Excess Reserves and Monetary Policy Tightening

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Summary

- Fascinating paper. I very much enjoyed reading it and I believe the results. Highly recommend it for everyone
- "Given the bank's reserve ratio before rates rise, how does the loan amount change when interest rates rise?"
  - Authors find banks with higher RR lend more to their clients after rates rise (in June 2022), compare to banks with lower reserve ratios
  - Bank-firm FE means they compare loan amounts within the same bank-firm pair over time.
- Firm borrows from two banks: 1) Bank High (RR) lends more reliably after rates rise/credit tightens than Bank Low (RR)
  - Banks with higher RR also have higher abnormal returns and interest income
- MP may be less effective on banks with the most QE
  - Bank-level reserves variation tied to QE expansion

Unique Contribution

- AnaCredit Dataset, credit data for the entire Euro area (detailed information on loans, borrowers etc)
  - Loan level data
- Looks at the relationship between reserves and lending during a period of ample reserves and rising rates
  - During 2H of 2022, total reserves are €4.6T and DFR goes from -0.5% to 3.0%
  - Europe had negative deposit rates and longer history of interest on reserves than US ▸ Deposit Rates
  - US banks have ON RRP to soak up liquidity
  - Europe has TLTRO (Targeted Longer-Term Refinancing Operations)
  - This suggests reserve/deposit rates play a greater role in bank valuations

Prior Literature Shows During QE, Relationship is Positive

1) Rodnyansky and Darmouni (2017, RFS) QE1 and QE3 increased lending for banks with MBS
   - $log(Lending_{it}) = \alpha_i + \gamma' QE_t + \delta'(Treat_i \times QE_t)...$
   - where $Treat$ is an indicator for top quartile of MBS holdings

2) Kandrac and Schlusche (2021, JMCB) - Uses IV to show (during QE & ample reserves), more reserves meant more lending
   - $\Delta Lending = \alpha + \rho \times (\frac{\Delta \widehat{Reserves}}{Assets}) + \psi' x_+ \varepsilon$
   - Shows ρ is positive and significant during QE1 and QE3 (MBS buying)

Prior Literature: Reserves Premium Increases Reserves Over Lending

3) Kim (2019) - Shows the reserves premium (IOR-3MT) incentivizes banks to increase reserves and lend less, after controlling for QE

$$\frac{Loans_{it}}{Assets_{it}} = \alpha_i + \lambda_1 \times \textit{Reserves Premium}_t + \lambda_2 \times \frac{Reserves_{it}}{Assets_{it}} + \lambda_3 \times QE_t + X'\Gamma + \varepsilon_{i,t}$$

- As QE increases lending, higher risk adjusted returns on reserves reduces lending at the margin.

