Liquidity Dependence and the Waxing and Waning of Central Bank Balance Sheets

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ONLINE APPENDIX

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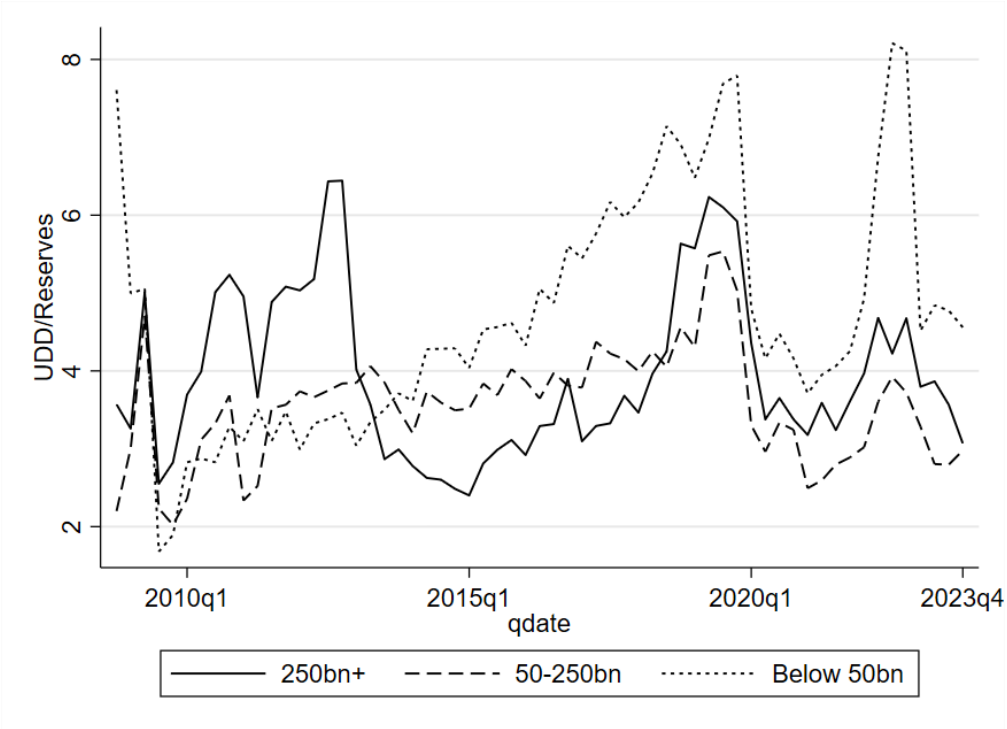
Appendix A

Figure A1: Ratcheting up of Aggregate Claims to Liquidity – Alternate Measures

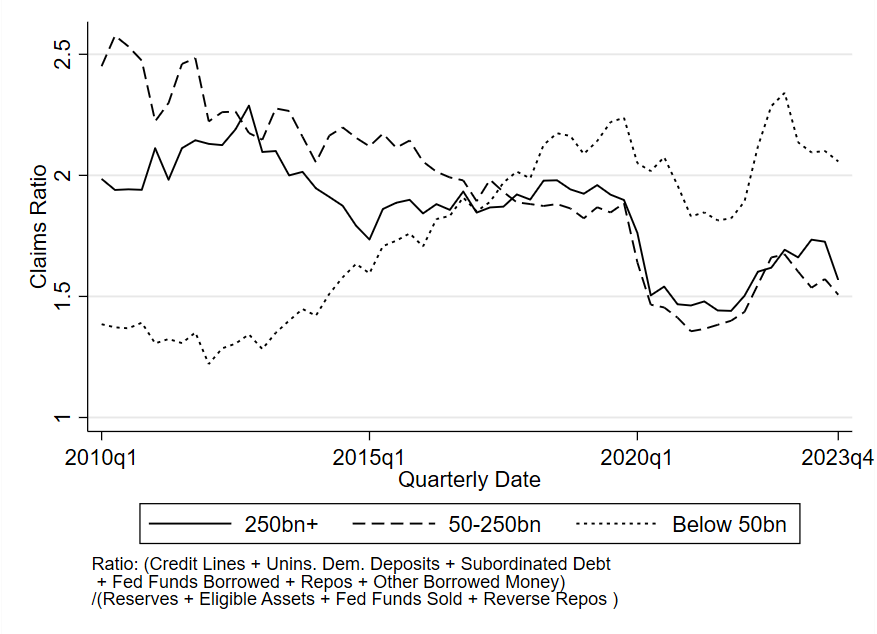
Panel A

We plot the ratio of aggregate uninsured demandable deposits to aggregate reserves of banks that fall within the size buckets of (i) Bank Assets above $250bn (ii) Bank Assets between $50-250bn and (iii) Bank Assets below $50bn, with Bank Assets measured in 2014Q3. Uninsured demandable deposits are defined as the difference between Total Uninsured Deposits and Uninsured Time Deposits plus Non-interest Bearing Foreign Deposits. Bank Assets refer to Total Book Assets. Bank Reserves refer to balances due at Federal Reserve Banks. The sample ranges 2008Q4 to 2023Q4. All data is sourced from FDIC's Call Reports.



Panel B

Panels B and C plot the alternate measures of the claims to liquidity ratio of credit lines and uninsured demandable deposits to reserves and eligible assets, aggregated by bank size categories, for banks that fall within the size buckets of (i) Bank Assets above $250bn in 2014Q3, (ii) Bank Assets between $50-250 bn in 2014Q3, and (iii) Bank Assets below $50bn in 2014Q3. Panel B plots the ratio as (Credit Lines + Uninsured Demandable Deposits + Funds Borrowed from the Federal Reserve + Other Borrowed Money)/(Reserves + Eligible Assets + Fed Funds Sold + Reverse Repos). Panel C plots the ratio as (Credit Lines + Uninsured Demandable Deposits + Subordinated Debt + Funds Borrowed from the Federal Reserve + Other Borrowed Money)/(Reserves + Eligible Assets + Fed Funds Sold + Reverse Repos). All Data is sourced from FDIC call reports.

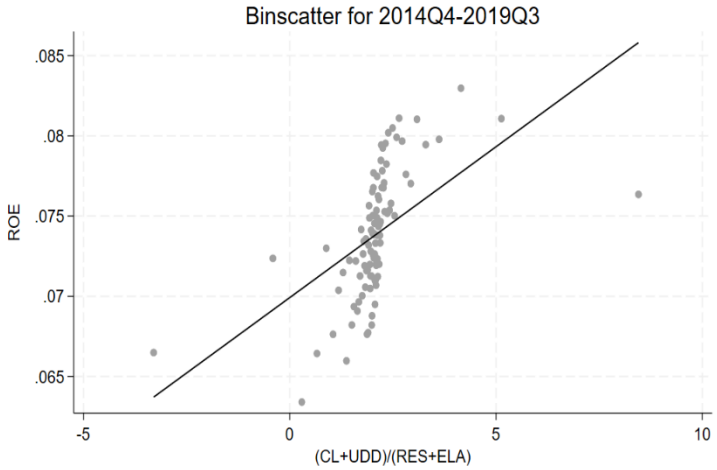


Panel C

Figure A2: Return on Equity and Claims to Potential Liquidity Ratio

This figure plots the binned scatters of bank return on equity on the Claims to Potential Liquidity ratio defined as the ratio of the sum of off-balance sheet credit lines and uninsured demandable deposits to the sum of reserves and eligible assets. Return on Equity is the ratio of Income before Tax to Total Bank Book Equity. Claims to potential liquidity ratio is as defined in Figure 5, using bank balance sheet data sourced from Call Reports. Both variables are winsorized at the 1st and 99th percentiles of their sample distribution. We control for bank and time fixed effects. The Panel A plots the figure for 2014Q4-2019Q3 (Post QE III + QT) and the Panel B for 2022Q1-2021Q4 (Post-Pandemic QT).

Panel A: Post-QE+QT (2014Q3 – 2019Q3)



Panel B: Post-Pandemic QT (2022Q1-2021Q4)

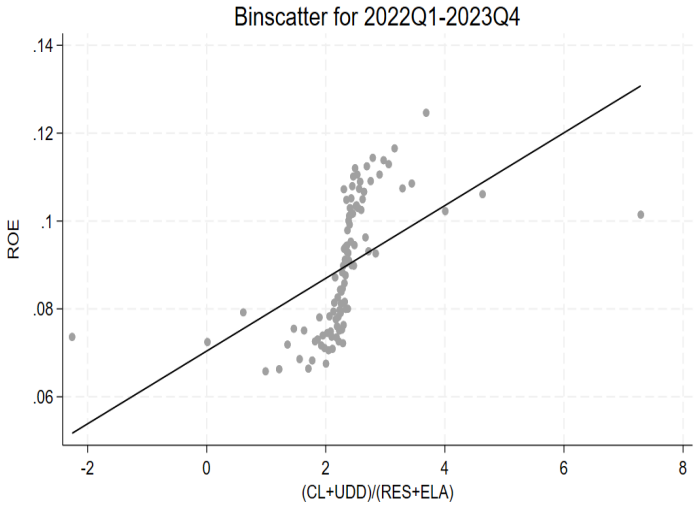


Table A1: Summary Statistics

This table shows descriptive statistics for our time-series variables. Demandable deposits is the sum of demand and other liquid deposits from the H.6 release. Time deposits is the sum of small- and large-time deposits (H6 and H8 release). All changes are calculated over a 12-month period. Δ Ln(Reserves) is the 12-month Δ the natural logarithm of reserves, and $Ln(Reserves)_{t-12}$ is the 12-month lag of Ln(Reserves). Δ Reserves is the 12-month Δ the level of reserves and $Reserves_{t-12}$ is the corresponding 12-month lagged variable. EFFR-IOR is the Effective Federal Fund Rate (EFFR) minus Interest on Reserves (IOR) on reserves, deposits and credit lines. Ln(Reserves) is the natural logarithm of reserves from the H.6 release, and Ln(Demand Deposits) is the natural logarithm of the sum of demand and other liquid deposits from the H.6 release. Ln(Time Deposits) is the sum of small and large time deposits (H6 and H8 release). Ln(Credit Lines) is the natural logarithm of unused (other) loan commitments from FDIC-insured banks (including corporate credit lines but not credit card commitments). Ln(Usage) is the natural logarithm of quarterly drawn credit lines of U.S. publicly listed firms sourced from Capital IQ. Ln(Uninsured) and Ln(Insured Deposits) and their components are taken from Quarterly FDIC Call Report Data. Uninsured Demandable Deposits and Insured Demandable deposits are obtained by subtracting Uninsured Time Deposits and Insured Time Deposits from Total Uninsured Deposits and Total Insured Deposits respectively. Δ Changes reflect 4-quarter changes.

Panel A: Time Series

	Mean	Median	SD	Min	Max	N
Δ Ln(Deposits)	.0693	.06	.0416	.0224	.203	147
Δ Ln(Demandable Deposits)	.0999	.0811	.0616	.0121	.288	147
Δ Ln(Time Deposits)	-.058	-.059	.114	-.337	.162	147
Δ Ln(Credit Lines)	.0563	.0716	.0623	-.118	.214	147
Δ Ln(Reserves)	.135	.0433	.277	-.297	1.21	147
Δ Ln(Uninsured Deposits)	0.128	0.082	0.220	-0.374	0.733	49
Δ Ln(Insured Deposits)	0.040	0.045	0.082	-0.189	0.216	49
Δ Ln(Uninsured Demandable Deposits)	0.093	0.068	0.083	-0.091	0.301	49
Δ Ln(Insured Demandable Deposits)	0.085	0.066	0.072	-0.084	0.302	49
Δ Deposits	803	570	677	170	3023	147
Δ Demandable Deposits	995	684	906	136	4050	147
Δ Time Deposits	-136	-127	251	-700	358	147
Δ Credit Lines	159	182	170	-238	731	147
Δ Reserves	254	85.2	564	-592	1641	147
Δ Uninsured Deposits	508	292	624	-585	1895	49
Δ Insured Deposits	295	303	566	-1223	1748	49
Δ Uninsured Demandable Deposits	528	370	569	-277	2257	49
Δ Insured Demandable Deposits	454	307	402	-301	1583	49
EFFR-IOR	-.0882	-.0943	.0575	-.183	.0725	155
Ln(Reserves)	7.58	7.65	.394	6.55	8.34	155
Ln(Deposits)	9.27	9.28	.241	8.89	9.79	155
Ln(Demand Deposits)	9.14	9.17	.324	8.51	9.81	155
Ln(Time Deposits)	7.71	7.69	.167	7.34	8.12	155
Ln(Credit Lines	7.86	7.9	.227	7.53	8.29	155
Ln(Usage)	20.6	20.5	.464	19.6	21.5	155
Ln(Uninsured Demandable Deposits)	8.55	8.59	0.314	7.923	9.212	53

Panel B: Bank-level Variables

The table shows summary statistics of bank-level variables constructed from Call Reports and S&P Global's *RateWatch* database. Total Deposits is the sum of Total Domestic and Foreign Deposits held at the depository level (RCON2200+RCFN2200 of Call Reports). Reserves are cash and balances due from Federal Reserve Banks at the consolidated bank-level (RCFD0090 of Call Reports). ΔLn(Reserves) and ΔLn(Deposits) are the year-on-year change of quarterly levels. 3-, 12- 18- and 24-month Certificate of Deposits (CD) spreads w.r.t Money Market (MM) Savings Deposit Rates are calculated at the bank-quarter level from S&P Global's *RateWatch data.* The first reserve instrument is the quarter-on-quarter growth in the Reserve Balances of the Federal Reserve Bank multiplied by the lagged bank-share of previous four quarters. Reserve Share is the ratio of bank-level Reserves to Aggregate Reserves. The second reserve instrument is the Growth in Aggregate Federal Reserve Assets quarter-on quarter multiplied by the lagged bank-share of previous four quarters. The County Deposit Growth Instrument is the log of the ratio of contemporary to one-quarter lagged level of total county deposits summed across all the counties the bank has a presence. ROE is the Income before Extraordinary Items by Total Equity capital. (CL+UDD)/(RES+EL) is the ratio of credit lines and uninsured demandable deposits to the sum of eligible assets and reserves. Excess Returns are estimated as the stock return over a period net of the S&P 500 index return over the same period. Gross Drawdowns reflects the drawing down of credit lines. Data on Stock Returns are from CRSP and Data on Gross Drawdowns in from DealScan. $\Delta Y_{it}=Y_{it}-Y_{it-4}$.

