The CentERpanel and the DNB Household Survey: Methodological Aspects

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Table of contents

Abstract

This study presents an overview of the main characteristics of the CentERpanel as well as of the DNB Household Survey, a longitudinal database of economic and psychological aspects of financial behaviour of Dutch households run at CentERdata, Tilburg University and sponsored by De Nederlandsche Bank. Started in 1993, the survey is a very rich and valuable database for both academic research and policy oriented studies. Its flexibility in collecting the data on a wide range of topics together with limited associated costs makes the DHS a very powerful instrument for empirical analysis.

1 Introduction

In standard economic models, agents are assumed to act in an environment with perfect information (and the ability to process it properly), full rationality and complete markets. The substantial increase in the collection and availability of survey and administrative micro data has allowed predictions stemming from theoretical models to be tested, which revealed that in many cases empirical findings do not fully support the theory. Consequently, a huge literature developed exploiting the information conveyed by survey/administrative data, which turned out to be extremely valuable not only for the academic community, but also for policymakers. While administrative data are a very valuable source of objective information on potentially the entire recorded population, they usually provide only limited individual characteristics and do not allow information matching between household members. Household surveys improve upon and complement administrative records as they allow for the collection of additional information from a representative sample of respondents by means of questionnaires.

In an increasing number of countries, large-scale household surveys are conducted regularly to obtain information on household income and wealth, household expenditure, job and occupational status, living conditions, access to and utilization of services, subjective expectations, health, and other critical areas of study, including psychological aspects of individual behaviour. The National Sample Survey Organization in India has been collecting household data on a regular basis since the 1940s. The Survey on Household Income and Wealth (SHIW) began in the 1960s with the aim of gathering data on the incomes and savings of Italian households. Of more recent date, the General Household Survey (GHS) is a survey conducted on an annual basis by the Office for National Statistics (ONS) and has collected data about private households in Great Britain since 1971. The British Household Panel Survey (BHPS) is an annual survey covering a nationally representative sample of about 5,500 households recruited in 1991, with a total of approximately 10,000 interviewed individuals. The University of Michigan Health and Retirement Study (HRS) surveys more than 22,000 Americans over the age of 50 every two years since 1992, collecting information about income, work, assets, pension plans, health insurance, disability, physical health and functioning, cognitive functioning, and health care expenditures.

In the Netherlands the collection of data about economic and psychological aspects of household financial behaviour started in in the early 1990s, with particular focus on savings. Since then a great amount of data has been collected annually through the so-called 'CentERpanel' at CentERdata, Tilburg University. Over the past two decades, the panel has become a very rich and valuable dataset for both academic research and policy oriented studies. Its flexibility in collecting the data on a wide range of topics together with limited associated costs makes the CentERpanel a very powerful and efficient instrument for data collection that serves as the basis for several projects. One of the most important projects using the CentERpanel is the DNB Household Survey (DHS from now on), a longitudinal study of Dutch households sponsored by De Nederlandsche Bank.

This study provides an overview of the main characteristics of both the CentER-panel and the DNB Household Survey. The paper is organized as follows. Section 2 reports a brief overview of the history of the CentERpanel. Section 3 elaborates on the methodological aspects of the survey, with particular emphasis on recruitment and selection, criteria for participation and dropping out, economic incentives, response monitoring, feedback from respondents and assistance, representativeness of the panel, and response rate. Section 4 reviews the projects using the CentERpanel. Section 5 describes the DHS questionnaires, the data dissemination and use. Section 6 concludes.

2 A brief history of the CentERpanel

The origins of the panel

In 1986 Willem Saris and Marius De Pijper of the University of Amsterdam developed a new procedure for computer-assisted data collection specifically designed for panel research. The main idea was to offer a good and reasonably priced instrument for data collection to be used for research in social sciences. A random sample of the Dutch-speaking population was provided with a computer, modem and software to communicate by telephone with a central computer located at the University of Amsterdam. Using this system, interviews could be sent to the respondents, who could then fill in the questionnaires (off line), and return the responses to the central computer. In late 1990, after a few years of testing, a panel of about 2,000 households in the Netherlands was set up at the University of Amsterdam with grants from Eurostat and the University of Amsterdam.

The sample was drawn in collaboration with Statistics Netherlands (CBS), the national statistics institute of the Netherlands. The recruitment was done as follows. At that time the fixed phone net covered virtually the whole population, with a 99 percent penetration rate. In order to include unlisted phone numbers, the last two digits of the phone numbers in the sample were randomized (Random Digit Dialing, RDD). An Equal Probability Selection Method (EPSEM) was used to select the telephone numbers (see Nyhus, 1996 for further details). Twenty contact persons were sent to visit the households at home. The recruitment interview contained questions about both demographic and non-demographic topics. The data collected this way were stored in a database. At the end of the interview the respondents were asked whether they were willing to participate in a longitudinal panel. Nobody had a private computer at that time. However, the households that had expressed their interest to participate were provided with a (Sinclair) computer and a modem to connect to the central computer. The contact person helped the respondent fill in the first questionnaire about the composition of the household and explained how to use the computer and the modem. If a household refused to participate, the contact person would visit the household next door and repeat the same procedure (Random Walk Method).

Over the years, in order to deal with panel attrition, new households with the same characteristics as the households that left the panel (in terms of region, age,

household composition, degree of urbanization and monthly household income) were drawn from the database. The database was updated regularly. Every now and then new, faster modems were purchased in order to facilitate the panel members and to keep pace with the ongoing technical development.

The development of the panel
In 1993 the panel included the overrepresentation of the wealthiest population segment, which is usually the most difficult segment to be inteĐrviewed. A subsample of about 1,000 households belonging to the 10 percent highest income group (defined as monthly net household income of at least 5,000 guilders) was created. The households belonging to this High Income Panel also received a small (Quaderno) laptop computer in use and a modem.

In 1997 the panel moved to the University of Tilburg. The High Income Panel component was stopped due to high associated costs and the households belonging to that group were added to the rest of the panel. The RDD-method was no longer used due to the increasing costs associated with two phenomena: the diffusion of many telephone numbers belonging to companies rather than to households on the one hand, and an increasing number of disconnected telephone numbers on the other. Instead telephone files from GeoMarktprofiel, the first postal code segmentation system that was developed and exploited in the Netherlands, were adopted. It was then possible to stratify the samples (e.g. with respect to age). In addition, in 1998 the recruitment of the panel members, done until then by CentERdata, was taken over by Marktonderzoeksbureau M4.

Moreover, the Netherlands Organisation for Scientific Research (NWO) sponsored the full replacement of the Sinclairs and Quadernos in the panel. In the second half of 1999, CentERdata launched a pilot study for the purchase and distribution of PCs for panel members which eventually led to the adoption of the Net.Box, a so called 'set top box' allowing Internet access through a connection to the television and the telephone line. There followed a period of transition: from DOS to Windows, from offline to online interviewing, to new interviewing software and a new panel management system. By end-2000 the move to online communication and new software had been completed.