Major Questions

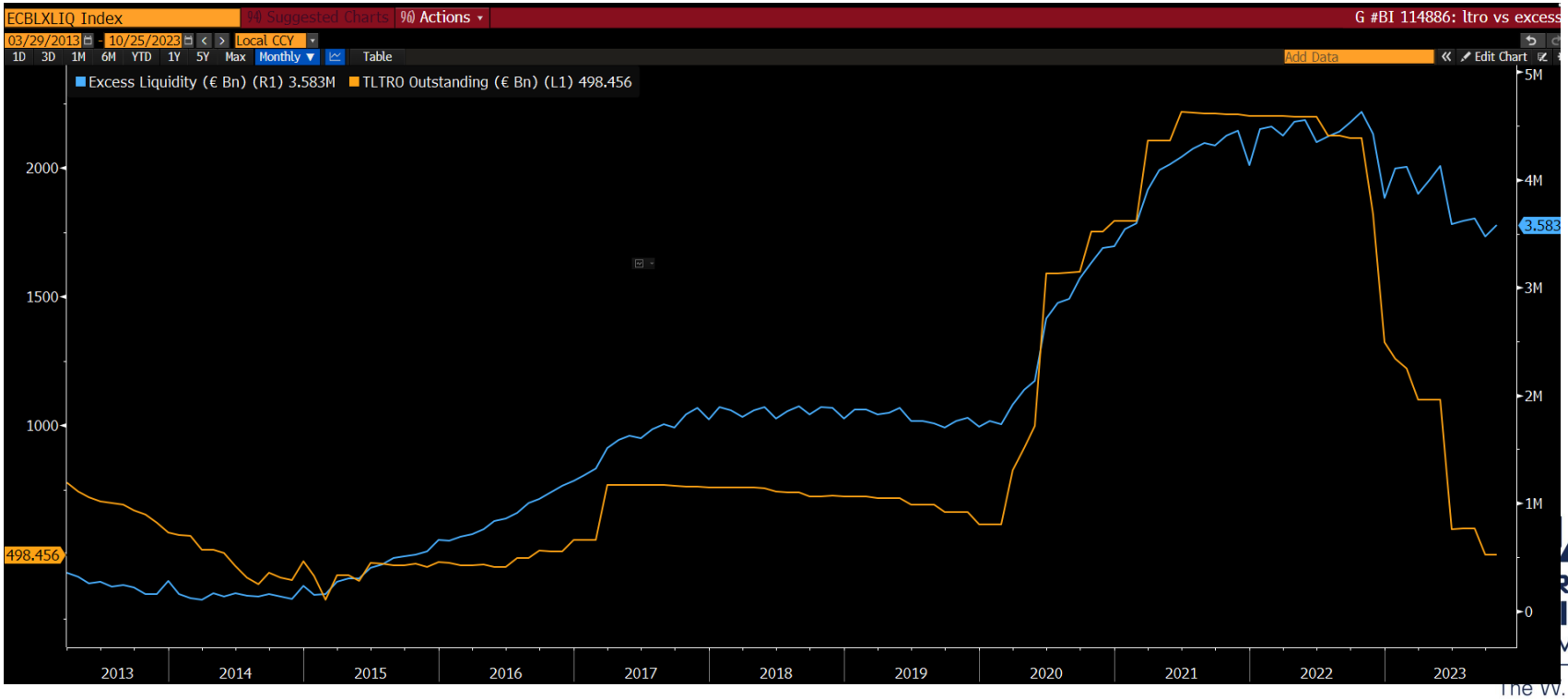
1) What is the baseline relationship between reserve ratios and lending?
   - During QE, its positive. After controlling for QE, its negative
   - If high RR bank initially lent a small amount, then its reliable lending is less economically significant than low RR bank that reduced lending a lot.
2) What if low RR Bank reduces lending due to paying back TLTRO Loans?
   - Bank-firm FE does not address time-varying omitted variables that influence both reserve ratio and loans, like TLTRO
   - TLTRO allowed banks to borrow at negative rates under the condition they pass on savings to borrowers
   - Smaller banks are more desperate for alternative financing because they cannot access covered bond markets

Baseline Relationship Between RR and Lending?

- Baseline relationship is absorbed by Bank FE (in Bank-Firm FE)
  - $log(credit_{b,f,t}) = \beta \times (RR_b) \times (DRF_t \geq 0) + X'_{b,t}\gamma ...$
- Baseline effect relationship without Bank-Firm FE?
  - $log(credit_{b,f,t}) = \beta_0 \times (RR_b) + \beta_1 \times (RR_b) \times (DRF_t \geq 0) + X'_{b,t}\gamma ...$
  - $\beta_0 =$ Average effect of reserve ratios on loans
  - $\beta_1 =$ Do banks with different reserve ratios respond differently to rising rates?

