DISCUSSION MONETARY TRANSMISSION THROUGH BANK SECURITIES PORTFOLIOS

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¹The views expressed here do not necessarily reflect those of the FRB Philadelphia or The Federal Reserve System.

Summary / Overview

Paper studies the transmission of monetary policy through bank securities portfolios in the US

Authors present a structural model to analyze the role of the AOCI filter during a monetary tightening cycle

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- Paper studies the transmission of monetary policy through bank securities portfolios in the US
 - How does the capital treatment of AOCI for AFS securities affects this mechanism?

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Paper studies the transmission of monetary policy through bank securities portfolios in the US

- How does the capital treatment of AOCI for AFS securities affects this mechanism?
- Firm-Bank level regressions (identified as in Khawa and Mian) show that a decline in the value of AFS securities has a negative impact on the supply of credit
- Firm level regressions show that changes in the value of AFS spills over to total debt and investment
- Authors present a structural model to analyze the role of the AOCI filter during a monetary tightening cycle

Overview Comments

Very interesting paper, timely, policy relevant



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- Incredible data work, main result robust (long appendix!),
 - Suggest expanding on the connection to bank lending channel literature



Overview Comments

Very interesting paper, timely, policy relevant

- Incredible data work, main result robust (long appendix!),
 - Suggest expanding on the connection to bank lending channel literature
- Rich structural model consistent with decline in loan supply when AOCI affects regulatory capital
- Empirical analysis and model somewhat disconnected, the rich model misses on some policy relevant trade-offs at the bank level

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Key Empirical Facts and Main Result

- Banks increase their securities holdings during 2020-2021, more so non-AOCI (NC) banks
 - Like Kashyap-Stein (1995, 2000) banks reduce securities holdings when monetary policy tightens, AC banks increase the fraction of "hedged" AFS securities



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- AOCI (AC) banks hold a larger share of securities as Hold-to-Maturity (HTM) than NC banks and increased this share during 2020-2021
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- Bank-Firm Regressions (Khwaja-Mian identification)

$$\Delta L_{i,j,t} = \underbrace{\alpha_{it}}_{\text{Firm-Time FE}} + \beta \frac{\Delta Value_{jt}^{AFS}}{Assets_{jt}} + \tau_{AC_{jt}} + \gamma X_{jt} + \kappa_j + u_{ijt}$$

Key Result: Banks that experienced larger value losses on their AFS portfolios extended relatively less credit β > 0: \$1 decline leads to a contraction in credit of 20 cents

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Robustness and Firm Level Results

- Effect appears stronger for AC banks (larger banks)
- Baseline results driven by unhedged AFS securities
- Other extensions show that the response of low-capitalized banks is stronger and that other bank controls do not affect the results
- Firm Level Regressions (Total Debt & Investment)

$$\Delta^{y} y_{i,t} = \underbrace{\alpha_{i}}_{\text{Firm FE}} + \beta \Delta \widetilde{Value}_{it}^{AFS} + \gamma X_{it} + \kappa_{j} + u_{it}$$

Key Result: Changes in the value of AFS securities in the bank-network of the firm results in a decline in total debt and investment (significant only for small firms)

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 - How to reconcile the new evidence with their results?
 - What is the right measure of liquidity? HTM vs AFS
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- Bank-firm regressions identified using K-M approach, require firms with more than one banking relationship (in sample)
 - In 2022:Q4, 91.48% of firms (TIN #) have positive total loans (Committed Exposure) and only one bank relationship
 - Median assets for firms that
 - operate with 1 bank are 1.69e+07
 - operate with more than 1 bank are 8.06e+08
 - Effect appears stronger for small firms when using multi-bank firms but when using all firms β appears to decline

Multi-bank firms vs single-bank firms

	∆ Total Debt		Investment	
	(1)	(11)	(m)	(1V)
Δ Value AFS	6.17**		5.31**	
	(3.09)		(2.67)	
Δ Value AFS $ imes$ Small		6.27**		5.36**
		(3.10)		(2.67)
Δ Value AFS \times Large		-11.37		-4.32
Ŭ		(13.12)		(9.31)
Fixed Effects				
Firm	✓	×	✓	✓
Time	~	~	~	✓
Firm Controls	~	✓	✓	✓

Table 8.1: Firm Level Effects.