The following years saw the updating and improvement of technical details and the emergence of new phenomena. The coverage of fixed phones decreased from 99 percent to 70 percent and the willingness of people in the Netherlands to participate in survey research dropped after 1990 (De Leeuw and Hox, 1998; De Heer and De Leeuw, 2002). In a study about non-response in the Dutch Labour Force Survey (LSF) Cobben and Schouten (2007) found that the respondents of the LFS and the non-respondents in the follow-up study differed with respect to the possession of a fixed phone and to their country of origin.

The current situation

Since 2008 TNS-NIPO has been in charge of panel member recruitment. TNS-NIPO is part of the TNS Group, one of the world's largest agencies in the field of marketing information and business insight. The TNS network provides access to research experience and expertise in more than eighty countries. TNS is an international leader in customer research, finance and public opinion. The recruitment procedure in place nowadays is described in detail in the next paragraph. For the households without a computer or Internet access, the Net.Box has been substituted by the SimPC, a simple computer specifically developed for older people and people with limited computer skills.

3 Methodological aspects of the CentERpanel

3.1 The interview mode

Individuals may be interviewed through the telephone, face to face, with drop-off questionnaires, or with on line questionnaires. There is an extensive literature focusing on the question of which interview mode is best. Given the wide-ranging variety of aspects and criteria this assessment involves, it is not surprising that no clear-cut answer has been provided so far. Many criteria have been considered important parameters for interview mode assessment, such as cost, timeliness and quality. While the first two criteria are fairly easy to compare, data quality is much more difficult to evaluate but probably the principal criterion. Data quality involves a number of different aspects, including reliability, consistency, completeness and accuracy. On the one hand, respondents to self-administered questionnaires may provide better quality data because they have more time to think when answering the questions, or because they can reread the questions until they fully understand them, or because the greater degree of anonymity reduces social desirability effects. On the other hand, an interviewer may help clarify the questions, by detecting and possibly correcting any misunderstanding in real time, or by showing support material to the respondent. At the same time, an interviewer need to be trained in order to minimize interviewer effects (see e.g. Bailar *et al.*, 1977; Belli *et al.*, 2004; Booker and David, 1952). Also, self-administered questionnaires may suffer from a higher ratio of incomplete interviews or answers. A potential way to assess data quality, in particular the accuracy of survey data, is the use of administrative records, but most of the time these are not available. All in all, then, it is not surprising that up to now the question as to the best interviewing mode has remained unanswered.

The CentERpanel is an on-line survey and thus belongs to the self-administered questionnaire category. Self-administered questionnaires have three distinctive features:

1. *There is no interaction between the respondent and the interviewer*
   The respondent is totally responsible for understanding the questions, completing the questionnaire and returning the questionnaire. In the absence of an interviewer who could assist the respondent in any of these phases, self-administered questionnaires require careful attention to the layout and wording

of questions. Respondents usually answer questions by following some instructions for collection. This implies that particular attention should be paid to the wording of the questions, with special emphasis on avoiding ambiguity. Moreover, when respondents are asked to complete a self-administered questionnaire, they are being asked to perform a task that from their perspective may look different from the task the data collector wishes them to perform. In principle, respondents can read the whole questionnaire before answering any questions: they are free to start anywhere and to make their own decisions as to which parts of the questionnaire to examine in what order. This may conflict with the data collector's perspective, who would prefer respondents to start at a specified place, read all the words in the intended order, provide answers to each question, and move sequentially through the questionnaire. In general, data collectors do not want respondents to mark answers without having fully read and understood the questions and accompanying instructions, nor should they feel free to pick and choose which questions get answered and in what order. In self-administered questionnaires both designing good navigational guides and achieving good information organization should be given high priority.

2   *They are usually considered less expensive than face to face interviews*
This is mainly due to the fact that they do not require training a large number of interviewers. In addition, they are usually inexpensive to administer. The collection time is reduced and there is no input time. Both the data follow-up and the data processing occur in real time, so that data delivery is usually very rapid. As a consequence, self-administered questionnaires allow for the collection of large amounts of data, with no geographical constraints, and they are typically used in large scale industries.

3   *They are effective at eliciting responses on potentially sensitive topics*
The absence of an interviewer usually entails a greater sense of privacy which in turn may lead to more candid self-disclosure (Tourangeau and Smith, 1996). Empirical research has shown that in general, compared to personal interviews, self-administered questionnaires provide more valid reports on sensitive behaviour (e.g. drug or alcohol use, sexual preferences) and less socially desirable answers (De Leeuw, 1992). As there is no interviewer present, respondents have time to consult records and other household members without feeling any time pressure. This may also increase data accuracy. Another important feature of self-administered questionnaires is that they are carried out at the same point in time. When data are collected by personal or telephone interviews and the sample size is large, it might take several weeks to complete the interviews. In the latter cases respondents will answer the questionnaires at different points in time, and this may cause differences in responses, especially where personal attitudes and expectations are concerned.

3.2 Recruitment and selection

The recruitment is based on a random national sample drawn from the private postal address file issue. Next, the addresses are associated with fixed-phone numbers. This procedure succeeds for approximately 52 percent of the addresses: these households are then contacted by phone, while the others are contacted by postal mail.

The recruitment and selection of the panelists consists of three steps:

1   People are contacted by telephone or by postal mail and requested to participate in a (short) interview. If they decline to participate (in the telephone interview) they are asked if they still want to answer a few questions concerning possible non-selective response. If they assent to being interviewed, they are asked at the end of the interview whether they would like to participate in long-term research. Upon their commitment, their data get stored in a database. The telephone survey is conducted by TNS-NIPO. The written survey is provided by CentERdata. The so-called 'soft' refusers are called again or approached face-to-face.

2   If a household stops participating in the CentERpanel, another household with the same characteristics as the dropping household is drawn from the above database. The characteristics are compared as regards head of household's age, income, housing, region and town.

3   The potential new household then receives a letter with information about the panel and whether the household wishes to participate in the panel. If so, the household is included in the panel; if not, then a new household is drawn from the database.

3.3 Criteria for participation and drop outs

Possession of a computer with Internet access at home is not a requirement for participation in the panel. If the household has neither Internet access nor a computer then CentERdata provides a simple PC and an ADSL connection so that the questionnaires can still be completed online. CentERdata will also provide what technical assistance the household may require for successful participation in the survey.

It is important to stress that households can only join the panel upon invitation from CentERdata, not by their own request.

The necessary condition for a household to remain in the panel is to complete the questionnaires it has been selected for within six weeks from selection. A household

that fails to do so is contacted by telephone and invited to fill in the questionnaires. If the household still does not react, it receives a letter informing it that unless it responds it will be dropped. Finally, the household (temporarily) stops participating.

