all aspects of their pension than women (note that the scale of vertical axis in the graphs for females is consistently lower than that of the graphs for males).

In addition to this level difference, we observe a different time pattern for knowledge, age and overall satisfaction. We find a drop towards the end of the sampling period that is earlier and more pronounced for male respondents. This can be interpreted as evidence for an impact of the financial crisis on satisfaction that differs between men and women, but this conjecture will have to be analyzed econometrically before stronger statements can be made.
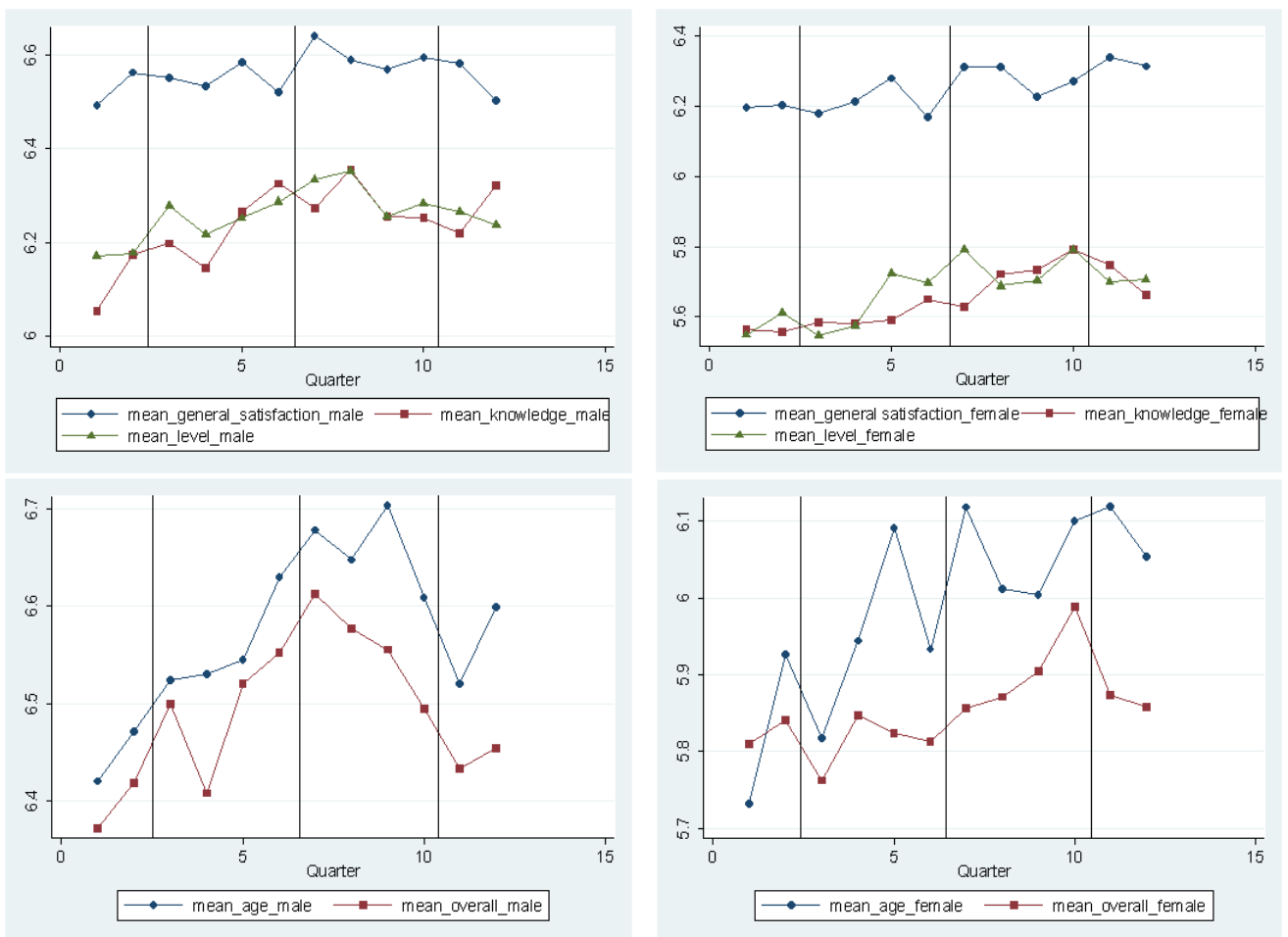
Figure 1: development of mean of dependent variables over time. Left column refers to males, right column refers to females.

Figure 2 presents the development in the dispersion of the satisfaction measures. It shows that for men, the standard deviation of these scales decreased up to the first half of 2008 and increased slightly afterwards. However, this pattern is less clear for women and, as was the case with the averages, the changes are rather small.

Descriptive statistics of the relevant variables are given in Table 2. A few respondents indicated unreasonably high income levels, probably because they reported yearly rather than monthly income. Hence all responses above 8,000 euro per month were removed from the data (twelve observations were lost this way).
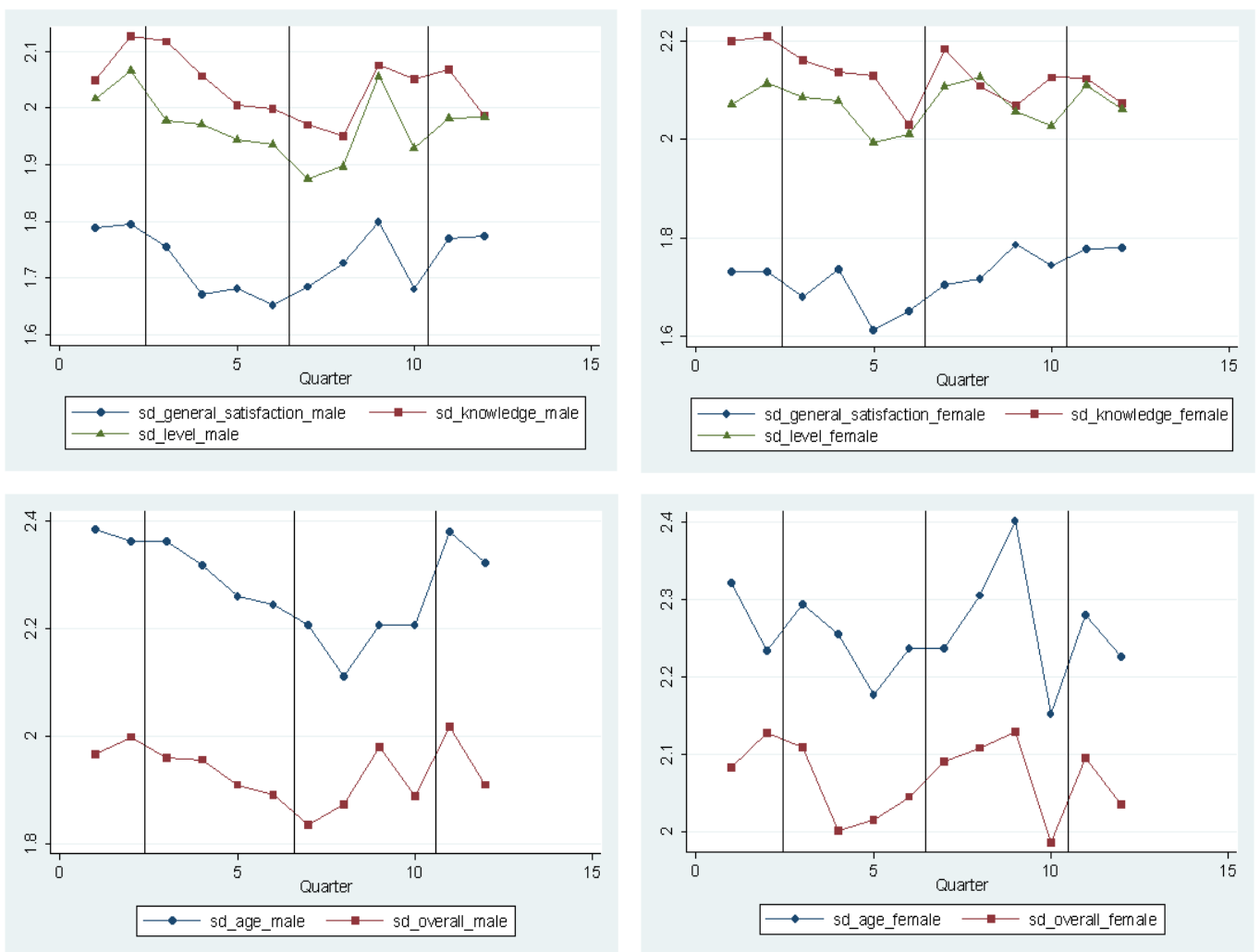

Figure 2: development of standard deviations of dependent variables over time. Left column refers to males, right column refers to females.

We follow the literature on subjective wellbeing and include income through a logarithmic term rather than a linear one, to mitigate the impact of any remaining extreme observations. No outliers have been removed from the other variables.

Variable	N	Mean	Std. Dev.	Min	Max
Dependent variables					
Overall satisfaction	15,175	6.213	2.019	1	10
Age satisfaction	14,861	6.320	2.293	1	10
Amount satisfaction	14,731	6.006	2.035	1	10
Knowledge satisfaction	15,076	5.980	2.101	1	10
General satisfaction	15,364	6.424	1.733	1	10
Regressors					
Ln(income) (net, per month)	16,578	6.143	3.477	-4.605	8.700
Construction	16,258	0.027	0.162	0	1
Government	16,258	0.209	0.406	0	1
Services	16,258	0.183	0.387	0	1
Self employed	16,578	0.042	0.200	0	1
Retired	16,578	0.248	0.432	0	1
Disabled	16,578	0.052	0.222	0	1
Unemployed	16,578	0.016	0.126	0	1
Not working	16,578	0.163	0.369	0	1
Age	16,578	53.293	14.434	22	94
Male	16,578	0.545	0.498	0	1
Partner	16,578	0.770	0.421	0	1
Owner-occupier	16,576	0.727	0.445	0	1
Education middle	15,247	0.314	0.464	0	1
Education high	15,247	0.362	0.481	0	1
Number of children	16,578	0.707	1.081	0	6

Table 2: descriptive statistics

4. Results: Baseline Models

This section presents the estimation results of our RE and FE ordered logit models of pension satisfaction.[7] In this section, we present the results for the benchmark specifications. In the next section we present some extended models in which we relate pension satisfaction to measures of general pessimism and other related variables.

