

QE, Bank Liquidity Risk Management, and Non-Bank Funding: Evidence From Administrative Data

R. M. Darst, S. Kokas, A. Kontonikas, JL Peydró, A.
Vardoulakis

Discussion by **Juan Pablo Gorostiaga** (PUC Chile)
jgorostiaga@uc.cl

The Micro and Macro of Financial Intermediation Workshop
Central Bank of Chile - October 7th, 2025

Main takeaway

- ▶ **Main RQ:** How do banks manage liquidity risk in response to a fragile funding shock?

Main takeaway

- ▶ **Main RQ:** How do banks manage liquidity risk in response to a fragile funding shock?
 - ▶ Pandemic QE increased the fragility of banks' UD

Main takeaway

- ▶ **Main RQ:** How do banks manage liquidity risk in response to a fragile funding shock?
 - ▶ Pandemic QE increased the fragility of banks' UD
 - ▶ Exploit across bank variation → high pre-exposure to NBFIs

Main takeaway

- ▶ **Main RQ:** How do banks manage liquidity risk in response to a fragile funding shock?
 - ▶ Pandemic QE increased the fragility of banks' UD
 - ▶ Exploit across bank variation → high pre-exposure to NBFIs
- **Active** LR management

Main takeaway

- ▶ **Main RQ:** How do banks manage liquidity risk in response to a fragile funding shock?
 - ▶ Pandemic QE increased the fragility of banks' UD
 - ▶ Exploit across bank variation → high pre-exposure to NBFIs
- **Active** LR management – describing the whole sequence:
 - ▶ Tilting the composition of their deposit base (↓ UD, ↑ ID)
 - ▶ Increasing their holdings of high quality liquid assets (HQLA)
 - ▶ Adjusting lending behavior: ↓ undrawn credit lines

Main takeaway

- ▶ **Main RQ:** How do banks manage liquidity risk in response to a fragile funding shock?
 - ▶ Pandemic QE increased the fragility of banks' UD
 - ▶ Exploit across bank variation → high pre-exposure to NBFIs
- **Active LR management** – describing the whole sequence:
 - ▶ Tilting the composition of their deposit base (↓ UD, ↑ ID)
 - ▶ Increasing their holdings of high quality liquid assets (HQLA)
 - ▶ Adjusting lending behavior: ↓ undrawn credit lines
- ▶ **Implications**
 - ▶ Real Effects: firms lose liquidity insurance and invest less

Main takeaway

- ▶ **Main RQ:** How do banks manage liquidity risk in response to a fragile funding shock?
 - ▶ Pandemic QE increased the fragility of banks' UD
 - ▶ Exploit across bank variation → high pre-exposure to NBFIs
- **Active LR management** – describing the whole sequence:
 - ▶ Tilting the composition of their deposit base (↓ UD, ↑ ID)
 - ▶ Increasing their holdings of high quality liquid assets (HQLA)
 - ▶ Adjusting lending behavior: ↓ undrawn credit lines
- ▶ **Implications**
 - ▶ Real Effects: firms lose liquidity insurance and invest less
 - ▶ Complementarities: deposits and liquidity (insurance) provision

Main takeaway

- ▶ **Main RQ:** How do banks manage liquidity risk in response to a fragile funding shock?
 - ▶ Pandemic QE increased the fragility of banks' UD
 - ▶ Exploit across bank variation → high pre-exposure to NBFIs
- **Active LR management** – describing the whole sequence:
 - ▶ Tilting the composition of their deposit base (↓ UD, ↑ ID)
 - ▶ Increasing their holdings of high quality liquid assets (HQLA)
 - ▶ Adjusting lending behavior: ↓ undrawn credit lines
- ▶ **Implications**
 - ▶ Real Effects: firms lose liquidity insurance and invest less
 - ▶ Complementarities: deposits and liquidity (insurance) provision
 - ▶ Effectiveness of UMP

Main takeaway

- ▶ **Main RQ:** How do banks manage liquidity risk in response to a fragile funding shock?
 - ▶ Pandemic QE increased the fragility of banks' UD
 - ▶ Exploit across bank variation → high pre-exposure to NBF

