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\* Views expressed are those of the authors and do not necessarily reflect official positions of De Nederlandsche Bank.

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# HOUSEHOLD SAVINGS BEHAVIOUR IN CRISIS TIMES<sup>1</sup>

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## *Abstract*

We analyze whether households' savings behaviour was affected by adverse experiences during the crisis and knowledge about banking supervision. Using a survey among Dutch households, we find that both factors have affected the allocation of savings. Individuals whose bank went bankrupt or received government support during the crisis gather more information about banks and saving instruments and are more likely to have savings at several banks. Respondents with better knowledge about banking supervision are more likely to gather information about banks and saving instruments, to spread their savings across banks, and to shift savings to other banks.

*JEL-codes:* D14, D84, E58

*Keywords:* savings, financial literacy, financial crisis, household decision-making

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<sup>1</sup> Corrie Vis (CentERdata) was extremely helpful in arranging the survey. Any errors or omissions are of course our own responsibility. Views expressed in this paper do not necessarily coincide with those of De Nederlandsche Bank and the International Monetary Fund.

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## **1. Introduction**

This paper analyzes whether the experience of households during the crisis has affected their savings behaviour. For instance, do households that were customer of a bank that failed spread their savings more than other households? Did customers of banks that received government support start gathering more information on banks and financial instruments than customers of other banks? In addition, we analyze whether households' knowledge and opinions about banking supervision affects their savings behaviour. In related work (Van der Crujsen, De Haan, Jansen and Mosch, 2010) we found that households' knowledge about banking supervision is far from perfect and that people often expect more than supervisors can realistically achieve. In this paper we test whether households' knowledge on banking supervision matters for their savings behaviour. For instance, do households that are aware of the deposit guarantee system spread their savings more than other households?

We investigate this issue using the Netherlands as a case study for consumer behaviour during the crisis. Two characteristics make the Netherlands an interesting country to study. First, the Dutch financial sector is relatively large, with total assets of more than six times Dutch GDP, contributing around 7.5 percent to GDP and directly providing employment to about 3.5 percent of the workforce. Second, developments in the Dutch financial sector were quite tumultuous since the start of the financial crisis in 2007. Two medium-sized banks (Icesave and DSB Bank) failed and three of the four largest financial institutions (ING, SNS REAAL, and Fortis Bank /ABN Amro) received government support. The latter was even nationalized. During the crisis, the financial sector received extensive media attention, thus fostering the awareness of consumers about what was happening in the financial sector.

As will be explained in more detail in section 2, our paper is related to the literature on financial literacy. Several papers report that knowledge about financial issues matters for decision-making. For instance, it has been shown that more knowledgeable individuals are more likely to plan for retirement (Van Rooij, Lusardi and Alessie, 2011a), to invest in stocks (Van Rooij, Lusardi and Alessie, 2011b) and to form realistic inflation expectations (Van der Crujsen, Jansen and De Haan, 2010). We contribute to the financial literacy literature by testing whether knowledge on banking supervision and experience with the financial crisis affect households savings behaviour. As far as we know, our paper is the first to investigate this topic.

Our data source is the DNB Household Survey (DHS), a continuous internet-based survey among Dutch households. The survey has been conducted by CentERdata (Tilburg University) since the mid-1990s. The CentERpanel forms a representative sample of the Dutch population. It consists of almost 2,500 members who answer questionnaires via their home computers. We asked the

CentERpanel members several questions about their savings behaviour, their experience during the financial crisis and their knowledge about banking supervision. The DHS has also been widely used in research on a broad spectrum of topics. For instance, Van der Cruysen and Eijffinger (2010) used the DHS to study the transparency of the European Central Bank, whereas Jonker (2007) focused on payment instruments, and Hurd, Van Rooij and Winter (2011) investigated stock market expectations.

Our results suggest that households' experience during the crisis has affected behaviour. Respondents who were customer of a bank that went bankrupt or received government support gather more information about banks or financial products than other respondents. Also, if a respondent's bank went bankrupt or received government support, he is more likely to have savings accounts at several banks. Financial literacy also turns out to be relevant. Individuals who are well informed about the deposit guarantee scheme gather more information about banks and saving instruments than poorly informed respondents. Respondents with better knowledge about banking supervision are more likely to spread their savings across banks and to shift savings to other banks. Furthermore, they are less likely to use time deposits. If they do use time deposits, the extent to which they do so is lower. Apparently, people learn from (bad) experiences by showing more risk-aware, well-informed and/or prudent financial behaviour afterwards. Also people who (already) score higher on financial literacy tend to make more financially sound decisions. This testifies to the importance of financial education.

The outline of our paper is as follows. Section 2 contains a selective review of the literature on financial literacy and households saving behaviour. Section 3 describes the survey outcomes on savings behaviour of Dutch households, while section 4 describes the other survey data used in our empirical analysis. Section 5 presents the regression analyses on households' saving behaviour. Section 6 offers our conclusions.

## **2. Previous studies**

As pointed out by Cronquist and Siegel (2011), the standard life-cycle savings model explains variation in savings behaviour across individuals by heterogeneity in time and risk preferences (i.e., those with low personal discount rates and high risk aversion are predicted to save more). According to this model, people should look ahead, anticipate the drop in income after retirement, and calculate how much they need to save in order to maintain a constant stream of consumption over their lifetime (Lusardi, 2011). This requires the ability to make projections about future variables (such as income growth, inflation, and pension benefits) as well as the ability to calculate present discounted values. Likewise, in taking portfolio decisions, individuals are assumed to

balance risks and expected returns. However, several studies have questioned the assumed cognitive ability to solve the consumption-savings and portfolio allocation problems (e.g. Benartzi and Thaler, 2007). Indeed, there is substantive evidence that “behavioural factors” explain variation in savings (or the lack of savings) across individuals. For instance, Lusardi and Mitchell (2008) assess knowledge of basic concepts that lie at the basis of saving and portfolio-choice decisions, such as interest compounding, inflation, and risk diversification, and find that only one-third of respondents in the Health and Retirement Study (HRS) for the US could do simple interest rate calculations and appeared to understand the effects of inflation and the workings of risk diversification. After instrumenting financial literacy with mandates across states for financial literacy education interacted with the amount of education expenses per pupil, Lusardi and Mitchell (2009) found an even stronger positive relationship between financial literacy and retirement planning than in the estimates using HRS data. This finding is consistent with the findings of Bernheim, Garrett and Maki (2001) who report that individuals who were exposed to financial education in high school had higher savings later in life. As Lusardi (2011) points out, it is not surprising that people lack financial knowledge, but how little they actually know about basic economic concepts. Financial illiteracy is not only widespread, but is particularly severe in certain demographic groups. Especially the elderly and women display very low levels of knowledge. These findings have been confirmed by other studies, using different data sets, different methods of data collection, and different age groups. Like American households, Dutch households also exhibit fairly low levels of financial knowledge (Van Rooij, Lusardi and Alessie, 2011b).