Time-Varying Omitted Variable (TLTRO)

- Banks have ~20% securities in US and EU (2013) (Paludkiewicz, 2021), and ~8% in EU 2022
- Do Banks with high RR:
  - Sell securities to ECB APP?
  - Borrow more from TLTRO and hold reserves?
  - TLTRO: attractive funding rates (negative rates) to stimulate bank lending

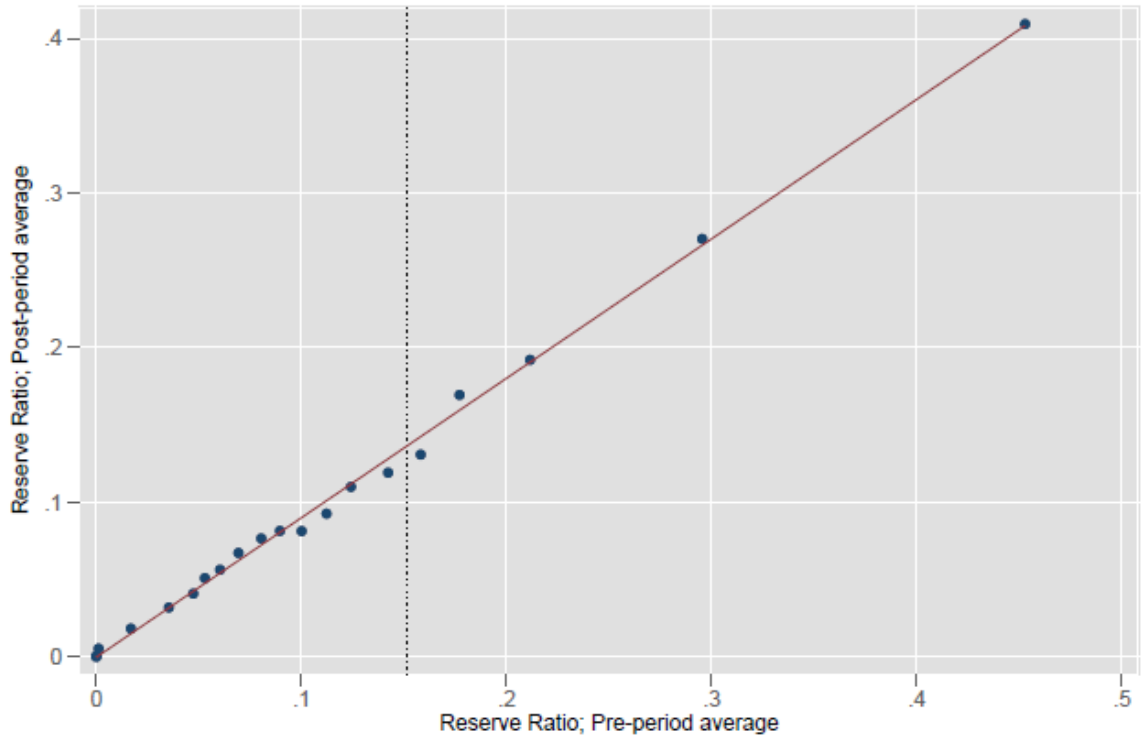


Time-Varying Omitted Variable (TLTRO)

- Effect of credit supply is stronger for smaller banks. Authors cite agency problems but...
  - Smaller banks cannot access covered bond markets to make up for the end of TLTRO financings
  - They may draw down on RR and loans simultaneously to pay back TLTRO
  - This positive relationship may be driving differential
- Importance of smaller banks may be overlooked in some regions
  - Smaller banks were overlooked during Dodd-Frank
  - Kim (2021) finds smaller banks hedged loans at half the rate of larger banks due to costs of Dodd-Frank uncertainty (4 years)
  - Community Banking Conference at the St. Louis Fed publicized community bank issues
  - Small banks in Europe are mostly German, Austrian, and Italian

Reserve Ratio Falls After Rates ↑ (Fig 1A.1)