→ **Active** LR management – describing the whole sequence:

- ▶ Tilting the composition of their deposit base (↓ UD, ↑ ID)
- ▶ Increasing their holdings of high quality liquid assets (HQLA)
- ▶ Adjusting lending behavior: ↓ undrawn credit lines

▶ Implications

- ▶ Real Effects: firms lose liquidity insurance and invest less
- ▶ Complementarities: deposits and liquidity (insurance) provision
- ▶ Effectiveness of UMP

▶ Takeaways

- ▶ Extensive, clean and thoughtful analysis on a relevant question
- ▶ Now, playing “devil's advocate”

QE, NBFIs and a funding shock for banks

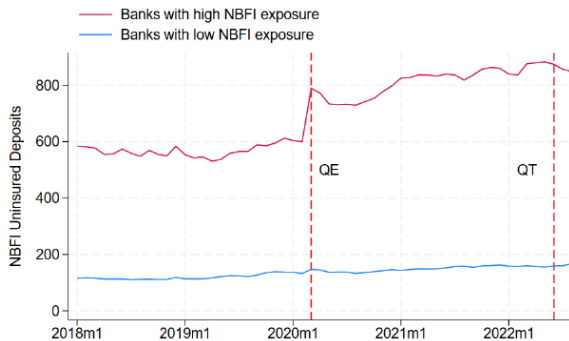
Non-Bank Financial Institutions (NBFI) cannot hold reserves

- ▶ QE is implemented through banks:
 - ▶ NBFI sell securities and own deposits (UD_{NBFI})
 - ▶ Banks hold reserves in exchange

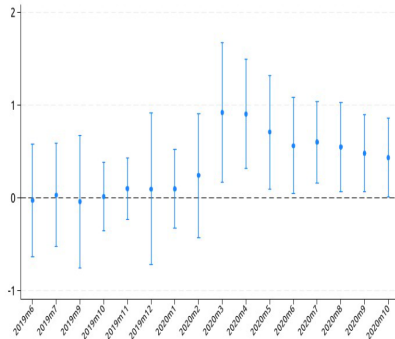
QE, NBFIs and a funding shock for banks

Non-Bank Financial Institutions (NBFI) cannot hold reserves

- ▶ QE is implemented through banks:
 - ▶ NBFI sell securities and own deposits (UD_{NBFI})
 - ▶ Banks hold reserves in exchange

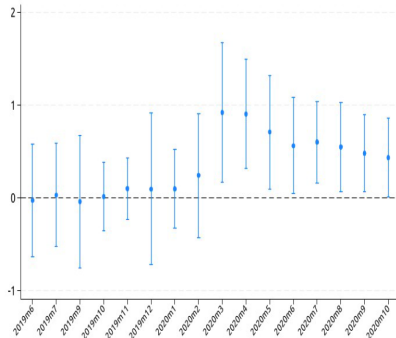


Shock to UD_{NBFI}



Liquidity risk issue since UD_{NBFI} are remarkably “flighty”

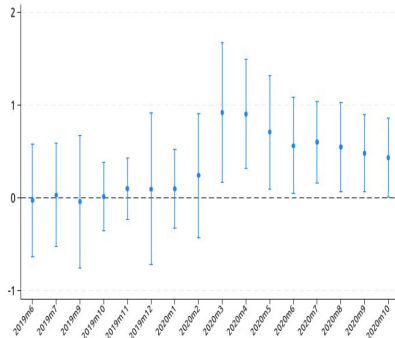
Shock to UD_{NBFI}



Liquidity risk issue since UD_{NBFI} are remarkably “flighty”

- ▶ Holding reserves is not mandatory and cannot hedge 1 to 1
- ▶ Unprofitable to hold (negative interest margin)

Shock to UD_{NBFI}



Liquidity risk issue since UD_{NBFI} are remarkably “flighty”

- ▶ Holding reserves is not mandatory and cannot hedge 1 to 1
- ▶ Unprofitable to hold (negative interest margin)
- ▶ Mechanically reduction of liquidity buffers
 - ▶ Initially: \$110 of safe assets for each \$100 expected outflows:
\$10 increase of UD & reserves $\Rightarrow$ LCR from 10% to 9.1%