It is important to emphasize that we are only describing patterns in self-reported satisfaction. These patterns may or may not reflect underlying differences in pension provisions (which we do not observe). Thus, if we find that one group is more satisfied than another, this can be because the first group has better pension provisions or because of differences in needs, personality types (optimism), etc.

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[7] Random effects ordered probit models were estimated as a robustness check and lead to similar qualitative conclusions. Results are available upon request.

Random effects models

Random effects (RE) models assume that the entire composite error term, both its time-constant and time-varying components, is uncorrelated with the independent variables. The RE estimates are shown in Table 3. The first model regresses overall (own) pension satisfaction on socio-economic characteristics of the respondent. This model can be interpreted as a reduced-form specification of the second model, in which satisfaction with aspects of own pension provisions are included as explanatory variables, and effects here might run through satisfaction with the various aspects. Income is found to be positively related to overall satisfaction. Inspection of models (3)-(5) explaining the satisfaction with the three aspects of pension provisions suggests that this effect runs through satisfaction with the retirement age and pension knowledge; this is confirmed by the fact that the impact of income disappears when controlling for the pension aspect satisfaction variables (col. 2).

Column 1 also shows that employees of the construction sector are happier, on average, with their pension than those in the manufacturing sector. Again, columns two to five show that this effect runs through satisfaction with retirement age and knowledge of pension provisions. Government workers are more content with their pension than industrial sector employees and this effect runs entirely through satisfaction with the retirement age. Moreover, respondents who are self-employed or work in family businesses are significantly less satisfied with their pension provisions than the other groups. This seems to be the net result of a positive correlation with satisfaction with their age of retirement and a stronger negative effect on satisfaction with the level of post-retirement income and knowledge of one's pension. It seems that, as far as pensions go, the freedom of being one's own boss is a mixed blessing indeed, with drawbacks in terms of information and income provision that outweigh the benefit of being able to time the onset of retirement as one sees fit. Those who are already retired evaluate their retirement provisions significantly better than other groups. This stems from higher satisfaction with their income level and with their retirement age.

Respondents' age and being male are also found to be positively related to overall pension satisfaction. The size of these effects decreases but remains significant when controlling for satisfaction with the aspects (col. 2).

	(1) Overall satisfaction	(2) Overall satisfaction	(3) Age	(4) Amount	(5) Knowledge	(6) General satisfaction
			Random effects Ordered Logit			
Age	-	0.697***	-	-	-	-
		(0.0173)				
Amount	-	1.518***	-	-	-	-
		(0.0250)				
Knowledge	-	0.518***	-	-	-	-
		(0.0184)				
Ln(income)	0.100***	0.00568	0.0505***	0.0192	0.0599***	0.0466***
	(0.0177)	(0.0126)	(0.0166)	(0.0138)	(0.0131)	(0.0107)
Construction	0.454**	-0.380	0.888***	0.206	0.587***	-0.317
	(0.215)	(0.234)	(0.333)	(0.290)	(0.224)	(0.227)
Government	0.579***	-0.106	0.635***	0.186	0.200	0.453***
	(0.186)	(0.137)	(0.151)	(0.173)	(0.134)	(0.157)
Services	0.0804	-0.0614	0.295**	-0.000869	0.183	0.366**
	(0.230)	(0.137)	(0.134)	(0.183)	(0.139)	(0.158)
Self employd	-1.130***	-0.332*	0.573***	-0.534***	-0.911***	0.335**
	(0.166)	(0.181)	(0.193)	(0.163)	(0.166)	(0.167)
Retired	1.588***	0.387**	2.960***	1.035***	0.112	0.816***
	(0.188)	(0.161)	(0.179)	(0.195)	(0.166)	(0.184)
Disabled	-0.308	-0.510**	1.263***	-0.974***	-0.159	0.330
	(0.213)	(0.203)	(0.181)	(0.214)	(0.170)	(0.214)
Unemployed	-0.242	-0.341	0.217	-0.232	-0.132	0.371
	(0.237)	(0.249)	(0.190)	(0.227)	(0.321)	(0.246)
Not working	0.673***	-0.171	1.159***	0.300	-0.127	0.457**
	(0.208)	(0.172)	(0.181)	(0.197)	(0.211)	(0.189)
Age	0.0611***	0.0133***	0.0637***	0.0472***	0.0296***	0.0455***
	(0.00604)	(0.00380)	(0.00455)	(0.00421)	(0.00426)	(0.00376)
Male	1.136***	0.207**	0.361***	1.053***	0.466***	0.270**
	(0.102)	(0.0842)	(0.111)	(0.117)	(0.0877)	(0.113)
Partner	0.243***	0.0170	0.172*	0.535***	0.411***	0.0232
	(0.0905)	(0.0915)	(0.102)	(0.113)	(0.102)	(0.0995)
Home owner	0.261**	0.224***	0.383***	0.615***	0.905***	0.126
	(0.108)	(0.0866)	(0.0926)	(0.0972)	(0.0919)	(0.108)
Educ. middle	0.178*	0.0284	-0.267**	0.192*	-0.132	0.0430
	(0.103)	(0.0938)	(0.108)	(0.101)	(0.124)	(0.100)
Educ. high	0.676***	0.152	0.343***	1.063***	0.449***	0.956***
	(0.101)	(0.0935)	(0.120)	(0.106)	(0.123)	(0.113)
No. children	0.0336	-0.0147	-0.326***	-0.121**	-0.145***	-0.269***
	(0.0438)	(0.0378)	(0.0587)	(0.0483)	(0.0426)	(0.0426)
Quarterly dummies	Yes***	Yes	Yes***	Yes**	Yes	Yes***
Sample size	13,625	12,549	13,336	13,221	13,544	13,797
No. individuals	2,438	2,343	2,439	2,397	2,445	2,454
ρ	0.713***	0.368***	0.654***	0.688***	0.641***	0.608***
	(0.005)	(0.014)	(0.007)	(0.006)	(0.007)	(0.008)

Table 3: RE ordered logit models of pension satisfaction. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Individuals living together with a partner are on average happier with their pension provisions than those living alone. This is driven primarily by the positive association between having a partner and being satisfied with the level of post-retirement income and the knowledge of pension provisions. A similar result is found for home owners. Finally, having gone through higher education has a strong positive relation to overall satisfaction. This effect runs through satisfaction with all three pension aspects considered here, but primarily through satisfaction with the (expected) level of post-retirement income (even though we control for current income).

The second model explains overall pension satisfaction from satisfaction with different aspects of one's (expected) pension, as well as on the socio-economic covariates from model (1). The results show that of the different pension aspects, satisfaction with the level of the expected post-retirement income has the strongest weight in overall pension satisfaction. Though their effects are smaller, satisfaction with the expected age of retirement and satisfaction with insight into one's pension provisions also significantly contribute to overall pension satisfaction.

When controlling for satisfaction with the three considered aspects of pension provisions, few other covariates remain significant. Interestingly, we still find that those who are currently retired evaluate their overall satisfaction more positively than employees in the industrial sector, although the size of the coefficient is smaller than in model (1). This suggests that there is another relevant aspect of pensions than the three considered on which the already retired score higher than those who are not yet retired. Genuine uncertainty about future retirement provisions (other than lack of knowledge) would be a plausible candidate. Moreover, we now find a strong and significant negative effect on overall satisfaction of being on (full or partial) disability benefits, suggesting that uncertainty and reduced faith in one's old age care is among the burdens of disability (even if satisfaction with the level of one's pension provisions remains unaffected). Finally, the variables *age* and *male* enter the equation significantly positively, as does the dummy for homeownership. Again, a possible explanation might be uncertainty, particularly for *age* and *male*, since pension uncertainty is induced by uncertainty in future labor income, which reduces with age and is smaller for men who more often work full-time without career interruptions than women.

The columns three to five in Table 3 report estimates for the equations explaining self-reported satisfaction with the three different aspects of the individual pension situation. We find a significant positive effect of income for satisfaction with two out of three aspects, namely retirement age, and insight into one's provisions. Presumably people with higher incomes build up resources for retirement more quickly and are able to time their retirement according to their own wishes (be it earlier or later in life). Moreover, having a higher income might enable respondents to engage in costly information gathering activities more easily, or the lack of financial constraints might lead individuals to evaluate a given level of information about their pension more positively (as they can afford not to worry).

The finding that personal income is not significantly related to satisfaction with expected post-retirement income might seem surprising. An explanation could be that respondents base the evaluation of their expected income on a comparison with the present (see, e.g., Clark and Oswald, 1996), in which case those with a high income are more critical than those with a lower income (even to such an extent that it outweighs the fact that their pensions are likely to be higher also).

As mentioned above, construction workers evaluate both their retirement age and the knowledge of their pensions more positively than industrial workers. This may be due to the fact that for many physically demanding occupations collective bargaining agreements have led to arrangements allowing for retirement long before the standard retirement age of 65 years. In fact, together the labor market dummies indicate that compared to all other groups, with the exception of the unemployed, those working in the industrial sector are less satisfied with their expected retirement age. Furthermore, individuals who are self-employed or work for a family-owned company are less satisfied with the level of their (expected) post-retirement income and the knowledge of their pension. Though the disabled are relatively happy with the age at which they expect to retire, they are less content than industrial workers with the level of their retirement income. Age and being male are positively related to satisfaction with all three aspects and those living with a partner feel more confident about their knowledge as well as the level of their pension benefits than singles. Home owners evaluate all three aspects of their pension-situation more positively, perhaps because one can use real estate as an

investment to complement other sources of retirement income. Finally, being highly educated improves all measures of satisfaction, while the number of children enters all three equations negatively.

The final column of Table 3 presents results of a model for satisfaction with the Dutch system of income provision for the elderly, not only the occupational pensions but also the first pillar state pensions (AOW). This measure is aimed at satisfaction with the system in general, rather than satisfaction with one's own personal situation. Despite the different dependent variable, the pattern of coefficients is qualitatively the same as in equations (3)-(5). Income again enters positively, as do the government and services-dummies. Interestingly, respondents who are self-employed evaluate the system of income provision more positively than industrial workers, although we found they were less happy with their own pension situation. Moreover, we observe a positive retirement effect as well as positive coefficients on age and the male-dummy. Having a partner or owning a house does not affect this satisfaction measure. Those with a university education evaluate the system more positively than others. Finally, the number of children enters negatively.

