

Deposit insurance: An empirical study of private investors' knowledge and perception[‡]

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Abstract

Theoretical studies about the interrelation of bank runs and deposit insurance assume that depositors are perfectly informed about deposit insurance and its main features. This assumption is commonly made, but was hardly ever checked empirically. Taking German depositors as an example, we investigate the knowledge about existing deposit insurance systems and how the insurance levels of different banks are perceived. By doing so, this study is one of the very few exceptions which address the public awareness of deposit insurance, and it may be the only one which examines how depositors perceive their deposits' security. Using survey data of 756 private investors, our results indicate a lack of knowledge about depositor protection but much confidence in it. Although practically all personal deposits of the banks in the survey are fully secured, private depositors perceive differences in the safety level across banks. These differences can be partly explained by the banks' reputations.

Key Words: Banking regulation, deposit insurance, public awareness, private investors.

JEL Classification: G21, G28

1 Introduction

Theory predicts that fully insured depositors never will withdraw their savings prematurely to avoid the negative consequences of bank runs (Diamond and Dybvig (1983)). Since bank runs damage the economy, various systems of deposit insurance were established around the globe in an effort to ensure the stability of banking systems and to protect bank depositors from incurring large losses due to bank failures (Demirgüç-Kunt and Kane (2002), Demirgüç-Kunt et al. (2005)). However, the recent US subprime mortgage financial crisis shows that the financial safety net is a fragile system. The bank run on Northern Rock in the U.K., which was squeezed by liquidity problems, and the credit crunch following the crisis demonstrate that depositors may rapidly lose their trust in the solvency of their bank in case of a serious crisis. They react with a massive withdrawal when bad news occur, even if their deposits are fully protected. Although the bank of England publicly announced to guarantee that all investors can retrieve their money (September 17, 2008), worried depositors continued to withdraw their savings (BBC News (2007)). The question arises whether such a bank run is triggered or amplified by depositors' lack of knowledge about the security net.

As the Financial Stability Forum¹ points out, it is essential that the public is informed about the benefits and limitations of a deposit insurance system. Only when its characteristics are publicized regularly, its credibility can be maintained and strengthened (Financial Stability Forum (2001)). Therefore, Garcia (1999) claims that the public should be informed of the key elements of the deposit insurance scheme to instill confidence. It is surprising that there is hardly any empirical work on this issue and the few studies dealing with this phenomenon have found that depositors have only a marginal understanding of existing deposit insurance systems (Bowyer et al. (1986), Steiger et al. (2001), Inakura et al. (2005), Safakli and Güray (2007)).

These studies did not comprehensively analyze the complex relationship between i) the extent

¹ The Financial Stability Forum is formed by the G7 Finance Ministers and Central Bank Governors to promote international financial stability. Its working group on deposit insurance set out a guidance for effective deposit insurance systems by which the benefits of heightened financial stability and small depositors' protection can be preserved.

of knowledge about insurance systems, ii) the demand for deposit security, and iii) the perceived degree of deposit security. Besides addressing this lack of knowledge, our paper extends the literature that investigates empirically the effectiveness of deposit insurance systems in the following directions. First, Germany has not been studied yet. The investigation of our research questions for Germany is especially interesting since, unlike the countries considered so far, Germany has three independent deposit insurance schemes, each covering one pillar of the banking sector and two of them being private. Nevertheless, the German banking system is generally regarded as a very stable system with secure deposits. Second, to the best of our knowledge, there is currently no thorough empirical study on the effect of banks' reputation on the perceived level of deposit security. Therefore, we develop the construct of perceived deposit security and present the results of an exploratory study examining the impact of bank's reputation on perceived deposit security. Thus, we analyze the following questions:

1. Do private depositors² have a sound understanding of the deposit insurance systems? Are there any differences in depositors knowledge related to specific depositor characteristics?
2. Is the security of deposits important for investment decisions of private depositors?
3. Do private depositors perceive their deposits to be safe?
4. Do private depositors assign banks different levels of deposit security? And if so, can these differences in perceived deposit security be partly explained by differing reputation levels of the banks?

We will shed light on these questions by analyzing a comprehensive survey which was conducted between October and December 2007. In total, 756 questionnaires are considered.

Regarding policy implications, answering our research questions provides an improved understanding of the differences in knowledge about existing deposit security mechanisms and the perceived level of deposit security, which may help to further explain the occurrence of bank

² We use survey data of German private investors. These investors need not be depositors since they may hold alternative types of investment. However, as current accounts also belong to deposits, we assume that all our subjects use some sort of deposits.

runs. Studying depositors' awareness is important with respect to the publication policy of deposit insurers.

From a manager's perspective, providing an answer to our questions can have important implications for promoting deposit security in retail banking. On the basis of such information, banks will be able to evaluate how they are perceived in comparison to their competitors. Understanding the structure of this relationship is important for managers to determine how banks can keep or acquire customers, especially in times when the awareness of possible bankruptcies is relatively high. Through differentiated marketing campaigns banks can better address depositor groups who differ in their need for, their knowledge about, and their perception of deposit insurance.

The results indicate that although the security of deposits seems to be important to German depositors, they are relatively ill-informed about the deposit insurance systems. Despite their lack of knowledge, German depositors are confident of the security of their deposits. Additionally, the findings show that depositors indeed perceive differences in the safety levels across banks. These differences can be partly explained by the banks' reputation. Furthermore, our study reveals that depositor characteristics play an important role regarding knowledge about, demand for, and perception of deposit insurance.

The remainder of the paper is organized as follows. In Section 2 we put our paper in perspective to the existing literature, give a brief summary of the German banking system and deposit insurance schemes, and develop our hypotheses. Section 3 describes our data set and contains our study's results. Finally, Section 4 draws conclusions, discusses directions for further research, and derives managerial and policy implications.

