QE, Safe Asset Scarcity and Real Effects

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Motivation

- Collateral Scarcity in Euro area secured money market since 2015
- Very low and highly dispersed repo rates
- Likely driven by PSPP purchases (Arrata et al, JFE)

- Does the dispersed drop in secured rates have real effects?
- Coeure (2018):
  - Affects monetary policy transmission?
  - Inefficient capital allocation?

This paper:

- Exogenous variation in repo funding costs $\rightarrow$ Effect on bank lending and profits

Approach

Banks are hit by an expogenous shock:

1. Repo rate dispersion is caused exogenously
   - Arrata et al. 2020
2. Bank exposure to drop in repo rates is heterogeneous
   - ex ante securities holdings determine subsequent use of collateral in repo borrowing

   $\rightarrow$ Exogenous measure of exposure to low repo rates: weighted average repo rate of ex ante security portfolio

Scarcity shock affects bank lending and profits

3. Repo funding costs impact bank lending
   - exogenous repo funding cost measure explains loan growth
4. Repo funding costs matter for bank profits
   - exogenous repo funding cost measure drives repo desk profits

Exogenous causes of the drop in repo rates

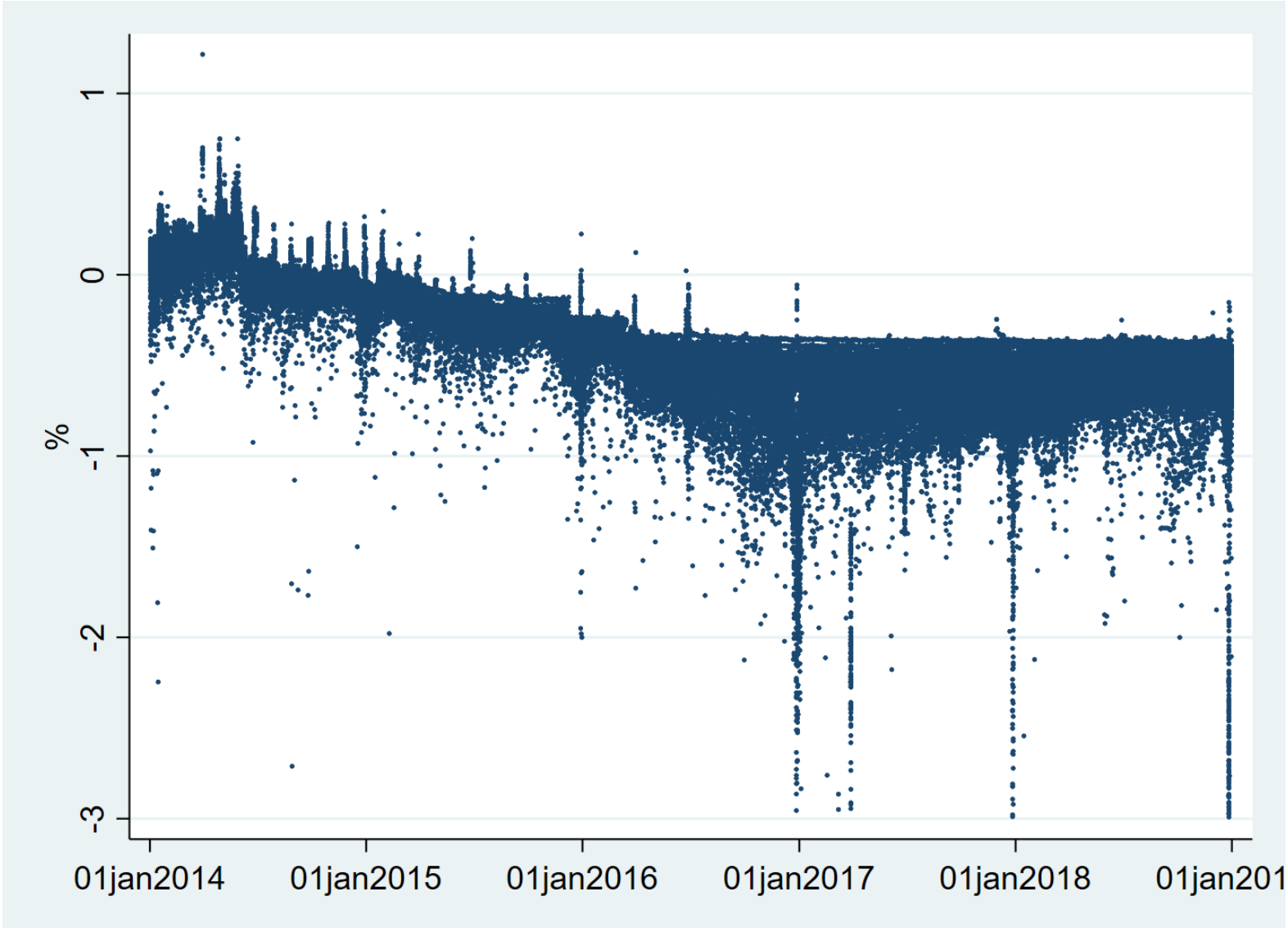
Heterogeneous exposure to drop in repo rates