Households with low levels of financial literacy tend not to plan for retirement (Lusardi and Mitchell, 2007a), borrow at higher interest rates (Lusardi and Tufano, 2009; Stango and Zinman, 2009), acquire fewer assets (Lusardi and Mitchell, 2007b), and participate less in the formal financial system (Van Rooij, Lusardi and Alessie, 2011b). Financial literacy has also been argued to play a role in the demand for services provided by banks. For instance, Cole, Sampson and Zia (2009) examine why the use of financial services is low in emerging markets. They differentiate between limited financial literacy and the view that that demand is rationally low, because formal financial services are expensive and of relatively low value to the poor. Using survey data from India and Indonesia, they show that financial literacy is a powerful predictor of demand for financial services.

In this paper, we examine whether financial literacy affects the allocation of savings of Dutch households. Some previous studies in the discrete choice literature are also related to our work, although they are based on a rather different approach. For instance, Dick (2008) estimates the demand for deposit services in the US commercial banking industry over 1993–1999. Based on

logit models, she finds that consumers respond to deposit rates and, to a lesser extent, account fees in choosing a depository institution. Moreover, consumer demand responds favourably to the staffing and geographic density of local branches, as well as to the age, size, and geographic diversification of banks. Dick (2000) also finds that income matters: higher income areas are more responsive to prices and bank size, and less to location characteristics, relative to lower income areas.

As we also examine whether the experience during the recent financial crisis affects savings behaviour of Dutch households, our work is also related to the literature on financial learning, notably the work by Agarwal and co-authors (Agarwal, 2010). For instance, Agarwal, Chomsisengphet, Liu and Souleles (2006) study the decision to borrow and choose between different credit contracts. Using data from a market experiment conducted by a large U.S. bank, they report that 40 percent of consumers made a mistake in choosing the optimal credit contract. For a small minority of the consumers, these mistakes cost hundreds of dollars in excess interest payments. However, over time consumers learn from their mistakes and the larger the costs, the more likely consumers will correct the mistakes. Agarwal, Driscoll, Gabaix and Laibson (2011) examine whether credit card holders change the way they use their credit cards—e.g., paying fewer fees—as they gain experience. Using data representing 120,000 consumers and 4,000,000 credit card statements, they find that fee payments are very large in the first few months after the opening of an account. However, over a four-year period, credit card fee payments dropped by 75 percent. These authors also find that consumers' hard-earned knowledge does not persist, as over time consumers tend to forget about the fee payments. These results suggest that experience produces learning, but only when the feedback is recent. In line with this, Cohen-Cole and Morse (2009) show that borrowers who have experienced a small financial shock, are more likely to default on mortgage debt than on other forms of debt (e.g., credit cards) in order to secure access to liquidity.<sup>6</sup>

In an attempt to understand who makes mistakes, Agarwal, Driscoll, Gabaix and Liabson (2009) document a link between age and the quality of financial decision-making in debt markets. In a cross section of prime borrowers, middle-aged adults borrow at lower interest rates and pay less in fees than do either younger or older adults. These effects are not explained by differences in observed risk characteristics. The age at which consumers are least likely to make financial

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<sup>6</sup> Trautmann and Vlahu. (2011) argue that changes in borrowers' uncertainty about the actions of other borrowers (and the impact of these actions on their payoff) can explain borrowers' default.

mistakes (described as the “Age of Reason”) is around 53. These findings were consistent across an array of credit instruments—three kinds of credit card fee payments, credit card interest payments, and interest rates on credit cards, mortgages, auto loans, home equity loans and credit lines, and small business.

### **3. The survey: savings behaviour**

In March 2010 we conducted a survey using the CentERpanel, which is a representative sample of Dutch households. Appendix 1 provides the details of our internet-based survey. The response rate was 85 percent (2,103 respondents in a sample of 2,475 panel members). Such a response rate is high compared to regular surveys, but not uncommon for internet-based surveys.<sup>7</sup> The survey also included questions on households’ savings behaviour. In this paper we use this information to analyse whether knowledge about supervision (our proxy for financial literacy) and personal experiences during the crisis affect households’ savings behaviour.

Survey participants were asked for the factors affecting their decision at which bank to deposit savings. In question 13 (see Appendix 1) panel members were provided with 13 pre-set factors, but they could also mention other factors. Table 1 shows the outcomes. Apparently, the respondents’ degree of trust in the bank and the bank’s reputation are more important factors than the level of the interest rate that is being offered. Almost half of the respondents consider the financial health of a bank as extremely important. An additional 40 percent find it a very important factor. Transparency and customer-friendliness are judged to be important too, as well as safe online banking and supervision of the bank by a Dutch supervisor. The only factor that is not considered important by most respondents is whether family members are customer of the same bank.

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<sup>7</sup> Blinder and Krueger (2004) report a response rate of 26 percent for their telephone survey. In contrast, for internet-based surveys Van der Cruysen and Eijffinger (2010) and Van der Cruysen, De Haan, and Jansen (2010) report response rates around 70 percent, while Van Rooij et al. (2011b) report a response rate of close to 75 percent.



**Table 1. Factors affecting savings behaviour**

	not at all an important factor	not a very important factor	a somewhat important factor	a very important factor	an extremely important factor
* That the bank offers an interest rate that is high in comparison to other banks	4%	14%	45%	26%	12%
* That I have trust in the bank	1%	2%	10%	46%	41%
* That the bank has a good reputation	1%	2%	14%	49%	34%
* That the bank discloses important information	2%	6%	25%	44%	24%
* That the bank is customer-friendly	1%	4%	23%	46%	26%
* That the bank is financially healthy	1%	1%	8%	40%	49%
* That the people that I know are satisfied with the bank	7%	16%	36%	28%	12%
* That my family is also customer of the bank	45%	30%	18%	5%	1%
* That a Dutch supervisor supervises the bank	2%	5%	21%	39%	33%
* That it is a Dutch bank	3%	7%	22%	40%	28%
* That I already have other products from that bank (e.g. checking account or mortgage)	11%	14%	28%	33%	15%
* That I can bank online safely	4%	4%	13%	41%	38%
* That there is an office of the bank close to where I live.	14%	18%	30%	25%	14%
* Other,...*	7%	3%	9%	34%	47%

Explanatory notes: CentERpanel, March 2010, number of observations (N) = 2103, and \*N=76.