2 Background of our study

2.1 Related literature

The empirical studies which are related to this paper mainly focus on the knowledge of depositors about the safety net. All of them support the hypothesis that most of the depositors have only basic knowledge. Bowyer et al. (1986) report the results of a survey taken at a depositors meeting of a bankrupt US institute. Their sample of 578 subjects provides them with the rare opportunity to examine the knowledge of depositors at a failed institution. They find evidence that a large number of depositors have only limited or incorrect information about the bank's deposit insurance and the bank's financial condition.

Steiger et al. (2001) conducted a US household survey to gather information about deposit insurance awareness and about deposit insurance coverage needs. Their results show that most of their 1,658 subjects know about the FDIC (Federal Deposit Insurance Corporation) and whether their banks are insured. However, they lack specific knowledge about the insured bank services and only half of their subjects correctly identify the exact amount covered by the deposit insurance.

Concerning knowledge about deposit insurance, Inakura et al. (2005) examine the determinants of households' knowledge. The authors have access to a set of household data from a financial behavior survey conducted in and around Tokyo in 1996 and 2001 (sample size: more than 2,500 subjects). Their data indicates that during this time period households became much more aware of the deposit insurance scheme. Their results show that households with higher levels of income, more financial assets, and higher educational attainment tend to be more knowledgeable with regard to the deposit insurance scheme. Furthermore, households with more knowledge are more likely to switch banks if banks increase their risks.

Safakli and Güray (2007) study depositors' knowledge in the Turkish Republic of Northern Cyprus, where a new insurance system was established in 2004. They conducted a survey with 81 bank employees and 100 clients. Their results show that depositors and even bank

employees do not have the adequate knowledge about the deposit insurance system.

These three studies are closely related to our own work. However, our study is different with respect to several aspects: i) Whereas the preceding studies mainly focus on depositor knowledge about deposit insurance, we also examine the demand for deposit security and the perceived security level. We measure the banks' reputations as well and examine their influence on the perceived security. To our knowledge, this has not been studied in prior research. ii) The German banking system, rarely explored with respect to deposit insurance, is an interesting arena for further examination. The German deposit insurance systems offer depositors very far reaching guarantees and many deposits can be considered as fully insured. Since our later analysis requires knowledge of the German banking system to appreciate our findings, we devote the next Section to a description of its most important features.

2.2 German banking and deposit insurance systems

The German banking sector is composed of three main pillars: the savings banks, the credit cooperatives, and the commercial banks. As part of an universal banking system, all of them offer a broad range of services. The savings banks are owned by different groups of jurisdictions (e. g. communities, cities, or states), whereas credit cooperatives and commercial banks are owned privately. Because of their public ownership, savings banks are obliged to serve public interest in their region. Savings banks as well as credit cooperatives are set up as a two-tier system. The local banks are usually confined to operate in the local markets that normally do not overlap. The few affiliated central institutions mainly offer services that cannot be supplied efficiently by small local banks themselves due to lack of competence or (efficient) size (Koetter et al. (2006)). The commercial banking sector consists of three distinct groups: a few big banks,³ regional banks (with the group of private bankers included) and the branches of foreign banks.

Germany has a privately administered and privately funded deposit insurance scheme. Each of

³ Currently Deutsche Bank AG, Dresdner Bank AG, Commerzbank AG, Bayerische Hypo- und Vereinsbank AG, Deutsche Postbank AG.

the three main banking pillars has its own deposit insurance system in Germany. The deposit insurance systems of savings banks and cooperative banks with their apex institutions are systems based on the solidarity of their member institutions. The primary task is maintaining the liquidity and solvency of all banks of the respective pillar. Membership in these schemes is compulsory and, as the survival of the banks is basically guaranteed, depositors virtually enjoy unlimited protection. The commercial banks, in addition to their compulsory system, which is based on the European directive 94/19/EC on deposit-guarantee schemes and came into force in 1998, have established a voluntary private system that is used to provide protection above the statutory scheme's basic compensation. Nearly all banks participate. As commercial banks are in direct competition with each other, the main purpose of the deposit insurance scheme is to guarantee payout of insured deposits and not the bail-out of a bankrupt institute.

To sum up, nearly all private depositors of German banks benefit from extensive guarantees of the different deposit insurance systems. Unless the whole German banking system breaks down, private investors' deposits can be viewed as fully insured.

2.3 Development of hypotheses

As the depositors are not in a position to control the banks' activities, their interests are defended by deposit insurance schemes, which shall avoid bank panics and their social costs (Dewatripont and Tirole (1994)). If the private depositors are as unsophisticated as described in the literature and therefore financial institutions have to be regulated, it is unclear whether the public is sufficiently aware of the deposit insurance system. If depositors have no incentive to control their banks since they do not suffer from the losses of their bank anymore (Merton (1977)), why should they care about the security system in the first place?

Based on the empirical findings from the other studies cited above we derive the following hypothesis:

H1: German depositors are ill-informed about the main features of the German deposit insurance systems.

Bowen (2002) shows that older people are knowledgeable about most financial areas. Thus, we hypothesize:

H1a: Depositors who are older tend to be better informed about the German deposit insurance systems.

Individuals who possess inadequate financial literacy are less likely to hold stocks and are more risk averse (van Rooij et al. (2007)). We hypothesize:

H1b: Depositors who are less risk averse tend to be better informed about the German deposit insurance systems⁴.

Involvement is defined as the perceived personal relevance or importance of a stimulus (e.g., product category, service, ad, etc.) to an individual (Greenwald and Leavitt (1984)). Thus, a private investor who is more involved with bank products/services is probably more interested in the security of his deposits. We hypothesize:

H1c: Depositors who are more involved in bank services tend to be better informed about the German deposit insurance systems.

