

Supply of private safe assets: Interplay between shadow and traditional banks

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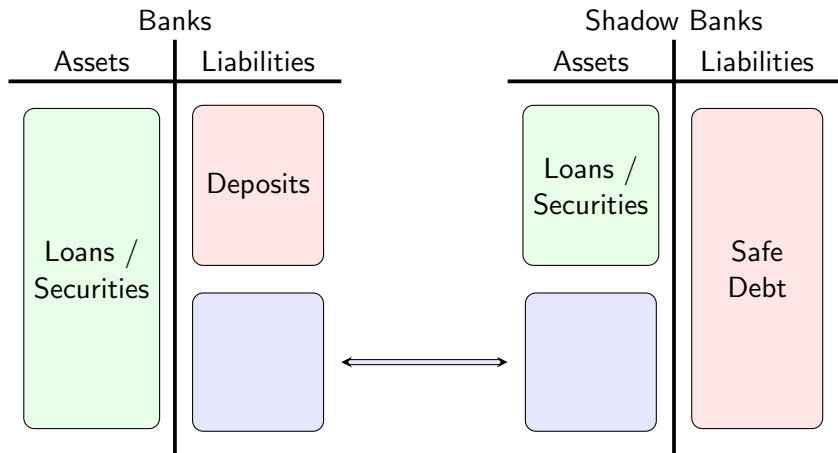
Federal Reserve Board

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Do shadow banks increase total private safe assets?



Why should we care about the effect of shadow banks on bank deposits?

- Monetary policy transmission
- Unintended consequences of (shadow) banking regulation

Money market reform resulted in a one-to-one substitution of deposits for shadow bank borrowing with no lending effect.



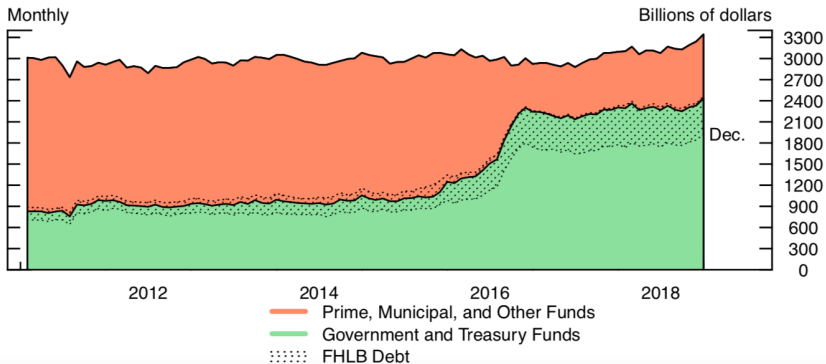
Identification challenge: Endogenous bank funding

Banks may use wholesale funding from shadow banking as:

- Substitute for deposit funding
 - Positive supply shock to wholesale funding
 - Negative supply shock to deposit funding
- Complement for deposit funding
 - Growing investment opportunity



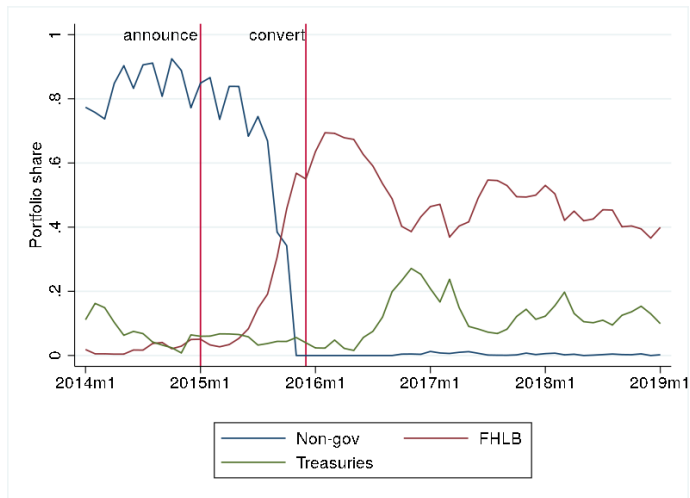
A demand shock to the safe debt of shadow banks



