The Interacting Roles of Bank Supervisory Effectiveness and Depositor Discipline in a Banking Crisis*

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This paper examines the interaction between bank supervision and depositor behavior during a banking crisis, utilizing a sample of finance professionals from six developed countries with comparable banking systems but varying supervisory effectiveness. These finance professionals, taking on the role of individual depositors, were asked to indicate their withdrawals from a set of deposit accounts at the onset of a hypothetical banking crisis. The accounts were designed to encompass several likely contributors to depositor decision-making, including deposit insurance coverage and bank capital level. The main results, along with multiple robustness checks performed, indicate that more effective bank supervision is associated with a reduced sensitivity of withdrawals by finance professionals to the risk of deposit loss due to incomplete insurance coverage, particularly when deposits are held at banks with a higher-than-average capital level. This finding brings into focus a potential unintended consequence whereby stringent supervisory practices can diminish the efficacy of depositor discipline among financially knowledgeable individuals, which has implications for the design of banking policy. The results can also help bank managers prioritize strategies to mitigate deposit withdrawals in future crises.

Keywords: Bank supervision; Depositor discipline; Banking crisis; Finance professional

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I. Introduction

Bank supervision refers to the totality of actions that government agencies can take to enforce existing rules and carry out their legal mandates to ensure the safe and sound operation of the banking system (FDIC, 2023, p. 40). The relationship between public supervision and private depositor discipline has been debated but its analysis remains limited. The literature indicates that effective supervision is associated with improved bank management and less risk-taking (Hirtle et al., 2020; Kandrac and Schlusche, 2021; Eisenbach et al., 2022). For example, Kandrac and Schlusche show that reduced supervisory capacity leads banks to take on significantly more risk, resulting in higher failure rates, costlier resolutions, and broader economic disruption. Yet, whether government oversight substitutes for or complements the monitoring role of depositors is less clear. If knowledgeable depositors view bank supervision as effective, they may be less inclined to impose discipline through deposit withdrawals. Such linkage is important to explore in view of evidence that supervisory shortcomings contributed to the 2008 financial crisis (Calomiris, 2017).

To fill in the knowledge gap, this paper examines depositor decision-making during a banking crisis using experimental data from 417 finance professionals across six developed countries with similar banking systems but varying supervisory effectiveness. The focus is on developed countries that exhibit strong legal institutions as this ensures that both public oversight and private monitoring mechanisms are credibly operational (Anginer and Demirgüç-Kunt, 2018). Supervisory effectiveness is assessed using the World Bank Official Supervisory Power Index (Barth et al., 2013a), in line with the approach adopted by Anginer et al. (2018). The paper opts to use experimental data because banking crises in developed countries have typically been accompanied by significant policy changes, making it difficult to isolate different influences on depositor decisions using historical data. As

part of the data collection, respondents were instructed to envision themselves as individual depositors and were shown bank accounts with different features and asked how much they would withdraw from each account. The accounts embed varying deposit insurance coverage and bank capitalization. The data collection additionally encompasses depositor-bank relationships. The key variable of interest represents the difference between the total deposit and the portion guaranteed to be repaid by the deposit insurer in the event of bank failure. It is used in the analysis to help quantify the effect of the potential deposit "haircut" on the withdrawal decision.

The findings suggest the existence of a substitution relationship between bank supervision and depositor discipline. Specifically, withdrawals in response to increased uninsured exposure are more pronounced in weaker supervisory environments, whereas stronger supervision is associated with a reduced propensity of depositors to discipline banks. This relationship is most evident for well-capitalized banks. To illustrate, an increase in the haircut from 0% to 33% of a deposit balance held at a bank with above-average capital raises the withdrawal rate by 19.2 percentage points (p.p.) under weaker supervision, compared to a significantly smaller increase of 6.6 p.p. under stronger supervision. In comparison, when the bank has below-average capital, the withdrawal rate rises by 32.1 p.p. and 28.4 p.p., respectively, highlighting withdrawal rate increases that are much larger but not significantly different between the two supervisory environments. Additional results underscore the robustness of key findings across multiple sensitivity tests and also suggest a moderating impact of long-term depositor-bank relationships on withdrawals in a crisis. Together, these findings contribute to a more nuanced understanding of the interplay between government oversight and market discipline and have implications for the design of banking regulation and bank management strategies.

The remainder of this paper is organized as follows. Section 2 reviews the literature and outlines the research hypotheses. Section 3 describes the sample and the process of data collection. Section 4 specifies the econometric model. Section 5 presents descriptive statistics, discusses the main estimation results, summarizes robustness checks, and provides additional findings. Section 6 concludes. Additional details on the data and robustness checks are included in the appendix.

II. Literature Review and Research Hypotheses

An examination of the role of bank supervisory effectiveness in depositor decision-making must be developed in the context of existing theory and empirical evidence of other influences on depositor behavior. The foundational literature for this study focuses on depositor discipline as a mechanism of market oversight. The theoretical basis for depositor behavior is exemplified in models of bank runs, beginning with Diamond and Dybvig (1983) in which banks are vulnerable to runs even if they are solvent. Goldstein and Pauzner (2005) extend this view, highlighting how shifts in risk perception can trigger self-fulfilling runs. Crises can spread through several channels, including direct exposure through interbank connections, the disorderly liquidation of illiquid assets, and information spillovers.

The approach in this paper focuses on the last channel—information spillovers, in particular, where one bank's distress may signal risks for other banks. The source of the increased perceived risk to the depositor's bank in this study is the negative signal from the failure of a large national bank in the same country that does not necessarily have a direct connection to the depositor's bank. Building on the findings of Iyer and Puri (2012), Goldsmith-Pinkham and Yorulmazer (2010) and Choi et al. (2024) empirically show how negative signals from one bank's distress amplify perceived risk for other banks. In particular, Goldsmith-Pinkham and Yorulmazer confirm the spillover effect of the 2007 Northern Rock failure on other banks in the United Kingdom. Choi et al. find that the contagion effect of the 2023 collapse of Silicon Valley Bank was evident in peer bank equity returns, with uninsured depositors and unrealized losses being the most relevant determinants.

Supervisory effectiveness represents an additional potential channel linking bank risk and depositor behavior. Hirtle et al. (2020) demonstrate that more intense supervision reduces risk-taking and enhances bank stability, whereas Kandrac and Schlusche (2021) find that weaker oversight increases bank failures and taxpayer costs. Eisenbach et al. (2022) document that strong supervision reduces distress and helps maintain capital adequacy[1]. However, whether depositors recognize

1. Bank supervision can also interact with bank transparency in shaping depositor behavior. Chen et al. (2022) show that disclosure reduces depositor sensitivity to non-financial signals. Elfers and Koenraadt (2022) indicate that confidential reporting requirements influence market discipline. Transparency magnifies depositor reactions: uninsured depositors at more transparent banks withdraw more quickly after negative

and incorporate supervisory effectiveness into their monitoring and decision-making (particularly their decision-making at the onset of a banking crisis) remains less understood. Calomiris (2017) suggests that government oversight and depositor discipline may act as substitutes, compensating for each other's weaknesses.

Considerable research has examined the interaction of deposit insurance and depositor discipline in shaping depositor behavior. While deposit insurance shores up depositor confidence in the banking system and may help prevent bank runs, it also potentially reduces depositor monitoring incentives. Anginer and Demirgüç-Kunt (2025) summarize how the design of deposit insurance, including coverage limits, scope of coverage, funding options, and premium structure, influences depositor reactions.[2] In developed economies, post-crisis deposit insurance reforms reduced depositor discipline and funding pressures but also led to greater bank risk-taking and procyclicality (Jareski Tuma et al., 2025). Many studies investigate the impact of deposit insurance on depositor behavior (e.g., Acharya and Mora, 2015; Egan et al., 2017; Iyer and Puri, 2012; Iyer et al., 2016; Iyer et al., 2019; Lambert et al., 2017; Martin et al., 2022; Quintero-V, 2023). The Diamond-Dybvig model underscores that insurance is effective only if it is viewed as fully credible. For this reason, our analysis focuses on developed countries, where governments are generally better positioned to sustain depositor confidence.

The methodology employed in this paper allows for a direct examination of the effects of varying deposit insurance coverage on depositor decision-making in the event of a banking crisis. Previous studies have typically differentiated between insured and uninsured deposits using some form of published data measurement, most often bank call reports. For example, in their empirical analyses, Egan et al. (2017), Lambert et al. (2017), Calomiris and Jaremski (2019), and Blickle et al. (2024) have employed aggregate deposit flows from call report data. These studies rely on the average deposit size relative to the applicable deposit insurance limit to infer whether deposits are insured or not. Recent empirical work suggests that distinguishing simply between

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signals, increasing the need for strong capital buffers (Chen et al.). All countries in this study exhibit the highest level of transparency.

2. Depositor decision-making may also be influenced by deposit repayment timelines and resolution procedures. Section 3.1 provides some details on these for the countries in this study.

insured and uninsured deposits is insufficient, as uninsured depositors often withdraw far more than needed to ensure full coverage (Martin et al., 2022). Given the assessment that deposit insurance design affects depositor behavior, we employ variables that reflect variations in design.[3] This allows us to focus on the depositor's own trade-offs, shaped by insurance effects, in the decision to withdraw funds at the onset of a crisis.

Bank capital buffers serve as another critical stabilizing influence on depositor behavior during crises. High capital level reassures depositors, reduces fragility, and mitigates bank runs (Drechsler et al., 2023; Egan et al., 2017; Gropp et al., 2019). It also enables banks to withstand unexpected losses while allowing for deposit and other liability withdrawals. Furthermore, as Drechsler et al. note, it helps the bank adjust the asset-liability mix to hedge risks. Due to its widespread use in research, the bank capital-to-assets ratio is included as a variable in this study, with a lower ratio indicating a heightened risk of failure. Examples of papers employing the ratio include Acharya and Mora (2015), Anginer et al. (2018), Berger and Bouwman (2013), Demirgüç-Kunt et al. (2013), and Schwert (2018). However, as Diamond and Rajan (2001) show, while additional capital reduces insolvency risk, it also constrains bank liquidity, making banks less able to absorb withdrawals. This trade-off affects the overall significance of the ratio.

Empirical research on depositor behavior must also account for the individual characteristics and considerations of depositors. Existing evidence suggests that depositor responses to banking crises are influenced by networks and information. Iyer and Puri (2012) document that depositors are more likely to run if their social or geographic peers do so, even in the absence of fundamentals. The relationship between the depositor and the bank further shapes depositor responses, with long-term ties reducing the likelihood of crisis-induced withdrawals (Brown et al., 2020; Iyer et al., 2016). Brown et al. find that depositors in Swiss banks with strong relationships and high switching costs were less likely to withdraw during stress, while those with weak relationships

3. Additional operational options have been recently employed on a major scale. Huberdeau-Reid and Pennacchi (2025) found that the 2023 failures of Silvergate Bank, Silicon Valley Bank, and Signature Bank revealed the vulnerability of uninsured deposits, prompting riskier banks to expand insured funding (e.g., reciprocal deposit networks, sweep deposits programs, deposit broker deposits, and listing services) as well as rely on government backstops, thereby weakening depositor discipline and increasing FDIC exposure.

and low switching costs moved funds easily, increasing the risk of bank runs and contagion. Also, Chen et al. (2022) document that the response of uninsured depositors is sophisticated enough to consider differences in the quality of information across banks. Evidence from recent stress episodes further highlights that depositor heterogeneity matters, with sophisticated and uninsured depositors being most responsive to bank risk (Drechsler et al., 2023).

To ensure that respondents recognize the effectiveness of bank supervision, this paper employs a sample of financial professionals who were placed in the position of individual depositors. The approach bears some similarity to that used by Cohn et al. (2015), in which they generated respondent samples consisting of finance professionals. Cohn et al. (2015) and Hendershott et al. (2015) emphasize the distinctive information-gathering expertise of such professionals, particularly in relation to economic news. Furthermore, Schmidt et al. (2016) observe differences between institutional and retail money market fund investors, noting that institutional investors are aware of fund holdings and exhibit distinct withdrawal patterns. Studies by Cohn et al. (2017) and Kirchler et al. (2018) sample financial industry practitioners and instruct them to respond from the perspective of their personal portfolios. The use of finance professionals as the depositor sample reduces concerns about noise in the answers, as they are likely to better understand the data collection instructions and questions than retail depositors.

Investigating whether bank supervision and depositor disciplining behavior interact during a crisis using historical data would present a significant challenge. Romer and Romer (2017) indicate that major banking crises in developed countries occur infrequently. In most countries, bank supervision parameters change infrequently as well and typically do so in conjunction with changes to other policy variables as part of the government's crisis response. Boyd et al. (2019) emphasize the importance of distinguishing between banking system shocks and policy responses to them. Thus, historical records present researchers with a challenging task of distinguishing the effects of bank supervision on depositor behavior during a crisis from the effects of contemporaneous policy changes induced by the crisis. Moreover, while countries exhibit differences in supervisory effectiveness, they also often differ in terms of major factors influencing depositor decisions, such as the generosity of deposit insurance or the perceived likelihood of bank bailouts, further complicating inferences from historical cross-country data. Instead, the approach pursued in this paper supplements the

actual cross-country variation in supervisory effectiveness with artificial variation in deposit and bank risk in the data collection design.

Taken together, the existing literature suggests several routes through which bank supervision can interact with depositor disciplining behavior. Yet, empirical evidence does not provide a clear answer as to whether supervisory effectiveness is a factor in depositor decisions during periods of financial stress. Based on the premise that government oversight and market discipline may act as substitutes, this study's main hypothesis is that more effective supervision reduces the sensitivity of depositor withdrawals to risk signals. At the same time, the literature highlights several complementary avenues that must be controlled for when testing the significance of supervision in depositor decision-making. Thus, we also hypothesize that withdrawals are more pronounced when deposit insurance is less credible (e.g., regarding the promptness of payouts if insurance prefunding is lacking) or less generous (e.g., if it exhibits a larger potential deposit loss due to only partial coverage), and that the latter influence is affected by bank risk specified in terms of the bank capital level. Lastly, when examining the effects, this paper hypothesizes that the sensitivity of withdrawals to risk signals falls when depositor attachment to banking rises.