Funding Costs and Bank Lending

Funding Costs and Bank Profits

Conclusion

Repo Rate Dispersion: BrokerTec traded ISINs



daily vol. weighted average repo rate per ISIN for ISINS from DE, FR, IT, NL, ES; GC and specific collateral on BrokerTec

Repo Rate Dispersion: Effect of PSPP purchases

W. Arrata, B. Nguyen and I. Rahmouni-Rousseau et al./Journal of Financial Economics 137 (2020) 837–856

Table 4
Effect of PSPP purchases on SC repo rates. This table shows the impact of PSPP purchases on "Spot-next" SC repo rates. All variables are in first difference. PSPP variable is the first difference of the share of the bond outstanding held by the PSPP. We use various set of fixed effects. The number of observations may change due to singletons. Standard errors are clustered at the maturity bucket-country level.

	(1) SC repo rate	(2) SC repo rate	(3) SC repo rate
PSPP	−0.656***	−0.765***	−0.781***
	(0.112)	(0.0914)	(0.0960)
Bond FE	Yes	No	Yes
Country-bucket-time FE	No	Yes	Yes
R^2	0.004	0.509	0.512
Observations	202,323	201,864	201,855

Standard errors are in parentheses, clustered at the maturity-country level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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Banks exposure driven by heterogeneous asset portfolios

- Is use of collateral determined by the security portfolio?
  $\rightarrow$ Then banks have heterogeneous exposure to repo rates

Data

- MMSR (repo), SHS (portfolios), WpHMV (trading)

Dependent variables

- Repo turnover/outstanding on Bank-ISIN level
- aggregate/daily 2016-2017

Main explanatory variables

- Security holdings (in June 2016 / monthly)
- Control for cash-market trading volume

$$\text{Repo Turnover}_{ij} = \beta_1 \text{Initial Holdings}_{ij} + \beta_2 \text{Cash Turnover}_{ij} + \gamma_i + \delta_j$$

Results I: Heterogeneous exposure to drop in repo rates

Dependent Variable:	Repo Turnover				Repo Outstanding	
	$\ln(\text{Borrowing+Lending})_{ij}$		$\ln(\text{Lending})_{ij}$	$\ln(\text{Borrowing})_{ij}$	$\ln(\text{Lending})_{ij}$	$\ln(\text{Borrowing})_{ij}$
Sample:	Held or Traded, issued	Repoed				
	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(\text{Initial Holdings Banking Book})_{ij}$	0.083***	0.068***	-0.241***	0.334***	-0.252***	0.388***
	(0.020)	(0.010)	(0.048)	(0.040)	(0.051)	(0.043)
$\ln(\text{Initial Holdings Trading Book})_{ij}$	0.151***	0.038***	0.019	0.112**	0.007	0.063
	(0.034)	(0.009)	(0.016)	(0.042)	(0.019)	(0.048)
$\ln(\text{Cash Turnover})_{ij}$	0.132***	0.055***	0.141***	0.052	0.162***	0.045
	(0.035)	(0.016)	(0.049)	(0.060)	(0.054)	(0.058)
Bank FE	yes	yes	yes	yes	yes	yes
ISIN FE	yes	yes	yes	yes	yes	yes
Observations	393,083	12,290	12,279	12,286	12,290	12,290
R^2	0.333	0.584	0.656	0.632	0.648	0.634

Results II: Heterogeneous exposure to drop in repo rates

Dependent Variable:	Repo Outstanding					
	$\ln(\text{Borrowing})_{ijt}$				$\ln(\text{Lending})_{ijt}$	
Sample:	Repoed			PSPP ISINs	Repoed	PSPP ISINs
	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(\text{Cash Turnover})_{ijt}$	-0.011**	-0.010	0.019***	0.021***	0.027***	0.033***
	(0.004)	(0.008)	(0.003)	(0.004)	(0.005)	(0.005)
$\ln(\text{Holdings})_{ijm-1}$	0.263***	0.202***	0.370***	0.514***	0.035*	0.042
	(0.055)	(0.043)	(0.071)	(0.103)	(0.020)	(0.033)
$\text{Traded Repo Rate}_{ijt}$	-0.003**	-0.004*				
	(0.001)	(0.002)				
$\text{Market Repo Rate}_{jt}$			-0.098**	-0.092*	-0.046	-0.015
			(0.043)	(0.052)	(0.033)	(0.036)
Bank*Day FE	yes	yes	yes	yes	yes	yes
Bank*ISIN FE	yes	yes	yes	yes	yes	yes
ISIN*Day FE	yes	no	no	no	no	no
Instrument for rate			Net PSPP_{jt}			
Observations	432,267	986,180	5,480,074	2,497,045	5,480,074	2,497,045
R^2	0.774	0.658	0.408	0.458	0.495	0.535