Fixed effects models

Table 4 presents the results of fixed effects ordered logit models. These estimates only use the observations on respondents with within-variation in the dependent variables, which explains the smaller sample sizes. Moreover, the relatively short time period over which data were collected (August 2006 till June 2009), limits the amount of within-variation in many of the independent variables. Especially the variables related to education and sector of employment, display considerable persistence. This reduces the precision of the estimates. Still, the Hausman tests of RE against FE model (see the bottom of Table 4) clearly reject the random effects hypothesis of zero correlation between individual unobserved effects and independent variables for most models. More precisely, the RE model is rejected for all specifications if we include the quarterly dummies in the vector of coefficients on which the test is based, but not for models (2) and (3) if these are removed. In light of this finding we have to interpret the results from the random effects models with some care: the effects in Table 3 may reflect correlations

of individual effects with regressors rather than causal effects. For the identification of causal relationships we should look at fixed effects models, despite the drawback of less precise inference.

Table 4 is organized in the same way as Table 3. The first column displays the model of overall pension satisfaction, not including satisfaction with the various aspects of pension benefits as regressors. This model provides additional evidence for a positive effect of personal income on overall pension satisfaction. Judging from columns (3)-(5) this positive effect stems from a positive impact of income on satisfaction with the level of income in retirement as well as with the insight one has in the own pension provisions. Moreover, we observe a strongly negative effect of becoming unemployed on general satisfaction, though the remaining columns do not identify the precise path of this relationship (if anything, one would say it runs through benefit-level satisfaction, since being unemployed enters this equation negatively, though the coefficient is estimated imprecisely). Perhaps unemployment increases uncertainty about future labor market prospects and therefore also about pension provisions. Finally, individuals who got married or completed their university degree became more satisfied with their pension. Both these effects come from the variables' positive effects on satisfaction with (expected) post-retirement income.

The second model (col. 2 in Table 4) supports our previous finding that, out of all three aspects, satisfaction with expected post-retirement income level is the most important predictor of overall pension satisfaction. Satisfaction with retirement age and knowledge also enter significantly, as was expected based on the previous discussion. Once we control for these satisfaction measures, few of the socio-economic variables remain significant. Those who receive disability benefits are slightly less satisfied with their pension than industrial workers, although this effect is only marginally significant. Furthermore, those who finished higher-level secondary school or vocational training became somewhat more satisfied.

Columns (3)-(5) present the results for satisfaction with the three aspects of personal pension provisions. These models confirm the result from the random effects models that workers in the construction and government sectors are more satisfied with their retirement age than those in other sectors.

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	(1) Overall satisfaction	(2) Overall satisfaction	(3) Age	(4) Amount	(5) Knowledge	(6) General satisfaction
		Fixed effects Ordered Logit				
Age	-	0.633***	-	-	-	-
		(0.017)				
Amount	-	0.978***	-	-	-	-
		(0.019)				
Knowledge	-	0.456***	-	-	-	-
		(0.017)				
Ln(income)	0.043**	-0.014	0.036	0.072***	0.094***	0.049**
	(0.019)	(0.027)	(0.025)	(0.020)	(0.017)	(0.020)
Construction	0.337	-1.960	1.269**	0.384	0.623*	1.063*
	(0.456)	(1.959)	(0.572)	(0.570)	(0.337)	(0.611)
Government	-0.089	-0.614	0.824***	0.196	-0.022	0.544*
	(0.266)	(0.484)	(0.285)	(0.298)	(0.248)	(0.314)
Services	-0.180	-0.373	0.295	-0.240	-0.179	0.341
	(0.246)	(0.498)	(0.240)	(0.257)	(0.238)	(0.315)
Self employd	-0.218	-0.954	0.309	-0.292	0.158	0.231
	(0.284)	(0.600)	(0.270)	(0.377)	(0.232)	(0.298)
Retired	0.471	-0.413	0.523	0.687**	-0.536**	1.009***
	(0.295)	(0.539)	(0.392)	(0.306)	(0.272)	(0.345)
Disabled	-0.212	-1.053*	0.840*	-0.197	-0.118	0.540
	(0.326)	(0.592)	(0.442)	(0.354)	(0.314)	(0.405)
Unemployed	-0.570**	-0.645	0.251	-0.257	-0.056	0.547
	(0.284)	(0.515)	(0.267)	(0.326)	(0.274)	(0.338)
Not working	-0.274	-0.965*	0.749***	-0.078	0.188	-0.022
	(0.266)	(0.583)	(0.260)	(0.270)	(0.267)	(0.330)
Partner	0.444**	0.027	0.378	0.346**	-0.057	0.250
	(0.180)	(0.379)	(0.249)	(0.161)	(0.167)	(0.189)
Home owner	-0.264	-0.209	0.002	0.173	-0.175	-0.626***
	(0.175)	(0.279)	(0.170)	(0.157)	(0.154)	(0.167)
Educ. middle	0.391	1.576*	0.242	-0.360	-0.137	-0.570
	(0.364)	(0.847)	(0.395)	(0.341)	(0.324)	(0.362)
Educ. high	1.001**	1.692	0.135	0.688*	0.576	0.181
	(0.450)	(1.628)	(0.568)	(0.352)	(0.374)	(0.418)
No. children	0.052	-0.091	-0.194**	0.170**	0.214***	0.092
	(0.084)	(0.123)	(0.090)	(0.084)	(0.081)	(0.085)
Quarterly dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	11,916	10,880	8,299	11,163	12,539	12,648
No. individuals	1,744	1,649	1,270	1,681	1,884	1,853
No. cutoffs	7	7	4	6	7	7
Hausman no quarters (df)	103.32*** (14)	4.08 (14)	5.73 (14)	133.28*** (14)	168.48*** (13)	78.64*** (14)
Hausman complete (df)	41.61** (25)	193.98*** (25)	-	121.81*** (25)	177.31*** (24)	69.41*** (25)

Table 4: FE ordered logit models of pension satisfaction. Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

The finding that government workers are relatively satisfied with their retirement age is in line with the current controversy around the hidden costs of public pension programs offering defined benefit plans and relatively early retirement compared to private companies. From that perspective it is remarkable, however, that neither the fixed effects nor the random effects models find a positive impact of working in the public sector on the other satisfaction measures.

Income positively affects satisfaction with (expected) post-retirement income level and with pension-related knowledge, but has no effect on satisfaction with the retirement age in these models. In addition, we find a positive retirement effect, but only on the amount of pension benefits. In contrast to the random effects models, Table 4 implies that those who retired during the sampling period actually became less satisfied with the knowledge of their retirement provisions. Finally, having more children negatively affects satisfaction with the retirement age but has a positive effect on the other measures of satisfaction.

The final column of Table 4 shows estimation results for satisfaction with the Dutch system of income provision for the elderly, which includes both occupational pensions and state benefits. Income enters this model significantly positively, as expected from Table 3. Retirement made individuals more satisfied with the system in general. Moreover, gaining home ownership was associated with less satisfaction with the Dutch income provisions. This could be due to the role of real estate as an investment, the returns on which can be used as a source of income when one stops working. Thus owning real estate would diminish reliance on welfare provisions and might lead to a less favorable evaluation of the system, since it is funded entirely by tax money.

Table 5 shows the coefficients on the quarterly dummies from the fixed effects models in Table 4. Clearly, models (2) and (6) show relatively little temporal variation. This suggests that overall pension satisfaction was relatively constant over the sampling period for given values of satisfaction with the various aspects, as was satisfaction with the old-age-income system in general. However, models (1) and (3)-(5) clearly indicate the importance of including time effects to control for macro-economic conditions, since many of the dummies are significantly different from zero.

	FE ordered logit: quarterly dummies					
	(1) **Overall** **satisfaction**	**(2)** **Overall** **satisfaction**	**(3)** **Age**	**(4)** **Amount**	**(5)** **Knowledge**	**(6)** **General** **satisfaction**
2006 – 4	0.219***	0.134	0.229***	0.165**	0.155***	-0.005
	(0.066)	(0.096)	(0.077)	(0.068)	(0.058)	(0.060)
2007 – 1	0.186**	0.105	0.166**	0.088	0.085	-0.019
	(0.072)	(0.109)	(0.082)	(0.072)	(0.062)	(0.065)
2007 – 2	0.238***	0.114	0.325***	0.213***	0.167***	0.023
	(0.069)	(0.100)	(0.077)	(0.069)	(0.060)	(0.061)
2007 – 3	0.106	-0.003	0.180**	0.153**	0.106*	-0.087
	(0.070)	(0.105)	(0.082)	(0.070)	(0.060)	(0.065)
2007 – 4	0.116*	0.077	0.172**	0.144**	0.157***	-0.205***
	(0.070)	(0.104)	(0.079)	(0.071)	(0.060)	(0.065)
2008 – 1	0.292***	0.220**	0.398***	0.324***	0.123**	0.107*
	(0.070)	(0.104)	(0.080)	(0.069)	(0.061)	(0.064)
2008 – 2	0.341***	0.301***	0.432***	0.361***	0.361***	0.120*
	(0.071)	(0.105)	(0.081)	(0.071)	(0.062)	(0.067)
2008 – 3	0.177**	0.030	0.192**	0.153**	0.205***	-0.162**
	(0.073)	(0.108)	(0.085)	(0.074)	(0.062)	(0.067)
2008 – 4	0.238***	0.205*	0.372***	0.245***	0.184***	0.001
	(0.069)	(0.106)	(0.078)	(0.067)	(0.060)	(0.064)
2009 – 1	0.011	0.010	0.180*	0.058	0.105	-0.088
	(0.080)	(0.120)	(0.093)	(0.082)	(0.071)	(0.074)
2009 – 2	-0.035	0.040	0.049	-0.086	0.144	-0.142
	(0.107)	(0.168)	(0.125)	(0.104)	(0.095)	(0.100)

Table 5: FE ordered logit models of pension satisfaction: quarterly dummies. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