Additionally, we want to know whether the security of bank deposits is of any importance for depositors' investment decision. We therefore ask our subjects how they rank different reasons for choosing a bank for their deposit. If people are interested in a safe investment, this criterion has to have a substantial weight. Empirical studies which focus on factors of bank choice indicate that the bank's safety is an important aspect for bank customers (Jagelaviciene et al. (2006)). This goes in line with the findings of Steiger et al. (2001) who show that FDIC coverage is very important to over half of their subjects. Concerning the relevance of the safety of deposits we hypothesize:

H2: The security of deposits is very important for investment decisions of German depositors.

⁴ Note that we mean the individual risk aversion in the context of financial investment decisions.

As the description of the German deposit insurance schemes has shown, nearly all depositors virtually enjoy unlimited protection in Germany. Furthermore, since the famous debacle of the Herstatt Bank in 1974, no major bank has gone bust in Germany. Since then there were only some cases (e.g. Privatbank Reithinger, BFI Bank AG, BkmU Bank AG) where private investors had to bear losses because deposits of the failed banks were just protected by the compulsory deposit insurance system. Since the deposit insurance systems of savings banks and cooperative banks guarantee the survival of their member institutes or forces banks in distress to fusion with a healthier institute of the respective pillar, none of their customers has had to bear a loss so far. Therefore, depositors should be extremely trustful concerning the safety of their deposits. Thus, we hypothesize:

H3: In general, German depositors perceive their deposits to be safe.

Based on the discussion below, we want to find out whether depositors assign banks different levels of deposit security and whether these differences can be partly explained by differing reputation levels of the banks, i.e. we examine whether there is a (positive) relationship between reputation and the perceived deposit insurance level.

To justify theoretically the nature of the relationship between bank's reputation and perceived deposit insurance level, we turn to Williamson's transaction cost approach (Williamson (1975), Williamson (1985)) and the contract theory. Williamson's basic assumptions are that there is asymmetric information between parties and that human beings are boundedly rational in their behavior, i.e. individuals cannot acquire and process information costlessly. Individuals have to use time and resources to gain information. The costs they have to cover are the transaction costs (here: information costs). For the depositors' situation this means that depositors have to incur information costs to find a bank which offers fully insured deposits (or to find out their insurance level).

Instead of bearing the information costs, individuals often rely on "rules of thumb" for decision making (Furubotn and Richter (2005)). Consequently, people are willing to accept a contract although there are information asymmetries. In our setting this means that depositors are not informed about the security of the deposits and also do not know whether the other side is

reliable. In this situation people seek information about the reliability of their contract partner and use their experience of the behavior of the other side or the knowledge about experiences from other people as a proxy for it, i.e. reputation functions as a kind of credence good. The contract partner can offer his reputation as a pledge and therefore signal his willingness to complete an agreement. In this way reputation-building is important since it serves as collateral in guaranteeing high-quality products and reliability in situations of asymmetric information. In a business context this means that consumers who become aware of a firm's reputation trust that the firm will maintain certain quality standards to maintain its reputation. A good reputation is an important signal of quality with the potential to reduce customers' risks (Fombrun and Shanley (1990)).

Transferred to the depositor-bank situation we examine whether depositors resort to stick to the banks which they have a certain degree of experience with and which they can trust. And that in turbulent times depositors may refrain from withdrawing their deposits immediately. This view is also followed by Kim and Choi (2003) who argue that the reputation of a bank may limit the extent of bank runs. Thus, if the reputational capital of a bank is large enough, it may not be effected by contagion, i.e. the higher the levels of banks' reputation, the less likely the potential contagion effect.⁵ Based on this perspective, the following hypothesis is proposed:

H4: German depositors assign banks different levels of deposit security, which can be partly explained by differing reputation levels of the German banks.

Because a key focus of this study is to examine how bank's reputation affects the perceived deposit insurance level, it is important to define the term reputation first. There are several different ways of defining it (a good survey is compiled by Walsh et al. (2008)). We follow Schwaiger (2004) who splits corporate reputation into two dimensions, competence as a cognitive and sympathy as an affective one, i.e. reputation consists of the knowledge and the emotions of individuals about a firm.

⁵ Although there may be other explanations for a higher perceived deposit security, like too-big-to-fail, we focus on reputation because we are confident that it is the most important factor. Kim and Choi (2003) refer to a large client base in the market and a long history/high age of the firm as other quality surrogates.

3 Empirical analysis

3.1 Design of the empirical study

Issues in design: To validate our theoretically deduced hypotheses, we need detailed information about depositors' real knowledge and perceptions. Theoretical models do not provide valid information about individuals' real behavior as research about the topic in hand still suffers from substantive lacks, as described above. Since already existing databases are not adequate with regard to the study's focus or are simply not available, an empirical study is conducted. To our mind conducting a standard questionnaire survey to elicit the information needed seems to be the most appropriate way deal with this problem as it is not afflicted with high costs or with systematic influence by the interviewer.

To test hypothesis 4 we considered four banks in our questionnaire. Our subjects had to rank either two commercial banks (Deutsche Bank and Citibank) or one savings bank ("Sparkasse") and one credit cooperative ("Volksbank"). We decided for the Deutsche Bank and the Citibank since our pilot test (see below) showed that among the well-known commercial banks in Germany these two banks hold distinctive parameter values for the bank's reputation. Additionally, a roughly similar number of subjects were asked to rank a savings bank and a credit cooperative to account the two other pillars of the German banking sector in our study. Since depositors normally see no difference between the individual credit cooperatives and savings banks of different regions, we asked our subjects to rank these banks on the basis of their view of their respective local institute.

Survey details: We conducted a paper questionnaire survey where subjects had to fill out the questionnaire on their own.⁶ Student assistants of our faculty acted as advisers when questions arose. Fill out time was approximately 15 minutes. After completion participants received a chocolate bar for their efforts. As an additional incentive, all participants could leave their telephone number or e-mail address to take part in a lottery, where prizes in total value of 550 Euro were raffled off among participants.