Summary of results

Highly NBFI pre-exposed banks actively manage liquidity risk

$$\log(y_{i,t+1}) = \beta QE \times \frac{UD_{NBFI}}{D_{Total}} + \alpha_{bank} + \alpha_{month}$$

Summary of results

Highly NBFI pre-exposed banks actively manage liquidity risk

$$\log(y_{i,t+1}) = \beta QE \times \frac{UD_{NBFI}}{D_{Total}} + \alpha_{bank} + \alpha_{month}$$

1. Strong inflow of NBFI's uninsured deposits (UD_{NBFI})
2. Tiltling BS composition:

Summary of results

Highly NBFI pre-exposed banks actively manage liquidity risk

$$\log(y_{i,t+1}) = \beta QE \times \frac{UD_{NBFI}}{D_{Total}} + \alpha_{bank} + \alpha_{month}$$

1. Strong inflow of NBFI's uninsured deposits (UD_{NBFI})
2. Tilting BS composition:

► **LS:** $\downarrow i^{UD} \Rightarrow \downarrow UD_{ALL/OTHER}$ while also $\uparrow i^{ID} \Rightarrow \uparrow ID$

Summary of results

Highly NBFI pre-exposed banks actively manage liquidity risk

$$\log(y_{i,t+1}) = \beta QE \times \frac{UD_{NBFI}}{D_{Total}} + \alpha_{bank} + \alpha_{month}$$

1. Strong inflow of NBFI's uninsured deposits (UD_{NBFI})
2. Tiltling BS composition:
 - ▶ **LS:** $\downarrow i^{UD} \Rightarrow \downarrow UD_{ALL/OTHER}$ while also $\uparrow i^{ID} \Rightarrow \uparrow ID$
 - ▶ **AS - Securities:** Exchange of FED Reserves for other HQLA (Treasures and Agencies)

Summary of results

Highly NBFI pre-exposed banks actively manage liquidity risk

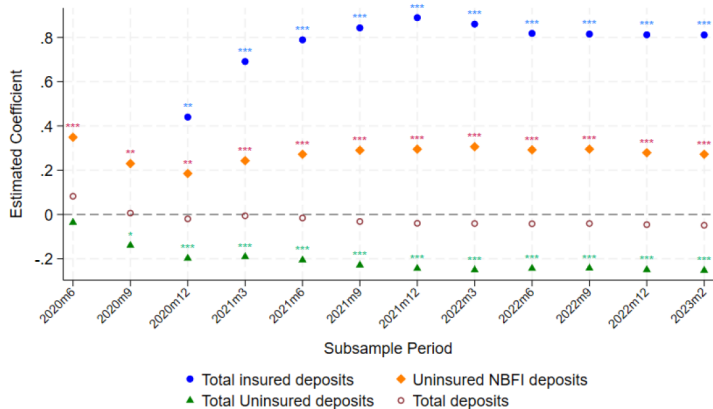
$$\log(y_{i,t+1}) = \beta QE \times \frac{UD_{NBFI}}{D_{Total}} + \alpha_{bank} + \alpha_{month}$$

1. Strong inflow of NBFI's uninsured deposits (UD_{NBFI})
2. Tiltling BS composition:

- ▶ **LS:** $\downarrow i^{UD} \Rightarrow \downarrow UD_{ALL/OTHER}$ while also $\uparrow i^{ID} \Rightarrow \uparrow ID$
 - ▶ **AS - Securities:** Exchange of FED Reserves for other HQLA (Treasuries and Agencies)
 - ▶ **AS - Loans:** Gradual reduction in undrawn CL
 - ▶ no difference for TL and utilized CL
- $\Rightarrow$ Stable Liquidity Ratios

Deposits volume, by type (rolling window)

NBFI pre-exposed banks respond quickly adjusting interest rates



Deposits – Comments

1. Persistence of UD_{NBFI} after $\downarrow i^{UD}$
 - ▶ I would have expected some convergence between UD types

Deposits – Comments

1. Persistence of UD_{NBFI} after $\downarrow i^{UD}$
 - ▶ I would have expected some convergence between UD types
 - ▶ What's so unique about NBFIs that leads to segmentation?

