

Are Banks Passive Liquidity Backstops? Deposit Rates and Flows During the 2007-2009 Crisis

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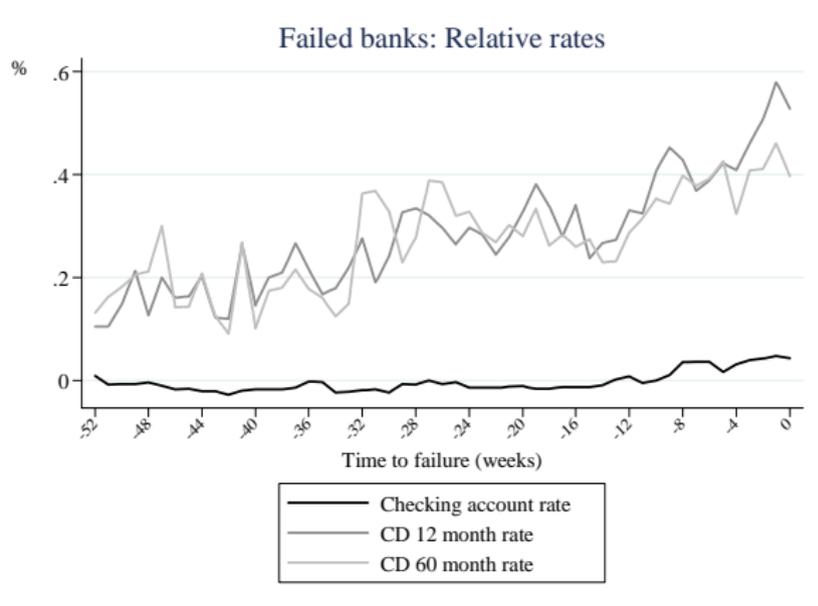
¹The views expressed herein are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of Kansas City or the Federal Reserve System.

Introduction

- Can banks maintain their advantage as liquidity providers when they are heavily exposed to a financial crisis?
- Standard argument hinges on deposit inflows that are seeking a safe haven and provide banks with a natural hedge to fund drawn credit lines and other commitments
- How compromised was banks' ability to meet the demand for liquidity in the 2007-09 crisis?
- What actions did banks take to ensure that deposit inflows persisted as funding sources were drying up?

Survey Evidence of Current Rates (one year to failure)

Supportive news reports of WaMu pitching above-market rates prior to its acquisition;
Citi fliers for 4% 6-month CDs



The relative rates are the average of the difference between rates for 43 failed banks (actual failures and near-fails) and rates of non-fail banks over the period 1997-2009. The underlying data are current rates from a weekly survey from Bank Rate Monitor (BRM).

Banks as Liquidity Providers and its Reconsideration

The Rationale:

- Natural synergy between deposit-taking and commitment lending (Kashyap, Rajan and Stein, 2002)
- Advantage greater in episodes of market stress due to govt guarantees (Gatev and Strahan, 2006; Pennacchi, 2006)

Why There May Be Limits to Banks Providing Liquidity in a Crisis:

- Aggregate risk may go up in a crisis, reducing banks' ability to diversify shocks (Acharya, Almeida, and Campello, 2010)
- Depositor flight – banks exposed to crisis (runs from even ex post fundamentally solvent banks); limits to deposit insurance
- Adverse household wealth shock → depositors withdraw funds
- Money market mutual funds as competing deposit collectors

Cumulative deposit growth, % from 2007Q2

Did the banking system gain proportionate deposits to match its increased funding needs?
(where funding needs went up to support drawn credit lines/ABCP conduits, increased holdings of MBS/ABS, uncertainty-driven panic)

	07Q3	07Q4	08Q1	08Q2	08Q3	08Q4	09Q1
Large banks (Top 25, H8 criteria)							
Insured	0.1	0.8	1.7	1.7	3.9	4.6	5.6
Core	0.2	2.4	3.8	3.4	6.3	9.7	10.8
Large Time	0.6	1.5	1.8	1.3	2.8	2.0	1.2
Small banks							
Insured	0.0	0.0	0.7	1.0	2.3	3.0	2.0
Core	-0.4	-0.7	-0.7	-0.5	0.0	0.9	0.5
Large Time	1.7	2.4	3.4	3.8	2.7	-0.2	-0.1
All Core					↑\$767 bn		
	↑\$90 bn		↑\$272 bn				
All Large Time					↓\$172 bn		
	↑\$53 bn		↑\$66 bn				

Compatible with He, Khang, Krishnamurthy (2010), Ashcraft Bech, Frame (2010).