⁶ For the German original of the questionnaire please look at the end of the document.

After designing the questionnaire, it was used in a pilot test involving 107 residents of XXX, who completed the questionnaire and provided valuable comments. The pilot test of the measures and the questionnaire were conducted at the city administration⁷ of the City of XXX. Based on the respondents' feedback, we modified the questionnaire to improve its readability and ensure its accuracy and appropriateness.

Most of the questionnaires of our main study were also collected at the city administration. Additionally, we collected questionnaires in trains, in old people's homes, and from employees of the administration department of our university.

Measurement of the variables: Respondents are asked to give responses to a set of questions and statements, by which we operationalized our research questions. In addition, respondents have to give information about some standard demographic variables. Methodologically, we use well-established seven-point Likert scales to measure respondent's attitudes (1= "I completely disagree"; 7 ="I completely agree")⁸.

To measure the *knowledge* about deposit insurance, we decide to ask some facts about the German deposit insurance systems; an approach quite similar to our predecessor studies (Bowyer et al. (1986), Steiger et al. (2001), Inakura et al. (2005), Safakli and Güray (2007)), i.e., respondents' knowledge on deposit insurance is measured by simple categorial variables (e.g., respondents have to mark if they think that the extent of deposit insurance covers 0, 20,000, 50,000, 100,000 Euro or an unlimited amount). By doing so, we are able to identify depositors who have correct and accurate information about the German deposit insurance systems. We also add some questions asking the subjects to rank their own knowledge based on their individual perception (seven-point Likert scale). To measure the *importance of the security of deposits* for the investment decisions of depositors, we ask the subjects how they rank (seven-point Likert scale) different reasons for choosing their bank when they have to make an investment

⁷ The the city administration is the place where all residents get their passports or can notify their change of address. Since XXX is a university town where about one fifth of the population are students and students generally more often change their address, this may explain why young, low income people are strongly represented in our sample (see below).

⁸ We decide for seven-point Likert scales as the multi-item scales we adapt from previous studies also used seven-point scales. For the reason of consistency we also use these scales for our newly developed items.

decision for a deposit. The reasons considered in the questionnaire are based on the choice of expert interviews (see above).

To measure the constructs risk aversion (Donthu and Gilliland (1996)), trust (Mittal (1995)), and involvement (Wingreen and Baglione (2005); Koufaris and Hampton-Sosa (2004); Cheung and Lee (2001); Lee and Turban (2001)), we employ well-established multi-item scales from previous studies. As Dohmen et al. (2005) show that risk attitudes are better measured from asking context-specific questions, in order to capture variation in risk perceptions, we adjust the item-scale to measure risk aversion to the investment context.

Additionally, we measure the "belief in governmental authorities" with a single item on a seven-point Likert scale ("It is not my task to ensure the safety of my deposits (e.g. by obtaining information about the financial situation of banks)").

To measure the latent construct *reputation*, we use a multi-item measurement approach developed by Schwaiger (2004): It is composed of six indicators, covering the two dimensions competence and sympathy. Schwaiger (2004) has proven its validity and reliability in several studies (e.g. Eberl and Schwaiger (2005)). We follow Schwaiger (2004) since the definition of reputation as a combination of affective and cognitive components is in line with our research topic. He applies his item battery on the samples where existing measurement concepts (Hutton (1986), Fombrun (2001)) are based upon. In these studies only one factor for reputation is extracted. However, Schwaiger's factor analysis reveals two principal components with eigenvalues >1 : a cognitive and an affective component. Schwaiger (2004) concludes that existing measurement concepts for reputation do not cover all aspects relevant for measuring corporate reputation (mainly just affective ones).

The measurement of latent constructs is always difficult, but the problem becomes even more critical in our case because we are the first addressing the problem of measuring *perceived deposit security*. Scales for the perceived deposit security are not available in the literature. Therefore, we generate a large pool of items and we test them for clarity and appropriateness in personal interviews with randomly chosen probands. The subjects in the personal interviews are asked to indicate any ambiguity or other difficulty they experience in responding to the

items. Based on the feedback received, some items are eliminated and others are modified. Academic experts of our faculty are asked to critically evaluate the items specificity and the clarity of construction. Based on the detailed critique, items are revised to improve their specificity and precision. In the end, we decide to measure the perceived deposit security with three newly developed items which show an adequate quality of the construct measurement in our pilot test (see above). Our aim is not to develop a comprehensive measurement approach for the perceived deposit security. Instead we focus on the identification of the most relevant drivers (based on our expert interviews).

Validity and reliability of the constructs' measurements are assessed by means of prevalent statistical criteria of the first and second generation, which are checked within a procedure comprising four purification steps and employing the "known group validation strategy" (Churchill (2005)). The reliability coefficient of each of the refined scales is reported in Table 1. The complete scales are provided in the Appendix A.1.

Construct	Measurement	Cronbach's alpha
Risk aversion	2 item measure based on Donthu and Gilliland (1996)	0.602
Involvement	5 item measure adapted from scales used by Mittal (1995)	0.937
Trust	4 item measure based on Wingreen and Baglione (2005); Koufaris and Hampton-Sosa (2004); Cheung and Lee (2001); Lee and Turban (2001)	0.880
Reputation	6 item measure based on Schwaiger (2004)	Competence = 0.709; sympathy = 0.754
Perceived deposit security	3 item measure developed for this study	0.636

Table 1: Constructs and their measurement

3.2 Descriptive statistics

The survey was conducted between October and December 2007 and in total 849 subjects participated. From these responses 756 were accepted as valid responses for further analysis after removing erroneous questionnaires⁹. 57 % of the respondents are female, and 43 % are male. The average age of the subjects is 34 years, which is younger than the population of

⁹ We removed questionnaires with a substantive proportion of missing values and cases in which subjects obviously wanted to finish it quickly to receive the chocolate bar or to join the lottery.