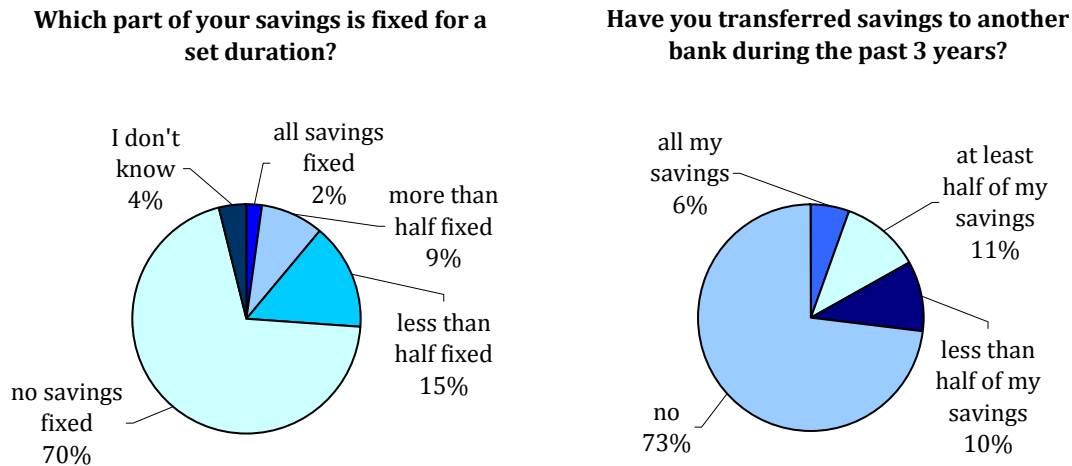
The answers to our next question "Currently, do you have a savings account at a bank?" reveal that 89 percent of the people have a savings account. Of the survey participants 55 percent saves at one bank, while 34 percent saves at several banks. The most important reason for spreading savings over several banks is that people only get a maximum amount of savings per bank repaid in case of a bank failure (see Table 2). More than half of the people that spread savings find it also important to spread because it takes some time to get savings back after a bank failure and because it enables them to benefit from interest rate differentials.

**Table 2. Reasons for spreading money**

	not at all an important reason	not a very important reason	a somewhat important reason	a very important reason	an extremely important reason
* Because in case of bank failure only a maximum amount of savings per bank is certainly given back.	22%	15%	17%	21%	25%
* Because in case of bank failure it takes some time before I get back (part of my) savings.	21%	20%	25%	22%	12%
* Because in this way I can profit from interest rate differentials	17%	15%	30%	25%	13%
* Other,...*	29%	14%	15%	23%	18%

Explanatory notes: CentERpanel, March 2010, and N=718 (\*N=98).

The left-hand side graph in Figure 1 shows that most savings do not have a fixed duration. People are therefore very flexible in transferring savings to another bank. Although developments in the Dutch financial sector were quite tumultuous during the crisis, 73 percent of the respondents with savings did not transfer their savings to another bank. Only 6 percent of the respondents shifted all their savings to another bank as is shown by the right-hand side graph of Figure 1.

**Figure 1. Savings: degree of fixing and shifting**

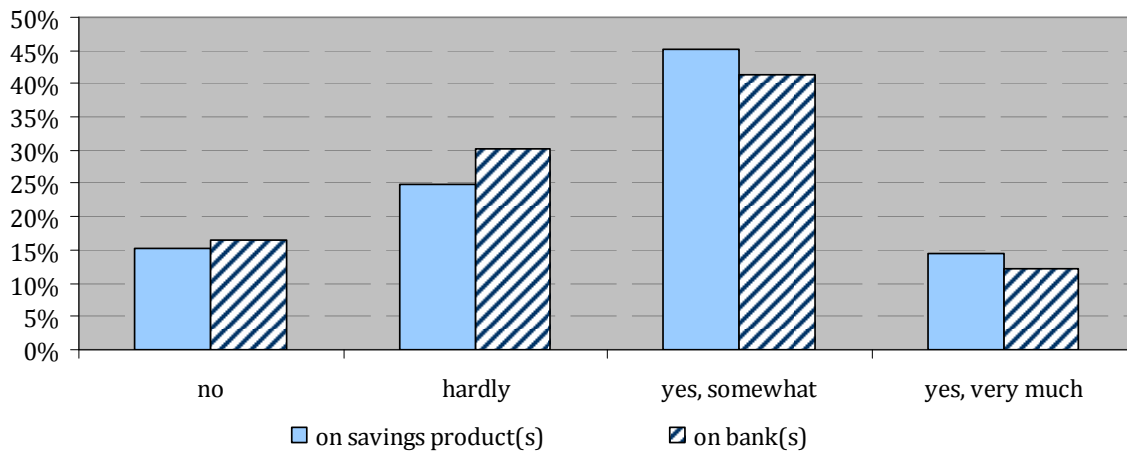
Explanatory notes: CentERpanel, March 2010, and N=1876.

On the basis of this information we constructed five variables reflecting savings behaviour of households that will be used in the empirical analysis. First,  $SB\_spread_i$  is 1 for respondents who spread their savings, and 0 otherwise. Second,  $SB\_fix_i$  is a dummy that is 1 for respondents who have some time deposits, and 0 otherwise. Third,  $SB\_fix\_degree_i$  measures the degree to which time deposits are used, ranging from 1 (no time deposits) to 4 (all time deposits). Fourth,  $SB\_shift_i$  is a

dummy that is 1 for respondents who have shifted their savings, and 0 otherwise. Finally,  $SB\_shift\_degree_i$  measures the degree of shifting, ranging from 1 (no shifting) to 4 (all savings shifted).

Furthermore, we asked panel members to which extent they have gathered information before choosing a particular bank or savings product. Although respondents collect more information on savings products than on banks, generally little information is gathered. About 15 percent of the respondents acquire no information at all, and another 25 to 30 percent hardly gathers any information (see Figure 2).

**Figure 2. Degree to which people gather information**



Explanatory notes: CentERpanel, March 2010, and N=1876.