	Mean	Median	SD	Min	Max	N
Ln(Total Deposits)	11.886	11.757	1.467	0.000	21.692	619,819
Ln(Reserves)	8.932	9.151	2.695	0.000	20.080	145,594
ΔLn(Reserves)	0.181	0.075	1.580	-11.684	13.305	128,420
ΔLn(Deposits)	0.078	0.047	0.238	-13.871	10.792	577,564
Ln(Demandable Deposits)	11.078	10.909	1.645	0.000	21.447	617,545
Ln(Time Deposits)	10.848	10.766	1.377	0.000	19.494	615,733
ΔLn(Demandable Deposits)	0.101	0.074	0.267	-13.388	10.726	575,365
ΔLn(Time Deposits)	0.044	0.000	0.319	-10.087	10.989	573,615
Ln(Uninsured Demandable Deposits)	9.729	9.677	2.092	0.000	20.905	473,162
ΔLn(Uninsured Demandable Deposits)	0.158	0.133	0.756	-10.063	10.574	411,272
Equity Capital/Assets	0.123	0.102	0.104	-5.195	1.000	626,206
Total Assets (1000s)	2.115	0.151	39.484	0.000	3476.711	626,208
Net Income/Assets	0.002	0.002	0.069	-50.841	1.569	625,111
3-month CD Rate – MM Savings Rate	0.256	0.050	0.640	-3.601	4.911	356,098
12-month CD Rate - MM Savings Rate	0.772	0.495	0.827	-2.410	6.931	393,264
18-month CD Rate - MM Savings Rate	0.866	0.604	0.823	-2.169	4.951	304,944
24-month CD Rate - MM Savings Rate	1.031	0.812	0.825	-2.558	5.067	374,817
Growth in Agg Reserves (q-o-q) X Average Past 4Q Reserve Share	0.000	0.000	0.002	-0.016	0.447	142,036
Growth in Agg Fed Assets (q-o-q) X Average Past 4Q Reserve Share	0.000	0.000	0.001	-0.006	0.157	137,216

County Deposit Growth Instrument	0.089	0.045	0.324	-5.853	7.572	594,240
ROE (winsorized)	0.063	0.057	0.087	-0.493	0.366	626,204
(CL+UDD)/RES+EL (winsorized)	1.906	1.068	3.724	0.000	40.095	95,480

	Mean	Median	SD	Min	Max	N
Excess Returns (March 1st -23rd 2020)	-0.120	-0.122	0.113	-0.431	0.207	310
Excess Returns (March 1st-13th 2023)	-0.138	-0.126	0.095	-0.800	0.012	305
Gross Drawdowns 2020Q1	0.005	0.003	0.010	-0.013	0.045	131
ΔLn(Uninsured Demandable Deposits) 2022Q4-2023Q1	-0.146	-0.111	0.413	-7.204	4.963	4070
Ln((CL+UDD)/(RES+ELA)) 2019Q4	1.073	1.012	0.924	-3.010	5.105	310
Ln(CL/(RES+ELA)) 2019Q4	-0.815	-0.704	1.296	-7.593	3.373	304
Ln(UDD/(RES+ELA)) 2019Q4	0.873	0.770	0.910	-2.277	4.911	309
Ln((CL+UDD)/(RES+ELA)) 2022Q4	0.799	0.701	1.419	-7.578	12.168	4127
Ln(CL/(RES+ELA))	-1.395	-1.336	1.768	-9.414	6.576	3830
Ln(UDD/(RES+ELA)) 2022Q4	0.667	0.556	1.381	-9.148	12.168	4072

Panel C: Credit Lines Quantities

Bank Balance Sheet Data is sourced from Consolidated Reports of Condition and Income for a Bank with Domestic and Foreign Offices (Call Reports) of the FDIC. *Reserves* are cash and balances from Federal Reserve Banks at the consolidated bank-level (RCFD0090). *Credit lines* are credit line originations from the Refinitiv *LoanConnector* database. Δ*Ln(Credit Lines)* is the Δ the amount of originated credit lines. IG represents Investment Grade and Non-IG represents Non-Investment Grade sub-sample respectively.

	Mean	Median	SD	Min	Max	N
Δ Ln(Reserves) - IG	0.233	0.076	1.345	-9.606	8.943	1905
Δ Ln(Reserves) – Non-IG	0.228	0.084	1.322	-9.606	8.943	2085
ΔLn(Credit Lines) - IG	0.056	0.030	0.873	-4.924	6.376	1760
ΔLn(Credit Lines) – Non-IG	0.048	0.049	1.004	-4.834	4.700	1951

Additional Data Description

We obtain data on the origination of credit lines by U.S. non-financial firms from *Refinitiv LoanConnector*. We rely on syndicated credit line data to get directly at their originations. While the Call Reports data provide outstanding credit lines (to both corporations and individuals) for a bank, time-series variation in this variable includes both the origination of new credit lines as well as the expiry of existing credit lines. Furthermore, since we also analyze fees on credit lines at the time of origination, focusing on syndicated credit lines maintains consistency of datasets across different parts of our analysis.

Much of our other data, however, are defined at the bank level. Using a link-table of parent-offspring relationships provided by the Federal Reserve Bank, we link each commercial bank in each quarter to its respective BHC. We then aggregate data from the commercial bank level to the BHC.

Table A2: Table 1 without Lagged Reserve Variable

These tables replicate Table 1 without the lagged Ln(Reserves)$_{t-4}$ variable. Panel A columns (1) to (4) use changes in the natural logarithm of deposits (1), demand deposits (2), time deposits (3) and credit lines (4) as dependent variables. Panel A columns (5) to (8) uses changes in the level of the same variables.. Data for Panel A are from FRED. Call Report data helps us aggregate Changes in Insured Demandable and Uninsured Demandable deposits as the dependent variables. Panel B columns (1) to (4) use changes in the natural logarithm of uninsured deposits (1), insured deposits (2), uninsured demandable (3) and (4) insured demandable deposit as dependent variables. Columns (5) to (8) uses changes in the level of the same variables. Standard errors (Newey-West) account for auto-correlation up to 4 quarters and are reported in parentheses. Thes sample ranges 2008Q4-2021Q4. * p<0.1, ** p<0.05, *** p<0.01

Panel A

	(1) Δ Ln(Deposits)	(2) Δ Ln(Demandable Deposits)	(3) Δ Ln(Time Deposits)	(4) Δ Ln(Credit Lines)	(5) Δ Deposits	(6) Δ Demandable Deposits	(7) Δ Time Deposits	(8) Δ Credit Lines
Δ Ln(Reserves)	0.106**	0.182***	-0.359***	0.0153				
	(0.0397)	(0.0439)	(0.0611)	(0.0461)				
Δ Reserves					0.920***	1.281***	-0.299***	0.108*
					(0.279)	(0.358)	(0.0480)	(0.0611)
Constant	0.0552***	0.0756***	0.000908	0.0543***	569.0***	669.6***	-8.324	131.1***
	(0.00489)	(0.00713)	(0.0195)	(0.0113)	(96.27)	(97.50)	(43.21)	(32.10)
N	49	49	49	49	49	49	49	49
R-Sq	0.47	0.63	0.57	0.00	0.58	0.63	0.54	0.13

Panel B

	(1) Δ Ln(Unisured Deposits)	(2) Δ Ln(Insured Deposits)	(3) Δ Ln(Unins. Demandable Deposits)	(4) Δ Ln(Insured Demandable Deposits)	(5) Δ Unisured Deposits)	(6) Δ Insured Deposits	(7) Δ Unins. Demandable Deposits	(8) Δ Insured Demandable Deposits
ΔLn(Reserves)	0.147	0.0661	0.170**	0.142***				
	(0.145)	(0.0659)	(0.0709)	(0.0479)				
ΔReserves					0.628***	0.292	0.762***	0.457***
					(0.111)	(0.235)	(0.182)	(0.164)
Constant	0.109***	0.0316**	0.0703***	0.0661***	348.3***	220.7**	334.3***	337.5***
	(0.0348)	(0.0118)	(0.0118)	(0.0133)	(101.5)	(87.97)	(66.67)	(62.42)
N	49	49	49	49	49	49	49	49
rsq	0.03	0.05	0.30	0.27	0.32	0.08	0.57	0.41

Table A3. Aggregate Price of Liquidity (Time-Series)

This table reports the results from time-series OLS regression of levels and changes in levels of the Effective Federal Fund Rate (EFFR) minus Interest on Reserves (IOR) on reserves, deposits, and credit lines. *Ln(Reserves)* is the natural logarithm of reserves from the H.6 release, *Ln(Demand Deposits)* is the natural logarithm of the sum of demand and other liquid deposits from the H.6 release. *Ln(Time Deposits)* is the sum of small and large time deposits (H6 and H8 release). *Ln(Credit Lines)* is the natural logarithm of unused (other) loan commitments from FDIC insured banks (including corporate credit lines but not credit card commitments). *Ln(Usage)* is the natural logarithm of quarterly drawn credit lines of U.S. publicly listed firms sourced from Capital IQ. Uninsured demandable deposits are obtained by subtracting time deposits of more than $250,000 ($100,000 before 2008Q4) from total uninsured deposits, the latter being estimated from schedule RC-O of Call Reports. They are referred to as UDD. Total – UDD reports the difference of total deposits and uninsured demandable deposits for a bank, which we add up to the aggregate level. Panel A reports the regression of the level of EFFR-IOR on the levels of reserves, deposits (and its constituents), and credit lines. All columns use quarterly frequency and the sample ranges 2008Q4-2021Q4. Panel B represents the analogous regressions for changes in levels. Standard errors (Newey-West) account for auto-correlation up to 4 quarters. * p<0.1, ** p<0.05, *** p<0.01

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Panel A: Regression in Levels of EFFR-IOR				
Ln(Reserves)	-0.0105	-0.190***	-0.189***	-0.198***	-0.146***	-0.182***	-0.191***	-0.207***
	(0.0273)	(0.0133)	(0.0157)	(0.0151)	(0.0109)	(0.0143)	(0.0170)	(0.0169)
Ln(Deposits)		0.365***				0.275***		
		(0.0164)				(0.0582)		
Ln(Demandable Deposits)			0.316***				0.248***	
			(0.0142)				(0.0449)	
Ln(Time Deposits)			0.107***				0.0705	
			(0.0354)				(0.0478)	
Ln(Unins. Dem. Dep)				0.197***				0.184***
				(0.0345)				(0.0309)
Ln(Deposits – UDD)				0.170***				0.0311
				(0.0390)				(0.0671)
Ln(Credit Lines)					0.295***	0.0830	0.0915*	0.156**
					(0.0199)	(0.0537)	(0.0488)	(0.0686)
Ln(Gross Drawdowns)					0.0196**	0.00304	-0.00653	-0.00422
					(0.00784)	(0.00766)	(0.00647)	(0.00881)
Obs	52	52	52	52	52	52	52	52
R-sq	0.005	0.911	0.913	0.918	0.870	0.916	0.921	0.929
SE (# Lags)				Newey-West (4)				

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Panel B: Regressions in ΔEFFR-IOR				
ΔLn(Reserves)	-0.149***	-0.198***	-0.206***	-0.221***	-0.174***	-0.207***	-0.219***	-0.221***
	(0.0335)	(0.0291)	(0.0204)	(0.0184)	(0.0312)	(0.0190)	(0.0213)	(0.0167)
ΔLn(Deposits)		0.464**				0.343*		
		(0.222)				(0.194)		
ΔLn(Demandable Deposits)			0.430***				0.360***	
			(0.106)				(0.0951)	
ΔLn(Time Deposits)			0.0586				0.0423	
			(0.0542)				(0.0603)	
ΔLn(Unins. Dem. Deposits)				0.320***				0.250***
				(0.0560)				(0.0680)
ΔLn(Deposits – UDD)				0.310***				0.217***
				(0.0731)				(0.0740)
ΔLn(Credit Lines)					0.182***	0.160***	0.170***	0.142***
					(0.0496)	(0.0511)	(0.0487)	(0.0423)
ΔLn(Gross Drawdowns)					-0.0154***	-0.0138*	-0.0120*	-0.0105*
					(0.00512)	(0.00693)	(0.00657)	(0.00580)
Obs	51	51	51	51	51	51	51	51
R-sq	0.468	0.518	0.530	0.564	0.562	0.588	0.605	0.611
SE (# Lags)				Newey-West (4)				

Price of liquidity

The effective fed funds rate (*EFFR*) is how much suppliers of liquidity will receive in the Fed Funds market. The interest on excess reserves (*IOR*) reflects the price the Fed would like to set in this market. The difference (possibly negative) is a measure of the price of liquidity, adjusting for

the prevailing Fed-intended rate (typically shadowing the policy rate). Our initial regressions follow the "demand for reserves" approach outlined in Lopez-Salido and Vissing-Jorgensen [LS-VJ] (2022), but augmented for outstanding bank credit lines as another claim on liquidity that could affect its price:[1]

$$EFFR - IOR_t = \gamma + \alpha\, Ln(Reserves)_t + \beta\, Ln(Deposits)_t + \gamma Ln(Credit\ Line)_t + \varepsilon_t \qquad (2)$$

We estimate versions of this specification using OLS on quarterly data during 2008Q4 to 2021Q4 to match the frequency of data on outstanding credit lines and report the results in Table 2 Panel A. Standard errors reported in parentheses are adjusted for autocorrelation in the residuals up to 4 quarters.