III. Sample and Data Collection Approach

A. Respondent Sample

We were able to repurpose a multinational dataset that was collected in 2015–2016, as this time frame overlaps with the most recent supervisory effectiveness measurement by the World Bank. The respondent sample was drawn from developed countries that differed in supervisory effectiveness but were all ranked in the top decile according to the rule of law and overall government effectiveness across the economies in the World Bank's Worldwide Governance Indicators database and, furthermore, featured comparable banking systems.[4] The data collection

4. Potential significant differences in the systems were assessed using three criteria in Cubillas et al. (2012): barriers to entry, prohibition of foreign bank ownership, and limitations on non-bank activities. There were some differences in the number of legally required documents in bank license applications, which serves as a proxy for barriers to entry, but no appreciable differences according to the other criteria.

sought respondents who worked in the investment division, provided financial planning solutions, or oversaw financial market operations at financial services companies in Austria, Germany, Liechtenstein, New Zealand, Switzerland, and the United States (U.S.). There was no intent to construct a sample representative of the global finance professionalpopulation. To maximize the response rate, the data collection was endorsed by the executive management of the companies. The response rate among U.S. respondents was 27%; the rate could not be accurately calculated for the other countries. Due to confidentiality, the names of participating companies could not be disclosed. These companies were neither banks nor directly affiliated with any form of bank.

The selection of countries introduces some considerations potentially relevant to bank failure resolution. Bail-in provisions empower regulators to cancel a portion of bank debt or convert it into equity to stabilize distressed institutions. Giuliana (2022) finds that heightened expectations of bail-ins can strengthen market discipline, though they may also increase bank funding cost, particularly through equity channels. In the aftermath of the 2008 financial crisis, developed countries placed greater emphasis on bail-in strategies for resolving failed banks. Notably, the Dodd-Frank Act, enacted in 2010, established bail-in procedures for unsecured bank creditors in the U.S. Similarly, the Bank Recovery and Resolution Directive (BRRD), adopted in 2014, introduced comparable provisions across the European Union. All countries included in this study maintain some form of bail-in framework.[5] Also, respondents were instructed to assume that in the event of bank failure, resolution would occur promptly. Procedurally, the maximum payout time periods are very short, ranging from one to two days in the U.S. to a maximum of seven days in EU countries. In the case of New Zealand, which lacked a formal deposit insurance scheme during the data collection time, there was no maximum payout period.

After data cleaning, the sample consists of 417 finance professionals, including 69 from Europe (Austria: 18, Germany: 8, Liechtenstein: 13, Switzerland: 30), 50 from New Zealand, and 298 from the U.S. Other researchers used samples of similar size (e.g., Brown et al., 2017; Cohn

5. The frameworks by country are as follows: Austria, Germany, Liechtenstein via BRRD; Switzerland via Financial Market Supervision Authority (FINMA); New Zealand via the Open Bank Resolution framework (OBR); the U.S. via the Dodd-Frank Act. The uninsured depositor often faces bail-in risk exposure.

et al., 2015; Cohn et al., 2017; Kirchler et al., 2018). The proportion of observations from Europe versus the U.S. is consistent with the financial services industry's employment levels in respective countries (OECD, 2019). Also, the proportional reliance on U.S. respondents (72%) is lower than that of Anginer et al. (2018) at 76% of their sample. Still, because the sample is weighted toward the U.S., robustness checks are performed to assess the sensitivity of the results to such imbalance (see Section 5.4 below and Section A.2 in the appendix).

B. Data Collection

Data were collected using an online questionnaire that presented respondents with a hypothetical banking crisis and asked them to indicate, among other things, their intended withdrawals from a selection of bank accounts, each with attributes exposing the depositor to different levels of risk. The questionnaire was designed using conjoint analysis methodology (Aribarg et al., 2017; Green and Wind, 1975; Netzer and Srinivasan, 2011).[6] Conjoint analysis has an advantage over other approaches (e.g., surveys on past behavior) as it produces results that are less susceptible to social desirability and retrospection biases; however, it has a disadvantage in that inferences are drawn from responses to hypothetical scenarios rather than actual events. It has been applied in a range of settings in economics, finance, management science, marketing, and other fields (e.g., Bertrand et al., 2010; Boyle et al., 2022; Ferjani et al., 2009; Iyengar et al., 2008; Kappe et al., 2017; Ramdas et al., 2010).

At the beginning of the questionnaire, respondents were informed that a large bank in their country had just failed, raising the likelihood of financial difficulties for the bank holding their deposit. Conceivably, respondents could have formed different beliefs about the crisis environment (e.g., regarding the likelihood that the government would rescue failing banks), with systematic differences in the beliefs emerging across the sampled countries, which could confound inferences. To

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6. The questionnaire was in English and used the U.S. dollar ($) as the currency unit. As finance professionals, the respondents from Europe and New Zealand were presumably able to convert a U.S. dollar amount into their domestic currency if needed. Because many prospective respondents were native German speakers, the questionnaire was pre-tested on a group of German-speaking academics and finance professionals. Their feedback indicated that it was easy to understand but also challenging and requiring thoughtful responses.

help prevent this, respondents were instructed to assume that the bank holding their deposit was not "too big to fail" (e.g., Iyer et al., 2019) and not owned by the government (e.g., Barth et al., 2013b; Chernykh and Mityakov, 2022).[7] Consistent with the focus on developed countries, respondents were also asked to suppose that the deposit insurance agency would promptly close failing banks and never fail to fulfill its obligations to depositors. In addition, they were asked to assume that they had no deposits in another bank and that neither inflation nor taxes were relevant for their decisions.

Respondents were then shown eight bank accounts (one account at a time), requested to put themselves in the position of the account holder, and asked the following two questions:

> Question 1: *On hearing about the shock to the banking system, I expect my bank to raise the deposit interest rate by...;*
> Question 2: *Given the increased risk of bank failure and expected interest rate change, what percentage of your deposit would you immediately withdraw?*

This study focuses on responses to Question 2 about withdrawals. The primary purpose of Question 1 was to prompt respondents to contextualize their decisions, recognizing that not only depositors but also banks would be reacting to the crisis. (Section 4.2 models the two questions jointly.) To minimize fatigue, respondents selected answers from a set of options rather than entering a numerical value. For Question 1, these were specified in steps of 0.5 percentage points (p.p.), from "zero" to "5.5 p.p. or more." For Question 2, the answer options ranged from "0%" to "100%" in steps of 10%. The process of eliciting crisis-induced responses iterated over the bank accounts, resulting in multiple observations for each finance professional in the sample.

A bank account represented an on-call deposit embedding a combination of depositor protection features and other characteristics. Accounts were specified along five attributes: maximum deposit insurance coverage amount per deposit ($250,000 or $100,000), relative deposit size (75%, 100%, or 150% of the maximum coverage amount), co-insurance provision (75% or 100% guaranteed payout up to the maximum coverage amount), bank capital-to-assets ratio (above or below

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7. Berndt et al. (2025) show that market expectations of government bailouts have significantly declined since the 2008 financial crisis, leading to reduced "too big to fail" protections and higher debt costs for large banks in the U.S. Thus, whether a bank is perceived as "too big to fail" or not may have become less consequential in practice.

TABLE 1. Bank Account Attributes

Attribute	Definition
Bank account attributes shown to finance professionals:	
Coverage limit	The maximum amount that a depositor can claim from the deposit insurer if the bank fails; equals either $100K or $250K.
Deposit as % of coverage limit	The size of the deposit specified as a percentage of the coverage limit; equals 75%, 100%, or 150% of the coverage limit value.
Maximum guaranteed payout	The percentage of the deposit, equaling either 75% or 100%, that will be paid back to the depositor if the bank fails (subject to the condition that such payout cannot exceed the coverage limit value).
Insurance fund	Equals 1 ('Yes') if there is an insurance fund (to which the bank contributes) that can be used to pay back depositors of failed banks, 0 ('No') otherwise.
Low bank capital	Equals 1 ('Yes') if the bank's capital-to-assets ratio is below the average value of this ratio for comparable banks in the country, 0 ('No') otherwise.
Additional variables constructed using bank account attributes:	
Deposit size	The size of the deposit (measured in $100K units).
Fraction at risk	The difference between 1 and the fraction of deposit that will for sure be paid back in the event of bank failure, given the coverage limit and maximum guaranteed payout provisions.
Fraction at risk $\times$ Low bank capital	The product (i.e., interaction) of Fraction at risk and Low bank capital variables.

Note: This table provides the definitions of bank account attributes and related variables used in the analysis.

average level across comparable banks in the country), and prefunding of deposit insurance (yes or no). Attribute definitions are listed in Table 1. One would have wished to investigate additional variables, such as bank size, liquidity, or profitability. However, given the number of attributes already included, adding more would have significantly increased the number of accounts, placing a high burden on respondents and increasing the likelihood of generating low-quality data. A fractional-factorial

design algorithm was applied to reduce the number of accounts to eight, aiming to keep the burden on respondents at a manageable level while allowing researchers to capture essential trade-offs.

Table 2 provides the layout of the accounts. Accounts 1, 4, 5, and 7 feature deposit insurance coverage of up to $100,000, while the other accounts offer a higher coverage limit of $250,000. Deposit sizes in accounts 1, 2, 3, and 7 are 75% of respective coverage limits; in accounts 5 and 6 they are equal to the limits; and in accounts 4 and 8 they are 150% of the limits. Accounts 1, 6, 7, and 8 incorporate co-insurance, guaranteeing a payout of only 75% of the deposit (up to the coverage limit); the other accounts are not subject to co-insurance. As a result, accounts 2, 3, and 5 provide full depositor protection while the remainder embed less-than-full protection in the event of bank failure. To capture this succinctly, a variable *Fraction at risk* is defined as the difference between 100% and the percentage of the deposit that must be paid back if the bank fails. For example, consider account 8, which features a deposit of 1.50×$250,000=$375,000. The insurer is obligated to pay back min {0.75×$375,000,$250,000}= $250,000, which comprises 66.67% of the deposit. Thus, *Fraction at risk* is 33.33%. Table 2 also shows that deposit insurance is prefunded in the case of accounts 1, 3, 5, and 8, and is post-funded otherwise. Accounts 1, 3, 4, and 6 are held at banks with relatively low capital, while the remainder are at banks with relatively high capital. Table 1 and Table 2 also include a constructed interaction between *Fraction at risk* and *Low bank capital*. It is useful because low bank capital could have more relevance for decision-making when depositors are less-than-fully, rather than fully, insured. At the end of the questionnaire, finance professionals reported their age, gender, and financial net worth, as well as measures of personal risk preferences, time preferences, and "attachment" to banking. (Section 5.1 provides the descriptive statistics.) Answer options in the age, gender, and net worth questions were categorical. Risk preferences were elicited using the following question, which had been adopted, with modifications, from Guiso and Paiella (2008):

You are offered the opportunity to buy a security that will immediately expire and pay you back, with equal probabilities, either a total of $5,000 or nothing. What is the maximum amount that you are willing to pay for this security?

TABLE 2. Layout of Bank Accounts

	Bank account							
Attribute	1	2	3	4	5	6	7	8
Information provided to finance professionals:								
Coverage limit	$100K	$250K	$250K	$100K	$100K	$250K	$100K	$250K
Deposit as % of coverage limit	75%	75%	75%	150%	100%	100%	75%	150%
Maximum guaranteed payout	75%	100%	100%	100%	100%	75%	75%	75%
Insurance fund	Yes	No	Yes	No	Yes	No	No	Yes
Low bank capital	No	Yes	No	No	Yes	No	Yes	Yes
Implied information:								
Deposit size	0.750	1.875	1.875	1.500	1.000	2.500	0.750	3.750
Fraction at risk	0.2500	0.0000	0.0000	0.3333	0.0000	0.2500	0.2500	0.3333
Fraction at risk × Low bank capital	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2500	0.3333

Note: This table describes the bank accounts shown to respondents. Each account has five attributes, which are defined in Table 1. In the cases of Insurance fund and Low bank capital, 'Yes' corresponds to 1 and 'No' to 0. Deposit size is measured in $100K units.

A larger willingness-to-pay is indicative of greater risk tolerance. For time preferences, respondents were asked a question that drew on Frederick et al. (2002):

Suppose you are offered a gift of $1,000 payable in one year from today. Alternatively, you may specify any amount to be gifted to you right now. What is the minimum amount you would accept right now instead of the $1,000 in one year?

Willingness to accept a smaller amount is indicative of greater impatience. When answering this and the risk preference question stated earlier, respondents entered exact dollar amounts. To gauge the extent of attachment to banking, respondents were asked to report the length of time their primary accounts had been open at actual banks (answer options were categorical) and provide the number of other relationships (loans, fiduciary, etc.) they had with the banks, in addition to the primary account.

Table 3 lists the created personal characteristic variables, which are used to perform robustness checks and additional analyses (see Sections 5.4 and 5.5, and Section A.4 in the appendix). [8] Additionally, it provides several variables specific to the respondent's country of residence, which are also used in robustness checks.

IV. Econometric Approach

A. Classification of Countries by Bank Supervisory Effectiveness

To classify countries by bank supervisory effectiveness, this study employs the World Bank Official Supervisory Power Index. For examples of its use in prior research, see Anginer et al. (2018) and Barth et al. (2004). The values of the index reflect information for the time period immediately preceding the data collection. Section A.1 in the appendix provides details on the index.

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8. The indicator variables in Table 3 were created using thresholds that, in each case, split the sample in half (as closely as possible) to maximize testing power. Their use facilitates easy interpretation of the results. The table does not include an indicator variable for net worth because the sample appears to be balanced with respect to this characteristic and, thus, a corresponding robustness check would be of little value.

TABLE 3. Personal Characteristic Variables and Variables Specific to Country of Residence

Variable	Definition
Variables reflecting personal characteristics of respondents:	
Indicator for age $\leq$ 40 years	Equals 1 if the respondent selected "20–30 years" or "31–40 years" and 0 if "41–50 years" or "over 50 years."
Indicator for female	Equals 1 if the respondent selected "female" and 0 if "male."
Indicator for willing to pay $1,000 or more for risky security	Equals 1 if the respondent entered 1,000 or a larger value in response to the question regarding the maximum amount they are willing to pay for a security paying $5,000 or nothing with equal probabilities, and equals 0 otherwise.
Indicator for willing to accept $900 or less now	Equals 1 if the respondent entered 900 or a smaller value in response to the question regarding the minimum amount they would accept now instead of $1,000 in one year, and equals 0 otherwise.
Indicator for short account duration	Equals 1 if the respondent indicated that (s)he opened the primary bank account "0–5" or "6–10" years ago and equals 0 otherwise.
Number of additional bank relationships	Number of additional relationships (loans, fiduciary, etc.) that the respondent reported having with the bank holding the primary account (other than the primary account itself).