XXX (in 2006: 40 years). 287 of the respondents are between 20-29 years old, 121 are in the range 30-44, 81 are between 45-59 and 78 respondents are more than 60 years old. 39 are under the age of 20. The respondents are engaged in various occupations (clerical employees as well as students make up about 35 %). With regard to educational attainment, A-levels as well as university graduates make up about 40 %, i.e. the depositors we survey represent a fairly well-educated group. In Germany 29.9 % of the population had A-levels and only about a half of them¹⁰ had a university degree in 2005 (Institut der deutschen Wirtschaft (2007)). More than 50 % of depositors surveyed can be considered low- or middle-income consumers. In Germany the average net income in 2006 was 1,452 Euro (Institut der deutschen Wirtschaft (2007)). Detailed descriptive statistics relating to the respondents' characteristics are shown in Table 2.

Measure	Value	Frequency	Percent
Gender	Female	425	56.6
	Male	326	43.4
Age	<20	39	6.1
	20-29	287	50.2
	30-44	121	18.9
	45-59	81	13.0
	>59	78	11.8
Occupation	Clerical Employee	258	35.0
	Technician	33	4.5
	Freelancer	44	6.0
	Unemployed	23	3.1
	Student	269	36.5
	Housewife	16	2.1
	Pensioner	77	10.5
	Other	17	2.3
Educational Attainment	None	11	1.4
	Secondary School	49	6.6
	Vocational Training	91	12.1
	A-Levels	313	41.7
	University	286	38.2
Net income	< 750 Euro	248	33.6
	750-1,500 Euro	171	23.2
	1,501-2,250 Euro	104	14.1
	2,251-3,000 Euro	55	7.4
	3,001-3,750 Euro	36	4.9
	> 3,750 Euro	35	4.7
	No Answer	89	12.1

Table 2: Summary statistics

¹⁰ In total 16.5 % of the population had a university degree and in Germany A-levels are a premise to study.

3.3 Hypotheses testing

Knowledge about the German deposit insurance systems

Hypothesis 1 predicts that German depositors are ill-informed about the main features of the German deposit insurance systems. We test the hypothesis by examining our subjects' extent of knowledge regarding the deposit insurance scheme. Our results are summarized in Table 3¹¹.

Question	True answers (false answers)	Frequency	Percent
1. In case of a bank failure, are deposits protected in Germany?	Yes (no)	314	41.8
2. Is there an institution called deposit insurance that protects deposits in Germany?	Yes (no)	301	40.0
3. Which is the maximum amount of deposits guaranteed by the compulsory deposit insurance system?	20,000 Euro (0; 50,000; 100,000; unlimited)	89	11.8
4. Is there any contractual arrangement which guarantees that savings banks will bail out each other if one of them fails?	Yes (no)	274	36.4
5. Is there any contractual arrangement between the commercial banks which guarantees the security of their deposits?	Yes (no)	116	15.4
6. Which forms of deposit insurance systems are existent in Germany?	Compulsory & private system (none)	181	24.1
7. Which types of investment underly the deposit insurance?	Savings accounts, time deposits & current accounts (stocks; bonds; investment funds)	140	18.6
8. Which group of depositors benefits from the deposit insurance?	Private persons, enterprises & public authorities (banks)	8	1.1

Table 3: Knowledge about deposit insurance

¹¹ In addition to the answers cited our subjects could also answer "I do not know".

Only about 40 % of the subjects know that the deposits in case of a bank failure are protected in Germany. We take this first question to differentiate between persons who have a basic knowledge about deposit insurance and those who do not, therefore we use this variable to label the people who correctly know about the deposit insurance as Knowers, and the others as Non-Knowers. Then we use analysis of variance (ANOVA) techniques to examine differences among profiles in outcome variables to test our subhypotheses 1 a-c. Table 4 shows means and p-values for the subhypotheses tested. All our subhypotheses are confirmed. The results indicate that the Knowers tend to be older, tend to be more risk averse concerning banking services and tend to be more involved with banking services.

Dependent variable	Group	Mean	Median	Scale	P-value
Age	Non-Knowers	32.49	26.00	Years	0.00
	Knowers	37.00	38.00		
Risk aversion	Non-Knowers	0.08	0.27	Factor value	0.01
	Knowers	-0.12	-0.23		
Involvement	Non-Knowers	-0.19	-0.42	Factor value	0.00
	Knowers	0.26	0.22		

Table 4: Differences between Knowers and Non-Knowers

The number of people who correctly answer all of the questions 1, 2, 4 and 5 (see Table 3) is on a very low level (4.9 %). From a legislator's point of view these questions can be viewed as the standard knowledge about deposit insurance depositors should be expected to have. Only 11.8 % know the correct maximum amount of deposit guaranteed per account (Question 3). There are only 7 (0) persons in the sample who answer questions 1-7 (1-8) completely correct. This low percentage is remarkable as a discernable fraction of the subjects is well-educated.

After completion of the questions cited in Table 3, we additionally ask our subjects to rate their knowledge on a seven-point scale and ask them if they think that their knowledge about deposit insurance is sufficient. The answers show that most of our subjects rank their knowledge as insufficient (only 11.3 % of our sample judged their knowledge with a value of 5 or better on

a seven-point Likert scale, where 7 indicates definitely sufficient knowledge while 1 indicates definitely insufficient knowledge). Only a sample's proportion of 11.9 % asserts that they have sufficient information about the deposit insurance system.