We constructed two variables that measure the degree of information gathering:  $SB\_info\_banks_i$  and  $SB\_info\_products_i$ . Both variables range from 0 (no information gathering) to 4 (a lot of information gathering). Also these variables will be used in the empirical analysis as proxies for saving behaviour of households.

#### 4. The survey: explanatory variables

In the next section we estimate models using the proxies for households' saving behaviour as described in the previous section as dependent variable. The explanatory variables are our proxies for financial literacy and crisis experience and several control variables.

##### *Financial literacy*

We use three knowledge variables as proxies for financial literacy:  $K$ ,  $know\ DGS$ , and  $know\ DGS\ amount$ .  $K$  is a variable that measures knowledge about the tasks and responsibilities of the Dutch

banking supervisors AFM and DNB. It is constructed using the answers to question 23 (see Appendix 1): “According to you, what belongs to the tasks and responsibilities of De Nederlandsche Bank (DNB) and the Netherlands Authority for the Financial Markets (AFM)?” Panel members were given a list of 13 tasks and responsibilities, numbered K1-K13. For each of those, panel members had to report whether “DNB”, “AFM”, “DNB & AFM”, or “neither of them” is responsible. They could also opt for “I don’t know”. Table A1 in Appendix 2 provides the detailed outcomes. Correct knowledge about a particular task or responsibility results in a score of 1.  $K$  is the sum of the scores on all 13 questions. As a result,  $K$  might range between 0 and 13. In practice, however, the highest knowledge score obtained is 11. The average number of correct answers per question is 25 percent, and less than 15 percent of all respondents answered a majority of the 13 questions correctly.

As an alternative to  $K$ , we use proxies for opinions about banking supervision. Survey participants answered to what extent they agree with 14 statements provided in question 20 (see Appendix 1). The response options given ranged from “fully disagree” to “fully agree”. The corresponding scoring ranges from 1 (fully disagree) to 5 (fully agree). Table A2 in Appendix 2 provides the detailed outcomes. Applying Principle Components Analysis to the statements and restricting the number of factors to two results in two variables.  $O\_A$  includes tasks and responsibilities which are current practice or realistic to expect and consists of the average of statements O1, O2, O3, O5, O8, O9, O12 and O14.  $O\_B$  includes tasks and responsibilities that are not current practice or unrealistic to expect, either because these tasks are not feasible or difficult to perform.  $O\_B$  is the average of statements O4, O6, O7, O10, O11 and O13. Note that both  $O\_A$  and  $O\_B$  range from 1 to 5. In our previous work (Van der Crujsen, De Haan, Jansen and Mosch, 2010), we found that respondents with better knowledge have more realistic opinions about banking supervision.

In addition to  $K$ , we constructed two 0-1 dummy variables: *know DGS* and *know DGS amount*. *Know DGS* is a dummy variable that is 1 for respondents who are familiar with the existence of the Deposit Guarantee System (DGS); see question 24 in Appendix 1. *Know DGS amount* is 1 for the respondents who could report the maximum amount that is being repaid as part of the DGS, which holds for 45 percent of the respondents (see question 25 in Appendix A1).

### *Crisis experience*

Savings behaviour and knowledge about the DGS are likely to be affected by households’ experience during the crisis. We have constructed two dummy variables: *bankrupt* and *bailout*. These reflect whether a bank at which respondents were customer went bankrupt or needed government support during the past three years, respectively. In the three years before our survey, two banks in

the Netherlands went bankrupt: Icesave in October 2008 and DSB Bank in October 2009. In addition, government granted capital support to ING, SNS REAAL, and Aegon, while the Dutch part of Fortis/ABN AMRO was nationalized.

The variable *bankrupt* is 1 in case the respondent indicated that his bank went bankrupt, and 0 otherwise. About 10 percent of the respondents were customer at a bank that went bankrupt. About 1 percent of the respondents permanently lost savings, on average EUR 1551. The most common reason—in 85 percent of the cases—for losing savings was that the respondent had more savings than covered by the DGS, which is limited at EUR 100,000 per person per bank. The rest permanently lost money because they had a savings account that was not covered by the DGS.<sup>8</sup>

The variable *bailout* is 1 when the respondent indicated that his bank received government support, which is the case for 44 percent of the respondents. *Bailout* is 0 for respondents who answered that their bank received no government support, which holds for 42 percent of the respondents. *Bailout* is also 0 for respondents who have no idea whether their bank received government support. It is quite noticeable that 14 percent actually has no idea whether this was the case.

#### *Control variables*

The survey provides detailed background information on the respondents, which we use to construct control variables. We control for the age of the survey participants (*age*), and include a dummy that is 1 if the respondent is male (*male*). The variable *status* ranges from 1 (low social-economic status) to 5 (high social-economic status). This variable takes a person's profession into account and whether he holds a managing position. The degree of urbanisation is controlled for by including a variable *city*, which ranges from 1 for respondents living in a rural area to 5 for respondents living in a very strongly urbanized area. We also control for gross monthly household income (*income*), which is a variable ranging from 1 (500 euro or less) to 12 (7,500 euro or more). The dummy variable *account* is 1 for respondents responsible for the household's financial affairs, and 0 otherwise. We also have information on whether respondents own a house. The dummy variable *house owner* is 1 for respondents owning a house, and 0 otherwise. We control for the presence of a partner by including the variable *partner*, which is 1 for survey panel members with a partner, and 0 otherwise. The survey also provides information on the respondents' level of education (*education*). We have constructed a dummy that is 1 for respondents who successfully completed higher vocational education and/or university education, and 0 otherwise.

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<sup>8</sup> These figures are based on 21 of the 23 people who lost money. Two respondents were not asked question 27c, because they reported a negative amount as answer to question 27b.

## 5. Savings behaviour: regression analyses

First, we analyse households' information gathering behaviour. Table 3 shows which factors matter for the degree to which people gather information before they opt for a particular bank (columns 1 and 2) and savings product (columns 3 and 4). The table gives parameters estimates for ordered probit models.

Our results suggest that financial literacy affects household's behaviour. The parameter estimates for knowledge about the deposit guarantee system and the guaranteed amount are significant for all the four models presented in Table 3. Based on these estimates, an individual who claims to know the DGS is about 8 percentage points more likely to gather the maximum amount of information about savings products, and around 7 percentage points more likely to gather a lot of information about banks. For those individuals who reported they know the amount that is guaranteed, these probabilities are between 3 and 4 percentage points higher.

