

Distortive Effects of Deposit Insurance: Administrative Evidence from Deposit and Credit Registers

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Motivation

- The **expansion of the coverage of deposit insurance (DI) during financial crises**, including DI creation, is one of the most widely used public policy tools
 - ▶ 1933 USA; 2008 EU and USA; Japan 1990s; 2023 USA after the SVB failure, etc.
- A key rationale of deposit insurance is that **bank runs have been crucial** during financial crises throughout history (Reinhart & Rogoff, 2009) and also recently (Shin, 2009; FDIC, 2023)
- But, banks mostly **fail due to solvency** (notably due to credit risk) **rather than liquidity** issues (Correia, Luck & Verner, 2026; Baron, Laeven, Pénasse & Usenko, 2026)
- All this raises a **key question**: **What do expansions of DI accomplish during financial crises?**
 - ▶ **Dávila and Goldstein (2023)** e.g. derive a model of optimal DI coverage highlighting trade-offs between benefits & costs. **Yet, empirical evidence on DI benefits & costs during crises is scant**

This paper

- **Question:** How do changes to deposit insurance coverage affect the allocation of deposits across banks (notably to weak banks) and, in turn, the allocation of credit to non-financial corporations?
- **Administrative data** from Denmark: Universe of retail and corporate deposits (**deposit register**) and of corporate loans (**credit register**) matched to person, bank & firm administrative info
- **Reform of deposit insurance limit** triggered by 2008 **Global Financial Crisis** (GFC)
 - ▶ Oct-2008: Deposit insurance limit of EUR 40K lifted, resulting in **unlimited deposit insurance**
- **Proxy for weak (exposed) banks:** banks' loan/deposit (L/D) ratio in Dec-2007 proxies for exposure to 2008 GFC (IMF, 2011; Jensen & Johannesen, AER 2017)
 - ▶ High L/D banks have fragile liabilities & higher pre-crisis credit growth, resulting in higher loan losses post-2008

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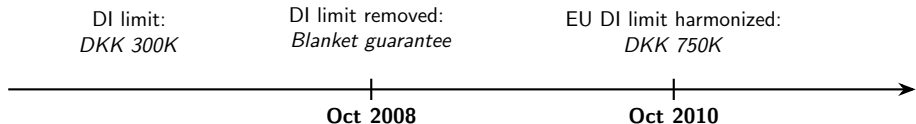
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 - ▶ Many exposed banks that get deposits due to DI eventually fail, with very strong predictive power, providing suggesting evidence that **DI contributes to persistence of too weak banks**
- **Exposed banks with higher percentage of uninsured deposits** cut credit supply when limited DI, but expand credit supply with unlimited DI, especially to very risky firms
 - ▶ Analysis with loan level data with firm-time FE, and loan volume and prices

Contributions to the literature

- Despite that deposit insurance is raised in crisis times, and that solvency issues are then crucial, the literature analyzes –in normal times– the moral hazard associated to DI (Demirgüç-Kunt and Detragiache, 2002; Demirgüç-Kunt and Huizinga, 2004; Beck and Laeven, 2008; Calomiris and Jaremski, 2019). We instead analyze **DI effects in crisis times and, moreover, push further on the causality front**
- Prior studies with granular data find that DI reduces uninsured runs, but only exploit 1 bank (Iyer and Puri, 2012; Iyer, Puri, and Ryan, 2016; Martin, Puri, and Ufier, 2026). We instead show that **DI implies deposit reallocation from stronger to weaker banks, raising their credit supply, but to very risky firms**. We also provide evidence on **corporate (vs retail) depositors**, which is much less analyzed
- We show how increased **DI coverage can benefit less solvent banks with more liquidity problems**, consistent with Correia, Luck, and Verner, 2024, **increasing misallocation** through deposit reallocation and continued lending to very risky firms (Hsieh and Klenow, 2009; Acharya et al., 2022)
- We **contribute empirically to the theoretical debate** on DI role in different types of bank runs (Diamond and Dybvig, 1983; Allen and Gale, 2004; Goldstein and Pauzner, 2005) and its distortions on market discipline (Gorton, 1988; Calomiris and Kahn, 1991; Diamond and Rajan, 2001; Rochet and Vives, 2004; Dávila and Goldstein, 2023)

Deposit Insurance, Data and Empirical Strategy

Deposit insurance (DI) reforms in Denmark: Timeline of key events



- Pre-Oct 08: DI limit was **DKK 300K**
- Oct 08: Reacting to Lehman collapse, Danish government **guarantees all deposits**
 - ▶ Danish banks financed credit boom, notably in real estate, by relying on wholesale (foreign) borrowing. Wholesale market freeze in 2008-Q3 led to liquidity squeeze for Danish banks
- Oct 10: EU harmonized DI to **DKK 750K**
- DI applies at the **depositor-bank** level

Administrative datasets

- **Universe of retail and corporate deposits (deposit register)**

- ▶ Data spans deposit accounts of 6.5 million individuals and 85,000 NFCs at 92 banks in Denmark between 2004 and 2010
- ▶ Annual data on **year-end volume** and interest payment over the previous year
- ▶ Impute deposit rates for depositor h at bank b in year t as
$$i_{hbt} = \frac{\text{Interest payments}_{hbt}}{0.5 \times (\text{Deposit balance}_{hbt} + \text{Deposit balance}_{hb,t-1})}$$
- ▶ Each deposit account is associated with a unique identifier for each individual and bank

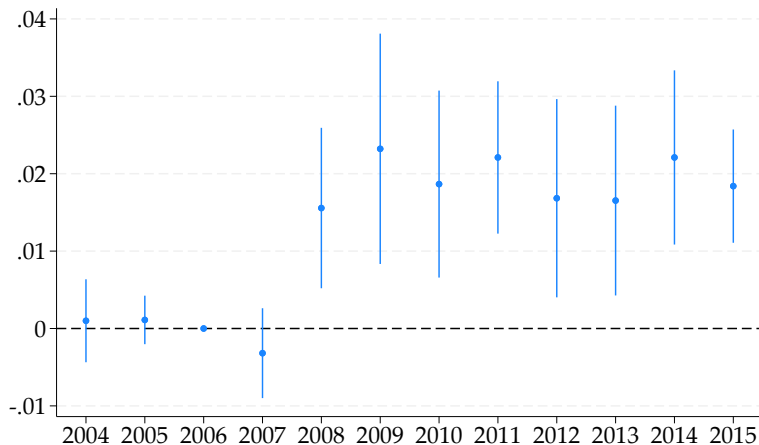
- **Matched with:**

- ▶ NFC credit register: Term loans, credit lines and credit cards
- ▶ Individual-level wealth data from tax records
- ▶ Supervisory bank data
- ▶ Firm registry