In order to facilitate interpretation of these results, Figure 3 presents graphs of the coefficients of the time dummies. The left panel shows that the pattern of the quarterly dummies is highly similar for the first three models. Satisfaction was above the level of the third quarter of 2006 in all consequent quarters for all three variables. Furthermore, the models reveal a marked increase in satisfaction during the first two quarters of 2008, followed by a sharp drop during the third quarter of that year. Explaining this as a result of the financial crisis would be premature, because a similar drop during the third quarter can also be observed in 2007. Hence, this pattern might be caused by seasonality. Note, however, that the "rebound" observed in the fourth quarter of 2008 is much stronger than that during the same period of 2007. In contrast to the pattern of the two previous years, satisfaction declines strongly during the first half of 2009. Perhaps this can be interpreted as evidence of an effect of the recession on pension satisfaction.
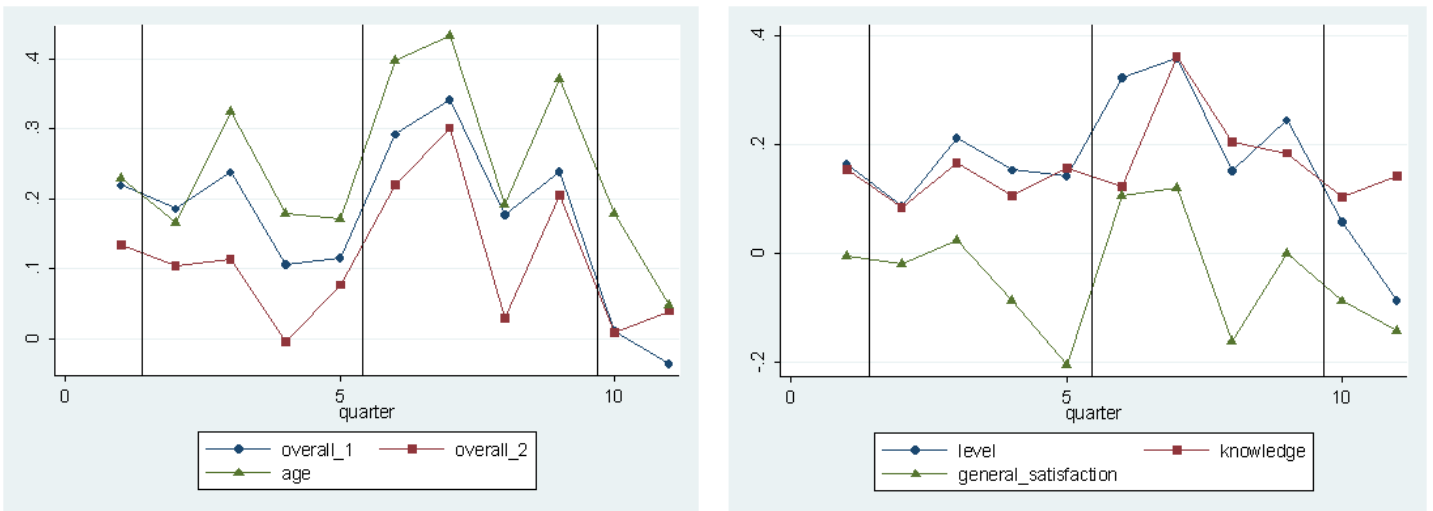
Figure 3: time pattern of satisfaction measures.

The right panel of Figure 3 presents the time patterns of the remaining three fixed-effects models. It reveals that satisfaction with the level of post-retirement income follows a path that is similar to that previously described. The same applies to the measure of knowledge-satisfaction, though its decline in 2009 is much less pronounced. General satisfaction seems to have a dip every third and fourth quarter, and like the other measures it does not return to its old level in 2009. Together these figures provide some evidence for an effect of the financial crisis on subjective satisfaction with pensions, but they also testify to the importance of accounting for seasonality in an effort to quantify such effects. If the financial crisis had any effect at all, it seems to be delayed and only really catching on in 2009.

5. Results: Extensions

Pension satisfaction and support for flexible benefits

In this subsection we analyze how satisfaction with pension provisions relates to opinions on the desired nature of the pension system. In particular, waves 1-11 contain the answers to the following questions:

Please indicate to what extent you agree with the following statements, on a scale from 1 (disagree completely) to 10 (fully agree):

If one retires earlier one should receive lower pension benefits

If one retires later one should receive higher pension benefits

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The answers to these questions are coded as the variables *downward sensitivity* and *upward sensitivity*. The upper part of Table 6 shows some descriptive statistics. For both variables, the mean indicates that on average, the respondents are in favor of making pension levels dependent on the age of retirement. But there is substantial heterogeneity. The variables can also be seen as indicators of a desire for individual responsibility – agreeing implies giving the potential retiree the choice between retiring earlier with a lower pension and retiring later with a higher pension. The optimal choice will depend on the marginal rate of substitution between (life-time) leisure and consumption.

Table 7, panel A, presents some results of random effects models that are identical to those from Table 3-5, except for the addition of the two sensitivity-of-benefits-to-retirement-age variables (for the complete set of results from these models, see Appendix 3; the coefficients on the other variables are similar to those in Table 3). Since these variables are available only for waves 1 through 11, sample sizes are much smaller than in Table 3. The smaller number of waves is also the reason why we did not consider fixed effects models.

We find that both sensitivity variables are significantly positive in models (1) and (3)-(6), but they are insignificant in equation (2). Thus it appears that those who think the level of pension benefits should be responsive to the age of retirement are more satisfied with all aspects of their pension, as well as with the Dutch system of income provision for the elderly in general. However, once we control for the aspects there is no independent effect on overall satisfaction.

The strongest effects are found for satisfaction with the pension system in general. Our interpretation of this finding is that people who prefer individual responsibility are more satisfied with the current system than people who are happy with an essentially fixed retirement age set by a paternalistic government.

Variable	N	Mean	Std. Dev.	Min	Max
Downward sensitivity	5,951	6.455	2.407	1	10
Upward sensitivity	5,951	7.025	2.313	1	10
Probability of decline welfare	16,338	53.051	33.500	0	100
Probability of decline pensions	16,410	46.548	33.007	0	100
Probability of increase minimum age welfare	16,418	64.034	30.437	0	100
Probability of increase retirement age	16,430	63.355	28.935	0	100

Table 6: descriptive statistics of additional variables

This suggests that the Dutch population perceives the current Dutch pension system as giving individual responsibility rather than paternalistic and would have the policy implication that further liberalization with more individual choices is not something the public would desire and would further increase dissatisfaction among groups that do not prefer larger individual choice.

Pension satisfaction and general pessimism

We can also analyze the relationship between different measures of pessimism regarding the Dutch pension system in general and satisfaction with pension provisions. The first two additional variables refer to the probabilities, in percentages, that the old age social security benefits (AOW; *probability of decline welfare*) and occupational pensions (*probability of decline pensions)* will decline in purchasing power in the foreseeable future (the coming 10-20 years). The other two are the subjective probabilities that the minimum eligibility age for AOW will increase (*probability of increase minimum age welfare)* and that people will have to work longer than now (*probability of increase retirement age).*

Panel A	Random effects Ordered Logit					
	(1) Overall satisfaction	(2) Overall satisfaction	(3) Age	(4) Amount	(5) Knowledge	(6) General satisfaction
Downward sensitivity	0.0733***	-0.00951	0.106***	0.104***	0.0559***	0.115***
	(0.0220)	(0.0186)	(0.0202)	(0.0219)	(0.0205)	(0.0195)
Upward sensitivity	0.0692***	0.0364*	0.0753***	0.0273	0.0572***	0.0938***
	(0.0220)	(0.0192)	(0.0207)	(0.0223)	(0.0209)	(0.0201)
Sample size	5,111	4,676	5,021	4,935	5,076	5,179
No. individuals	2,105	2,001	2,103	2,060	2,114	2,127
Panel B						
Probability of decline welfare	-0.0113	-0.0100	-0.0125	2.78e-04	-0.0140	-0.00374
	(0.00936)	(0.0100)	(0.00929)	(0.00941)	(0.00924)	(0.00915)
Probability of decline pensions	-0.0484***	-0.0338***	-0.0232**	-0.0494***	-0.0153*	-0.0231**
	(0.00940)	(0.0101)	(0.00935)	(0.00942)	(0.00923)	(0.00918)
Prob. of increase min. age welfare	0.0142	0.0127	-0.0135	-0.0128	8.96e-04	-0.0140
	(0.00998)	(0.0108)	(0.0100)	(0.0102)	(0.0100)	(0.0101)
Prob. of increase retirement age	0.0131	0.0159	0.0109	0.0140	0.0113	0.0305***
	(0.0105)	(0.0113)	(0.0106)	(0.0108)	(0.0102)	(0.0102)
Sample size	13,469	12,413	13,190	13,072	13,394	13,634
No. individuals	2,421	2,330	2,426	2,384	2,430	2,437

Table 7: some additional models of pension satisfaction: attitude towards flexible benefits and general pessimism. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

These four subjective probabilities can all be seen as indicators of pessimism concerning future generosity of the Dutch system of pensions and old age social security. Note that the coefficients listed in panel B of Table 7 have been multiplied by 10, so they correspond to 10 percentage point increases in the subjective probabilities. See Appendix 1 for a list of all variables and their descriptions.[8]

Table 6 presents some descriptive statistics. As indicated by the large standard deviations, there is substantial heterogeneity in the respondents' expectations concerning pension system generosity. The means show that, in line with the current policy debate, the majority is rather pessimistic – particularly concerning the future eligibility age for social security benefits and the retirement age.

The bottom panel of Table 7 shows how pension satisfaction is associated with these indexes of pessimism.[9] The main finding is that pessimism regarding the purchasing power of pensions has a significant negative effect on all reported satisfaction levels. The negative sign tells us 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, and this may lead to less satisfaction with these provisions.

Model (6), explaining satisfaction with the general system of income provision for the elderly, shows a similarly significantly negative coefficient of the subjective probability of a decline in the purchasing power of pensions, but also a significantly positive coefficient of the probability of an increase in retirement age. Hence respondents who are more pessimistic about the age at which the Dutch can stop working in the future, evaluate the present system more favorably. Perhaps this is because what we called "pessimism" about the retirement age should be called "optimism" about sustainability of the pension system and the political feasibility to do what is necessary for this – increase the effective retirement age.

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[8] See Bissonnette, Nelissen and Van Soest (2009) for an analysis of the development over time and the determinants of these subjective probabilities.

[9] Complete estimation results are presented in Appendix 4.

Pension satisfaction and early retirement arrangements

In January 2006 many Dutch pension funds introduced a marked change of second-pillar pension arrangements: they restricted eligibility for generous early retirement to those born before 1950. Such early retirement measures, collectively referred to as VUT, were the result of a government experiment started in the 1970s to stimulate early retirement in the health and education sectors and create work for young starters on the labor market. The experiment quickly grew into an entitlement that was shared by an ever larger proportion of the employed. Against the backdrop of the demographic transition, however, it became clear that early retirement only worsens the structural problems faced by many pension schemes. Thus pension funds moved to a more actuarially fair system in 2006, in which younger cohorts of workers are still given the opportunity of early retirement, but at a cost to the level of benefits.

