

Where Do Banks End and NBFIs Begin?

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* The views expressed in this paper are those of the authors and do not necessarily represent those of the Federal Reserve Bank of New York, the Federal Reserve System, or any of their staff.

1. Introduction

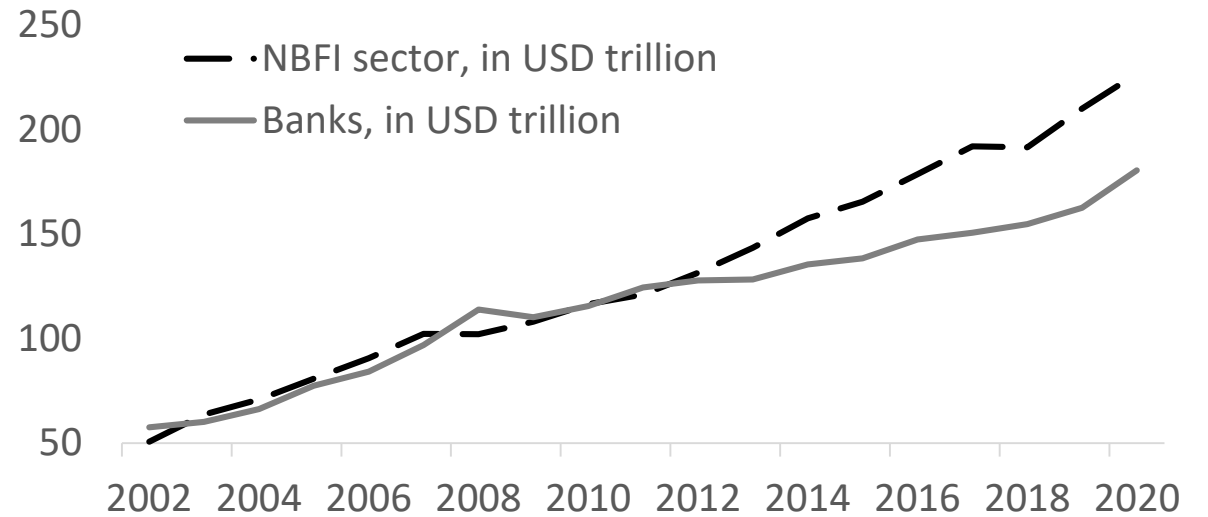
- Non-bank financial intermediaries (NBFIs)
 - Lightly regulated
 - Sizable part of the financial sector
 - Often, even if not always, viewed as separate from banks
- “Goodhart’s Law” for Regulatory Perimeter of the Financial Sector:

As the banking perimeter is used for “control” (regulatory) purposes, but activity around the perimeter can be “manipulated” (via regulatory arbitrage) by banks and non-bank financial intermediaries, does the regulatory perimeter inexorably cease to be useful for control purposes?

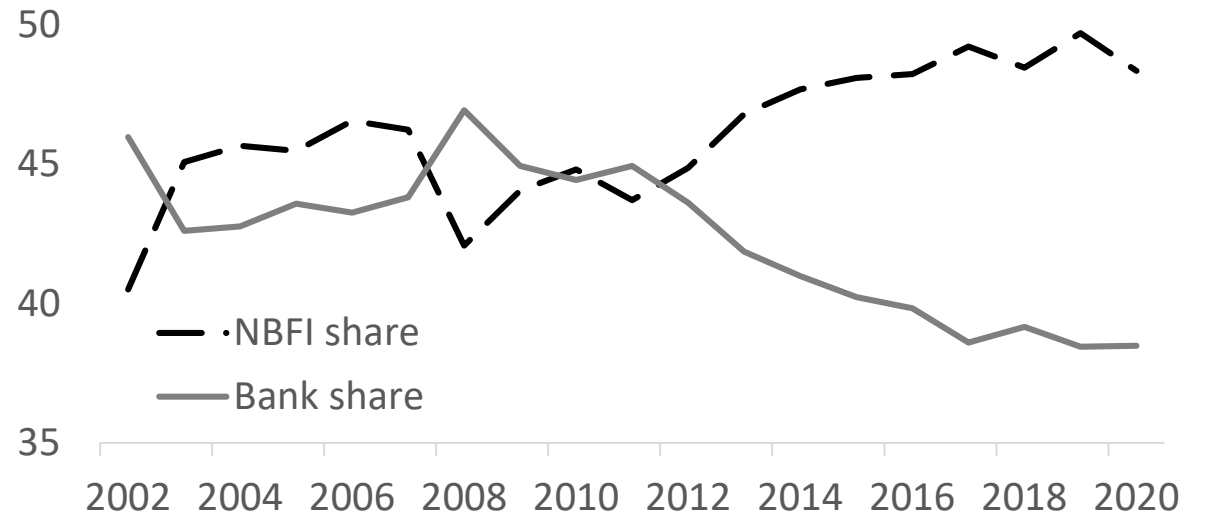
NBFIs up, banks down

- Since GFC, NBFIs have experienced steady growth ...
- ... while banks' share of financial assets has been declining
- Seemingly NBFIs *substituting* banks and dominating as financial intermediaries
- Example: Post-GFC impact of living wills on banks
 - Cetorelli and Prazad (2023)

Global assets of NBFIs and Bank sectors



NBFIs vs. Bank shares (%)



But...