Banks with weaker balance sheets

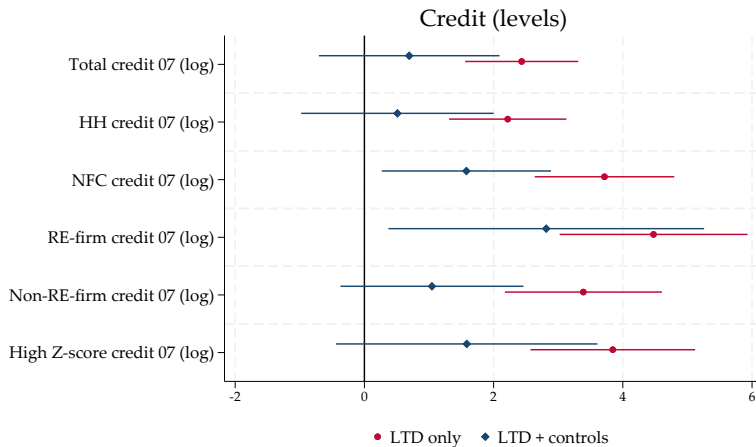
- Banks with weak asset fundamentals and liquidity issues are more vulnerable in times of crisis
- A proxy to identify banks with weaker fundamentals, particularly those holding more illiquid assets—in particular high levels of credit—, notably with higher credit growth in the boom:
 - ▶ The **loan-to-deposit** ratio serves as a measure of a bank's exposure; banks with higher ratios are more susceptible to crises (IMF in rescue programs, 2011; Schularick and Taylor, AER 2012; Johannsen et al., AER 2017)
- We also analyze ex-post failed banks

High L/D banks had elevated *ex-post* loan losses



Table

High L/D banks had larger loan portfolios *pre-crisis*



Bank exposure correlates *pre-crisis* with other fragility measures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outcome: Loan/deposit ratio 2007									
Total assets (log)	0.10*** (0.02)								0.04 (0.03)
T1 capital ratio (std)		-0.01* (0.01)							-0.01*** (0.00)
Avg credit growth 2004-2007			1.62*** (0.39)						0.95** (0.36)
Interbank debt (log, std)				0.06*** (0.01)					0.03*** (0.01)
Real-estate credit share					0.38* (0.20)				0.29* (0.17)
Loan losses '08-'15/Capital '07						0.27*** (0.05)			0.03 (0.06)
Failing bank b/t 2009-2015							0.39*** (0.07)		0.14** (0.07)
Top-6 bank								0.18 (0.11)	-0.09 (0.19)
Observations	94	94	91	89	89	89	94	94	77
R2	0.24	0.09	0.19	0.35	0.06	0.24	0.19	0.01	0.63

Notes: All characteristics are measured in 2007 unless indicated otherwise.

Empirical strategy

- We analyze deposit and credit data by exploiting:
 - ▶ Before and after deposit insurance (DI) reform during the GFC: crisis with limited vs unlimited DI
 - ▶ Below and above DI limit (DKK 300K)
 - ▶ Differential bank exposure to the GFC based on their loan-to-deposit ratio at the end of 2007: $(Loans/Deposits)_{Dec-07}$
 - As well as % uninsured bank deposits
 - Further heterogeneity: Depositor-level wealth; firm weakness (ex-ante risk & ex-post loan defaults)
- Exploiting data at the *bank-time*, *bank-account-time*, *individual-bank-time*, *firm-bank-time* level, and differential granular level of fixed effects
 - ▶ E.g., the same individual reallocating deposits across different banks within the same period
 - ▶ E.g., within the same bank at the same time, change of deposits just above vs just below the DI limit

The 2008 Global Financial Crisis (GFC) and
shift from limited to unlimited DI coverage:
Bank-level outcomes

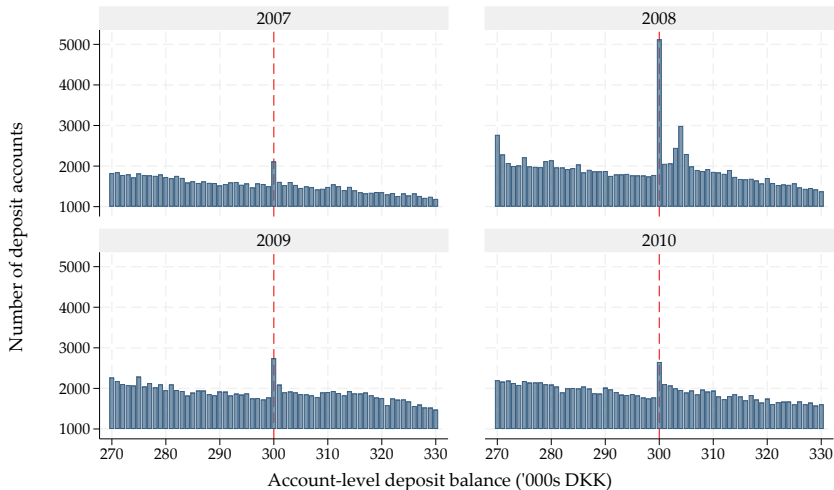
Liquidity stress in 2008: Q3 limited vs. Q4 unlimited DI coverage

Outcome: Quarterly change in logs	Total liquidity		Total deposits		Deposit rate	
	(1)	(2)	(3)	(4)	(5)	(6)
	2008-q3	2008-q4	2008-q3	2008-q4	2008-q3	2008-q4
Loan/deposit 2007	-0.06 (0.06)	0.22*** (0.06)	-0.06*** (0.02)	0.10*** (0.03)	0.24*** (0.09)	-0.53*** (0.11)
Observations	61	61	61	61	61	61
R2	0.14	0.16	0.18	0.24	0.28	0.36
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes

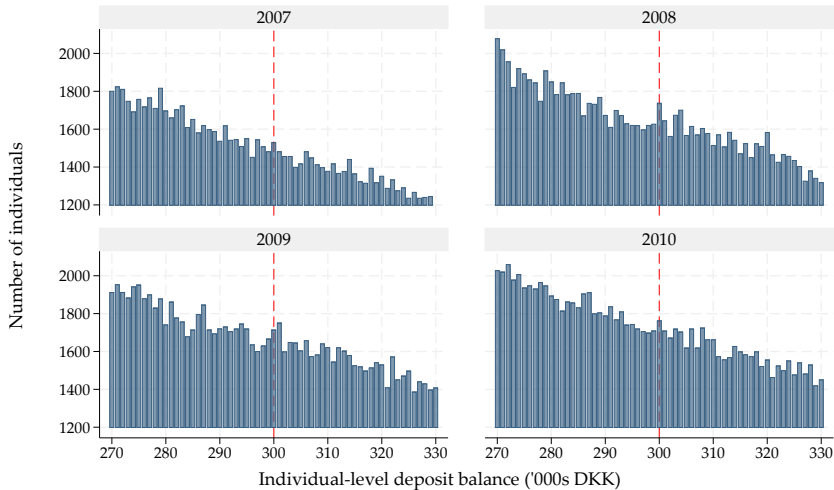
Deposit insurance reforms:
insured vs. uninsured deposits

Granular data

Person-Bank deposit accounts bunch below 300K DKK limit as crisis unfolds

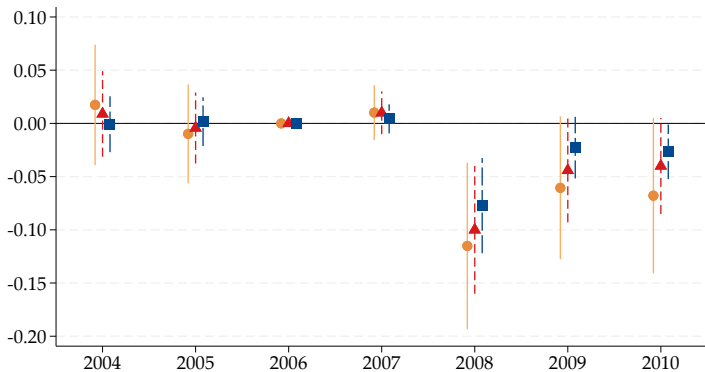


But *NO* bunching of person-level overall bank deposits



Deposit growth in narrow account ranges around 300K DI limit

$$\text{Log}(\text{deposits})_{btk} = \alpha_{k,t} + \alpha_{b,t} + \sum_t \beta_t (\eta_t \times \text{Loan/Deposit}_{b,2007} \times \text{Above } 300K_{bk}) + \dots + \epsilon_{btk}$$



● ± 75K [225K,375K]
 ▲ ± 50K [250K,350K]
 ■ ± 25K [275K,325K]
 ← Just +/- 3.5K \$ around DI limit

Deposit reallocation at individual level

- Deposit changes *within* individual: focus on those with 2+ banks in Dec-07 & add individual FEs

$$\Delta \log(\text{deposits})_{ibt} = \beta_1 \text{Loan/deposit}_{b,07} \times \text{Above 300K}_{i,t-1} + \beta_2 \text{Loan/deposit}_{b,07} + \alpha_b + \alpha_i + \dots + \epsilon_{ibt}$$

Outcome: Δ (log) Deposits	Individuals with 2+ banks				
	2008				2009
	(1)	(2)	(3)	(4)	(5)
Loan/deposit 2007 (de-meanned)	-0.044** (0.017)	-0.046** (0.018)	-0.035** (0.016)		
Above 300K		-0.522*** (0.027)	-0.504*** (0.025)	-0.507*** (0.026)	-0.285*** (0.013)
Loan/deposit 2007 (de-meanned) X Above 300K			-0.182** (0.071)	-0.187** (0.072)	0.059** (0.026)
Observations	1,776,698	1,776,698	1,776,698	1,776,698	1,622,053
R2	0.46	0.47	0.47	0.47	0.46
Individual FE	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes		
Bank FE				Yes	Yes

Deposit reallocation at firm level

- Deposit changes *within* firm: focus on those with 2+ banks in Dec-07 & add firm FEs

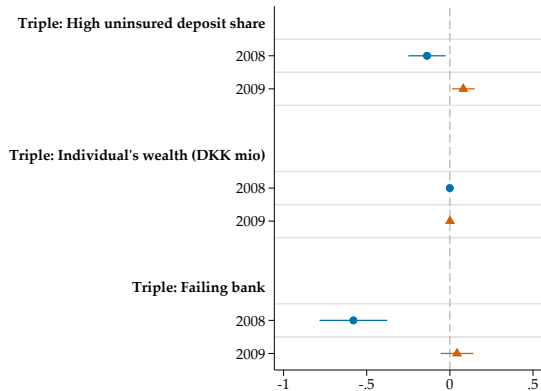
$$\Delta \log(\text{deposits})_{ibt} = \beta_1 \text{Loan/deposit}_{b,07} \times \text{Above 300K}_{i,t-1} + \beta_2 \text{Loan/deposit}_{b,07} + \alpha_b + \alpha_i + \dots + \epsilon_{ibt}$$

Outcome: Δ (log) Deposits	Firms with 2+ banks in 2007				
	2008				2009
	(1)	(2)	(3)	(4)	(5)
Loan/deposit 2007 (de-meaned)	-0.01 (0.06)	-0.06 (0.08)	0.06 (0.09)		
Above 300K		-0.53*** (0.03)	-0.48*** (0.03)	-0.51*** (0.03)	-0.43*** (0.03)
Loan/deposit 2007 (de-meaned) X Above 300K			-0.33** (0.13)	-0.25* (0.13)	0.04 (0.13)
Observations	17,834	17,834	17,834	17,834	12,574
R2	0.45	0.47	0.47	0.48	0.47
Firm FE	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes		
Bank FE				Yes	Yes