The removal of early retirement policies predates our sample period and we lack a sufficiently fine classification of employment to exactly determine early retirement eligibility for each respondent (though in general only older cohorts qualify). However, the public sector is an exception in this respect, because almost all employees of this sector are all members of two different pension funds (PGGM which mainly covers the health sector, and ABP which covers civil servants and the education sector). We use the precise criteria adopted by these funds to determine which public sector employees are eligible for VUT-style early retirement (316 out of 3,392 observations on public sector employees).We compare those employed in the public sector who are eligible for VUT to those who are not in order to test for an effect of early retirement on pension satisfaction.[10]

Figure 4 shows graphs of the raw averages of the satisfaction scales for VUT-eligible versus non-eligible government employees for each quarter in the sample. The top left panel shows that average satisfaction with retirement age is much higher for employees that have the option of generous early retirement than for those who do not (around 7-7.5 compared to 5.5).

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[10] We do not include such VUT-term in our baseline specifications because we cannot use them in FE-models. Eligibility is determined primarily by birth cohort and therefore almost time-constant.
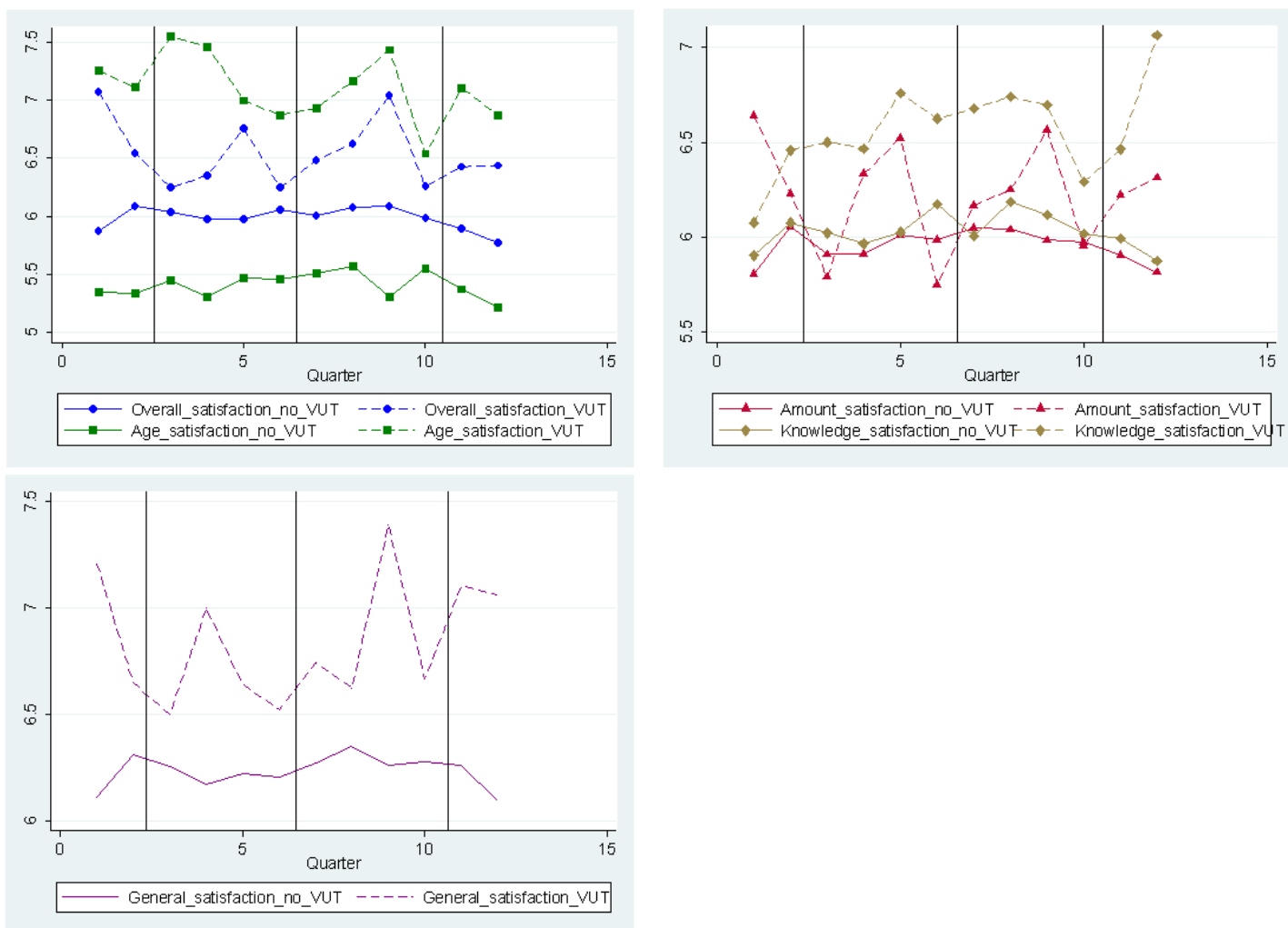
Figure 4: average satisfaction for VUT-eligible and non-eligible government employees over time.

This difference between average satisfaction of those eligible for early retirement versus those who are not is less pronounced for overall satisfaction. The other panels show that for satisfaction with pension knowledge and with the system in general those in the VUT-scheme are slightly happier on average in all periods, but this difference is less strong than for retirement age. For income level- satisfaction the difference is particularly small, with those eligible for generous early retirement reporting lower satisfaction on average in some quarters. Note that the relatively high variability in average satisfaction among VUT-eligible workers is due to the small size of this group.

Appendix 5 presents random effects models similar to our baseline specifications to which we added the VUT-dummy as described above. Surprisingly, the dummy is negative and significant in model (1), indicating that those who are eligible for the VUT

are less satisfied on average with their personal pension than those who also work for the government but are not eligible. This effect seems to be the net result of a strong positive impact of the VUT-scheme on satisfaction with retirement age on the one hand, and a negative impact on satisfaction with pension knowledge on the other hand.[11] The strong positive effect of VUT eligibility on the retirement age is plausible. The negative effect on knowledge suggests that pension reforms should be accompanied by good information campaigns, since even those who are not affected might find a lack of information unsettling. The other coefficients don't change much compared to Table 3.[12]

Is the financial crisis a structural break?

The final part of our analysis formally analyzes the possibility of a structural break as a result of the financial crisis that occurred during the fall of 2008. Despite the relatively short sampling period spanned by our data, we try to determine a possible breakpoint in our models endogenously by estimating a set of RE logit models with breaks in all months between August 2008 and February 2009. In order to control for seasonality, as motivated above, these models not only include a linear time trend but also a set of quarterly dummies (that are restricted to be the same in each year). Moreover, an interaction term with the retired-dummy is included, because we would not expect the financial crisis to affect satisfaction of the currently retired. We then evaluate the overall model fit, measured by the log likelihood and the chi-square statistic of joint significance of all coefficients, as well as the significance of the break itself, and thus select the breakpoint with the "best" statistics.[13]

    Appendix 6 shows the process of selecting a breakpoint, both with and without controls. We do not find any breaks in the models (2), (3) and (6), which is not surprising given the above mentioned lack of systematic variation over time in these dependent

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[11] This pattern in the VUT-coefficients does not change if we control for age in a more flexible way by adding a quadratic term.

[12] In addition to the models of Appendix 5, we also estimated models in which the VUT-dummy was interacted with semi-yearly dummies to investigate whether the effects of the reversal of the VUT are constant across the sample period. In none of the models, this hypothesis is rejected.

[13] This procedure to select a final model involves elaborate pre-testing, so that we should be cautious with inference on the basis of t-values and standard errors in the models that are finally selected.

variables. The other models do provide evidence of a break, dated January 2009 for overall and knowledge satisfaction, and September 2008 for income level satisfaction. Thus we find some support for immediate effects of the financial crisis on expectations regarding the level of pension provisions, but the other satisfaction measures did not suffer a comparable immediate drop. Instead, we find what might be a delayed effect for some of these variables, with satisfaction dropping in the first months of 2009. Furthermore, the break is only present in the working part of the sample in the models explaining amount and knowledge satisfaction, but affects the entire sample in the model of overall satisfaction. Interestingly, neither satisfaction with the expected retirement age nor satisfaction with the system in general seems affected by the financial crisis. Appendix 7 provides the complete set of estimation results from the models with our preferred breakpoints.

So far we have only allowed for a break-in-means during the economic downturn. In addition it is interesting to see whether this break affected satisfaction in different socio-economic groups differently. To this end we included interaction terms between the break indicator and various independent variables (see Appendix 8). These results offer some support for the idea of a heterogeneous impact, since the interactions are jointly significant in the model of satisfaction with expected income level and that of satisfaction with knowledge on pension provisions. According to model (4), the crisis has had a less severe impact on satisfaction with (expected) income during retirement in the retired part of the sample, as well as in the service sector and in the subsample outside the labor force (Appendix 8). However, in the final model of satisfaction with knowledge of pensions, not one of the interaction terms is individually significant.

6. Conclusions

Though previous analyses have found that the economic crisis already negatively affects Dutch people's perception of the pension system in general, satisfaction with pension provisions has received no prior attention. Against this background, the present paper draws on insights from the life satisfaction literature to investigate the determinants of different dimensions of subjective pension satisfaction. Using a monthly rotating panel following a random sample of the Dutch population, we reach several conclusions.

Firstly, on a methodological level, Hausman tests indicate that fixed effect estimation is preferred over random effect specifications for all models. This confirms the general finding in the life satisfaction literature that unobserved effects are correlated with explanatory variables, so that estimators that rely on between-variation are inconsistent. However, a major downside of the fixed effects approach is the heavy penalty it imposes in terms of efficiency. We find that, due to the relatively short period during which the sample was collected, many variables show little within-variation so that inference based upon FE models is necessarily imprecise. Thus, even though they do not necessarily reflect causal effects, the more precise random effects estimates provide interesting complementary information on how satisfaction is related to individual characteristics.

Secondly, using nonlinear models, we encounter some interesting patterns in the data. Overall satisfaction is primarily determined by satisfaction with the (expected) level of post-retirement income, followed by satisfaction with the (expected) retirement age and satisfaction with the insight one has into his pension situation. Moreover, we find that the retired part of the sample is more satisfied with their provisions than those employed in the industrial sector. This might be due to contentment being defined in relative terms with respect to the current working population. If that is the case, the retirement effect implies that those currently retired are more positive about their own pension compared to what they expect for future generations of pensioners. Both the RE and FE models indicate that income is an important determinant of pension satisfaction, with increases in income being associated with higher reported satisfaction. Moreover, government workers seem to be particularly happy with their retirement age. Being highly educated also affects several satisfaction measures positively. All in all these findings are in line with the determinants of actual pension wealth during retirement documented elsewhere. For instance, based on US data it was found that high income, education, having few children and home ownership are strong predictors of earnings sufficiency during retirement (Haveman et al., 2007).