Deposits – Comments

1. Persistence of UD_{NBFI} after $\downarrow i^{UD}$

- ▶ I would have expected some convergence between UD types
- ▶ What's so unique about NBFIs that leads to segmentation?
- ▶ Suggestion: exploit rich counter-party heterogeneity

Deposits – Comments

1. Persistence of UD_{NBFI} after $\downarrow i^{UD}$
 - ▶ I would have expected some convergence between UD types
 - ▶ What's so unique about NBFIs that leads to segmentation?
 - ▶ Suggestion: exploit rich counter-party heterogeneity
2. Total UD more than compensates NBFI
 - ▶ In which case, NBFI must be a very “flighty” source

Deposits – Comments

1. Persistence of UD_{NBFI} after $\downarrow i^{UD}$
 - ▶ I would have expected some convergence between UD types
 - ▶ What's so unique about NBFIs that leads to segmentation?
 - ▶ Suggestion: exploit rich counter-party heterogeneity
2. Total UD more than compensates NBFI
 - ▶ In which case, NBFI must be a very “flighty” source
 - ▶ But way less sensitive to interest rates than UD_{OTHER}

Deposits – Comments

1. Persistence of UD_{NBFI} after $\downarrow i^{UD}$
 - ▶ I would have expected some convergence between UD types
 - ▶ What's so unique about NBFIs that leads to segmentation?
 - ▶ Suggestion: exploit rich counter-party heterogeneity
2. Total UD more than compensates NBFI
 - ▶ In which case, NBFI must be a very “flighty” source
 - ▶ But way less sensitive to interest rates than UD_{OTHER}
 - ▶ So what does “flighty” really mean? (Retail vs Hedge-fund)

Deposits – Comments

1. Persistence of UD_{NBFI} after $\downarrow i^{UD}$
 - ▶ I would have expected some convergence between UD types
 - ▶ What's so unique about NBFIs that leads to segmentation?
 - ▶ Suggestion: exploit rich counter-party heterogeneity
2. Total UD more than compensates NBFI
 - ▶ In which case, NBFI must be a very “flighty” source
 - ▶ But way less sensitive to interest rates than UD_{OTHER}
 - ▶ So what does “flighty” really mean? (Retail vs Hedge-fund)
3. Intrinsic difference between low and high pre-exposed banks?
 - ▶ Liquidity management ability allowing to hold more UD_{NBFI}

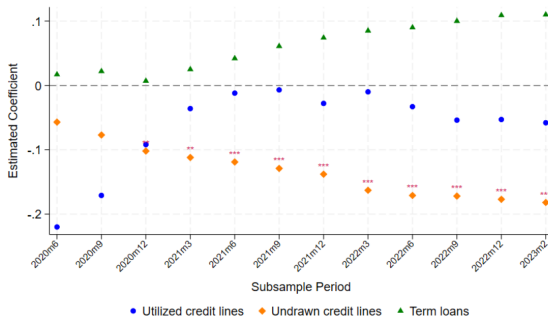
Deposits – Comments

1. Persistence of UD_{NBFI} after $\downarrow i^{UD}$
 - ▶ I would have expected some convergence between UD types
 - ▶ What's so unique about NBFIs that leads to segmentation?
 - ▶ Suggestion: exploit rich counter-party heterogeneity
2. Total UD more than compensates NBFI
 - ▶ In which case, NBFI must be a very “flighty” source
 - ▶ But way less sensitive to interest rates than UD_{OTHER}
 - ▶ So what does “flighty” really mean? (Retail vs Hedge-fund)
3. Intrinsic difference between low and high pre-exposed banks?
 - ▶ Liquidity management ability allowing to hold more UD_{NBFI}
 - ▶ Matching (Schwert, 2018); Diversification (Doerr, 2024)

