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**SWITCHING COSTS, DEPOSIT INSURANCE AND DEPOSIT
WITHDRAWALS FROM DISTRESSED BANKS**

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Switching Costs, Deposit Insurance and Deposit Withdrawals from Distressed Banks

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Abstract: We study deposit withdrawals by retail customers of two large Swiss banks after these banks incurred substantial investment losses in the wake of the U.S. subprime crisis. Our analysis is based on survey data providing information on all bank relations of 1,475 households and documenting their reallocation of deposits in 2008-2009. We find that households are 16 percentage points more likely to withdraw deposits from a distressed bank than from a non-distressed bank. The propensity to withdraw deposits from a distressed bank is substantially reduced by household-level switching costs: Households which rely on a single deposit account, which do not live close to a non-distressed bank, or which maintain a credit relationship with the distressed bank, are significantly less likely to withdraw deposits. By contrast, we find that the withdrawal of deposits from distressed banks is unrelated to household coverage by deposit insurance. Our findings provide empirical support to the Basel III liquidity regulations which emphasize the role of well-established client relationships for the stability of bank funding.

Keywords: Liquidity Risk, Bank Run, Market Discipline, Deposit Insurance, Switching Costs

JEL Codes: D14, G21, G28

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1. Introduction

The recent financial crisis has demonstrated forcefully that the withdrawal risk of wholesale and retail funds may jeopardize the liquidity position and solvency of banks leading to costly policy interventions (e.g. Northern Rock in the U.K. or Washington Mutual in the U.S.). The role of liquidity risk in the recent crisis has led policy makers in the U.S. and Europe to introduce two key policy changes: First, they have harmonized minimum liquidity requirements for banks within the regulatory framework of Basel III. Second, they have substantially expanded the coverage of deposit insurance; e.g. from 100'000 to 250'000 Dollars for deposits with U.S. banks.

The Basel III liquidity requirements discriminate strongly between “stable” and “unstable” customer deposits. The regulations assume that customer deposits which are embedded in a well-established bank-client relationship are less subject to withdrawal risk (BIS, 2013). This emphasis of regulators on the scope of bank relations is consistent with theory and evidence suggesting that retail bank customers are subject to substantial switching costs (Sharpe, 1997). However, to our knowledge there is no publicly available evidence documenting to what extent the run off rates of retail deposits from distressed banks are dependent on the intensity of the bank-client relationship.

Generous deposit insurance coverage should mitigate the risk of bank-runs, whether they are driven by panic (Diamond and Dybvig, 1983) or are based on information about bank fundamentals (Chari and Jagannathan, 1988) or bank behavior (Calomiris and Kahn, 1991; Diamond and Rajan, 2001). But does deposit insurance really mitigate withdrawal risk from the retail depositors it is targeted to? Recent evidence (Iyer and Puri, 2012; Iyer et al., 2013) documents that deposit insurance does affect the propensity of households to run on small cooperative banks in an emerging economy. However, to our knowledge, there is no evidence which confirms this role of deposit insurance in bank runs on large commercial banks in an OECD economy.

In this paper we examine - at the household level - how switching costs and deposit insurance affect the propensity of retail clients to withdraw deposits from large, distressed commercial banks. We study deposit reallocations across banks in Switzerland during 2008-2009, exploiting a “natural experiment”: The two largest Swiss commercial banks (Credit Suisse and UBS) suffered substantial losses during the recent financial crisis, leading to recapitalizations of both banks and a government bailout of one bank (UBS). Importantly, the losses of the two large banks were driven by asset write downs on financial investments and trading losses in the wake of the U.S. subprime crisis, and were largely unrelated to their domestic retail banking operations. Indeed, their domestically focused competitors (state-owned commercial banks and regional savings banks) suffered no losses at all, earning stable net interest incomes throughout the crisis. Thus, the distress situation at the two large Swiss banks in 2008-2009 can be viewed as an exogenous shock to their retail clients in Switzerland which we study here.

We use survey data which covers all bank relationships of 1,475 households in German-speaking Switzerland, and provides information on the reallocation of assets across banks in 2008-2009. The survey is representative of the underlying population with respect to the household characteristics which are most important for our study: Household wealth, household location, and pre-crisis deposit relations with banks. As the majority of Swiss households maintain multiple bank accounts, we can compare the withdrawal behavior from distressed banks to that from non-distressed banks for the same households. By doing so we can control for unobserved heterogeneity in the clientele of distressed versus non-distressed banks.

We present four main results: First, we document that households have a strong propensity to withdraw deposits from distressed banks: Our estimates suggest that households are 16 percentage points more likely to withdraw deposits, 11 percentage points more likely to withdraw at least half the deposits and 7 percentage points more likely to close the account with a distressed bank compared to a non-distressed bank. Second, we show that the effect of distress on deposit

withdrawals is five times higher in the case of a publicly announced government bailout (UBS) compared to the case where the distressed bank was not bailed out (Credit Suisse). Third, we show that the propensity to withdraw deposits is substantially lower for households which faced high switching costs: Households with no other bank account, households which are geographically distant from a non-distressed bank and households which have a strong relationship with the distressed bank prior to the crisis. Fourth, we document that the propensity to withdraw deposits from distressed banks is unrelated to household-level deposit insurance coverage.

Our findings contribute primarily to the empirical literature on bank runs and market discipline. Studies which examine bank balance-sheet data provide evidence that distressed banks suffered stronger deposit outflows during the Great Depression (Saunders and Wilson, 1996, Calomiris and Mason, 1997), the U.S. Savings and Loan crisis (Goldberg and Hudgins, 2002), the financial crises in Latin America in the 1980s and 1990s (Peria and Schmukler, 2001; Schumacher, 2000) as well as more recently in Latin America (Oliveira et al., 2013) and Eastern Europe (Karas et al., 2013; Hasan et al., 2013). Studies of bank-level interest rates provide evidence for market discipline by relating bank risk to changes in deposit interest rates for uninsured deposits (Demirguc-Kunt and Huizinga, 2004; Ellis and Flannery, 1992; Hannan and Hanweck, 1988).

We contribute to this literature by providing – to our knowledge – the first household-level analysis of deposit withdrawals from large, distressed commercial banks in an OECD economy. Our study complements the work of Iyer and Puri (2012) and Iyer et al. (2013) who provide depositor-level evidence for panic-based and information-based bank runs in the context of a failing Indian cooperative bank. Iyer and Puri (2012) find that in the case of a panic-based run uninsured depositors are more likely to withdraw, while clients with credit relationships to the bank are less likely to withdraw. Iyer et al. (2013) document that - in the case of an information-driven run - well-informed clients (e.g. staff and borrowers) as well as clients with uninsured balances

are more likely to withdraw their deposits. We re-examine these findings in a representative sample of households from a high-income country, where households typically have multiple bank relationships. We document that the ready-availability of other bank accounts strongly affects the propensity of retail clients to withdraw deposits from a distressed bank. We also document that among retail clients of large, distressed commercial banks in high-income countries, the coverage by deposit insurance may not mitigate withdrawal risk.

Our findings are also related to the industrial organization literature which highlights the importance of switching costs in retail banking markets. Sharpe (1997) argues that switching costs for existing bank clients reduces the effective competition between banks for retail deposits. Exploiting differences in migration levels across regional banking markets (e.g. a proxy for customers with low switching costs), he documents that a high proportion of movers increases the deposit rates paid by banks. These findings have been confirmed by Carbo-Valverde et al. (2011) and Hannan and Adams (2011).¹ Kiser (2002) documents that retail bank customers in the U.S. (very) rarely change their main bank relationship. Her evidence suggests that both preferences for differentiated products (e.g. customer service) as well as explicit switching costs (geographic location) are responsible for the stickiness of household-bank relations. We contribute to this literature by documenting the importance of switching costs in mitigating the withdrawal risk of retail deposits at distressed banks.

The remainder of the paper is organized as follows. Section 2 describes the institutional background to the paper. Section 3 presents the data and methodology. Section 4 contains the empirical results. Section 5 concludes.

¹ Kim et al. (2003) estimate the size of switching costs for borrowers in Norway.

2. Institutional Background

In this section we argue that the 2007-2009 global financial crisis gave rise to a “natural experiment” in the Swiss retail banking market which allows us to study how depositors react to exogenous shocks to the solvency of large commercial banks: First, the two largest Swiss commercial banks suffered substantial distress during this period, while the competing commercial and savings banks did not. Second, the distress of the two large banks was caused by developments which are unrelated to their domestic retail market.

In Switzerland, the retail banking market is served by three main groups of banks: The two large banks Credit Suisse and UBS compete with 24 regionally operating state-owned commercial banks (Cantonal Banks) and over 400 regional savings banks.² At the end of 2007 Credit Suisse and UBS together held 30 percent of domestic customer deposits, while the cantonal banks accounted for 32 percent and the savings banks for 30 percent of the deposit market. In addition to these three major bank groups a limited number of other banks, such as the state-owned postal bank³, smaller nationwide commercial banks and specialized consumer lenders operate in the Swiss retail market.

Figure 1 here

In the wake of the U.S. subprime crisis the two large Swiss banks suffered massive trading losses and asset-write downs. Figure 1 shows that between 2007 and 2008 the two large banks had to write down their financial investments and tradable assets by over 30 billion Swiss Francs (1 CHF = 0.87 USD in October 2008), while they also incurred trading losses of 10 billion CHF in 2008. In contrast to Germany where many state-owned banks (Landesbanken) had also heavily invested in U.S. asset backed securities (see Puri et al., 2011), this was not the case for the

² There are currently 321 mutually owned Raiffeisen banks and 66 other regional savings banks.

³ For the following analysis, cantonal banks and the postal bank were aggregated into one category (state-owned banks).

state-owned commercial banks (or savings banks) in Switzerland. Indeed, as both of these banking groups have limited financial investments and tradable assets, they incurred negligible asset-write downs or trading losses (see Figure 1).