To sum up, the results show that nearly half of the subjects at least know that some sort of deposit insurance exists, but only slightly above 10 % of the subjects have detailed knowledge about the German deposit insurance systems. The research findings indicate that depositors are not aware of the essentials of deposit insurance in Germany. These results go in line with findings from previous studies concerning the knowledge of depositors in other countries. Bowyer et al. (1986) show that a vast majority of depositors surveyed (89 %) believed that their deposits were insured by the State of Ohio, although this was not correct. Steiger et al. (2001) find evidence that although 85 % of their subjects have heard of the FDIC, only 49 % could state the exact amount covered and only 57 % knew that the FDIC does not insure all bank transactions. The results of Inakura et al. (2005) show that in 1996 (2001) only 7 % (24 %) knew detailed contents of the deposit insurance scheme and 52 % (67 %) at least knew of the scheme. According to Safakli and Güray (2007) 55 % of their subjects asserted that they had information about the deposit insurance system and only 9 % were able to give the exact amount of guaranteed deposit per account.

Demand for deposit insurance

To test hypothesis 2, which predicts that the security of deposits is important for private investors, we ask our subjects how they rank different reasons for choosing their bank when they have to decide to make an investment decision for a deposit. As shown in Table 5, we find that apart from bank terms people's choice of banks is also based on the safety of the bank. 77 % of the depositors consider it as top priority and rank it with a value of 5 or better (1 is "Criterion is not important" and 7 is "Criterion is very important"). We observe that the subjects consider the safety of the bank as the second most important criterion. We apply a non-parametric Wilcoxon test to analyze the mean differences between the safety of the bank and all other determinants. Only bank terms are more significantly ($p < 0.01$) important than the safety of the bank when people invest in deposits. In comparison to the other reasons for choosing a bank, the safety of the bank is significantly more important except for the quality

of advice. Here the safety of the bank holds a higher mean value of importance, but it does not differ significantly from the mean value of the quality of advice, i.e. we are able to show that the safety of the bank is one of the three top determinants when choosing a bank for investments in deposits. This is in line with the results by Steiger et al. (2001) who show that 57 % of their subjects quote the FDIC coverage as an important factor when deciding where to invest.

Imagine you will invest a considerable amount in deposits. How would you rank the following criteria of bank selection on a scale from 1 to 7 (1 is "Criterion is not important" and 7 is "Criterion is very important")?

Criterion	Mean	Standard deviation	Median	% with 5 or more points
Family/friends	4.63	1.81	5.00	58.4
Bank terms	5.85	1.73	7.00	84.8
Quality of advice	5.52	1.72	6.00	78.3
Safety of the bank	5.59	1.84	6.00	77.0
Bank's reputation	5.19	1.65	6.00	72.3
Your regular bank	4.63	1.80	5.00	56.9

Table 5: Demand for deposit insurance

With regard to our further analysis, participants are classified into high and low deposit security seekers using the median split technique (median=6) for the answers to the question how important the safety of the bank is for the investment decision in deposits. Subjects with values of 7 are designated as high and those with values of 5 or below are designated as low deposit security seekers. Then we use analysis of variance (ANOVA) techniques to examine differences among profiles between these groups. Table 6 shows means and p-values. The results indicate that people who are high deposit security seekers tend to be older, tend to be more risk averse concerning bank services, tend to be more involved in bank services, tend to trust people or institutions less easily, and tend to have a high belief in governmental authorities.

Dependent variable	Group	Mean	Median	Scale	P-value
Age	Low deposit security seekers	29.93	25.00	Years	0.00
	High deposit security seekers	38.25	31.00		
Risk aversion	Low deposit security seekers	-0.24	-0.79	Factor value	0.00
	High deposit security seekers	0.19	0.27		
Involvement	Low deposit security seekers	-0.16	-0.06	Factor value	0.00
	High deposit security seekers	0.10	0.66		
Trust	Low deposit security seekers	0.12	0.13	Factor value	0.01
	High deposit security seekers	-0.10	-0.54		
Belief in governmental authorities	Low deposit security seekers	2.83	2	Reversed seven-point scale	0.00
	High deposit security seekers	2.20	2		

Table 6: Differences between low and high deposit security seekers

Perceived deposit security in general

In hypothesis 3, we predict that although most of the respondents have a low knowledge of the deposit insurance system, the vast majority perceive their deposits as safe. We decide to measure the perceived deposit security with three newly developed items, as described above.

An exploratory factor analysis using SPSS is conducted for these three items. The results are shown in Table 7, which indicate that a one factor-structure emerges. Cronbach's alpha, indicating the internal consistency of the measure, is 0.636. Although Hair et al. (2006) suggest that the lowest limit for Cronbach's alpha should be 0.70, this result is quite acceptable given the small number of items and the exploratory nature of this research. The factor loadings range from 0.458 to 0.852 for perceived deposit security. Since all factor loadings are of an acceptable level (>0.4), evidence is provided for convergent validity of the measures (Steenkamp and van Trijp (1991)). Accordingly, the quality of measurement can be characterized as adequate, all three items are retained for further analysis. In accordance with hypothesis 3 the means for the items are very low which indicates that the deposits are perceived as safe.¹²

¹² Strictly speaking we measure how the subjects perceive the danger of a deposit loss. Therefore, the meaning of the scales is reversed, i.e. low values mean that the deposits are perceived as safe.

Item	Mean	Median	Factor loading	Initial Eigenvalue		
				Total	% of Variance	Cumulative of %
Deposits of German banks are jeopardized to get totally lost.	2.26	2.00	0.852	1.764	58.80	58.80
There is great danger that German banks will go bankrupt in the next five years.	2.92	3.00	0.570	0.746		
The security of deposits is not guaranteed for German banks.	2.96	3.00	0.458	0.490		

Table 7: Perceived deposit security: factor analysis

Perceived deposit security of individual banks

Hypothesis 4 predicts that German depositors' perception of deposit security varies with different banks, which can be substantively explained by differing banks' reputation levels. The measurement of the latent construct of reputation is adapted from the multi-item scales derived by Schwaiger (2004), who employs six reflective indicators for reputation (three for competence and three for sympathy). In order to assess the quality of the measurement model, we proceed analog to the evaluation of the other multi-item measures used in this study (see Appendix A2). All indicators feature standardized factor loadings exceeding 0.40. Cronbach's alpha reveals a value of 0.709 for competence and 0.754 for sympathy, i.e. all values surpass the commonly adopted threshold value of 0.70. A test where we use the Fornell and Larcker criterion (Fornell and Larcker (1981)) proves the discriminant validity of both dimensions of reputation ($p < 0.01$). Hence, sympathy and competence are distinctive components of reputation.