H1. Deposit Rates in the Run-up to Bank Failure

$$\underline{\underline{\text{Deposit Rate}_{i,t} = \sum_{l=0}^L \beta_l \text{Fail}_{i,t+l} + b_i + \tau_t + \text{controls}_{i,t} + e_{i,t}}}$$

	(1)	(2)	(3)	(4)
	Large Time (LT)		Core	
	Formal fail	All fail ^a	Formal fail	All fail
4 quarters < Fail	0.010	0.005	0.087***	0.065***
3 quarters < Fail	0.036**	0.026**	0.082***	0.062***
2 quarters < Fail	0.057***	0.039***	0.087***	0.070***
1 quarter < Fail	0.066***	0.051***	0.082***	0.074***
Period of failure	0.059***	0.035**	0.087***	0.087***

^aAll fail: captures both formal fails (regulatory-assisted) and near-fails (market equity returns worse than -90% over 18-month period, as in Acharya, Pedersen, Philippon and Richardson, 2010) Close to 200 all fails in sample, of which 70 near-fails.

H2. Variation in Vulnerability to Illiquidity and Insolvency

Quarterly 1996–2009, crisis1 = 07Q3-08Q2 and crisis2 = 08Q3-09Q2

$$\text{Deposit Rate}_{i,t} = \beta_1 \text{risk}_{i,t-1} + \beta_2 \text{risk}_{i,t-1} \times \text{crisis}_t + b_i + \tau_t + \text{other controls}_{i,t} + e_{i,t}$$

	(1)	(2)	(3)	(4)
	LT	LT	Core	Core
Bank Fixed Effects	Y	N	Y	N
<i>Liquidity measures</i>				
Unused commit	0.027	-0.231***	-0.074***	-0.461***
Unused commit*crisis1	0.144***	0.178***	-0.011	0.186***
Unused commit*crisis2	-0.167***	-0.217***	-0.175***	-0.150***
Liquid assets	-0.043***	-0.114***	-0.039***	-0.183***
Liquid*crisis1	0.017	0.040	-0.112***	-0.146***
Liquid*crisis2	-0.042*	-0.030	-0.082***	-0.088***
Wholesale funding	0.124***	0.123***	-0.068***	0.257***
Wholesale*crisis1	0.032*	0.096***	0.125***	0.139***
Wholesale*crisis2	-0.060***	0.006	0.081***	0.084***

H2. (cont'd)

	(1)	(2)	(3)	(4)
	LT	LT	Core	Core
<i>Solvency measures</i>				
NPL	0.210***	0.216***	0.053	0.412***
NPL*crisis1	-0.131	0.045	0.194***	0.443*
NPL*crisis2	0.319***	0.450***	0.278***	0.468***
Capital	-0.256**	0.009	-0.513***	0.093
Capital*crisis1	0.461***	0.479***	0.161	0.091
Capital*crisis2	0.083	-0.038	0.013	-0.179
Risk-based capital	0.029	-0.053	-0.001	-0.025
Risk-based*crisis1	-0.201***	-0.240***	-0.052	-0.015
Risk-based*crisis2	-0.134	-0.114	0.047	0.051
Large bank	-0.019	-0.056	0.005	-0.099***
Large bank*crisis1	-0.046	-0.061	-0.080***	-0.167***
Large bank*crisis2	-0.038	-0.039	-0.012	-0.040*

Deposit Inflows

Responsive to bank risk? Was there a shift in relative deposit growth in the crisis?

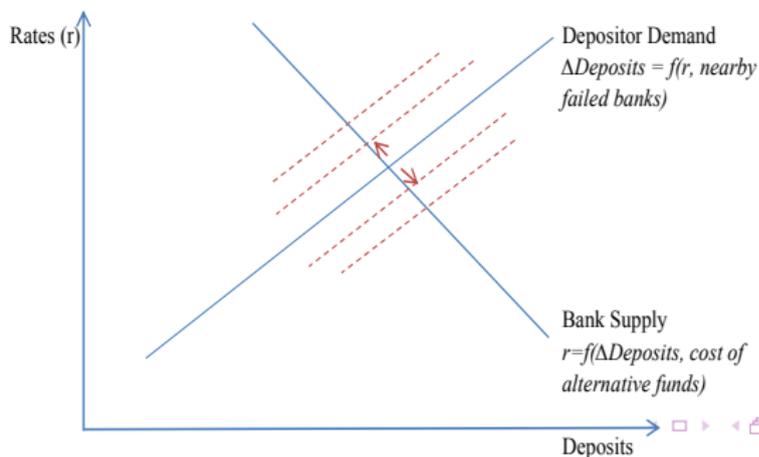
	(1)	(2)	(3)	(4)
	Total	Core	Brokered	TAG 08Q4
Unused commit	0.040***	0.028***	0.009***	0.189***
Unused commit*crisis1	-0.009	-0.008	0.006**	
Unused commit*crisis2	0.022***	0.012**	0.017***	
Liquid asset	-0.088***	-0.062***	-0.008***	0.047***
Liquid*crisis1	0.013***	0.012***	-0.004***	
Liquid*crisis2	-0.017***	-0.003	-0.007***	
Risk-based capital	-0.007*	-0.006	0.000	-0.023
Risk-based*crisis1	0.032**	0.012	-0.001	
Risk-based*crisis2	0.052***	0.036***	-0.005*	
Large bank	-0.006*	-0.005**	-0.001	0.018*
Large bank*crisis1	0.010***	0.003	-0.0004	
Large bank*crisis2	-0.005	0.008**	-0.006***	