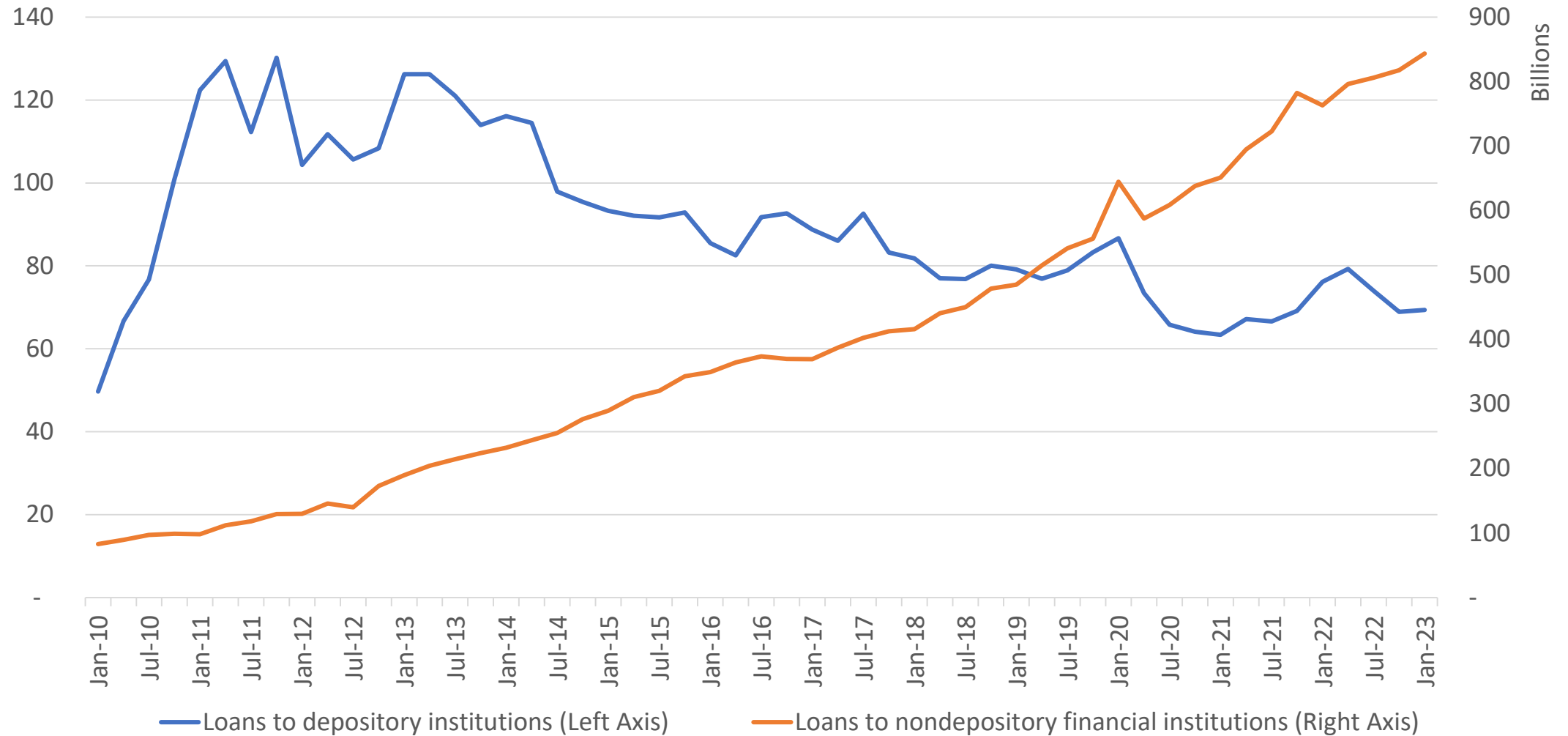
- Banks and NBFIs are in practice intimately and intricately inter-twined
 - Origin of NBFIs – more often than not – catalyzed by banking sector regulation
 - Banks maintain funding advantages and retain risks
 - Explicit funding of origination activities of NBFIs with risk-retention by banks
 - Liquidity insurance of the (aggregate) risk of NBFIs by banks
 - Complex interflow of risks between banks and NBFIs
 - “Dash for cash” in March 2020 on bank credit lines (e.g., Kashyap, 2020)

The Transformation of Risks in the Banking System

Risk	Direct Risks of the Banking System	Indirect Risks of the Banking System
<p>Credit risk moves off bank balance sheets to return in different forms. Fire-sale risks from correlated holdings.</p>	<ul style="list-style-type: none"> • Corporate loans • Mortgage loans 	<ul style="list-style-type: none"> • Holdings of MBS, CLO tranches • Loans to private credit companies • Loans to mortgage REITs
<p>Funding needs move from banks to nonbanks.</p>	<ul style="list-style-type: none"> • Mortgage/other ABS origination • LBO financing • Mortgage servicing obligations 	<ul style="list-style-type: none"> • Warehouse credit lines to nonbank originators • Loans to private equity companies • Bank-sponsored CP or direct lending to nonbank mortgage servicers
<p>Counterparty risk is transformed into nonbank funding needs.</p>	<ul style="list-style-type: none"> • Uncleared derivatives with end users 	<ul style="list-style-type: none"> • Loans and credit lines to nonbanks to fund initial margin and variation margin calls on cleared derivatives