Further heterogeneity in withdrawal patterns

- Banks:
 - ▶ Share of uninsured deposits in 2007
 - ▶ Failing bank indicator (2009-2015)
- Retail depositors: Wealth
- Corporate depositors: Net worth (equity ratio)

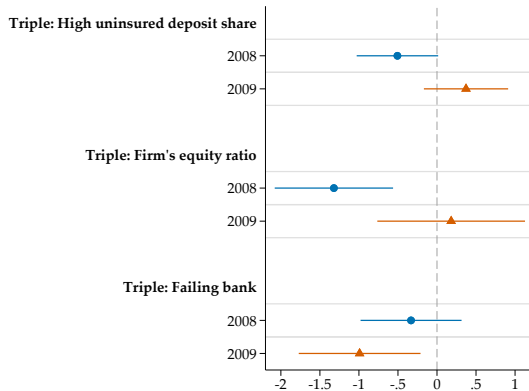
Heterogeneity in withdrawals: Retail deposits



Wealth Effects

Uninsured Share Effects

Heterogeneity in withdrawals: Corporate deposits

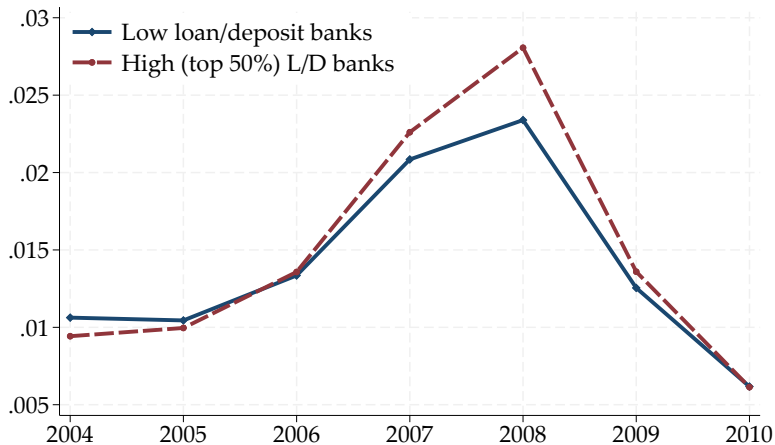


Leverage Effects

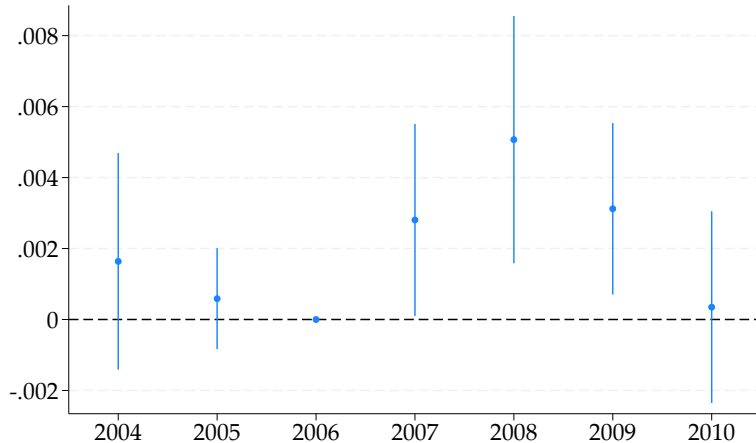
Uninsured Share Effects

Evidence on deposit rates

High L/D banks raise deposit rates at onset of crisis



$$\text{Deposit rate}_{bt} = \alpha_b + \alpha_t + \sum_t \beta_t (\eta_t \times \text{Loan/Deposit}_{b,2007}) + \sum_t \gamma_t (X_b \times \eta_t) + \epsilon_{bt}$$



Summary of the results so far

- **Raise in deposit insurance (DI) triggers deposit reallocation** from stronger to weaker banks
 - ▶ Onset of GFC: Funding liquidity squeeze at exposed banks (when limited DI); **immediate reversal** with unlimited DI
 - ▶ Bank-account data: Exposed banks lose deposits from **just above vs below** DI limit when limited DI
 - ▶ Individual-bank data: She withdraws more deposits from exposed banks, notably above the DI limit, when limited DI (using **individual FEs**). Opposite with unlimited DI
 - Crucial **heterogeneity** across: banks with different uninsured deposits; or failing banks versus other banks; HH versus NFC deposits; depositor wealth
 - ▶ Exposed banks raise deposit rates to attract deposits in 2008 (when limited DI); but this is progressively reduced with unlimited DI

Ex-post failing banks

Deposit withdrawals at failing banks

Retail depositors

Outcome: Δ (log) Deposits	Individuals with 2+ banks	
	2008	2009
	(1)	(2)
Loan/deposit 2007 (de-meanned) X Failing X Above 300K	-0.808*** (0.203)	0.074 (0.071)
Loan/deposit 2007 (de-meanned) X Above 300K	0.018 (0.035)	0.041 (0.040)
Failing bank X Above 300K	0.045 (0.051)	-0.025 (0.026)
Above 300K	-0.503*** (0.026)	-0.295*** (0.014)
Observations	1,776,698	1,788,460
R2	0.47	0.47
Individual FE	Yes	Yes
Bank FE	Yes	Yes

Note: "Failing bank" is an indicator variable equal to one if the bank fails between 2009 and 2015.

Deposit withdrawals at failing banks

Corporate depositors

Outcome: Δ (log) Deposits	Firms with 2+ banks in 2007		All firms	
	2008	2009	2008	2009
	(1)	(2)	(3)	(4)
Loan/deposit 2007 (de-meanned) X Failing X Above 300K	-0.33 (0.39)	-0.94** (0.47)	-0.40* (0.23)	-0.44 (0.30)
Loan/deposit 2007 (de-meanned) X Above 300K	-0.09 (0.14)	0.08 (0.13)	0.05 (0.11)	0.15** (0.07)
Failing bank X Above 300K	-0.14 (0.14)	0.35** (0.15)	-0.03 (0.07)	0.16* (0.09)
Above 300K	-0.50*** (0.03)	-0.45*** (0.03)	-0.49*** (0.02)	-0.47*** (0.02)
Observations	17,834	12,574	48,075	46,446
R2	0.48	0.47	0.05	0.04
Firm FE	Yes	Yes		
Bank FE	Yes	Yes	Yes	Yes

Note: "Failing bank" is an indicator variable equal to one if the bank fails between 2009 and 2015.