In column (1), we only include *Ln(Reserves)* as the explanatory variable and find there is a statistically insignificant correlation between *EFFR-IOR* and reserves over time, replicating the finding of LS-VJ (2022). Column (2) includes *Ln(Deposits)* and shows a positive correlation of deposits with the price of liquidity, with the coefficient on *Ln(Reserves)* now turning statistically significant (and growing by a factor of over 15 relative to column (1)). Note also that the coefficient on deposits is close to twice the magnitude of that on reserves. Importantly, because changes in deposits are positively correlated with changes in reserves, this regression suggests we are not simply picking up some common component, since they have diametrically opposite correlations with the price of liquidity. This is further supported when we split deposits into demand and time deposits in column (3). In particular, the coefficient on demand deposits is about 1.5 times the magnitude of the coefficient on reserves, and nearly three times the coefficient estimate on time deposits. This suggests that it is the demandable nature of bank liabilities that primarily offsets the impact of reserves on reducing the price of liquidity. Next, in column (4), we split deposits into uninsured demandable deposits and the rest. The coefficient on uninsured demandable deposits is somewhat larger than the coefficient on the other deposits.

We then estimate versions of columns (1)-(4) that also include undrawn credit lines from FRED, *Ln(Credit Lines)*, along with quarterly data on credit lines usage of U.S. firms from Capital IQ , *Ln(Usage)*. The various specifications are in columns (5)-(8). In particular, the coefficient on *Ln(Reserves)* in all specifications is negative, large in magnitude, and statistically significant. The coefficient on demandable deposits is positive and

[1] The literature offers several approaches to estimating the so-called "aggregate reserves demand" of banks (see, e.g., Hamilton (1996), Carpenter and Demiralp (2006), and Afonso, Giannone, La Spada and Williams (2022)).

large. The coefficient on credit lines outstanding is positive and statistically significant except in column 6, suggesting that their demandability is also associated with a higher price of liquidity. The coefficient estimate on credit line usage is not robust in sign, magnitude, or significance.

Since there are well-known problems with regressions in levels, we also estimate versions of specification (2) in log changes in Table 2 Panel B. This has the advantage of absorbing confounding variation that may simply shift the levels of dependent and explanatory variables:

$$\Delta(EFFR - IOR)_t = \alpha\, \Delta Ln(Reserves)_t + \beta\, \Delta Ln(Deposits)_t + \gamma \Delta Ln(Credit\ Line)_t + \varepsilon_t$$

The results largely support the findings of Panel A in levels, with a few differences: one, reserves are now negatively and significantly related to the price of liquidity even without controlling for deposits or credit lines (column 1); secondly, the coefficient estimates on deposits, demandable deposits and uninsured demandable deposits (columns 2-4 and 6-8) are magnified in differences; and, finally, coefficients on outstanding credit lines (usage) are robustly positive (negative) and significant.[2, 3, 4]

[2] In Panel C given below, we separate the data on deposits and reserves into those for the overall banking system, for US banks only, and for foreign banks (overall minus US banks) only, and estimate the specification of Panel B with reserves only and with reserves and deposits (or separately demandable deposits in the case of US banks). Throughout, we find that bank reserves have a negative and significant coefficient estimate, not only for the reserves held by US banks but also for Fed reserves held by foreign banks, the latter being consistent with the evidence in Anderson et al. (2021) that global banks played an important intermediation function between the Fed and money market funds when they did not have access to interest on reserves. Furthermore, demandable US bank deposits have the expected positive significant coefficient estimate that is larger than that on overall US bank deposits, while the coefficient on time deposits is insignificant. Unfortunately, we cannot break up foreign bank deposits into demand and time. At any rate, foreign banks face regulatory constraints in raising deposits and hold a relatively small stock. Overall, this is supportive of the view that while foreign bank holdings of Fed reserves do matter for the price of liquidity, both demandable deposits and reserves of US banks play an important role too.

[3] One concern may be that the Fed's provision of reserves to the financial system following the collapse of Lehman Brothers in September 2008 and the Treasury repo rate spike of September 2019 was a direct response – among other things – to the elevated *EFFR*, which create potential endogeneity issues in "reserves demand" estimation. We have verified (results available upon request) that our conclusions are robust to focusing on the period from Q3 2009 to Q2 2019, a period over which the alteration of aggregate reserves by the Fed was most likely unrelated to the state of the inter-bank markets, in particular, to *EFFR-IOR*.

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Panel C: Effect of Non-US Banks Reserves and Deposits

Columns (1) represent regressions of EFFR-IOR on *US Banks' Ln(Reserves*), calculated as the aggregate sum of cash and balances due from Federal Reserve banks (RCFD0090) and *Non-US Banks' Ln(Reserves)* calculated as the difference of *Total Reserves* in H.6. Release and the aggregate sum of RCFD0090. In Column (4) along with the previous independent variables, we regress EFFR-IOR on *US Banks' Ln(Deposits)* ,estimated as the aggregate sum of domestic deposits (RCON2200), and *Non-US Banks' Ln(Deposits)* calculated as the difference between Total Deposits of H.6 and H.8 release and aggregate sum of RCON2200. Column (5) splits deposits into demandable and time deposits. Standard errors (Newey-West) account for auto-correlation up to 12 months. * p<0.1, ** p<0.05, *** p<0.01

	(1) ΔEFFR-IOR	(2) ΔEFFR-IOR	(3) ΔEFFR-IOR	(4) ΔEFFR-IOR	(5) ΔEFFR-IOR
ΔLn(Reserves)	-0.174***				
	(0.0327)				
ΔUS-Banks Ln(Reserves)		-0.133***		-0.0658***	-0.133***
		(0.0313)		(0.0223)	(0.0300)
ΔNon-US-Banks Ln(Reserves)			-0.116***	-0.113***	-0.118***
			(0.0303)	(0.0314)	(0.0314)
ΔUS-Banks Ln(Deposits)				-0.0484	
				(0.200)	
ΔNon-US-Banks Ln(Deposits)				-0.00621	-0.00000277
				(0.00770)	(0.00631)
ΔUS-Banks Ln(Demandable Deposits)					0.502***
					(0.184)
ΔUS-Banks Ln(Time Deposits)					0.110
					(0.0839)
Constant	0.0248***	0.0212***	0.0159*	0.0276*	-0.00935
	(0.00554)	(0.00664)	(0.00817)	(0.0157)	(0.0153)
Obs	48	48	48	46	46
R-Sq	0.690	0.498	0.474	0.754	0.780
Reg-Type	OLS	OLS	OLS	OLS	OLS
Data Frequency	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
Standard-Error	Newey-West	Newey-West	Newey-West	Newey-West	Newey-West
# Lags	4	4	4	4	4

Table A4: Deposits on Reserves and Household Financial Assets net of Deposits

This table shows the results of regressing change in Ln(Deposits) and Ln(Demandable Deposits) against Change in Ln(Reserves) and Change in Ln(Household Financial Assets net of Deposits) and Change in IOR to match the specification in LS-VJ (2023) for completeness. All variables are taken from FRED. All changes are calculated over a 12-month period. Δ *Ln(Reserves)* is the 12-month change in the natural logarithm of reserves, and $Ln(Reserves)_{t-12}$ is the 12-month lag of *Ln(Reserves)*. Δ *Reserves* is the 12-month change in the level of reserves and $Reserves_{t-12}$ is the corresponding 12-month lagged variable. Standard errors (Newey-West) account for auto-correlation up to 12-months. Standard errors are reported in parentheses. Data ranges from 2009M1 – 2021M11. * p<0.1, ** p<0.05, *** p<0.01

	(1)	(2)	(3)	(4)
	ΔLn(Demandable Deposits)			
ΔLn(Reserves)	0.0877**	0.0865**	0.160***	0.161***
	(0.0383)	(0.0385)	(0.0394)	(0.0384)
ΔLn(Fin Assets - Deposits)	0.160		0.157	
	(0.116)		(0.147)	
ΔLn(Fin Assets – Insured Deposits)		0.159		0.125
		(0.110)		(0.148)
ΔIOR				
Constant	0.0459***	0.0457***	0.0670***	0.0688***
	(0.00870)	(0.00875)	(0.0106)	(0.0104)
N	146	146	146	146
R-Sq	0.457	0.462	0.597	0.593
Reg-Type	Newey-West	Newey-West	Newey-West	Newey-West
# Lags	12	12	12	12

Table A5: First Stage: Clustering errors by Bank

The table shows first-stage results with bank-level clustering. Deposit and reserve data are sourced from *FDIC's Call Reports*. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank-level (RCFD0090). Panel A shows the first-stage of , Δ*Ln(Reserves)* is instrumented by reserve instrument: *Growth in Aggregate Reserves × Lagged Share in Reserves, averaged over previous 4 quarters* (z^{R1}_{it}) controlling for Time-FE, lagged Ln(assets), Equity-Capital Ratio, Net Income/Assets, indicator for Primary Dealers and Ln(Reserves) lagged by five quarters. $\Delta Y = Y_t - Y_{t-4}$. Columns (1) represent the regressions on the overall sample ranging 2008 Q4 – 2021 Q4. Columns (2) represent QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Columns (3) represent the QEI-III period: 2008Q4 - 2014Q3. Columns (4) show results for the Post-QE III + QT period 2014Q4 - 2019Q3. Panel B shows the first stage of *Ln(Reserves)* and *Ln(Deposits)* instrumented respectively by *Growth in Aggregate Reserves × Lagged Share in Reserves, averaged over previous 4 quarters* (z^{R1}_{it}) and *Deposit Growth Instrument* (z^{D}_{it}), with bank-level controls. Note Total Deposits contain domestic and foreign deposits at the bank-level. Bank-level variables are sourced from *FDIC's Call Reports* data. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank level (RCFD0090). * p<0.1, ** p<0.05, *** p<0.01

Panel A

	(1)	(2)	(3)	(4)
		ΔLn(Reserves)		
Ln(Reserves_t/Reserves_t-1) # Lagged Share in Agg. Reserves over 4Q	13.14***	12.54***	12.67***	25.87**
	(3.139)	(3.126)	(3.227)	(11.56)
N	81892	51062	43236	30830
Kl-P F-stat	17.63	16.32	15.57	4.91
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(Reserves)				Ln(Total Deposits)			
Deposit Growth Instrument	0.0487**	0.0119	0.0328	0.0476**	0.0137***	0.0134***	0.0159***	0.0118***
	(0.0236)	(0.0342)	(0.0348)	(0.0235)	(0.00242)	(0.00335)	(0.00368)	(0.00289)
Ln(Reserves_t/ Reserves_t-1) # Lagged Share in Agg. Reserves over 4Q	8.712***	9.125***	8.283***	28.49***	-0.659**	-0.550*	-0.505*	-0.794
	(1.277)	(1.424)	(1.359)	(7.038)	(0.292)	(0.283)	(0.279)	(1.204)
N	81907	51104	43289	30720	83793	51738	43767	31984
Kl-P F-stat	22.28	10.58	13.97	1.84	22.28	10.58	13.97	1.84
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3
Bank and Time-FE					Y			

Table A6: Correlation of the Instrument with Time Varying Controls

This table shows the correlation of the instrument with time-varying controls. All data is sourced from FDIC's Call Reports for the time period 2008Q4-2021Q4.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(Reserves_t/Reserves_t-1)				# Lagged Share in Agg. Reserves over 4Q			
Log Assets$_{t-1}$	0.058							
Equity/Assets$_{t-1}$		-0.006						
Return on Assets$_{t-1}$			-0.003					
Primary Dealer$_{t-1}$				0.056				
Interest Expense Beta$_{t-1}$					0.021			
Securities/Assets$_{t-1}$						0.001		
Loans/Assets$_{t-1}$							-0.023	
Credit Lines/Assets$_{t-1}$								0.006
Observations	332921	332921	332743	332921	297710	332921	332921	300314