Deposits – Comments

1. Persistence of UD_{NBFI} after $\downarrow i^{UD}$
 - ▶ I would have expected some convergence between UD types
 - ▶ What's so unique about NBFIs that leads to segmentation?
 - ▶ Suggestion: exploit rich counter-party heterogeneity
2. Total UD more than compensates NBFI
 - ▶ In which case, NBFI must be a very “flighty” source
 - ▶ But way less sensitive to interest rates than UD_{OTHER}
 - ▶ So what does “flighty” really mean? (Retail vs Hedge-fund)
3. Intrinsic difference between low and high pre-exposed banks?
 - ▶ Liquidity management ability allowing to hold more UD_{NBFI}
 - ▶ Matching (Schwert, 2018); Diversification (Doerr, 2024)
 - ▶ Policy implication: would have non-exposed banks responded so effectively if they had experienced an equivalent shock?
 - ▶ Easy check: are results driven by large shares? or banks with smaller shares rebalance their BS proportionally?

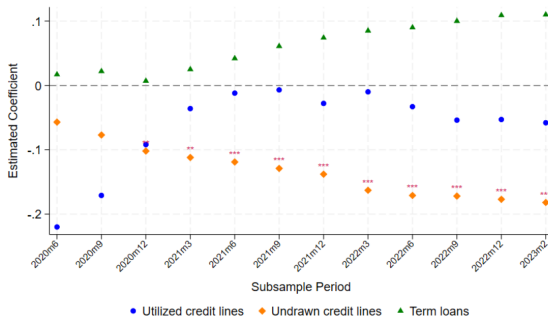
Asset Side: Lending behavior



“Curtailling (UCL) allows banks to reduce liquidity mismatch”

- Less undrawn credit lines (but steady utilized credit lines)

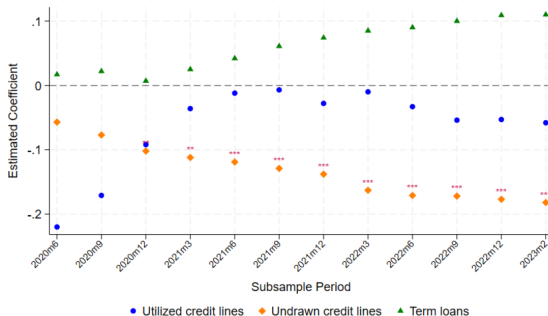
Asset Side: Lending behavior



“Curtailling (UCL) allows banks to reduce liquidity mismatch”

- ▶ Less undrawn credit lines (but steady utilized credit lines)
- ▶ The credit line is the same, borrower decides how much to use

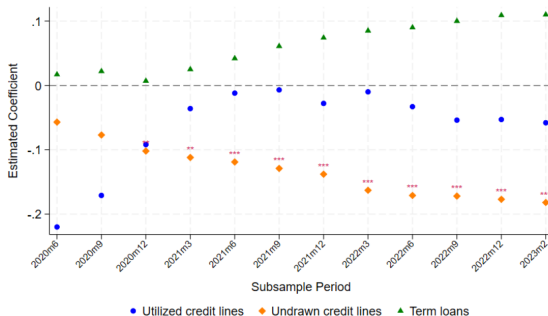
Asset Side: Lending behavior



“Curtailling (UCL) allows banks to reduce liquidity mismatch”

- ▶ Less undrawn credit lines (but steady utilized credit lines)
- ▶ The credit line is the same, borrower decides how much to use
- ▶ How can the bank influence this decision?
 - ▶ Curtail new originations? raise/lower commitment/draw fees?
 - ▶ no $\neq$ in interest rates, nor new origination

Asset Side: Lending behavior



“Curtailling (UCL) allows banks to reduce liquidity mismatch”

- ▶ Less undrawn credit lines (but steady utilized credit lines)
- ▶ The credit line is the same, borrower decides how much to use
- ▶ How can the bank influence this decision?
 - ▶ Curtail new originations? raise/lower commitment/draw fees?
 - ▶ no $\neq$ in interest rates, nor new origination $\Rightarrow$ What's going on?