Predicting bank failures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Tier-1 capital ratio 2007	-0.07 (0.13)	-0.04 (0.10)		-0.03 (0.05)	-0.02 (0.05)	-0.09 (0.06)	-0.01 (0.04)	-0.05 (0.05)		-0.07 (0.07)	-0.03 (0.06)		-0.04 (0.08)	-0.03 (0.05)
Total assets 2007 (log)		0.18 (0.16)		-0.15 (0.17)	0.11 (0.13)	0.01 (0.15)	-0.14 (0.16)	-0.27 (0.19)		-0.05 (0.15)	-0.22 (0.19)		0.02 (0.16)	-0.21 (0.19)
Loan/deposit 2007			3.56*** (0.89)	3.87*** (1.02)							4.39*** (1.36)			4.83*** (1.32)
Deposit growth 2008-q3					-7.44** (3.51)									
Deposit growth 2008-q4						3.83** (1.83)								
Predicted deposit growth 2008-q3							-48.81*** (14.30)							
Predicted deposit growth 2008-q4								15.38*** (4.13)						
Uninsured deposit share									3.04** (1.49)	4.30* (2.50)	-0.68 (3.18)			
High uninsured deposit share (>average)												0.91* (0.53)	0.86 (0.64)	-0.65 (0.82)
Observations	94	94	94	94	78	86	78	86	92	92	92	92	92	92
Pseudo R2	0.02	0.04	0.20	0.21	0.08	0.10	0.19	0.23	0.04	0.07	0.23	0.03	0.05	0.23
AUC	0.74	0.71	0.81	0.82	0.70	0.76	0.81	0.82	0.69	0.74	0.83	0.61	0.70	0.84

Note: The outcome variable is an indicator equal to one if the bank fails between 2009 and 2015.

Weak banks benefited more from deposit insurance & had worse loans pre-GFC

What happens to their lending during the crisis?

Loan-level evidence: credit supply & risk-taking by weaker banks

			Ex-ante firm risk		Ex-post firm risk	
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable: $\Delta \log \text{ credit}$	2008	2009	2008	2009	2008	2009
Loan/deposit 2007	-0.04*** (0.00)	-0.03*** (0.00)				
Loan/deposit 2007 $\times$ Z-score (t-1)			-0.32 (0.42)	0.73** (0.33)		
Loan/deposit 2007 $\times$ Defaulting firm					-0.04** (0.02)	0.06*** (0.02)
Observations	5,575	4,993	3,929	3,301	5,349	4,832
R2	0.49	0.49	0.52	0.52	0.51	0.50
Firm controls	Y	Y	Y	Y	Y	Y
Bank controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Bank FE			Y	Y	Y	Y

Weaker banks do not charge higher rates on loans to riskier firms

► Lending rates

Credit supply by weak more-DI-exposed banks

Dependent Variable: $\Delta \log \text{ credit}$			Ex-ante firm risk		Ex-post firm risk	
	(1) 2008	(2) 2009	(3) 2008	(4) 2009	(5) 2008	(6) 2009
High uninsured deposit share X Loan/deposit 2007	-0.37*	0.49***				
	(0.20)	(0.16)				
High uninsured deposit share (2007)	0.05	-0.07				
	(0.04)	(0.05)				
Loan/deposit 2007	0.14	-0.64***				
	(0.19)	(0.15)				
Z-score X Uninsured share X Loan/deposit 2007			-0.59	3.36*		
			(2.54)	(1.76)		
High uninsured deposit share X Z-score			0.27	-1.13**		
			(0.66)	(0.50)		
Loan/deposit 2007 X Z-score			3.47	-5.90		
			(4.37)	(5.78)		
Defaulting firm X High Uninsured share X Loan/deposit 2007					-0.49	0.87*
					(0.50)	(0.50)
High uninsured deposit share X Defaulting firm					-0.00	-0.17
					(0.13)	(0.16)
Loan/deposit 2007 X Defaulting firm					0.51	-1.16
					(0.99)	(1.06)
Observations	5,998	5,108	3,929	3,301	5,992	5,097
R2	0.49	0.49	0.52	0.52	0.50	0.50
Diff. int. term 09-08		0.86		3.96		1.35
Diff: SE		0.26		3.09		0.71
Diff: t-stat		3.34		1.28		1.91
p-value (2-sided)		0.00		0.20		0.06
p-value (1-sided)		0.00		0.10		0.03
Firm controls	Y	Y	Y	Y	Y	Y
Bank controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Bank FE			Y	Y	Y	Y

More exposed banks do not charge higher rates on loans to riskier firms

► Lending rates

Conclusions

Summary of the main results

- **No indiscriminate runs** by retail or corporate depositors
- Increase in **deposit insurance triggers deposit reallocation from stronger to weaker banks**
- **Depositor discipline is distorted** by increasing deposit insurance limit
- **Similar behavior of corporate vs retail depositors**, though some key differences
- Many exposed banks that get deposits due to DI eventually fail, with very strong predictive power, providing suggesting evidence that **DI contributes to persistence of too weak banks**
- Weak banks stop losing (and gain some) deposits and increase credit supply with unlimited DI
- But they increase credit supply to ex-ante and ex-post riskier firms (defaults): increasing **DI allows weak banks to engage in excessive risk-taking** in lending in crisis times