People with more realistic opinions on banking supervision also gather more information about banks and saving instruments. The variable *K* that proxies respondents' knowledge about banking supervision is not significant if the proxies for opinions on banking supervision are included. This is in line with our previous finding that knowledge about banking supervision is an important determinant of opinions on banking supervision (Van der Crujsen, De Haan, Jansen and Mosch, 2010). Dropping the proxies for opinions on banking supervision makes the coefficient of our knowledge proxy *K* significant in the model for households' gathering of information on banks (column 2 of Table 3).<sup>9</sup>

Negative experiences during the financial crisis were also relevant for savings behaviour. If a person's bank went bankrupt, the likelihood that he gathers information about banks or savings products is around 8 percentage points higher. Also, if someone's bank was bailed out, he is more likely to gather information (by 4 percentage points).

Several control variables are also significant. Respondents responsible for the household's finances, with a high degree of education, and who are female and have a partner gather more information on banks. Respondents responsible for the household's finances, with a high social-economic status and who are old search more for information on savings products.

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<sup>9</sup> To check whether our results just reflect differences in risk aversion among respondents, we have redone all regressions in the paper, including a proxy for risk aversion that is based on six questions in the DHS referring to risk aversion. A good example of such a question is the following: "I find it more important to invest in a safe way and to receive a guaranteed return than to take risk hoping to receive the highest return possible". The answers range from 1 (totally disagree) to 7 (totally agree). Adding this variable to our regressions does not change any of our findings. The results are available on request.

**Table 3. Savings behaviour: information gathering about banks and savings products**

	(1)	(2)	(3)	(4)
	SB_info_banks <sub>i</sub>		SB_info_products <sub>i</sub>	
Knowledge about banking supervision (K)	0.02 (0.01)	0.02* (0.01)	0.01 (0.01)	0.01 (0.01)
Know DGS	0.38*** (0.06)	0.40*** (0.06)	0.35*** (0.06)	0.37*** (0.06)
Know DGS amount	0.17*** (0.06)	0.19*** (0.06)	0.18*** (0.06)	0.19*** (0.06)
Realistic expectations (O_A)	0.27*** (0.07)		0.25*** (0.07)	
Unrealistic expectations (O_B)	-0.02 (0.06)		-0.02 (0.06)	
Education	0.12* (0.06)	0.14** (0.06)	0.04 (0.06)	0.06 (0.06)
Age	0.00 (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
Male	-0.16*** (0.06)	-0.17*** (0.06)	-0.08 (0.06)	-0.09 (0.06)
Social-economic status	0.05 (0.03)	0.04 (0.03)	0.06** (0.03)	0.06* (0.03)
City	-0.02 (0.02)	-0.03 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Income	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Account	0.13** (0.06)	0.15** (0.06)	0.10* (0.06)	0.11* (0.06)
Home owner	0.07 (0.07)	0.06 (0.07)	0.08 (0.07)	0.07 (0.07)
Partner	0.14** (0.07)	0.14** (0.07)	0.06 (0.07)	0.05 (0.07)
Bank went bankrupt	0.40*** (0.09)	0.40*** (0.09)	0.30*** (0.09)	0.30*** (0.09)
Bank was bailed out	0.19*** (0.05)	0.21*** (0.05)	0.11** (0.05)	0.13** (0.05)
Observations	1806	1806	1806	1806
McKelvey & Zavoina's Pseudo R <sup>2</sup>	0.14	0.13	0.13	0.12

Explanatory notes: *SB\_info\_banks<sub>i</sub>* and *SB\_info\_products<sub>i</sub>* measure the degree of information gathering on banks and savings products, respectively. Both variables range from 0 (no information gathering) to 4 (a lot of information gathering). Estimates are based on ordered probit models. Robust standard errors are shown in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Second, we try to explain what determines whether people spread, fix and shift their savings and to what extent they do so. Table 4 gives an overview of the outcomes. The first column shows the estimation results for our model explaining whether or not respondents spread their savings across banks. The second column presents estimates for the model for *SB\_fix<sub>i</sub>* (a dummy that is 1 for respondents who have time deposits, and 0 otherwise). The third column shows the model explaining the extent to which respondents use time deposits. The fourth column shows the results for a model with *SB\_shift<sub>i</sub>* as dependent variable (a dummy that is 1 for respondents who have shifted their savings during the crisis, and 0 otherwise). The fifth column gives the estimation

results for the extent to which respondents have shifted their savings during the financial crisis. In columns 3 and 5, our estimates are based on ordered probit models, while in the other columns probit models are used, as the dependent variables in these models are binary dummies.

**Table 4. Savings behaviour: spreading, fixing and shifting**

	(1) SB_spread <sub>i</sub>	(2) SB_fix <sub>i</sub>	(3) SB_fix_degree <sub>i</sub>	(4) SB_shift <sub>i</sub>	(5) SB_shift_degree <sub>i</sub>
Know DGS	0.03 (0.07)	-0.05 (0.08)	-0.07 (0.07)	0.27*** (0.08)	0.23*** (0.07)
Know DGS amount	-0.04 (0.07)	0.11 (0.07)	0.09 (0.07)	0.22*** (0.08)	0.16** (0.07)
Realistic expectations (O_A)	0.15* (0.08)	-0.19** (0.09)	-0.20** (0.08)	0.10 (0.10)	0.05 (0.09)
Unrealistic expectations (O_B)	-0.18*** (0.07)	0.05 (0.07)	0.05 (0.07)	-0.00 (0.07)	0.04 (0.06)
Education	0.09 (0.08)	-0.12 (0.08)	-0.14* (0.08)	0.17* (0.09)	0.13* (0.08)
Age	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.00 (0.00)	0.00 (0.00)
Male	-0.18** (0.08)	0.04 (0.08)	0.10 (0.08)	-0.10 (0.09)	-0.05 (0.08)
Social-economic status	0.08** (0.04)	0.06 (0.04)	0.06* (0.04)	0.08* (0.04)	0.04 (0.04)
City	0.04 (0.03)	0.02 (0.03)	0.01 (0.03)	0.03 (0.03)	0.04 (0.03)
Income	0.04*** (0.01)	0.00 (0.02)	-0.00 (0.01)	0.05*** (0.02)	0.03** (0.02)
Account	-0.08 (0.08)	-0.22*** (0.08)	-0.22*** (0.07)	-0.13 (0.08)	-0.12 (0.08)
Home owner	0.27*** (0.09)	0.25*** (0.09)	0.19** (0.09)	0.23** (0.10)	0.21** (0.09)
Partner	0.16* (0.09)	-0.13 (0.09)	-0.09 (0.08)	0.01 (0.10)	-0.00 (0.09)
Bank went bankrupt	0.51*** (0.10)	0.12 (0.11)	0.04 (0.09)	1.11*** (0.11)	0.86*** (0.08)
Bank was bailed out	0.35*** (0.07)	0.00 (0.07)	-0.01 (0.06)	0.22*** (0.08)	0.16** (0.07)
Info about bank	0.10** (0.05)	0.05 (0.05)	0.07 (0.05)	0.21*** (0.06)	0.22*** (0.06)
Info about savings product	0.23*** (0.05)	0.34*** (0.05)	0.27*** (0.05)	0.35*** (0.06)	0.28*** (0.06)
Constant	-2.74*** (0.34)	-1.77*** (0.34)		-3.90*** (0.41)	
Observations	1806	1742	1742	1806	1806
McKelvey & Zavoina's Pseudo R <sup>2</sup>	0.15	0.08	0.06	0.28	0.24
Model	Probit	Probit	Ordered Probit	Probit	Ordered Probit