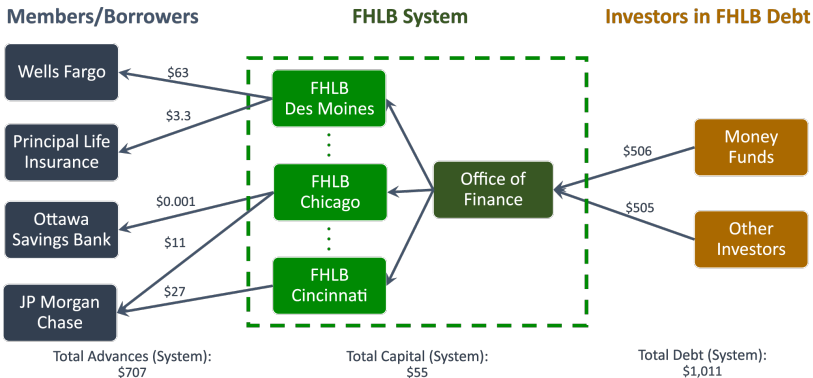
The money fund reform

- Main purpose
 - Improve resiliency of the money fund industry
 - Reduce risk of runs
 - Timing
 - Announcement: July 2014
 - Enactment: October 2016
 - Main changes
 - Funds need to transact at a floating net asset value (NAV)
 - Fund boards can impose liquidity fees and redemption gates
 - Government funds are exempt
 - Resulted in a \$1 trillion flow from prime to government funds
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- A horizontal progress bar at the bottom of the slide, consisting of a blue segment on the left and a grey segment on the right.

FHLB debt as a substitute of Treasury debt for gov. MMFs

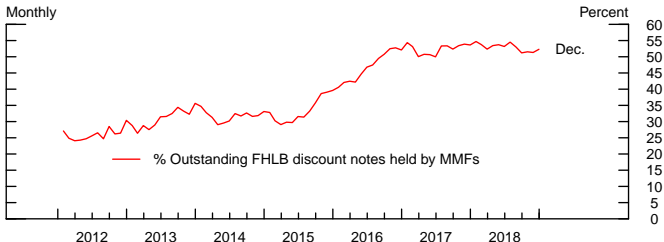


FHLBs as "government-sponsored shadow banks"



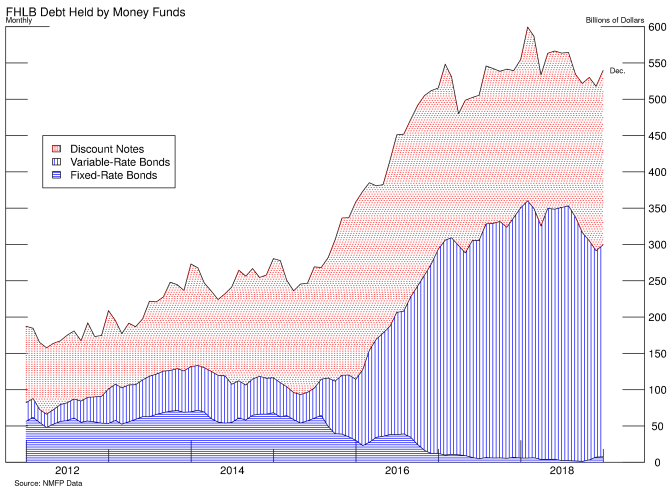
Money funds became the main investors in FHLB debt

Money Funds and FHLB Debt – Holdings



Source: SEC N-MFP Filings. FHLB Filings.