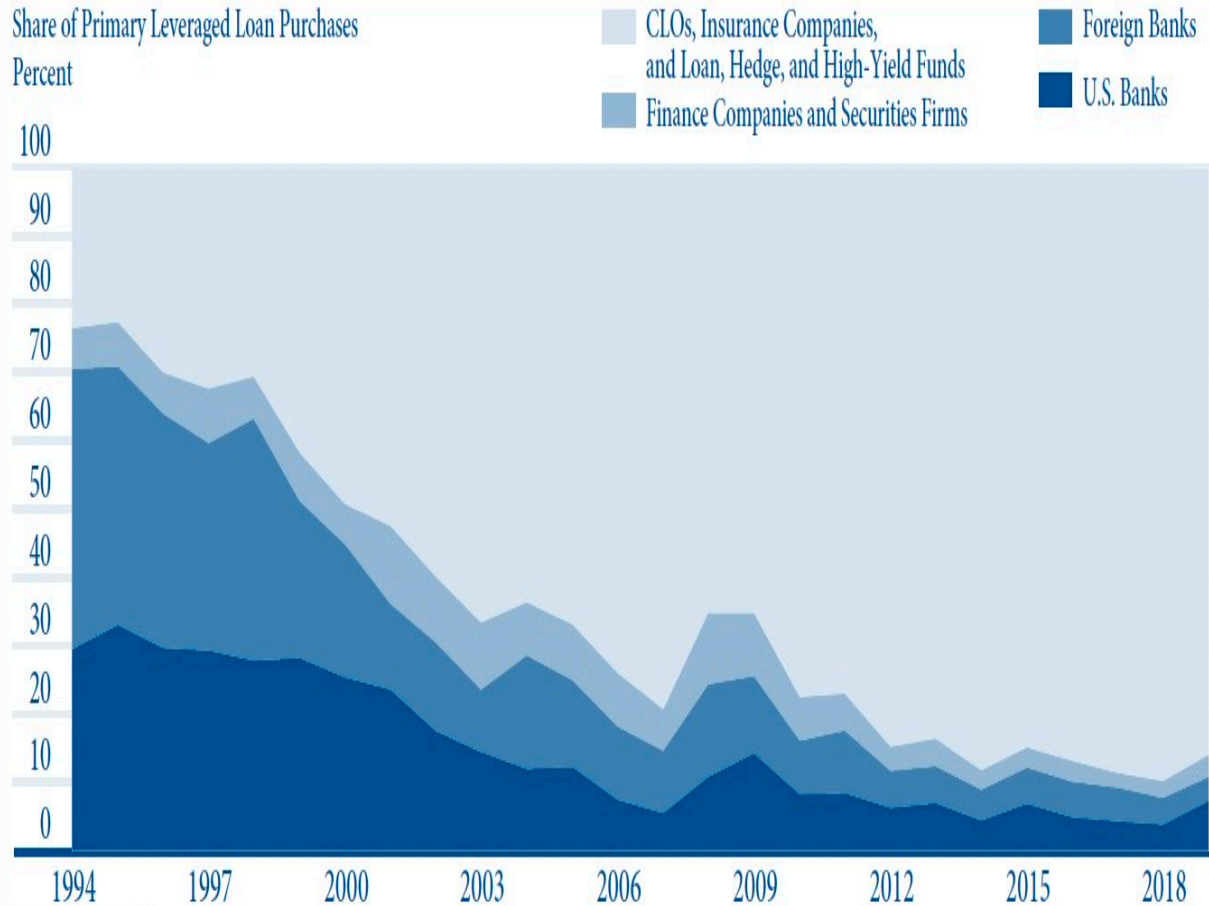
Dramatic growth of bank loans to nonbanks post GFC

Aggregate bank credit to banks and nonbanks



Source: FR Y-9C

U.S. Bank Share of Primary Leveraged Loan Purchases Has Declined Significantly, Though Risk Exposure Remains



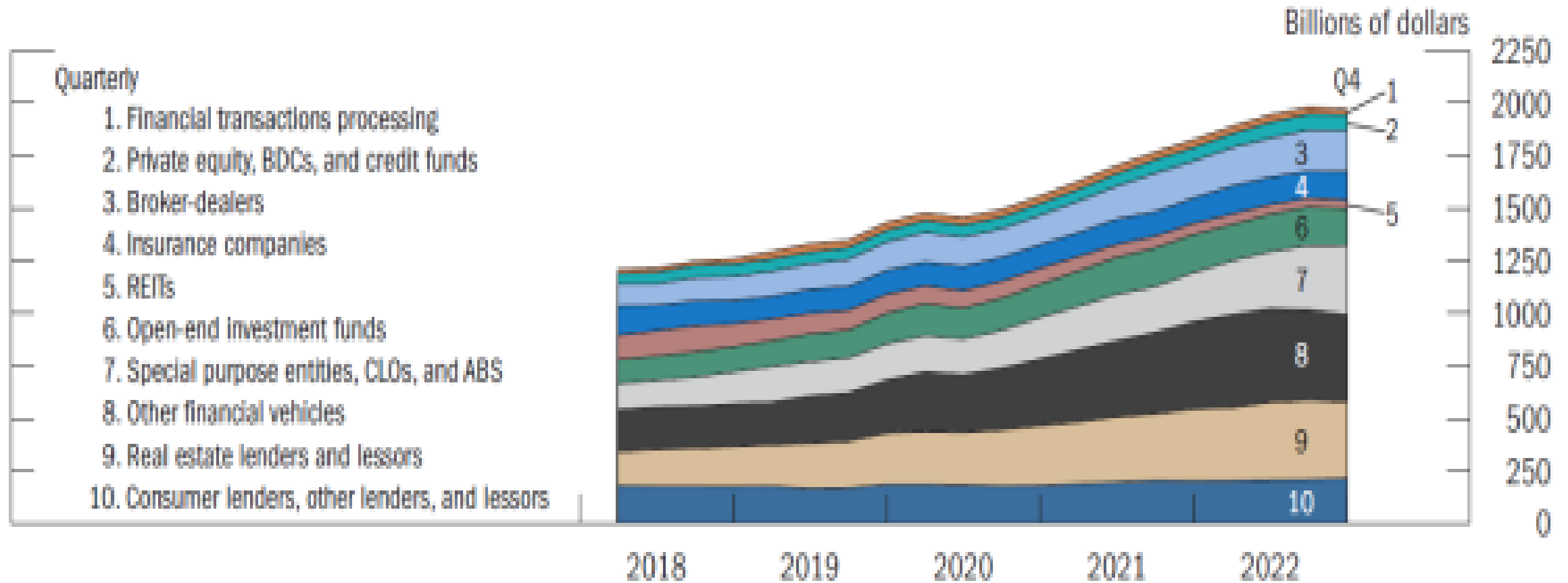
Source: S&P LCD.

Notes: Excludes revolving credit-only loans as well as left and right agent commitments (including administrative, syndication and documentation agent, and arranger). Data are through second quarter 2019.