3.4 Modules, response monitoring, feedback and assistance

Every week from Friday afternoon (5 p.m.) until Tuesday night (12 p.m.) the panelists have the opportunity to fill in the Internet questionnaire(s) they are selected for. The selection is based on data from the so-called 'household box', a questionnaire on household composition and demographics for each household member. This questionnaire is the first one the household completes when it joins the DHS panel. In order to keep this individual background information up to date, the head of the household is asked every six weeks to check it and to make any necessary changes.

The time devoted to the questionnaires has been agreed with the panelists to be no more than 30 minutes per week (this should be enough to answer 80 questions at an easy pace). Lest they forget to fill in the questionnaires, panelists may ask CentERdata to send a reminder by e-mail every Friday. CentERdata has a 'real time' monitoring procedure on the response rate, because every single answer to a particular questionnaire is stored in an ad-hoc file when submitted by the single respondent. Therefore, if on Monday the panelists have not yet started/completed the questionnaire, they receive another reminder by e-mail on Monday evening urging them to do so. In the questionnaire screen, the panelists may also indicate weeks they will not be available on account of e.g. holiday, work or illness. This information helps CentERdata to optimize the selection of panelists in terms of lowering the probability of non-response.

At the end of each questionnaire, the panel respondent has the possibility to comment on the questionnaire they have just completed. Wherever required, the panel respondent gets immediate feed-back on their comments from the CentERdata management department. In addition, during office hours, panelists may also call the free helpdesk for any technical questions and comments. Moreover, if a household faces (technical) problems related to the completion of the questionnaires or further assistance, a member of CentERdata visits the household upon appointment to help them solve any technical problems.

3.5 Representativeness of the panel and data quality

The CentERpanel is designed to offer an accurate reflection of the Dutch-speaking population. Table 1 reports a comparison between official statistics from Statistics Netherlands (CBS) and the data collected from the CentERpanel's latest wave. Although the panel is representative along various dimensions, exceptions exist with

Table 1 Representativeness of the CentERpanel

Variable	CBS statline 2009	CentERpanel Jan. 2010
Gender		
Men	49.5	51.9
Women	50.5	48.1
Age classes		
Less than 20 year old	23.8	26.1
20 to 39 year old	25.7	21.4
40 to 64 year old	35.5	37.9
65 to 79 year old	11.2	13.0
80 year old or older	3.8	1.6
Degree of urbanization		
Very strong (2500 address per km² or more)	19.4	13.5
Strong (1500 to 2500)	23.1	25.1
Moderate (1000 to 1500)	18.3	21.2
Limited (500 to 1000)	19.4	22.2
Very limited (less than 500)	19.8	17.5
Provinces		
Groningen	3.5	3.5
Friesland	3.9	5.0
Drenthe	3.0	3.3
Overijssel	6.8	7.3
Flevoland	2.3	2.1
Gelderland	12.1	12.0
Utrecht	7.3	7.2
Noord-Holland	16.0	14.3
Zuid-Holland	21.1	19.0
Zeeland	2.3	3.2
Education level (Highest completed)		
Basic	8.7	8.3
Intermediate -level 1	24.7	24.6
Intermediate -level 2	31.1	20.8
Intermediate -level 3	10.2	10.9
High	17.1	24.3
Very high	8.3	11.1

Table 1 continued Representativeness of the CentERpanel

Variable	CBS statline 2009	CentERpanel Jan. 2010
Household size		
1 person	35.8	23.6
2 persons	32.8	40.4
3 persons	12.3	11.2
4 persons	13.3	16.5
5 persons or more	5.8	8.3
Marital status		
Single or living alone	36.1	23.9
(Un)married without children	29.2	38.7
(Un)married with children	28.2	33.4
Single-parent household	6.5	4.0
Aver. disposable hh yearly income		
(in 10% groups)		
Low 1	7.3	8.6
2	14.9	18.8
3	18.4	22.8
4	22.1	26.7
5	26.1	30.3
6	30.7	34.2
7	35.7	38.9
8	41.9	43.7
9	51.0	50.1
High 10	86.7	85.1

respect to education (overrepresentation of the upper echelons and underrepresentation of the middle level), household composition (underrepresentation of single households), urbanization (underrepresentation of people living in a highly urbanized setting) and non-western foreigners (including strong underrepresentation on account of language problems and of strong concentration in urban areas). CentERdata constantly tries to correct these defects during the recruitment phase and by using sample weights. In January 2010 the number of households participating in the panel amounted to 1,856. It is going to be increased to 2,500 units.

A sounding board has been established in recent years which periodically meets in order to maintain and improve the quality of the panel, by constantly discussing and reviewing the questionnaires. The sounding board consists of experienced members working at CentERdata and at De Nederlandsche Bank, as well as survey experts from other research institutes, such as RAND.

Another element contributing to data quality is that the computerized nature of interviews permits asking confirmation questions to make sure that the respondent answered correctly before the follow-up questions are presented. Careful programming checks are properly implemented to detect and correct range errors that might undermine the validity of answers. Similarly, consistency checks are directly implemented by having the programme compare responses to two different questions that are supposed to measure the same variable. The program can repeat the questions or ask a third question on the same matter. This way both data cleaning and, to some extent, data imputation can be performed shortly after the data collection phase. The panel component also plays a crucial role in imputing missing data that can be retrieved from previous waves (Saris, 1991).

3.6 Response rate

Table 2 shows the sample differentiating respondents according to the length of time they participate in the survey. The last wave (2009) consists of a total number of 1,856 households, 26 of which have participated since the very beginning (1990), 33 since 1991 and so on. The largest fractions of participating households joined the panel in 2000, 2001 and 2009 and each counts for approximately 10 percent of the current panel membership. If we compare these figures to the corresponding ones from the biannual Survey on Household Income and Wealth by Banca d'Italia, we see that in Italy the largest fraction of participating households in the last 2008 wave consisted of newly recruited households counting for about 45 percent of currently interviewed households (see Table 1a in Banca d'Italia, 2010).