Takeaways

Securities holdings predict repo activity

- Higher bank-level repo activity in ISINs with higher holdings
- Higher borrowing outstanding in ISINs with higher holdings
- No/small effect on repo lending
- Effect is not driven by trading in cash markets

Repo rate affects repo borrowing

- Lower rates lead to higher borrowing outstandings
- Rate change from 75%-ile (-54bp) to 25%-ile (-90bp) increases borrowing outstanding by -36*-0.003*100=10.8%

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An Exogenous Measure of Repo Funding Costs

Data

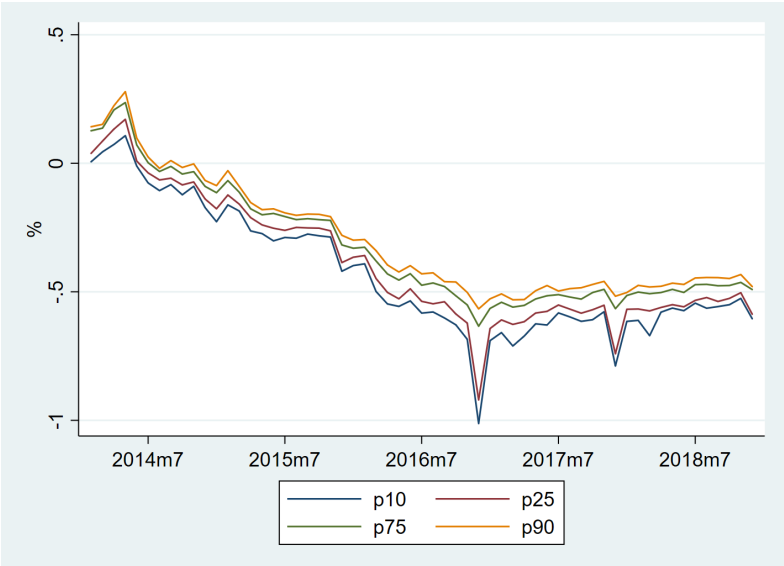
- Ex ante bank-level securities holdings from SHS
- ISIN-level overnight repo rates from BrokerTec

Construction

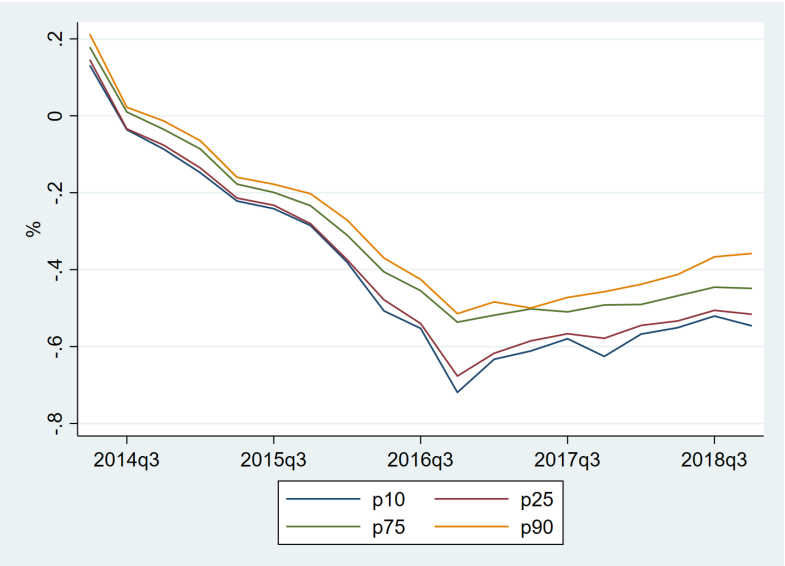
- yearly average overnight rates weighted by initial holdings

$$\text{Funding Rate}_{it} = \sum_j \frac{\text{repo rate}_{jt} * \text{holdings}_{ij,t\text{-}1}}{\text{Total repoable holdings}_{ij,t\text{-}1}}$$