The net interest income of the two large banks also declined by more than one-third during the financial crisis (2008 and 2009 compared to 2006 and 2007). By contrast, Figure 1 (Panel D) shows that the net-interest income of the domestically focused cantonal banks and savings banks remained stable during the crisis period. As a result of the low interest rate policy of the Swiss National Bank, interest margins in the domestic retail market decreased from 2008 onwards. However, this decrease in interest margins was compensated by a substantial increase in the volume of retail (mortgage) lending activity by the cantonal banks and savings banks.

The combined losses of 51 billion CHF by UBS and Credit Suisse during the financial crisis wiped out a substantial share of their pre-crisis equity (69 billion CHF at the end of 2007). In response to the losses incurred both banks were forced to raise additional shareholder capital. Credit Suisse secured a capital infusion of CHF 10 billion in October 2008 from a group of large private investors (Credit Suisse, 2008). UBS had to absorb substantially higher losses and required multiple capital infusions: UBS raised USD 11.5 billion of equity capital (mainly from sovereign wealth funds) at the end of 2007 and another USD 16 billion through a rights offering to its shareholders in mid-2008 (UBS, 2007; UBS, 2008a). Despite these capital infusions UBS required a government bailout in October 2008. The Swiss National Bank agreed to take over up to USD 60 billion of illiquid assets from UBS's balance sheet. At the same time, UBS received CHF 6 billion of additional capital in the form of mandatory convertible notes fully placed with the Swiss Confederation (UBS, 2008b). This direct government intervention was the only bailout in the Swiss banking industry during the recent financial crisis.

Figure 2 here

Despite the recapitalizations of the two large banks, and the eventual bail-out of UBS, both banks were subject to discipline by market investors. Figure 2 compares the yields of UBS and Credit Suisse to that of the other Swiss banks with public debt. At the onset of the crisis there was no substantial difference in the yields for the two large banks compared to the other Swiss banks. Between mid2007 and the end of 2008 the spreads for Credit Suisse and UBS and Credit Suisse bonds rose by more than 250 and 350 basis points respectively, while the yields on other Swiss banks hardly increased at all.

In the following, we examine to what extent retail customers disciplined the two large, distressed banks during the financial crisis by withdrawing their deposits. We analyze whether retail clients (like market investors) disciplined the bailed-out bank (UBS) more than the less distressed bank (Credit Suisse). Most importantly, we examine the heterogeneity of deposit withdrawals across different households: Are withdrawals from the two large, distressed banks related to individual household-level switching costs and/ or coverage by deposit insurance?

3. Data and methodology

3.1. Household survey data

Our analysis is based on a survey of households in the German-speaking area of Switzerland. This survey was conducted by GfK, a leading international market research institute, on behalf of the University of St. Gallen in spring 2011 and covers 1,475 households.⁴ The survey sample was constructed to be representative of the underlying population with respect to gender,

⁴ The sample size corresponds to 0.05% of the targeted population in Switzerland, which is an adequate coverage compared to large surveys in the U.S. or the EU (e.g. the Health and Retirement Study in the U.S. covers about 0.03% and the Survey of Health, Aging and Retirement in Europe about 0.04% of the targeted population).

age and geographical locations.⁵ Appendix 1 (Panel A) shows furthermore that the survey is representative of the Swiss population in terms of income, wealth and education.

The survey was implemented with telephone interviews (in German) which lasted on average 15 minutes. The interviewees were not remunerated for their participation. However, at the beginning of each interview respondent was explicitly told about the academic purpose of the survey in order to encourage participation and reduce the number of non-responses to what may be viewed as sensitive questions on financial status and financial behavior.⁶

The survey was designed to elicit information on the bank relationships maintained by each household and their reallocation of funds between banks during the financial crisis.⁷ Information was also gathered on socioeconomic characteristics (e.g. age, education, gender, household income and wealth), financial literacy and knowledge about deposit insurance, behavioral traits (risk aversion and time preferences) and the geographical location of the households. We match the location of each household with hand-collected information on the geographical location of all bank branches in Switzerland.⁸

Figure 3 here

The 1'475 households in our sample report a total of 2'959 bank relationships of which 2,630 feature either a savings or current account. The majority of households (59%) in our sample have multiple bank relationships. Figure 3 illustrates the network of deposit relationships of

⁵ Respondents were limited to those with an age of 20-74 years of age, with sufficient German skills to be able to understand the questions, and to the respondents which were not self-employed.

⁶ In total 9'361 households were contacted, of which 6'696 refused to participate and 1'151 interviews were terminated early (primarily due to a lack of German language knowledge). According to GfK the response rate for the survey is comparable to other academic-orientated surveys and higher than that for regular market research surveys in the field of financial services.

⁷ The questionnaire is available upon request.

⁸ We use data for the network of bank branches in Switzerland as per December 2012. Distance calculations are based on zip code information for both households and bank branches, and computed through the Google maps API (also see Brown and Hoffmann, 2013).

households in our sample prior to the financial crisis. Of the 1'475 households in our sample, 495 (34%) had deposits (savings or current account) with a large bank (Credit Suisse or UBS) before the financial crisis. Among these households, 242 also had a deposit account with a state-owned bank, a savings bank or another non-distressed bank. Appendix 1 (Panel B) shows that deposit market shares across banks calculated on the basis of the number of bank relationships derived from the survey are consistent with market shares based on official deposit volume data of the Swiss National Bank. This again points to the representativeness of our survey in terms of household characteristics relevant to our analysis.

For each household in the survey we elicit whether they reallocated assets across banks during the financial crisis. Specifically, each respondent was asked whether he /she “(...) *reallocated bank assets during the financial crisis, i.e. at the end of 2008 or in 2009. With reallocation we understand the transfer of (savings) deposits or securities from one bank to another.*” All households which replied that they did reallocate funds were subsequently asked which bank they withdrew funds from. For each bank relationship that assets were withdrawn from respondents were asked which share of their assets they withdrew from this bank (less than 25 percent, 25-50 percent, 50-75 percent, more than 75 percent), what type of assets they withdrew (deposits, securities portfolios, voluntary retirement savings) and which bank they transferred the assets to. Finally, all respondents which reallocated funds were asked to report their motives for doing so.

The main dependent variable in our analysis is the binary variable *Withdrew deposits* which takes on the value of one if the household shifted deposits away from a bank during 2008/2009 (zero otherwise). In order to test the sensitivity of our results we employ two further indicators of withdrawals. The variable *Withdrew deposits (>50%)* takes on the value of one if at least 50% of the deposits held at a bank were reallocated to another bank (zero otherwise). Furthermore, the variable *Account closed* takes on the value of one if the household not only withdrew all of its deposits from the bank but also closed the corresponding account. The main explanatory variable

in our analysis is the variable *Distress* which takes on the value one for a deposit relationship with one of the two large distressed banks prior to the crisis and zero for a deposit relationship with any other bank prior to the crisis. Appendix 2 provides definitions of all variables employed in our analysis. Appendix 3 provides summary statistics and shows that 5% of the pre-crisis deposit relations in our sample experience a withdrawal during the crisis, 3% experience a withdrawal of more than 50%, and 2% of deposit accounts are closed. In total 113 of the 1'475 households in our survey reallocated their deposits during the crisis

We employ three measures of **switching costs** to examine whether such costs deter households from withdrawing deposits from distressed banks. Our first indicator of switching costs is the variable *Single account* which takes on the value of one if a respondent had only one deposit account prior to the crisis. Having only one deposit account implies high switching costs for two reasons: First, the household would have to incur the costs of opening a second account in order to reallocate deposits. Second, the household is likely to be using the existing account for all payment and savings transactions, implying high costs of switching these services to another bank. The variable *No local banks* captures the geographical distance between the household and non-distressed banks and thus the transaction costs involved in opening up a new account. It takes on the value one if there is no branch of a non-distressed bank in the same location (same Zip-code) as the household. *Credit linkage* provides us with a further indicator of the scope of the services used within a bank relationship. It indicates whether the household had a consumer loan or mortgage loan with the bank at the beginning of the financial crisis. Appendix 3 shows that in our sample 52% of households have a single deposit account prior to the crisis, 23% of households are not located close to a branch of a non-distressed bank, and 22% of the bank relations have a credit linkage.

To examine whether **deposit insurance** reduces the propensity of depositors to withdraw from distressed banks we employ an indicator of deposit insurance coverage as well as an indica-

tor of household knowledge about deposit insurance. All banks that have at least one branch in Switzerland are required by law to participate in the depositor protection scheme.⁹ This scheme guarantees up to CHF 100'000 per each depositor and bank. The survey data does not provide information on the volume of deposits held by household's with each of their banks. However, we do have information on the total financial wealth of each household. We classify a household as one with *Insurance coverage* if total financial wealth (and thus also the volume of deposits at any bank) is below CHF 100'000 CHF.¹⁰ Appendix 3 shows that 72% of the households in our survey are covered according to this indicator. The survey elicited the knowledge of respondents about deposit insurance protection: Households were asked if they knew whether a deposit insurance scheme exists in Switzerland or not. In our analysis we use the binary variable *Insurance knowledge* which takes on the value of one if the household knew about the existence of the deposit insurance scheme. This is the case for 71% of the households in the survey.¹¹

3.2. Identification and estimation

As illustrated in equations [1a-1c] we estimate a linear parametric model using ordinary least squares where the dependent variable $Withdraw_{j,i}$ indicates whether household i withdrew deposits from its relationship j . In all three empirical models the estimate β for the variable $Distress_{j,i}$ captures the propensity of households to withdraw deposits from distressed banks as opposed to non-distressed banks. In all models the vector of household-level socioeconomic

⁹ See www.einlagensicherung.ch/en for details of foreign banks' requirements to participate in the Swiss depositor protection scheme.

¹⁰ In unreported robustness checks, we divide overall household wealth by the number of deposit relationships a household had and use *Low income* (household income below CHF 7'000 per month) as an alternative measure of deposit insurance coverage. Both indicators yield qualitatively similar results to *Insurance coverage*.