Table 3 reports the response rates for different stages in the recruitment round carried out in December 2009. The figures derive from an additional national random sample of 2,500 addresses drawn to compensate for panel attrition. During

Table 2 Households interviewed in 1990-2009 surveys (participating on January 2010)

Year of 1st interview	Frequency	Percent	Cumulative percent
1990	26	1.4	1.4
1991	33	1.8	3.2
1992	29	1.5	4.7
1993	54	3.0	7.7
1994	79	4.2	11.9
1995	45	2.4	14.3
1996	42	2.3	16.6
1997	30	1.6	18.2
1998	63	3.4	21.6
1999	87	4.7	26.3
2000	196	10.6	36.9
2001	201	10.8	47.7
2002	175	9.4	57.1
2003	119	6.4	63.5
2004	120	6.5	70.0
2005	126	6.8	76.8
2006	89	4.8	81.6
2007	92	4.9	86.5
2008	63	3.4	89.9
2009	187	10.1	100.0
Total	1856		100.0

Table 3 Response rates for different stages in the recruitment process December 2009

	Dutch population (CBS 2009)	Distrib. of respondents (to recruitment interviews) (resp. rate 29.5%)	Distrib. of respondents willing to participate (resp. rate 55.3% of interviewed hhs)
Age Classes			
Less than 30 years	12.5	6.7	6.1
30 to 39 years	17.3	13.4	16.4
40 to 49 years	20.6	20.0	21.7
50 to 64 years	26.9	32.3	36.5
More than 64 years	22.7	27.6	19.3
Marital Status			
Singles	36.1	23.4	17.8
HHs with children	34.7	39.2	45.5
HHs without children	29.2	37.4	36.8

Table 4 Households contacted and reasons for non-response

	FORMER PANEL		NEW PANEL		TOTAL	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Household Level						
Respondents	1518	81.1	184	86.0	1702	81.6
Refusals	75	4.0	0	0	78	3.7
No answer (*)	279	14.9	30	14.0	306	14.7
Total	1872	100	214	100	2086	100
Individual Level						
Respondents	2151	72.1	254	62.8	2405	70.9
Refusals	122	4.1	0	0	122	3.6
No answer (*)	712	23.8	150	37.2	862	25.5
Total	2985	100	404	100	3389	100

Panel members are those participating in the CentERpanel on January 2009; Non panel members are new members recruited between January and December 2009; (*) denotes no answer due to death or stop participation in the panel.

this process 738 households were interviewed (616 by telephone, 91 by paper and pencil and 31 online). Of these, 391 households were willing to participate in the panel, 55 households expressed an interest to have more information before taking their decision. The soft refusers to the recruitment interview (by telephone) were visited face-to-face.

Table 4 shows the response/refusal rates for the year 2010, both at the household and at the individual level. A total number of 2,086 households were contacted of which 1,812 were panel members already (defined as participating in the CentER-panel of January 2009) and 214 were newly recruited households. The total response rate was 81.6 percent, the refusal rate was 3.7 percent, the dropping rate was 14.7 percent. Similarly, a total number of 3,389 individuals were contacted of whom 2,985 were panel members already (defined as participating in the CentERpanel of January 2009) and 404 were newly recruited respondents. The total response rate at the individual level was 70.9 percent, the refusal rate was 3.6 percent, the dropping rate was 25.5 percent.

The top chart in Figure 1 shows the response at the individual level to the DHS questionnaires between 2002 and 2009. The questions refer to Economic and Psychological concepts, Income and Health, Accommodation and Mortgages, Work and Pensions, Assets and Debts. The module with the highest overall response rate is the one about Accommodation and Mortgages, although the response rate declined over the years.

The bottom chart in Figure 1 displays the individual response rate over the years by questionnaire. As already mentioned, the Accommodation and Mortgages module is the one attracting the highest overall response rate, but even this module has shown a declining pattern. Overall, the willingness to respond has declined for all questionnaires. However, in the last year there was a substantial increase in the individual response rate for Income and Health, Work and Pensions, Assets and Debts.

Panel attrition for the years 2003-2009 is reported in the top chart of Figure 2. Finally, the percentage of permanence in the panel is reported in the bottom chart of Figure 2. Households staying in the panel for less than one year represent 9 percent of the total number of panel households. The highest percentage is for the 1-year stay (31.4 percent). However, for longer time periods, percentages decrease substantially: 21.2 percent for 2 years, 9.4 percent for 3 years, until virtually zero for periods exceeding 15 years.