(Continued)

TABLE 3. Personal Characteristic Variables and Variables Specific to Country of Residence

Variable	Definition
Variables specific to the respondent's country of residence:	
Bank asset concentration	The percentage of total commercial banking assets held by the five largest banks in the country in 2015.
Financial institutions development	The value of the International Monetary Fund's (IMF) Financial Institutions Index for 2015, measuring depth, access, and efficiency. *Remark: This variable is unavailable for Liechtenstein.*
Per capita GDP	The value of the country's Gross Domestic Product (GDP) per capita in 2015, expressed in U.S. dollars or, alternatively, in purchasing power parity (PPP) international dollars.

Note: This table provides the definitions of the personal characteristic variables and variables specific to the respondent's country of residence. These variables are used in the robustness checks and additional analyses.

TABLE 4. Age, Gender, Net Worth, Risk Tolerance, and Impatience of Respondents

	Frequency (%) among respondents from countries with:		Pearson's χ^2-statistic
Personal characteristic	More effective supervision	Less effective supervision	(p-value)
Age:			
20–30 years	11.64	20.83	25.28
31–40 years	22.33	39.58	(0.0000)
41–50 years	25.16	22.92	
Over 50 years	40.88	16.67	
Gender:			
Male	70.16	83.16	6.28
Female	29.84	16.84	(0.0122)
Net worth:			
Under $100,000	15.05	22.45	3.99
$100,000–$500,000	31.66	33.67	(0.4075)
$500,000–1 million	25.71	22.45	
$1–5 million	24.14	18.37	
Over $5 million	3.45	3.06	

(Continued)

TABLE 4. Age, Gender, Net Worth, Risk Tolerance, and Impatience of Respondents

	Frequency (%) among respondents from countries with:		Pearson's χ^2
Personal characteristic	More effective supervision	Less effective supervision	(p-value)
Maximum amount respondent is willing to pay for a 50/50 chance to get $5,000 or nothing:			
$0	31.35	16.33	54.43
$1–$100	10.64	12.24	(0.0145)
$101–$500	12.23	11.22	
$501–$1,000	18.50	18.37	
$1,001–$2,500	20.35	37.75	
$2,501–$5,000	6.88	4.08	
Minimum amount respondent is willing to accept now in lieu of $1,000 in one year from now:			
$0–$100	8.77	15.30	56.23
$101–$500	12.54	4.08	(0.0569)
$501–$800	15.98	9.18	
$801–$900	15.67	16.33	
$901–$950	15.35	15.30	
$951–$999	10.96	14.28	
$1,000	20.69	25.51	

Note: This table shows the distributions of categorically reported values of age, gender, and financial net worth of respondents, as well as the distributions of their numerical responses to the questions about willingness to pay for a risky security offering a 50/50 chance of instant $5,000 payout versus $0 payout and willingness to accept cash immediately in lieu of a $1,000 gift in one year. In each case, the distributions are tabulated separately for respondents residing in countries with more effective supervision and those from countries with less effective supervision. Also provided are the results of Pearson's χ^2 test of the null hypothesis that these distributions are the same.

The main analysis splits the six countries represented in the sample into two three-country groups, using as the threshold the supervisory index value of 12 (this value is close to the unweighted average of index values in the sample). The group with more effective supervision comprises Germany (index value of 12), Liechtenstein (12.4), and the U.S. (13). The group with less effective supervision includes Switzerland (8), New Zealand (10), and Austria (11). These two groups contain 319 and 98 respondents, respectively. An advantage of partitioning countries into two groups is that this facilitates easy interpretation of the results. Because the threshold value of 12 is somewhat arbitrary, robustness checks are performed to assess the sensitivity of the results to changing it (see Section 5.4 and Section A.3 in the appendix).

The cases of Austria and Germany, which are included in different supervisory system groups in the main analysis, require a comment. In November 2014, these countries formally became part of the Single Supervisory Mechanism (SSM) coordinated by the European Central Bank, suggesting that they should be grouped together.[9] However, because the data collection from the finance professionals in the sample was initiated in 2015, the existence of the SSM at the time may not yet have been internalized in their answers. Thus, we prefer to use the classification of countries based on the Official Supervisory Power Index. We performed (unreported) robustness checks by reclassifying Austria and Germany as both having more effective supervision and, alternatively, as both having less effective supervision. In each case, the results were very similar to those in the main analysis, implying that the conclusions in this paper are not sensitive to the specific categorization of Austria and Germany.

B. Econometric Model

An econometric model is specified to better understand the pattern of finance professionals' deposit withdrawal responses while controlling for key influences on their decision-making. An important issue motivating the data collection design was the challenge of making inferences if respondents had formed systematically different beliefs about critical aspects of the banking crisis environment (e.g., how likely the bank

9. We thank an anonymous reviewer for bringing the existence of the SSM to our attention.

would be deemed too big to fail). To prevent the emergence of major belief differences, all respondents were instructed to make several assumptions, as listed in Section 3.2 (e.g., they were asked to assume that banks were not "too big to fail"). Still, respondents could have mentally "filled in the gaps" in the instructions and formed different beliefs (e.g., about the severity of the crisis) or interpreted a given instruction or question differently. The goal is to account for such possible differences by leveraging multiple responses collected from each finance professional, which allows for the inclusion of respondent fixed effects in the model. These effects can help prevent potential confounding from personal characteristics, observed or unobserved. Because the country of residence is a personal characteristic, the fixed effects absorb the additive effect of any country-specific factor, observed or unobserved, on respondents' answers.[10] The fixed effects also help account for possible differences in the interpretation of the banking crisis setup. Formal testing strongly supports the existence of the fixed effects.

Let be *1* if respondent comes from a country with less effective supervision (Austria, New Zealand, or Switzerland in the main analysis) and *0* if resides in a country with more effective supervision (Germany, Liechtenstein, or the U.S.). For bank account , let be the vector of its attributes, containing variables *Deposit size, Fraction at risk, Insurance fund, Low bank capital*, and the interaction *Fraction at risk* $\times$ *Low bank capital*, as defined in Table 1. Also included in equations is the interaction to allow for potential differences in the account attribute effects between the two supervisory system groups. Lastly, let be the interest rate change response given by respondent when evaluating bank account and be the corresponding withdrawal response.

Since the interest rate change and withdrawal responses for a given bank account were elicited nearly simultaneously, they are modeled jointly using a simultaneous equations system:

$$r_{ij} = w_{ij}.\alpha_w + \mathbf{p}'_j.\alpha_p + (L_i \times \mathbf{p}_j)'.\alpha_L + \mu_i + \eta_{ij} \tag{1}$$

$$w_{ij} = r_{ij}.\beta_r + \mathbf{p}'_j.\beta_p + (L_i \times \mathbf{p}_j)'.\beta_L + \nu_i + \varepsilon_{ij} \tag{2}$$

10. Robustness checks discussed in Section A.4 in the appendix explore the potential effects of interactions between respondent personal characteristics and country-specific measures, on the one hand, and account attributes, on the other hand. Such interactive effects are distinct from additive effects accounted for by respondent fixed effects.

where the $\boldsymbol{\alpha}$'s and $\boldsymbol{\beta}$'s coefficients, μ_i and ν_i are respondent fixed effects, and η_{ij} and ε_{ij} are residual error terms.By plugging Equation (1) into Equation (2) and solving for w_{ij} yields the reduced-form withdrawal equation

$$w_{ij} = \mathbf{p}_j' \cdot \gamma_p + (L_i \times \mathbf{p}_j)' \cdot \gamma_L + \theta_i + \epsilon_{ij} \tag{3}$$

where $\boldsymbol{\gamma}_p$ and $\boldsymbol{\gamma}_L$ are coefficient vectors, θ_i is a respondent fixed effect, and ϵ_{ij} is an error term.

In what follows, the focus is on estimating Equation (3) and its extensions. Unlike Equation (2), Equation (3) does not include the "interest rate component" (i.e., a term involving r_{ij} on the right-hand side) and, by itself, would not allow one to distinguish between the "direct" effects of account attributes on the withdrawal rate (i.e., effects p_j and $L_i \times p_j$ on w_{ij} conditional on the value of r_{ij}) and "indirect" effects (i.e., effects of p_j and $L_i \times p_j$ on w_{ij} operating through their impact on r_{ij}). However, because the values of the explanatory variables in Equation (3) are relatively easy to observe in practice, while interest rate change expectations are not, Equation (3) may be of more interest and relevance than Equation (2). Also, one may have little need to distinguish between the direct and indirect effects of account attributes and just be interested in the combined effect represented by $\boldsymbol{\gamma}_p$ and $\boldsymbol{\gamma}_L$. Vector $\boldsymbol{\gamma}_p$ captures the intended withdrawal decisions of respondents residing in countries with more effective supervision. Vector $\boldsymbol{\gamma}_L$ reflects differences in the withdrawal behavior between respondents from countries with less effective supervision and those residing in countries with more effective supervision.

V. Results and Discussion

A. Descriptive Statistics for Personal Characteristics of Respondents

The distributions of answers to the respondent age, gender, and financial net worth questions, as well as the distributions of slightly aggregated answers to the risk and time preference questions, are provided in Table 4. In each case, the table separately displays the distribution for respondents residing in countries with more effective bank supervision and that for respondents from countries with less effective supervision. (Table A1 in the appendix shows the distributions of answers for each country of residence separately.) Also reported in the table are the results of Pearson's χ^2 tests that the distributions are the same.

TABLE 5. Measures of Respondent Attachment to Banking

Measure of attachment	Frequency (%) among respondents from countries with: More effective supervision	Less effective supervision	Pearson's χ^2-statistic (p-value)
Age of primary bank account:			
0–5 years	10.66	7.14	4.72
6–10 years	12.23	20.41	(0.1935)
Over 10 years	76.18	71.43	
Missing	0.94	1.02	
Number of additional bank relationships (loan, fiduciary, etc.):			
0	19.75	20.41	10.60
1	19.12	21.43	(0.0600)
2	21.32	31.63	
3	17.55	7.14	
4	6.58	3.06	
5 or more	15.67	16.33	

Note: This table shows the distributions of reported values of the age of primary account held by a respondent at an actual bank and the number of additional relationships (loan, fiduciary, etc.), if any, the respondent has with the bank (i.e., relationships other than the primary account). In each case, distributions are tabulated separately for respondents residing in countries with more effective bank supervision and those from countries with less effective supervision. Also provided are the results of Pearson's χ^2 test of the null hypothesis that these two distributions are the same.

There are some differences between the two supervisory system groups with regard to the age, gender, risk tolerance, and impatience of respondents, but no difference in the case of net worth. Specifically, respondents from countries with less effective supervision are younger and proportionately more male. They also tend to exhibit greater risk tolerance and patience.

Table 5 compares the distributions of the attachment-to-banking measures between the supervisory system groups. (Table A2 in the appendix shows country-specific distributions.) Over 70% of respondents opened their primary accounts more than ten years prior to the data collection. Roughly 10% have had the accounts open for five years or less. There is no significant difference between the primary account age distributions of the two supervisory system groups. The table also shows that 20% of respondents have no additional relationship with the banks holding their primary accounts. Another 20% have a single additional relationship, and 15% have five or more relationships. There are some inter-group differences in the proportions of those with two and three relationships. Overall, the distributions differ at the 6% significance level. (Also, untabulated results indicate that respondents from the two supervisory system groups have a similar number of bank relationships on average.) Thus, while there are some differences in the attachment to banking, they do not seem to be large.

B. Main Estimation Results

Table 9 shows the estimated parameters of Equation (3) along with some additionally calculated statistics, test results, and R^2 values. Column (1) reports the estimated components of γ_p, which represent the magnitudes of bank account attribute effects for respondents residing in countries with more effective supervision. Column (2) lists estimated components of γ_L, which show differences in effect magnitudes between respondents from countries with less effective supervision and those residing in countries with more effective supervision. To facilitate the interpretation of the results, the table additionally includes column (3), which provides calculated attribute effect magnitudes for respondents from countries with less effective supervision (i.e., $\hat{\gamma}_p + \hat{\gamma}_L$) along with their standard errors. Also included is a separate row for the calculated total effect of the haircut on the withdrawal rate when bank capital is below average (each effect size shown in this row is the sum of corresponding entries

TABLE 6. Distributions of Interest Rate Change and Intended Withdrawal Responses, Aggregated Over Bank Accounts

	Frequency (%) among respondents from countries with:	
Response	More effective supervision	Less effective supervision
Panel A: Deposit interest rate change responses		
Response (p.p.):		
0	28.88	23.47
0.5–2.0	44.87	41.32
2.5–3.5	16.93	18.87
4.0–5.0	5.25	11.99
5.5 or more	2.35	3.32
Missing	1.72	1.02
Average (std.dev.), p.p.	1.45 (1.42)	1.78 (1.66)
# non-missing	2,508	776
Pearson's χ^2-statistic (p-value)	90.48 (0.0000)	
Equal-means t-statistic (p-value)	−5.54 (0.0000)	

(Continued)

TABLE 6. Distributions of Interest Rate Change and Intended Withdrawal Responses, Aggregated Over Bank Accounts

	Frequency among countries with:	
Measure	More effective supervision	Less effective supervision
Panel B: Intended withdrawal responses		
Response (percentage):		
0	25.55	20.41
10–40	28.84	22.31
50	15.67	18.75
60–90	14.14	18.10
100	15.13	20.03
Missing	0.67	0.38
Average (std.dev.), %	41.50 (35.34)	48.78 (36.00)
# non-missing	2,535	781
Pearson's χ^2-statistic (p-value)	39.45 (0.0000)	
Equal-means t-statistic (p-value)	−5.02 (0.0000)	

Note: This table reports the distributions of responses aggregated over bank accounts. Responses to the interest rate question "On hearing about the shock to the banking system, I expect my bank to raise the deposit interest rate by" are reported in percentage points (p.p.). The distributions of these responses are provided in Panel A. Responses to the intended withdrawal question "Given the increased risk of bank failure and expected interest rate change, what percentage of your deposit would you immediately withdraw?" are reported as a percentage of the deposit balance; their distributions are provided in Panel B. Additionally, the table shows the calculated average and standard deviation (std.dev.) of responses and the number of non-missing responses. In each case, the distributions and statistics are tabulated separately for respondents residing in countries with more effective bank supervision and those from countries with less effective supervision. Also provided are the results of Pearson's χ^2 test of a null hypothesis that the distributions are the same and the results of the t test of a null hypothesis that the distributions' means are equal.

in the rows for Fraction at risk and Fraction at risk × Low bank capital.) The within R^2 is 0.2345, indicating that the model explains almost a quarter of the variation in withdrawal responses.