Asset Side: Securities

Table 8: Liquidity Buffers and High-Quality Liquid Assets

	1	2	3	4	5	6	7	8
Dependent variable:	Log (Reserves)		Log (OMO)		Log (HQLA)		Liquidity buffer ratio	
QE*Shares	-1.178*** (-8.826)		0.073* (1.909)		-0.354*** (-6.966)		0.075 (1.19)	
March 2020*Shares	0.702*** (7.979)		-0.055 (-1.525)		0.249*** (8.214)		0.203*** (3.382)	
QE ex March 2020*Shares	-1.258*** (-11.185)		0.078** (2.057)		-0.379*** (-8.276)		0.07 (1.099)	

Asset Side: Securities

Table 8: Liquidity Buffers and High-Quality Liquid Assets

	1	2	3	4	5	6	7	8
Dependent variable:	Log (Reserves)		Log (OMO)		Log (HQLA)		Liquidity buffer ratio	
QE*Shares	-1.178*** (-8.826)		0.073* (1.909)		-0.354*** (-6.966)		0.075 (1.19)	
March 2020*Shares	0.702*** (7.979)		-0.055 (-1.525)		0.249*** (8.214)		0.203*** (3.382)	
QE ex March 2020*Shares	-1.258*** (-11.185)		0.078** (2.057)		-0.379*** (-8.276)		0.07 (1.099)	

'Las negras tambien juegan': UMP's bank lending channel
→ bank's incentives and asset choice (Chakraborty et al., 2020)

Asset Side: Securities

Table 8: Liquidity Buffers and High-Quality Liquid Assets

	1	2	3	4	5	6	7	8
Dependent variable:	Log (Reserves)		Log (OMO)		Log (HQLA)		Liquidity buffer ratio	
QE*Shares	-1.178*** (-8.826)		0.073* (1.909)		-0.354*** (-6.966)		0.075 (1.19)	
March 2020*Shares	0.702*** (7.979)		-0.055 (-1.525)		0.249*** (8.214)		0.203*** (3.382)	
QE ex March 2020*Shares	-1.258*** (-11.185)		0.078** (2.057)		-0.379*** (-8.276)		0.07 (1.099)	

‘Las negras tambien juegan’: UMP’s bank lending channel

→ bank’s incentives and asset choice (Chakraborty et al., 2020)

► Capital gain (Treasuries): FED Purchase → CA appreciation

Asset Side: Securities

Table 8: Liquidity Buffers and High-Quality Liquid Assets

	1	2	3	4	5	6	7	8
Dependent variable:	Log (Reserves)		Log (OMO)		Log (HQLA)		Liquidity buffer ratio	
QE*Shares	-1.178*** (-8.826)		0.073* (1.909)		-0.354*** (-6.966)		0.075 (1.19)	
March 2020*Shares	0.702*** (7.979)		-0.055 (-1.525)		0.249*** (8.214)		0.203*** (3.382)	
QE ex March 2020*Shares	-1.258*** (-11.185)		0.078** (2.057)		-0.379*** (-8.276)		0.07 (1.099)	

'Las negras tambien juegan': UMP's bank lending channel

→ bank's incentives and asset choice (Chakraborty et al., 2020)

- ▶ Capital gain (Treasuries): FED Purchase → CA appreciation
- ▶ Origination (MBS): asset type eligible for FED purchase
 - ▶ Internal capital market frictions → C&I decline

Asset Side: Securities

Table 8: Liquidity Buffers and High-Quality Liquid Assets

	1	2	3	4	5	6	7	8
Dependent variable:	Log (Reserves)		Log (OMO)		Log (HQLA)		Liquidity buffer ratio	
QE*Shares	-1.178*** (-8.826)		0.073* (1.909)		-0.354*** (-6.966)		0.075 (1.19)	
March 2020*Shares	0.702*** (7.979)		-0.055 (-1.525)		0.249*** (8.214)		0.203*** (3.382)	
QE ex March 2020*Shares	-1.258*** (-11.185)		0.078** (2.057)		-0.379*** (-8.276)		0.07 (1.099)	

'Las negras tambien juegan': UMP's bank lending channel

→ bank's incentives and asset choice (Chakraborty et al., 2020)