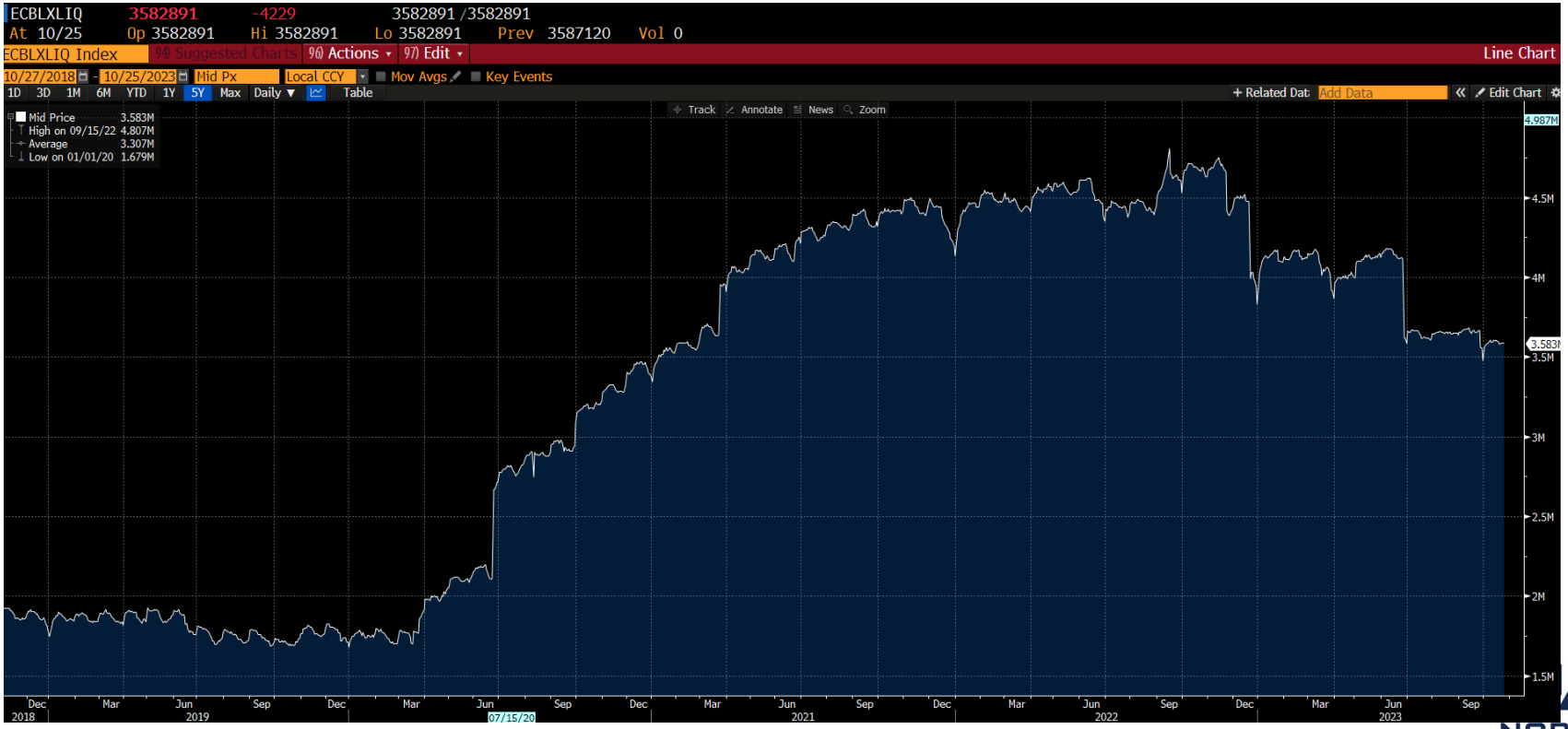
1) Prior RR higher due to €90B in ECB net purchases from April-June 2022?
   - Larger, trading banks selling securities have higher RR, predisposition to replace RR with loans?
2) If smaller, undercapitalized banks take a larger share of TLTRO
   - Unwinding TLTRO may bind reserves and loans together



▸ Credit

Drops in ECB Excess Liquidity Related to TLTRO Paybacks?