C. Descriptive Statistics for Interest Rate Change and Withdrawal Responses

Table 6 presents the distributions of responses, aggregated over bank accounts, to the questions on the deposit interest rate change and intended withdrawal by respondents from more effective and less effective supervisory systems. (Table A3 in the appendix shows country-specific distributions.) The table also lists the results of testing for differences between the distributions of responses in the two groups. Finance professionals from countries with less effective supervision tend to react more strongly to crisis news than those residing in countries with more effective supervision. The former group expects the bank to increase the interest rate by 1.78 p.p. on average, which is higher (at the 1% significance level) than the average of 1.45 p.p. in the latter group. Also, the former group plans to withdraw 48.78% of the deposit balance on average, which is larger (at the 1% level) than the average of 41.50% in the latter group.

Table 7 shows, by account and respondent group, the average interest rate change and provides test statistics for inter-group differences. Table 8 is laid out similarly but focuses on withdrawals. Figure 1 plots, by account, the average interest rate change alongside the average withdrawal percentage for the two groups. The results further highlight a stronger response to crisis news in the case of less effective supervisory systems. Specifically, respondents from such systems expect a larger interest rate increase by banks across the board, with the difference from the increase anticipated by respondents residing in more effective systems being statistically significant (at the 10% level or better) for accounts 2, 4, 5, and 7. Respondents from less effective systems also plan to withdraw more on average, and this is statistically significant for accounts 4, 5, 6, 7, and 8.

In both respondent groups, the intended withdrawals are greatest for accounts 7 and 8, which represent deposits with sizable haircuts and are held at banks with below-average capital. In contrast, accounts 3 and 5 feature more subdued responses, possibly due to full depositor protection and deposit insurance prefunding.

TABLE 7. Descriptive Statistics for Interest Rate Change Responses, by Bank Account

	Respondents from countries with:	
Statistic	More effective supervision	Less effective supervision
Bank account 1:		
Average (std.dev.), p.p.	1.29 (1.30)	1.41 (1.57)
# non-missing	318	98
Equal-means t-statistic (p-value)	-0.78 (0.4331)	
Bank account 2:		
Average (std.dev.), p.p.	1.50 (1.43)	2.18 (1.82)
# non-missing	315	95
Equal-means t-statistic (p-value)	-3.79 (0.0002)	
Bank account 3:		
Average (std.dev.), p.p.	1.16 (1.21)	1.40 (1.61)
# non-missing	314	98
Equal-means t-statistic (p-value)	-1.59 (0.1134)	

(Continued)

TABLE 7. Descriptive Statistics for Interest Rate Change Responses, by Bank Account

	Respondents from countries with:	
Statistic	More effective supervision	Less effective supervision
Bank account 4:		
Average (std.dev.), p.p.	1.38 (1.44)	1.68 (1.64)
# non-missing	312	96
Equal-means t-statistic (p-value)	-1.68 (0.0936)	
Bank account 5:		
Average (std.dev.), p.p.	1.18 (1.19)	1.64 (1.53)
# non-missing	317	98
Equal-means t-statistic (p-value)	-3.10 (0.0020)	

(Continued)

TABLE 7. Descriptive Statistics for Interest Rate Change Responses, by Bank Account

	Respondents from countries with:	
Statistic	More effective supervision	Less effective supervision
Bank account 6:		
Average (std.dev.), p.p.	1.56 (1.46)	1.78 (1.61)
# non-missing	311	97
Equal-means t-statistic (p-value)		-1.27 (0.2035)
Bank account 7:		
Average (std.dev.), p.p.	1.80 (1.62)	2.24 (1.69)
# non-missing	315	96
Equal-means t-statistic (p-value)		-2.31 (0.0214)
Bank account 8:		
Average (std.dev.), p.p.	1.70 (1.50)	1.93 (1.64)
# non-missing	306	98
Equal-means t-statistic (p-value)		-1.32 (0.1862)

Note: This table reports, by bank account, the calculated average, standard deviation, and number of non-missing responses to the interest rate change question for the group of respondents residing in countries with more effective bank supervision and those from countries with less effective supervision. Also reported in each account's case are the results of the t test of a null hypothesis that the means of the two groups' response distributions are equal.

Additionally, although deposits in accounts 2, 3, and 5 are fully insured, both respondent groups plan to withdraw an average of at least 23.9% of the balances in these accounts. This finding suggests that, regardless of supervisory effectiveness, respondents are apprehensive of the loss of access to funds, however temporary, should the bank fail. Crisis-induced withdrawals from fully insured accounts have been observed in practice. For example, Carlson and Rose (2016) find that the run on Continental Illinois in 1984 continued after the FDIC guaranteed all bank liabilities. Also, Martin et al. (2022) report flight from insured deposits in a failing bank. Overall, account-specific inter-group differences suggest that the two respondent groups could assign different importance to the same account attribute when responding to the crisis. The econometric model estimates discussed below enable a closer look into this matter.

The main results are as follows. When the bank has above-average capital *(Low bank capital = 0)*, haircuts matter to everyone, but are three times as important to respondents from countries with less effective supervision as they are to respondents in countries with more effective supervision. For example, raising the haircut fraction from 0% to 33% increases the average withdrawal among the former respondents by 19.2 p.p. (0.33×58.2838) compared to only 6.6 p.p. (0.33×20.0851) among the latter respondents. The difference between these magnitudes is statistically significant at the 1% level. This difference implies a sizable differential in the scale of crisis-induced withdrawals by large depositors with similar characteristics but residing in countries with different supervisory effectiveness. To illustrate, consider a \$750,000 deposit held at a bank with above-average capital and insured up to \$250,000, without a co-insurance provision. In this case, the depositor faces a potential haircut of $(\$750{,}000 - \$250{,}000)/(\$750{,}000 \cdot 100\%) = 66.67\%$.

Focusing on the increments that are statistically significant in Table 9, the estimates suggest that the withdrawal when supervision is less effective would exceed that when supervision is more effective by $38.1988 \cdot 0.6667/100 \cdot 750{,}000 \approx 191{,}000$.

When bank capital is below average *(Low bank capital = 1)*, which suggests a potentially high prospect of bank failure, haircuts matter much more.

TABLE 8. Descriptive Statistics for Intended Withdrawal Responses, by Bank Account

	Respondents from countries with:	
Statistic	More effective supervision	Less effective supervision
Bank account 1:		
Average (std.dev.), percentage	37.46 (35.25)	40.10 (34.69)
# non-missing	319	98
Equal-means t-statistic (p-value)	-0.65 (0.5152)	
Bank account 2:		
Average (std.dev.), percentage	41.23 (36.63)	46.73 (38.60)
# non-missing	316	98
Equal-means t-statistic (p-value)	-1.28 (0.2005)	
Bank account 3:		
Average (std.dev.), percentage	25.84 (32.08)	25.40 (31.46)
# non-missing	315	98
Equal-means t-statistic (p-value)	0.12 (0.9067)	

(Continued)

TABLE 8. Descriptive Statistics for Intended Withdrawal Responses, by Bank Account

	Respondents from countries with:	
Statistic	More effective supervision	Less effective supervision
Bank account 4:		
Average (std.dev.), percentage	38.93 (31.29)	55.61 (29.78)
# non-missing	305	98
Equal-means t-statistic (p-value)	-4.67 (0.0000)	
Bank account 5:		
Average (std.dev.), percentage	23.94 (32.53)	30.20 (31.49)
# non-missing	317	98
Equal-means t-statistic (p-value)	-1.68 (0.0942)	
Bank account 6:		
Average (std.dev.), percentage	48.20 (32.73)	55.88 (32.11)
# non-missing	316	97
Equal-means t-statistic (p-value)	-2.03 (0.0430)	

(Continued)

TABLE 8. Descriptive Statistics for Intended Withdrawal Responses, by Bank Account

	Respondents from countries with:	
Statistic	More effective supervision	Less effective supervision
Bank account 7:		
Average (std.dev.), percentage	59.56 (34.11)	67.81 (33.60)
# non-missing	318	96
Equal-means t-statistic (p-value)		-2.09 (0.0377)
Bank account 8:		
Average (std.dev.), percentage	56.69 (30.85)	68.98 (29.72)
# non-missing	317	98
Equal-means t-statistic (p-value)		-3.48 (0.0006)

Note: This table reports, by bank account, the calculated average, standard deviation, and number of non-missing responses to the intended withdrawal question for the group of respondents residing in countries with more effective bank supervision and those from countries with less effective supervision. Also reported in each account's case are the results of the t test of a null hypothesis that the means of the two groups' response distributions are equal.

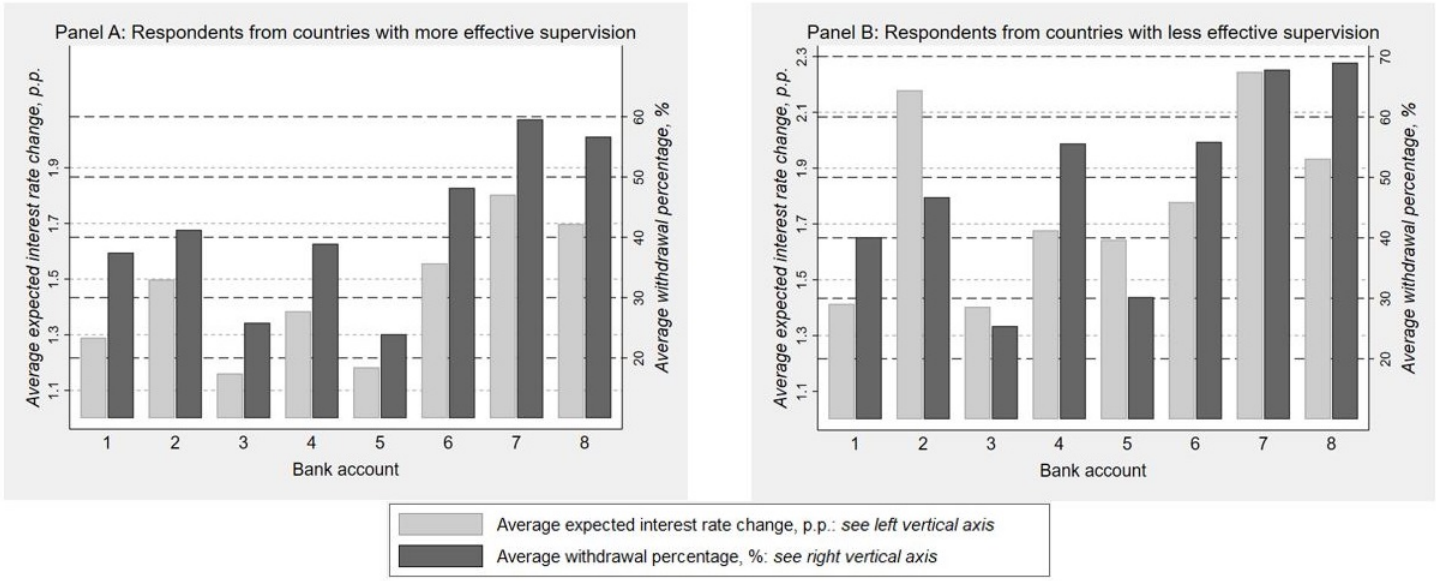

FIGURE 1.— Average deposit interest rate change and withdrawal percentage, by bank account and supervisory effectiveness group.

Note: This figure shows, by bank account and respondent group, the values of average deposit interest rate change (in p.p.) and average intended withdrawal rate (in %). Panel A provides the values for respondents residing in countries with more effective bank supervision. Panel B presents the values for respondents from countries with less effective supervision.

For example, raising the haircut fraction from 0% to 33% increases the average intended withdrawal by 32.1 p.p. (0.33×97.1347) among respondents from countries with less effective supervision and by 28.4 p.p. (0.33×86.0034) among those residing in countries with more effective supervision. The difference between these values is relatively small and not statistically significant.[11]

Taken together, the estimates highlight a negative association between supervisory effectiveness and depositors' propensity to impose discipline on banks. More effective supervision is associated with a "dampened" impact of Fraction at risk on intended withdrawals by finance professionals when confronted with a banking crisis. Such dampening is marked in the case of well-capitalized banks. We do not find a statistically significant dampening of the impact for under-capitalized banks, which could reflect a prominent role of low bank capital in the withdrawal plans of financially knowledgeable individuals when their bank is in potential distress.

In addition, Table 9 reveals that respondents from countries with less effective supervision increase withdrawals by 1.99 p.p. on average with each additional $100,000 held on deposit and by 6.87 p.p. if the bank has below-average capital, even when the deposit is fully insured. The effects are statistically significant at the 5% and 1% levels, respectively. No such statistically significant effects are found for respondents residing in countries with more effective supervision. Also, deposit insurance prefunding reduces withdrawals of respondents from less effective and more effective supervisory systems by 12.84 p.p. and 11.24 p.p., respectively. Both estimates are statistically significant at the 1% level and do not differ significantly from each other. The estimated impact of prefunding likely relates to concerns about the promptness of deposit insurance payouts after bank closure, with prefunding partly alleviating such concerns. Overall, the findings support the research hypotheses outlined in Section 2. More effective supervision is associated with a reduction in the sensitivity of withdrawals to deposit risk, particularly when bank capital is high.

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11. Compared to the above-average bank capital scenario, the differential in the withdrawals between the two supervisory system groups is now substantially subdued. Returning to the illustrative example of the $750,000 deposit, suppose that the bank has below-average capital. Then, the only statistically significant increment implied by the results in Table 9 is that for Low bank capital, suggesting that the withdrawal when supervision is less effective would exceed that when supervision is more effective by $7.5744/100 \cdot 750{,}000 \cong 56{,}800$.