“Banks’ direct exposure to institutional leveraged loans has fallen during the past 20 years. But some banks still have direct exposure to revolving credit facilities that are often part of a leveraged loan deal and additional indirect exposure to institutional leveraged loans. This exposure includes (1) pro rata leveraged loans, (2) warehouse lines of credit used for collateralized loan obligations, and (3) subscription finance loans... Bank exposure to risk from nonbanks that participate in leveraged lending is opaque, and the nature and size of the risk is obscured. Risk is difficult to quantify because it is not reported in a standardized manner.”

Bank credit lines to nonbanks also exploded post GFC

Figure 3.15. Bank credit commitments to nonbank financial institutions remained high



Source: Federal Reserve Board, Form FR Y-14Q (Schedule H.1), Capital Assessments and Stress Testing.

Therefore...

- What shifts with evolution of regulatory perimeter / regulation is this complex interflow between banks and NBFIs, and not activities *per se*
 - Easy to fall into the trap of viewing bank and non-bank activities separately
- Deep implications for macroprudential regulation
 - Calls for an integrated approach to monitoring and regulating bank-NBFI linkages
 - Beyond “regulate by function not form” / “congruence principle”
 - Metrick and Tarullo (2022), among others

Roadmap

2. Funding Interconnections across Banks and NBFIs
3. Is Every NBFI just a Special Purpose Vehicle (SPV) of Banks?
4. Contingent Funding of NBFIs by Banks
5. Aggregation of Bank and NBFI Risks
6. Bank-NBFI Linkages and Systemic Risk Over Time
7. Implications for Macroprudential Regulation

2. Funding Interconnections across Banks and NBFIs

- Financial Flow of Funds (From Whom To Whom or FWTW) provides a useful window on bank-NBFI linkages
- Non-bank financial intermediaries heavily dependent on banks for funding
- Banks also dependent on non-bank financial intermediaries
- Asymmetric dependence:
Non-bank reliance on banks far greater than bank reliance on non-banks
- Patterns stable over time

Matrix of asset/liability interdependence

2023q1	HOLDERS															
ISSUERS	ABS	Banks	B/Ds	eREITs	FCs	GSEs	Life Ins.	MMMFs	mREITs	MFs	OFB	PC Ins.	PFs	Real	RoW	TOTAL
ABS	-	0.143	0.004	0.000	0.001	0.011	0.573	0.045	0.000	0.039	0.068	0.116	0.027	0.045	0.375	1.45
Banks	-	3.127	0.685	0.043	0.056	1.096	0.555	0.429	0.021	0.232	0.247	0.143	0.301	18.800	4.425	30.16
Broker/Dealers	0.000	1.370	1.285	(0.008)	(0.004)	0.112	0.009	0.459	(0.002)	0.030	0.003	0.003	(0.038)	0.571	1.587	5.38
Equity REITs	0.029	0.224	(0.000)	0.009	0.005	0.012	0.130	0.000	0.015	0.061	0.002	0.024	0.062	0.169	0.160	0.90
Finance Companies	-	0.196	0.000	0.003	0.005	0.002	0.153	0.006	0.001	0.099	0.018	0.035	0.086	0.289	0.445	1.34
GSE and Agency	-	3.209	0.102	0.001	0.001	0.234	0.276	0.791	0.171	0.543	0.000	0.135	0.408	1.892	1.361	9.12
Life Ins.	0.178	0.328	0.008	0.007	0.004	0.145	0.519	0.009	0.002	0.010	0.000	0.023	1.006	6.708	0.206	9.15
Money Market Funds	-	-	-	-	-	-	0.077	-	-	0.237	0.435	0.042	0.288	4.385	0.200	5.66
Mortgage REITs	-	0.044	0.066	0.001	0.001	0.014	0.042	0.052	0.000	0.029	0.001	0.010	0.024	0.038	0.199	0.52
Mutual Funds	-	0.014	-	-	-	-	1.471	-	-	-	-	0.031	4.868	10.700	1.052	18.14
Other Fin. Bus.	-	0.049	0.878	0.005	0.003	0.004	0.027	0.019	0.002	0.011	0.107	0.006	0.068	0.399	0.037	1.62
PC Ins.	0.001	0.035	(0.001)	0.005	0.003	0.008	0.027	0.001	0.002	0.007	0.000	0.200	0.061	1.876	0.326	2.55
Pension Funds	-	-	-	-	-	-	-	-	-	-	-	-	-	27.100	-	27.10
Real Sector	1.275	16.200	0.679	0.256	1.197	10.500	3.477	1.214	0.333	3.365	0.186	1.214	12.400	43.400	22.100	117.80
Rest of World	0.001	3.799	0.520	0.007	0.466	0.098	1.156	0.438	0.004	0.928	0.233	0.570	0.670	8.257	-	17.15

Figures are in \$ Trillions. Source: Flow of Funds

Most nonbanks substantially dependent on banks

MATRIX OF DEPENDENCE																
ISSUERS	HOLDERS															TOTAL
	ABS	Banks	B/Ds	eREITs	FCs	GSEs	Life Ins.	MMMFs	mREITs	MFs	OFB.	PC Ins.	PFs	Real	RoW	
ABS	0	10	0	0	0	1	40	3	0	3	5	8	2	3	26	1.45
Banks	0	10	2	0	0	4	2	1	0	1	1	0	1	62	15	30.16
Broker/Dealers	0	25	24	0	0	2	0	9	0	1	0	0	-1	11	30	5.38
Equity REITs	3	25	0	1	1	1	14	0	2	7	0	3	7	19	18	0.90
Finance Companies	0	15	0	0	0	0	11	0	0	7	1	3	6	22	33	1.34
GSE and Agency	0	35	1	0	0	3	3	9	2	6	0	1	4	21	15	9.12
Life Ins.	2	4	0	0	0	2	6	0	0	0	0	0	11	73	2	9.15
MMF	0	0	0	0	0	0	1	0	0	4	8	1	5	77	4	5.66
Mortgage REITs	0	8	13	0	0	3	8	10	0	6	0	2	5	7	38	0.52
Mutual Funds	0	0	0	0	0	0	8	0	0	0	0	0	27	59	6	18.14
Other Fin. Bus.	0	3	54	0	0	0	2	1	0	1	7	0	4	25	2	1.62
PC Ins.	0	1	0	0	0	0	1	0	0	0	0	8	2	74	13	2.55
Pensions	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	27.10
																0.00
Real Sector	1	14	1	0	1	9	3	1	0	3	0	1	11	37	19	117.80
Rest of World	0	22	3	0	3	1	7	3	0	5	1	3	4	48	0	17.15

The figures represent (in %) the composition of liabilities for each segment issuer (on each row), by each corresponding holder (on each column).