Table A7. Robustness: Bank-level controls set at the beginning of the sub-sample

This table shows the robustness result of running tables 3 and 4 of the paper with time-varying bank-level controls set at the beginning of each sub-sample. All bank-level data is from FDIC Call Reports and ranges the time period 2008Q4-2021Q4. The table shows the first stage, the OLS and the second-stage of 2SLS IV regressions. Deposit and reserve data are sourced from FDIC's Call Reports. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank-level (RCFD0090). We supplement the *Reserves* variable with the field at depository institution level (RCON0090) if the former field is missing. Panel A shows the first-stage of Δ*Ln(Reserves)* instrumented by reserve instrument (z^{R1}_{it}): *Growth in Aggregate Reserves in quarter t × Lagged Share in Reserves, averaged over previous 4 quarters.*

Panel A: First Stage for Quantities

All specifications control for Time-FE, Ln(assets), Equity-Capital Ratio, Net Income/Assets, indicator for Primary Dealers,fixed at the beginning of each sub-sample. Columns (1) represent the regressions on the overall sample ranging 2008 Q4 – 2021 Q4. Columns (2) represent QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Columns (3) represent the QEI-III period: 2008Q4 - 2014Q3. Columns (4) show results for the Post QE III and QT period 2014Q4 - 2019Q3. Standard errors are two-way clustered at the bank and time level. Newey-West SE adjusted for autocorrelation up to 4 quarters are also reported for OLS. Stock & Yogo (S&Y) weak ID test critical values with 10% maximal IV size for the first-stage are reported below the F-stats. * p<0.1, ** p<0.05, *** p<0.01

	(1)	(2)	(3)	(4)
		ΔLn(Reserves)		
Ln(Reserves_t/Reserves_t-1) # Lagged Share in Agg. Reserves over 4Q	17.37***	18.46***	18.25***	-63.22*
	(1.441)	(2.027)	(1.795)	(34.41)
N	81892	51062	43236	30830
Kl-P F-stat	146.28	83.61	104.21	3.38
F-stat	117.8	103.2	96.05	68.40
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3

Panel B: First Stage for Rates

The table shows the first stage (Panel B) and the second stage (Panel D) of 2SLS IV regressions of *3, 12, 18 and 24-month CD – Money Market (MM) savings spread* against bank-level *Ln(Reserves).* Panel B shows the first stage of *Ln(Reserves)* and *Ln(Deposits)* instrumented respectively by *Growth in Aggregate Reserves × Lagged Share in Reserves averaged over previous 4 quarters* (z^{R1}_{it}) and *Deposit Growth Instrument* (z^{D}_{it}), with bank-level controls. Note Total Deposits contain domestic and foreign deposits at the bank-level. Bank-level variables are sourced from *FDIC's Call Reports* data. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank level (RCFD0090). We control for bank and time fixed effects. Standard errors are two-way clustered at the bank and time level. Stock & Yogo (S&Y) weak ID test critical values with 10% maximal IV size for the first-stage are reported below the F-stats. The sample period is 2008Q4 – 2021Q4. * p<0.1, ** p<0.05, *** p<0.01

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(Reserves)					Ln(Total Deposits)		
Deposit Growth Instrument	0.158***	0.250***	0.319***	0.0473	0.240***	0.340***	0.357***	0.109**
	(0.0519)	(0.0739)	(0.0775)	(0.0569)	(0.0323)	(0.0426)	(0.0480)	(0.0470)
Ln(Reserves_t/ Reserves_t-1) # Lagged Share in Agg. Reserves over 4Q	47.17***	50.77***	45.50***	-1803.1***	31.43***	34.16***	29.63***	-1371.8***
	(12.16)	(15.49)	(10.61)	(609.0)	(9.839)	(12.39)	(8.150)	(459.5)
N	84871	53445	45508	31426	92809	58027	49657	34782
F-stat	12.21	11.14	17.39	4.430	32.06	34.99	33.49	6.981
Kl-P F-stat	135.27	28.92	50.67	0.75	135.27	28.92	50.67	0.75
Hansen-J Test p-value	0.000	0.000	.	.	0.000	0.000	.	.
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3

Panel C: Second Stage Quantities

Panel C.1: Unins Dem Dep	(1)	(2)	(3)	(4)
		ΔLn(Unins Demandable Deposits)		
ΔLn(Reserves)	0.187***	0.186***	0.187***	0.288*
	(0.0164)	(0.0160)	(0.0157)	(0.147)
N	73906	43643	35938	30263
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3
Time-FE		Y		
Panel C.2: Time Dep	(1)	(2)	(3)	(4)
		ΔLn(Time Deposits)		
ΔLn(Reserves)	-0.138***	-0.138***	-0.119***	-0.213
	(0.0442)	(0.0444)	(0.0259)	(0.151)
N	82910	51982	44201	30928
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3
Time-FE		Y		

Panel D: Second Stage Rates

Panel D.1: Overall	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	-0.216***	-0.0920**	-0.321***	-0.160***
	(0.0564)	(0.0432)	(0.107)	(0.0595)
Ln(Total Deposits)	0.524	0.227	0.497	0.264
	(0.350)	(0.241)	(0.493)	(0.281)
N	60848	65494	54476	64549
Period	2008Q4-2021Q4	2008Q4-2021Q4	2008Q4-2021Q4	2008Q4-2021Q4
Bank and Time-FE		Y		

Panel D.2: All QEs	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	-0.165***	-0.0721***	-0.235**	-0.128**
	(0.0408)	(0.0255)	(0.106)	(0.0538)
Ln(Total Deposits)	0.119	0.310	0.243	0.289
	(0.330)	(0.255)	(0.446)	(0.290)
N	39347	42084	34972	41432
Period	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4
Bank and Time-FE		Y		

	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	-0.177***	-0.0725**	-0.246**	-0.136**
	(0.0391)	(0.0303)	(0.106)	(0.0517)
Ln(Total Deposits)	0.320	0.416**	0.456	0.403*
	(0.255)	(0.187)	(0.324)	(0.222)
N	34578	36818	30526	36200
Period	2008Q4-2014Q3	2008Q4-2014Q3	2008Q4-2014Q3	2008Q4-2014Q3
Bank and Time-FE		Y		

	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	0.443	0.0350	-0.215	0.334
	(0.425)	(0.712)	(0.537)	(0.725)
Ln(Total Deposits)	-0.641	-0.155	0.329	-0.806
	(1.109)	(1.504)	(1.136)	(1.591)
N	21426	23331	19429	23039
Period	2014Q4-2019Q3	2014Q4-2019Q3	2014Q4-2019Q3	2014Q4-2019Q3
Bank and Time-FE		Y		

Table A8. Robustness: Tables 3 and 4 with no bank-level controls

This table shows the robustness result of running tables 3 and 4 of the paper without time-varying bank-level controls. The table shows the first stage, the OLS and the second-stage of 2SLS IV regressions. Deposit and reserve data are sourced from FDIC's Call Reports. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank-level (RCFD0090). We supplement the *Reserves* variable with the field at depository institution level (RCON0090) if the former field is missing. Panel A shows the first-stage of Δ*Ln(Reserves)* instrumented by reserve instrument (z^{R1}_{it}): *Growth in Aggregate Reserves in quarter t × Lagged Share in Reserves, averaged over previous 4 quarters.* Interest Rate data is sourced from *RateWatch* dataset. All bank-level data is from FDIC Call Reports and ranges the time period 2008Q4-2021Q4.

Panel A: First Stage

All specifications control for Time-FE, and Ln(Reserves) lagged by five quarters. Columns (1) represent the regressions on the overall sample ranging 2008 Q4 – 2021 Q4. Columns (2) represent QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Columns (3) represent the QEI-III period: 2008Q4 - 2014Q3. Columns (4) show results for the Post QE III and QT period 2014Q4 - 2019Q3. Standard errors are two-way clustered at the bank and time level. Newey-West SE adjusted for autocorrelation up to 4 quarters are also reported for OLS. Stock & Yogo (S&Y) weak ID test critical values with 10% maximal IV size for the first-stage are reported below the F-stats. * p<0.1, ** p<0.05, *** p<0.01

	(1) ΔLn(Reserves)	(6) ΔLn(Reserves)	(7) ΔLn(Reserves)	(8) ΔLn(Reserves)
Ln(Reserves_t/Reserves_t-1) # Lagged Share in Agg. Reserves over 4Q	17.37***	18.46***	18.25***	-63.22*
	(1.441)	(2.027)	(1.795)	(34.41)
N	81892	51062	43236	30830
Kl-P F-stat	146.28	83.61	104.21	3.38
F-stat	117.8	103.2	96.05	68.40
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3

Panel B: First Stage for Rates

The table shows the first stage (Panel B) of 2SLS IV regressions of *3, 12, 18 and 24-month CD – Money Market (MM) savings spread* against bank-level *Ln(Reserves).* Panel B shows the first stage of *Ln(Reserves)* and *Ln(Deposits)* instrumented respectively by *Growth in Aggregate Reserves × Lagged Share in Reserves averaged over previous 4 quarters* (z^{R1}_{it}) and *Deposit Growth Instrument* (z^{D}_{it}), with bank-level controls. Note Total Deposits contain domestic and foreign deposits at the bank-level. Bank-level variables are sourced from *FDIC's Call Reports* data. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank level (RCFD0090). We control for bank and time fixed effects. Standard errors are two-way clustered at the bank and time level. Stock & Yogo (S&Y) weak ID test critical values with 10% maximal IV size for the first-stage are reported below the F-stats. The sample period is 2008Q4 – 2021Q4. * p<0.1, ** p<0.05, *** p<0.01

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(Reserves)				Ln(Total Deposits)			
Deposit Growth Instrument	0.158***	0.250***	0.319***	0.0473	0.240***	0.340***	0.357***	0.109**
	(0.0519)	(0.0739)	(0.0775)	(0.0569)	(0.0323)	(0.0426)	(0.0480)	(0.0470)
Ln(Reserves_t/ Reserves_t-1) # Lagged Share in Agg. Reserves over 4Q	47.17***	50.77***	45.50***	-1803.1***	31.43***	34.16***	29.63***	-1371.8***
	(12.16)	(15.49)	(10.61)	(609.0)	(9.839)	(12.39)	(8.150)	(459.5)
N	84871	53445	45508	31426	92809	58027	49657	34782
F-stat	12.21	11.14	17.39	4.430	32.06	34.99	33.49	6.981
Kl-P F-stat	135.27	28.92	50.67	0.75	135.27	28.92	50.67	0.75
Hansen-J Test p-value	0.000	0.000	.	.	0.000	0.000	.	.
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3

Panel C: Second Stage for Quantities

C.1: Unin Dem Dep	(1) ΔLn(Unins Demandable Deposits)	(2) ΔLn(Unins Demandable Deposits)	(3) ΔLn(Unins Demandable Deposits)	(4) ΔLn(Unins Demandable Deposits)
ΔLn(Reserves)	0.187***	0.186***	0.187***	0.288*
	(0.0164)	(0.0160)	(0.0157)	(0.147)
N	73906	43643	35938	30263
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3
Time-FE				

C.2: Time Dep	(1) ΔLn(Time Deposits)	(2) ΔLn(Time Deposits)	(3) ΔLn(Time Deposits)	(4) ΔLn(Time Deposits)
ΔLn(Reserves)	-0.138***	-0.138***	-0.119***	-0.213
	(0.0442)	(0.0444)	(0.0259)	(0.151)
N	82910	51982	44201	30928
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3
Time-FE				

Panel D: Second Stage Rates

D.1: Overall sample	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	-0.216***	-0.0920**	-0.321***	-0.160***
	(0.0564)	(0.0432)	(0.107)	(0.0595)
Ln(Total Deposits)	0.524	0.227	0.497	0.264
	(0.350)	(0.241)	(0.493)	(0.281)
N	60848	65494	54476	64549
Period	2008Q4-2021Q4	2008Q4-2021Q4	2008Q4-2021Q4	2008Q4-2021Q4
Time-FE				

D.2: All QEs	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	-0.165***	-0.0721***	-0.235**	-0.128**
	(0.0408)	(0.0255)	(0.106)	(0.0538)
Ln(Total Deposits)	0.119	0.310	0.243	0.289
	(0.330)	(0.255)	(0.446)	(0.290)
N	39347	42084	34972	41432
Period	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4
Time-FE				

D.2: QE-I-III	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	-0.177***	-0.0725**	-0.246**	-0.136**
	(0.0391)	(0.0303)	(0.106)	(0.0517)
Ln(Total Deposits)	0.320	0.416**	0.456	0.403*
	(0.255)	(0.187)	(0.324)	(0.222)
N	34578	36818	30526	36200
Period	2008Q4-2014Q3	2008Q4-2014Q3	2008Q4-2014Q3	2008Q4-2014Q3
Time-FE				

D.3: Post-QE+QT	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	0.443	0.0350	-0.215	0.334
	(0.425)	(0.712)	(0.537)	(0.725)
Ln(Total Deposits)	-0.641	-0.155	0.329	-0.806
	(1.109)	(1.504)	(1.136)	(1.591)
N	21426	23331	19429	23039
Period	2014Q4-2019Q3	2014Q4-2019Q3	2014Q4-2019Q3	2014Q4-2019Q3
Time-FE				