TABLE 9. Estimated Deposit Withdrawal Equation with Respondent Fixed Effects

Explanatory variable	(1) Estimated effect magnitude under More effective supervision	(2) Estimated increment in effect magnitude: Less versus More effective supervision	(3) Calculated effect magnitude under Less effective supervision
Deposit size (in $100k)	0.7045	1.2900	1.9946**
	(0.4621)	(0.9287)	(0.8016)
Fraction at risk	20.0851***	38.1988***	58.2838***
	(6.2152)	(10.3194)	(8.5457)
Insurance fund	-11.2357***	-1.6002	-12.8359***
	(1.0885)	(2.5476)	(2.3052)
Low bank capital	-0.7011	7.5744***	6.8733***
	(1.5438)	(2.7775)	(2.3224)
Fraction at risk × Low bank capital	65.9183***	-27.0674**	38.8509***
	(7.5006)	(13.2867)	(11.2395)

(Continued)

TABLE 9. Estimated Deposit Withdrawal Equation with Respondent Fixed Effects

Explanatory variable	(1) Estimated effect magnitude under More effective supervision	(2) Estimated increment in effect magnitude: Less versus More effective supervision	(3) Calculated effect magnitude under Less effective supervision
Calculated total effect magnitude when bank capital is below average:			
Fraction at risk	86.0034***	11.1313	97.1347***
	(6.1024)	(11.8758)	(10.2643)
H_0: All coefficients are jointly non-significant	F-statistic = 88.50 (p-value = 0.0000)		
H_0: All fixed effects are jointly non-significant	F-statistic = 7.93 (p-value = 0.0000)		
R^2-within (R^2-overall)	0.2345 (0.1299)		

Notes: This table reports the results of estimating Equation (3). Respondents are divided into those residing in countries with more effective bank supervision and those from countries with less effective supervision. Column (1) lists estimated coefficients representing average percentage reduction in deposit size among respondents residing in countries with more effective supervision following a 1-unit increase in a corresponding explanatory variable. Column (2) shows estimated coefficients on the interactions between explanatory variables and the indicator for respondents from countries with less effective supervision; these coefficients represent estimated differences in effect magnitudes between respondents from countries with less effective supervision and those residing in countries with more effective supervision. Column (3) lists calculated average effect magnitudes for respondents from countries with less effective supervision. To facilitate the interpretation of the results, the table additionally reports the calculated total effect of Fraction at risk when bank capital is below average. The estimation employs linear panel data regression methods and uses 3,316 non-missing withdrawal answers from 417 respondents. Bootstrapped standard errors (based on 1,000 replications, clustered on the respondent) are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Also, withdrawal rates are higher when deposit insurance is less generous, and are markedly so when bank capital is low. Furthermore, less confidence in the promptness of deposit insurance payouts (e.g., if insurance is not prefunded) seems to exacerbate withdrawals.

D. Summary of Robustness Checks

We conduct three sets of robustness checks to assess the sensitivity of the key findings to the sample imbalance, the implemented classification of countries by supervisory effectiveness, and the specification of explanatory variables in the econometric model. Details on these robustness checks are provided in the appendix Sections A.2, A.3, and A.4, respectively.

Section A.2 examines the robustness to the sample imbalance using three approaches.[12] First, it implements a country-level wild-cluster bootstrap. The results, though accompanied by rather wide confidence sets, align well with the key findings, particularly regarding the haircut effect under varying levels of bank capital and supervisory effectiveness (see Section A.2.1 for details). Second, the model is re-estimated after excluding subsets of respondents from specific countries. The exclusion, one country at a time, of Austria, Germany, and Liechtenstein has a negligible impact on the results, while dropping New Zealand and Switzerland has a modest impact on estimates without affecting the main conclusions. A more extensive test involves excluding progressively larger fractions of U.S. respondents to mitigate the sample imbalance; even then, the main conclusions remain unchanged (Section A.2.2). Third, multilevel models with random slopes are employed to allow for more variation across countries in the magnitude of account attribute effects on withdrawals. Similar to the main model, these models indicate that more effective supervision dampens the effect of deposit risk when bank capital is high (Section A.2.3).

Section A.3 investigates the robustness of the results to reclassifying countries by supervisory effectiveness.[13] By shifting, up or down, the

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12. We thank an anonymous reviewer for the suggestions.

13. As indicated in Section 4.1, we also performed a separate robustness check pertaining to the classification of Austria and Germany specifically, but do not tabulate the results.

threshold value of the Official Supervisory Power Index used to classify countries, it shows that the key findings persist. The estimates continue to reflect a negative association between supervisory effectiveness and the haircut effect, with small changes in estimated magnitudes aligning well with the ranking of countries.

Section A.4 assesses whether the main results could be spurious due to possible omission of important explanatory variables from the econometric model. Two sets of variables are considered: personal characteristics of respondents (e.g., age, gender, risk tolerance, impatience) and country-specific factors (e.g., bank asset concentration, financial institutions development, per capita GDP). Including the interactions of these variables with bank account attributes in the withdrawal equation does not alter the main conclusions, further highlighting the robustness of the findings.

E. Additional Findings

Guided by studies investigating the impact of depositor "attachment" to the bank on depositor decisions (e.g., Brown et al., 2020; Egan et al., 2017; Iyer and Puri, 2012; Iyer et al., 2016), we use corresponding respondent characteristics to perform two additional analyses. First, we check whether the effects of account attributes on withdrawals can differ not only between the two supervisory system groups, but also between respondents with older and newer primary bank accounts within each group. Let D_i be the indicator of a relatively short duration of respondent *i*'s primary account: D_i = 1 if *i* opened the account at most 10 years ago and D_i = 0 if more than 10 years ago. Thus, we partition respondents into four subgroups—by supervisory effectiveness and primary account age—and re-specify the econometric model to allow the account attribute effects to be subgroup-specific. Equation (3) becomes

$$\begin{aligned} w_{ij} = \mathbf{p}_j' \cdot \boldsymbol{\gamma}_p + (L_i \times \mathbf{p}_j)' \cdot \boldsymbol{\gamma}_L + (D_i \times \mathbf{p}_j)' \cdot \boldsymbol{\gamma}_D \\ + (D_i \times L_i \times \mathbf{p}_j)' \cdot \boldsymbol{\gamma}_{DL} + \theta_i + \epsilon_{ij} \end{aligned} \tag{4}$$

where most of the notation is similar to that defined earlier, and $\boldsymbol{\gamma}_D$ and $\boldsymbol{\gamma}_{DL}$ are new coefficients to estimate. Effect magnitudes for each respondent subgroup can be calculated by adding coefficients. For example, the effect of p_j on the withdrawal rate of respondents from countries with less effective supervision who have had their primary

TABLE 10. Impact of Fraction at risk on Withdrawals when Effects of Bank Account Attributes Are Additionally Allowed to Vary with Respect to Age of Primary Bank Account

Impact of Fraction at risk on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Main results (Table 9):			
Bank capital > average	20.0851***	38.1988***	58.2838***
	(6.2152)	(10.3194)	(8.5457)
Bank capital < average	86.0034***	11.1313	97.1347***
	(6.1024)	(11.8758)	(10.2643)
Re-specified econometric model:			
Effects for respondents who have had a primary bank account open for more than 10 years:			
Bank capital > average	14.6630**	54.5296***	69.1926***
	(7.1299)	(10.5670)	(7.8313)
Bank capital < average	77.4134***	14.6837	92.0971***
	(6.5436)	(13.3909)	(12.0260)

(Continued)

TABLE 10. Impact of Fraction at risk on Withdrawals when Effects of Bank Account Attributes Are Additionally Allowed to Vary with Respect to Age of Primary Bank Account

Impact of Fraction at risk on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Effects for respondents who have had a primary bank account open for at most 10 years:			
Bank capital > average	38.3343***	-8.9118	29.4225
	(11.7096)	(24.3913)	(21.8008)
Bank capital < average	115.1105***	-4.3842	110.7263***
	(13.3733)	(26.4020)	(22.8521)

Notes: This table contains a subset of results from estimating Equation (4), where the effects of bank account attributes on withdrawals are allowed to vary jointly with respect to (1) the level of supervisory effectiveness (more versus less effective) and (2) the age of the respondent's primary bank account (more than 10 years versus at most 10 years). The table focuses on the effect of Fraction at risk on withdrawal percentage and shows its magnitude in the cases of above- versus below-average bank capital level under more versus less effective supervision, and does so separately for respondents who have had a primary account open for more than 10 years versus those who have had the account open for at most 10 years. To facilitate the interpretation of the findings, the initial rows of the table show the effect magnitudes for the main model specification, which does not differentiate respondents by the primary account age, copied from Table 9. Bootstrapped standard errors (based on 1,000 replications, clustered on the respondent) are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

accounts open for at most 10 years is $\boldsymbol{\gamma}_p + \boldsymbol{\gamma}_L + \boldsymbol{\gamma}_D + \boldsymbol{\gamma}_{DL}$.

Table 10 presents estimates, focusing on the magnitude of the haircut effect for each respondent subgroup. The results for respondents who have had their primary accounts open for more than 10 years (i.e., those who have long-standing relationships with their banks) are similar to the main estimates in Table 9: More effective supervision is associated with a dampened impact of Fraction at risk on the withdrawal rate, and such dampening is statistically significant only in the above-average bank capital case. In contrast, there is no evidence that more effective supervision is associated with a dampened impact of *Fraction at risk* among respondents who have had their primary accounts open for 10 years or less, regardless of the bank capital level.

Next, we examine whether the magnitude of account attribute effects varies with the number of bank relationships beyond the primary account. Let N_i be the number of such relationships of respondent i. Each effect magnitude is modeled as a linear function of N_i and, therefore, Equation (3) becomes:

$$\begin{aligned} w_{ij} = \mathbf{p}_j' \cdot \boldsymbol{\gamma}_p + (L_i \times \mathbf{p}_j)' \cdot \boldsymbol{\gamma}_L + \mathbf{p}_j' \cdot N_i \boldsymbol{\gamma}_N \\ + (L_i \times \mathbf{p}_j)' \cdot N_i \boldsymbol{\gamma}_{NL} + \theta_i + \epsilon_{ij} \end{aligned} \tag{5}$$

where $\boldsymbol{\gamma}_N$ and $\boldsymbol{\gamma}_{NL}$ are new coefficients to estimate. Thus, if respondent i resides in a country with more effective supervision and has N_i relationships, the impact of $\mathbf{p}_j$ on w_{ij} is $\boldsymbol{\gamma}_p + \boldsymbol{\gamma}_N N_i$: Coefficients $\boldsymbol{\gamma}_p$ and $\boldsymbol{\gamma}_N$ can be respectively interpreted as the "intercept" and "slope" of this impact with respect to N_i. If i comes from a country with less effective supervision, the impact of p_j on w_{ij} is $(\boldsymbol{\gamma}_p + \boldsymbol{\gamma}_L) + (\boldsymbol{\gamma}_N + \boldsymbol{\gamma}_{NL})N_i$, where $(\boldsymbol{\gamma}_p + \boldsymbol{\gamma}_L)$ and $(\boldsymbol{\gamma}_N + \boldsymbol{\gamma}_{NL})$ are the "intercept" and "slope," respectively.

Table 11 presents estimates, focusing on the "intercept" and "slope" of the functions representing the magnitude of the haircut effect, when differentiated according to bank capital and supervisory effectiveness levels. For example, if respondent *i* resides in a country with more effective supervision, has a deposit at a well-capitalized bank, and has N_i relationships, the haircut effect's magnitude is "43.7246"-10".7915".N_i. The magnitude here decreases with N_i (the slope estimate is significant at the 1% level), indicating a weakening of the link between the haircut and withdrawal rate as the number of bank relationships increases.

To visualize the results, Figure 2 plots the estimated values of the

haircut effect under various scenarios. Panel A shows the magnitudes under more effective (long dashed line) and less effective (short dashed line) supervision when deposits are held at high-capital banks. There is an attenuation of the effect's size as the number of bank relationships increases in the case of more effective supervision. In comparison, there is no link between the effect's size and the number of relationships under less effective supervision: the slope of the short dashed line is negative (-2.4953), but not significantly different from zero. Panel B plots the values when deposits are held by low-capital banks. The effect's size does not vary with the number of relationships, regardless of the supervisory effectiveness level: the slopes of the lines in Panel B are not significantly different from zero.

Figure 3 plots the difference in the Fraction at risk's effect on withdrawals between the cases of less effective and more effective supervision, in terms of the number of relationships. Panel A implies that when bank capital is above average, more effective supervision is associated with a dampened impact of Fraction at risk in all instances, except in the case of respondents with no links to their bank beyond the primary account. In turn, Panel B indicates that when bank capital is below average, there is no significant association between the magnitude of the haircut effect and supervisory effectiveness across all respondent subgroups.[14]

Overall, the findings in this section provide qualified support for the depositor attachment hypothesis outlined in Section 2. Specifically, we find strong evidence that the sensitivity of withdrawals to deposit risk declines with increased depositor attachment to banking when supervision is more effective and bank capital is high. There is little to no evidence of a decline in the sensitivity in response to increased attachment under different circumstances.

VI. Conclusion

Recent research provides a favorable assessment of bank oversight, indicating that supervisory attention can improve bank managers' decisions and help reduce bank risk and the likelihood of bank failure.