The TOTAL column expresses (in \$T) the total liabilities issued by each sector

But banks not as dependent on nonbanks

MATRIX OF DEPENDENCE

ISSUERS	HOLDERS														TOTAL	
	ABS	Banks	B/Ds	eREITs	FCs	GSEs	Life Ins.	MMMFs	mREITs	MFs	OFB.	PC Ins.	PFs	Real		RoW
ABS	0	10	0	0	0	1	40	3	0	3	5	8	2	3	26	1.45
Banks	0	10	2	0	0	4	2	1	0	1	1	0	1	62	15	30.16
Broker/Dealers	0	25	24	0	0	2	0	9	0	1	0	0	-1	11	30	5.38
Equity REITs	3	25	0	1	1	1	14	0	2	7	0	3	7	19	18	0.90
Finance Companies	0	15	0	0	0	0	11	0	0	7	1	3	6	22	33	1.34
GSE and Agency	0	35	1	0	0	3	3	9	2	6	0	1	4	21	15	9.12
Life Ins.	2	4	0	0	0	2	6	0	0	0	0	0	11	73	2	9.15
MMF	0	0	0	0	0	0	1	0	0	4	8	1	5	77	4	5.66
Mortgage REITs	0	8	13	0	0	3	8	10	0	6	0	2	5	7	38	0.52
Mutual Funds	0	0	0	0	0	0	8	0	0	0	0	0	27	59	6	18.14
Other Fin. Bus.	0	3	54	0	0	0	2	1	0	1	7	0	4	25	2	1.62
PC Ins.	0	1	0	0	0	0	1	0	0	0	0	8	2	74	13	2.55
Pensions	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	27.10
																0.00
Real Sector	1	14	1	0	1	9	3	1	0	3	0	1	11	37	19	117.80
Rest of World	0	22	3	0	3	1	7	3	0	5	1	3	4	48	0	17.15

The figures represent (in %) the composition of liabilities for each segment issuer (on each row), by each corresponding holder (on each column).

The TOTAL column expresses (in \$T) the total liabilities issued by each sector

Risk exposures also asymmetric: *NBFIs more exposed to banks*

MATRIX OF EXPOSURES															
ISSUERS	HOLDERS														
	ABS	Banks	B/Ds	eREITs	FCs	GSEs	Life Ins.	MMMFs	mREITs	MFs	OFB	PC Ins.	PFs	Real	RoW
ABS	0	0	0	0	0	0	7	1	0	1	5	5	0	0	1
Banks	0	11	16	13	3	9	7	12	4	4	19	6	1	15	14
Broker/Dealers	0	5	30	-2	0	1	0	13	0	1	0	0	0	0	5
Equity REITs	2	1	0	3	0	0	2	0	3	1	0	1	0	0	0
Finance Companies	0	1	0	1	0	0	2	0	0	2	1	1	0	0	1
GSE and Agency	0	11	2	0	0	2	3	23	31	10	0	5	2	2	4
Life Ins.	12	1	0	2	0	1	6	0	0	0	0	1	5	5	1
MMF	0	0	0	0	0	0	1	0	0	4	33	2	1	4	1
Mortgage REITs	0	0	2	0	0	0	0	2	0	1	0	0	0	0	1
Mutual Funds	0	0	0	0	0	0	17	0	0	0	0	1	24	9	3
Other Fin. Bus.	0	0	21	2	0	0	0	1	0	0	8	0	0	0	0
PC Ins.	0	0	0	2	0	0	0	0	0	0	0	8	0	2	1
Pensions	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0
Real	86	56	16	78	69	86	41	35	61	60	14	48	61	35	68
Rest of World	0	13	12	2	27	1	14	13	1	17	18	22	3	7	0
TOTAL	1.48	28.74	4.22	0.33	1.74	12.24	8.49	3.46	0.55	5.59	1.30	2.55	20.23	124.63	32.47

The figures represent (as %) the composition of holdings of each segment (in each column) by each corresponding issuer (on each row).

The TOTAL row expresses (in \$T) the total assets of each sector

Patterns of dependence and exposures consistent over time

Issuer	Holder	Average Issuer Share	Average Holder Share	Issuer	Holder	Average Issuer Share	Average Holder Share
Banks	ABS	0%	0%	ABS	Banks	10%	1%
	Banks	12%	12%	Banks		12%	12%
	Broker/Dealers	3%	15%	Broker/Dealers		23%	5%
	Equity REITs	0%	24%	Equity REITs		33%	1%
	Finance Companies	1%	6%	Finance Companies		19%	2%
	GSE and Agency	4%	9%	GSE and Agency		29%	11%
	Life Ins.	2%	6%	Life Ins.		3%	1%
	MMF	3%	18%	MMF		0%	0%
	Mortgage REITs	0%	3%	Mortgage REITs		11%	0%
	Mutual Funds	1%	4%	Mutual Funds		0%	0%
	Other Fin. Bus.	1%	23%	Other Fin. Bus.		0%	0%
	PC Ins.	0%	5%	PC Ins.		1%	0%
	Pensions	1%	2%	Pensions		0%	0%
	Real	57%	14%	Real		15%	54%
Rest of World	15%	17%	Rest of World	21%	13%		