We test hypothesis 4 by estimating the following regression equation:

$$Y = b_1 X_1 + b_2 X_2 + e$$

where Y denotes the dependent variable "perceived deposit security", X_1 correspond to the first independent variable, "competence", and X_2 to the second independent variable, "sympathy". Random effects are accounted for by the error term e . The results obtained from estimating the regression approach are provided in Table 8.

About 26 % of the variance of perceived deposit security is explained by reputation ($R^2 =$

Independent variable	Regression coefficient	P-value	VIF
Competence	-0.394	0,000	2.163
Sympathy	-0.090	0.014	2.163

Table 8: Parameter estimates for competence and sympathy

0.261) while the complete model is significant ($p < 0.01$). Also the single effects of competence and sympathy on perceived deposit security turn out to be significant ($p < 0.05$). The coefficients are -0.394 for competence and -0.090 for sympathy. This means that perceived deposit security is considerably affected by bank's reputation which has a positive significant impact (the higher the values for perceived deposit security, the lower the subjects' perceived deposit security). And competence is a more important determinant of perceived deposit security than sympathy.

To account for the possibility of a high correlation between competence and sympathy (as they are both determinants of corporate reputation), we also examine the level of collinearity among these constructs. A common measure for collinearity in regression models is the variance inflation factor (VIF). The variable-specific VIF values are smaller than 10 for all variables, i.e. collinearity is not a problem in our analysis of corporate reputation (Hair et al. (2006)).

Table 9 shows how the subjects evaluate the different banks with regard to reputation and perceived deposit security. We apply a non-parametric Wilcoxon test for the mean difference between the banks' reputation. Additionally, we test for the mean difference between the banks' perceived deposit security. All differences between the banks' competence, sympathy, and perceived deposit security are significant ($p < 0.01$), except for the mean difference between the sympathy of savings banks and credit cooperatives as well as the perceived deposit security of credit cooperatives and Deutsche Bank. The first exception is not very surprising as our expert interviews indicate that people do not substantively differentiate between the sympathy of German savings banks and credit cooperatives. We explain the second exception by the differing levels of competence and sympathy between the Deutsche Bank and the credit cooperatives. Since the Deutsche Bank is perceived as more competent but less likeable and the perceived deposit security is partly explained by reputation, the lacking significance is not very surprising.

Determinant	Mean	Standard deviation	Median
Deutsche Bank competence	4.90	1.24	5.00
Deutsche Bank sympathy	3.43	1.39	3.33
Deutsche Bank perceived deposit security	2.43	1.07	2.33
Citibank competence	3.72	1.16	3.66
Citibank sympathy	2.75	1.18	2.66
Citibank perceived deposit security	3.17	1.17	3.33
Savings banks competence	4.61	1.27	4.67
Savings banks sympathy	4.19	1.55	4.00
Savings banks perceived deposit security	2.22	1.06	2.00
Credit cooperatives competence	4.47	1.23	4.67
Credit cooperatives sympathy	4.02	1.49	4.00
Credit cooperatives perceived deposit security	2.52	1.09	2.33

Table 9: Reputation and perceived deposit security

In general the results show that the subjects perceive their deposits as safe and rank the banks' reputation mostly above average. The most striking result for the individual reputation and perceived deposit security level of the considered banks are the relatively bad ratings for the Citibank. This indicates that from a management perspective the Citibank's reputation and perceived deposit security level clearly falls short of satisfactory levels. The Deutsche Bank shows a lower value for sympathy than the savings banks and the credit cooperatives but achieves the highest rank on competence. Thus, smaller institutions which operate just in the local markets have a higher emotional but a smaller cognitive appeal.

The highest perceived deposit security analyzed in this study can be found for the savings banks. We believe that the deposits of savings banks are perceived as very safe, since until 2005 the savings banks enjoyed explicit deposit guarantees provided by their local authorities¹³ and most of the subjects may not know that this has changed. Although the media elaborately

¹³ The "Gewährträgerhaftung" (guarantee obligation) made the local authority liable against others without restriction if their savings bank went bankrupt. Through the "Anstaltslast" (maintenance obligation) local authorities were obliged to capitalize their savings banks adequately, because they were responsible for the viability of an owned company (Hackethal (2004)).

reported about this change¹⁴, our anecdotal evidence supports this tentative explanation.

¹⁴ For example, the Handelsblatt, a German business newspaper comparable to the Financial Times, printed 221 articles which contained the words "Gewährträgerhaftung" and "Anstaltslast" between 2001 and 2007. During the same time period, the Tagesspiegel, a daily newspaper from Berlin, printed 48 articles about the same topic.

4 Conclusions

Using survey data from more than 700 depositors, we examine private investors' knowledge and perception of deposit insurance in Germany. The first objective of our study was to find out whether German depositors have a sound knowledge about the existing deposit insurance systems. It turns out that, although the current banking crisis was a topic frequently reported about over the last months (the crisis began in July 2007 and the survey was conducted between October and December 2007), depositors do not adequately know whether and how their deposits are protected. This is in line with the few previous studies. Our results reveal that more than 50 % of the depositors have nearly no knowledge about deposit insurance, which supports the hypothesis that German depositors are ill-informed about the deposit insurance systems.

The second objective of our study was to investigate the need for deposit security. Although the subjects do not know enough about the actual security of their deposits, they rank it, surprisingly, as an important criterion for their investment decisions in general.