Table A9: Robustness: Controlling for Expense Betas × ΔEFFR

This table shows the robustness result of running tables 3 and 4 of the paper with interest expense betas from Dreschler et al. (2021) interacted with Change in Effective Federal Funds Rate. Interest expense betas are extracted from https://pages.stern.nyu.edu/~pschnabl/data/data_deposit_beta.htm. All bank-level data is from FDIC Call Reports and ranges the time period 2008Q4-2021Q4. The table shows the first stage, the OLS and the second-stage of 2SLS IV regressions. Deposit and reserve data are sourced from FDIC's Call Reports. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank-level (RCFD0090). We supplement the *Reserves* variable with the field at depository institution level (RCON0090) if the former field is missing. Panel A shows the first-stage of *ΔLn(Reserves)* instrumented by reserve instrument (z^{R1}_{it}): *Growth in Aggregate Reserves in quarter t × Lagged Share in Reserves, averaged over previous 4 quarters.*

Panel A: First Stage for Quantities

All specifications control for Time-FE, lagged Ln(assets), Equity-Capital Ratio, Net Income/Assets, indicator for Primary Dealers, Interest Expense Beta interacted with ΔEFFR and Ln(Reserves) lagged by five quarters. Columns (1) represent the regressions on the overall sample ranging 2008 Q4 – 2021 Q4. Columns (2) represent QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Columns (3) represent the QEI-III period: 2008Q4 - 2014Q3. Columns (4) show results for the Post QE III and QT period 2014Q4 - 2019Q3. Standard errors are two-way clustered at the bank and time level. Newey-West SE adjusted for autocorrelation up to 4 quarters are also reported for OLS. Stock & Yogo (S&Y) weak ID test critical values with 10% maximal IV size for the first-stage are reported below the F-stats. * p<0.1, ** p<0.05, *** p<0.01

	(1) ΔLn(Reserves)	(2) ΔLn(Reserves)	(3) ΔLn(Reserves)	(4) ΔLn(Reserves)
Ln(Reserves_t/Reserves_t-1) # Lagged Share in Agg. Reserves over 4Q	12.74***	12.20***	12.24***	35.26**
	(0.785)	(0.711)	(0.897)	(13.74)
N	67278	42743	36438	24535
Kl-P F-stat	0.00	0.00	0.00	6.57
F-stat	.	.	.	18.14
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3

Panel B: First Stage for Rates

Panels B and D show the first and second stage of 2SLS IV regressions of *3, 12, 18 and 24-month CD – Money Market (MM) savings spread* against bank-level *Ln(Reserves).* Panel A shows the first stage of *Ln(Reserves)* and *Ln(Deposits)* instrumented respectively by *Growth in Aggregate Reserves × Lagged Share in Reserves averaged over previous 4 quarters* (z^{R1}_{it}) and *Deposit Growth Instrument* (z^{D}_{it}), with bank-level controls. Note Total Deposits contain domestic and foreign deposits at the bank-level. Bank-level variables are sourced from *FDIC's Call Reports* data. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank level (RCFD0090). We supplement the *Reserve* variable with the field at depository institution level (RCON0090) if the former field is missing. All specifications control for lagged Ln(Assets), Equity/Assets Ratio, Net Income/Assets, and Primary Dealer indicator, Interest Expense Beta interacted with ΔEFFR and bank and time fixed effects. Standard errors are two-way clustered at the bank and time level. Stock & Yogo (S&Y) weak ID test critical values with 10% maximal IV size for the first-stage are reported below the F-stats. The sample period is 2008Q4 – 2021Q4. * p<0.1, ** p<0.05, *** p<0.01

	(1) Ln(Reserves)	(2) Ln(Reserves)	(3) Ln(Reserves)	(4) Ln(Reserves)	(5) Ln(Total Deposits)	(6) Ln(Total Deposits)	(7) Ln(Total Deposits)	(8) Ln(Total Deposits)
Deposit Growth Instrument	0.0866***	0.0784	0.106*	0.108***	0.0238***	0.0273***	0.0313***	0.0193***
	(0.0281)	(0.0482)	(0.0525)	(0.0268)	(0.00426)	(0.00677)	(0.00824)	(0.00510)
Ln(Reserves_t/ Reserves_t-1) # Lagged Share in Agg. Reserves over 4Q	10.40***	10.01***	9.919***	-11.63	-0.738***	-0.376	-0.131	8.263
	(1.123)	(1.096)	(1.236)	(29.76)	(0.263)	(0.419)	(0.432)	(6.912)
N	67458	42904	36586	24554	68979	43405	36965	25574
F-stat	1535.4	945.0	741.5	2109.5	22290.5	16710.5	11888.7	29727.5
Kl-P F-stat	135.27	28.92	50.67	0.75	135.27	28.92	50.67	0.75
Hansen-J Test p-value	0.000	0.000	.	.	0.000	0.000	.	.
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3

Panel C: Second Stage for Quantities

C.1: Unin Dem Dep	(1) ΔLn(Unins Demandable Deposits)	(2) ΔLn(Unins Demandable Deposits)	(3) ΔLn(Unins Demandable Deposits)	(4) ΔLn(Unins Demandable Deposits)
ΔLn(Reserves)	0.198***	0.199***	0.200***	0.283
	(0.0161)	(0.0165)	(0.0176)	(0.309)
N	60536	36339	30100	24197
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3
Time-FE				

C.2: Time Dep	(1) ΔLn(Time Deposits)	(2) ΔLn(Time Deposits)	(3) ΔLn(Time Deposits)	(4) ΔLn(Time Deposits)
ΔLn(Reserves)	-0.155***	-0.124***	-0.135***	0.657
	(0.0435)	(0.0417)	(0.0322)	(0.618)
N	66858	42489	36234	24369
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3
Time-FE				

Panel D: Second Stage for Rates

D.1: Overall sample	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	-0.184***	-0.0744**	-0.271**	-0.133**
	(0.0448)	(0.0344)	(0.105)	(0.0549)
Ln(Total Deposits)	0.940*	0.344	1.061	0.617
	(0.484)	(0.384)	(0.750)	(0.470)
N	52586	56021	46396	55249
Period	2008Q4-2021Q4	2008Q4-2021Q4	2008Q4-2021Q4	2008Q4-2021Q4
Time-FE				

D.2: All QEs	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	-0.168***	-0.0568**	-0.220*	-0.112*
	(0.0426)	(0.0278)	(0.111)	(0.0550)
Ln(Total Deposits)	0.352	0.446	0.700	0.564
	(0.508)	(0.413)	(0.651)	(0.452)
N	33882	35849	29717	35333
Period	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4
Time-FE				

D.3: QE I-III	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	-0.172***	-0.0522*	-0.225**	-0.117**
	(0.0361)	(0.0302)	(0.108)	(0.0508)
Ln(Total Deposits)	0.842*	0.708*	1.119*	0.850*
	(0.472)	(0.405)	(0.637)	(0.449)
N	29659	31220	25832	30731
Period	2008Q4-2014Q3	2008Q4-2014Q3	2008Q4-2014Q3	2008Q4-2014Q3
Time-FE				

D4. Post-QE-I-III	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	0.509	0.0872	-0.235	0.308
	(0.358)	(0.622)	(0.526)	(0.589)
Ln(Total Deposits)	-0.507	-0.510	0.590	-0.839
	(1.716)	(1.706)	(1.300)	(1.894)
N	18637	20104	16615	19849
Period	2014Q4-2019Q3	2014Q4-2019Q3	2014Q4-2019Q3	2014Q4-2019Q3
Time-FE				

Table A10: Deposit Rate Spreads - OLS Regressions

The table shows OLS regressions of *3, 12, 18 and 24-month CD – Money Market (MM) savings rate spread* against bank-level *Ln(Total Deposits)* and *Ln(Reserves).* CD and MM savings rates are sourced from *S&P Global's RateWatch* deposit data. Bank-level variables are sourced from *FDIC's Call Reports* data. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank level (RCFD0090). *Total Deposits* is the sum of deposits held in domestic and foreign offices (RCON2200 + RCFN2200. Panel A shows the results for the overall period. Panel B shows the results QE I-III+ Pandemic QE periods. Panels C and D shows results for QE I-III and Post-QE-III+QT periods respectively. All specifications control for Log(Assets), Net Income/Assets, Equity/Assets, Primary Dealer indicator lagged by one quarter along with bank and time fixed effects. Standard errors are two-way clustered at the bank and time level. The sample period is 2008Q4 – 2021 Q4. * p<0.1, ** p<0.05, *** p<0.01

Panel A	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24-month CD Rate - MM Savings Rate
Ln(Reserves)	-0.000608	0.00147	0.00197	0.00307
	(0.00136)	(0.00171)	(0.00176)	(0.00225)
N	60200	64809	53869	87265
Period		2008Q4-2021Q4		
Panel B	(1) 3-month CD Rate - MM Savings Rate	(2) 12-month CD Rate - MM Savings Rate	(3) 18-month CD Rate - MM Savings Rate	(4) 24-month CD Rate - MM Savings Rate
Ln(Reserves)	-0.00136	-0.00109	-0.000152	0.000771
	(0.00152)	(0.00165)	(0.00167)	(0.00180)
N	37995	40624	33776	39996
Period		2008Q4 - 2014Q3 & 2019Q4 - 2021Q4		

Panel C	(1) 3-month CD Rate - MM Savings Rate	(2) 12-month CD Rate - MM Savings Rate	(3) 18-month CD Rate - MM Savings Rate	(4) 24-month CD Rate - MM Savings Rate
Ln(Reserves)	-0.00138	-0.00138	-0.000678	0.000878
	(0.00164)	(0.00162)	(0.00171)	(0.00187)
N	33292	35433	29391	34838
Period		2008Q4 - 2014Q3		
Panel D	(1) 3-month CD Rate - MM Savings Rate	(2) 12-month CD Rate - MM Savings Rate	(3) 18-month CD Rate - MM Savings Rate	(4) 24-month CD Rate - MM Savings Rate
Ln(Reserves)	0.00134	0.00756**	0.00659**	0.00549*
	(0.00185)	(0.00280)	(0.00288)	(0.00275)
N	23577	25672	21312	25320
Period		2014Q4 - 2019Q3		

Table A11 – SVB Regressions Robustness

This table presents regression results in two panels. Panel A reports cross-sectional results excluding failed banks (Signature Bank and Silicon Valley Bank), and Panel B is identical to Table 7 except it includes a control for Mark-to-Market Losses (MTM Loss/Assets), estimated as per Jiang et al. (2023). The dependent variables are excess returns (columns 1–4), log change in uninsured demandable deposits (columns 5–7), and log change in other borrowed money balances (columns 8–10). Explanatory variables include banks' claims to potential liquidity, size indicators, and interactions of claims to potential liquidity ratios with the size indicators (equal to one if bank assets<=$250 billion). Excess returns are estimated as the bank's cumulative return over a period net of the S&P 500 return over the indicated period. Changes in uninsured demandable deposits and other borrowed money are measured quarterly between 2022Q1 and 2023Q1. Other borrowed money is from Call Reports (RCFD 3190) and includes FHLB advances and other borrowings made by banks for liquidity needs during this period. The claims to potential liquidity ratio is defined as (off-balance sheet unused credit lines plus uninsured demandable deposits) divided by (reserves plus eligible assets). The unused credit lines to potential liquidity ratio is (off-balance sheet credit lines)/(reserves plus eligible assets). The uninsured demandable deposits to potential liquidity ratio is (uninsured demandable deposits)/(reserves plus eligible assets). All specifications control for the equity/assets ratio, net income/assets, the NPL/loans ratio, loans/assets, a primary dealer indicator, and the log of total assets (Panel A) and MTM Loss/Assets (Panel B), lagged by a quarter. Columns (5)-(10) control for Time-FE. Standard errors are in parentheses and clustered at BHC level.* p<0.1, ** p<0.05, *** p<0.01

Panel A: Excluding Failed Banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Excess Returns				ΔLn(Uninsured Dem. Deposits)			ΔLn(Other Borrowed Money)		
	01/03-02/28/23	03/01-03/13/23			2022Q4-2023Q1					
Ln(Claims to Potential Liquidity)	0.00961**	0.0489*			0.218***			-0.684***		
	(0.00466)	(0.0278)			(0.0629)			(0.0814)		
1{Bank Assets <=$250bn}		-0.0440	-0.0975**	-0.0541*	0.120	-0.106	0.0592	0.0729	0.528***	0.234
		(0.0293)	(0.0417)	(0.0292)	(0.102)	(0.133)	(0.104)	(0.161)	(0.161)	(0.148)
1{Bank Assets <=$250bn} # Ln(Claims to P.L.)		-0.0627**			-0.233***			0.695***		
		(0.0287)			(0.0624)			(0.0809)		
Ln(Unused Credit Lines to P.L.)			0.0125			0.0535**			-0.0819	
			(0.00909)			(0.0243)			(0.0787)	
1{Bank Assets <=$250bn} # Ln(Unused Credit Lines to P.L.)			-0.0120			-0.0590**			0.0795	
			(0.00976)			(0.0235)			(0.0792)	
Ln(Uninss. Dem Deposits to P.L.)				0.0665**			0.235***			-0.859***
				(0.0271)			(0.0885)			(0.111)
1{Bank Assets <=$250bn} # Ln(Uninss. Dem Deposits to P.L.)				-0.0819***			-0.252***			0.872***
				(0.0281)			(0.0882)			(0.110)