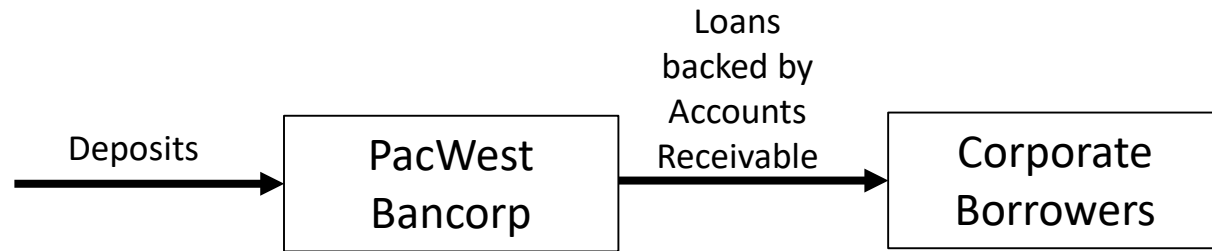
Source: Flow of Funds

3. Is Every NBFI just a Special Purpose Vehicle (SPV) of Banks?

- Regulation shifts activity to non-banks but banks retain a significant role
 - Financiers and/or ultimate risk-bearers
 - Akin to the pre-GFC Asset-backed Commercial Paper (ABCP) conduits and SIVs
 - Acharya, Schnabl and Suarez (2013)
 - Contractually or otherwise, risks ultimately return to banks