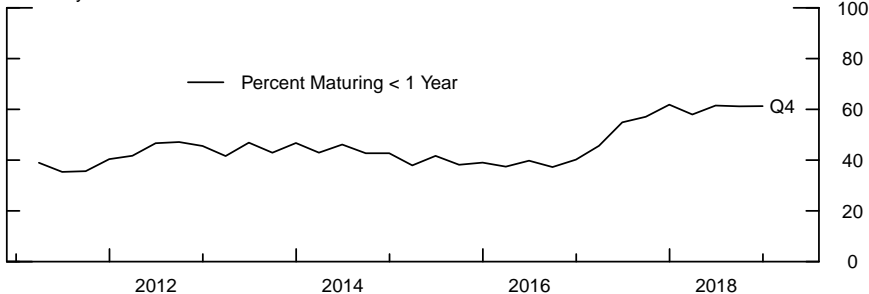
FHLBs adjusted repricing of their liabilities



FHLBs adjusted repricing of their advances

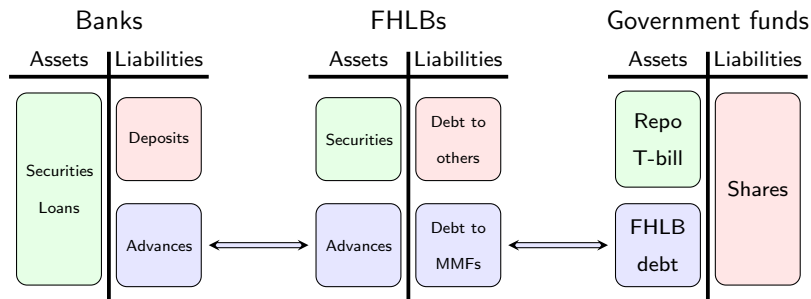
FHLB Advances to Commercial Banks

Quarterly



Source: Call reports.

Chain of intermediation: From government funds to banks via FHLBs



Identifying the effect on banks: IV approach

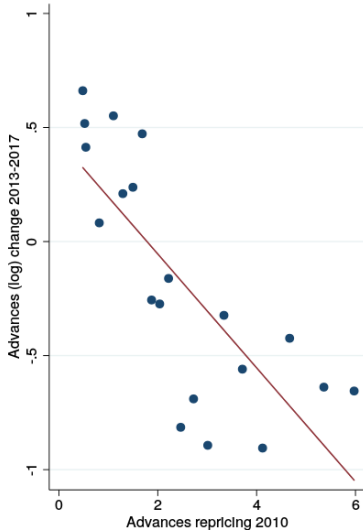
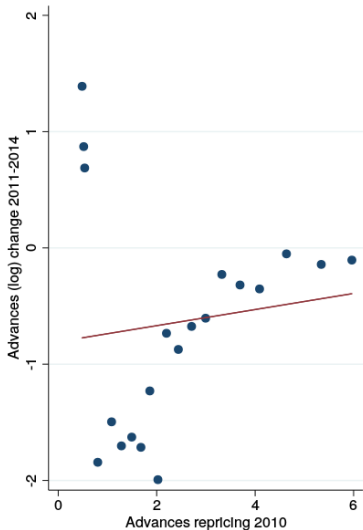
- Limit the sample to banks < \$10bn and no MMF borrowing

Advances to banks

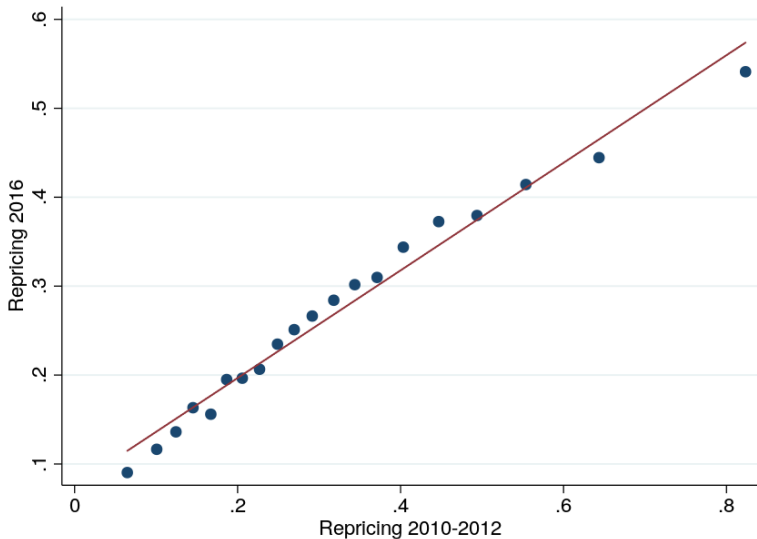
- Use variation in a banks' FHLB borrowing driven by:
 - Banks' ability to borrow short-term/frequent-repricing
 - Government funds' demand for short-term FHLB debt
- Instrumental variables
 - Banks' average liability repricing between 2010 and 2012
 - Government funds AUM/total money industry AUM
- First stage regression:

$$FHLB_{bt} = \beta * (Reprice_b \times \frac{GovMF}{MFIndustry_t}) + \gamma_b^1 + \gamma_t^2 + X_{bt}\delta + \epsilon_{bt}$$