Funding Rates by Bank



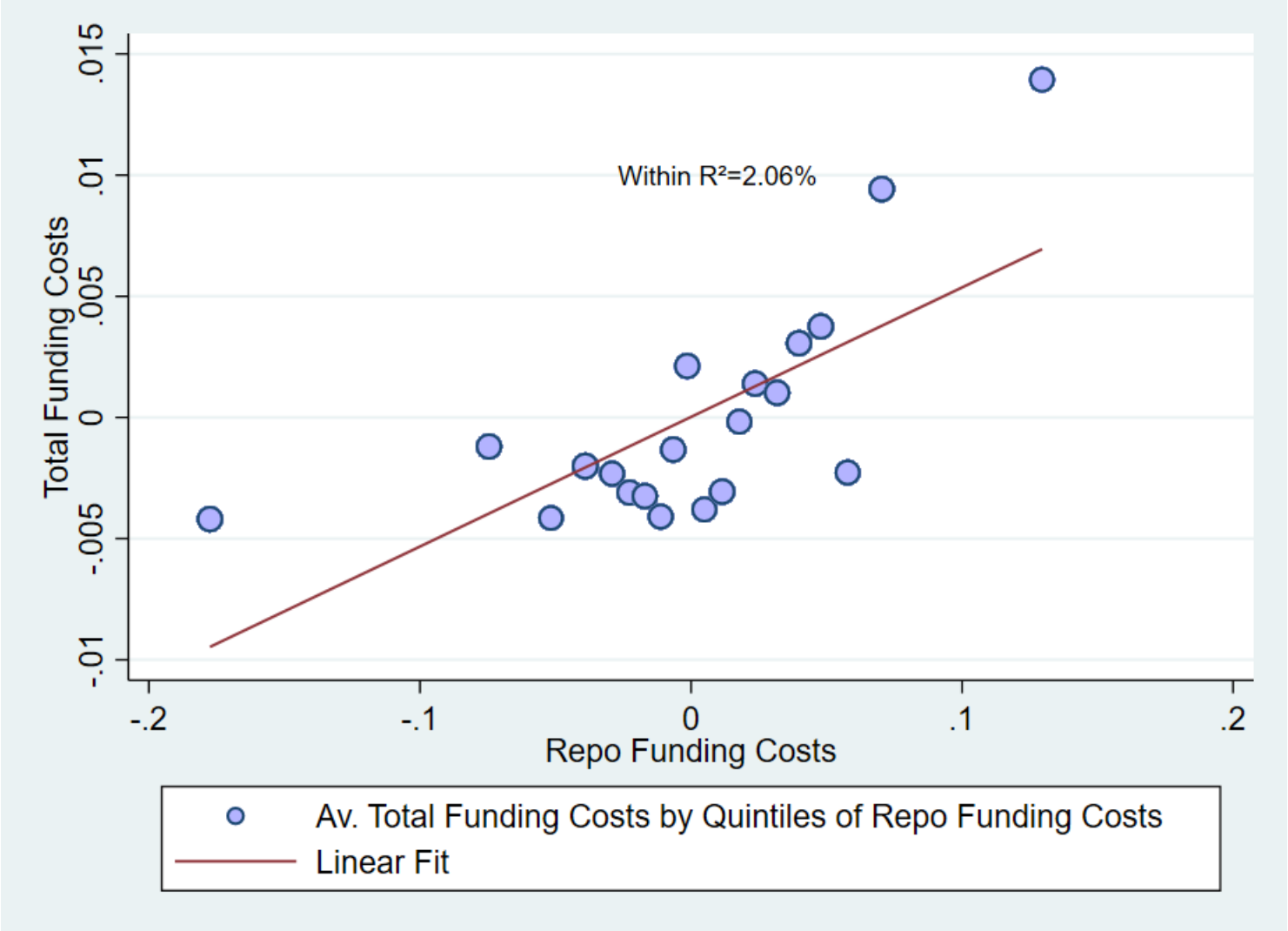
German Banks



selected Euro Area Banks (SHS-G)