Figure I

Response rates at individual level to the different DHS questionnaires (2002 – 2009) per year
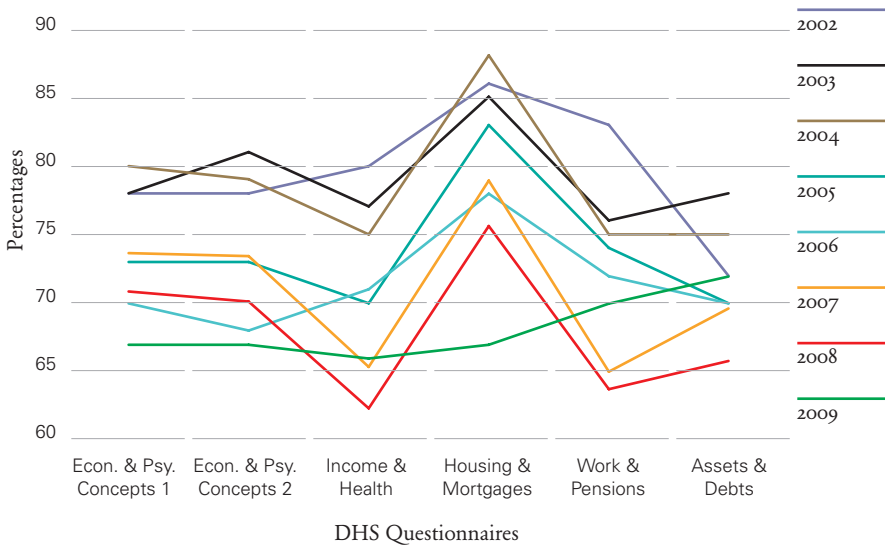
Response rates at individual level to the different DHS questionnaires (2002 – 2009) per DHS questionnaire
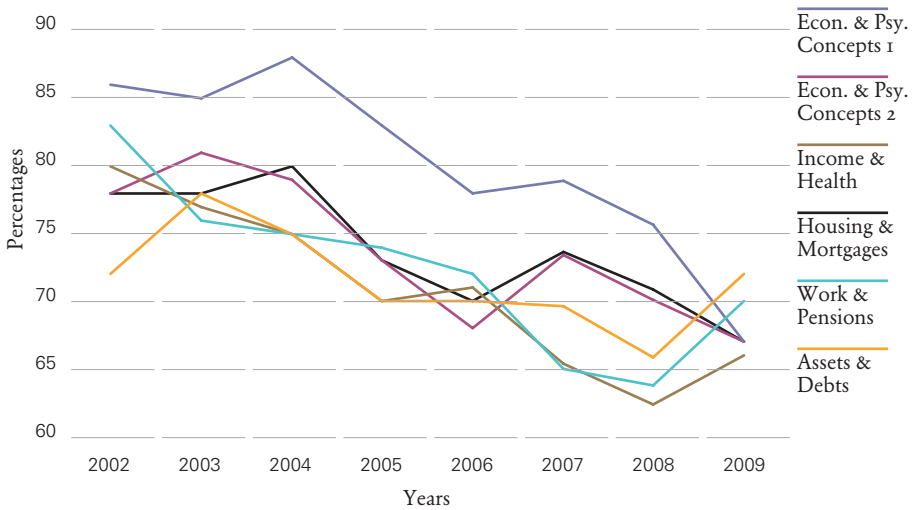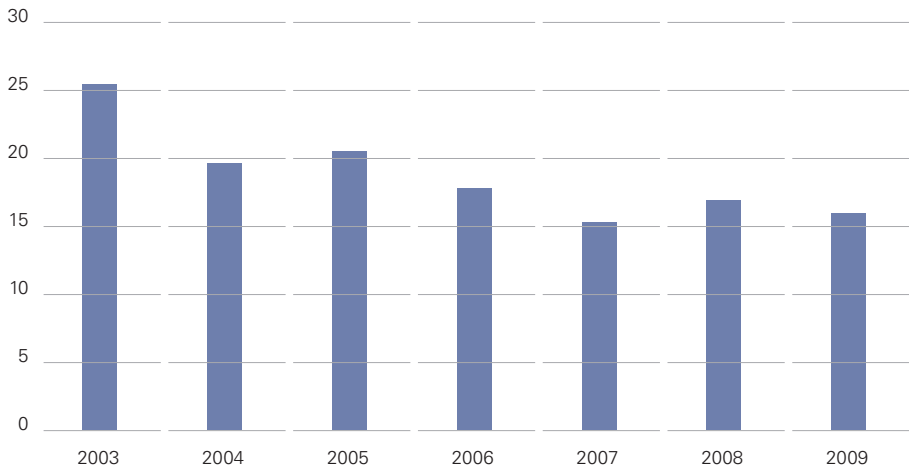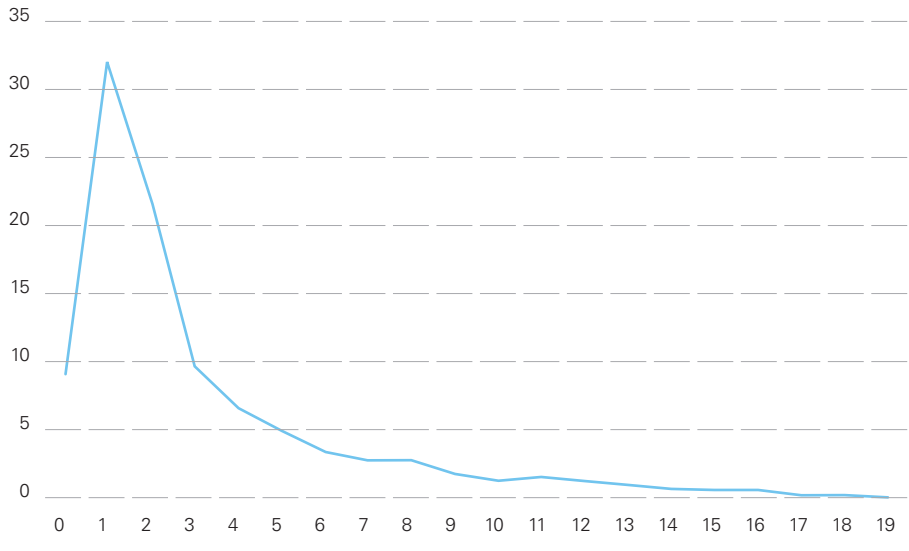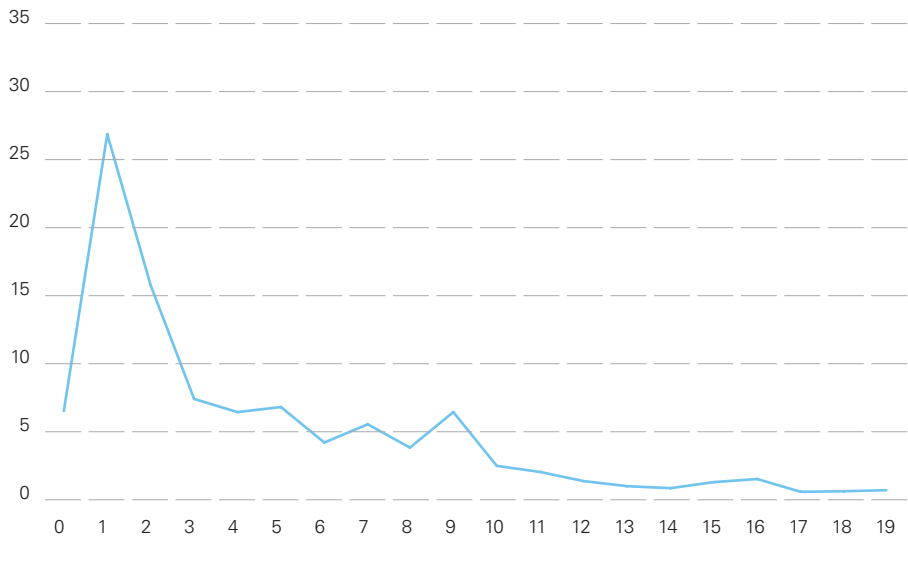
Figure II

Percentage of panel attrition in the years 2003 - 2009

Percentage of permanence in the panel

Percentage of permanence in the panel

3.7 Incentives for participation

As documented in the previous subsection, maintaining high response rates in household surveys is becoming increasingly difficult. This issue has given rise to a growing literature focussing on exploring the effects of offering incentives vs. no incentives, the size of the incentive (the 'optimum' incentive), whether the incentive should be monetary or non-monetary (e.g. cash vs. gift vouchers), and whether the incentive should be paid upfront or promised (conditional upon completion). The literature finds a positive and substantial influence of incentives on survey response rates. Offering a worthwhile incentive can induce up to 50 percent of those who would otherwise not have completed a survey to finish and submit it. This applies to both pencil-and-paper and online surveys. Deutskens *et al.* (2004) examine the effects that the timing of follow-ups, different incentives, length and presentation of the questionnaire have on the response rate and response quality in an online experimental setting. They claim that vouchers seem to be the most effective incentive for long questionnaires, while prize draws are more effective in the case of short surveys. A follow-up study revealed that prize draws with small prizes but higher winning odds are most effective in increasing the response rate. Ryu *et al.* (2006) find that a cash incentive yields higher response rates than an in-kind incentive in a mail-based survey.

In the CentERpanel the panelists receive a compensation for their expenses (mainly internet use) in the form of CentERpoints. For every completed questionnaire, a number of points are awarded in proportion to the average time needed for completion. On average, this means 25 points per questionnaire. Once every three months, the CentERpoints are paid out, either in cash (1 CentERpoint is worth 1 eurocent), or in the form of a donation to a charity or a state lottery, as the household prefers. Panelists who participate longer receive extra points. In particular, after 40 weeks of participation (e.g. all members of the household have completed the questionnaires for the 40 weeks in which they have been selected) a households receives 1.5 times the regular number of points, and after 100 weeks they receive twice the regular number. Sometimes the panelists are involved in panel game experiments (based on game theory), developed by researchers at Tilburg University. Participants in these experiments may win real money prizes. In addition, three or four times a year, the panelists receive 'the CentERpanel', a magazine with background information and an overview of the main results of research based on the panel data.