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14. Figures 2 and 3 provide 90% confidence intervals. We also calculated 95% confidence intervals; however, the change in the significance level does not alter the conclusions

TABLE 11. Impact of Fraction at risk on Withdrawals when Effects of Bank Account Attributes Vary with Number of Additional Bank Relationships

Type of impact on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Intercept: Impact of Fraction at risk when respondents have no additional relationships:			
Bank capital > average	43.7246***	19.6288	63.3534***
	(9.9265)	(14.4812)	(11.4652)
Bank capital < average	81.5719***	−4.1491	77.4229***
	(9.9825)	(18.3985)	(15.6020)

(Continued)

TABLE 11. Impact of Fraction at risk on Withdrawals when Effects of Bank Account Attributes Vary with Number of Additional Bank Relationships

Type of impact on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Slope: Impact of interaction between Fraction at risk and number of additional relationships:			
Bank capital > average	-10.7915***	8.2963	-2.4953
	(3.9499)	(6.5482)	(5.3837)
Bank capital < average	2.0131	7.7623	9.7754
	(3.4031)	(7.4768)	(6.6929)

Notes: This table contains a subset of results from estimating Equation (5), where the effects of bank account attributes are allowed to vary with respect to the supervisory effectiveness level and the magnitude of each effect is specified as a linear function of the number of additional relationships (loan, fiduciary, etc.) that the respondent has with the bank holding his or her primary account. The table focuses on linear functions representing the effect of Fraction at risk on withdrawal percentage in the cases of above- versus below-average bank capital under more versus less effective supervision. For each combination of the bank capital and supervisory effectiveness levels, it shows (1) the impact of Fraction at risk when the respondent has no relationships beyond the primary account (this impact represents the "intercept" of an underlying linear function) and (2) the impact of the interaction between Fraction at risk and number of additional relationships (this impact represents the "slope" of the function). (Figure 2 and Figure 3 help visualize the results by plotting the functions and differences, respectively, along with corresponding confidence intervals.) Bootstrapped standard errors (based on 1,000 replications, clustered on the respondent) are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

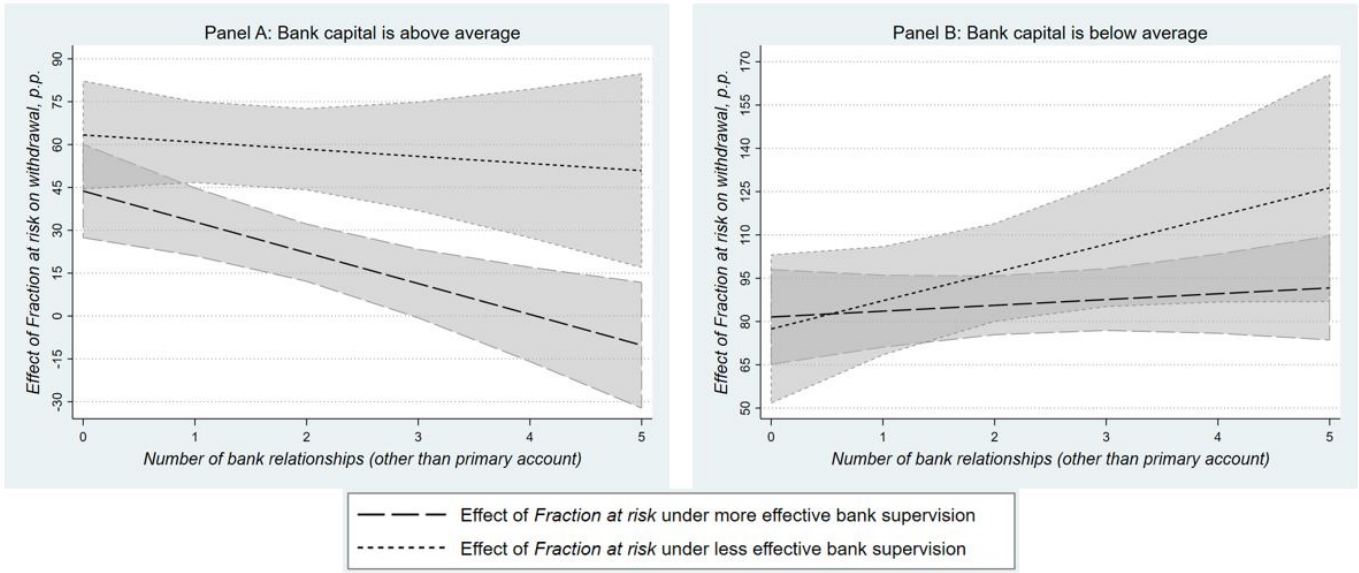

FIGURE 2.— Impact of the number of additional bank relationships on the magnitude of the Fraction at risk's effect on withdrawals.

Note: This figure shows the estimated effect of Fraction at risk on intended withdrawals when the magnitude of this effect is modeled in Equation (5) as a linear function of the number of additional relationships (i.e., relationships other than the primary account) that respondents have with banks holding their primary accounts. Panel A provides the magnitudes, differentiated with regard to the supervisory effectiveness level, for the case of above-average bank capital. Panel B presents the magnitudes for the case of below-average capital. The black dashed lines represent the estimates of the magnitudes. The outlined light gray-shaded areas show corresponding bootstrapped 90% confidence intervals. The dark gray-shaded segments of the areas indicate the instances of partial overlap of confidence intervals.

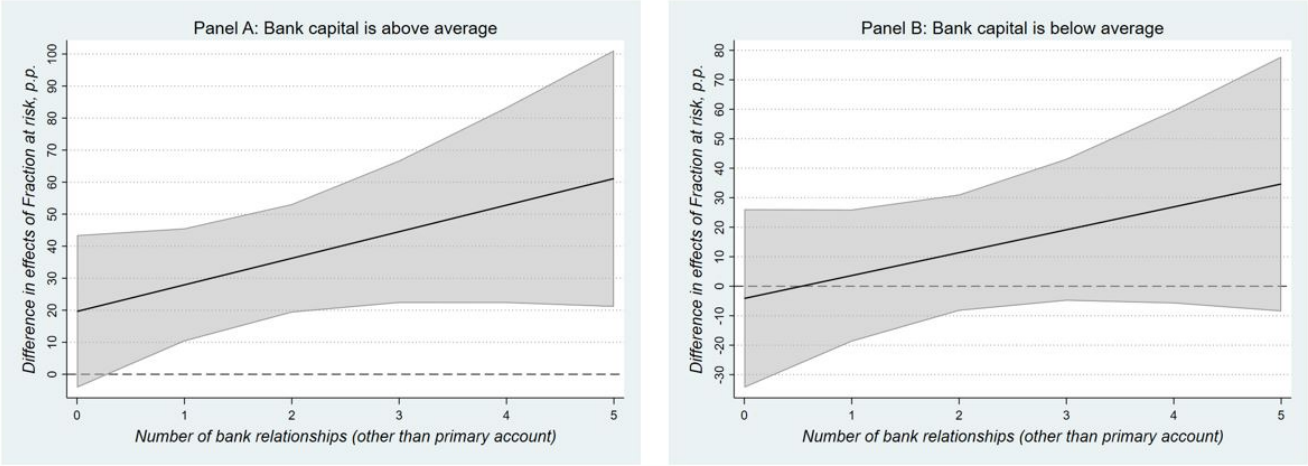

FIGURE 3.— Difference in the magnitudes of the Fraction at risk's effect on withdrawals, by the number of additional bank relationships.

Note: This figure shows the difference between the magnitude of the Fraction at risk's effect on withdrawals under less effective bank supervision and that under more effective supervision, by the number of additional relationships (i.e., those other than the primary account) that respondents have with their banks. (The underlying effect levels are plotted in Figure 2.) Panel A provides the difference for the case of above-average bank capital. Panel B shows the difference for the case of below-average capital. The outlined gray-shaded areas represent corresponding bootstrapped 90% confidence intervals.

However, depending on how this linkage is perceived by financially knowledgeable depositors, more effective supervision can diminish their incentive to impose discipline on banks. This paper investigates such potential relationship by analyzing the behavior of finance professionals residing in developed countries with varying supervisory effectiveness. During the data collection exercise, these professionals assumed the role of individual depositors in banks affected by a hypothetical crisis.

Controlling for several variables found in previous studies to meaningfully affect depositor behavior (e.g., deposit insurance coverage and bank capital level), the results highlight a strong negative relationship between bank supervisory effectiveness and the propensity of financially knowledgeable individuals to impose discipline on banks at the crisis onset: more effective supervision is associated with a reduced sensitivity of withdrawals to the risk of deposit loss, particularly in the case of deposits held at banks with above-average capital level. This key finding persists across a range of robustness checks assessing its sensitivity to the sample imbalance, the approach to classifying countries by supervisory effectiveness, and the specification of the econometric model. Additional results indicate that crisis-induced withdrawals can be reduced if deposit insurance is prefunded or more generous and can also be mitigated if depositors have deeper ties to the banking system, particularly in cases where bank supervision is strong and bank capital level is high.

If the causal effect of supervisory effectiveness on the behavior of financially knowledgeable depositors underlying the key findings indeed exists, the results of this paper have several implications. Specifically, if more effective supervision undermines the incentive for financially knowledgeable depositors to impose discipline on banks, bolstering a bank regulator's supervision mandate can have undesirable moral hazard consequences, which is of relevance for designing banking policy. Additionally, the results suggest that, regardless of the supervisory setting, bank managers should prioritize shoring up bank capital as a means of mitigating potential withdrawals in a future crisis, especially when depositors are only partially insured. In settings with more effective supervision, this strategy will be further strengthened by credible oversight that bolsters depositor confidence, enabling banks to limit withdrawal risk through capital adequacy without unduly restricting liquidity creation. The findings of this paper pertaining to bank-depositor relationships are more nuanced but still relevant. In particular, to further lessen withdrawals in a future crisis, managers of well-capitalized banks in a more effective supervisory system would want to cultivate

relationships with depositors. However, such a strategy would not be particularly effective in other situations (e.g., when bank capital is low). Thus, the results suggest a priority list for bank managers, namely: focus on strengthening bank capital first and then shift attention to deepening ties with depositors.

Certain Note of caution must be recognized in interpreting the results. The respondents comprise a convenience sample of finance professionals from six countries. Sampling is limited to developed economies due to previous research indicating that bank monitoring is only tractable in environments with an established rule of law. There is a need for future extensions of the supervision effect testing to the cases of broader depositor populations and other countries, including developing economies. Studies of this kind may become feasible in the future as the World Bank continues collecting data on bank supervisory effectiveness around the globe.

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Appendix

A.1. Details on the World Bank Official Supervisory Power Index

The Official Supervisory Power Index is based on the multi-country Bank Regulation and Supervision Survey (BRSS) conducted by the World Bank. Barth et al. (2013a) describe early rounds of the survey and the index itself. The BRSS, including its most recent round (World Bank, 2021), is filled out by local bank regulatory officials, with several officials often drawn from the same country to ensure the consistency of responses. The index is constructed using 11 questions that focus on supervisors' authority to oversee bank activities and take corrective action. Responses to eight of these questions are coded as 1 if affirmative and 0 otherwise. Responses to the other three questions receive double weight and are coded as 2 if affirmative (0 otherwise). The index is the sum of the 11 responses, as coded, with the value ranging from 0 to 14. Higher values indicate more effective supervision.

The first two of the 11 questions pertain to the interaction between the supervisor and a bank's external auditor. The next six questions focus on the supervisor's relationship with the bank, particularly the supervisor's ability to influence bank management (e.g., by reducing bonuses paid to managers) or require the bank to take certain actions (e.g., change internal organization

structure, establish loss coverage provisions, or suspend dividend payments to shareholders). The final three questions address the supervisor's authority in a problem bank resolution process (namely, the power to declare bank insolvency, supersede shareholder rights, and replace bank management). The three double-weighted questions refer to the supervisor's ability to reduce managers' remuneration, supersede shareholder rights, and replace bank management.

Index values are straightforward to calculate for all countries in the sample, except Liechtenstein. They range from 8 for Switzerland (relatively least effective supervision) to 13 for the U.S. (most effective supervision); the values for New Zealand, Austria, and Germany are in between, at 10, 11, and 12, respectively. The unweighted average is 12.1. Unlike in most sampled countries, supervisors in Switzerland lacked the power to require banks to establish loss coverage provisions and the power to supersede shareholder rights or remove bank management in a problem bank resolution process. In the case of Liechtenstein, answers to three of the 11 questions are unavailable. Therefore, an "all average scaled" index version is used in this case, calculated as an average of non-missing answers multiplied by 11 (Barth et al., 2013a). The value is 12.4, suggesting a supervisory effectiveness somewhere between that in Germany and the U.S.

A.2. Robustness of Results to Sample Imbalance

The data employed in the paper exhibit an imbalance in the representation of countries. The sensitivity of the key findings to this data feature is assessed below using a country-level wild-cluster bootstrap method, re-estimations of the main econometric model after dropping a subset of respondents from the sample, and multilevel models with random slopes.

A.2.1. Country-Level Wild-Cluster Bootstrap

In settings with clustered errors, especially those where clusters are heterogeneous or of unequal size, or where the number of clusters is small, the wild-cluster bootstrap (Cameron et al., 2008) could approximate the true data-generating process more accurately than other approaches, potentially enabling more robust inference. We implement it using the "boottest" package in Stata (Roodman et al., 2019). Table A4 reports the 90% confidence sets for the effect of Fraction at risk on withdrawal percentage obtained using this method. Similar to other analyses in the paper, the focus is on the haircut effect in cases of above- versus below-average bank capital levels under more versus less effective supervision, as well as differences in magnitude between the two

TABLE A1. Age, Gender, Net Worth, Risk Tolerance, and Impatience of Respondents, by Country of Residence (%)

Characteristic	Austria	Germany	Liechtenstein	New Zealand	Switzerland	United States
Age:						
20–30 years	16.67	62.50	15.38	32.00	3.33	10.40
31–40 years	33.33	25.00	7.69	40.00	40.00	22.82
41–50 years	27.78	12.50	53.85	16.00	30.00	24.16
Over 50 years	22.22	0.00	23.08	12.00	26.67	42.62
Gender:						
Male	77.78	62.50	100.00	80.00	83.33	68.12
Female	22.22	37.50	0.00	20.00	16.67	31.88
Net worth:						
Under $100,000	33.33	50.00	15.38	28.00	6.67	14.09
$100,000–$500,000	50.00	25.00	15.38	30.00	30.00	32.55
$500,000–1 million	16.67	12.50	23.08	26.00	20.00	26.17
$1–5 million	0.00	12.50	38.46	14.00	36.67	23.83
Over $5 million	0.00	0.00	7.69	2.00	6.67	3.36
Maximum amount respondent is willing to pay for a 50/50 chance to get $5,000 or nothing:						
$0	22.22	12.50	46.15	8.00	26.67	31.21
$1–$100	16.68	25.00	7.69	12.00	9.99	10.42
$101–$500	5.56	0.00	0.00	12.00	13.33	13.09
$501–$1,000	16.67	25.00	7.69	22.00	13.33	18.79
$1,001–$2,500	33.33	37.50	38.45	44.00	29.99	19.14

(Continued)

TABLE A1. Age, Gender, Net Worth, Risk Tolerance, and Impatience of Respondents, by Country of Residence(%)

Characteristic	Austria	Germany	Liechtenstein	New Zealand	Switzerland	United States
Minimum amount respondent is willing to accept now in lieu of $1,000 in one year:						
$0–$100	16.67	0.00	7.69	10.00	23.33	9.06
$101–$500	5.56	0.00	7.69	4.00	3.33	13.09
$501–$800	5.56	25.00	7.69	8.00	13.33	16.10
$801–$900	27.78	0.00	15.38	20.00	3.33	16.10
$901–$950	11.11	12.50	15.38	20.00	10.00	15.46
$951–$999	16.68	25.00	15.38	14.00	13.33	10.40
$1,000	16.67	37.50	30.77	24.00	33.33	19.80

Note: This table shows, by country of residence, the distributions of the specified personal characteristics of the respondents.