- Bank-level Funding Rate gets more heterogeneous after 2015

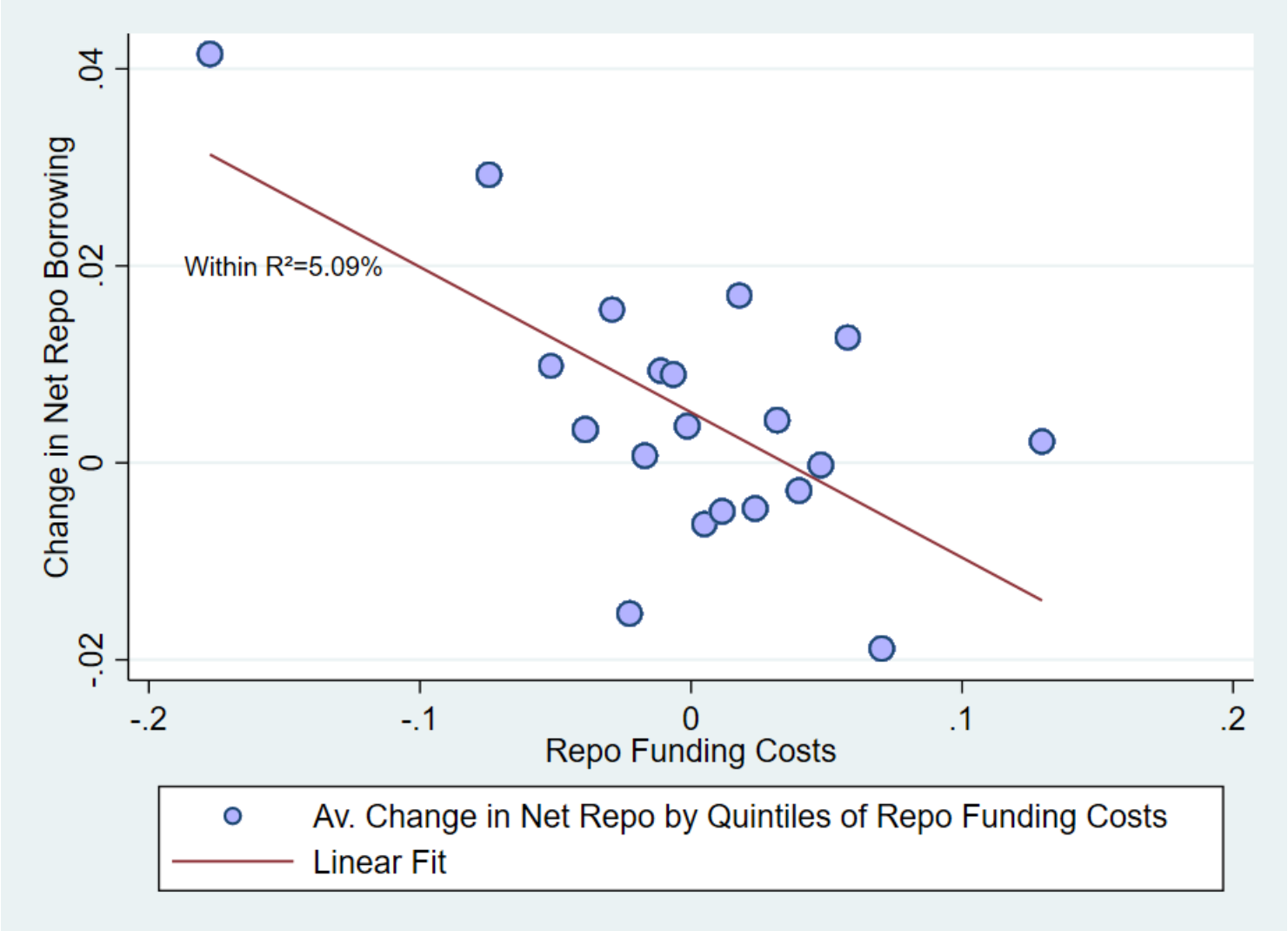
Funding Rate and Total Funding Costs



- Funding Rate explains cross-section of total funding costs

German Banks 2013-2018, adjusted for yearly fixed effects

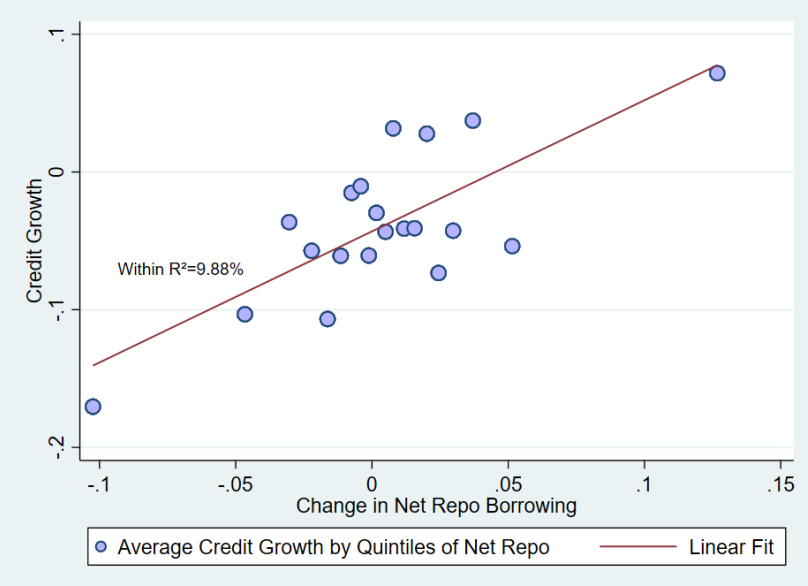
Funding Rate and Net Repo Position

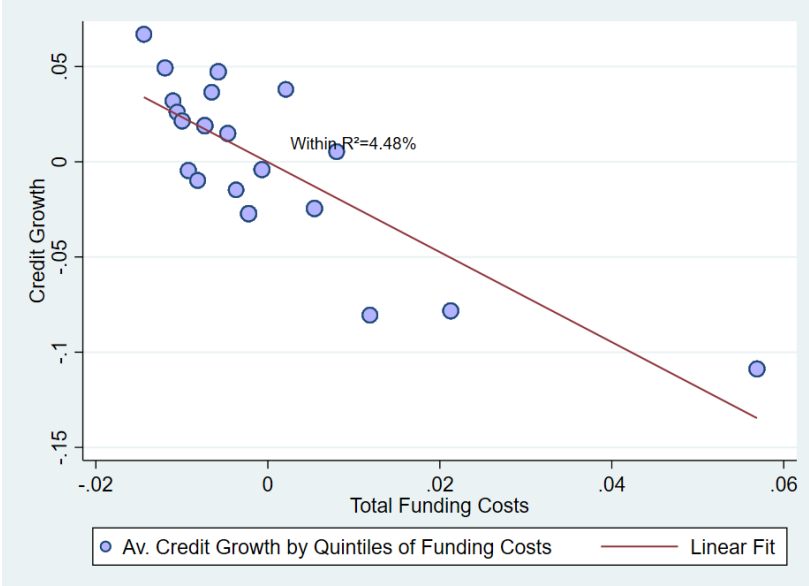


- Funding Rate explains cross-section of net repo position

German Banks 2013-2018, adjusted for yearly fixed effects

Net Repo, Total Funding Costs and Credit Growth





- Change in Net Repo position and Total Funding Costs explain cross-section of credit growth

German Banks 2013-2018, adjusted for yearly fixed effects

Did the drop in Repo Rates increase Bank Lending?

- Explain Credit Growth using the Funding Rate as exogenous proxy for the exposure to the drop in repo rates

Data

- German banks (BISTA): yearly 2013-2018
- Funding Rate

Dependent Variable

- Yearly growth rate of lending to nonbanks

Main Explanatory Variables

- Funding Rate
- Lagged balance sheet controls (share of deposits, lending, reserves, capital)

$$\text{Credit Growth}_{it} = \beta_1 \text{Funding Rate}_{it} + \boldsymbol{\beta}' \text{Controls}_{i,t\text{-}1} + \gamma_i + \delta_t$$

Results I: Repo Rates and Bank Lending - Germany

Dependent Variable:	$(\Delta$Nonbank Lending$_{it})$/Nonbank Lending$_{it\text{-}1}$			
Sample:	Germany 2013-2018			
	(1)	(2)	(3)	(4)
Funding Rate$_{it}$	-0.029**	-0.010	0.002	-0.008
	(0.012)	(0.020)	(0.018)	(0.022)
Repo User$_{it}$			-0.009	
			(0.023)	