¹¹ Those households which answered correctly were then asked whether they knew how high the coverage limit of the scheme was (100'000 CHF) and whether it had been changed in the prior three years (yes, increased from 30'000 CHF in 2008). Only 25% of households in the sample answered both of these questions correctly. This finding is consistent with recent survey evidence suggesting that households are not well informed about the coverage by and procedures of deposit insurance schemes across Europe (Bartiloro, 2011; Sträter *et al.*, 2008).

characteristics X_i accounts for observable heterogeneity between households which have a deposit account with a distressed bank and households that have deposit accounts with non-distressed banks. A direct comparison between clients of distressed and non-distressed banks reveals that, on average, the clients of distressed banks have higher income, higher wealth and are better educated (see Appendix 4). This disparity between the two groups can be explained by the fact that the distressed banks are large commercial banks which have a stronger focus on wealth management services as compared to state-owned banks or regional banks. This vector includes indicators of household income and wealth, age, gender, education, nationality, risk aversion, time preferences and geographical proximity to branches of the two distressed banks. Appendix 2 and 3 provide definitions and summary statistics of these household-level control variables.

In models [1b, 1c] the variables $Switching_{j,i}$ or $Insurance_i$ capture our indicators of switching costs and deposit insurance described above. Thus the parameter estimates of δ for the interaction term $Distress_{j,i} \cdot Switching_{i,j}$ or $Distress_{j,i} \cdot Insurance_i$ capture whether deposit insurance or switching costs reduce the propensity of households to withdraw from a distressed bank account – more than it reduces their probability to withdraw from an account of a non-distressed bank.¹² We calculate heteroskedasticity-robust standard errors by clustering at the regional level.¹³

$$[1a] \quad Withdraw_{j,i} = \alpha + \gamma \cdot X_i + \beta \cdot Distress_{j,i} + \varepsilon_{j,i}$$

$$[1b] \quad Withdraw_{j,i} = \alpha + \gamma \cdot X_i + \beta \cdot Distress_{j,i} + \theta \cdot Switching_{j,i} + \delta \cdot Distress_{j,i} \cdot Switching_{j,i} + \varepsilon_{j,i}$$

$$[1c] \quad Withdraw_{j,i} = \alpha + \gamma \cdot X_i + \beta \cdot Distress_{j,i} + \delta \cdot Distress_{j,i} \cdot Insurance_i + \varepsilon_{j,i}$$

¹² Note that the main effect of *Insurance* is absorbed by household covariates X_i in equation [1c]. By contrast the main effect of *Switching* can vary within households (for the indicators of relationship scope) and is thus included in equation [1b].

¹³ Switzerland is partitioned into 106 MS regions which largely represent local labor markets.

Although we control for a wide array of household characteristics in models [1a, 1b, 1c] it is questionable whether we observe and correctly measure all relevant variables that jointly affect withdrawals of deposits and the decision to have a relationship with a distressed (i.e. large) bank. In order to control for a potential bias due to unobserved heterogeneity of distressed bank clients versus non-distressed bank clients we also conduct our analysis on a sample of households that had bank relationships with at least one distressed bank and at least one non-distressed bank prior to the crisis. This allows us to control for unobserved heterogeneity at the household level with household fixed effects α_i .

The estimated effect of $Distress_{j,i}$, $Distress_{j,i} \cdot Switching_{i,j}$ or $Distress_{j,i} \cdot Insurance_i$ in the subsample of households with bank relationships at distressed and non-distressed banks is cleanly identified as it is not biased by unobserved heterogeneity across holders of accounts with the distressed and non-distressed banks. However, this identified effect is not representative for the average effect across all households. In particular, if we conjecture that switching costs affect the propensity of households to withdraw deposits then the estimated effect in this subsample of multiple account holders should be higher than in the full sample including households with only one deposit account. In the following we therefore provide (where applicable) estimates for the full sample of deposit accounts as well as for the subsample of accounts held by households with accounts at both distressed and non-distressed banks.

4. Results

4.1 Do depositors discipline distressed banks?

We argued above that the losses of the two large Swiss banks during 2007-2009 constitute a “natural experiment” to study deposit withdrawals from distressed banks as (i) they were the only Swiss banks absorbing losses during the financial crisis which threatened their solvency and (ii) these losses were unrelated to their domestic retail operations. If this is the case we should observe that deposit withdrawals during the financial crisis are largely confined to the two large banks. Tables 1 and 2 document that this is the case.

Panel A of Table 1 shows that in the full sample of pre-crisis deposit relations only 5% experienced withdrawals of deposits during the crisis (*Withdrew deposits*). However, for distressed banks the propensity to withdraw was fourteen-times higher (17.6%) than for non-distressed banks (1.3%). Considering only the most substantial deposit withdrawals (*Withdrew deposits* (>50%)) the propensity to withdraw from distressed banks is 11.4% compared to 0.8% at non-distressed banks. Moreover, 7.3% of deposit accounts at distressed banks were closed (*Account closed*) compared to 0.4% at non-distressed banks. The multivariate analysis presented in Panel A (columns 1-3) of Table 2 confirm the economic magnitude and statistical significance of these estimates.

Table 1 (Panel B) presents univariate results for the subsample of households with deposit accounts at distressed and non-distressed banks prior to the crisis. The results documents that the differences in deposit withdrawals between distressed banks and non-distressed banks are not driven by heterogeneities in the clientele of the two large banks compared to other banks. The differences in withdrawals from distressed and non-distressed banks are even higher in the subsample of households: These households are 23 percentage points more likely to withdraw from their distressed bank account, are 15 percentage points more likely to withdraw a substantial share of these deposits, and are 10 percentage points more likely to close their account with a distressed bank. The multivariate estimates presented in Panel A of Table 2 (columns 4-6) again confirm these univariate results.

Table 1 here

Table 2 here

How representative are the withdrawal rates of our survey households with regard to the effective figures observed for domestic deposit funds in Switzerland between 2007 and 2009? Cross-checking with the aggregated deposits statistics released by the Swiss National Bank, we observe that between 2007 and 2009 the two large banks (CS and UBS) lost 19 percent of their deposit funds from Swiss clients. This figure compares well to the withdrawal propensity of households in our survey as shown in Table 1 and Table 2 (Panel A).

Figure 2 suggests that bond-market investors disciplined the bailed out bank (UBS) significantly more than the other distressed large bank (Credit Suisse). Table 2 (Panels B and C) documents similar behavior among retail depositors. In Panel B we compare withdrawals from the bailed-out bank (UBS) to withdrawals from non-distressed banks.¹⁴ Controlling for heterogeneity across households with household-level covariates our estimates in columns (1-2) suggest that households are 22 percentage points more likely to withdraw deposits and are 15 percentage points more likely to withdraw a substantial share of deposits from UBS than they are from non-distressed banks. Moreover, the column (3) estimates show that households are 11 percentage points more likely to close their account with UBS than with a non-distressed bank. The column (4-6) results confirm these significant estimates in the sample of deposit accounts of households with an account at distressed and non-distressed banks. The survey results are again consistent with the outflows of customer funds experienced by UBS in the wake of the financial crisis. For their domestic Swiss clients, UBS had to absorb in 2008 and 2009 net money outflows of 62 billion Swiss francs or 19 percent of the pre-crisis level of invested assets for these clients.

¹⁴ In this analysis we exclude all bank relationships with the distressed bank that was not bailed out (Credit Suisse).

In Panel C we replicate this exercise, comparing withdrawals from the distressed bank which was not bailed out (Credit Suisse) to withdrawals from non-distressed banks.¹⁵ Here, our estimates suggest a much weaker effect of bank distress on deposit withdrawals. The column (1-3) results show that households are only 4 percentage points more likely to withdraw deposits from the distressed bank. Moreover, the propensity to withdraw more than half of the deposits or close the deposit account is not significantly higher at Credit Suisse compared to a non-distressed bank.

The Table 1 and 2 results suggest that retail clients disciplined distressed banks by withdrawing their deposits and closing accounts. However, the magnitude of market discipline is strongly dependent on whether the bank receives a government bailout or not. This finding is consistent with recent evidence suggesting that publicly announced regulatory intervention is key to triggering deposit withdrawals by retail depositors. Shin (2009) documents that retail deposit withdrawals from the UK bank Northern Rock were triggered by the liquidity support to the bank by the Bank of England in September 2007. In their study of deposit withdrawals from a failed Indian cooperative bank Iyer et al. (2013) document that (uninformed) depositors only started to withdraw their funds in a substantial manner after the Reserve Bank of India made public that they would intervene in the bank.

4.2. Do switching costs or deposit insurance mitigate withdrawal risk?

In this section we study the heterogeneity of withdrawal behavior across different types of households to examine how household-level switching costs and deposit-insurance coverage affect the propensity to withdraw from distressed banks. In Table 3 we commence our analysis with a univariate comparison of the (113) households which reallocated deposits during the re-

¹⁵ In this analysis we exclude all bank relationships with the bailed out bank (UBS).

cent crisis to the (1319) households which did not reallocate deposits from their pre-crisis accounts.

Panel A provides full-sample comparisons of withdrawers versus non-withdrawers. The panel shows that households which withdraw deposits were on average less likely to be covered by deposit insurance and more likely to know about the existence of the deposit insurance scheme. Households which withdraw were also less likely to have single deposit accounts and less likely to live in areas where no branch of a non-distressed bank was located.

The Table 3, Panel A results are likely driven by heterogeneity in household characteristics for clients large banks compared to clients of other banks in Switzerland (see Appendix 4). To account for heterogeneity in client composition, Panel B of Table 3 repeats the comparison of withdrawers versus non-withdrawers for the subsample of households with accounts at distressed and non-distressed banks. In this table we find no difference in insurance coverage between households that withdraw and those that don't. However we do find a significant difference in the incidence of credit linkages between households and their banks: Households which withdraw deposits are less likely to have a credit linkage with one of their banks.

Table 3 here

In Tables 4 and Table 5 we provide multivariate difference-in-difference analyses of the impact of switching costs and deposit insurance on the propensity to withdraw from distressed (as opposed to non-distressed) banks. In light of the findings in Table 2 we limit the distressed bank relations to those with the bailed-out bank (UBS) and compare withdrawals from this bank to withdrawals from non-distressed banks.¹⁶ The dependent variable employed in both tables is

¹⁶ Relations with the distressed, but not bailed out bank (Credit Suisse) are omitted from these analyses.