TABLE A2. Measures of Respondent Attachment to Banking, by Country of Residence (%)

Measure	Austria	Germany	Liechtenstein	New Zealand	Switzerland	United States
Age of primary bank account:						
0–5 years	0.00	25.00	0.00	10.00	6.67	10.74
6–10 years	11.11	25.00	7.69	20.00	26.67	12.08
Over 10 years	83.33	50.00	92.31	70.00	66.67	76.17
Missing	5.56	0.00	0.00	0.00	0.00	1.01
Number of additional bank relationships (loan, fiduciary, etc.):						
0	16.67	12.50	15.38	24.00	16.67	20.13
1	16.67	25.00	15.38	24.00	20.00	19.13
2	16.67	37.50	7.69	34.00	36.67	21.48
3	5.56	12.50	38.46	8.00	6.67	16.78
4	5.56	0.00	15.38	4.00	0.00	6.38
5 or more	38.89	12.50	7.69	6.00	20.00	16.11

Notes: This table shows, by country of residence, the distributions of reported values of the age of primary account held by a respondent at an actual bank and the number of additional relationships (loan, fiduciary, etc.) the respondent has with the bank.

TABLE A3. Distributions of Interest Rate Change and Intended Withdrawal Responses, Aggregated Over Bank Accounts, by Country of Residence (%)

Response	Austria	Germany	Liechtenstein	New Zealand	Switzerland	United States
Panel A: Deposit interest rate change responses						
Response (p.p.):						
0	22.92	12.50	21.15	21.00	27.92	29.66
0.5–2.0	37.49	23.43	57.70	43.00	40.83	44.87
2.5–3.5	16.67	37.50	10.57	18.50	20.83	16.66
4.0–5.0	20.14	18.75	4.81	11.75	7.50	4.91
5.5 or more	1.39	4.69	3.85	5.50	0.83	2.22
Missing	1.39	3.12	1.92	0.25	2.08	1.68
Average (std.dev.), p.p.	1.98 (1.72)	2.46 (1.63)	1.67 (1.32)	1.90 (1.72)	1.46 (1.47)	1.41 (1.41)
# non-missing	142	62	102	399	235	2,344
Panel B: Intended withdrawal responses						
Response (percentage):						
0	13.89	23.44	24.04	22.50	20.83	25.67
10–40	18.05	28.12	27.89	21.25	26.66	28.90
50	20.83	7.81	19.23	17.50	19.58	15.73
60–90	25.69	28.13	5.76	18.00	13.74	14.13
100	21.53	12.50	22.12	20.50	18.33	14.89
Missing	0.00	0.00	0.96	0.25	0.83	0.67
Average (std.dev.), %	56.11 (34.03)	45.94 (35.49)	43.98 (36.90)	48.17 (36.82)	45.38 (35.28)	41.27 (35.27)
# non-missing	144	64	103	399	238	2,368

Note: This table shows, by country of residence, the distributions of interest rate change and intended withdrawal responses aggregated over bank accounts.

supervisory system groups. The midpoints of each confidence set are provided for comparison with the corresponding point estimates in the main results in the paper. If a confidence set contains zero, then the null hypothesis of no effect (or no difference in effect magnitudes) cannot be rejected. While the confidence sets in Table A4 tend to be wider than those implied by the standard errors reported in the main results, they are well-aligned with the key findings in the paper. Specifically, when the bank capital level is higher than average, the confidence set for the difference in effect magnitudes (see the "Confidence set for increment" column) implies that the haircut effect's size is larger under less effective supervision than under more effective supervision.[15] In turn, when the capital level is below average, equal effects cannot be rejected. Thus, the key conclusions are unchanged.

A.2.2. Re-estimation After Dropping Subsets of Respondents

A further check is performed by re-estimating the main econometric model on subsamples created by excluding various groups of respondents from the full sample (e.g., by leaving respondents from a particular country out). Table A5 summarizes the results, focusing again on the magnitude of the haircut effect under the different scenarios, as well as the differences in magnitude between the supervisory system groups. The table indicates that excluding data for respondents from Austria, Germany, or Liechtenstein, one country at a time, has a negligible impact on the estimated magnitudes compared to the main results, and thus has no effect on the key conclusions. Excluding observations from New Zealand results in a small change in the estimates, reflecting a modest reduction in the sensitivity of withdrawals to haircuts under less effective supervision. This finding suggests that, compared to finance professionals from other countries, those from New Zealand tend to be more apprehensive about potential deposit loss, which could be due to the country's lack of formal deposit insurance at the time of data collection and limited direct experience with deposit insurance historically. Still, the estimates indicate that more effective supervision is associated with a statistically significant decrease in the magnitude of the haircut effect when the bank capital level is above average and non-significant decrease when the capital level is below average. In turn, leaving out data for finance professionals from Switzerland produces results that tend to be even more pronounced than the main findings: in addition to being strongly associated with a reduced haircut effect when the bank capital level is above average, more effective supervision is also associated with a reduced haircut effect when the capital level is below average, though in the

15. Unreported estimates show that the null hypothesis of equal effects can be rejected here at the 5% significance level in a two-sided test, rather than only at the 10% level implied in Table A4.

TABLE A4. 90% Confidence Sets for Effects of Fraction at Risk on Withdrawal Percentage Obtained Using Wild-Cluster Bootstrap

Impact of Fraction at risk on withdrawal percentage for bank capital levels	Confidence set for magnitude under More effective supervision	Confidence set for increment: Less versus More effective supervision	Confidence set for magnitude under Less effective supervision
Bank capital > average	[−1.8362, 46.9616] Midpoint: 22.5627	[7.9090, 69.5249] Midpoint: 38.7170	[29.7636, 90.2769] Midpoint: 60.0203
Bank capital < average	[83.3840, 88.7196] Midpoint: 86.0518	[−47.5411, 68.6678] Midpoint: 10.5634	[36.7314, 156.4769] Midpoint: 96.6042

Note: This table reports the 90% confidence sets for the effect of Fraction at risk on withdrawal percentage obtained using the country-level wild-cluster bootstrap method. The method is implemented in Stata using the "boottest" package and employs 999 replications (Roodman et al., 2019). The focus is on the magnitude of the effect of Fraction at risk in the cases of above- versus below-average bank capital level under more versus less effective supervision, as indicated in the table. Also shown, in each bank capital level case, are the wild-cluster bootstrap-based confidence sets for the difference in the effect magnitude between respondents from countries with relatively less effective bank supervision and those residing in countries with more effective supervision.

TABLE A5. Sensitivity of Main Results to Excluding Indicated Respondents from Estimation Sample

Impact of Fraction at risk on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Main results in the paper (no respondents are excluded):			
Bank capital > average	20.0851*** (6.2152)	38.1988*** (10.3194)	58.2838*** (8.5457)
Bank capital < average	86.0034*** (6.1024)	11.1313 (11.8758)	97.1347*** (10.2643)
Respondents from Austria are excluded:			
Bank capital > average	20.0851*** (6.0824)	40.9484*** (11.5066)	61.0335*** (9.6296)
Bank capital < average	86.0034*** (6.0289)	14.3805 (12.6494)	100.3840*** (11.1791)
Respondents from Germany are excluded:			
Bank capital > average	19.1472*** (6.1727)	39.1366*** (10.3730)	58.2838*** (8.2352)
Bank capital < average	86.1736*** (6.0082)	10.9612 (11.8763)	97.1347*** (10.2121)
Respondents from Liechtenstein are excluded:			
Bank capital > average	18.4457*** (6.3715)	39.8382*** (10.1450)	58.2838*** (8.2509)
Bank capital < average	85.8562*** (5.8996)	11.2786 (11.8386)	97.1347*** (10.3311)

(Continued)

TABLE A5. Sensitivity of Main Results to Excluding Indicated Respondents from Estimation Sample

Impact of Fraction at risk on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Main results in the paper (no respondents are excluded):			
Respondents from New Zealand are excluded:			
Bank capital > average	20.0851*** (6.3712)	25.3682*** (9.8032)	45.4532*** (7.4693)
Bank capital < average	86.0034*** (5.8552)	−14.9397 (13.1076)	71.0638*** (11.4784)
Respondents from Switzerland are excluded:			
Bank capital > average	20.0851*** (6.2538)	44.0244*** (12.5228)	64.1095*** (10.6912)
Bank capital < average	86.0034*** (5.9881)	25.6968* (14.8341)	111.7003*** (13.4063)
Two-thirds of respondents from the U.S. are excluded:			
Bank capital > average	21.8070** (10.8206)	36.4769*** (13.9821)	58.2838*** (8.5066)
Bank capital < average	90.8805*** (9.0392)	6.2542 (13.3426)	97.1347*** (10.0782)

Notes: This table contains a subset of results from estimating the main econometric model when leaving the specified respondents out. The table shows the magnitude of the impact of Fraction at risk on withdrawal percentage for the cases of above- versus below-average bank capital under more versus less effective supervision. To facilitate the interpretation of the findings, the initial rows of the table show the main results (Table 9 in the paper), when no respondents are excluded. Bootstrapped standard errors (based on 1,000 replications, clustered on the respondent) are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

supervisory setting. Instead of excluding all U.S. finance professionals from the sample, we investigate whether mitigating the imbalance in country representation by dropping a large fraction (e.g., a randomly selected one-half) of U.S. respondents alters the key results. Thus, re-estimations are performed after dropping one-half, two-thirds, and three-fourths of U.S. respondents. To illustrate the findings, the final rows of Table A5 show estimates obtained in the middle-ground case, after excluding two-thirds of U.S. observations.[16] Except for increased standard errors and weaker statistical significance in several cases, the estimates resemble the main results, although the magnitude of the (still positive and statistically significant) difference in the haircut effects between less and more effective supervisory systems when the bank capital level is above average is somewhat reduced. Thus, it does not appear that the imbalance in country representation in the full sample substantially skews the key results.[17]

A.2.3. Multilevel Models with Random Slopes

The final check of robustness to the sample imbalance is performed using multilevel models with random slopes. We consider a range of such models but focus on three-level ones in which the first (bottom) level is the level of individual observations, the second (middle) level is the respondent level (recall that each respondent provides eight withdrawal answers), and the third (top) level is the country-of-residence level. Estimations are performed using the "mixed" command in Stata (StataCorp, 2025).

latter case this is significant only at the 10% level.

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16. Estimates obtained after dropping one-half of U.S. respondents are virtually the same as those for the full sample, except for mildly larger standard errors. The results obtained after dropping three-fourths of U.S. respondents are not much different. However, due to increased standard errors, the estimate of the haircut effect under more effective supervision when the bank capital level is above average loses statistical significance, while the difference in the haircut effect magnitudes between less versus more effective supervisory settings when the capital level is above average becomes significant only at the 5% (rather than 1%) level.

17. A related concern of an anonymous reviewer is that the results could be driven primarily by a U.S.–versus–Switzerland comparison. To explore the possibility, we drop all observations from these two countries and reclassify Austria, Germany, and Liechtenstein as having more effective supervision and New Zealand as having less effective supervision. This provides an estimation sample that is only one-fifth the size of the full sample, but roughly balances the number of observations between the two supervisory system groups. Estimates still indicate that more effective supervision is associated with a dampened impact of Fraction at risk on withdrawals; however, because of much increased standard errors, the results are not significant at the 5% level.

Leaving respondents from the U.S. out of the estimation sample, particularly when doing so without reclassifying the other countries by supervisory effectiveness, presents a difficult challenge for statistical inference. The difficulty arises because dropping all U.S. observations reduces the dataset to only about one-quarter of its original size, while simultaneously eliminating over 90% of observations classified as originating from a more effective To illustrate the findings and relate them to the main results, we provide estimates obtained for a flexible three-level model with random slopes and random intercepts. In the model, the effects of bank account attributes on withdrawals are allowed to vary across the countries in the sample and are specified using random slopes. Furthermore, the means of the slopes and the variances of the random components of the slopes are permitted to differ between the two supervisory system groups. To help capture possible non-independence of the eight withdrawal answers by a respondent (e.g., due to potential confounding factors), the model additionally incorporates random intercepts at the respondent level. Similar to the main withdrawal equation in the paper, each of the eight withdrawal answers includes a distinct residual error term; these residual errors are allowed to be heteroskedastic. The model is potentially limited, however, in that it imposes a joint normal distribution on the random components and the errors.

Table A6 provides a subset of model estimates, focusing on the means of the random slopes within each of the two supervisory system groups. It also shows the calculated difference between respective means.[18] While the obtained means of the slopes for *Fraction at risk* when the bank capital level is above average and for *Fraction at risk* when the capital level is below average suggest that the effects of haircuts on withdrawals are, in general, somewhat less pronounced compared to the effects indicated by the main results, the estimates still clearly show that more effective supervision is associated with a significantly dampened impact of *Fraction at risk* when bank capital is high and insignificantly dampened impact when bank capital is low. Thus, the key conclusions are unaffected.

A.3. Robustness of Results to Reclassifying Countries by Supervisory Effectiveness

One might worry that the negative association between supervisory effectiveness and depositors' propensity to impose discipline on banks brought to light in the paper is a mere artifact of partitioning countries using the threshold value for the Official Supervisory Power Index set at 12. To assess

18. Because the multilevel model here is parameterized differently from the main econometric model in the paper, the layout of Table A6 is intentionally different from that of the main results' table to help prevent confusion.