 - Bank financing of private credit companies (private credit now 30% of overall credit)
 - Bank financing of mortgage origination and servicing (see paper)

Bank Financing of Private Credit Companies

Previously



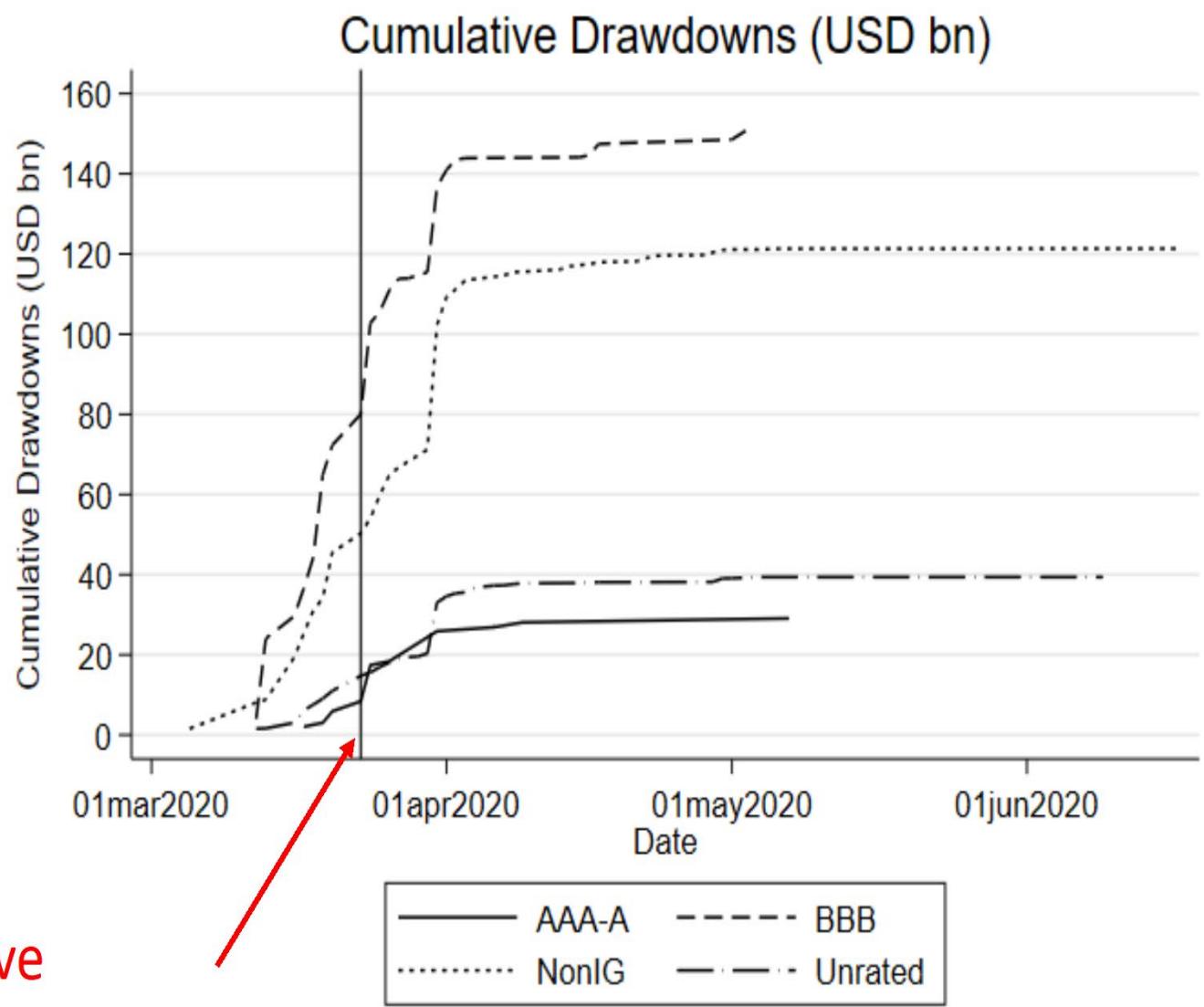
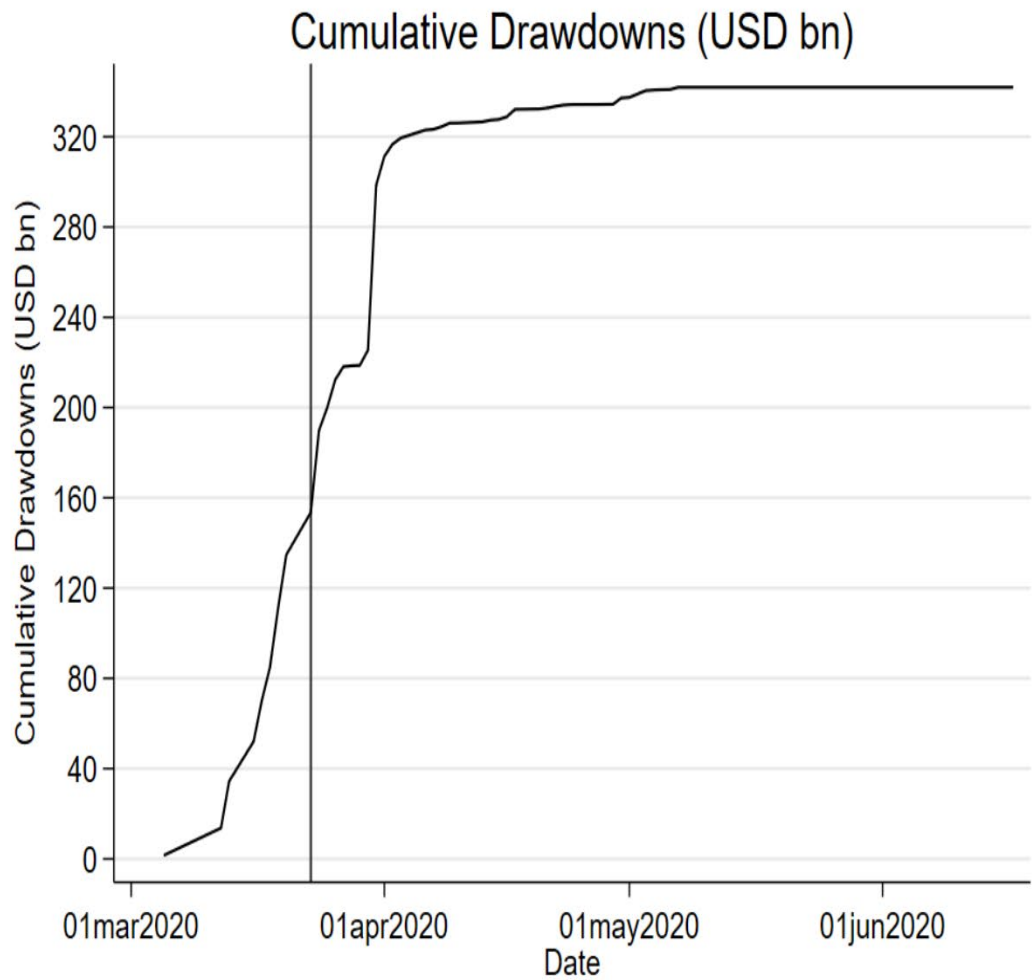
June 2023: Ares Management bought loan portfolio from PacWest Bancorp, partly financed by Barclays PLC