Explanatory notes: *SB\_spread<sub>i</sub>* is 1 for respondents who spread their savings, and 0 otherwise. *SB\_fix<sub>i</sub>* is a dummy that is 1 for respondents who have some savings fixed, and 0 otherwise. *SB\_fix\_degree<sub>i</sub>* measures the degree to which savings are fixed, ranging from 1 (no savings fixed) to 4 (all savings fixed). *SB\_shift<sub>i</sub>* is a dummy that is 1 for respondents who have shifted their savings, and 0 otherwise. *SB\_shift\_degree<sub>i</sub>* measures the degree of shifting, ranging from 1 (no shifting) to 4 (all savings shifted). Robust standard errors are shown in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



In line with our previous results, we find that financial literacy (proxied by knowledge about banking supervision) matters. People who know the DGS are 6 percentage points more likely to shift savings, and 2 percentage points more likely to shift savings as much as possible (marginal effects based on the models in columns 4 and 5). Furthermore, respondents having more realistic opinions about banking supervision are more likely to spread their savings (column 1), less likely to use time deposits (column 2) and if they use time deposits, then the extent to which they do so is lower (column 3).

We also find that the extent to which respondents gather information matters. Respondents who gathered information on the bank before opening an account, spread and shift more frequently. Respondents who collected information on savings products spread (column 1) and shift (column 4) more than those who did not gather this information, and they are more likely to use time deposits (column 2).

It also turns out that households learn from adverse experiences during the financial crisis. If a respondent's bank went bankrupt, the likelihood of having savings accounts at several banks increases by 17 percentage points. For individuals whose bank was bailed out, the probability increases by roughly 11 percentage points. It also increases the probability that savings are shifted and the degree to which these savings are shifted. Potentially, there may be a reverse causality issue: people who have accounts at several banks are more likely to be confronted with at least one bankruptcy or bail out. Using DHS waves for the years between 2000 and 2010, however, we find that before 2008, around 70 percent of the respondents had at most one savings account. From that point of view, reverse causality is not likely. In addition, there is a significant increase in the average number of savings accounts per person from 2008 onwards, which is in line with the idea that households started to spread and shift their savings in response to the financial crisis.

Turning to the control variables, house owners spread, shift and fix more than people who do not possess a house. Highly educated respondents are more likely to shift savings, and the degree to which they do so is also higher. Furthermore, they are less likely to fix a high share of their savings. Male respondents are 6 percentage points less likely to spread savings, which is in line with the finding that women are more risk-averse in financial decision-making than men (Jianakoplos and Bernasek, 1998). People with a relatively high social-economic status are more likely to shift and spread their savings than people with a low status. In addition, they use a relatively high proportion of time deposits. High-income respondents are more likely to spread and shift savings and the share of savings they shift is relatively high. Old people are more likely to spread and to fix savings than young people. Finally, respondents who are responsible for the household's finances are less likely to fix savings and the degree of fixing is lower.

In Table 4, the variable  $K$  was not included as it turned out not to be significant. As explained before, knowledge about banking supervision is an important determinant of opinions on banking supervision (Van der Cruisen, De Haan, Jansen and Mosch, 2010). Dropping the proxies for opinions on banking supervision makes the coefficient of our knowledge proxy significant in the model explaining whether or not households spread their savings across banks (column 1 of Table 5).

**Table 5. Savings behaviour: spreading, fixing and shifting (alternative specification)**

	(1) SB_spread <sub>i</sub>	(2) SB_fix <sub>i</sub>	(3) SB_fix_degree <sub>i</sub>	(4) SB_shift <sub>i</sub>	(5) SB_shift_degree <sub>i</sub>
Knowledge about banking supervision (K)	0.03** (0.01)	-0.02 (0.01)	-0.02 (0.01)	0.02 (0.02)	0.02 (0.01)
Know DGS	0.02 (0.07)	-0.04 (0.08)	-0.07 (0.07)	0.26*** (0.08)	0.21*** (0.08)
Know DGS amount	-0.06 (0.07)	0.11 (0.08)	0.09 (0.07)	0.21*** (0.08)	0.15** (0.07)
Education	0.08 (0.08)	-0.12 (0.08)	-0.14* (0.07)	0.16* (0.09)	0.12 (0.08)
Age	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.00 (0.00)	0.00 (0.00)
Male	-0.18** (0.08)	0.05 (0.08)	0.11 (0.08)	-0.12 (0.09)	-0.08 (0.09)
Social-economic status	0.08** (0.04)	0.06* (0.04)	0.07* (0.04)	0.07* (0.04)	0.03 (0.04)
City	0.04 (0.03)	0.03 (0.03)	0.01 (0.03)	0.03 (0.03)	0.03 (0.03)
Income	0.04*** (0.01)	0.00 (0.02)	-0.01 (0.01)	0.05*** (0.02)	0.03** (0.02)
Account	-0.08 (0.08)	-0.23*** (0.08)	-0.23*** (0.07)	-0.13 (0.08)	-0.11 (0.08)
Home owner	0.27*** (0.09)	0.26*** (0.09)	0.21** (0.09)	0.23** (0.10)	0.21** (0.09)
Partner	0.15* (0.09)	-0.13 (0.09)	-0.09 (0.08)	0.01 (0.10)	0.00 (0.09)
Bank went bankrupt	0.51*** (0.10)	0.11 (0.11)	0.03 (0.09)	1.12*** (0.11)	0.87*** (0.08)
Bank was bailed out	0.34*** (0.07)	-0.00 (0.07)	-0.01 (0.06)	0.22*** (0.07)	0.15** (0.07)
Info about bank	0.10** (0.05)	0.05 (0.05)	0.06 (0.05)	0.21*** (0.06)	0.22*** (0.06)
Info about savings product	0.23*** (0.05)	0.33*** (0.05)	0.26*** (0.05)	0.35*** (0.06)	0.29*** (0.06)
Constant	-2.85*** (0.23)	-2.27*** (0.24)		-3.54*** (0.27)	
Observations	1806	1742	1742	1806	1806
McKelvey & Zavoina's Pseudo R <sup>2</sup>	0.15	0.08	0.06	0.28	0.24
Model	Probit	Probit	Ordered Probit	Probit	Ordered Probit