TABLE A6. Estimates for Multilevel Withdrawal Model with Random Slopes

Bank account attribute	Mean of random slopes: Less effective supervision group	Mean of random slopes: More effective supervision group	Calculated difference in means
Deposit size (in $100k)	1.8756**	1.0232*	0.8523
	(0.9275)	(0.5368)	(1.0375)
Fraction at risk when bank capital > average	53.7775***	19.9446***	33.8328***
	(9.3126)	(6.0545)	(9.7528)
Insurance fund	−13.5734***	−11.7404***	−1.8330
	(2.1477)	(1.0814)	(2.3304)
Low bank capital	5.5893**	−0.6955	6.2849**
	(2.7116)	(1.7576)	(2.8478)
Fraction at risk when bank capital < average	95.2700***	84.8284***	10.4417
	(11.9768)	(5.1065)	(12.9186)

Notes: This table reports a subset of estimates from a three-level model with random slopes and random intercepts. In the model, the bottom level is that of withdrawal response observations, the middle level is the respondent, and the top level is the country of residence. The effects of the bank account attributes are allowed to vary across countries and are specified using random slopes. The means (i.e., expected values) of the slopes and variances of the random components of the slopes are permitted to differ between the two supervisory system groups. The model contains random intercepts at the respondent level and allows the residual error terms in the respondent's account-specific withdrawal answers to be heteroskedastic. The table shows the means of the random slopes across countries in each of the two supervisory system groups and provides the calculated difference between the respective means (i.e., the mean across countries with more effective bank supervision is subtracted from that across countries with less effective supervision). The estimation employs the "mixed" command in Stata (StataCorp, 2025) and uses 3,316 non-missing withdrawal answers from 417 finance professionals residing in six countries. Standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE A7. Sensitivity of Main Results to Reclassification of Countries by Supervisory Effectiveness

Impact of Fraction at risk on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Main results in the paper:			
Bank capital > average	20.0851***	38.1988***	58.2838***
	(6.2152)	(10.3194)	(8.5457)
Bank capital < average	86.0034***	11.1313	97.1347***
	(6.1024)	(11.8758)	(10.2643)
Re-estimated econometric models:			
Countries are partitioned using a high threshold value of the supervisory effectiveness index:			
Bank capital > average	17.4229***	40.8052***	58.2282***
	(6.3941)	(10.1253)	(8.1011)
Bank capital < average	86.0298***	9.0267	95.0565***
	(6.3427)	(10.7313)	(8.9172)

(Continued)

TABLE A7. Sensitivity of Main Results to Reclassification of Countries by Supervisory Effectiveness

Impact of Fraction at risk on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Countries are partitioned using a low threshold value of the supervisory effectiveness index:			
Bank capital > average	21.4817***	39.5518***	61.0335***
	(6.0040)	(11.0590)	(9.6070)
Bank capital < average	85.8416***	14.5424	100.3840***
	(5.9395)	(12.7322)	(11.2972)

Notes: This table contains a subset of results from re-estimation of the econometric model after changing the threshold value of the supervisory effectiveness index used to partition countries according to supervisory effectiveness. The table focuses on the effect of Fraction at risk on withdrawal percentage and shows its magnitude in the cases of above- versus below-average bank capital level under more versus less effective supervision. To facilitate the interpretation of the findings, initial rows of the table show the effect magnitudes for the main econometric model specification in the paper. Bootstrapped standard errors (based on 1,000 replications, clustered on the respondent) are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

the sensitivity of the key findings to this threshold choice, Equation (3) in the paper is re-estimated after changing how countries are classified. Table A7 contains a subset of the results, with the focus on the magnitude of the haircut effect under the different scenarios of interest.

First, the threshold value is increased to 13 ("high threshold value" referenced in Table A7), implying that the group of respondents from more effective systems now consists only of those residing in the U.S. (298 respondents), while the group of those from less effective systems includes everyone else (119 respondents in total). Second, the threshold value is decreased to 11 ("low threshold value"), which implies that the former group is comprised of respondents residing in Austria, Germany, Liechtenstein, and the U.S. (337 respondents), while the latter group includes only those from New Zealand and Switzerland (80 respondents). Changing the threshold value does not alter the conclusion that the negative association exists: the pattern of pertinent estimates (and their statistical significance) in Table A7 is similar to that in the main results, indicating that the key findings are robust to the reclassification. While numerical changes in the estimated magnitudes are small, their direction reflects the ranking of countries by supervisory effectiveness. Specifically, given that the negative relationship is strong in the case of high-capital banks, one would anticipate the impact of Fraction at risk when the bank capital level is above average to be smallest among respondents residing in the country with the most effective supervision in the sample (i.e., the U.S.) and largest among those from countries with the least effective supervision (New Zealand and Switzerland). Estimates in Table A7 align with this anticipation. To illustrate, when the high threshold value is used to partition respondents, estimated effects of Fraction at risk under more effective supervision represent average effects across U.S. respondents; the estimate in the case of above-average bank capital is 17.4229, down from the corresponding main estimate in the paper of 20.0851. When the low threshold value is employed, Fraction at risk's effects under less effective supervision reflect average effects across respondents from New Zealand and Switzerland; the estimate in the case of above-average bank capital is 61.0335, up from the corresponding main estimate of 58.2838.

A.4. Robustness of Results to Omission of Potentially Important Variables

One might also worry that the key findings of this paper are spurious in that bank supervision could, in fact, be irrelevant in depositor decision-making while the obtained association between supervisory effectiveness and the haircut effect is simply due to the main econometric model specification omitting a variable that (a) influences depositor decisions in a tangible way and (b) takes values that systematically differ between the two supervisory system groups. If that is the case, including this (hypothetical) variable in the model should cause the

TABLE A8. Sensitivity of Main Results to Including in Econometric Model Interactions Between Bank Account Attributes and Personal Characteristic Variables

Impact of Fraction at risk on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Main results in the paper:			
Bank capital > average	20.0851*** (6.2152)	38.1988*** (10.3194)	58.2838*** (8.5457)
Bank capital < average	86.0034*** (6.1024)	11.1313 (11.8758)	97.1347*** (10.2643)
Re-specified econometric models:			
Model includes interactions with indicator for age ≤ 40 years:			
Bank capital > average	14.8021** (7.3901)	34.2849*** (10.3551)	49.0870*** (10.1238)
Bank capital < average	80.6531*** (7.1403)	7.1804 (12.0685)	87.8335*** (11.8228)

(Continued)

TABLE A8. Sensitivity of Main Results to Including in Econometric Model Interactions Between Bank Account Attributes and Personal Characteristic Variables

Impact of Fraction at risk on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Model includes interactions with indicator for female:			
Bank capital > average	28.5143*** (7.2775)	34.4625*** (10.5171)	62.9768*** (8.1497)
Bank capital < average	89.2614*** (7.3228)	9.6100 (12.1697)	98.8714*** (10.3147)
Model includes interactions with indicator for willing to pay $1,000 or more for risky security:			
Bank capital > average	18.1661** (8.4852)	37.6127*** (10.1153)	55.7788*** (9.9332)
Bank capital < average	91.2597*** (8.2996)	12.6914 (11.7750)	103.9512*** (11.0589)
Model includes interactions with indicator for willing to accept $900 or less now:			
Bank capital > average	30.2323*** (7.6760)	36.6853*** (10.2516)	66.9176*** (9.6399)
Bank capital < average	105.7335*** (8.5774)	7.9832 (11.7833)	113.7166*** (11.2515)

Notes: This table contains a subset of results from re-estimations of the econometric model after adding interactions between bank account attributes and each of the four specified personal characteristic indicators to the list of explanatory variables. The table shows the magnitude of the impact of Fraction at risk on withdrawal percentage for the cases of above- versus below-average bank capital under more versus less effective supervision when the value of the specified personal characteristic indicator variable is equal to zero. Notably, the "Increment" column in the table is also applicable when the value of the personal characteristic indicator variable is equal to one; this column shows components of the estimated coefficient vector in Equation (A1). To facilitate the interpretation of the findings, the initial rows of the table show the effect magnitudes for the main econometric model specification in the paper. Bootstrapped standard errors (based on 1,000 replications, clustered on the respondent) are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

previously obtained key results to dissipate. Formally, let x_i be the value of such a variable in the case of respondent i. The revised withdrawal equation, which includes x_i, is specified as

$$w_{ij} = \mathbf{p}'_j \cdot \boldsymbol{\gamma}_p + (L_i \times \mathbf{p}_j)' \cdot \boldsymbol{\gamma}_L + (x_i \times \mathbf{p}_j)' \cdot \boldsymbol{\gamma}_x + \theta_i + \epsilon_{ij} \qquad \text{(A1)}$$

where $\boldsymbol{\gamma}_x$ represents new coefficients to estimate (the other notation is similar to that in the paper). If x_i was indeed erroneously omitted previously and supervisory effectiveness does not, in fact, affect depositor decisions, the estimates for the components of $\boldsymbol{\gamma}_L$ in Equation (A1) should be statistically non-significant and negligible when compared to the corresponding estimates for Equation (3) in the paper.[19] Below, we explore two sets of candidate variables for x_i. Table 3 in the paper provides the underlying variable definitions.

A.4.1. Personal Characteristics of Respondents

Since the two supervisory system groups are not perfectly balanced with regard to age, gender, risk tolerance, and impatience of respondents (see Table 4 in the paper), the basic question is whether the key findings for supervisory effectiveness in the paper could be spurious because respondents with different characteristics assign different importance to bank account attributes when deciding on withdrawals. Table A8 provides a subset of results from estimating Equation (A1) using the four corresponding personal characteristic indicators. By comparing the estimates shown in Table A8 with the main results (Table 9 in the paper), we infer that the pattern of the main results cannot be attributed to compositional differences between the two supervisory system groups. In fact, even after additionally allowing for different effects of account attributes on withdrawals by respondents with different characteristics, residing in a country with more (versus less) effective bank supervision is still associated with a substantial dampening of the impact of Fraction at risk on withdrawals from high-capital banks and a non-significant dampening in the case of low-capital banks.

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19. To be clear, by including respondent fixed effects, Equation (3) in the paper already accounts for any respondent-level variable, observed or unobserved, that has an additive effect on withdrawals. By contrast, the potential "omitted variable bias" that could cause spurious results when estimating Equation (3), and is of concern to us here, is one that would operate through interactions between the omitted variable and account attributes. Equation (A1) aims to preclude such bias

TABLE A9. Sensitivity of Main Results to Including in Econometric Model Interactions Between Bank Account Attributes and Country-Specific Variables

Impact of Fraction at risk on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Main results in the paper:			
Bank capital > average	20.0851*** (6.2152)	38.1988*** (10.3194)	58.2838*** (8.5457)
Bank capital < average	86.0034*** (6.1024)	11.1313 (11.8758)	97.1347*** (10.2643)
Re-specified econometric models:			
Model includes interactions with a measure of bank asset concentration:			
Bank capital > average	27.1994*** (6.9255)	25.5435** (10.0095)	52.7429*** (7.9451)
Bank capital < average	94.5098*** (7.4382)	−4.0079 (12.6467)	90.5019*** (9.8837)

(Continued)

TABLE A9. Sensitivity of Main Results to Including in Econometric Model Interactions Between Bank Account Attributes and Country-Specific Variables

Impact of Fraction at risk on withdrawal percentage for indicated bank capital levels	Magnitude under More effective supervision	Increment: Less versus More effective supervision	Magnitude under Less effective supervision
Model includes interactions with a measure of financial institutions development:			
Bank capital > average	26.3147*** (9.0990)	31.9342*** (10.3583)	58.2489*** (8.2981)
Bank capital < average	97.8263*** (8.0732)	−0.7621 (10.7306)	97.0641*** (10.1946)
Model includes interactions with per capita GDP in U.S. dollars:			
Bank capital > average	21.8890*** (6.3420)	39.4523*** (10.1905)	61.3413*** (8.3179)
Bank capital < average	83.7486*** (6.5673)	9.5066 (11.6162)	93.2553*** (10.0167)
Model includes interactions with per capita GDP in PPP dollars:			
Bank capital > average	21.4196*** (6.2257)	41.1047*** (10.3298)	62.5243*** (8.6603)
Bank capital < average	84.4293*** (6.3703)	7.6137 (11.7084)	92.0431*** (10.4469)

Notes: This table contains a subset of results from re-estimations of the econometric model after adding interactions between bank account attributes and each of the four specified country-specific measures to the list of explanatory variables. The value of each country-specific variable is set to the Z-score for the underlying numerical measure. The table shows the magnitude of the impact of Fraction at risk on withdrawal percentage for the cases of above- versus below-average bank capital under more versus less effective supervision when the Z-score is equal to zero. Notably, the "Increment" column in the table is applicable regardless of the value of the Z-score; this column shows components of the estimated coefficient vector in Equation (A1). To facilitate the interpretation of the findings, the initial rows of the table show the effect magnitudes for the main econometric model specification in the paper. The model involving the measure of financial institutions' development is estimated without observations from Liechtenstein because the IMF's Financial Institutions Index value is unavailable for Liechtenstein. Bootstrapped standard errors (based on 1,000 replications, clustered on the respondent) are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

A. Country-Specific Variables

Another candidate for x_i in Equation (A1) would be a country-specific characteristic that may affect depositor decisions during a crisis.[20] For example, respondents in countries with more interconnected banking systems may be more concerned about the possibility of the crisis spreading widely and, thus, may respond more strongly to a given deposit risk signal, compared to those from less interconnected systems. If the level of a country's supervisory effectiveness is systematically related to the degree of its banking system's interconnectedness, the key findings in the paper could be invalid.

Although many potential candidate variables exist, of most concern are variables pertaining to the economic and banking system environment, as they could be related to both the level of supervisory effectiveness in a respondent's country of residence and the respondent's perception of deposit risk. While the sampled countries feature comparable financial systems, they can still differ in important ways, namely, in the extent of competition in the banking industry, the degree of development of financial institutions, or the level of societal prosperity. To construct corresponding variables, we use available measures of bank asset concentration, financial institutions development, and per capita Gross Domestic Product (GDP). The value of bank asset concentration is equal to the percentage of total commercial banking assets held by the five largest banks in the country in 2015, which ranges from 29.2% for Germany to 95.3% for Liechtenstein (source: fred.stlouisfed.org). The financial institutions' development is proxied by the IMF's Financial Institutions Index for 2015; its value ranges from 0.68 for Austria to 0.99 for Switzerland (source: prosperitydata360.worldbank.org). [21] For per capita GDP, we use the 2015 value in U.S. dollars, which ranges from $38,639 for New Zealand to $167,809 for Liechtenstein, and, alternatively, the 2015 value in purchasing power parity (PPP) international dollars, which ranges from $37,488 for New Zealand to $134,192 for Liechtenstein (sources: CIA World Factbook and databank.worldbank.org). Prior to estimation, the values of these country-specific measures are converted to Z-scores. Table A9 presents a subset of results, following the same layout as Table A8. The estimates indicate that even after including the interactions between the country-specific variables and bank account attributes in the econometric model, the key findings of the paper remain intact.

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20. In the setting of this paper, a country-level variable is a special case of a respondent-level variable because the country of residence is a respondent's personal characteristic.

21. The IMF's Financial Institutions Index measures the development of financial institutions in terms of their depth, access, and efficiency. We also investigated using the IMF's Financial Development Index, but found no substantive change to the estimation results of interest when employing it instead of the Financial Institutions Index. The values of both indices are unavailable for Liechtenstein.