- Extreme drops in liquidity seem to be related to TLTRO paybacks, which had deadlines
- ECB APP unwinding schedule is smoother...



Small Suggestions

1) In Summary tables, Log(Assets) and Log(Credit) should be raw just for informativeness
2) Clarify "Bonds Held Ratio". MBS, Bunds? 8% seems very low (~20% in US and in Paludkiewicz, 2021)
3) More information on deposits
   - Higher RR banks have lower retail deposits... and higher corporate deposits?
   - No deposit insurance in EU banks, so does it matter?
4) Higher RR Returns due to APP security sellers or TLTRO borrowers?
5) Chart like this can help: ▸ Khwaja and Mian
6) Relationship lending lit = smaller community banks lend more during crisis (Bolton, Freixas, Gambacorta and Mistrulli, 2016)

Other Ideas

Higher RR due to selling assets to APP or borrowing from TLTRO?

1) If APP, then trading banks (high RR) may act differently during tightening
   - Trading banks are more opportunistic: Trading banks use central bank liquidity to purchase securities at low prices, instead of lend (Abbassi, Iyer, Peydro, Tous 2016, JFE)
   - Profit take selling securities (APP) and rebalance to higher yielding loans (Paludkiewicz, 2021)
   - Reserves from security selling may be marked for similar cashflows from loans
2) TLTRO winding down links reserves and lending (loan-level data comes in handy)
   - Do longer banking relationships remain "sticky"?
   - Transformation of loan maturity, credit risk, industry, etc. composition from higher risk to lower risk
   - Lower risk loans may be a substitute for low risk TLTRO loan

Conclusion

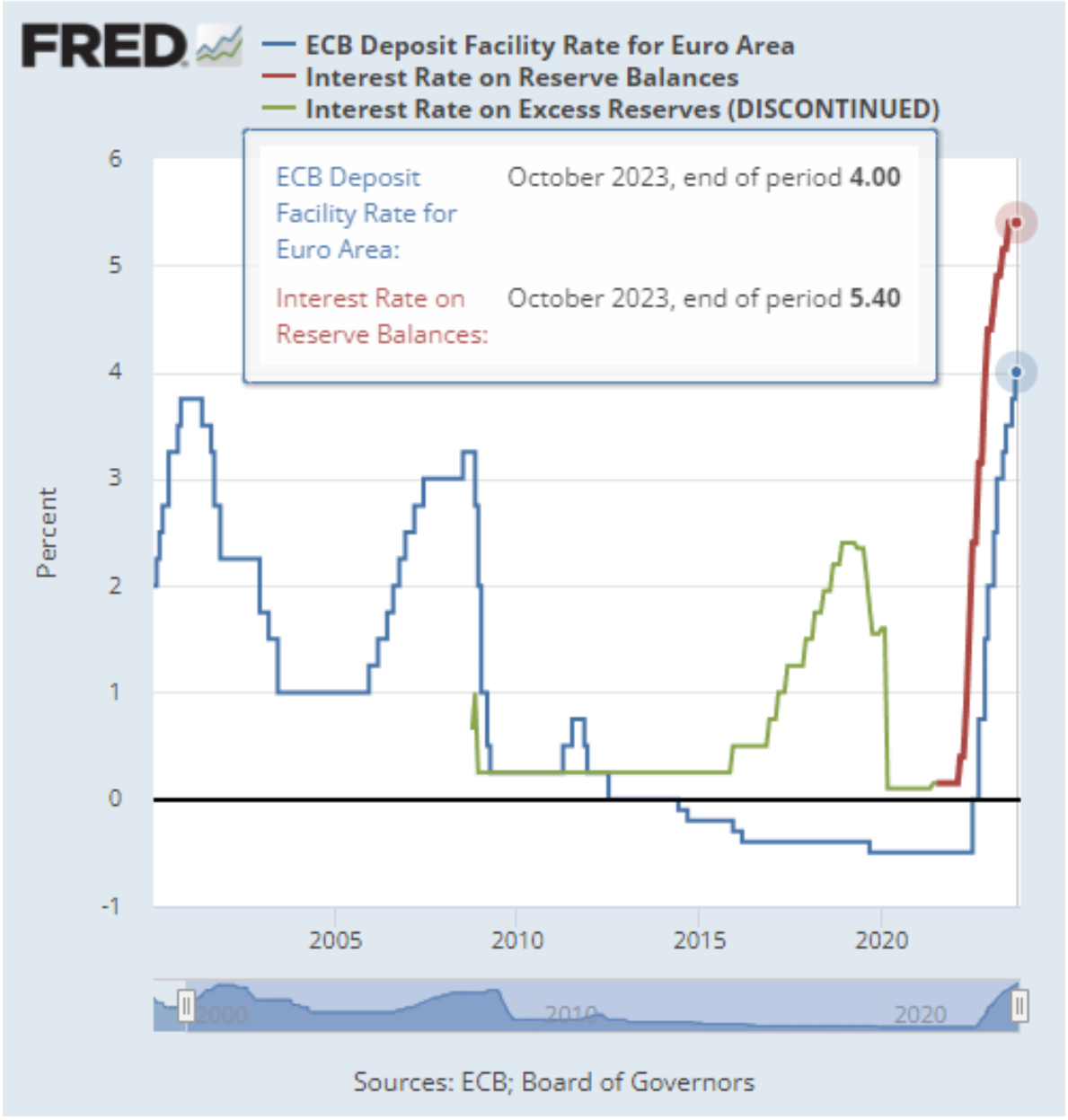
1) Results are very intriguing. Excess reserves make the transmission of monetary policy more difficult.