In sum, our contributions to the literature

- Despite that deposit insurance is raised in crisis times, and that solvency issues are then crucial, the literature analyzes –in normal times– the moral hazard associated to DI (Demirgüç-Kunt and Detragiache, 2002; Demirgüç-Kunt and Huizinga, 2004; Beck and Laeven, 2008; Calomiris and Jaremski, 2019). We instead analyze **DI effects in crisis times and, moreover, push further on the causality front**
- Prior studies with granular data find that DI reduces uninsured runs, but only exploit 1 bank (Iyer and Puri, 2012; Iyer, Puri, and Ryan, 2016; Martin, Puri, and Ufier, 2026). We instead show that **DI implies deposit reallocation from stronger to weaker banks, raising their credit supply, but to very risky firms**. We also provide evidence on **corporate (vs retail) depositors**, which is much less analyzed
- We show how increased **DI coverage can benefit less solvent banks with more liquidity problems**, consistent with Correia, Luck, and Verner, 2024, **increasing misallocation** through deposit reallocation and continued lending to very risky firms (Hsieh and Klenow, 2009; Acharya et al., 2022)
- We **contribute empirically to the theoretical debate** on DI role in different types of bank runs (Diamond and Dybvig, 1983; Allen and Gale, 2004; Goldstein and Pauzner, 2005) and its distortions on market discipline (Gorton, 1988; Calomiris and Kahn, 1991; Diamond and Rajan, 2001; Rochet and Vives, 2004; Dávila and Goldstein, 2023)

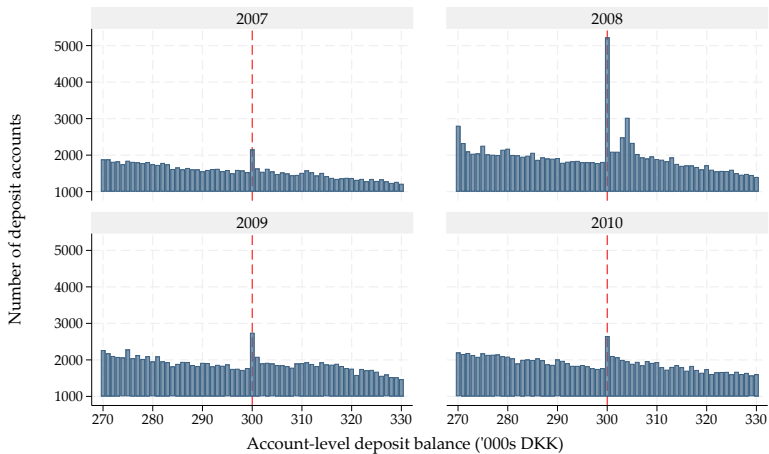
Appendix

Descriptive statistics

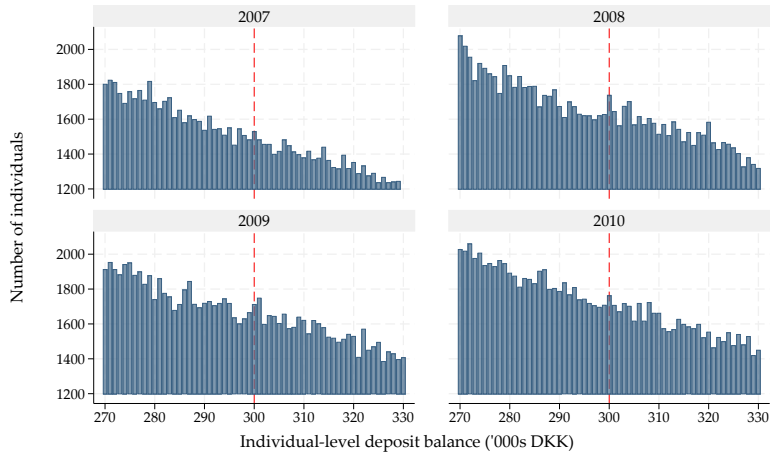
	Mean	SD	p10	p50	p90
Panel A. Banks					
Total assets (bn. DKK)	56.27	336.57	0.62	4.68	33.83
Number of employees	630.84	2,606.28	20.00	104.50	609.00
Loan/deposit ratio	1.17	0.37	0.65	1.16	1.78
Tier-1 capital ratio	0.13	0.09	0.08	0.12	0.19
Uninsured deposit share	0.42	0.15	0.26	0.39	0.54
Bank defaults b/t 2009-2015	0.21	0.41	0.00	0.00	1.00
Panel B. Retail depositors					
Deposits (10,000 DKK)	10.52	110.73	0.09	1.94	22.70
Deposit rate	0.01	0.01	0.00	0.01	0.03
Deposit growth (with 0s)	0.21	0.94	-0.90	0.02	1.98
Deposit growth (Delta log)	0.06	0.67	-1.08	0.03	1.24
Deposits (100,000 DKK)	9.58	60.09	0.00	1.29	23.36
Has uninsured deposits	0.06	0.24	0.00	0.00	0.00
Has 2+ deposit banks	0.19	0.40	0.00	0.00	1.00
Panel C. Non-financial companies					
Deposits (100,000 DKK)	24.81	396.59	0.07	2.87	31.55
Deposit rate	0.02	0.02	0.00	0.01	0.05
Deposit growth (with 0s)	0.12	1.20	-1.00	-0.23	2.32
Deposit growth (Delta log)	-0.07	1.09	-1.87	0.00	1.58
Has uninsured deposits	0.29	0.45	0.00	0.00	1.00
Has 2+ deposit banks	0.18	0.38	0.00	0.00	1.00
Credit (100,000 DKK)	64.28	677.44	0.18	6.52	80.61
Lending rate	0.08	0.05	0.02	0.07	0.13
Credit growth (with 0s)	-0.14	0.74	-1.00	-0.18	1.26
Credit growth (Delta log)	0.04	0.65	-1.00	0.01	1.11
Has 2+ credit banks	0.10	0.29	0.00	0.00	0.00
Equity/assets	0.37	0.20	0.12	0.34	0.66
Gross profit margin	0.41	1.21	0.04	0.47	0.93

Data on 94 banks, 5.4 million individuals, and 84,540 non-financial companies.

Bunching of deposit accounts at DI threshold



No bunching of individual-level balances at Di threshold



Stronger effects for wealthier depositors

Outcome: Δ (log) Deposits	Individuals with 2+ banks	
	Year: 2008	Year: 2009
	(1)	(2)
Loan/deposit 2007 (de-meanned) X Wealth (DKK 1m) X Above 300K	-0.001*** (0.000)	0.001* (0.001)
Loan/deposit 2007 (de-meanned) X Above 300K	-0.178** (0.069)	0.050** (0.023)
Wealth (DKK 1m) X Above 300K	-0.000 (0.000)	-0.002*** (0.001)
Loan/deposit 2007 (de-meanned) X Wealth (DKK 1m)	0.001** (0.000)	-0.001** (0.000)
Above 300K	-0.503*** (0.026)	-0.286*** (0.014)
Observations	1,404,822	1,400,733
R2	0.47	0.46
Bank FE	Yes	Yes
Individual FE	Yes	Yes

Note: Wealth refers to individual-level gross wealth measured in DKK 1m (apx EUR 135K) as of December 2007.