Repricing, advances growth, and the money fund reform



Repricing of bank liabilities is stable



Banks with short repricing received more advances after the MMF reform

<i>Dep.var.: FHLB</i>	(1)	(2)	(3)	(4)
Reprice × GovMF	-0.0225*** (0.00501)	-0.0250*** (0.00434)	-0.0245*** (0.00458)	-0.0229*** (0.00468)
Reprice	0.0837*** (0.00349)		0.0820*** (0.00324)	
GovMF	0.0149*** (0.00291)	0.0170*** (0.00254)		
Bank FE	N	Y	N	Y
Time FE	N	N	Y	Y
Observations	86,888	86,786	86,819	86,854
R ²	0.177	0.780	0.189	0.778


Descriptive statistics

Banks decreased deposits

So did credit unions

<i>Dep.var.:</i>	(1)	(2)	(3)	(4)
	Total deposits	Total deposits	Transact. acc.	Time dep.
\widehat{FHLB}	-1.148*** (0.181)	-1.086*** (0.158)	-1.765*** (0.448)	1.920*** (0.543)
Reprice	0.0118 (0.0139)			
GovMF	0.00223** (0.00101)			
Bank FE	N	Y	Y	Y
Time FE	N	Y	Y	Y
Observations	86,888	86,854	86,854	86,854
R ²	0.327	0.656	0.830	0.764
Kl.-P. F	20.09	23.86	23.86	23.86

The additional effects of FHLB borrowing on banks

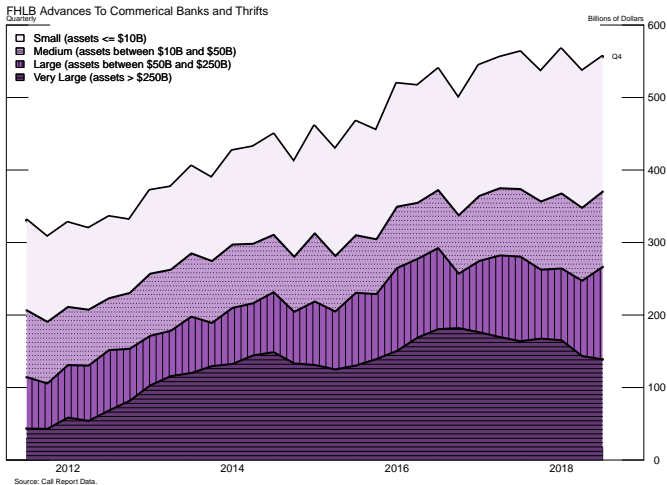
- Banks changed the composition of deposits **composition**
 - Banks did not increase deposit rates **rates**
 - Banks did not increase lending
 - ... but decreased cash holdings **assets**
 - Banks received higher net income
 - ... mainly because of lower non-interest expenses **income**
 - Robust to interest rate **rise**, and **local market power**
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Conclusion

- MMF reform increased demand for gov.-backed safe asset
 - Government-backed shadow bank expanded balance sheet
 - Rise of shadow bank debt led banks to decrease deposits
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Small banks receive almost two-fifth of advances to banks

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Descriptive statistics [Back to first stage](#)