2) Additional Specification that shows baseline effect between RR and Lending
   - Prior relationship may be negative, while post rate hike, the additional response is positive
   - Provides further detail on the manifestation of MP distortion

3) APP or TLTRO Channel - does tightening impact lending similarly?
   - Heterogenous impact on lending from exposure to APP and TLTRO
   - TLTRO channel can bind reserves and loans more closely than APP
   - APP Reinvestment (slow) vs TLTRO (fast)

4) Relationship driven by TLTRO withdrawal introduces a cross current in monetary policy

Europe Has Longer History with Interest on Reserves



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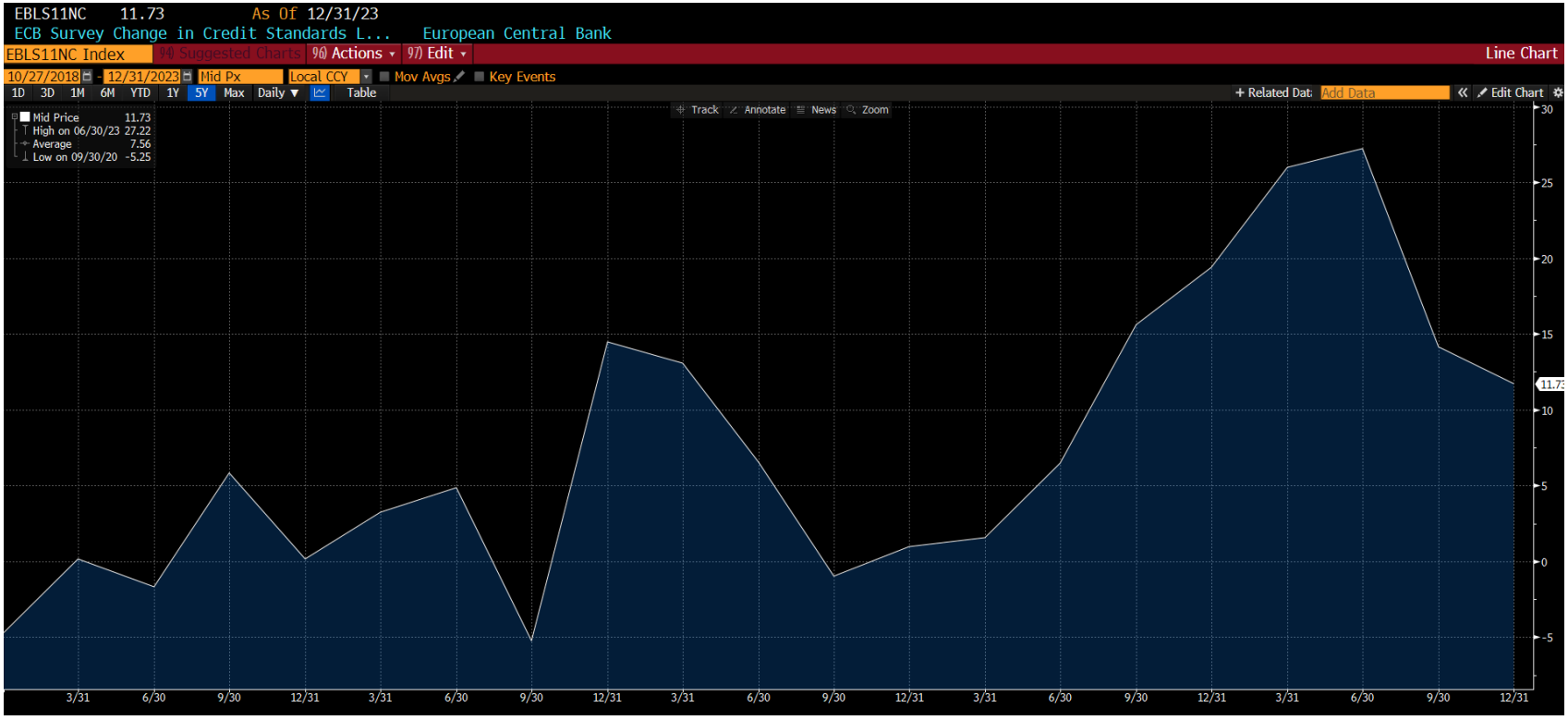
Credit Standards Tightening



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TLTRO III Borrowing Was Common