Funding Rate*Repo User$_{it}$			-0.144**	
			(0.069)	
Funding Rate*Share repoable				-0.819*
				(0.463)
Share repoable Securities$_{it}$				-0.972*
				(0.533)
Constant	0.032			
	(0.033)			
Controls	yes	yes	yes	yes
Bank FE	no	yes	yes	yes
Year FE	no	yes	yes	yes
Observations	3,950	3,919	3,919	3,919
R^2	0.006	0.319	0.323	0.321

Results II: Repo Rates and Bank Lending - Euro Area

Dependent Variable:	(ΔNonbank Lending$_{it}$)/Nonbank Lending$_{it\text{-}1}$			
Sample:	Euro Area (SHS-G) 2014-2018			
	(1)	(2)	(3)	(4)
Funding Rate$_{it}$	-0.224**	-0.310**	-0.663*	-0.781***
	(0.104)	(0.125)	(0.363)	(0.255)
Controls	yes	yes	yes	yes
Bank FE	no	yes	yes	no
Year FE	no	no	yes	no
Country*Year FE	no	no	no	yes
Observations	76	76	76	72
R^2	0.174	0.452	0.502	0.398

Results III: Repo Rates and Bank Lending - Credit Register

Dependent Variable:	ΔLog(Loan Volume$_{ijt}$)					
Country and Period:	Germany 2013-2018					
Borrower Sample:	Non-banks					
Bank Sample:	All Banks			Constant Repo User$_i$		
	(1)	(2)	(3)	(4)	(5)	(6)
Funding Rate$_{it}$	-0.029*	-0.032**	-0.016	-0.870***	-0.821*	-0.745**
	(0.016)	(0.016)	(0.017)	(0.314)	(0.421)	(0.317)
Repo User$_{it}$	-0.048*					
	(0.027)					
Funding Rate*Repo User$_{it}$	-0.142**					
	(0.057)					
Constant Repo User$_i$		-0.033	-0.105**			
		(0.034)	(0.048)			
Funding Rate*Constant Repo User$_i$		-0.129*	-0.223***			
		(0.067)	(0.071)			
Controls	yes	yes	yes	no	yes	yes
Year FE	-	-	yes	yes	-	-
Borrower*Year FE	yes	yes	no	no	yes	yes
Bank FE	no	no	no	no	no	yes
Observations	856,236	856,236	856,236	218,481	218,481	218,481
R^2	0.379	0.379	0.018	0.452	0.017	0.454