Withdrew deposits. Unreported robustness tests confirm the results when we consider substantial deposit withdrawals (*Withdrew deposits (>50%)*) or account closures (*Account closed*).

Table 4 here

In Table 4 we examine whether switching costs, as measured by single vs. multiple bank accounts, the geographical proximity to non-distressed banks or a credit relationship with the distressed bank deter households from withdrawing deposits from distressed banks. In column (1) of the table we compare the withdrawal propensity of households with single bank accounts to those with multiple bank accounts. This specification is conducted on the full sample of bank relations with either UBS or a non-distressed bank. The estimated interaction term *Distress * Single account* is negative, statistically significant and economically large (22 percentage points). This result suggests that the lack of an alternative deposit account reduces the propensity to withdraw from a distressed bank by more than two-thirds.

In column (2) of Table 4 we compare the withdrawal propensity of households which are geographically distant from non-distressed banks to that of households which are close to other banks. As described in section 2, the variable *No local banks* is a dummy variable taking the value of one if no non-distressed bank has a branch within the same ZIP code area as the household. We conjecture that the geographical distance to a non-distressed bank imposes higher switching costs on households - especially for households which would have to open a new bank account in order to reallocate funds away from a distressed bank. Our analysis is thus conducted on the sample of households with single bank relations to either the bailed-out bank or non-distressed banks. The estimate displayed for the interaction term *Distress * No local banks* in column (2) is negative, significant and economically relevant. Households which have only a deposit account with the bailed out bank (UBS) and are not geographically close to other banks are almost 9 per-

centage points less likely to withdraw than similar households which are geographically close to non-distressed banks.

In columns (3-4) of Table 4 we document that depositors which have *Credit linkages* with a bank are substantially less likely to withdraw deposits when the bank is in distress: The economic magnitude of the coefficient for *Distress* Credit Linkages* is negative, statistically significant and large (14 percentage points). The column (4) results shows that this estimated effect of credit linkages estimation is even larger in our preferred sample of households with deposit accounts at both the bailed out bank and a non-distressed bank: The coefficient reported in column (4) for the interaction term *Distress * Credit linkage* suggests that mortgage or consumer loans reduce the probability of withdrawing deposits from the distressed bank by 21 percentage points more than from any non-distressed bank.

Overall the results of Table 4 point to a pivotal role of switching costs in mitigating the withdrawal risk of retail deposits from large distressed commercial banks. These results speak to the new Basel III liquidity requirements which assume substantially lower run-off rates for “stable” deposits in well-established bank-customer relations.

Table 5 here

In Table 5 we compare deposit withdrawals for households which are covered by deposit insurance with deposit withdrawals of households that are not covered by deposit insurance. Again we conduct our analysis on the comprehensive sample of all deposits accounts at the bailed out bank or non-distressed banks (columns 1-2) as well as on our preferred sample of households with deposit accounts at the bailed out bank and at least one non-distressed bank (columns 3-4).

If deposit insurance does reduce the propensity of depositors to withdraw from distressed banks we expect the estimates for the interaction term *Distress * Insurance coverage* in Table 5 to display significant negative coefficients. This is not the case. In the full-sample estimates in column (1) the estimated effect differential effect of deposit insurance is negative but comparatively weak (6 percentage points) and imprecisely estimated. The magnitude and statistical precision of the estimate does not increase if we limit the sample to households with knowledge about the deposit insurance scheme (column 2). Moreover, in our preferred sample of households with deposit accounts both at the distressed and non-distressed banks (columns 3-4) the estimated effect of deposit insurance coverage is negligible in terms of economic magnitude and statistical significance.

The Table 5 results cast doubt on the conjecture that deposit insurance reduces the propensity of retail depositors to shift funds away from large, distressed commercial banks. These findings are at odds with the results of Iyer et al. (2013) who find that in India depositors with uninsured deposits withdraw more from a failing bank than those with fully insured deposits. However, in contrast to Iyer et al. (2013) our analysis focuses on a large and systemic relevant bank in a developed country and not on a bank run on a small- and medium sized financial institution. These opposing results suggest that retail clients act differently depending on the nature and size of the distressed bank. One potential explanation could be a lack of trust in the existing deposit scheme and that it will cover all losses incurred by bank clients as guaranteed.¹⁷

4.3. Why do households withdraw and where do they shift their money to?

Our findings in Tables 1 and 2 document that a substantial share of retail clients withdraw deposits from distressed banks and that the withdrawal risk for distressed banks is much higher

¹⁷ In the case of Switzerland, the maximum loss incurred per bank that is still covered under the deposit insurance scheme is limited to a maximum of six billion Swiss francs, whereas UBS and CS had at the end of 2008 domestic customer funds of more than 287 billion Swiss francs outstanding.

in the case of a government bailout. One reason why a government bailout may trigger “panic” among depositors is that it is a very salient signal that their savings may be at risk.¹⁸ An alternative explanation is that retail clients are angered or disappointed by a bank which has to be bailed out with public funds.

Management and consumer research provides evidence that company crises damage organizational reputations and affect how clients interact with a company (see e.g. Jorgensen, 1996, or Pearson and Clair, 1998). During the recent financial crisis banks and their senior executives have repeatedly been subject to public anger. For example, public outcry over the involvement of Barclays Bank in the recent LIBOR scandal contributed to the dismissal of their CEO in 2012.¹⁹ It is thus reasonable to assume that the withdrawal of deposits from distressed banks in our context - and especially withdrawals from the bailed out bank - were at least partly driven by anger at the bank’s corporate policies, as opposed to fear over losing savings.²⁰

Table 6 here

Table 6 documents that anger over its corporate policies was indeed a major motivation for households to withdraw from the bailed-out bank. In the survey, all households which withdrew funds from a bank during the crisis were asked about their motivations for doing so. Specifically respondents were asked to what extent they agreed (on a scale of 0 to 4) to the propositions that they withdrew their funds because they (i) were offered better conditions or better services at other banks, (ii) feared that their funds were at risk at the current bank, or (iii) because they did not agree with the corporate policy of the bank although the bank is safe. Table 6 reports the share of households who list competitors’ conditions, bank risk or corporate policy as their

¹⁸ See Brown et al. (2013) for experimental evidence on the role of salience in bank runs.

¹⁹ See Financial Times (2013).

²⁰ See Teichert and Wagenführer (2012) for survey evidence of changes in attitudes of retail clients towards German banks and how this impacts their intentions to switch banks in the aftermath of the financial crisis.

strongest motive to withdraw funds.²¹ We hereby compare 79 households which withdrew only from the bailed-out bank (UBS) to 18 households which withdrew only from non-distressed banks.

The Table 6 results suggest that bank risk and anger over corporate policy are equally important motivations for retail clients to withdraw funds from UBS. In particular, clients who closed their account with the bailed-out bank are more likely to do this out of anger over corporate policy than concerns about bank risk. By contrast, among households which withdraw a substantial share of their deposits, but do not close their account bank risk is a more important motive than corporate policy. Thus it seems that the most severe punishment for a bank, i.e. the closure of the account, is mainly motivated by anger, while less severe punishment is mainly driven by market discipline. Reassuringly, we find that among households which withdraw from non-distressed banks the conditions offered by competitors are a more important motivation than either bank risk or corporate policy.

Table 7 here

Our findings in Table 5 suggest that the propensity of households to withdraw from distressed banks is weakened if this involves substantial transaction costs. If switching costs do affect withdrawal behavior we would expect households (with multiple bank relations) to shift their funds to banks with which they already have an ongoing relation.²² In Table 7 we examine where households shift their deposits to when they withdraw from a distressed bank (and do not withdraw from any other non-distressed bank). We again focus our analysis on households which withdraw deposits from the bailed-out bank (UBS). Column (1) of the table confirms that

²¹ Households which responded that two or three motives are equally important are counted repeatedly.

²² See Kiser (2002) for household-level evidence on switching costs in deposit markets.

the majority (64 percent) of shifts by households that withdrew deposits and had multiple bank relations prior to the crisis were to an existing relationship.

In columns (2) of Table 7 we examine whether those households which shifted funds from the bailed out bank to a new bank account predominantly shift their deposits to state-owned banks which – in Switzerland - are widely perceived to offer unlimited implicit deposit insurance. We find that this is only the case for 8 of the 40 shifts to new bank accounts. Due to the low number of observations, the Table 7 results must obviously be interpreted with care. Nevertheless, the finding that households do not predominantly shift funds to state-owned and thus state-guaranteed banks is consistent with our finding that deposit insurance does not affect the propensity of households to shift funds away from distressed banks in the first place. These results also document that households which shifted deposits away from UBS during 2008-2009 did not question the stability of the regional savings banks or other non-state-owned commercial banks. Again, this result confirms that the distress situation of the two large Swiss banks during the recent financial crisis can be indeed viewed as a “natural experiment”.

5. Conclusion

We study deposit withdrawals in Switzerland during the recent financial crisis, exploiting a “natural experiment” in which two large commercial banks suffered substantial losses which were unrelated to their domestic retail operations. Our analysis is based on survey data providing information on all bank relations of 1’475 households and documenting their reallocation of deposits across banks relations during 2008-2009. We document that retail clients of large banks do discipline distressed banks: Our estimates suggest that households are 16 percentage points more likely to withdraw deposits from a distressed bank compared to a non-distressed bank. We also show that the effect of distress on household deposit withdrawals is four times higher in the case of a government bailout (UBS) compared to the case where the distressed bank was not bailed

out (Credit Suisse). Households report that they withdraw from the bailed out bank not only out of concern over the safety of their deposits, but also in order to punish the bank for its failed corporate strategy. In this context, the ultimate punishment is the termination of the bank relationship by the client.

We find that deposit withdrawals are substantially lower for households facing high switching costs (e.g. as measured by a single bank account, geographical distance to a non-distressed bank or a loan with the distressed bank). By contrast, the propensity to withdraw deposits is unrelated to household-level deposit insurance coverage.