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Name	TLTRO III Drawn (EUR B)
▾ Other Banks	
▾ German Banks	
Total €34.7B at 1Q23	
▾ Commerzbank	
Total €8.9B at 1Q23	
TLTRO III -4 (€5.3B at 1Q23)	32.300B
TLTRO III -7 (€3.6B at 1Q23)	3.600B
Max Limit After to Increase to 55%...	
Allowance Left: EUR 0B	
▾ Deutsche Bank	
Total €25.8B at 1Q23	
TLTRO III -4 (~€3B at 1Q23)	30.000B
TLTRO III -5 (~€4B at 1Q23)	4.000B
TLTRO III -6 (~€4B at 1Q23)	3.500B
TLTRO III -7 (~€3B at 1Q23)	3.300B
TLTRO III -8 (~€1B at 1Q23)	3.900B
TLTRO III -9 (~€10B at 1Q23)	
▾ French Banks	
Total €204B	
▾ BNP Paribas	
Total €67B at 4Q22	
▾ Societe Generale	
Total €47B at 1Q23	
▾ Groupe Credit Agricole	
Total €90B at 1Q23	
TLTRO III -4 (~€55.2B at 1Q23, as...	90.000B
TLTRO III -6 (€10.8B at 1Q23)	10.800B
TLTRO III -7 (€14B at 1Q23)	14.000B