4 The projects using the CentERpanel

Each year, some fifty questionnaires are submitted to the CentERpanel in the context of independent projects. Three distinctive groups make use of data collection through the CentERpanel: scientists (e.g. academics), non-profit organizations and the government, and private companies. Such external project may vary widely in terms of size and duration.

One of the main projects based on the CentERpanel is the DNB Household Survey, formerly known as CentER Savings Survey. A detailed description of the DHS is provided in the next section. Examples of other projects are listed below.

Pilot studies in preparation of large-scale surveys
The CentERpanel is eminently suited to testing questionnaires that will be distributed on a large scale. Panel members can be asked to express their views on the clarity of the questions, the length of the questionnaire and the ease with which questions can be completed. Panel members are invited to make suggestions for question improvement. The results of such pilot studies also indicate which questions may be deleted, such as those to which all respondents give the same answer.

Measuring changes over time
Repeating surveys help understand changes. Smoking and drinking habits, for in-stance, were measured at the same point in the years 2003, 2005, and 2007. One group of respondents participates in several measurements.

Behaviour and knowledge
The Netherlands Nutrition Center conducted a study on eating habits and people's awareness of the relation between diet and health. The questions were submitted in two batches: first a questionnaire on eating habits, followed, some time later, by another on people's awareness of the influence of diet on health.

Monitoring
Every two months since 2002, CentERdata has submitted a health monitor. By way of time-series analysis, these data can help understand how people's health

perceptions develop. The data can also serve as background variables for other studies.

Policy preparation

The CentERpanel is particularly suited for use as a background for policy purposes. Reforms in the pension system are a typical example of policy issues capturing great attention among policy makers, practitioners and academics. Recently, the Network for Studies on Pensions, Aging and Retirement (Netspar) funded a project on pension schemes, focused on eliciting information about the public opinion on the proposed schemes and whether its views change in the course of time.

Experiments

Questionnaires offer plenty of possibilities to conduct experiments: different groups may be given different sets of questions; random figures may be read into the questionnaire; calculations can be performed inside the questionnaire.

Knowledge and opinion

When people are asked for their opinions, it is also important to know how well-informed they are about different aspects of a particular topic. If people know little about a topic, their opinion is probably unsteady and dependent on the context in which the question is asked.

5 The DNB Household Survey

The DNB Household Survey is the main project based on the CentERpanel. Formerly known as the CentER Savings Survey, it collects information about household finances and individual financial decisions as of 1993 with annual frequency. This section highlights the main features of the DHS, with particular emphasis on the survey contents and on data dissemination.

5.1 The questionnaires

The DHS consists of five distinctive questionnaires.

1 **Work and Pensions.** This questionnaire is submitted to respondents who are (or were) engaged in paid employment. The questionnaire contains questions on their current or previous employer, their position, type of employment contract, employment periods, the number of hours a week they are or would like to be engaged in paid employment, and whether they are looking for another job. It also contains questions on pension funds and supplementary pension schemes.

2 **Housing and Mortgages.** This questionnaire asks one member of each household for information about their current and previous home. It collects information on whether the household rents or owns its home, the type of accomodation (flat, apartment, house) and the home's size. Information about rents, housing benefits and mortgage schemes is also included. In particular, the questionnaire provides information on the mortgage lender, the type of mortgage scheme, the amount outstanding, the interest rate paid, the maturity of the mortgage, *et cetera*.

3 **Income and Health.** All household members aged sixteen or over receive detailed questions on their source of income: income from paid employment, income from self-employment, pension schemes, sick pay, allowances, and other sources of income. In addition, the questionnaire contains questions on tax returns, inheritances, bequests, interest received and paid, child support payments, parental contributions towards their children education, health insurance, and company cars. Respondents are also asked what they consider high or low income levels. Health questions pertain to height, weight, alcohol intake, smoking, respondents' perception of their own state of health, and life expectancy.

4 **Assets and Debts.** Assets have been itemized into twenty different components and debts into eight components. The value of all assets is estimated. Depending on the type of asset, the questionnaire then presents questions on the name of

the financial institution where the product was purchased, instalments, interest percentages, etc. Similar questions are asked regarding debts.

5 **Economic and Psychological Concepts.** In 2000, the questionnaire on economic and psychological concepts was split into two parts on account of its length. This is probably the most heterogeneous module with respect to the topics covered. Examples of topics included in this module are individual attitudes on saving behaviour, people's perception of their personal financial situation when compared to other people's financial situation, risk perception and risk aversion, hypothetical lotteries, expectations for the future when compared to the current situation, financial planning, and personal characteristics.

5.2 Data dissemination and use

The DHS data are freely available for scientific research purposes only and can be downloaded from CentERdata's website upon certain conditions. Users have to sign a statement confirming that none of the information contained in the data will be disclosed to third parties. Whenever a paper is written using DHS data, the author is expected to include an acknowledgement and to send a copy to CentERdata. Some 400 researchers world-wide are currently registered as users of the DHS. About 60 percent are Dutch and 40 percent are non-Dutch. The DHS data are released in several formats, including Stata, SPSS and SAS.

The DHS and, more in general, the CentERpanel have served as the basis for an increasingly large literature, consisting of publications in prominent refereed academic journals, books or book chapters, scientific reports and discussion papers, conference papers, and doctoral and master's theses. The users of these data are not only authors located in the Netherlands, but also authors working at international universities, central banks and other research institutes. A complete list of all the publications based on the CentERpanel and the DHS is constantly updated by CentERdata and reported on its website. Given the great variety of information available from the data, the literature based on the DHS and the CentERpanel is very diverse. The topics covered range from purely economic contributions to more interdisciplinary output, reflecting the great amount of information about individual attitudes, preferences and behaviour. Examples of topics are households' portfolio choices and individual financial decision-making (Kapteyn and Teppa, 2011; Van Rooij *et al.*, 2011), mortgages and housing wealth, level of indebtedness and financial distress, psychological aspects of saving behavior, retirement decisions, wealth effects on consumption, financial literacy and retirement provisions (Van Rooij *et al.*, 2011), payment behavior (Bolt *et al.*, 2010), subjective expectations about e.g. mortality, house prices, inflation, the stock market (Hurd *et al.*, 2011), trust in financial institutions and satisfaction (Guiso *et al.*, 2008), individual risk attitudes

(von Gaudecker *et al.*, 2011), central bank communication and transparency, attitudes towards the euro (van der Cruijsen *et al.*).