- ▶ Capital gain (Treasuries): FED Purchase → CA appreciation
- ▶ Origination (MBS): asset type eligible for FED purchase
 - ▶ Internal capital market frictions → C&I decline
- ▶ Authors bundle treasuries and agencies ('Asset Swap')
 - ▶ Intertwined predictions that cancel each other if tested in cluster

Asset Side: Securities

Table 8: Liquidity Buffers and High-Quality Liquid Assets

	1	2	3	4	5	6	7	8
Dependent variable:	Log (Reserves)		Log (OMO)		Log (HQLA)		Liquidity buffer ratio	
QE*Shares	-1.178*** (-8.826)		0.073* (1.909)		-0.354*** (-6.966)		0.075 (1.19)	
March 2020*Shares	0.702*** (7.979)		-0.055 (-1.525)		0.249*** (8.214)		0.203*** (3.382)	
QE ex March 2020*Shares	-1.258*** (-11.185)		0.078** (2.057)		-0.379*** (-8.276)		0.07 (1.099)	

'Las negras tambien juegan': UMP's bank lending channel

→ bank's incentives and asset choice (Chakraborty et al., 2020)

- ▶ Capital gain (Treasuries): FED Purchase → CA appreciation
- ▶ Origination (MBS): asset type eligible for FED purchase
 - ▶ Internal capital market frictions → C&I decline
- ▶ Authors bundle treasuries and agencies ('Asset Swap')
 - ▶ Interwined predictions that cancel each other if tested in cluster
 - ▶ May be driving BS tilting: **from** Asset **to** Liability side

Asset Side: Securities

Table 8: Liquidity Buffers and High-Quality Liquid Assets

	1	2	3	4	5	6	7	8
Dependent variable:	Log (Reserves)		Log (OMO)		Log (HQLA)		Liquidity buffer ratio	
QE*Shares	-1.178*** (-8.826)		0.073* (1.909)		-0.354*** (-6.966)		0.075 (1.19)	
March 2020*Shares	0.702*** (7.979)		-0.055 (-1.525)		0.249*** (8.214)		0.203*** (3.382)	
QE ex March 2020*Shares	-1.258*** (-11.185)		0.078** (2.057)		-0.379*** (-8.276)		0.07 (1.099)	

'Las negras tambien juegan': UMP's bank lending channel

→ bank's incentives and asset choice (Chakraborty et al., 2020)

- ▶ Capital gain (Treasuries): FED Purchase → CA appreciation
- ▶ Origination (MBS): asset type eligible for FED purchase
 - ▶ Internal capital market frictions → C&I decline
- ▶ Authors bundle treasuries and agencies ('Asset Swap')
 - ▶ Interwined predictions that cancel each other if tested in cluster
 - ▶ May be driving BS tilting: **from** Asset **to** Liability side
- ▶ Easy to test if pre-holdings of Treasuries vs. MBS moderate or expand results on UD_{NBFI} pre-exposure

Firm Level Implications

	1	2	3	4	5	6
Dependent variable:	Log(Utilized credit lines)	Log(Undrawn credit lines)	Log(Term loans)	Log(Total commitments)	Log(Other borrowing)	Investment
QE *Bank-firm relationship shares	-0.014 (-0.515)	-0.071*** (-2.926)	0.001 (0.072)	-0.014* (-1.800)	-0.006 (-0.226)	-0.354*** (-4.130)
QT *Bank-firm relationship shares	-0.105** (-2.729)	-0.095*** (-3.507)	0.036 (1.428)	-0.029** (-2.301)	-0.080** (-2.710)	-0.454*** (-3.573)
Observations	223,976	256,001	122,718	497,200	264,437	43,199
R-squared	0.820	0.798	0.929	0.951	0.914	0.817

Confirm borrowing patterns, with weak funding substitution

Firm Level Implications

	1	2	3	4	5	6
Dependent variable:	Log(Utilized credit lines)	Log(Undrawn credit lines)	Log(Term loans)	Log(Total commitments)	Log(Other borrowing)	Investment
QE *Bank-firm relationship shares	-0.014 (-0.515)	-0.071*** (-2.926)	0.001 (0.072)	-0.014* (-1.800)	-0.006 (-0.226)	-0.354*** (-4.130)
QT *Bank-firm relationship shares	-0.105** (-2.729)	-0.095*** (-3.507)	0.036 (1.428)	-0.029** (-2.301)	-0.080** (-2.710)	-0.454*** (-3.573)
Observations	223,976	256,001	122,718	497,200	264,437	43,199
R-squared	0.820	0.798	0.929	0.951	0.914	0.817

