

Liquidity dependencies in the euro area

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In a nutshell

- Has the expansion of central bank liquidity changed banks' incentives to hold liquid liabilities, making them more dependent from central bank liquidity and heightening banks' vulnerabilities to liquidity shocks?
- First paper to estimate this mechanism for the euro area.
- Banks increased demand for liquid deposits during periods of expanding excess liquidity, not reverting when excess liquidity decreased.
- The increased exposure to liquid claims is economically very mild and not at the expense of time deposits.

Disclaimer:

The paper contains the views of the author and not necessarily those of the European Central Bank, the Banco de Portugal or the Eurosystem.

Motivation

- The supply of liquidity by the central bank may have altered banks' incentives and the ex-post demand for liquidity (Acharya and Rajan, 2024).
 - Banks issue demandable claims to fund reserves. Possible reasons: ALM strategies, higher cost of capital.
 - When faced with a liquidity shock, banks hoard reserves (because of speculation, regulation or convenience yield of reserves) and the "effective" reserves available are not enough to cover the shock.
- Evidence for the US points to the increase in demandable deposits with QE, not reverted during QT, increasing banks' vulnerabilities to liquidity shocks (Acharya et al., 2023).

Estimate the relationship between aggregate deposits and excess liquidity:

$$\Delta D_t = \alpha \Delta EL_t + \beta EL_{t-12} + \gamma \text{slope}_t + \epsilon_t \quad (1)$$

where:

- D_t : Total (*TotDepo*), demand (*DemandDepo*) or time (*TimeDepo*) deposits
- EL_t : Excess liquidity of the Eurosystem
- slope_t : Spread between 10- and 1-year government bond yields of the euro area
- t : Month

- Data: monthly frequency, euro area aggregate, from Sep-2008 to Aug-23.
- Variables defined in logarithms and in € amounts.

	$\Delta \ln(TotDepo)$		$\Delta \ln(DemandDepo)$		$\Delta \ln(TimeDepo)$	
$\Delta \ln(EL)$	0.023*** (0.005)	0.017*** (0.005)	0.009** (0.004)	0.004 (0.003)	-0.012 (0.009)	-0.008 (0.010)
Slope	No	Yes	No	Yes	No	Yes
Observations	180	180	180	180	180	180

Note: Dependent variables in column. Δ variables defined as 12-month changes. β and γ coefficients not reported. Standard errors in parentheses adjusted for autocorrelation in the residuals up to 12 months. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Main conclusions:

- Increase in EL associated with mild increase in demand deposits and no relationship with time deposits.
- Weaker elasticity when controlling for the slope of the yield curve.
- From the estimation in levels (reflecting the 'mechanical' effect of liquidity injection): for 1€ extra of EL, 1€ more in total deposits, around 30cent more in demand deposits.

Individual bank response to excess liquidity

Identification

- Instrumental variables approach to overcome endogeneity of bank reserves.
- Bank reserves would evolve in order to keep the bank's position in the liquidity network unchanged (Bartik-type of instrument):

$$Instrument_{it} = \ln \left(\frac{EL_t}{EL_{t-12}} \right) \frac{1}{12} \sum_{k=1}^{12} \frac{EL_{it-12-k}}{EL_{t-12-k}} \quad (2)$$

- This instrument is used in a 2SLS estimation:

First stage:

$$\Delta \ln EL_{it} = \beta_1 Instrument_{it} + \beta_2 \ln EL_{it-12} + \beta_3 X_{it-12} + \theta_i + \theta_{ct} + \epsilon_{it} \quad (3)$$

Second stage:

$$\Delta \ln Deposits_{it} = \alpha_1 \Delta \ln EL_{instr_{it}} + \alpha_3 X_{it-12} + \delta_i + \delta_{ct} + \epsilon_{it} \quad (4)$$

where:

- EL_{it} : bank i excess reserves for month t
- X_{it} : bank level time varying controls (size measured by the log of total assets and balance sheet capital ratio)
- θ_i, δ_i : bank fixed effects to control for bank unobserved heterogeneity
- θ_{ct}, δ_{ct} : country-time fixed effects to proxy for deposit demand at the country level
- Data: Bank balance sheet data (IBSI) and reserves with the Eurosystem (MOPDB).
- Monthly frequency, from Sep-08 to Sep-23.

Overall results

- For the period 2008-2023, there is no evidence that banks intentionally increased demand deposits or decreased time deposits in response to excess liquidity.

Table: Results of estimation for demand deposits.

	(1)	(2)	(3)	(4)
$\Delta \ln(EL_{it})$	0.036*** (0.007)	-0.054** (0.026)	-0.038 (0.027)	-0.057 (0.045)
$\ln(TA_{it-12})$			-0.276*** (0.031)	-0.292*** (0.035)
$Equity_{it-12}$			-0.028 (0.021)	-0.026 (0.023)

First stage results

	$\Delta \ln(EL_{it})$	$\Delta \ln(EL_{it})$	$\Delta \ln(EL_{it})$
$instrument_{it}$	35.35*** (7.688)	32.10*** (7.486)	24.09*** (2.165)
Specification	OLS	IV	IV
Fixed effects	Bank	Bank	Bank
N	116524	116508	113557

Note: Robust standard errors in parentheses, clustered at bank level in column (1), adjusted for autocorrelation in the residuals up to 12 months for columns (2) to (4). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Investigating the mechanisms

Different responses over the liquidity cycle?

- Do banks increase demand for liquid deposits when EL expands and revert it when EL reduces?
- Split estimation sample between periods of expanding EL and stable/decreasing EL.
- Banks' expanded demand deposits in response to increasing excess reserves during periods of expanding EL (Jan-15 to Dec-17, May-20 to Dec-21).
- No reversal during periods of stable/decreasing EL.
- No evidence of ratcheting of demand deposits at the cost of time deposits.

Different responses to different sources of liquidity?

- Sources of EL in the euro area can be 'temporary' or 'permanent', while in the US is only 'permanent'.
- Split banks' excess reserves by source: borrowed reserves (refinancing operations) and non-borrowed reserves (asset purchases) (Altavilla et al., 2023).
 - Implies *pari passu* adjustment in the instrumental variable.
- No statistically significant effect on demand deposits from either type of reserves.

Impact on deposit rates

- IV regression for the spread between the interest rate on deposits with agreed maturity over 2 years (i_{it}^{LT}) and overnight deposits (i_{it}^{ON}).
- Two Bartik-type of instruments: for excess reserves and for deposits.
- Estimate

$$i_{it}^{LT} - i_{it}^{ON} = \alpha_1 \Delta \ln EL_{instr_{it}} + \alpha_2 \Delta \ln Depo_{it} + \alpha_3 X_{it-12} + \delta_i + \delta_{ct} + \epsilon_{it} \quad (5)$$

- No significant evidence of substitution from time to demand deposits as a response to changes in excess reserves.
- Since 2022, deposit rates spreads suggest that banks are actively searching for more long-term deposits relative to overnight deposits as excess reserves fall.

Open questions

- Liquidity dependencies are milder in the euro area than in the US.
- Different sources of liquidity could be a justification. However, borrowed reserves are in part a result of a decision of the bank.
- Liquidity regulation is stricter in the euro area.

References

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