Stronger effects for less levered depositors

Outcome: Δ (log) Deposits	Firms with 2+ banks in 2007		All firms	
	Year: 2008	Year: 2009	Year: 2008	Year: 2009
	(1)	(2)	(3)	(4)
Loan/deposit 2007 (de-meanned) X Low leverage 2007 X Above 300K	-0.69*** (0.25)	-0.04 (0.27)	-0.30** (0.13)	0.06 (0.12)
Loan/deposit 2007 (de-meanned) X Above 300K	0.13 (0.21)	0.03 (0.21)	0.08 (0.13)	0.21** (0.10)
Low leverage 2007 X Above 300K	0.20*** (0.06)	0.10 (0.07)	0.15*** (0.02)	0.05* (0.03)
Low leverage 2007	0.00 (.)	0.00 (.)	0.03* (0.02)	0.07*** (0.02)
Above 300K	-0.59*** (0.05)	-0.44*** (0.05)	-0.57*** (0.02)	-0.51*** (0.03)
Observations	12,967	9,302	32,616	29,264
R2	0.48	0.47	0.05	0.04
Bank FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes		

[Back to Corporate Figure](#)

Stronger effects for weaker banks with higher uninsured deposit share

Retail depositors

Outcome: Δ (log) Deposits	Individuals with 2+ banks	
	2008	2009
	(1)	(2)
Loan/deposit 2007 (de-meanned) X Bank's uninsured deposit share 2007 X Above 300K	-1.479** (0.564)	0.379** (0.162)
Loan/deposit 2007 (de-meanned) X Above 300K	0.582** (0.247)	-0.076 (0.082)
Bank's uninsured deposit share 2007 X Above 300K	-0.545** (0.212)	-0.318*** (0.120)
Above 300K	-0.245*** (0.083)	-0.155*** (0.051)
Observations	1,766,963	1,778,282
R2	0.47	0.47
Bank FE	Yes	Yes
Individual FE	Yes	Yes

Notes: The bank's uninsured share is defined as the share of uninsured deposits in total deposits as of December 2007.

Stronger effects for weaker banks with higher uninsured deposit share

Corporate depositors

Outcome: Δ (log) Deposits	Firms with 2+ banks in 2007		All firms	
	Year: 2008	Year: 2009	Year: 2008	Year: 2009
	(1)	(2)	(3)	(4)
Loan/deposit 2007 (de-meaned) X Bank's uninsured deposit share 2007 X Above 300K	-3.24*** (0.76)	1.21 (0.76)	-2.17** (0.88)	1.45*** (0.37)
Loan/deposit 2007 (de-meaned) X Above 300K	1.51*** (0.38)	-0.43 (0.41)	1.10** (0.44)	-0.51*** (0.19)
Bank's uninsured deposit share 2007 X Above 300K	-0.55 (0.35)	-1.07*** (0.37)	-0.42* (0.23)	-0.69*** (0.17)
Above 300K	-0.23 (0.16)	0.07 (0.18)	-0.29*** (0.11)	-0.14* (0.08)
Observations	17,834	12,574	48,075	46,446
R2	0.48	0.47	0.05	0.04
Bank FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes		

Notes: The bank's uninsured share is defined as the share of uninsured deposits in total deposits as of December 2007.

[Back to Corporate Figure](#)

Weaker banks did not charge higher rates on loans to defaulting firms

Dependent Variable: Loan rate	(1) 2008	(2) 2009	(3) 2008	(4) 2009	(5) 2008	(6) 2009
Loan/deposit 2007 (de-meaned)	0.00*** (0.00)	0.00 (0.00)	-0.01*** (0.00)	-0.01*** (0.00)		
Loan/deposit 2007 (de-meaned) X Defaulting firm			-0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00 (0.00)
Observations	7,866	7,152	7,520	6,891	7,509	6,883
R2	0.51	0.54	0.52	0.54	0.53	0.56
Firm controls			Y	Y	Y	Y
Bank controls	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Bank FE					Y	Y

Note: "Defaulting firm" is an indicator variable equal to one if the firm defaults between 2009 and 2015.

Weak banks more exposed to DI reforms: risk-taking

Dependent Variable: $\Delta \log \text{ credit}$	(1) 2008	(2) 2009	(3) 2008	(4) 2009	(5) 2008	(6) 2009
Loan/deposit 2007 (High uninsured deposit share '07)	-0.04*** (0.00)	-0.02*** (0.00)	-0.11*** (0.04)	-0.14*** (0.04)		
Loan/deposit 2007 (Low uninsured deposit share '07)	0.14 (0.17)	-0.43*** (0.16)	3.70** (1.77)	-2.01 (1.78)		
Defaulting firm X Loan/deposit (High uninsured)			-0.03** (0.02)	0.06*** (0.02)	-0.03** (0.02)	0.06*** (0.02)
Defaulting firm X Loan/deposit (Low uninsured)			-0.28 (0.47)	-0.41 (0.55)	-0.44 (0.69)	-0.38 (0.54)
Observations	5,575	4,993	5,359	4,843	5,349	4,832
R2	0.49	0.49	0.49	0.49	0.51	0.50
Diff. int. term 09-08 (L)		-0.57		-0.13		0.05
Diff (L): SE		0.23		.		0.88
Diff (L): t-stat		-2.44		.		0.06
p-value (L; 2-sided)		0.01		.		0.95
p-value (L; 1-sided)		0.99		.		0.48
Diff. int. term 09-08 (H)		0.02		0.09		0.10
Diff (H): SE		0.01		0.05		0.02
Diff (H): t-stat		3.23		1.96		4.01
p-value (H; 2-sided)		0.00		0.05		0.00
p-value (H; 1-sided)		0.00		0.03		0.00
Bank controls	Y	Y	Y	Y	Y	Y
Firm controls			Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Bank FE					Y	Y