Explanatory notes: See notes under Table 4.

## 6. Conclusions

This paper analyzes whether the experience of Dutch households' during the crisis and financial literacy affected the allocation of their savings using the DNB Household Survey (DHS). We asked respondents several questions about their savings behaviour, potential adverse experiences during the financial crisis and their knowledge about banking supervision. Our results suggest that households' financial literacy and adverse experiences during the crisis has affected household savings behaviour. Respondents who are well informed about the deposit guarantee scheme gather more information about banks and saving instruments than respondents who are poorly informed. Likewise, respondents who were customer of a bank that went bankrupt or received government support gather more information than other respondents and are more likely to have savings at several banks. Respondents with better knowledge are more likely to gather information about banks and saving instruments, to spread their savings across banks, and to shift savings to other banks. Furthermore, they are less likely to use time deposits.

In sum, this paper has identified two mechanisms which induce households to pay more attention to savings decisions: (1) financial literacy with respect to banking supervision, and (2) adverse experiences during a financial crisis. More attention for literacy may decrease the likelihood of adverse experiences. Better knowledge about banking supervision may help in formulating realistic views on what to expect from banking supervision. It would also increase the awareness that making well-thought-out financial decisions is important, as bank failures cannot always be prevented.

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## Appendix 1. The questionnaire

In the first part of this questionnaire you will first be asked a few questions about trust in general and then a few questions about trust in financial institutions. In the second part of this questionnaire you will be asked questions on banking supervision. In this questionnaire you can't scroll back to the previous question.

...

In the Netherlands banks are supervised. In the second part of the questionnaire we want to obtain more insight into your expectations and knowledge of banking supervision. We also want to know more about the factors that influence your choice for a particular bank.

The goal of the next questions is to obtain more insight into your choices regarding the allocation of savings. With savings we mean the money that you keep in reserve for future expenditures on a savings account or checking account. For the clarity: savings as part of the salary savings scheme, savings policies within mortgages, capital insurances for study costs of children, and single-premium insurance policies do not belong to our definition of savings.

### Q13

What determines where you deposit your savings? Indicate for each of the below factors how important they are for you. If you have never had savings, think up factors you would find important when you would have savings.

	not at all an important factor	not a very important factor	a somewhat important factor	a very important factor	an extremely important factor
* That the bank offers an interest rate that is high in comparison to other banks					
* That I have trust in the bank					
* That the bank has a good reputation					
* That the bank discloses important information					
* That the bank is customer-friendly					
* That the bank is financially healthy					
* That the people that I know are satisfied with the bank					

And how important are the following factors for you when determining where to put your savings? If you have never had savings, think up which factors you would find important at the moment that you would have savings.

	not at all an important factor	not a very important factor	a somewhat important factor	a very important factor	an extremely important factor
* That my family is also customer of the bank					
* That a Dutch supervisor supervises the bank					
* That it is a Dutch bank					
* That I already have other products from that bank (e.g. checking account or mortgage)					
* That I can bank online safely					
* That there is an office of the bank close to where I live.					
* Other,...					

#### Q14

Currently, do you have a savings account at a bank?

- ☐ yes, at one bank
- ☐ yes, at several banks
- ☐ no

*if Q14="yes, at several banks"*

#### Q15

Why have you spread your savings? Indicate for each of the below reasons how important this reason is for you.

	not at all an important reason	not a very important reason	a somewhat important reason	a very important reason	an extremely important reason
* Because in case of bank failure only a maximum amount of savings per bank is certainly given back.					
* Because in case of bank failure it takes some time before I get back (part of my) savings.					
* Because in this way I can profit from interest rate differentials					
* Other,...					

*if Q14#3*

**Q16**

Which part of your savings is fixed for a set duration?

- ☐ All my savings are fixed for a set duration
- ☐ At least half of my savings (but not all) are fixed for a set duration
- ☐ Part of my savings (but less than half) are fixed for a set duration
- ☐ I don't have savings fixed for a set duration
- ☐ I don't know

*if Q14#3*

**Q17**

Did you gather information in advance about the savings product that you currently have and about the banks that offer those products?

	yes, very much	yes, somewhat	hardly	no
* On savings product(s)				
* On bank(s)				

*if Q14#3*

**Q18**

Have you transferred savings to another bank during the past 3 years?

- ☐ Yes, all my savings
- ☐ Yes, at least half of my savings but not all my savings
- ☐ Yes, less than half of my savings
- ☐ No

**Q19**

To what extent do you agree with the below statements? If you have no savings at the moment, think up what would have been your opinion if you would have had savings.

	fully disagree	disagree	neutral	agree	fully agree
* The higher the amount of savings that people get repaid in case of a bank failure (=guaranteed amount) the better					
* I am willing to accept a lower interest rate on my savings in exchange for a higher guaranteed amount in case of a failure of my bank.					
* I am willing to accept a lower interest rate on my savings in exchange for a lower probability of a failure of my bank.					
* I am willing to accept a lower interest rate on my savings in exchange for the certainty that I will get all my savings back when my bank goes bankrupt.					