De Nederlandsche Bank has the opportunity to field in the CentERpanel about 200 questions every year for both academic research and policy purposes. The data coming from these ad hoc modules can then easily merged with the rich information provided by the DHS. As a consequence, within De Nederlandsche Bank, the DHS is used by many divisions, including the economic policy and research division, payments, communications, supervision, financial stability, and the Governing Board. The output based on the DHS also includes policy articles in the DNB Quarterly Bulletin. Examples are articles on payment security in the Netherlands (March 2009), early retirement and Dutch household wealth (March 2008), customer satisfaction with Internet payments (March 2007), limited financial literacy among Dutch households (June 2006), confidence, happiness and financial situation of Dutch households (September 2005). The full list of output from DNB based on the DHS (and more generally on the CentERpanel) is reported in Table 5.

As of 2006, the DHS has been part of a euro area project on household finance and consumption led by the European Central Bank in close collaboration with the Eurosystem national central banks and statistics offices. The purpose of the Household Finance and Consumption Network (HFCN) is to provide the Eurosystem with unique, good-quality comparable micro-level data on euro area households' finances, as an important input for a number of Eurosystem policy areas.

Table 5 Literature review by DNB based on the DHS - Publications in refereed journals

Author (s)	Reference	Main results
Van der Cruijsen, de Haan, Jansen and Mosch (2012)	Journal of Financial Stability	Better-informed people have more realistic views on banking supervision
van Rooij, Lusardi and Alessie (2012)	The Economic Journal	Financial literacy is strongly associated to wealth accumulation
Kapteyn and Teppa (2011)	Journal of Economic Psychology	Sophisticated measures of risk aversion based on economic theory may exceed the financial capability of respondents
van Rooij, Lusardi, and Alessie (2011c)	Journal of Economic Psychology	Strong and positive relationship between financial knowledge and thinking about retirement
van Rooij, Lusardi, and Alessie (2011a)	Journal of Financial Economics	Causal impact of financial literacy on stock market participation
van Rooij, Lusardi, and Alessie (2011b)	Journal of Pension Economic and Finance	Panel estimations show a causal impact of financial knowledge on retirement planning
Hurd, van Rooij and Winter (2011)	Journal of Applied Econometrics	Stock market expectations are correlated with stock ownership. Expectations are influenced by recent stock gains or losses.
Bolt, Jonker and van Renselaar (2010)	Journal of Banking and Finance	Imposing surcharges steers consumers away from using ('cheap') debit cards towards ('expensive') cash
Alessie and Teppa (2010)	Empirical Economics	Evidence in favor of habit formation, even if the magnitude of the habit formation coefficient is rather small
Van der Cruijsen and Eijffinger (2010)	Journal of Economic Psychology	Central bank transparency perceptions matter for inflation perceptions and expectations as well as for trust in the ECB
van Rooij, Kool and Prast (2007)	Journal of Public Economics	Employees consider themselves financially unsophisticated with low levels of risk tolerance, and both characteristics are important individual explanatory variables of pension attitudes
Jonker (2007)	De Economist	Most consumers are satisfied with the degree of safety, the transaction speed and the costs involved in paying with cash, debit cards, e-purse and credit card
Christensen, van Els and van Rooij (2006b)	De Economist	Perceptions of economic growth and inflation are widely dispersed
van Els, van den End and van Rooij (2004)	De Economist	Dutch households expect public pension schemes to be retrenched within ten years, but are opposed to reforms and rather pay higher public pension contributions
Kapteyn and Teppa (2003)	The Economic Journal	Models with habit formation appear to be superior to models with intertemporally additive preferences

Table 5 Literature review by DNB based on the DHS - Working Papers / Discussion Papers

Author (s)	Reference	Main results
van der Cruijsen, de Haan, Jansen and Mosch (2011a)	DNB WP 315	Adverse experiences during the crisis and knowledge about banking supervision matter for households' savings behaviour
Teppa (2011)	DNB WP 302	Consistently with theoretical predictions, people expecting to live longer claim to prefer the annuity rather than a lump sum payment
Van Rooij, Lusardi and Alessie (2011e)	DNB WP 289	While financial knowledge did not increase from 2005 to 2010, significantly more individuals planned for their retirement in 2010
Galati, Teppa and Alessie (2011)	DNB WP 288	Subjective house prices are well behaved and display heterogeneity and segmentation along several dimentions
van der Cruijsen, de Haan and Jansen (2010b)	DNB WP 252	More intensive use of information improves respondents' understanding of the ECB
van der Cruijsen, de Haan, Jansen and Robert Mosch (2010b)	DNB WP 275	Better-informed people have more realistic views on banking supervision
Kosse (2009a)	DNB WP 245	Consumers' payment preferences for cash and debit cards are strongly affected by how consumers assess
Gorter and Schilp (2010)	DNB WP 238	Healthier, wealthier and more risk-tolerant consumers choose higher levels of deductibility
Lusardi and van Rooij (2010)	Netspar Panel Paper 16	Initiatives that simplify financial decision-making are worthwhile, but they do not alleviate the need for households to increase their financial skills
Van Rooij, Lusardi and Alessie (2011d)	DNB WP 231	see Van Rooij, Lusardi and Alessie (2011c)
Hurd, van Rooij and Winter (2010)	DNB WP 228	see Hurd, van Rooij and Winter (2011)
Bolt, Jonker and van Renselaar (2008)	DNB WP 196	see Bolt, Jonker and van Renselaar (2010)
van der Cruijsen and Eijffinger (2008)	DNB WP 163	see Van der Cruijsen and Eijffinger (2010)
Kakes and de Winter (2008)	DNB WP 179	Support for redistributive policies is related to self-interest, exposure to misfortune and risk aversion
Van Rooij, Lusardi and Alessie (2007)	DNB WP 146	see Van Rooij, Lusardi and Alessie (2011a)
van Rooij and Teppa (2008)	DNB WP 165	Procrastination and financial illiteracy are the main explanation for why people stick to the default option when making their choices
Bruinshoofd and Grob (2006)	DNB WP 115	Retrenchments of pension arrangements to the effect of raising the standard retirement age by 1 year induce people on average to postpone retirement by about half a year
Christensen, van Els and van Rooij (2006a)	DNB WP 93	Perceptions of economic growth and inflation show a large dispersion
Jonker (2005a)	DNB WP 53	Most consumers are satisfied with the degree of safety, the transaction speed and the costs involved in paying with cash, debit cards, e-purse and credit card
van Els, van den End and van Rooij (2005)	BIS Paper 22	Increasing financial vulnerability of households. The increase in mortgage debt is related to mortgage equity withdrawal
van Rooij, Kool and Prast (2004)	DNB WP 25	Risk aversion is domain dependent and highest in the pension domain