With regard to temporal patterns in satisfaction, we find limited evidence for a negative effect of the current economic downturn. Interestingly, though satisfaction did decrease markedly during the third quarter of 2008, arguably more so than in previous

years, there was a strong rebound during the final quarter of that year. The first half of 2009 shows what might be a delayed effect, since satisfaction fell to approximately the level of the third quarter of 2006, rather than showing a positive spring effect as it did in the other years. One clear conclusion that emerges from this analysis is the importance of accounting for seasonal effects in pension satisfaction when trying to identify the impact of specific macro-economic events. An analysis of the possibility of a structural break during the period of the financial crisis reveals that there might be a negative shock to average satisfaction with (expected) income during retirement in September 2008. Overall pension satisfaction and satisfaction with the insight into one's pension also drop, but only in January 2009. Perhaps this reflects increasing publicity around the losses of pension funds after the initial confusion caused by the crisis.

Additional model specifications were estimated to investigate the relationship between pessimism regarding the Dutch pension and welfare systems in general and satisfaction with one's personal provisions. We find that those who are more optimistic regarding the future purchasing power of Dutch pensions are currently more satisfied with their own pension. Moreover, respondents who expect that people will retire at later ages in the future are currently more satisfied with the system of income provision to the elderly. We also observe that those who think the level of pension benefits should be made more sensitive to the age of retirement are currently more satisfied with their pension. Furthermore, we find that government workers who are still eligible for generous early retirement provisions are more satisfied with the age at which they expect to retire than their non-eligible colleagues. However, they are less satisfied with their insight into their pension provisions.

One policy implication that emerges from this final finding is that information provision is important in any revision of the pension system. Even though a certain group is still allowed to retire early and receive more generous benefits than would be actuarially fair, overall pension satisfaction in this group was still lower than among their peers due to diminished satisfaction with pension knowledge. Also, our results suggest some directions for future research. Most importantly, we feel that increasing the sample size by collecting more waves of data will add to the analysis. After all, a longer sample period will increase within-variation in our variables, enabling more precise inference in

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our fixed effects models. Secondly, it would be interesting to delve deeper into the possible effects of the recession and how the financial crisis might affect pension satisfaction. To achieve this, one would have to learn more about the distributions followed by test statistics in nonlinear models after pretesting with relatively few time periods.

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Appendix

1. Variables

Variable	Description	Baseline
Dependent variables		
Overall satisfaction	"All in all, how satisfied are you with you pension?" – 10 point scale	
Age satisfaction	"How satisfied are you with the age at which you expect to retire/have retired?" – 10 point scale	
Amount satisfaction	"How satisfied are you with the level of your (expected) income after retirement?" – 10 point scale	
Knowledge satisfaction	"How satisfied are you with the knowledge you currently have about your pension/had about your pension before retirement?" – 10 point scale	
General satisfaction	"All in all, how satisfied are you with the current system of pensions and welfare in the Netherlands? This concerns the Dutch system, not your own situation." – 10 point scale	
Regressors		
Ln(income)	Natural logarithm of personal net monthly income in Euros	
Construction	Employed in construction sector	Private industry
Government	Employed in governmental sector	Private industry
Services	Employed in service sector	Private industry
Self employed	Employed in own or family-run company	Private industry
Retired	Labor market status: retired	Private industry
Disabled	Labor market status: disabled	Private industry
Unemployed	Labor market status: unemployed	Private industry
Not working	Labor market status: not working	Private industry
Age	Age in years	
Male	Respondent is of male sex	Female
Partner	Respondent lives with a partner	No partner
Owner-occupier	Respondent owns residence	Rental residence
Education middle	Secondary school/lower vocational training	Primary school/lower secondary
Education high	Polytechnic university/university	Primary school/lower secondary
Number of children	No. of children of respondent	
Downward sensitivity	"If one retires earlier one should receive lower pension benefits" – 10 point scale	
Upward sensitivity	"If one retires later one should receive higher pension benefits" – 10 point scale	
Prob. welfare drop	"What do you reckon is the probability that in 10-20 years the purchasing power of AOW welfare will have declined on average compared to now?"	
Prob. pension drop	"What do you reckon is the probability that in 10-20 years the purchasing power of pensions will have declined on average compared to now?"	
Increase min. age welfare	"What do you reckon is the probability that in 10-20 years the age at which people become eligible for AOW welfare will have increased compared to now?"	
Increase retirement age	"What do you reckon is the probability that in 10-20 years the average age at which people stop working will have increased compared to now?"	

2. Histograms of dependent variables
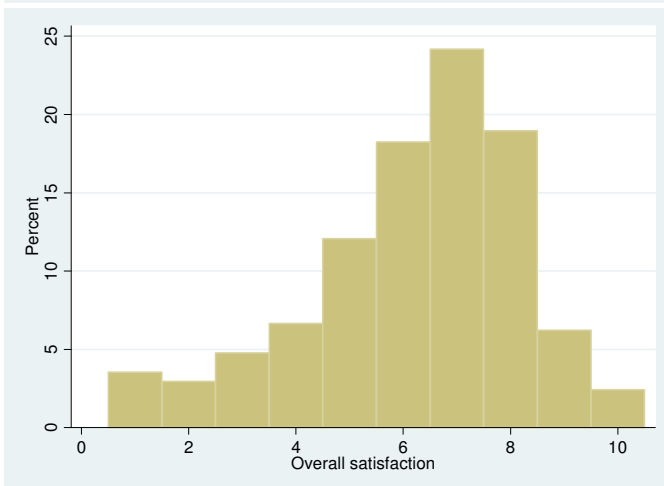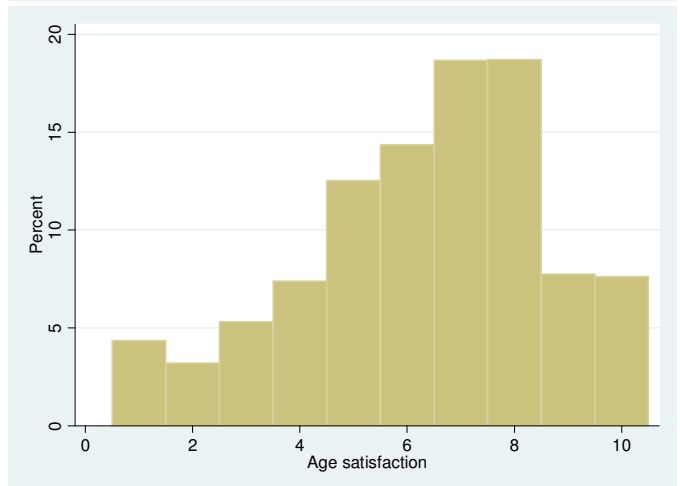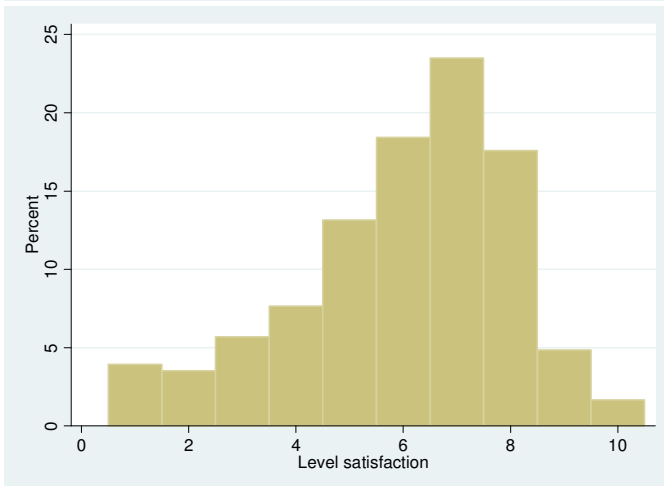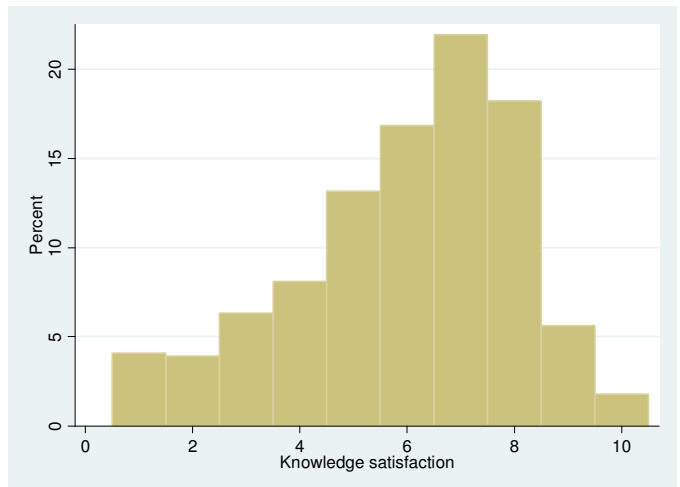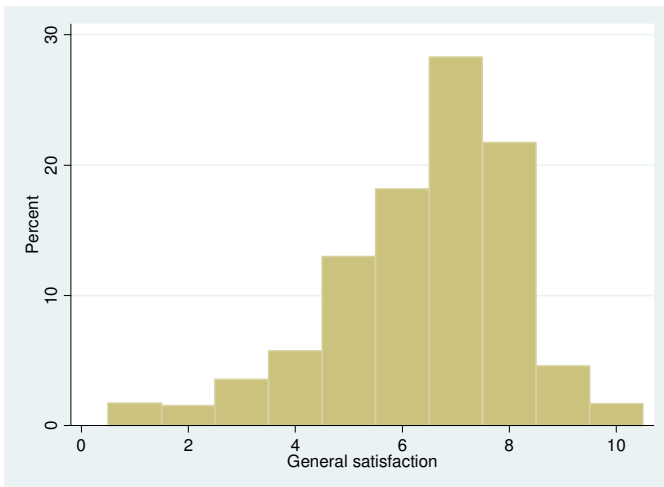
Histograms of the dependent variables. All waves are pooled.