N	307	304	299	303	3949	3679	3949	2245	2125	2220
R^2	0.130	0.426	0.418	0.430	0.0137	0.0103	0.0147	0.0248	0.0248	0.0254

Panel B: Controlling for MTM Losses

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Excess Returns			ΔLn(Uninsured Dem. Deposits)			ΔLn(Other Borrowed Money)		
	01/03-02/28/23	03/01-03/13/23			2022Q1-2023Q1					
Ln(Claims to Potential Liquidity)	0.00934*	0.0443*			0.126***			-0.536***		
	(0.00484)	(0.0262)			(0.0436)			(0.163)		
1{Bank Assets <=$250bn}		-0.0880**	-0.136***	-0.0992**	-0.000143	-0.0977**	-0.0402	0.0721	0.446***	0.217**
		(0.0418)	(0.0487)	(0.0425)	(0.0426)	(0.0447)	(0.0419)	(0.122)	(0.0984)	(0.0912)
1{Bank Assets <=$250bn} # Ln(Claims to Potential Liquidity)		-0.0602**			-0.138***			0.538***		
		(0.0273)			(0.0436)			(0.163)		
Ln(Unused Credit Lines to Potential Liquidity)			0.0108			0.0300***			-0.0703	
			(0.00877)			(0.0101)			(0.0591)	
1{Bank Assets <=$250bn} # Ln(Unused Credit Lines to Potential Liquidity)			-0.00936			-0.0294***			0.0734	
			(0.0104)			(0.00989)			(0.0592)	
Ln(Uninss. Dem Deposits to Potential Liquidity)				0.0594**			0.120*			-0.569***
				(0.0263)			(0.0670)			(0.202)
1{Bank Assets <=$250bn} # Ln(Uninss. Dem Deposits to Potential Liquidity)				-0.0768***			-0.136**			0.570***
				(0.0275)			(0.0670)			(0.202)
N	307	306	301	305	13690	13024	13690	7320	7048	7287
R-Sq	0.131	0.380	0.375	0.383	0.0491	0.0410	0.0512	0.0188	0.0193	0.0189

Table A12: Loan Quantities - Impact due to Exogenous Increase in Bank Reserves

The table represents the second-stage results of loan quantities regression. The first instrument for reserves z_{it}^{R1} is defined as *Growth in Aggregate Reserves × Lagged Share in Reserves, averaged over past four quarters. Aggregate Reserves* are sourced from *FRED*. Total Loans is the sum of Loans and leases held for sale and loans and leases net of unearned income (RCFD5369+RCFDB528 of Call Reports). Reserves are cash and balances due from Federal Reserve Banks at the consolidated bank-level (RCFD0090 of Call Reports). Aggregate Reserves is taken from FRED. $\Delta Y_{it}=Y_{it}-Y_{it-4}$. All specifications control for Log(Assets), Net Income/Assets, Equity/Assets, Primary Dealer indicator lagged by one quarter. All regressions contain Quarter Time-Fixed Effects. Standard errors are two-way clustered at the bank and quarter level. Columns (1) represent the regressions on the overall sample ranging 2008 Q4 – 2021 Q4. Columns (2) represent QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Columns (3) represent the QEI-III period: 2008Q4 - 2014Q3. Columns (4) show results for the Post-QE III + QT period 2014Q4 - 2019Q * p<0.1, ** p<0.05, *** p<0.01

	(1)	(2)	(3)	(4)
		ΔLn(Total Loans)		
ΔLn(Reserves)	-0.0904***	-0.102***	-0.102***	0.455
	(0.0191)	(0.0224)	(0.0201)	(0.448)
N	81535	50834	43071	30701
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3
Time-FE		Y		

Table A13: Covid and SVB episode with Alternate Measures of Claims to Liquidity

The regression tables replicate Tables 6 and 7 of the paper with alternate measures of Claims to Potential Liquidity. *Alternate Claims Ratio 1* is Log of (Credit Lines + Uninsured Demandable Deposits + Subordinated Debt + Funds Borrowed from the Federal Reserve + Other Borrowed Money)/(Reserves + Eligible Assets + Fed Funds Sold + Reverse Repos). *Alternate Claims Ratio 2* is Log of (Credit Lines + Uninsured Demandable Deposits + Funds Borrowed from the Federal Reserve + Other Borrowed Money)/(Reserves + Eligible Assets + Fed Funds Sold + Reverse Repos). All Data is sourced from FDIC call reports. Panel A shows OLS regressions of U.S. *banks' excess stock returns over the 1/1/2020 – 2/28/2020* period (column (1)), or over the *3/1/2020 – 3/23/2020 period* (columns (2)-(4)), and *Gross Drawdowns* relative to assets over the period Q1 2020 (columns (5)-(6)) on alternate *Claims to Potential Liquidity* ratios. Panels B and C shows the cross-sectional regressions for Excess returns and Uninsured Demandable deposit withdrawals against banks' claims to potential liquidity during the Silicon Valley Bank Failure of March 2023. Excess returns are estimated as the bank's cumulative return over a period net of the S&P 500 return over the same period. Change in uninsured demandable deposits is measured as the quarterly change between 2022Q4 and 2023Q1. Equity/Assets ratio, Net Income /Assets and Primary Dealer indicator. All explanatory variables are measured as of 2019Q4 for Panel A and as of 2022Q4 for Panels N and C. Panel B shows the results with the claims to potential liquidity ratios as the main independent variable, while Panel C shows the results with interactions of claims to potential liquidity ratios with the size indicators which are equal to one if bank assets in 2022Q4 are less than $250bn. Standard errors are in parentheses. * p<0.1, ** p<0.05, *** p<0.01

Panel A

	(1) Pre-Covid Excess Returns	(2) Pre-Covid Excess Returns	(3) Covid-Excess Returns	(4) Covid-Excess Returns	(5) Gross Drawdowns in 2020Q1	(6) Gross Drawdowns in 2020Q1
Alt. Claims Ratio 1	0.0173***		-0.0146**		0.000456	
	(0.001)		(0.035)		(0.608)	
Alt. Claims Ratio 2		0.0174***		-0.0144**		0.000424
		(0.000)		(0.038)		(0.633)
Constant	-0.0759***	-0.0759***	-0.102***	-0.102***	0.00490***	0.00494***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R-squared	0.0544	0.0549	0.0136	0.0132	0.00110	0.000948
Number obs.	309	309	310	310	131	131

Panel B

	(1) Pre-SVB Excess Returns	(2) Pre-SVB Excess Returns	(3) 1st-13th Mar Excess Return	(4) 1st-13th Mar Excess Return	(5) Change in Ln(Uninsured Demandable Deposits)	(6) Change in Ln(Uninsured Demandable Deposits)
Alt. Claims Ratio 1	0.00492		-0.0160**		-0.0179***	
	(0.00464)		(0.00674)		(0.00651)	
Alt. Claims Ratio 2		0.00485		-0.0160**		-0.0179***
		(0.00464)		(0.00673)		(0.00651)
N	308	308	305	305	4022	4022
R-Sq	0.111	0.111	0.400	0.400	0.00491	0.00491

Panel C

	(1) 1st-13th Mar Excess Return	(2) 1st-13th Mar Excess Return	(3) Change in Ln(Uninsured Demandable Deposits)	(4) Change in Ln(Uninsured Demandable Deposits)
Alt. Claims Ratio 1	0.0293		0.152*	
	(0.0380)		(0.0784)	
Bank Assets<=$250bn=1	-0.0596	-0.0598	0.0475	0.0472
	(0.0382)	(0.0379)	(0.119)	(0.119)
Bank Assets<=$250bn=1 # Alt. Claims Ratio 1	-0.0451		-0.170**	
	(0.0383)		(0.0787)	
Alt. Claims Ratio 2		0.0298		0.154**
		(0.0380)		(0.0783)
Bank Assets<=$250bn=1 # Alt. Claims Ratio 2		-0.0456		-0.172**
		(0.0383)		(0.0786)
N	305	305	4022	4022
R-Sq	0.416	0.416	0.00507	0.00507

Appendix B: Alternate 2-SLS Specifications

Table B1.1 Effect of Reserves on Deposit Quantities - First Stage (Bank-level) – Fed Balance Sheet Instrument

This table shows the first-stage results of the instrumental variable two-stage least-squares regressions of deposit types on reserves. Bank balance sheet data is sourced from Consolidated Reports of Condition and Income for a Bank with Domestic and Foreign Offices (Call Reports) of the FDIC. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank-level (RCFD0090). The instrument for reserves, z_{it}^{R} is defined as *Growth in Fed Balance Sheet × Lagged Share in Reserves, averaged over past four quarters. Aggregate Reserves* are sourced from *FRED*. We use $\Delta Ln(Reserves) = Ln(Reserves)_t - Ln(Reserves)_{t-4}$ as the dependent variable. Column (1) represents the regressions on the overall sample ranging 2008Q4 – 2021 Q4. Column (2) represents QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Column (3) represents the QEI-III period: 2008Q4 - 2014Q3. Column (4) shows results for the Post-QE III + QT period 2014Q4 - 2019Q3. All specifications control for lagged Ln(Assets), Net Income/Assets, Equity/Assets, and Primary Dealer Indicator and they contain time-fixed effects. All Cragg-Donald F-statistics are above 10 as per Staiger and Stock (1997). Standard errors are two-way clustered at the bank and time level. * p<0.1, ** p<0.05, *** p<0.01

First Stage: Change in Reserves by Period	(1)	(2)	(3)	(4)
	ΔLn(Reserves)	ΔLn(Reserves)	ΔLn(Reserves)	ΔLn(Reserves)
z_{it}^{R} (=Ln(Fed Balance Sheets$_t$/Fed Balance Sheets$_{t-1}$) × Lagged Share in Agg. Reserves over 4Q)	33.00***	31.00***	33.81***	209.0***
	(5.596)	(6.190)	(4.567)	(49.71)
N	81892	51062	43236	32908
Kl-P F-stat	35.69	26.75	57.57	17.00
F-stat	73.01	62.83	64.28	34.42
Time-FE	Y	Y	Y	Y
Bank & Time Clustered FE	Y	Y	Y	Y
Period	Overall: 2008Q4 - 2021Q4	QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4	QE I-III: 2008Q4 - 2014Q3	Post-QE III + QT2014Q4 - 2019Q3

Table B1.3: Effect of Reserves and Deposits on Deposit Rate Spreads: 1st Stage

This table shows the first stage results of the instrumental variable two-stage least-squares regressions of interest rates spreads on bank reserves and deposits. Bank Balance Sheet Data is sourced from Consolidated Reports of Condition and Income for a Bank with Domestic and Foreign Offices (Call Reports) of the FDIC. *Reserves* are cash and balances from Federal Reserve Banks at the consolidated bank-level (RCFD0090). *Total Deposits* is the sum of deposits held in domestic and foreign offices (RCON2200 + RCFN2200). The instrument for deposits, z^{D}_{it} (henceforth, *Deposit Growth Instrument)* is *the deposit growth rates of the counties the bank has a presence in, weighted by their relative deposit size last period.* Data for branch-level deposits are from FDIC's Summary of Deposits. The instrument for reserves z^{R}_{it} is defined as *Growth in Fed Balance Sheets× Lagged Share in Reserves, averaged over past four quarters. Aggregate Reserves* are sourced from *FRED*. Columns (1) & (5) represent the regressions on the overall sample ranging 2008Q4 – 2021 Q4. Columns (2) & (6) represent QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Columns (3) & (7) represent the QEI-III period: 2008Q4 - 2014Q3. Columns (4) & (8) show results for the Post-QE III + QT period 2014Q4 - 2019Q3. All specifications control for Log(Assets), Net Income/Assets, Equity/Assets, Primary Dealer and indicator lagged by one quarter along with bank and time fixed effects. All Cragg-Donald F-statistics are above 10 as per Staiger and Stock (1997). Standard errors are two-way clustered at the bank and time level. * p<0.1, ** p<0.05, *** p<0.01

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(Reserves)				Ln(Deposits)			
z^{D}_{it}	0.0774***	0.0500	0.0781	0.123***	0.0204***	0.0212**	0.0240**	0.0195***
	(0.0262)	(0.0444)	(0.0485)	(0.0252)	(0.00432)	(0.00833)	(0.00931)	(0.00545)
z^{R}_{it}	26.65***	25.26***	27.12***	146.5	-0.509	1.840	1.998	17.33
	(3.060)	(3.649)	(2.568)	(104.2)	(2.140)	(3.731)	(3.124)	(32.39)
N	81966	51170	43351	32878	83862	51804	43835	34168
F-stat	1957.0	1164.0	1258.4	2786.0	17418.8	9470.4	6351.5	34664.7
Kl-P F-stat	10.54	24.67	25.93	4.66	10.54	24.67	25.93	4.66
Hansen-J Test p-value	0.000	.	.	.	0.000	.	.	.
Bank & Time Clustered FE	Y	Y	Y	Y	Y	Y	Y	Y
Period	Overall: 2008Q4 - 2021Q4	QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4	QE I-III: 2008Q4 - 2014Q3	Post-QE III + QT2014Q4 - 2019Q3	Overall: 2008Q4 - 2021Q4	QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4	QE I-III: 2008Q4 - 2014Q3	Post-QE III + QT2014Q4 - 2019Q3