Table 5 Literature review by DNB based on the DHS - Articles in magazines

Author (s)	Reference	Main results
v.d. Cruijsen et al. (2011b)	Economisch Statistische Berichten	Adverse experiences during the crisis and knowledge about banking supervision matter for households' savings behaviour
Van Rooij, Alessie and Lusardi (2011)	Economisch Statistische Berichten	Evidence of limited financial and pension knowledge and its relation to retirement expectations
Broeders and Rijsbergen (2010)	Tijdschrift voor Pensioen-vraagstukken	A certain level of guarantees creates trust between participants and pension fund and it is in line with the preference of the majority of participants
van der Cruijsen (2010)	Economisch Statistische Berichten	More intensive use of information improves respondents' understanding of the ECB
v.d. Cruijsen et al. (2010a)	Economisch Statistische Berichten	Better-informed people have more realistic views on banking supervisionJonker and Jonker and Kosse (2010)
Kosse (2010)	Cards International	Debit cards are widely accepted domestically, the Dutch mainly use their credit card abroad
Jonker (2009)	Economisch Statistische Berichten	Most consumers are satisfied with the degree of safety, the transaction speed and the costs involved in paying with cash, debit cards, e-purse and credit card
Kosse (2009c)	DNB Magazine	Consumers' payment preferences for cash and debit cards are affected by how consumers assess risk
Foudraine (2008)	Economisch Statistische Berichten	The Dutch population has a positive view on 10 years ECB
van der Cruijsen (2007)	Medium Econometrische Toepassingen	Indices with relatively more weight on political and current policy transparency matter the most in the formation of overall transparency perceptions
Mosch and Prast (2007)	Tijdschrift voor Politieke Ekonomie	Public trust in Dutch financial sector and DNB is at a high level
van Renselaar and Jonker (2007)	DNB Magazine	Consumers are sensitive to debit card surcharging. They avoid the fee by using cash instead
Berben, Bernoth and Mastrogiacomo (2006)	Tijdschrift voor Politieke Ekonomie	Households react more to capital losses than to capital gains
Bruinshoofd and Grob (2006)	De Economist	Financial incentives are an important determinant of individual retirement choices
Christensen, van Els and van Rooij (2006b)	Economisch Statistische Berichten	Perceptions of economic growth and inflation show a large dispersion
Irrgang and Hoeberichts (2006)		Income inequality in NL has been stable since 1992
Liedorp, Schrijvers and Rookmaker (2006)	Tijdschrift voor Schuldsanering	Low income households have higher consumption debt relative to income
van Renselaar and van Rooij (2006)	Economisch Statistische Berichten	The Dutch favor the institutional set-up in which the ECB operates independently of the national governments to achieve price stability
Jonker, Kleijmeer and Uittenbogaard (2005)	Economisch Statistische Berichten	Consumers find cash cheap and card payments costly
Grob (2005)	Economisch Statistische Berichten	The effects of government intervention in the house market are critically reviewed
Prast, Mosch and van Raaij (2005)	Tijdschrift voor Politieke Ekonomie	Confidence is hardly influenced by policy makers and relevant for its positive effect on the economy
Prast, van Rooij and Kool (2005)	Economisch Statistische Berichten	Dutch employees are not in favor of investor autonomy or DC pensions

Table 5 Literature review by DNB based on the DHS - DNB Occasional Studies / DNB (Quarterly) Bulletin

Author (s)	Reference	Main results
Mosch and Prast (2008) Jonker and Kosse (2008)	DNB OS 6(2) DNB OS 6(1)	Interpersonal trust in NL is high and positively related to trust in institutions The Dutch pay differently for their cross-border purchases than for their domestic purchases
Kakes and Broeders (2006)	DNB OS 4(6)	The recent changes in pension schemes and in pension funds' financing have enhanced the system's controllability and its sustainability
Bruinshoofd and Grob (2005)	DNB OS 3(1)	The actual moment of retirement is highly dependent on whether the level of the pension benefit varies with it. A large share of the Dutch proves willing to participate in the labour process longer if they can do so on a part-time basis
van der Cruijsen, de Haan and Jansen (2010a)	DNB Quarterly Bulletin	More intensive use of information improves respondents' understanding of the ECB
Kosse (2009b)	DNB Quarterly Bulletin	Consumers payment preferences for cash and debit cards are strongly affected by how consumers assess the likelihood and seriousness of safety incidents related to cash, debit cards and ATM withdrawals
Jonker and Kosse (2008) Jonker and Kleijmeer (2007a)	DNB Quarterly Bulletin DNB Quarterly Bulletin	Dutch consumers are satisfied with making cross-border payments in Europe Dutch consumers are on the whole satisfied with the payment methods accepted by Internet shops
Jonker and Kleijmeer (2007b)	DNB Quarterly Bulletin	The number of consumers using internet banking is growing. However old people are lagging behind
Jonker and van Renselaar (2007) van Renselaar and Bom (2006)	DNB Quarterly Bulletin DNB Quarterly Bulletin	see Bolt, Jonker and van Renselaar (2010) About two-thirds of the Dutch population are in favour of Dutch membership of the EU
Hoeberichts and Bernoth (2005) Jonker (2005b)	DNB Quarterly Bulletin DNB Quarterly Bulletin	Investigation of the relationship between household wealth and happiness Most consumers are satisfied with the degree of safety, the transaction speed and the costs involved in paying with cash, debit cards, e-purse and credit card
Hoeberichts and van Rooij (2004)	DNB Quarterly Bulletin	Analysis the development and composition of household wealth for different income groups

Table 5 Literature review by DNB based on the DHS - Other publications

Author (s)	Reference	Main results
van der Cruijsen (2011)	DNB magazine	Adverse shocks during the crisis and knowledge about banking supervision affect households' savings behaviour
van der Cruijsen (2010)	DNB magazine	Better-informed people have more realistic views on banking supervision
Kosse (2009c)	DNB magazine	Review of skimming risk
van Els, van Rooij and Schuit (2007)	Book chapter	The vast majority of Dutch households favor the current system of mandatory retirement saving
Van Els, van den End and van Rooij (2003a)	DNB Research Report	Review of findings on preferences over pensions in NL
Van Els, van den End and van Rooij (2003b)	DNB Research Report	Review of findings on household financial behaviour in NL

6 Conclusions

This paper aims to present an overview of the CentERpanel as an important instrument for online data collection in the Netherlands run by CentERdata at Tilburg University. Comprising more than 2,000 households representative of the Dutch population, the CentERpanel has served as a basis for several projects. Principal among these is the DNB Household Survey, a longitudinal study started in 1993 on household finances and on economic and psychological aspects of financial behaviour. The project has two main goals. The first goal is to test the descriptive and predictive power of economic and psychological factors as regards households' saving behaviour. The second goal is to study the effect of any of these variables on saving behaviour. The collection and availability of a wide set of psychological factors makes the DHS data set unique and particularly suited to studying individual preferences and financial choices.

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