H3. Joint Determination of Deposit Rates and Quantities

$$\text{Deposit Rate}_{i,t} = \beta_1 \Delta \text{Deposit}_{i,t} + \text{fundamentals}_{i,t-1} + b_i + \tau_t + \text{other controls}_{i,t} + e_{i,t}$$

$$\Delta \text{Deposit}_{i,t} = \beta_2 \text{Deposit Rate}_{i,t} + \text{fundamentals}_{i,t-1} + b_i + \tau_t + \text{other controls}_{i,t} + e_{i,t}$$

Hypothesis 3 : $\beta_1 < 0, \beta_2 > 0$ (IV Approach)



H3. Joint Determination of Deposit Rates and Quantities

Other liquidity and solvency terms also included (not shown). Results also robust to controlling for local economic conditions

	(1)	(2)	(3)	(4)
	LT Rate	Deposit growth First Stage	LT Rate IV	LT Rate IV
<i>Instrument</i>				
Share of failed deposits in bank's geographic market	-0.128***	0.102***		
<i>Instrumented variable</i>				
Deposit growth (insured)			-1.245**	-2.940***
Deposit growth (insured)*crisis1				2.413
Deposit growth (insured)*crisis2				2.350*

H3. (cont'd)

	(1)	(2)	(3)	(4)
	Dep growth	LT Rate First Stage	Dep growth IV	Dep growth IV
<i>Instrument</i>				
TED Spread	0.001***	0.345***		
<i>Instrumented variable</i>				
LT Rate			0.004***	0.002***
LT Rate*crisis1				0.035***
LT Rate*crisis2				0.012**

Reconciling with Gatev and Strahan (2006)

Banks as a natural liquidity backstop?

	(1)	(2)	(3)
	Deposit Growth		
	GS 1991-2000	1990-2009	1990-2009
Unused commit	-0.021***	0.025***	0.025***
Unused commit*stress	0.041***	0.007	0.022***
Unused commit*stress*crisis1			-0.039**
Unused commit*stress*crisis2			0.018

Note stress is proxied by commercial paper spread

⇒ Banks that had offered insurance to nonfinancial borrowers before the crisis were not as well positioned to deliver the promised liquidity

Reconciling with Gatev and Strahan (2006), cont'd

	(1)	(2)
	LT Rate	Core Rate
Unused commit	-0.434***	-0.323***
Unused commit*stress	0.137*	-0.147***
Unused commit*stress*crisis1	0.250**	0.513***
Unused commit*stress*crisis2	0.025	0.167***

⇒ Even before the 2007-09 crisis, banks most exposed to liquidity demand shocks were actively managing deposit (LT) rates to attract inflows rather than being purely passive recipients of deposits due to flight to safety

Robustness Checks and Other Results

- Alternative data source (Bank Rate Monitor, weekly)
 - Compatible results (e.g., banks with high insolvency risk)
 - Fall 2008 - evidence insolvency risk \uparrow post-Lehman pre-TARP; Illiquidity risk most acute pre-Lehman
- Alternative bank risk measures
 - Banks with real estate / securitization focus \uparrow rates in crisis
- Maturity structure of deposits
 - Banks with more short-term deposits \uparrow rates in crisis; Maturity also shortened for banks with liquidity risk
- Endogeneity of bank risk measures
 - Results robust to pre-crisis controls
- Predictors of bank failure
 - Pre-crisis liquidity / solvency measures

Conclusion

- Results present a nuanced view of deposit rates and flows to the banks in a crisis, one that reflects banks not just as safety havens but also as stressed entities scrambling for deposits
 - Related Literature Depositor Discipline (e.g., Flannery, 1998)
- Banks as stabilizing liquidity insurer? Not necessarily if funds are deposited at unhealthy banks with attractive rates or at banks with an unnatural advantage because of explicit or implicit guarantees
- Next paper – Deposit rate contagion – rate increases lead other banks to offer higher rates
- Policy implications (e.g., Acharya, Santos, Yorulmazer, 2010)