Our findings have important implications for policy makers and banks: First, our results confirm that well established client relationships can significantly mitigate the withdrawal risk of retail deposits for banks in distress. We thus provide an empirical underpinning for the discrimination of “stable” versus “unstable” deposits in the recent Basel III liquidity regulations and underline the relevance of relationship scope as an indicator of stability.

Second, our results cast doubt on the conjecture that recent increases in deposit insurance coverage in the U.S. and Europe may prevent future bank runs, at least on large commercial banks. This result calls into question the idea that deposit insurance undermines market discipline, but also calls into question the effectiveness of explicit deposit insurance schemes to contain runs on such banks. As in the case of Northern Rock in the U.K. or Washington Mutual in the U.S., the UBS example in Switzerland suggests that deposit insurance hardly prevents runs on distressed banks, especially when government intervention in the bank has been announced.

Finally, our results document that whether systemically important banks experience an inflow of deposits during a financial crisis (as documented for Brazil by Oliveira et al. (2013)) depends strongly on how banks are differentially affected by the crisis. Our evidence suggests that when systemically important banks are hit directly by the crisis themselves they experience substantial deposit outflows despite their too big to fail status.

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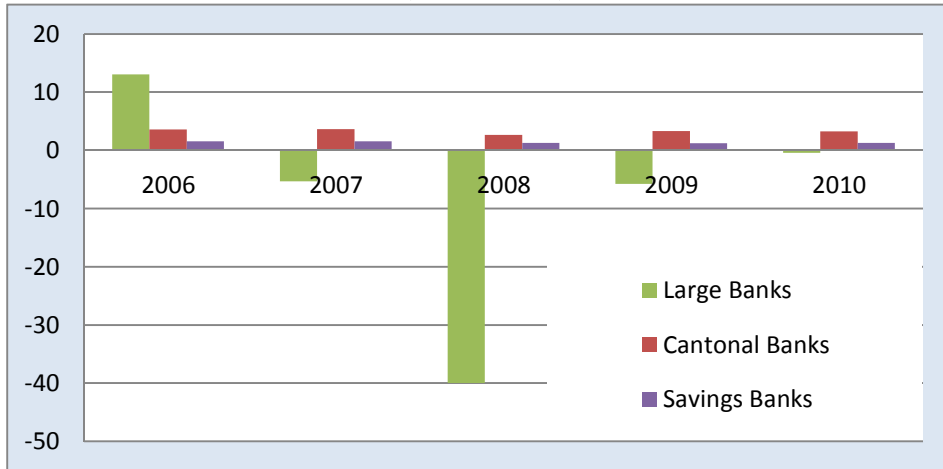
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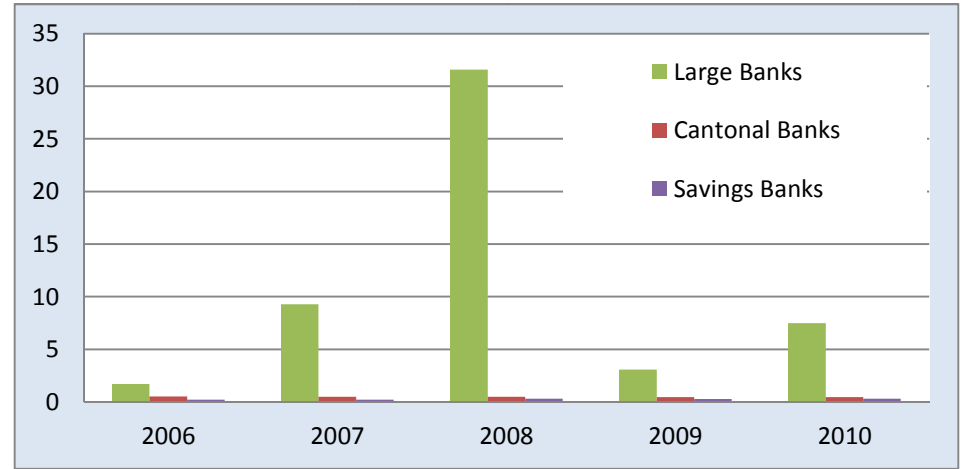
Figure 1. The Swiss natural experiment

This figure compares the Large Banks to Cantonal Banks and Savings Banks before and after the crisis with respect to net income before tax (Panel A), asset write downs (Panel B), trading gains and losses (Panel C), net interest income (Panel D).

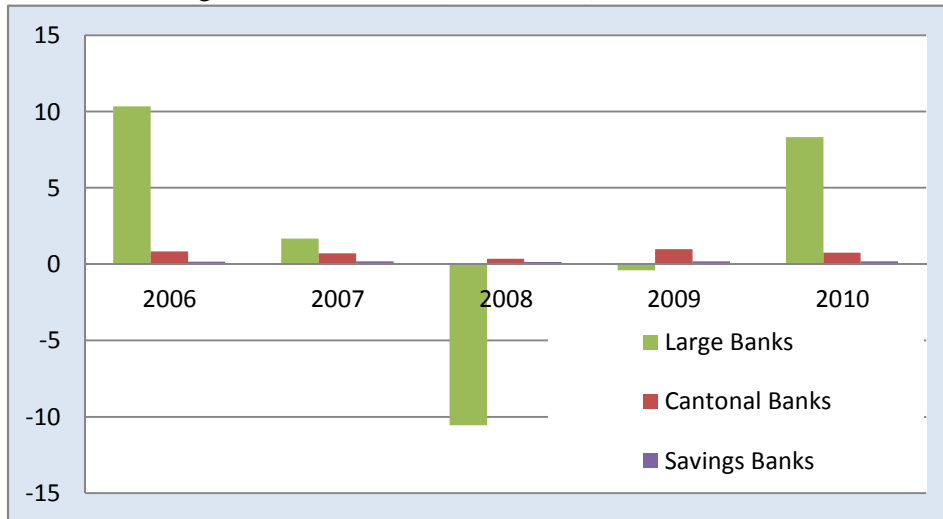
Panel A. Net Income before Tax (Billion CHF)



Panel B. Asset write downs (Billion CHF)



Panel C. Trading Gains and Losses (Billion CHF)



Panel D. Net Interest Income (Billion CHF)

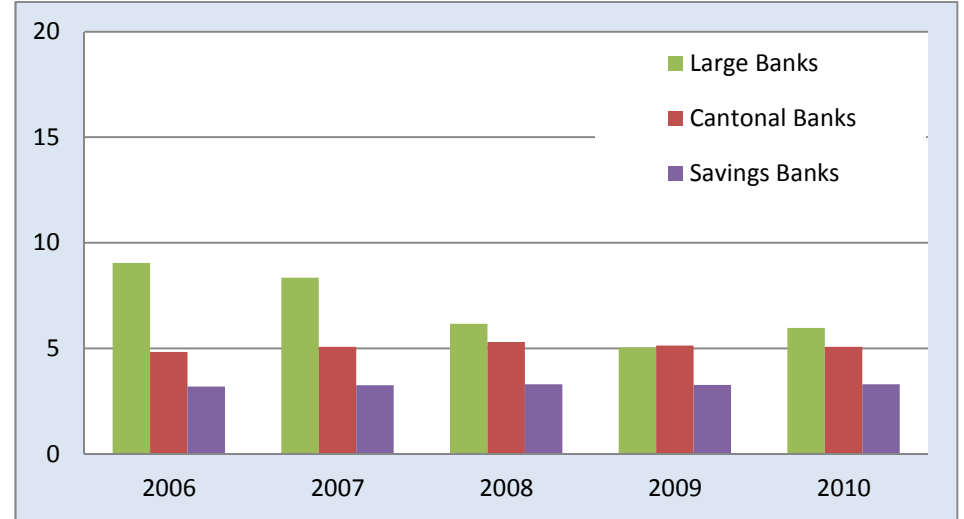


Figure 2. Market discipline by bond investors

This figure compares yield spreads between government and bonds of UBS, Credit Suisse and other Swiss banks. Source: Swiss National Bank (Financial Stability Report 2010).

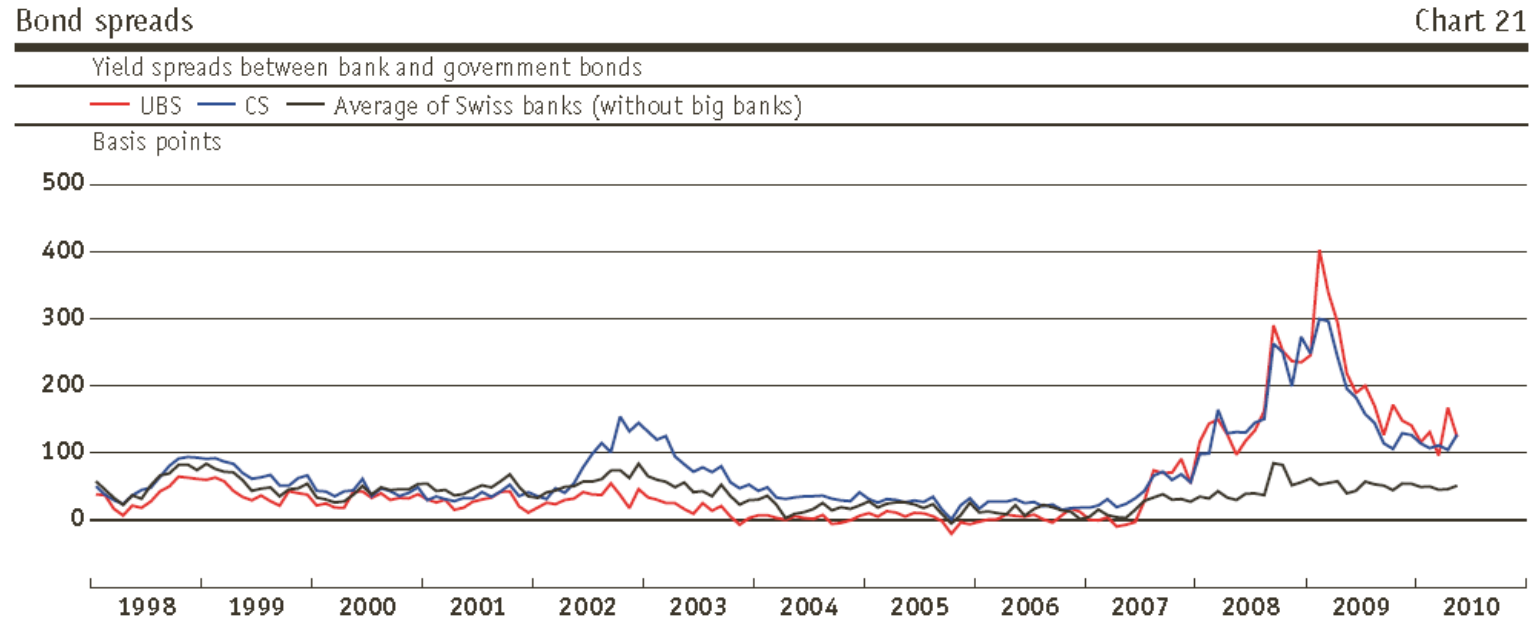


Figure 3. Households and banks

This figure shows the number of households that had at least one deposit relationship at a Large bank (UBS & Credit Suisse), State owned bank (Cantonal banks & Postfinance), Savings bank (Raiffeisen banks and savings banks) and other banks indicated by the red and blue circles. Besides the dark lines connecting two circles indicate the number of households that had at least one deposit accounts with each bank type.