**Q20**

To what extent do you agree with the following statements?

	fully disagree	disagree	neutral	agree	fully agree
In my opinion, banking supervisors...					
* have to supervise the financial health of banks					
* have to take care that there is openness about what is happening on financial markets					
* have to take care that banks are clear towards their customers about the costs of a product					
* have to take care that banks don't sell products to customers that actually can not afford them					
* have to take care that banks don't give misleading information					
* have to take care that banks never go bankrupt					
* have to take care that in case of bankruptcy of my bank I will get my guaranteed savings back within a few days					
* have to contribute to the stability of the financial sector					
* have to decide on the granting of a bank permit					
* have to decide on the bankruptcy of a bank					
* have to supervise the careful treatment of customers by banks					
* have to supervise the rewarding of bankers					
* have to tell it when a bank experiences problems					
* after a bank goes bankrupt have to explain why they did not succeed to save the bank					

**Q21**

To what extent do you agree with the following statement? It is important to be well informed on banking supervision.

- ☐ fully disagree
- ☐ disagree
- ☐ neutral
- ☐ agree
- ☐ fully agree

With the next four questions we want to measure your knowledge about banking supervision in the Netherlands. It is no problem if you don't know the answers. To get a good view of your knowledge it is important that you don't look up answers.

**Q22**

Which institute(s) is (are) responsible for banking supervision in the Netherlands?

**Q23**

According to you, what belongs to the tasks and responsibilities of De Nederlandsche Bank (DNB) and the Netherlands Authority for the Financial Markets (AFM)?

	DNB	AFM	DNB & AFM	Neither of them	I don't know
* never let banks go bankrupt					
* supervision on the careful treatment of customers by banks					
* supervision on the financial health of banks					
* supervision on the rewarding of bankers					
* taking care that banks don't give misleading information					
* taking care that there is openness on what is happening on financial markets					
* taking care that banks are clear towards their customers about the costs of a product					
* taking care that banks don't sell products to customers that actually can not afford them					
* contributing to the stability of the financial sector					
* deciding on the granting of a bank permit					
* deciding on the bankruptcy of a bank					
* telling it when a bank is in financial problems					
* when a bank goes bankrupt taking care that all customers get all their savings back					

**Q24**

Are you familiar with the existence of the deposit guarantee scheme?

- ☐ yes
- ☐ no

It can happen that a bank is not capable of repaying the depositors. When this happens, the deposit guarantee scheme enters into operation. This provides in repaying the money of the account holder, such that the account holder does not experience any losses.

**Q25a**

The repayment as part of the deposit guarantee scheme is limited to a maximum amount. Do you know this amount?

- ☐ yes
- ☐ no

*if Q25a= yes*

**Q25b**

What is the amount?

**Q26**

By means of which information source do you receive information on banking supervision and how often?

	Never	Occasionally (less than once a month)	Regularly (more than once a month, but less than once a week)	Often (at least once a week)
* Television				
* Radio				
* Newspapers				
* Magazines				
* Internet				
* Friends				
* Family				
* Colleagues				
* other source,...				

**Q27a**

During the past 3 years did a bank at which you were customer go bankrupt?

- ☐ yes, DSB
- ☐ yes, Icesave
- ☐ yes, other...
- ☐ no

*if Q27a= yes*

**Q27b**

How much savings at this (these) bank(s) do you think you have permanently lost as a result of this? If you have lost nothing fill in a 0 (zero).

*if Q27b>0*

**Q27c**

Why did you loose money?

- ☐ Because I had more savings than the amount that is (will be) paid back with certainty.
- ☐ Because I had saving on an account for which it holds that nothing will be paid back (or will be paid back with certainty).

**Q28**

During the past 3 years did a bank at which you were customer survive with the help of government support?

- ☐ yes
- ☐ no
- ☐ I don't know

...

## Appendix 2. Additional information

**Table A1. Knowledge about supervisory tasks and responsibilities**

		DNB	AFM	DNB & AFM	Neither of them	I don't know
K1	never let banks go bankrupt	21%	3%	25%	30%√	21%
K2	supervision on the careful treatment of customers by banks	13%	30%√	29%	10%	19%
K3	supervision on the financial health of banks	37%√	7%	41%	1%	14%
K4	supervision on the rewarding of bankers	13%	16%	30%√	21%	20%
K5	taking care that banks don't give misleading information	9%	31%√	41%	3%	17%
K6	taking care that there is openness on what is happening on financial markets	11%	23%√	43%	5%	17%
K7	taking care that banks are clear towards their customers about the costs of a product	9%	31%√	35%	7%	18%
K8	taking care that banks don't sell products to customers that actually can not afford them	9%	25%	29%	18%√	19%
K9	contributing to the stability of the financial sector	28%√	7%	46%	2%	16%
K10	deciding on the granting of a bank permit	45%√	7%	29%	2%	18%
K11	deciding on the bankruptcy of a bank	33%	5%	30%	12%√	20%
K12	telling it when a bank is in financial problems	29%	9%	37%	8%√	18%
K13	when a bank goes bankrupt taking care that all customers get all their savings back	42%	3%	29%	7%√	18%

Source: Van der Cruijssen, De Haan, Jansen and Mosch (2010).

Explanatory notes: CentERpanel, March 2010, and N=2103. √ indicates the correct answer.

**Table A2. Opinions about banking supervisors**

	I find that banking supervisors...	fully disagree	disagree	neutral	agree	Fully agree
O1	have to supervise the financial health of banks	0%	0%	7%	33%	60%
O2	have to take care that there is openness about what is happening on financial markets	0%	1%	12%	39%	48%
O3	have to take care that banks are clear towards their customers about the costs of a product	0%	1%	8%	33%	57%
O4	have to take care that banks don't sell products to customers that actually can not afford them	0%	2%	12%	27%	59%
O5	have to take care that banks don't give misleading information	0%	1%	7%	25%	67%
O6	have to take care that banks never go bankrupt	2%	8%	28%	29%	34%
O7	have to take care that in case of bankruptcy of my bank I will get my guaranteed savings back within a few days	1%	3%	17%	32%	47%
O8	have to contribute to the stability of the financial sector	0%	1%	16%	40%	43%
O9	have to decide on the granting of a bank permit	1%	2%	19%	34%	45%
O10	have to decide on the bankruptcy of a bank	2%	8%	37%	29%	25%
O11	have to supervise the careful treatment of customers by banks	0%	3%	18%	39%	40%
O12	have to supervise the rewarding of bankers	1%	4%	17%	28%	50%
O13	have to tell it when a bank experiences problems	1%	2%	14%	32%	51%
O14	after a bank goes bankrupt have to explain why they did not succeed to save the bank	1%	3%	18%	32%	47%

Source: Van der Cruijssen, De Haan, Jansen and Mosch (2010).

Explanatory notes: CentERpanel, March 2010, and N=2103.

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