Results IV: Repo Rates and Bank Lending - Channel

Dependent Variable:	Interest Rate Corporate Loans		$(\Delta \text{Lending}_{it})/\text{Lending}_{it-1}$	
	$\leq$ 1 year	$>$ 1 year	Corporate $\leq$ 1 year	
Sample:	Germany 2013-2018			
	(1)	(2)	(3)	(6)
Funding Rate*Repo user	0.293**	-0.051	-0.510*	-0.509*
	(0.124)	(0.117)	(0.292)	(0.290)
Funding Rate$_{it}$	-0.068	0.012	-0.077	-0.090
	(0.096)	(0.057)	(0.144)	(0.141)
Repo User$_{it}$	0.056	-0.005	0.023	0.039
	(0.087)	(0.068)	(0.102)	(0.103)
Consumer Deposit Rate$_{it}$	-0.095	-0.306**		0.302
	(0.139)	(0.127)		(0.267)
Corporate Deposit Rate$_{it}$	0.328	0.293**		0.330
	(0.209)	(0.141)		(0.349)
Controls	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Observations	1,012	1,012	1,012	1,012
R^2	0.806	0.886	0.356	0.359

Takeaways

Drop in repo rates increases credit growth

- Lower repo funding rate explains increases in credit growth
- Holds on German and European level
- Effect not driven by increases in security prices

Repo rates affect short term corporate loans

- Short term loan rates decrease with repo rate exposure
- Growth of short term loans increases

Exogenous causes of the drop in repo rates

Heterogeneous exposure to drop in repo rates

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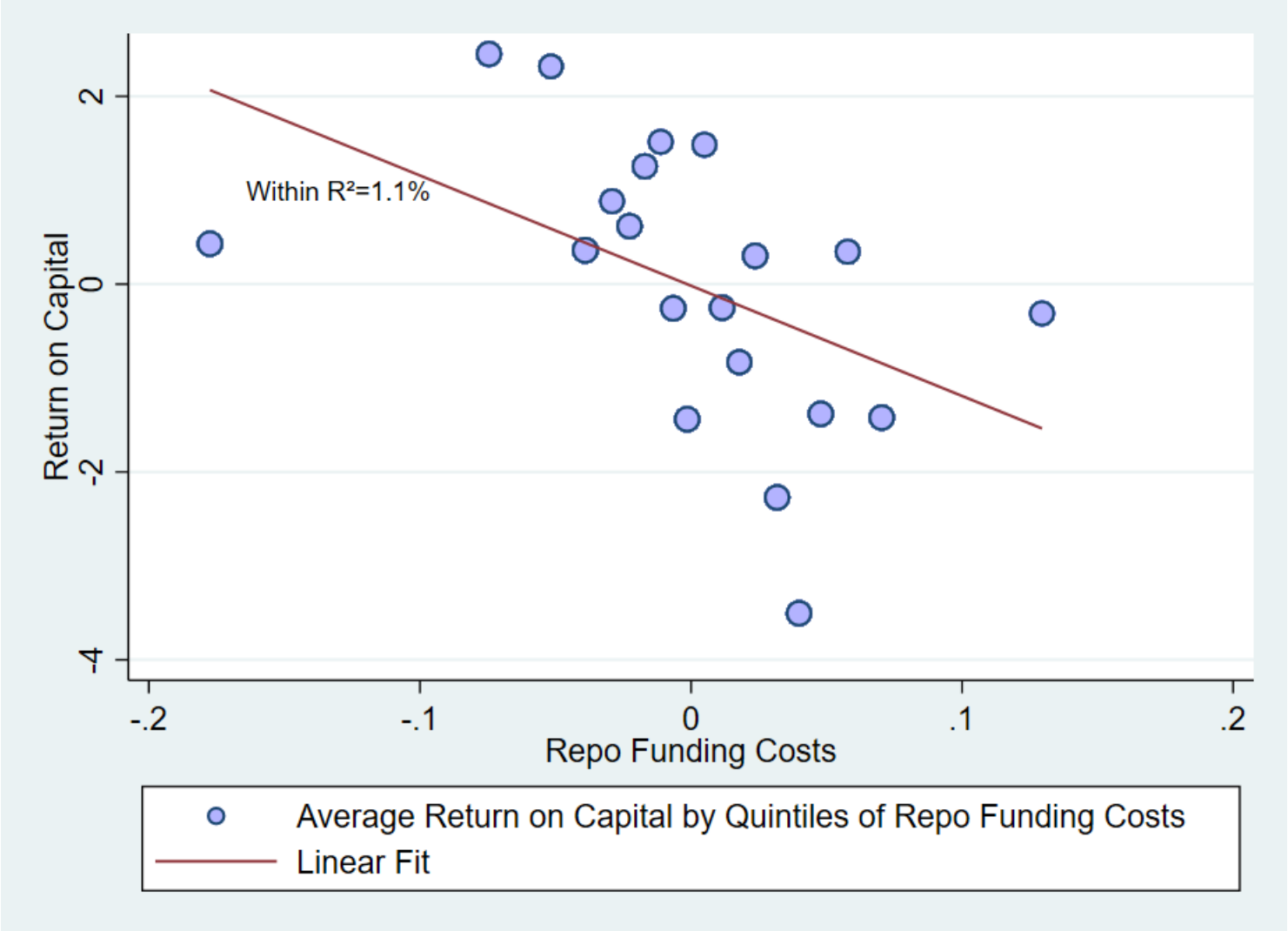
Conclusion

Repo Funding Costs and Return on Capital



- Funding Rate explains cross section of Return on Capital

German Banks 2013-2018, adjusted for yearly fixed effects

Did the drop in repo rates increase repo desk profits?