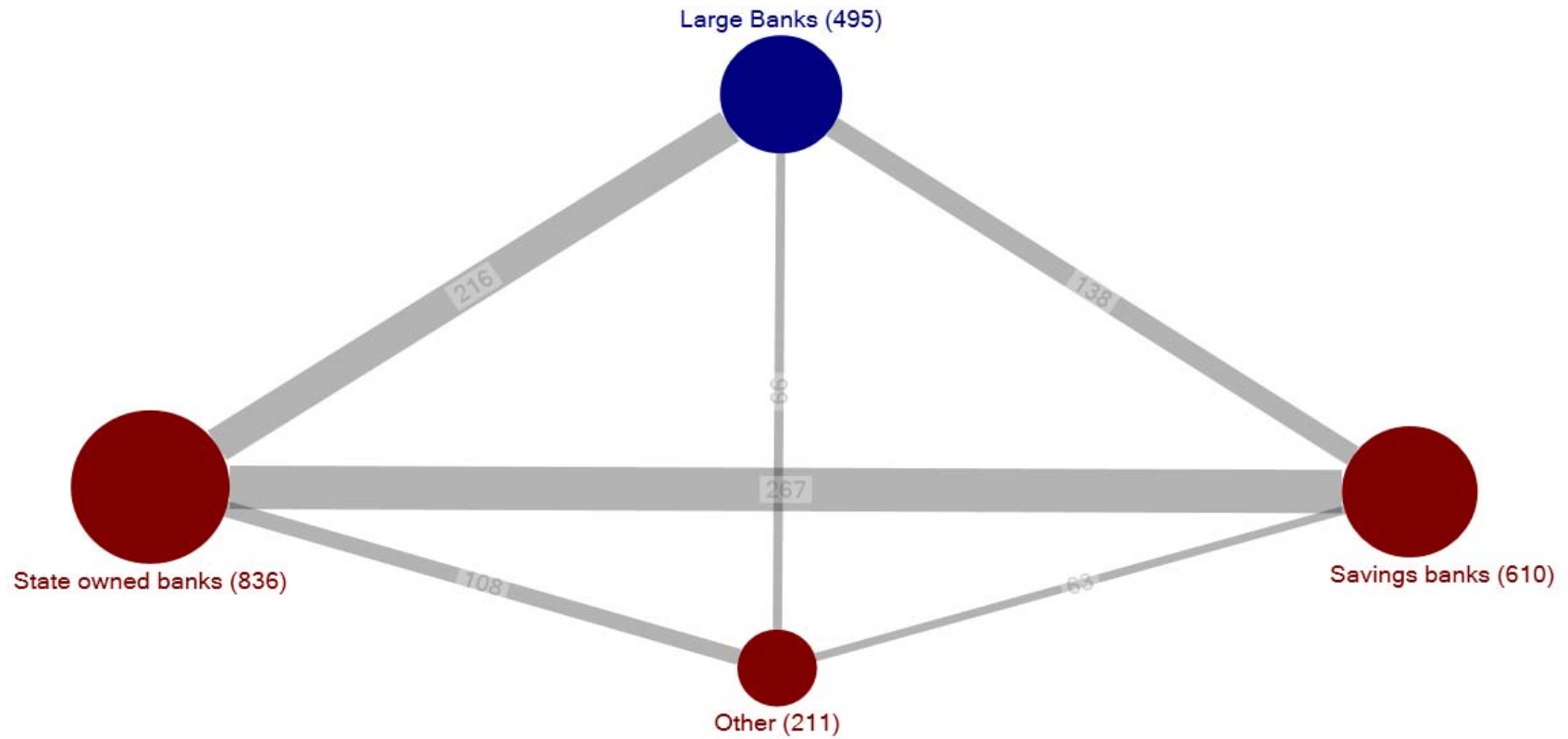


Table 1. Bank distress and deposit withdrawals (univariate)

This table shows univariate tests that compare mean withdrawals from deposit accounts with distressed banks to mean withdrawals from deposit accounts with non-distressed banks. In each panel the dependent variables are *Withdrew deposits*, *Withdrew deposits (>50%)* and *Account closed*. Panel A shows the results for the entire sample of all deposit accounts. Panel B shows the results for the subsample of deposit accounts held by households that had deposit accounts at distressed banks and at least one non-distressed bank. Ordinary standard errors and the number of relationships (N) are reported in parentheses. ***, **, * denote statistical significance at the 0.01, 0.05 and 0.10-level respectively. Definitions and sources of the variables are provided in appendix 2.

Panel A. All deposit accounts

Dependent variable	Mean	Distress	Non-Distress	Difference
Withdrew deposits	0.050*** (0.004) (N=2414)	0.176*** (0.016) (N=546)	0.013*** (0.003) (N=1868)	0.163*** (0.010) (N=2414)
Withdrew deposits (>50%)	0.032*** (0.004) (N=2414)	0.114*** (0.014) (N=546)	0.008*** (0.002) (N=1868)	0.106*** (0.008) (N=2414)
Account closed	0.020*** (0.003) (N=2414)	0.073*** (0.011) (N=546)	0.004*** (0.002) (N=1868)	0.069*** (0.007) (N=2414)

Panel B. Deposit accounts held by households with deposit accounts at distressed banks and non-distressed banks

Dependent variable	Mean	Distress	Non-Distress	Difference
Withdrew deposits	0.111*** (0.011) (N=822)	0.244*** (0.023) (N=348)	0.013*** (0.005) (N=474)	0.232*** (0.021) (N=822)
Withdrew deposits (>50%)	0.069*** (0.009) (N=822)	0.155*** (0.019) (N=348)	0.006* (0.004) (N=474)	0.149*** (0.017) (N=822)
Account closed	0.050*** (0.008) (N=822)	0.109*** (0.017) (N=348)	0.006* (0.004) (N=474)	0.103*** (0.015) (N=822)

Table 2. Bank distress and depositor withdrawals (multivariate)

This table shows the results of a linear probability model where the dependent variables are *Withdrew deposits* (columns 1, 4), *Withdrew deposits (>50%)* (columns 2, 5), *Account closed* (columns 3, 6). Panel A (B, C) shows the effect of having a deposit relationship with a distressed bank (bailed out bank (UBS), distressed but not bailed out bank (Credit Suisse)). Columns 1-3 report the results for the full sample of all deposit relationships with distressed or non-distressed banks. Columns 4-6 report the results for the subsample of deposit relationships held by households with deposits at distressed and at at least one non-distressed bank. In columns 1-3 household control variables are the *Wealth* and *Income* dummy variables, *Age*, *Male*, *University*, *Swiss nationality*, *Risk aversion*, *Time preference*, *Distance UBS km* and *Distance CS km*. Definitions of the variables are provided in appendix 2. Standard errors are clustered on the MS Region level and are reported in parentheses. ***, **, * denote statistical significance at the 0.01, 0.05 and 0.10-level respectively.

Panel A. Deposit relationships with distressed banks (UBS or Credit Suisse) vs. non-distressed banks

Sample	1	2	3	4	5	6
	All deposit accounts	All deposit accounts	All deposit accounts	Deposit accounts of households with deposit accounts at a distressed bank and non-distressed banks		
Dependent variable	Withdrew deposits	Withdrew deposits (>50%)	Account closed	Withdrew deposits	Withdrew deposits (>50%)	Account closed
Distress	0.164*** [0.020]	0.113*** [0.014]	0.077*** [0.013]	0.247*** [0.024]	0.152*** [0.015]	0.112*** [0.016]
Household Controls	YES	YES	YES	NO	NO	NO
Household Fixed Effects	NO	NO	NO	YES	YES	YES
Observations	2,093	2,093	2,093	822	822	822
Households	1,231	1,231	1,231	315	315	315
R-squared	0.110	0.073	0.054	0.218	0.132	0.095
Clustering	MS-Region	MS-Region	MS-Region	MS-Region	MS-Region	MS-Region
Method	OLS	OLS	OLS	OLS	OLS	OLS

Panel B. Deposit relationships with the bailed out bank (UBS) vs. non-distressed banks

Sample Dependent variable	1	2	3	4	5	6
	Deposit accounts at the bailed out bank or at non-distressed banks			Deposit accounts of households with deposit accounts at the bailed out bank and at non-distressed banks		
	Withdrawn deposits	Withdrawn deposits (>50%)	Account closed	Withdrawn deposits	Withdrawn deposits (>50%)	Account closed
Distress	0.218*** [0.022]	0.153*** [0.017]	0.106*** [0.017]	0.311*** [0.026]	0.198*** [0.019]	0.154*** [0.021]
Household Controls	YES	YES	YES	NO	NO	NO
Household Fixed Effects	NO	NO	NO	YES	YES	YES
Observations	1,947	1,947	1,947	605	605	605
Households	1,188	1,188	1,188	242	242	242
R-squared	0.151	0.105	0.076	0.299	0.191	0.145
Clustering	MS-Region	MS-Region	MS-Region	MS-Region	MS-Region	MS-Region
Method	OLS	OLS	OLS	OLS	OLS	OLS