	N	Mean	St.Dev.	Median	Min	Max
<i>Bank variables, in % of assets</i>						
FHLB	75337	0.0426	0.0478	0.0291	0	0.639
Deposits	75337	0.840	0.0669	0.845	0.623	1.027
Transaction accounts	75337	0.235	0.127	0.238	0.0121	0.574
Time deposits	75337	0.287	0.119	0.276	0.0449	0.675
Demand deposits	75337	0.135	0.0829	0.127	0.00376	0.437
Savings deposits	75337	0.143	0.126	0.101	0	0.539
Money market deposits	75337	0.174	0.128	0.147	0	0.592
Time dep. <1 year	75337	0.184	0.0870	0.170	0.0300	0.529
Time dep. >1 year	75337	0.102	0.0656	0.0909	0.00111	0.332
Cash	75337	0.0757	0.0640	0.0553	0.00221	0.453
Loans and leases	75337	0.648	0.143	0.663	0.226	0.928
Net income	75337	0.00406	0.00299	0.00407	-0.139	0.110
Interest exp. savings dep.	75337	0.000226	0.000181	0.000177	0.00000997	0.00137
Other interest expenses	75337	0.000223	0.000279	0.000130	0	0.00171
Total interest expenses	75337	0.000347	0.000721	0.0000126	-0.000741	0.00406
Non-interest expenses	75337	0.00761	0.00263	0.00722	0.00307	0.0217
<i>Other bank variables</i>						
Assets, in \$Millions	75337	655.9	1513.5	246.7	9.0	32066.9
Liabilities repricing, in years	75337	0.613	0.267	0.580	0.0479	1.670
<i>Money industry variables</i>						
Govt AUM/Total AUM	75337	0.341	0.198	0.233	0.221	0.795

OLS: Bank deposit and FHLB borrowing

<i>Dep.var.:</i>	(1) Deposits	(2) Deposits	(3) Transact. dep.	(4) Time dep.
FHLB	-0.847*** (0.0137)	-0.617*** (0.0165)	-0.230*** (0.0181)	-0.0600*** (0.0198)
Bank FE	N	Y	Y	Y
Time FE	N	Y	Y	Y
Observations	92,570	92,536	92,536	92,536
R ²	0.372	0.681	0.897	0.901

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Banks changed composition of deposits

<i>Dep.var.:</i>	(1) Demand	(2) Savings	(3) MM	(4) Time dep. (short)	(5) Time dep. (long)
\widehat{FHLB}	-1.049*** (0.322)	-0.434* (0.255)	-0.925*** (0.332)	-0.546** (0.270)	2.379*** (0.558)
Bank FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Observations	86,854	86,854	86,854	86,854	86,854
R ²	0.800	0.934	0.911	0.850	0.161
Kl.-P. F	23.86	23.86	23.86	23.86	23.86

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Banks did not increase deposit rates

<i>Dep.var.:</i>	(1) 3 months CD	(2) 6 months CD	(3) 12 months CD	(4) 24 months CD	(5) Checking acct.
FHLB	-0.510 (1.911)	-1.009 (1.544)	-3.282* (1.904)	-4.815** (2.178)	-0.129 (0.391)
Bank FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Observations	80,157	89,828	90,569	88,510	85,340
R ²	0.686	0.667	0.560	0.541	0.720

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Banks did not increase lending

Neither did credit unions

<i>Dep.var.:</i>	(1) Assets	(2) Cash	(3) Loans
\widehat{FHLB}	-0.571*** (0.160)	-0.836*** (0.267)	0.0178 (0.395)
Bank FE	Y	Y	Y
Time FE	Y	Y	Y
Observations	86,786	86,043	86,166
R ²	-0.066	0.679	0.886
Kl.-P. F	23.76	22.64	22.94

OLS

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Banks received higher net income

<i>Dep.var.:</i>	(1) Net income	(2) Interest exp.dep.	(3) Interest exp.other	(4) Interest exp.	(5) Non-int. exp.
\widehat{FHLB}	0.0194** (0.00990)	-0.00401*** (0.00105)	0.0223*** (0.00613)	0.0126*** (0.00246)	-0.0289*** (0.00900)
Bank FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Observations	86,854	86,842	76,244	86,854	86,854
R ²	0.485	0.583	-1.550	0.683	0.725
Kl.-P. F	23.86	23.80	8.984	23.86	23.86

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Robustness to rate rise: Deposits