3. Sensitivity of pension benefits to retirement age

	(1) Overall satisfaction	(2) Overall satisfaction	(3) Age	(4) Amount	(5) Knowledge	(6) General satisfaction
	Random effects Ordered Logit					
Age	-	0.660***	-	-	-	-
		(0.0253)				
Amount	-	1.540***	-	-	-	-
		(0.0382)				
Knowledge	-	0.478***	-	-	-	-
		(0.0272)				
Sens. dwnwrd.	0.0733***	-0.00951	0.106***	0.104***	0.0559***	0.115***
	(0.0220)	(0.0186)	(0.0202)	(0.0219)	(0.0205)	(0.0195)
Sens. upward	0.0692***	0.0364*	0.0753***	0.0273	0.0572***	0.0938***
	(0.0220)	(0.0192)	(0.0207)	(0.0223)	(0.0209)	(0.0201)
Ln(income)	-0.00177	-0.0252*	0.0328	0.0391	0.0512**	0.0382**
	(0.0198)	(0.0147)	(0.0207)	(0.0251)	(0.0206)	(0.0189)
Construction	0.151	-0.265	0.633*	-0.106	0.0117	-0.580
	(0.509)	(0.272)	(0.363)	(0.409)	(0.365)	(0.353)
Government	0.159	-0.0366	0.287	0.240	0.425*	0.00455
	(0.282)	(0.158)	(0.248)	(0.293)	(0.226)	(0.217)
Services	-0.424	-0.0849	-0.0332	-0.233	-0.112	0.000367
	(0.303)	(0.156)	(0.246)	(0.300)	(0.233)	(0.211)
Self employd	-0.943***	-0.431**	0.511*	-1.414***	-1.052***	0.0330
	(0.315)	(0.202)	(0.263)	(0.328)	(0.277)	(0.261)
Retired	1.281***	0.248	2.850***	0.898***	0.0942	0.199
	(0.339)	(0.189)	(0.317)	(0.343)	(0.271)	(0.251)
Disabled	-1.001**	-0.451**	0.687*	-1.344***	-0.328	-0.142
	(0.424)	(0.227)	(0.361)	(0.413)	(0.304)	(0.314)
Unemployed	-1.925***	-0.377	-0.0742	-1.882***	-0.753**	-0.621
	(0.376)	(0.307)	(0.400)	(0.380)	(0.354)	(0.384)
Not working	0.113	-0.340*	1.403***	-0.0838	0.125	-0.100
	(0.343)	(0.197)	(0.321)	(0.401)	(0.280)	(0.257)
Age	0.0625***	0.0133***	0.0524***	0.0433***	0.0402***	0.0416***
	(0.00739)	(0.00433)	(0.00657)	(0.00849)	(0.00650)	(0.00555)
Male	0.664***	-0.00887	0.504***	0.633***	0.529***	0.205*
	(0.176)	(0.0925)	(0.150)	(0.216)	(0.144)	(0.124)
Partner	0.361*	0.0257	0.122	0.165	0.550***	-0.0141
	(0.187)	(0.104)	(0.166)	(0.231)	(0.158)	(0.139)
Home owner	1.112***	0.212**	0.506***	1.129***	0.949***	0.415***
	(0.161)	(0.0984)	(0.153)	(0.217)	(0.149)	(0.129)
Educ. middle	0.323*	0.0118	-0.0872	-0.0563	-0.0965	0.132
	(0.174)	(0.103)	(0.170)	(0.203)	(0.162)	(0.138)
Educ. high	0.606***	0.0269	0.500***	0.811***	0.340**	0.592***
	(0.176)	(0.104)	(0.171)	(0.205)	(0.163)	(0.143)
No. children	-0.181**	-0.0273	-0.301***	-0.0391	-0.109	-0.209***
	(0.0761)	(0.0425)	(0.0670)	(0.0836)	(0.0676)	(0.0564)
Quarterly dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	5,111	4,676	5,021	4,935	5,076	5,179
No. individuals	2,105	2,001	2,103	2,060	2,114	2,127
ρ	0.754***	0.264***	0.654***	0.721***	0.677***	0.567***
	(0.009)	(0.024)	(0.012)	(0.010)	(0.011)	(0.015)

RE ordered logit models. Standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

4. Pessimism and satisfaction

	(1) Overall satisfaction	(2) Overall satisfaction	(3) Age	(4) Amount	(5) Knowledge	(6) General satisfaction
	Random effects Ordered Logit					
Age	-	0.698***	-	-	-	-
		(0.0174)				
Amount	-	1.520***	-	-	-	-
		(0.0253)				
Knowledge	-	0.521***	-	-	-	-
		(0.0186)				
Probability of decline welfare	-0.0113	-0.0100	-0.0125	2.78e-04	-0.0140	-0.00374
	(0.00936)	(0.0100)	(0.00929)	(0.00941)	(0.00924)	(0.00915)
Probability of decline pensions	-0.0484***	-0.0338***	-0.0232**	-0.0494***	-0.0153*	-0.0231**
	(0.00940)	(0.0101)	(0.00935)	(0.00942)	(0.00923)	(0.00918)
Prob. of increase min. age welfare	0.0142	0.0127	-0.0135	-0.0128	8.96e-04	-0.0140
	(0.00998)	(0.0108)	(0.0100)	(0.0102)	(0.0100)	(0.0101)
Prob. of increase retirement age	0.0131	0.0159	0.0109	0.0140	0.0113	0.0305***
	(0.0105)	(0.0113)	(0.0106)	(0.0108)	(0.0102)	(0.0102)
Ln(income)	0.0696***	0.00427	0.0596***	0.0560***	0.0568***	0.0486***
	(0.0136)	(0.0127)	(0.0157)	(0.0135)	(0.0125)	(0.0113)
Construction	0.413*	-0.388	0.882***	0.429**	0.627***	-0.296
	(0.231)	(0.238)	(0.240)	(0.210)	(0.230)	(0.234)
Government	0.0803	-0.125	0.720***	0.140	0.207	0.358*
	(0.174)	(0.137)	(0.156)	(0.140)	(0.138)	(0.189)
Services	-0.172	-0.0910	0.338***	-0.298*	0.168	0.336*
	(0.194)	(0.137)	(0.120)	(0.172)	(0.145)	(0.172)
Self employd	-0.505***	-0.356**	0.538***	-0.674***	-0.960***	0.329**
	(0.157)	(0.180)	(0.159)	(0.172)	(0.204)	(0.167)
Retired	1.525***	0.352**	2.905***	1.031***	0.102	0.894***
	(0.202)	(0.161)	(0.167)	(0.158)	(0.166)	(0.207)
Disabled	-0.507**	-0.551***	1.309***	-0.974***	-0.193	0.317
	(0.198)	(0.206)	(0.177)	(0.190)	(0.163)	(0.217)
Unemployed	-0.580**	-0.379	0.354*	-0.772***	-0.0913	0.268
	(0.254)	(0.250)	(0.195)	(0.230)	(0.244)	(0.297)
Not working	0.213	-0.220	1.232***	0.286*	-0.139	0.509**
	(0.239)	(0.173)	(0.180)	(0.167)	(0.185)	(0.212)
Age	0.0543***	0.0130***	0.0618***	0.0476***	0.0302***	0.0416***
	(0.00522)	(0.00385)	(0.00415)	(0.00482)	(0.00413)	(0.00494)
Male	-0.000280	0.198**	0.399***	0.900***	0.438***	0.210
	(0.108)	(0.0845)	(0.101)	(0.123)	(0.0876)	(0.131)
Partner	0.263*	0.0178	0.152	0.609***	0.397***	0.0677
	(0.141)	(0.0917)	(0.0972)	(0.142)	(0.0970)	(0.111)
Home owner	1.324***	0.206**	0.427***	0.756***	0.919***	0.160
	(0.112)	(0.0874)	(0.0901)	(0.101)	(0.0902)	(0.119)
Educ. middle	0.716***	0.0484	-0.245**	0.0402	-0.0751	0.107
	(0.140)	(0.0948)	(0.102)	(0.106)	(0.108)	(0.102)
Educ. high	0.865***	0.164*	0.343***	0.991***	0.464***	0.987***
	(0.113)	(0.0938)	(0.113)	(0.0977)	(0.114)	(0.122)
No. children	-0.0171	-0.0203	-0.334***	-0.000636	-0.146***	-0.232***
	(0.0547)	(0.0379)	(0.0477)	(0.0439)	(0.0457)	(0.0592)
Quarterly dummies	Yes***	Yes	Yes**	Yes***	Yes	Yes***
Sample size	13,469	12,413	13,190	13,072	13,394	13,634
No. individuals	2,421	2,330	2,426	2,384	2,430	2,437
ρ	0.708***	0.371***	0.657***	0.694***	0.638***	0.603***
	(0.006)	(0.014)	(0.007)	(0.007)	(0.007)	(0.009)

RE ordered logit models. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

5. Early retirement and pension satisfaction

	(1) Overall satisfaction	(2) Overall satisfaction	(3) Age	(4) Amount	(5) Knowledge	(6) General satisfaction
		Random effects Ordered Logit				
Age	-	0.698***	-	-	-	-
		(0.0173)				
Amount	-	1.517***	-	-	-	-
		(0.0251)				
Knowledge	-	0.518***	-	-	-	-
		(0.0184)				
Ln(income)	0.116***	0.00534	0.0474***	0.0173	0.0564***	0.0476***
	(0.0135)	(0.0126)	(0.0147)	(0.0134)	(0.0121)	(0.0110)
Construction	0.293	-0.381	1.027***	0.191	0.518*	-0.316
	(0.178)	(0.234)	(0.290)	(0.265)	(0.265)	(0.234)
Government	0.618***	-0.0847	0.563***	0.221	0.237*	0.402**
	(0.223)	(0.140)	(0.149)	(0.170)	(0.141)	(0.168)
Services	-0.285*	-0.0606	0.314**	0.00289	0.176	0.371**
	(0.170)	(0.137)	(0.130)	(0.178)	(0.145)	(0.162)
Self employd	-1.066***	-0.337*	0.467**	-0.545***	-0.868***	0.347**
	(0.167)	(0.181)	(0.191)	(0.171)	(0.187)	(0.168)
Retired	1.550***	0.363**	3.076***	0.982***	0.0556	0.883***
	(0.213)	(0.164)	(0.164)	(0.194)	(0.163)	(0.210)
Disabled	-0.358*	-0.518**	1.260***	-0.995***	-0.205	0.367
	(0.204)	(0.203)	(0.178)	(0.208)	(0.174)	(0.224)
Unemployed	-0.411*	-0.350	0.210	-0.242	-0.0766	0.361
	(0.233)	(0.250)	(0.191)	(0.224)	(0.250)	(0.262)
Not working	0.626***	-0.180	1.116***	0.286	-0.176	0.495**
	(0.216)	(0.172)	(0.173)	(0.194)	(0.199)	(0.214)
Age	0.0500***	0.0140***	0.0633***	0.0486***	0.0319***	0.0437***
	(0.00617)	(0.00393)	(0.00463)	(0.00427)	(0.00464)	(0.00441)
Male	0.981***	0.209**	0.309***	1.053***	0.483***	0.241**
	(0.111)	(0.0842)	(0.106)	(0.116)	(0.0921)	(0.123)
Partner	0.247**	0.0205	0.156	0.526***	0.427***	0.0334
	(0.0991)	(0.0916)	(0.0976)	(0.112)	(0.0999)	(0.107)
Home owner	0.550***	0.225***	0.374***	0.602***	0.853***	0.156
	(0.121)	(0.0866)	(0.0914)	(0.0928)	(0.0895)	(0.123)
Educ. middle	0.313***	0.0294	-0.267**	0.208**	-0.0898	0.0431
	(0.113)	(0.0938)	(0.108)	(0.101)	(0.120)	(0.102)
Educ. high	0.744***	0.155*	0.340***	1.071***	0.425***	0.947***
	(0.111)	(0.0936)	(0.106)	(0.105)	(0.118)	(0.114)
No. children	-0.0380	-0.0163	-0.293***	-0.131***	-0.125***	-0.258***
	(0.0395)	(0.0378)	(0.0546)	(0.0445)	(0.0438)	(0.0472)
VUT	-0.578***	-0.182	1.673***	-0.266	-0.789***	0.249
	(0.202)	(0.236)	(0.188)	(0.223)	(0.223)	(0.219)
Quarterly dummies	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	13,625	12,549	13,336	13,221	13,544	13,797
No. individuals	2,438	2,343	2,439	2,397	2,445	2,454
ρ	0.707***	0.368***	0.655***	0.687***	0.641***	0.607***
	(0.006)	(0.014)	(0.006)	(0.006)	(0.007)	(0.009)