Thirdly, our findings regarding the perceived deposit security indicate that German depositors feel relatively safe. This is a peculiarity since depositors perceive their deposits to be safe although they are not sufficiently informed about the systems. These findings imply that the subjects are either somehow vaguely aware of their widespread protection or are extremely trustful with regard to the deposits' security.

The fourth objective of our study was to investigate whether or not our subjects perceive a difference in security between different banks and, if so, whether or not a bank's reputation has an impact on the perceived security of its deposits. The findings reveal strong support for such an effect. Our research suggests that reputation has a considerable influence on depositors' perceived security. Customers of service firms like banks seem to have more difficulties in evaluating the quality of services and thus banks may be more likely to feel the effects of reputation loss than other types of firms. Hence, a bank's reputation may limit the magnitude of potential spillover effects of other banks' failures, i.e. if banks' reputational capital is large

enough an industry failure may be avoided.

Policy implications: The lack of depositors' knowledge is important with respect to the publication policy of deposit insurances. It is important that the terms and conditions of deposit insurance coverage are adequately publicized since without sufficient knowledge about the safety net panic-based bank runs still may occur. Accordingly, the legislator should pay attention to regularly publish features of the deposit insurance system. By doing so, one can ensure to limit the probability of bank runs in case of a bank failure. We are able to identify factors which discriminate depositors who have a basic knowledge of deposit insurance and those who do not. In particular the latter should be targets of publication campaigns.

Managerial implications: With regard to banks' marketing mix, banks should stronger accentuate the full coverage of their deposits. We suggest that banks stress their deposits' security and the safety system they belong to. Banks should therefore inform and explain their depositors about the safety of their deposits. This recommendation especially holds for banks which have a low reputation, like internet banks, which may not be perceived as fully safe. With this knowledge, depositors could be reassured that deposits are a safe way to invest money. Otherwise incidents like the latest banking crisis could seriously undermine depositors confidence.

This study also shows that depositors' perceived security is influenced by banks' reputations. Banks with a high reputation could potentially charge a premium for their deposits, e.g. by offering lower interest rates on deposits. Although both competence as well as emotional appeal seem to drive banks' perceived security, the role of competence appears to be stronger, i.e. competence may be a more important determinant of perceived deposit security than sympathy. However, as we do not know how costly it is for banks to improve their perceived competence in relation to improving their perceived sympathy, there are no simple answers on which of these two factors managers should focus on. Further research is needed to tackle this issue in detail.

It regularly involves significant costs to achieve a noticeable increase in corporate reputation. Therefore, managers need to consider whether it is financially viable to strive for higher levels

of reputation for certain depositors or depositor segments. Banks might aim for very high levels of reputation among their highly valued depositors but accept lower levels of reputation among their less valued customers.

Methodological implications: There are also methodological implications of our study. One natural extension of our paper would be a more sophisticated method to measure the perceived deposit insurance to enhance its validity in future studies. Furthermore, our study represents only a first step in the study of relationships between banks' reputations and perceived deposit insurance. For example, research could examine whether there are other influence factors that strengthen or weaken the relationship between a bank's reputation and perceived deposit insurance. It could be hypothesized that the relationship is weaker if depositors have more knowledge about deposit insurance. Additionally, it is not entirely clear whether reputation is a predictor or a consequence of other variables. This is comparable to studies which found that a higher financial performance leads to a good reputation, which in turn enhances a company's likelihood to perform well in the future.

Avenues for further research: Possibly the most natural extension of our survey is to conduct a similar empirical design in another country with a less wide depositor protection. Our study may also not be fully generalizable to all German depositors as people from other parts of Germany have different sociodemographic or psychographic characteristics. A further addition would be to ask German depositors again: Since the survey was done the international banking crisis has worsened and therefore we expect that depositors have become more cautious regarding their deposits. Since the banking crisis is more prevalent in the media, the public may have become more competent about deposit insurance.

A Appendix

A.1 Multi-item measures

Construct	Scale
Risk aversion	When buying bank products I avoid risky things. I want to be sure before I buy a bank product.
Involvement	Bank products/services are important for me. Bank products/services mean a lot to me. I have a high interest in bank products/services. Bank products/services have a high significance to me. In comparison to other products/services, bank products/services are of high concern for me.
Trust	It is easy for me to trust a person/thing. My tendency to trust a person/thing is high. I tend to trust a person/thing, even though I have little knowledge of it. Trusting someone or something is not difficult.
Reputation	... is a top competitor in its market. As far as I know ... is extremely recognized. I believe that ... performs at a premium level. ... is a bank I can identify with better than with other banks. ... is a bank I would regret more if it didn't exist any more than I would with other banks. I regard ... as a likeable bank.
Perceived deposit security	There is great danger, that German banks will go bankrupt in the next five years. The security of deposits is guaranteed for German banks. Deposits of German banks are jeopardized to get totally lost.

Table 10: Multi-item measures

A.2 Competence and sympathy: factor analysis

Item	Mean	Median	Factor loading	Initial Eigenvalue		
				Total	% of Variance	Cumulative of %
I believe that ... performs at a premium level.	4.06	4.00	0.807	1.935	64.49	64.49
As far as I know ... is extremely recognized.	4.75	5.00	0.746	0.656		
... is a top competitor in its market.	3.37	4.00	0.525	0.410		

Table 11: Competence: factor analysis

Item	Mean	Median	Factor loading	Initial Eigenvalue		
				Total	% of Variance	Cumulative of %
I regard ... as a likeable bank.	3.98	4.00	0.844	2.019	67.30	67.30
... is a bank I can identify with better than with other banks.	3.08	3.00	0.739	0.611		
... is a bank I would regret more if it didn't exist any more than I would with other banks.	4.38	4.00	0.567	0.370		

Table 12: Sympathy: factor analysis

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