<i>Dep.var.:</i>	(1)	(2)	(3)	(4)
	Total deposits	Transact. acc.	Demand dep.	Time dep.
\widehat{FHLB}	-0.835*** (0.281)	-2.072*** (0.688)	-0.988** (0.438)	2.245** (0.876)
Reprice X FF	0.00295 (0.00260)	-0.00360 (0.00573)	0.000713 (0.00367)	0.00381 (0.00747)
Bank FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	86,854	86,854	86,854	86,854
R ²	0.677	0.798	0.807	0.713

[Local market power and rate rise](#)
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Robustness to rate rise: Assets

<i>Dep.var.:</i>	(1) Assets	(2) Cash	(3) Loans
\widehat{FHLB}	-0.563* (0.292)	-1.043** (0.438)	0.266 (0.583)
Reprice X FF	9.53e-05 (0.00284)	-0.00237 (0.00348)	0.00287 (0.00417)
Bank FE	Y	Y	Y
Time FE	Y	Y	Y
Observations	86,786	86,043	86,166
R ²	-0.062	0.636	0.889

OLS: Bank assets and FHLB borrowing

<i>Dep.var.:</i>	(1) Assets	(2) Cash	(3) Loans	(4) Net income
FHLB	0.258*** (0.00892)	-0.107*** (0.0106)	0.355*** (0.0225)	0.00305*** (0.000652)
Bank FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	92,464	91,676	91,810	92,536
R ²	0.156	0.741	0.885	0.494

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The effect on credit unions' liabilities

	(1)	(2)	(3)	(4)	(5)
	FHLB	Shares	MM Shares	Share Certificate	Short Share Certificate
GovMF×Reprice	-0.026** (0.011)				
\widehat{FHLB}		-0.997 (0.614)	-1.091** (0.528)	0.549 (0.616)	-0.099 (0.304)
Time FE	Y	Y	Y	Y	Y
CU FE	Y	Y	Y	Y	Y
Observations	13,859	13,859	13,856	13,859	13,859
R ²	0.807	0.934	0.931	0.906	0.882

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Credit unions do not increase assets

	(1)	(2)	(3)	(4)	(5)
	FHLB	Assets	Fixed Mortgage	Adjustable Mortgage	Vehicle
GovMf×Reprice	-0.026** (0.011)				
\widehat{FHLB}		-0.235 (0.326)	0.522 (0.730)	0.533 (0.494)	0.151 (0.741)
Time FE	Y	Y	Y	Y	Y
CU FE	Y	Y	Y	Y	Y
Observations	13,859	13,859	13,859	13,841	13,859
R ²	0.807	0.121	0.930	0.905	0.947

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Robustness to rate rise and local environment: Deposits

<i>Dep.var.:</i>	(1) Total deposits	(2) Transact. acc.	(3) Demand dep.	(4) Time dep.
\widehat{FHLB}	-0.835*** (0.282)	-2.071*** (0.688)	-0.988** (0.438)	2.244** (0.875)
Reprice \times FF	0.00295 (0.00260)	-0.00360 (0.00573)	0.000711 (0.00367)	0.00382 (0.00747)
HHI \times FF	-0.00563** (0.00256)	0.00853 (0.00789)	0.00400 (0.00536)	-0.00966 (0.00874)
Bank FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	86,854	86,854	86,854	86,854
R ²	0.677	0.798	0.807	0.713

Only rate rise

Robustness to rate rise and local environment: Assets

<i>Dep.var.:</i>	(1) Assets	(2) Cash	(3) Loans	(4) Net income
\widehat{FHLB}	-0.563* (0.292)	-1.043** (0.438)	0.265 (0.583)	-0.0170 (0.0183)
Reprice \times FF	9.68e-05 (0.00284)	-0.00237 (0.00348)	0.00286 (0.00417)	-0.000427*** (0.000162)
HHI \times FF	-0.00290 (0.00267)	0.00168 (0.00455)	-0.00939 (0.00615)	-0.000272 (0.000186)
Bank FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	86,786	86,043	86,166	86,854
R-squared	-0.062	0.636	0.889	0.477