Weak banks more exposed to DI reforms: risk-taking (II)

Only banks with above-average 2007 share of uninsured deposits

Dependent Variable: $\Delta \log \text{ credit}$	(1) 2008	(2) 2009	(3) 2008	(4) 2009	(5) 2008	(6) 2009
Loan/deposit 2007	-0.23*** (0.06)	-0.16*** (0.04)	-0.75* (0.38)	-0.73** (0.34)		
Loan/deposit 2007 X Defaulting firm			-0.15 (0.13)	0.41*** (0.15)	-0.16 (0.13)	0.45*** (0.15)
Observations	4,786	4,280	4,610	4,152	4,607	4,150
R2	0.49	0.49	0.49	0.49	0.51	0.50
Diff. int. term 09-08				0.56		0.61
Diff: SE				0.20		0.20
Diff: t-stat				2.86		3.08
p-value (2-sided)				0.00		0.00
p-value (1-sided)				0.00		0.00
Bank controls	Y	Y	Y	Y	Y	Y
Firm controls			Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Bank FE					Y	Y

Deposit withdrawals at defaulting banks

Outcome: Δ (log) Deposits	Individuals with 2+ banks			
	2008		2009	
	(1)	(2)	(3)	(4)
Defaulting bank (2009-2015)	-0.030 (0.019)		-0.077** (0.034)	
Above 300K		-0.501*** (0.026)		-0.292*** (0.016)
Defaulting bank X Above 300K		-0.241*** (0.068)		0.013 (0.022)
Observations	1,776,698	1,776,698	1,788,460	1,788,460
R2	0.46	0.47	0.46	0.47
Individual FE	Yes	Yes	Yes	Yes
Bank controls	Yes		Yes	
Bank FE		Yes		Yes

Defaulting banks increase credit supply to defaulting firms

Dependent Variable: $\Delta \log \text{ credit}$	(1) 2008	(2) 2009	(3) 2008	(4) 2009	(5) 2008	(6) 2009
Defaulting bank (2009-2015)	-0.16*** (0.03)	-0.12*** (0.02)	-0.19 (0.23)	-0.70*** (0.20)		
Defaulting firm X Defaulting bank			-0.14* (0.08)	0.21** (0.08)	-0.15* (0.08)	0.24*** (0.08)
Observations	5,575	4,993	5,359	4,843	5,349	4,832
R2	0.49	0.49	0.49	0.49	0.51	0.50
Bank controls	Y	Y	Y	Y	Y	Y
Firm controls			Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Bank FE					Y	Y

Defaulting banks do not increase loan rates to defaulting firms

Dependent Variable: Loan rate	(1) 2008	(2) 2009	(3) 2008	(4) 2009	(5) 2008	(6) 2009
Defaulting bank (2009-2015)	0.00** (0.00)	0.00 (0.00)	-0.04*** (0.01)	-0.02 (0.01)		
Defaulting firm X Defaulting bank			-0.01 (0.00)	-0.01* (0.00)	-0.01 (0.00)	-0.01 (0.00)
Observations	7,866	7,152	7,520	6,891	7,509	6,883
R2	0.51	0.54	0.52	0.54	0.53	0.56
Bank controls	Y	Y	Y	Y	Y	Y
Firm controls			Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Bank FE					Y	Y

Banks with more uninsured deposits decrease loan rates

Dependent Variable: Loan rate	(1) 2008	(2) 2009	(3) 2008	(4) 2009	(5) 2008	(6) 2009
Uninsured deposit share (2007, de-meaned)	0.01*** (0.00)	0.00 (0.00)	-0.11*** (0.03)	-0.05* (0.03)		
Defaulting firm X Uninsured share			-0.02 (0.01)	-0.03** (0.01)	-0.02* (0.01)	-0.02** (0.01)
Observations	7,866	7,152	7,520	6,891	7,509	6,883
R2	0.51	0.54	0.52	0.54	0.53	0.56
Bank controls	Y	Y	Y	Y	Y	Y
Firm controls			Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
Bank FE					Y	Y

Ex-post defaulting firms are ex-ante riskier

	Surviving firms			Defaulting firms ('09-'15)			Diff
	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	
Total assets (DKK m)	369.79	4,269.95	27.48	59.02	218.11	12.35	310.77***
Employees	113.15	799.30	22.00	37.35	67.83	15.00	75.80***
RoA	0.06	0.13	0.06	0.03	0.16	0.06	0.03**
Sales/Employment	6.95	17.26	3.85	5.41	6.27	3.54	1.53**
Leverage	0.70	0.17	0.72	0.76	0.13	0.77	-0.06***
TFP	0.36	0.44	0.41	0.39	0.38	0.45	-0.03
Equity/Assets	0.28	0.21	0.28	0.20	0.18	0.22	0.08***
Sales growth	0.33	1.44	0.09	0.46	1.86	0.06	-0.13
Value-added/Worker (DKK m)	0.63	0.45	0.51	0.51	0.32	0.47	0.12***
Sales/Assets	1.59	1.20	1.43	1.81	1.21	1.56	-0.23**
Real-estate firm	0.16	0.37	0.00	0.12	0.33	0.00	0.04
Avg. loan rate (loan size-weighted)	0.05	0.03	0.05	0.06	0.04	0.06	-0.01**
Z-score	7.76	12.33	5.09	3.73	4.93	2.55	4.02***
Zombie firm (bottom 10%)	0.01	0.10	0.00	0.05	0.21	0.00	-0.04**
N	2,365			147			2,512

Resulting in elevated loan losses – Table

Outcome: Loan losses/TA	Period: 2004-2015			Period: 2008-2015		
	(1)	(2)	(3)	(4)	(5)	(6)
Loan/deposit 2007	0.006*** (0.0011)	0.007*** (0.0013)	0.006*** (0.0013)	0.011*** (0.0017)	0.015*** (0.0023)	0.013*** (0.0024)
Observations	881	638	638	541	305	305
R2	0.41	0.49	0.50	0.22	0.29	0.33
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls		Yes	Yes		Yes	Yes
Control: Top-6 bank			Yes			Yes

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