Chart Like This Could Clarify

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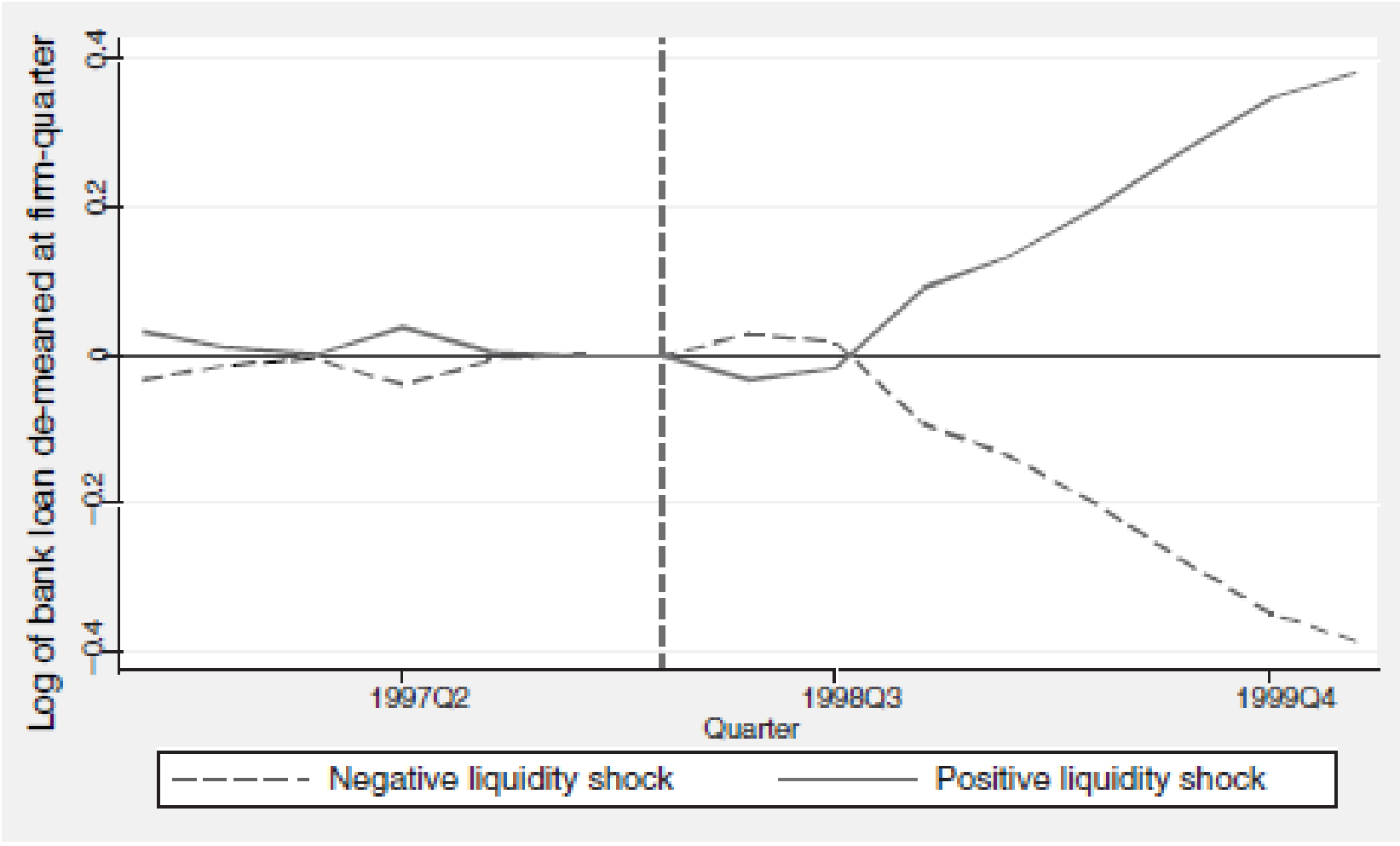

FIGURE 4. BANK LENDING CHANNEL WITH FIRM FE