Data

- MMSR (2016-2017): Construct total outstanding repo book
- Funding Rate; WpHMV to control for cash trading volume

Dependent variable

- Repo book return (vol. weighted av. lending − borrowing rate)

Explanatory variables

- Daily Funding Rate (using last month's security holdings)
- Aggregate daily cash trading volume
- Repo Imbalance $\frac{\text{abs(borrowing outstanding-lending outst.)}}{\text{max(borrowing outstanding,lending outst.)}}$

$$\text{Repo Book Return}_{it} = \beta_1 \text{Funding Rate}_{it} + \kappa X_{it} + \gamma_i + \delta_t + u_{it}$$

Results: Funding Costs and Repo Desk Profits

Dependent Variable:	Repo Book Return$_{it}$		Borrowing Rate$_{it}$	Lending Rate$_{it}$
Sample:	daily June 2016 - Dec 2017, no year ends			
	(1)	(2)	(3)	(4)
Funding Rate$_{it}$	-24.757***	-12.100**	6.865***	-6.203
	(8.121)	(4.396)	(2.324)	(4.113)
Repo Book Mismatch$_{it}$	-0.017	0.003		
	(0.050)	(0.042)		
ln(Cash Turnover)$_{it}$	-0.172**	-0.023		
	(0.071)	(0.093)		
Bank FE	yes	yes	yes	yes
Day FE	no	yes	yes	yes
Observations	7,148	7,148	7,148	7,148
R^2	0.756	0.821	0.908	0.845

Exogenous causes of the drop in repo rates

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Conclusion

Banks are affected differently by repo scarcity

- Security Holdings determine subsequent repo borrowing
- Low rates increase use of expensive collateral
  $\rightarrow$ Portfolios determine heterogeneous exposure to repo rates

Lower funding costs lead to higher loan growth

- Loan rates decrease, loan growth increases
- In Germany and EA
- Driven by short-term corporate loans

Drop in repo rates increased banks' repo desk profits

- Profits increase when banks' repo funding rate is lower
- Driven by effect on borrowing rate

Appendix

Did rate dispersion lead to uncertainty and lower lending?

- Altavilla, Carboni, Lenza, Uhlig (2019): high volatility in unsecured rates 2011-2013 reduced loan growth
- Here: test conjections using volatile period in secured rates

Data

- German banks (BISTA): yearly 2013-2018 (as before)
- Funding Rate, measures of repo rate volatility

Repo Rate Uncertainty Measures

- Repo Vola: Volatility of rates of collateral in banks' portfolios
- Repo Max-Min: highest−lowest rate of collateral in portfolio

$$\text{Credit Growth}_{it} = \beta_1 \text{Funding Rate}_{it} + \beta_2 \text{Repo Uncertainty}_{it} + \boldsymbol{\beta}' \mathbf{X}_{i,t\text{-}1} + \gamma_i (+\delta_t)$$

Results: Rate Dispersion, Uncertainty and Lending

Dependent Variable:	$(\Delta$Nonbank Lending$_{it})$/Nonbank Lending$_{it\text{-}1}$			
Sample:	Germany 2013-2018			
	(1)	(2)	(3)	(4)
Funding Rate*Repo user	-0.150**	-0.145**	-0.145**	-0.147**
	(0.070)	(0.070)	(0.069)	(0.073)
Funding Rate$_{it}$	0.011	0.009	-0.003	-0.003
	(0.017)	(0.017)	(0.018)	(0.018)
Repo User$_{it}$	-0.010	-0.010	-0.009	-0.009
	(0.023)	(0.023)	(0.023)	(0.023)
Repo Vola$_t$	0.105**			
	(0.043)			
Repo Max-Min$_t$		0.017***		
		(0.004)		
Repo Max-Min$_{it}$			-0.003	-0.002
			(0.002)	(0.002)
Repo Max-Min$_{it}$*Repo User				-0.001
				(0.009)
Eonia$_t$	0.020	0.073**		
	(0.031)	(0.036)		
Controls	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes
Year FE	no	no	yes	yes
Observations	3,919	3,919	3,919	3,919
R^2	0.318	0.321	0.323	0.323

- Aggregate rate volatility leads to *higher* loan growth
- Bank-individual volatility insignificant, but *lower* loan growth