Table B1.4: Effect of Reserves on Deposit Quantities – Second Stage

The table shows the second-stage of 2SLS IV regressions of *Deposit types* as the dependent variable against Δ*Ln(Reserves).* Deposit and reserve data are sourced from *FDIC's Call Reports*. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank-level (RCFD0090). Panel A Demandable Deposits as the dependent variable. $\Delta Y = Y_t - Y_{t-4}$. Panel B uses Ln(*Time Deposits)* (RCON6648 + RCONJ473 + RCONJ474) or (RCON6648+RCON2604) as the dependent variablesn(Reserves) lagged by five quarters. Columns (1) represent the regressions on the overall sample ranging 2008Q4 – 2021 Q4. Columns (2) represent QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Columns (3) represent the QEI-III period: 2008Q4 - 2014Q3. Columns (4) show results for the Post-QE III + QT period 2014Q4 - 2019Q3. In all second-stage regressions, Δ*Ln(Reserves)* is instrumented by the reserve instrument (z^R_{it}): *Growth in Fed Balance Sheet* × *Average Lagged Share in Reserves over the previous 4 quarters.* Standard errors are two-way clustered at the bank and time level. Newey-West SE adjusted for autocorrelation up to 4 quarters are also reported for OLS. * p<0.1, ** p<0.05, *** p<0.01

Panel A: ΔLn(Uninsured Demandable Deposits)

	(1)	(2)	(3)	(4)
		ΔLn(Uninsured Demandable Deposits)		
ΔLn(Reserves)	0.197***	0.186***	0.187***	-0.281
	(0.0208)	(0.0231)	(0.0206)	(0.262)
Obs	72431	42536	34911	29895
Time-FE	Y	Y	Y	Y
Two-way Clustering	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Period	Overall: 2008Q4-2021Q4	QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4	QE I-III: 2008Q4 - 2014Q3	Post-QE III + QT: 2014Q4-2019Q3

Panel B: ΔLn(Time Deposits)

	(1)	(2)	(3)	(4)
		ΔLn(Time Deposits)		
ΔLn(Reserves)	-0.204**	-0.169**	-0.157***	0.471
	(0.0893)	(0.0796)	(0.0403)	(0.332)
Obs	81106	50555	42853	30551
Time-FE	Y	Y	Y	Y
Two-way Clustering	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Reg Type	IV	IV	IV	IV
Period	Overall: 2008Q4 - 2021Q4	QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4	QE I-III: 2008Q4 - 2014Q3	Post-QE III + QT2014Q4 - 2019Q3

Table B1.5: Effect of Reserves and Deposits on CD Rate – Money Market Savings Rate Spread: Second Stage

The table shows the second stage of 2SLS IV regressions of *3, 12, 18 and 24-month CD – Money Market (MM) savings spread* against bank-level *Ln(Total Deposits)* and *Ln(Reserves).* Panel A represents the overall sample. Panel B represents the sub-sample QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4. Panel C represents the sub-sample QE I-III: 2008Q4 - 2014Q3. Panel D shows results for the Post-QE III + QT2014Q4 - 2019Q3 CD and Money Market (MM) savings rates are sourced from *S&P Global's RateWatch* deposit data. Bank-level variables are sourced from *FDIC's Call Reports* data. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank level (RCFD0090). *Ln(Reserves)* are instrumented with *Growth in Aggregate Reserves × Lagged Share in Reserves, averaged over previous 4 quarters* (z^R_{it}). *Ln(Total Deposits)* instrumented with the *Deposit Growth Instrument* (z^D_{it}) All specifications control for lagged Ln(Assets), Equity/Assets Ratio, Net Income/Assets and Primary Dealer indicator along bank and time fixed effects. Standard errors are two-way clustered at the bank and time level. The sample period is 2008 Q4 – 2021 Q4. * p<0.1, ** p<0.05, *** p<0.01

Panel A: Overall Period: 2008Q4 – 2021Q4

	(1) 3 month CD Rate - MM Savings Rate	(2) 12 month CD Rate - MM Savings Rate	(3) 18 month CD Rate - MM Savings Rate	(4) 24 month CD Rate - MM Savings Rate
Ln(Reserves)	-0.160***	-0.0490***	-0.260***	-0.121**
	(0.0371)	(0.0111)	(0.0730)	(0.0520)
N	58950	63432	52761	62513
Time-FE	Y	Y	Y	Y
Two-way Clustering	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Period	Overall: 2008Q4-2021Q4			

Panel B: QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4-2021Q4

	(1) 3 month CD Rate - MM Savings Rate	(2) 12 month CD Rate - MM Savings Rate	(3) 18 month CD Rate - MM Savings Rate	(4) 24 month CD Rate - MM Savings Rate
Ln(Reserves)	-0.130***	-0.0304**	-0.185**	-0.0948*
	(0.0290)	(0.0119)	(0.0775)	(0.0472)
N	37872	40491	33661	39863
Time-FE	Y	Y	Y	Y
Two-way Clustering	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Period	QE I-III+Pandemic QE: 20008Q4-2014Q3 + 2019Q4-2021Q4			

Panel C: QEI-III: 2008Q4 - 2014Q3

	(1) 3 month CD Rate - MM Savings Rate	(2) 12 month CD Rate - MM Savings Rate	(3) 18 month CD Rate - MM Savings Rate	(4) 24 month CD Rate - MM Savings Rate
Ln(Reserves)	-0.144***	-0.0377	-0.201**	-0.110**
	(0.0177)	(.)	(0.0734)	(0.0400)
N	33180	35311	29287	34716
Time-FE	Y	Y	Y	Y
Two-way clustering	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Period	QE I-III: 20008Q4-2014Q3			

Panel D: Post-QEIII + QT: 2014Q4 - 2019Q3

	(1) 3 month CD Rate - MM Savings Rate	(2) 12 month CD Rate - MM Savings Rate	(3) 18 month CD Rate - MM Savings Rate	(4) 24 month CD Rate - MM Savings Rate
Ln(Reserves)	0.210	0.148	-0.0345	0.306
	(0.138)	(0.341)	(0.319)	(0.325)
N	22449	24428	20320	24115
Time-FE	Y	Y	Y	Y
Two-way clustering	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Period	Post-QE III+QT: 2014Q4-2019Q3			

Table B2.1 Effect of Reserves on Deposit Quantities - First Stage (Bank-level) with 2 Reserve Instruments

This table shows the first-stage results of the instrumental variable two-stage least-squares regressions in Table 4. Bank balance sheet data is sourced from Consolidated Reports of Condition and Income for a Bank with Domestic and Foreign Offices (Call Reports) of the FDIC. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank-level (RCFD0090). The instrument for reserves, z_{it}^{R1} is defined as *Growth in Fed Balance Sheet × Lagged Share in Reserves, averaged over past four quarters. Aggregate Reserves and* z_{it}^{R2} is defined as *Growth in Aggregate Reserves× Lagged Share in Reserves, averaged over past four quarters. Aggregate Reserves* are sourced from *FRED*. We use $\Delta Ln(Reserves) = Ln(Reserves)_t - Ln(Reserves)_{t-4}$ as the dependent variable. Column (1) represents the regressions on the overall sample ranging 2008 Q4 – 2021Q4. Column (2) represents QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Column (3) represents the QEI-III period: 2008Q4 - 2014Q3. Column (4) shows results for the Post-QE III + QT period 2014Q4 - 2019Q3. All specifications control for lagged Ln(Assets), Net Income/Assets, Equity/Assets, and Primary Dealer Indicator and they contain time-fixed effects. All Cragg-Donald F-statistics are above 10 as per Staiger and Stock (1997). Standard errors are two-way clustered at the bank and time level. * p<0.1, ** p<0.05, *** p<0.01

First Stage: Change in Reserves by Period	(1)	(2)	(3)	(4)
	ΔLn(Reserves)	ΔLn(Reserves)	ΔLn(Reserves)	ΔLn(Reserves)
z_{it}^{R1}	28.66***	30.70***	27.39**	-18.28
	(8.306)	(6.544)	(10.87)	(13.84)
z_{it}^{R2}	-44.86	-52.51**	-43.04	246.6***
	(27.76)	(23.74)	(36.90)	(59.71)
N	81892	51062	43236	32908
Kl-P F-stat	38.46	.	.	9.61
F-stat	131978.5	63730.1	158630.9	30.23
Time-FE	Y	Y	Y	Y
Bank & Time Clustered FE	Y	Y	Y	Y
Period	Overall: 2008Q4 - 2021Q4	QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4	QE I-III: 2008Q4 - 2014Q3	Post-QE III + QT2014Q4 - 2019Q3

Table B2.2: Effect of Reserves and Deposits on Deposit Rate Spreads: 1st Stage

This table shows the first stage results of the instrumental variable in the 2-SLS regressions. Bank Balance Sheet Data is sourced from Consolidated Reports of Condition and Income for a Bank with Domestic and Foreign Offices (Call Reports) of the FDIC. *Reserves* are cash and balances from Federal Reserve Banks at the consolidated bank-level (RCFD0090). *Total Deposits* is the sum of deposits held in domestic and foreign offices (RCON2200 + RCFN2200). The instrument for deposits, z^{D}_{it} (henceforth, *Deposit Growth Instrument)* is *the deposit growth rates of the counties the bank has a presence in, weighted by their relative deposit size last period.* Data for branch-level deposits are from FDIC's Summary of Deposits. The instruments for reserves z_{it}^{R1} are *Growth in Reserves × Lagged Share in Reserves, averaged over past four quarters. Aggregate Reserves and* z_{it}^{R2} *Growth in Fed Balance Sheets× Lagged Share in Reserves, averaged over past four quarters.* Columns (1) & (5) represent the regressions on the overall sample ranging 2008Q1 – 2021 Q4. Columns (2) & (6) represent QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Columns (3) & (7) represent the QEI-III period: 2008Q4 - 2014Q3. Columns (4) & (8) show results for the Post-QE III + QT period 2014Q4 - 2019Q3. All specifications control for Log(Assets), Net Income/Assets, Equity/Assets, Primary Dealer and indicator lagged by one quarter along with bank and time fixed effects. All Cragg-Donald F-statistics are above 10 as per Staiger and Stock (1997). Standard errors are two-way clustered at the bank and time level. * p<0.1, ** p<0.05, *** p<0.01

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Ln(Reserves)				Ln(Deposits)		
z_{it}^{D}	0.0774***	0.0499	0.0783	0.123***	0.0204***	0.0212**	0.0239**	0.0195***
	(0.0262)	(0.0444)	(0.0485)	(0.0252)	(0.00431)	(0.00830)	(0.00930)	(0.00546)
z_{it}^{R1}	-49.37	-57.04**	-59.63*	286.8**	14.80	24.09	19.19	-4.798
	(31.04)	(26.13)	(31.45)	(107.1)	(9.215)	(16.11)	(17.21)	(16.06)
z_{it}^{R2}	27.98**	30.24***	30.92**	-68.28*	-5.636*	-8.176	-6.127	10.76
	(11.41)	(9.670)	(11.67)	(38.70)	(2.831)	(5.142)	(5.844)	(9.691)
N	81966	51170	43351	32878	83862	51804	43835	34168
F-stat	2248.4	1894.2	113269.7	2815.9	15479.8	8726.0	5881.5	31302.9
Kl-P F-stat	116.60	18.91	38.12	3.52	116.60	18.91	38.12	3.52
Hansen-J Test p-value	2.828	.	.	.	2.828	.	.	.
Bank & Time Clustered FE	Y	Y	Y	Y	Y	Y	Y	Y
Period	Overall: 2008Q4 - 2021Q4	QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4	QE I-III: 2008Q4 - 2014Q3	Post-QE III + QT2014Q4 - 2019Q3	Overall: 2008Q4 - 2021Q4	QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4	QE I-III: 2008Q4 - 2014Q3	Post-QE III + QT2014Q4 - 2019Q3

Table B1.4: Effect of Reserves on Deposit Quantities – Second Stage

The table shows the second-stage of 2SLS IV regressions of *Deposit types* as the dependent variable against Δ*Ln(Reserves).* Deposit and reserve data are sourced from *FDIC's Call Reports*. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank-level (RCFD0090), which is replaced with item RCON0090 if the former is missing. Panel A uses the Ln(*Uninsured Demandable Deposits)* and Panel B uses Ln(*Time Deposits)* (RCON6648 + RCONJ473 + RCONJ474) or (RCON6648+RCON2604) as the dependent variables. $\Delta Y = Y_t - Y_{t-4}$. Computation of Insured and Uninsured Domestic Deposits are based on call report schedule RC-O. Insured deposits are defined as deposits lying below the FDIC deposit insurance thresholds of $100,000 before 2006Q1, non-retirement accounts below $100,000 and retirement accounts below $250,000 between 2006Q1-2009Q2, and $250,000 after 2009Q2. Split of Time Deposits into Insured vs. Uninsured Domestic Deposits are based on the aforementioned deposit insurance thresholds ($100k before 2010Q1 and $250k thereafter) in schedule RC-E. Demandable Insured and Uninsured Domestic Deposits are estimated by taking the difference between Total Insured/Uninsured Domestic Deposits and Insured/Uninsured Domestic Time Deposits respectively. Uninsured demandable deposits are obtained by adding non-interest-bearing foreign deposits to uninsured domestic demand deposits. Uninsured time deposits are obtained by adding interest-bearing foreign deposits to uninsured domestic time deposits. All specifications control for Time-FE, lagged Ln(assets), Equity-Capital Ratio, Net Income/Assets, indicator for Primary Dealers and Ln(Reserves) lagged by five quarters. Columns (1) represent the regressions on the overall sample ranging 2008Q4 – 2021 Q4. Columns (2) represent QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Columns (3) represent the QEI-III period: 2008Q4 - 2014Q3. Columns (4) show results for the Post-QE III + QT period 2014Q4 - 2019Q3. In all second-stage regressions, Δ*Ln(Reserves)* is instrumented by the reserve instruments (z^{R1}_{it}): *Growth in Aggregate Reserves × Average Lagged Share in Reserves over the previous 4 quarters and Growth in Fed Balance Sheet × Average Lagged Share in Reserves over the previous 4 quarters.* Standard errors are two-way clustered at the bank and time level. * p<0.1, ** p<0.05, *** p<0.01