RE ordered logit models. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

6. Endogenous structural break

	(1) Overall satisfaction	(2) Overall satisfaction	(3) Age	(4) Amount	(5) Knowledge	(6) General satisfaction
	Endogenous structural break: Log likelihood, Chi-square and z-statistics					
August 08	-20261.619	-13260.682	-21979.672	-20604.537	-22882.812	-21304.041[a]
	658.45	11296.99	1236.09	535.04	321.11	495.67[a]
	[-1.36]	[0.90]	[-0.07]	[-2.40]	[-1.63]	[-0.52][a]
September 08	-20259.861	-13260.766	-21978.875	-20601.556[a]	-22881.397	-21304.168
	661.97	11296.82	1237.69	541.00[a]	323.94	495.42
	[-2.26]	[0.80]	[-0.21]	[-3.21][a]	[-2.48]	[-0.71]
October 08	-20259.305	-13260.551[a]	-21977.896[a]	-20603.318	-22881.366	-21304.229
	663.08	11297.25[a]	1239.64[a]	537.47	324.00	495.30
	[-2.25]	[0.12][a]	[0.06][a]	[-2.96]	[-2.34]	[-0.41]
November 08	-20258.913	-13260.725	-21978.229	-20603.183	-22882.195	-21306.05
	663.86	11296.90	1238.98	537.74	322.34	491.65
	[-1.98]	[0.68]	[0.04]	[-3.07]	[-2.27]	[-0.71]
December 08	-20259.853	-13261.979	-21979.911	-20604.742	-22882.996	-21305.621
	661.98	11294.40	1235.61	534.63	320.74	492.51
	[-2.41]	[0.10]	[-0.30]	[-2.53]	[-1.89]	[-0.92]
January 09	-20255.777[a]	-13261.768	-21978.754	-20601.71	-22880.289[a]	-21305.373
	670.13[a]	11294.82	1237.93	540.69	326.16[a]	493.01
	[-3.67][a]	[-0.04]	[-1.35]	[-3.49]	[-2.71][a]	[-1.59]
February 09	-20258.343	-13261.374	-21980.187	-20604.185	-22881.625	-21306.124
	665.00	11295.61	1235.06	535.74	323.49	491.51
	[-2.80]	[-0.28]	[-0.92]	[-2.44]	[-2.47]	[-0.78]

RE ordered logit models. Log likelihood; Chi-square statistics of joint significance of all variables; z-statistics of break in square brackets.
[a] indicates the selected breakpoint

7. Models with structural break

| | Random effects Ordered Logit | | | | | |
	(1) Overall satisfaction	(2) Overall satisfaction	(3) Age	(4) Amount	(5) Knowledge	(6) General satisfaction
Age	-	0.696***	-	-	-	-
		(0.0172)				
Amount	-	1.517***	-	-	-	-
		(0.0250)				
Knowledge	-	0.519***	-	-	-	-
		(0.0184)				
Ln(income)	0.100***	0.00522	0.0495***	0.0192	0.0606***	0.0468***
	(0.0176)	(0.0126)	(0.0162)	(0.0140)	(0.0127)	(0.0108)
Construction	0.457**	-0.376	0.939**	0.211	0.569**	-0.301
	(0.218)	(0.234)	(0.380)	(0.294)	(0.240)	(0.228)
Government	0.575***	-0.106	0.640***	0.180	0.200	0.459***
	(0.187)	(0.137)	(0.148)	(0.173)	(0.135)	(0.160)
Services	0.0748	-0.0599	0.298**	-0.00983	0.181	0.366**
	(0.235)	(0.136)	(0.133)	(0.183)	(0.141)	(0.160)
Self employd	-1.129***	-0.326*	0.556***	-0.526***	-0.908***	0.337**
	(0.166)	(0.181)	(0.210)	(0.165)	(0.167)	(0.168)
Retired	1.574***	0.435***	3.012***	0.962***	0.0822	0.777***
	(0.189)	(0.163)	(0.173)	(0.194)	(0.167)	(0.191)
Disabled	-0.310	-0.508**	1.252***	-0.963***	-0.164	0.340
	(0.214)	(0.203)	(0.179)	(0.216)	(0.170)	(0.220)
Unemployed	-0.242	-0.336	0.222	-0.243	-0.0962	0.344
	(0.237)	(0.249)	(0.189)	(0.227)	(0.270)	(0.260)
Not working	0.672***	-0.163	1.140***	0.299	-0.107	0.464**
	(0.208)	(0.172)	(0.183)	(0.197)	(0.206)	(0.194)
Age	0.0611***	0.0130***	0.0638***	0.0471***	0.0302***	0.0454***
	(0.00602)	(0.00380)	(0.00473)	(0.00417)	(0.00419)	(0.00381)
Male	1.130***	0.208**	0.348***	1.053***	0.468***	0.245**
	(0.102)	(0.0841)	(0.111)	(0.121)	(0.0876)	(0.120)
Partner	0.243***	0.0149	0.165	0.539***	0.439***	0.0234
	(0.0901)	(0.0915)	(0.101)	(0.116)	(0.0980)	(0.100)
Home owner	0.260**	0.222**	0.376***	0.619***	0.901***	0.144
	(0.109)	(0.0866)	(0.0916)	(0.0959)	(0.0910)	(0.116)
Educ. middle	0.179*	0.0281	-0.265**	0.183*	-0.105	0.0369
	(0.104)	(0.0937)	(0.112)	(0.0998)	(0.118)	(0.1000)
Educ. high	0.679***	0.152	0.335***	1.065***	0.475***	0.955***
	(0.101)	(0.0935)	(0.116)	(0.105)	(0.124)	(0.112)
No. children	0.0344	-0.0148	-0.317***	-0.128***	-0.150***	-0.267***
	(0.0438)	(0.0378)	(0.0636)	(0.0477)	(0.0418)	(0.0437)
Linear trend	-0.00157	-0.00320	-0.00425	0.00270	0.00109	-0.00546*
	(0.00222)	(0.00294)	(0.00264)	(0.00286)	(0.00214)	(0.00295)
Q2	-0.00666	-0.0365	0.0568	0.0184	0.0815*	0.00193
	(0.0508)	(0.0560)	(0.0499)	(0.0508)	(0.0492)	(0.0491)
Q3	-0.133***	-0.0215	-0.0955*	-0.0432	-0.00681	-0.0978**
	(0.0517)	(0.0556)	(0.0496)	(0.0497)	(0.0500)	(0.0488)
Q4	-0.0838*	-0.00631	-0.0354	0.0265	0.0301	-0.0893*
	(0.0493)	(0.0522)	(0.0467)	(0.0473)	(0.0476)	(0.0462)
Break	-0.319***	0.00987	0.00434	-0.224***	-0.224***	-0.0354
	(0.0871)	(0.0796)	(0.0711)	(0.0698)	(0.0829)	(0.0679)
Int. break ret.	0.0593	-0.198*	-0.224**	0.258***	0.362***	0.200**
	(0.142)	(0.108)	(0.0985)	(0.0941)	(0.136)	(0.0885)
Timing break	January 09	October 08	October 08	Septembr 08	January 09	August 08
Sample size	13,625	12,549	13,336	13,221	13,544	13,797
No. individuals	2,438	2,343	2,439	2,397	2,445	2,454
ρ	0.712***	0.368***	0.654***	0.688***	0.640***	0.607***
	(0.005)	(0.014)	(0.007)	(0.006)	(0.007)	(0.009)

RE ordered logit models. Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1, not adjusted for pre-testing

8. Models with structural break and break-in-slopes

	Random effects Ordered Logit: interaction terms with break		
	(1) Overall satisfaction	**(4)** Amount	**(5)** Knowledge
Break	-0.235	-0.528***	-0.197
	(0.196)	(0.145)	(0.187)
Construction	-0.243	0.434	0.402
	(0.404)	(0.293)	(0.397)
Government	-0.381	0.243	-0.210
	(0.238)	(0.165)	(0.227)
Services	-0.0409	0.375**	-0.0850
	(0.246)	(0.173)	(0.235)
Self employd	0.327	0.00255	0.334
	(0.351)	(0.226)	(0.351)
Retired	-0.0245	0.561***	0.335
	(0.226)	(0.158)	(0.216)
Disabled	0.0968	0.455*	-0.442
	(0.348)	(0.234)	(0.326)
Unemployed	0.187	0.265	-0.0422
	(0.523)	(0.399)	(0.534)
Not working	0.105	0.450**	0.275
	(0.256)	(0.179)	(0.245)
Chi squared (8 df)	7.45	15.80**	17.34**
Sample size	13,625	13,221	13,544
No. individuals	2,438	2,397	2,445
ρ	0.713***	0.688***	0.640***
	(0.00521)	(0.00570)	(0.007)

RE ordered logit models. Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1, not adjusted for pre-testing