Table G.2: Omitting Firm-Time Fixed Effects.

	(i)	(ii)	(iii)	(iv)
Δ Value AFS	4.58** (1.91)	6.09** (2.31)	3.47** (1.51)	5.45** (2.32)
Δ Value HTM			-4.59** (2.05)	-3.15 (2.04)
Fixed Effects Location \times Size \times Time	~		~	
Location × Size × Time × Industry Bank & AC × Time	~	~	~	~

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Some Initial Comments on Empirical Results (cont.)

- Results show a positive response by NC banks (in some cases): what is the mechanism in this case?
- Sample used 2021:Q1 to 2023:Q1: What is the data capturing during 2021?
 - fig Monetary cycle
 - Baseline effect robust to using data since 2016:Q4 2023:Q1: What is the mechanism here? Unrealized gains/losses seem to be a lot smaller than during the recent period
 - Also splitting sample into + and effects show that effects matter f(Table G7)

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Evolution of Key Rates



Monetary policy cycle starts in March 2022, inflation earlier

▶ return

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Evolution AOCI and Unrealized Gains/Losses



Figure F.2: AOCI and Unrealized Gains/Losses AFS.

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Model (Brief Summary)

Small (constrained) firms borrow using term loans, large (unconstrained) firms borrow using credit lines and bonds to finance investment. Both types of firms derive utility from holding cash



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Model (Brief Summary)

- Small (constrained) firms borrow using term loans, large (unconstrained) firms borrow using credit lines and bonds to finance investment. Both types of firms derive utility from holding cash
- Risk-neutral saver that owns the representative bank with time-varying discount factor (shock to real interest rates)
- The representative bank provides loans to both types of firms (fixed credit line limit *L*) and holds (a constant value of) long term securities that are revalued when interest rates change
- They face a (r-w) capital requirement (binding in eq.)

$$k_t + \mathcal{I}_{\{AC\}} \underbrace{(P_t - \overline{P}) \times b^{LT}}_{=AOCI_t} \ge \chi^B (B^{loan}_{C,t} + B^{line}_{U,t}) + \chi^L (\overline{L} - B^{line}_{U,t})$$

with $\mathcal{I}_{\{AC\}} \in \{0,1\}$ denotes the policy regime

If I_{AC} = 1 and AOCI_t < 0, the bank needs to recapitalize by reducing the credit supply to constrained firms (B^{loan}_{C,t}) _____

Model Experiment / Results

▶ Model calibrated to match $\frac{\Delta Total Debt}{\Delta Value AFS}$ in "Mark to Market" scenario



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- Model calibrated to match $\frac{\Delta \text{Total Debt}}{\Delta \text{Value AFS}}$ in "Mark to Market" scenario
- Main Experiment: Study the impact of a rise in inflation, real interest rates, and a decline in investment (ε_π, ε_β, and ε_λ) under two policy scenarios
 - 1. $\mathcal{I}_{\{AC\}} = 1$ Rep. bank is an AC bank ("Mark-to-Market")
 - 2. $\mathcal{I}_{\{AC\}} = 0$ Rep. bank is a NC bank ("Book Value")

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Model Experiment / Results

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 - 1. $\mathcal{I}_{\{AC\}} = 1$ Rep. bank is an AC bank ("Mark-to-Market")
 - 2. $\mathcal{I}_{\{AC\}} = 0$ Rep. bank is a NC bank ("Book Value")
- Quantitative results
 - A rise in real rates decreases the value of long-term government bonds: in the AC bank economy this reduces regulatory bank capital
 - If capital falls below regulatory minimum, bank reduces lending in order to satisfy capital requirements
 - Loan supply is lower when $\mathcal{I}_{\{AC\}} = 1$ than when $\mathcal{I}_{\{AC\}} = 0$

Comment: Link between Model and Data

- 1. Rich model of corporate borrowing (term loans/credit lines) but it captures the relationship between the change in the value of securities and the loan supply in a somewhat mechanical way
 - Model is calibrated so the capital constraint is binding, a negative value of AOCI_t requires the bank to reduce lending (the only margin of adjustment)
 - Calibration targets the response of bank loans in the "Mark to Market" economy, so evaluation depends on what gives when introducing book value accounting