Panel C. Deposit relationships with the distressed but not bailed out bank (Credit Suisse) vs. non-distressed banks

Sample Dependent variable	1	2	3	4	5	6
	Deposit accounts at the distressed & not bailed out bank or at non-distressed banks			Deposit accounts of households with deposit accounts at the distressed & not bailed out bank and at non-distressed banks		
	Withdrawn deposits	Withdrawn deposits (>50%)	Account closed	Withdrawn deposits	Withdrawn deposits (>50%)	Account closed
Distress	0.039* [0.022]	0.017 [0.016]	0.010 [0.009]	0.089*** [0.025]	0.039* [0.020]	0.012 [0.012]
Household Controls	YES	YES	YES	NO	NO	NO
Household Fixed Effects	NO	NO	NO	YES	YES	YES
Observations	1,772	1,772	1,772	270	270	270
Households	1,142	1,142	1,142	106	106	106
R-squared	0.023	0.016	0.011	0.058	0.021	0.003
Clustering	MS-Region	MS-Region	MS-Region	MS-Region	MS-Region	MS-Region
Method	OLS	OLS	OLS	OLS	OLS	OLS

Table 3. Households which withdraw vs. households which do not withdraw deposits

This table compares household characteristics of those households which withdraw deposits from at least one account to those that do not withdraw. Panel A reports results for all households that had at least one deposit relationship. Panel B reports results for households that had a deposit relationship with the bailed out bank and at least one deposit relationship with a non-distressed bank. In this table, *Credit linkage (Relationship with distressed bank)* is defined by having at least one deposit relationship including a credit linkage (at least one deposit relationship with a bank in distress). The last column tests the differences in means (t-test). The number of households (N) are reported in parentheses. ***, **, * denote statistical significance at the 0.01, 0.05 and 0.10-level respectively (calculated using ordinary standard errors). Definitions and sources of the variables are provided in appendix 2.

Panel A. All households that had at least one deposit relationship

	Households withdrawing deposits	Households not withdrawing deposits	Difference
Insurance coverage	0.549 (N=102)	0.732 (N=1186)	-0.183*** (N=1288)
Insurance knowledge	0.903 (N=113)	0.698 (N=1319)	0.204*** (N=1432)
Single account	0.088 (N=113)	0.553 (N=1319)	-0.464*** (N=1432)
No local banks	0.168 (N=113)	0.240 (N=1319)	-0.072* (N=1432)
Credit linkage	0.319 (N=113)	0.381 (N=1319)	-0.063 (N=1432)
Low income	0.337 (N=104)	0.398 (N=1211)	-0.061 (N=1315)
Age	3.813 (N=113)	3.780 (N=1319)	0.033 (N=1432)
Male	0.513 (N=113)	0.471 (N=1319)	0.042 (N=1432)
University	0.460 (N=113)	0.306 (N=1319)	0.154*** (N=1432)
Swiss nationality	0.965 (N=113)	0.899 (N=1319)	0.065** (N=1432)
Relationship with distressed bank	0.867 (N=113)	0.333 (N=1319)	0.534*** (N=1432)

Panel B. Households with a relationship with the bailed out bank and with non-distressed banks

	Households withdrawing deposits	Households not withdrawing deposits	Difference
Insurance coverage	0.583 (N=72)	0.605 (N=152)	-0.022 (N=224)
Insurance knowledge	0.897 (N=78)	0.799 (N=164)	0.099* (N=242)
No local banks	0.167 (N=78)	0.262 (N=164)	-0.096 (N=242)
Credit linkage	0.346 (N=78)	0.500 (N=164)	-0.154** (N=242)
Low income	0.319 (N=72)	0.283 (N=152)	0.037 (N=224)
Age	3.837 (N=78)	3.836 (N=164)	0.000 (N=242)
Male	0.500 (N=78)	0.457 (N=164)	0.043 (N=242)
University	0.423 (N=78)	0.409 (N=164)	0.015 (N=242)
Swiss nationality	0.974 (N=78)	0.957 (N=164)	0.017 (N=242)

Table 4. Switching costs and deposit withdrawals

This table displays the results of a linear probability model where the dependent variable is *Withdrawn deposits*. Columns 1 & 3 show the results for the full sample of all deposit relationships with the bailed out bank (UBS) or non-distressed banks. Column 2 shows the results for the subsample of deposit relationships of households with only one deposit relationship. Column 4 shows the results for the subsample of deposit accounts of households with deposits at the bailed out bank (UBS) and at at least one non-distressed bank. In all columns, deposit relationships with the distressed but not bailed out bank (Credit Suisse) are excluded. Household control variables are the *Wealth* and *Income* dummy variables, *Age*, *Male*, *University*, *Swiss nationality*, *Risk aversion*, *Time preference*, *Distance UBS km* and *Distance CS km*. Definitions of the variables are provided in appendix 2. Standard errors are clustered on the MS Region level and are reported in parentheses. ***, **, * denote statistical significance at the 0.01, 0.05 and 0.10-level respectively.

	1	2	3	4
Sample	All deposit accounts	Deposit accounts of household with only one account	All deposit accounts	Deposit accounts of households with deposits at the bailed out bank and a non-distressed bank
Dependent variable	Withdrawn deposits	Withdrawn deposits	Withdrawn deposits	Withdrawn deposits
Distress	0.280*** [0.025]	0.078** [0.031]	0.251*** [0.020]	0.350*** [0.030]
Distress*Single account	-0.221*** [0.033]			
Distress*No local banks		-0.086** [0.038]		
Distress*Credit linkage			-0.137*** [0.036]	-0.209*** [0.074]
Single account	-0.015** [0.006]			
No local banks		-0.001 [0.005]		
Credit linkage			-0.007 [0.005]	0.041 [0.039]
Household Fixed Effects	NO	NO	NO	YES
Household Controls	YES	YES	YES	NO
Observations	1,947	576	2,236	605
Households	1,188	576	1,378	242
R-squared	0.190	0.136	0.156	0.313
Clustering	MS-Region	MS-Region	MS-Region	MS-Region
Method	OLS	OLS	OLS	OLS

Table 5. Deposit insurance and deposit withdrawals

This table displays the results of a linear probability model where the dependent variable is *Withdrawn deposits*. Columns 1 & 2 show the results for the full sample of all deposit relationships. Columns 3 & 4 show the results for the subsample of deposit relationships held by households with deposits at the bailed out bank (UBS) and at at least one non-distressed bank. In columns 2 & 4, only deposit relationships held by households that know about the existence of deposit insurance are considered. In all columns, deposit relationships with the distressed but not bailed out bank (Credit Suisse) are excluded. Household control variables are the *Wealth* and *Income* dummy variables, *Age*, *Male*, *University*, *Swiss nationality*, *Risk aversion*, *Time preference*, *Distance UBS km* and *Distance CS km*. Definitions of the variables are provided in appendix 2. Standard errors are clustered on the MS Region level and are reported in parentheses. ***, **, * denote statistical significance at the 0.01, 0.05 and 0.10-level respectively.

	1	2	3	4
Sample	All deposit accounts	All deposit accounts of households with deposit insurance knowledge	Deposit accounts of households with deposit accounts at the bailed out bank and at non-distressed banks	Deposit accounts of households with deposit accounts at the bailed out bank and at non-distressed banks & deposit insurance knowledge
Dependent variable	Withdrawn deposits	Withdrawn deposits	Withdrawn deposits	Withdrawn deposits
Distress	0.165*** [0.038]	0.187*** [0.041]	0.304*** [0.048]	0.330*** [0.050]
Distress*Insurance coverage	-0.064 [0.046]	-0.069 [0.051]	0.009 [0.062]	0.002 [0.072]
Household Fixed Effects	NO	NO	YES	YES
Household Controls	YES	YES	NO	NO
Observations	1,884	1,430	557	463
Households	1,180	864	224	187
R-squared	0.110	0.127	0.297	0.319
Clustering	MS-Region	MS-Region	MS-Region	MS-Region
Method	OLS	OLS	OLS	OLS

Table 6. Reasons for deposit withdrawals

This table reports the reasons for deposit withdrawals reported by households. The dependent variables are *Corporate policy* (column 1), *Bank risk* (column 2), *Prices* (column 3) and *Mixed* (column 4). *Corporate policy* takes on the value of one if the respondent stated that the reason *Corporate policy* was more important than *Bank risk* and *Prices* (zero otherwise). *Bank risk* takes on the value of one if the respondent stated that the reason *Bank risk* was more important than *Corporate policy* and *Prices* (zero otherwise). *Prices* takes on the value of one if the respondent stated that the reason *Prices* was more important than *Bank risk* and *Corporate policy* (zero otherwise). *Mixed* takes on the value of one if the respondent valued two out of three reasons (*Corporate policy*, *Bank risk*, *Prices*) as being equally important and more important than the third reason or if the respondent valued all three reasons as being equally important (zero otherwise). Row 1 reports the results for the subsample of households that withdrew deposits from the bailed out bank (UBS) but did not withdraw deposits from any non-distressed bank. Row 2 shows the results for the subsample of households that withdrew deposits from the bailed out bank (UBS) where deposit accounts were closed but did not withdraw deposits from any non-distressed bank. Row 3 shows the results for the subsample of households that withdrew more than 50% of their deposits from the bailed out bank (UBS) but did not withdraw deposits from any non-distressed bank. Row 4 shows the results for the subsample of households that withdrew less than 50% of their deposits from the bailed out bank (UBS) but did not withdraw deposits from any non-distressed bank. The last row shows the results for the subsample of households that withdrew deposits from non-distressed banks but not from distressed banks (UBS or Credit Suisse).