Panel A: ΔLn(Uninsured Demandable Deposits)

	(1)	(2)	(3)	(4)
		ΔLn(Uninsured Demandable Deposits)		
ΔLn(Reserves)	0.212***	0.207***	0.207***	-0.284
	(0.0209)	(0.0191)	(0.0184)	(0.237)
Obs	72431	42536	34911	29895
Time-FE	Y	Y	Y	Y
Two-way Clustering	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Period	Overall: 2008Q4 - 2021Q4	QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4	QE I-III: 2008Q4 - 2014Q3	Post-QE III + QT: 2014Q4-2019Q3

Panel B: ΔLn(Time Deposits)

	(1)	(2)	(3)	(4)
	ΔLn(Time Deposits)	ΔLn(Time Deposits)	ΔLn(Time Deposits)	ΔLn(Time Deposits)
ΔLn(Reserves)	-0.139***	-0.119***	-0.159***	0.423
	(0.0124)	(0.00998)	(0.0275)	(0.302)
Obs	81106	50555	42853	30551
Time-FE	Y	Y	Y	Y
Two-way Clustering	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Reg Type	IV	IV	IV	IV
Period	Overall: 2008Q4 - 2021Q4	QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4	QE I-III: 2008Q4 - 2014Q3	Post-QE III + QT2014Q4 - 2019Q3

Table B2.5: Effect of Reserves and Deposits on CD Rate – Money Market Savings Rate Spread: Second Stage

The table shows the second stage of 2SLS IV regressions of *3, 12, 18 and 24-month CD – Money Market (MM) savings spread* against bank-level *Ln(Total Deposits)* and *Ln(Reserves).* Panel A represents the overall sample. Panel B represents the sub-sample QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4 - 2021Q4. Panel C represents the sub-sample QE I-III: 2008Q4 - 2014Q3. Panel D shows results for the Post-QE III + QT: 2014Q4 - 2019Q3 CD and Money Market (MM) savings rates are sourced from *S&P Global's RateWatch* deposit data. Bank-level variables are sourced from *FDIC's Call Reports* data. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank level (RCFD0090). *Ln(Reserves)* are instrumented with *Growth in Aggregate Reserves × Lagged Share in Reserves, averaged over previous 4 quarters* (z^R_{it}) and *Growth in Aggregate Fed Balance Sheets × Lagged Share in Reserves, averaged over previous 4 quarters* (z^R_{it}). . *Ln(Total Deposits)* instrumented with the *Deposit Growth Instrument* (z^D_{it}) All specifications control for lagged Ln(Assets), Equity/Assets Ratio, Net Income/Assets and Primary Dealer indicator along bank and time fixed effects. Standard errors are two-way clustered at the bank and time level. The sample period is 2008 Q4 – 2021 Q4. * p<0.1, ** p<0.05, *** p<0.01

Panel A: Overall Period: 2008Q4 – 2021Q4

	(1) 3 month CD Rate - MM Savings Rate	(2) 12 month CD Rate - MM Savings Rate	(3) 18 month CD Rate - MM Savings Rate	(4) 24 month CD Rate - MM Savings Rate
Ln(Reserves)	-0.197***	-0.100*	-0.301**	-0.156***
	(0.0486)	(0.0571)	(0.114)	(0.0522)
N	58950	63432	52761	62513
Time-FE	Y	Y	Y	Y
Period	Overall: 2008Q4-2021Q4			

Panel B: QE I-III + Pandemic QE: 2008Q4 - 2014Q3 & 2019Q4-2021Q4

	(1) 3 month CD Rate - MM Savings Rate	(2) 12 month CD Rate - MM Savings Rate	(3) 18 month CD Rate - MM Savings Rate	(4) 24 month CD Rate - MM Savings Rate
Ln(Reserves)	-0.181***	-0.0674*	-0.239*	-0.121**
	(0.0511)	(0.0390)	(0.118)	(0.0561)
N	37872	40491	33661	39863
Time-FE	Y	Y	Y	Y
Period	QE I-III+Pandemic QE: 20008Q4-2014Q3 + 2019Q4-2021Q4			

Panel C: QEI-III: 2008Q4 - 2014Q3

	(1) 3 month CD Rate - MM Savings Rate	(2) 12 month CD Rate - MM Savings Rate	(3) 18 month CD Rate - MM Savings Rate	(4) 24 month CD Rate - MM Savings Rate
Ln(Reserves)	-0.184***	-0.0593	-0.245*	-0.122**
	(0.0464)	(0.0434)	(0.119)	(0.0539)
N	33180	35311	29287	34716
Time-FE	Y	Y	Y	Y
Period	QE I-III: 20008Q4-2014Q3			

Panel D: Post-QEIII + QT: 2014Q4 - 2019Q3

	(1) 3 month CD Rate - MM Savings Rate	(2) 12 month CD Rate - MM Savings Rate	(3) 18 month CD Rate - MM Savings Rate	(4) 24 month CD Rate - MM Savings Rate
Ln(Reserves)	0.203	0.150	-0.0316	0.307
	(0.134)	(0.334)	(0.317)	(0.319)
N	22449	24428	20320	24115
Time-FE	Y	Y	Y	Y
Period	Post-QE III+QT: 2014Q4-2019Q3			

Appendix C: Restricting to Top-100 Banks by Size

This table shows the robustness result of running tables 3 and 4 of the paper with top 100 banks by 2014Q3 bank assets in the FDIC Call Reports data. All data is from FDIC Call Reports and ranges the time period 2008Q4-2021Q4. The table shows the first stage, and the second-stage of 2SLS IV regressions. Deposit and reserve data are sourced from FDIC's Call Reports. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank-level (RCFD0090). We supplement the *Reserves* variable with the field at depository institution level (RCON0090) if the former field is missing. Panel A shows the first-stage of $\Delta Ln(Reserves)$ instrumented by reserve instrument (z^{R1}_{it}): *Growth in Aggregate Reserves in quarter t × Lagged Share in Reserves, averaged over previous 4 quarters.*

Panel A: First Stage for Quantities

Panels A and C show the first stage and second stage for quantities respectively. All specifications control for Time-FE, lagged Ln(assets), lagged Equity-Capital Ratio, lagged Net Income/Assets, lagged indicator for Primary Dealers. Columns (1) represent the regressions on the overall sample ranging 2008 Q4 – 2021 Q4. Columns (2) represent QE I-III + Pandemic QE of 2008Q4 - 2014Q3 & 2019Q4-2021Q4. Columns (3) represent the QEI-III period: 2008Q4 - 2014Q3. Columns (4) show results for the Post QE III and QT period 2014Q4 - 2019Q3. Standard errors are two-way clustered at the bank and time level. Stock & Yogo (S&Y) weak ID test critical values with 10% maximal IV size for the first-stage are reported below the F-stats. * p<0.1, ** p<0.05, *** p<0.01

	(1) ΔLn(Reserves)	(2) ΔLn(Reserves)	(3) ΔLn(Reserves)	(4) ΔLn(Reserves)
Ln(Reserves_t/Reserves_t-1) # Lagged Share in Agg. Reserves over 4Q	8.928***	9.031***	9.054***	45.00***
	(2.999)	(3.024)	(3.127)	(12.08)
N	4574	2736	1999	1838
Kl-P F-stat	8.86	8.92	8.38	13.87
F-stat	22.24	14.81	12.88	15.80
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3

Panel B: First Stage for Rates

The table shows the first stage (Panel B) and the second stage (Panel D) of 2SLS IV regressions of *3, 12, 18 and 24-month CD – Money Market (MM) savings spread* against bank-level *Ln(Reserves).* Panel A shows the first stage of *Ln(Reserves)* and *Ln(Deposits)* instrumented respectively by *Growth in Aggregate Reserves × Lagged Share in Reserves averaged over previous 4 quarters* (z^{R1}_{it}) and *Deposit Growth Instrument* (z^{D}_{it}), with bank-level controls. Note Total Deposits contain domestic and foreign deposits at the bank-level. Bank-level variables are sourced from *FDIC's Call Reports* data. *Reserves* are cash and balances due from Federal Reserve Banks at the consolidated bank level (RCFD0090). We supplement the *Reserve* variable with the field at depository institution level (RCON0090) if the former field is missing. All specifications control for lagged Ln(Assets), Equity/Assets Ratio, Net Income/Assets, and Primary Dealer indicator, and bank and time fixed effects. Standard errors are two-way clustered at the bank and time level. Stock & Yogo (S&Y) weak ID test critical values with 10% maximal IV size for the first-stage are reported below the F-stats. The sample period is 2008Q4 – 2021Q4. * p<0.1, ** p<0.05, *** p<0.01

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(Reserves)				Ln(Total Deposits)			
Deposit Growth Instrument	0.345***	0.362***	0.323***	0.188	0.0559***	0.0641***	0.0596***	0.0268
	(0.0947)	(0.113)	(0.117)	(0.140)	(0.0148)	(0.0164)	(0.0173)	(0.0214)
Ln(Reserves_t/ Reserves_t-1)	6.506***	6.753***	6.721***	35.97**	-0.433	-0.356	-0.224	8.483*
# Lagged Share in Agg. Reserves over 4Q								
	(1.693)	(1.725)	(1.839)	(15.42)	(0.439)	(0.465)	(0.489)	(4.374)
N	4578	2743	2006	1835	4590	2751	2013	1839
F-stat	288.7	162.4	107.2	1024.5	2080.1	1602.9	1413.8	3402.5
Kl-P F-stat	3.67	6.33	5.14	0.80	3.67	6.33	5.14	0.80
Hansen-J Test p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3

Panel C: Second Stage for Quantities

	(1)	(2)	(3)	(4)
	ΔLn(Unins Demandable Deposits)			
ΔLn(Reserves)	0.271***	0.266***	0.268***	-0.263
	(0.0401)	(0.0386)	(0.0426)	(0.274)
N	4416	2603	1875	1813
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3
Time-FE				
	(1)	(2)	(3)	(4)
	ΔLn(Time Deposits)			
ΔLn(Reserves)	-0.246	-0.210	-0.219	0.715
	(0.161)	(0.157)	(0.157)	(0.434)
N	4442	2670	1960	1772
Period	2008Q4-2021Q4	2008Q4-2014Q3, 2019Q4-2021Q4	2008Q4-2014Q3	2014Q4-2019Q3
Time-FE				

Panel D: Second Stage for Rates

D.2:	(1) 3 month CD Rate - Money Market AC Rate	(2) 12 month CD Rate - Money Market AC Rate	(3) 18 month CD Rate - Money Market AC Rate	(4) 24 month CD Rate - Money Market AC Rate
Ln(Reserves)	-0.367**	-0.153	-0.561	-0.231
	(0.170)	(0.152)	(0.377)	(0.194)
Ln(Total Deposits)	3.540*	2.891*	5.905	3.182
	(1.949)	(1.654)	(3.762)	(2.016)
N	2863	2871	2760	2848
Period	2008Q4-2021Q4	2008Q4-2021Q4	2008Q4-2021Q4	2008Q4-2021Q4
Time-FE				

D.3: QE I-III	(1)	(2)	(3)	(4)
	3 month CD Rate - Money Market AC Rate	12 month CD Rate - Money Market AC Rate	18 month CD Rate - Money Market AC Rate	24 month CD Rate - Money Market AC Rate
Ln(Reserves)	-0.379**	-0.171	-0.524	-0.241
	(0.165)	(0.153)	(0.414)	(0.196)
Ln(Total Deposits)	2.686	2.280*	3.448	2.416
	(1.658)	(1.222)	(2.649)	(1.596)
N	1376	1378	1324	1361
Period	2008Q4-2014Q3	2008Q4-2014Q3	2008Q4-2014Q3	2008Q4-2014Q3
Time-FE				

D.4: Post QEIII+QT	(1)	(2)	(3)	(4)
	3 month CD Rate - Money Market AC Rate	12 month CD Rate - Money Market AC Rate	18 month CD Rate - Money Market AC Rate	24 month CD Rate - Money Market AC Rate
Ln(Reserves)	0.244	-0.363	-0.492	-0.0952
	(0.263)	(0.794)	(3.162)	(0.607)
Ln(Total Deposits)	-2.758	8.573	14.69	3.608
	(4.753)	(14.14)	(69.99)	(10.87)
N	1090	1095	1056	1089
Period	2014Q4-2019Q3	2014Q4-2019Q3	2014Q4-2019Q3	2014Q4-2019Q3
Time-FE				

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