Confirm borrowing patterns, with weak funding substitution

- ▶ Investment result is reassuring (LT). Would be nice to see some more direct effect on cash holdings and payout policy

Firm Level Implications

	1	2	3	4	5	6
Dependent variable:	Log(Utilized credit lines)	Log(Undrawn credit lines)	Log(Term loans)	Log(Total commitments)	Log(Other borrowing)	Investment
QE *Bank-firm relationship shares	-0.014 (-0.515)	-0.071*** (-2.926)	0.001 (0.072)	-0.014* (-1.800)	-0.006 (-0.226)	-0.354*** (-4.130)
QT *Bank-firm relationship shares	-0.105** (-2.729)	-0.095** (-3.507)	0.036 (1.428)	-0.029** (-2.301)	-0.080** (-2.710)	-0.454*** (-3.573)
Observations	223,976	256,001	122,718	497,200	264,437	43,199
R-squared	0.820	0.798	0.929	0.951	0.914	0.817

Confirm borrowing patterns, with weak funding substitution

- ▶ Investment result is reassuring (LT). Would be nice to see some more direct effect on cash holdings and payout policy
- ▶ Result on QT and credit line raises two questions:
 1. Back to the concern about how do banks effectively reduce their off-BS exposure to undrawn CL

Firm Level Implications

	1	2	3	4	5	6
Dependent variable:	Log(Utilized credit lines)	Log(Undrawn credit lines)	Log(Term loans)	Log(Total commitments)	Log(Other borrowing)	Investment
QE *Bank-firm relationship shares	-0.014 (-0.515)	-0.071*** (-2.926)	0.001 (0.072)	-0.014* (-1.800)	-0.006 (-0.226)	-0.354*** (-4.130)
QT *Bank-firm relationship shares	-0.105** (-2.729)	-0.095** (-3.507)	0.036 (1.428)	-0.029** (-2.301)	-0.080** (-2.710)	-0.454*** (-3.573)
Observations	223,976	256,001	122,718	497,200	264,437	43,199
R-squared	0.820	0.798	0.929	0.951	0.914	0.817

Confirm borrowing patterns, with weak funding substitution

- ▶ Investment result is reassuring (LT). Would be nice to see some more direct effect on cash holdings and payout policy
- ▶ Result on QT and credit line raises two questions:
 1. Back to the concern about how do banks effectively reduce their off-BS exposure to undrawn CL
 2. Whats the interpretation of QT: new shock or lagged effect from QE shock? absent through-out the paper

Conclusions

- ▶ Very interesting paper, I enjoyed reading it!
- ▶ Important research question and interesting empirics
- ▶ Unconventional shock to answer a core question
 - ▶ Complementarities between deposits and liquidity provision
 - ▶ Effectiveness of UMP
 - ▶ Insightful in both ways

Minor Comments

1. Low hanging fruits – bank-month level specifications:
 - ▶ Clustering SE by bank and month
 - ▶ Bank level controls for ROE, Leverage and Liquidity (Cash over deposits)
2. Typos: p13, p29

References

- I. Chakraborty, I. Goldstein, and A. MacKinlay. Monetary stimulus and bank lending. *Journal of Financial Economics*, 136(1):189–218, 2020.
- M. Di Maggio, A. Kermani, and C. J. Palmer. How quantitative easing works: Evidence on the refinancing channel. *The Review of Economic Studies*, 87(3):1498–1528, 2020.
- S. Doerr. Bank geographic diversification and funding stability. *Available at SSRN 4788627*, 2024.
- A. Rodnyansky and O. M. Darmouni. The effects of quantitative easing on bank lending behavior. *The Review of Financial Studies*, 30(11):3858–3887, 2017.
- M. Schwert. Bank capital and lending relationships. *The Journal of Finance*, 73(2):787–830, 2018.