Reason for withdrawal	Corporate policy	Bank risk	Prices	Mixed	Observations
Withdrew only from bailed out bank	0.24	0.22	0.15	0.39	N=79
closed	0.35	0.12	0.18	0.35	N=34
not closed & more than 50% of deposits withdrawn	0.04	0.30	0.13	0.52	N=23
not closed & less than 50% of deposits withdrawn	0.27	0.27	0.14	0.32	N=22
Withdrew only from non-distressed banks	0.06	0.11	0.44	0.39	N=18

Table 7. Destination of withdrawn deposits

This table shows where households shifted deposits to when deposits were withdrawn from the bailed out bank (UBS). The dependent variables are *Shift to existing relationship* (column 1) and *Shift to state-owned bank* (column 2). Furthermore, the subsample in column 1 only includes households that had at least one deposit relation with a non-distressed bank. The subsample in column 2 only includes households which shifted funds to newly established accounts. The number of relationships (N) is reported in parentheses. Definitions of the variables are provided in appendix 2.

Sample	Shifts by households with deposit relations with the bailed out bank which experienced a deposit withdrawal and where households had at least one deposit relation with a non-distressed bank	Shifts to newly established accounts by households with deposit relations with the bailed out bank which experienced a deposit withdrawal
Dependent variable	Shift to existing relationship	Shift to state-owned bank
	63.8% (N=94)	20.0% (N=40)

Appendix 1. Survey Representativeness

Panel A compares socioeconomic characteristics of the surveyed households to official data provided by the Federal Statistical Office in Switzerland (*Income, Age, Male, Swiss nationality*), Swiss Federal Tax Administration (*Wealth*) and OECD (*University*). Panel B compares the share of bank relationships in the survey to the share of total domestic deposits (savings and sight & time deposits) depending on bank type (Large banks, Cantonal banks, Savings banks, Other banks) as reported by the Swiss National Bank (as per end 2010).

Panel A. Socioeconomic characteristics

	Survey	Official data
Income*	106'405	115'248
Wealth**		
Wealth below CHF 100'000	71.7%	66.0%
Wealth above CHF 100'000 & below CHF 1'000'000	26.8%	29.2%
Wealth above CHF 1'000'000	1.5%	4.8%
Education***		
University	32.0%	35.2%
Age		
20-39 years	42.3%	33.6%
40-64 years	45.4%	44.7%
65+ years	12.4%	21.7%
Male	47.4%	49.6%
Swiss nationality	90.4%	76.7%

* Arithmetic average. Survey mean calculated as follows: income dummies weighted by share of households (assuming an average of CHF 2'250 of *First income dummy* and CHF 24'000 of *Sixth income dummy* and the middle of the income intervals for the other income dummies) for all households; Official data taken from the Swiss Federal Statistical Office. ** Official data taken from Swiss Federal Tax Administration (Gesamtschweizerische Vermögensstatistik der natürlichen Personen 2010). *** Official data taken from OECD (Factbook 2011-2012).

Panel B. Bank relationships

	Survey: Share of bank relationships (May 2011)	Official data: Share of total domestic deposits* (end 2010)
Large banks (UBS or Credit Suisse)	23.6%	36.8%
Cantonal banks	23.5%	30.7%
Savings banks	24.3%	19.0%
Other banks	28.6%	13.5%

* Source: Swiss National Bank (Banks in Switzerland 2010).

Appendix 2. Variable definitions and sources

This table presents definitions and sources of the variables used in the empirical analysis. The first column indicates the variable name. The second column indicates the definition of the variable. The third column shows the data source.

Variable name	Definition	Source
Bank relationship variables - dependent		
Withdrew deposits	Dummy = 1 if the household has withdrawn deposits from transaction or savings accounts, = 0 otherwise	Survey
Withdrew deposits (>50%)	Dummy = 1 if the household has withdrawn at least 50% of its deposits from transaction or savings accounts, = 0 otherwise	Survey
Account closed	Dummy = 1 if the household has withdrawn deposits and has closed its bank account, = 0 otherwise	Survey
Shift to existing relationship	Dummy = 1 if the household has shifted funds to a bank with which a relationship had existed, = 0 otherwise	Survey
Shift to state-owned bank	Dummy = 1 if the household has shifted funds to a state-owned bank (Postfinance or Cantonal banks), = 0 otherwise	Survey
Bank relationship variables - explanatory		
Distress	Dummy = 1 if the deposit relationship that existed was with a bank in distress, = 0 otherwise	Survey
Credit linkage	Dummy = 1 if the deposit relationship that existed included a credit linkage with the bank (consumer or mortgage loan), = 0 otherwise	Survey
Household-level variables		
Insurance coverage	Dummy = 1 if the household wealth is below CHF 100'000, = 0 otherwise	Survey
Insurance knowledge	Dummy = 1 if the respondent correctly responds to the question about the existence of deposit insurance, = 0 otherwise	Survey
Single account	Dummy = 1 if the household had one deposit account with one bank, = 0 otherwise	Survey
No local banks	Dummy = 1 if there was no other bank branch in the same ZIP code (except distressed banks), = 0 otherwise	Survey
Wealth	Household wealth; five wealth dummy variables (below CHF 50'000, at least CHF 50'000 and below CHF 100'000, at least CHF 100'000 and below CHF 250'000, at least CHF 250'000 and below CHF 1 mio., at least CHF 1 mio.)	Survey
Low income	Dummy = 1 if the monthly household income is below CHF 7'000, = 0 otherwise	Survey
Income	Monthly household income; six income dummy variables (below CHF 4'500, at least CHF 4'500 and below CHF 7'000, at least CHF 7'000 and below CHF 9'000, at least CHF 9'000 and below CHF 12'000, at least CHF 12'000 and below CHF 15'000, at least CHF 15'000)	Survey
Age	Age of the respondent in years (natural logarithm)	Survey
Male	Dummy = 1 if the respondent is male, = 0 otherwise	Survey
University	Dummy = 1 if the respondent has a university degree, = 0 otherwise	Survey
Swiss nationality	Dummy = 1 if the respondent is Swiss, = 0 otherwise	Survey
Risk aversion	Dummy = 1 if the respondent has high risk aversion (above two on a scale from 1 (low) to 6 (high)), = 0 otherwise	Survey
Time preference	Dummy = 1 if the respondent has high time preference (above two on a scale from 1 (low) to 4 (high)), = 0 otherwise	Survey
Distance UBS km	Travel distance by car between the household and the closest UBS bank branch in km	Googlemaps
Distance CS km	Travel distance by car between the household and the closest Credit Suisse bank branch in km	Googlemaps

Appendix 3. Summary statistics

This table reports the summary statistics of variables which include the number of observations, the mean values and standard deviations, as well as the minimum and maximum values. Panel A reports the summary statistics of characteristics of bank relationships that existed at the beginning of the financial crisis (end 2008). Panel B reports the summary statistics of household characteristics of households that had bank relationships that existed at the beginning of the financial crisis (end 2008). Definition and sources of the variables are provided in appendix 2.

Panel A. Bank relationship variables

	Mean	Std. Dev.	Minimum	Maximum	Observations
Withdrew deposits	0.05	0.22	0	1	2414
Withdrew deposits (>50%)	0.03	0.18	0	1	2414
Account closed	0.02	0.14	0	1	2414
Shift to existing relationship	0.04	0.19	0	1	2414
Shift to state-owned bank	0.01	0.12	0	1	2414
Distress	0.23	0.42	0	1	2414
Credit linkage	0.22	0.41	0	1	2414

Panel B. Household-level variables

	Mean	Std. Dev.	Minimum	Maximum	Observations
Insurance coverage	0.72	0.45	0	1	1288
Insurance knowledge	0.71	0.45	0	1	1432
Single account	0.52	0.50	0	1	1432
No local banks	0.23	0.42	0	1	1432
First wealth dummy	0.47	0.50	0	1	1288
Second wealth dummy	0.25	0.43	0	1	1288
Third wealth dummy	0.18	0.38	0	1	1288
Fourth wealth dummy	0.09	0.29	0	1	1288
Fifth wealth dummy	0.01	0.12	0	1	1288
Low income	0.39	0.49	0	1	1315
First income dummy	0.09	0.28	0	1	1315
Second income dummy	0.30	0.46	0	1	1315
Third income dummy	0.25	0.43	0	1	1315
Fourth income dummy	0.19	0.39	0	1	1315
Fifth income dummy	0.09	0.29	0	1	1315
Sixth income dummy	0.07	0.25	0	1	1315
Age	3.78	0.30	3	4	1432
Male	0.47	0.50	0	1	1432
University	0.32	0.47	0	1	1432
Swiss nationality	0.90	0.29	0	1	1432
Risk aversion	0.32	0.47	0	1	1405
Time preference	0.28	0.45	0	1	1419
Distance UBS km	5.08	5.95	0	85	1432
Distance CS km	7.38	7.35	0	58	1432

Appendix 4. Clients of distressed banks vs. clients of non-distressed banks

This table compares household characteristics of those households with a bank relationship to a distressed bank (UBS or Credit Suisse) and those households without a bank relation to a distressed bank. In this table, *Credit linkage* is defined by having at least one deposit relationship including a credit linkage. The last column tests the differences in means (t-test). The number of households (N) are reported in parentheses. ***, **, * denote statistical significance at the 0.01, 0.05 and 0.10-level respectively (calculated using ordinary standard errors). Definitions and sources of the variables are provided in appendix 2.

	Clients of distressed banks		Difference
	Yes	No	
Insurance coverage	0.618 (N=474)	0.775 (N=814)	-0.157*** (N=1288)
Insurance knowledge	0.795 (N=537)	0.666 (N=895)	0.129*** (N=1432)
Single account	0.348 (N=537)	0.617 (N=895)	-0.269*** (N=1432)
No local banks	0.251 (N=537)	0.225 (N=895)	0.027 (N=1432)
Credit linkage	0.412 (N=537)	0.355 (N=895)	0.056** (N=1432)
Low income	0.331 (N=489)	0.430 (N=826)	-0.098*** (N=1315)
Age (log years)	3.808 (N=537)	3.768 (N=895)	0.040** (N=1432)
Male	0.482 (N=537)	0.469 (N=895)	0.013 (N=1432)
University	0.399 (N=537)	0.270 (N=895)	0.128*** (N=1432)
Swiss nationality	0.912 (N=537)	0.899 (N=895)	0.013 (N=1432)