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Link Between Model and Data I

- **b** Banks cannot adjust their security portfolio (b^{LT} is constant)
 - Evidence shows that there was a decline in securities since 2022 (more so for NC banks)



In the model, the ratio of securities to assets increases for the AC bank ("Mark to Market" case) and declines for the NC bank ("book value" case) but its loan supply increases

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Link Between Model and Data II

- Bank does not have the option to allocate securities as AFS or HTM
 - In the data, fraction of HTM securities is significant
 - AC banks increased their share of HTM since 2020 (since 2022 for all banks)
 - Fuster and Vickery (2018) and Kim, Kim, and Ryan (2023) provide evidence consistent with changes in this share as a reaction to policy changes



Important trade-off missing: HTM sec reduce capital risk (volatility) but increases liquidity risk during periods of stress (or high credit risk)

Link Between Model and Data III

- The rep. bank cannot adjust the size of the credit line (\overline{L} is constant)
 - Results are robust when using a sample that includes credit lines (committed or used?)

	(i)	(ii)	(iii)	(iv)
Δ Value AFS	6.68***	7.63***	6.68***	7.63***
	(1.97)	(2.30)	(1.98)	(2.29)
∆ Value HTM			0.36	0.29
			(0.95)	(1.00)
Fixed Effects				
$Firm \times Time$	~		~	
Firm \times Time \times Purpose		~		~
Bank & AC × Time	~	~	~	~
Bank Controls	~	~	~	~
R-squared	0.62	0.62	0.62	0.62
Observations	35,884	29,988	35,884	29,988
Number of Firms	2,718	2,359	2,718	2,359
Number of Banks	28	28	28	28

Table G.4: Credit Lines.

- Is the estimated effect robust because term loans reaction is "strong enough" or because credit lines react similarly?
- Interesting to evaluate credit lines separately

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Bridging the Gap Between Model and Data

- $1. \ \mbox{Moving the data closer to the model}$
 - More about Term loans vs Credit Lines
 - Focus a lot more on capital channel: key mechanism in the model
 - Gradual implementation of AOCI (from 2014 to 2018): what do we make of the early period?
- 2. Moving the model closer to data
 - Calibrate to an economy where a fraction of securities is held as HTM or b^{LT} corresponds only to AFS (unhedged)
 - Are all the current features of the model necessary for the main question/experiment?
 - Would incorporating some of the features I discussed matter? Discussing them in more detail will be useful

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Great Paper!

Really enjoyed reading the paper

Very interesting and relevant



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Evolution of Securities



Figure 5.3: Evolution of Securities Portfolio.

Notes: Data from FR Y-14Q Schedules B.1 and B.2. The graph shows the evolution of the securities portfolio by bank type (AC versus NC banks). The left panel depicts securities as a percentage of total assets. The middle panel shows HTM holdings as a percentage of total securities. The right panel shows the share of AFS securities that are hedged. Vertical dashed lines indicate 2019:Q4 and 2021:Q4.

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Table Firm-Banks: AC Banks

	(i)	(ii)	(iii)	(iv)
Δ Value AFS	4.83**	5.65**	-2.08	-2.53
	(2.14)	(2.37)	(4.81)	(4.92)
Δ Value AFS \times AC	7.55**	9.26***	12.95*	15.18**
	(3.50)	(3.14)	(6.94)	(6.39)
Fixed Effects				
$Firm \times Time$	\checkmark		\checkmark	
Firm \times Time \times Purpose		\checkmark		\checkmark
Bank	\checkmark	\checkmark	\checkmark	\checkmark
Bank Controls	\checkmark	~	\checkmark	\checkmark
Bank Controls $\times \Delta$ Value AFS			\checkmark	~
R-squared	0.57	0.55	0.57	0.55
Observations	13,038	11,093	13,038	11,093
Number of Firms	1,289	1,105	1,289	1,105
Number of Banks	27	26	27	26

Table 7.1: AC Banks.

Model: Main Experiments



Note: Blue line is Book Value Economy, Red line is Mark-to-Market economy

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