Source: Lex (2023), "Ares/PacWest: Barclays is strange bedfellow in \$2.3bn loan deal," *Financial Times*, June 26.

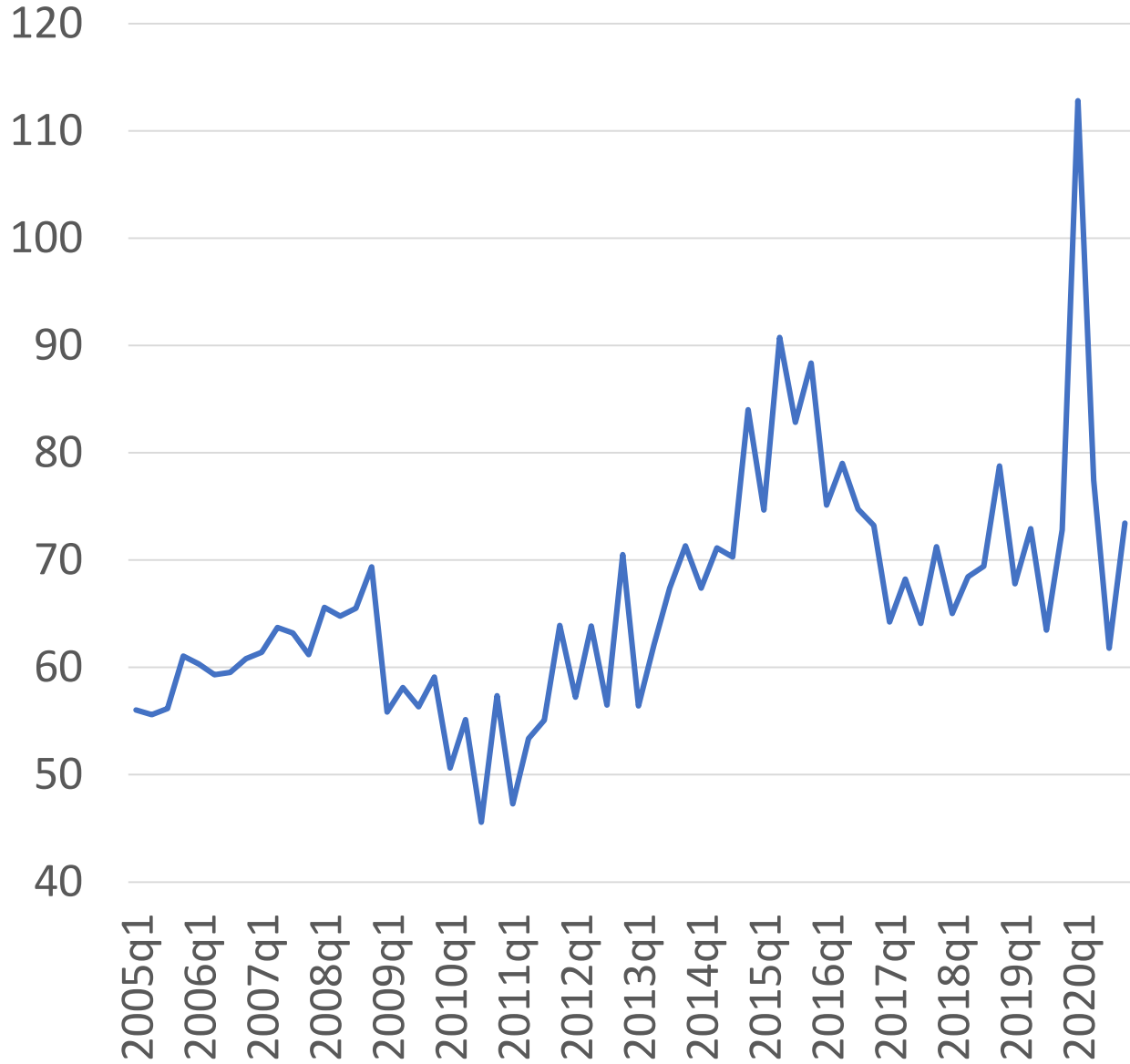
4. Contingent Funding of NBFIs by Banks

- Banks have a unique advantage in providing liquidity insurance
 - Economies of cash between deposits and credit lines: Kashyap, Rajan, Stein (2002)
 - Access to official backstops (deposit insurance, LOLR): Gatev and Strahan (2006)
- Banks' special role extends to providing liquidity insurance to NBFIs:
 - Largest example historically, backups to commercial paper (CP) financing
 - Credit lines to help roll over funding risk (REITs in particular, but also CCPs, CLOs)
 - CLs to finance derivatives margin (UK pension funds, Electricity producers in 2022)

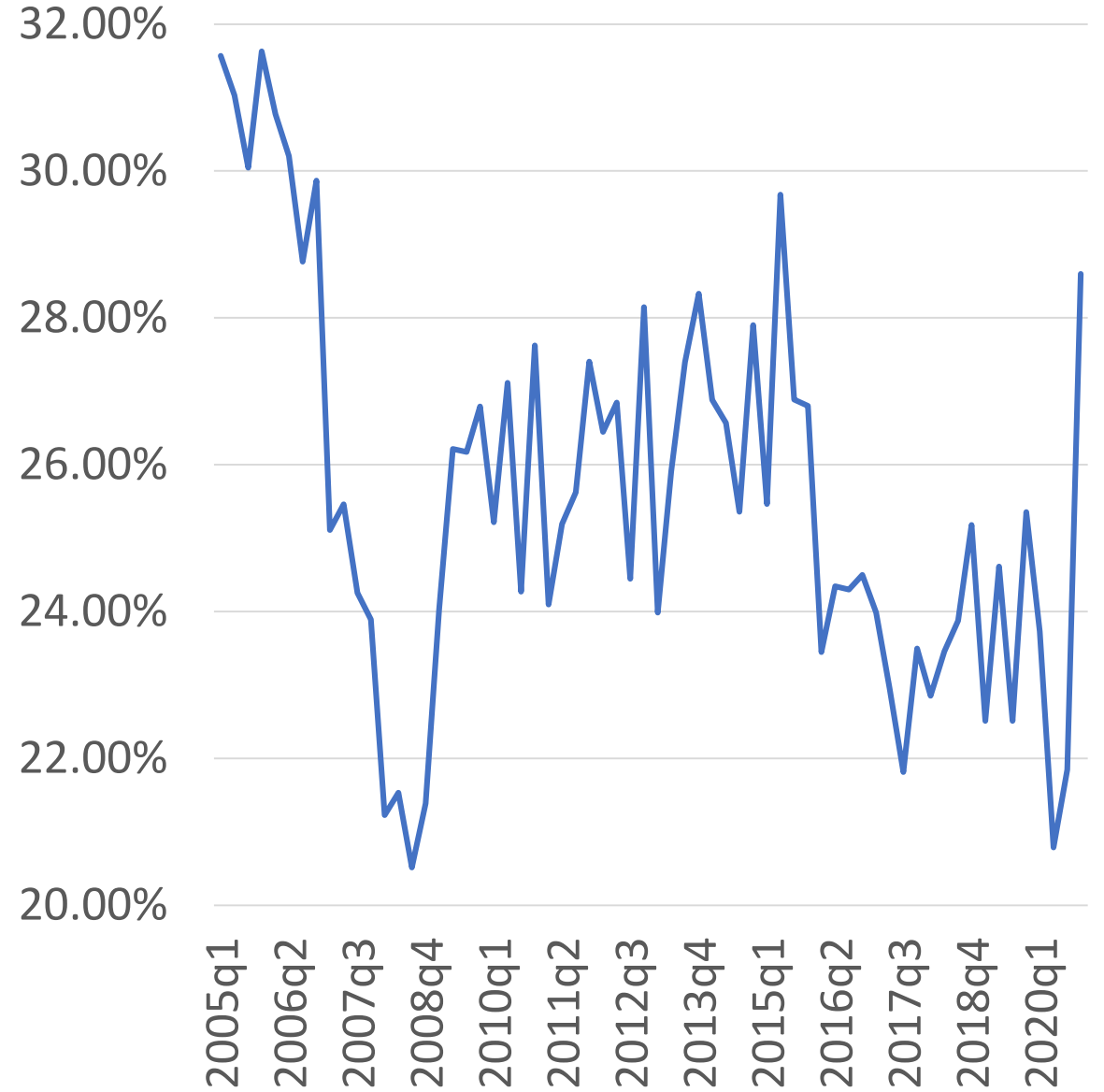


Federal Reserve announced the corporate bond buying program

Drawdown of NBFIs (in USD billion)



Drawdown Share of NBFIs

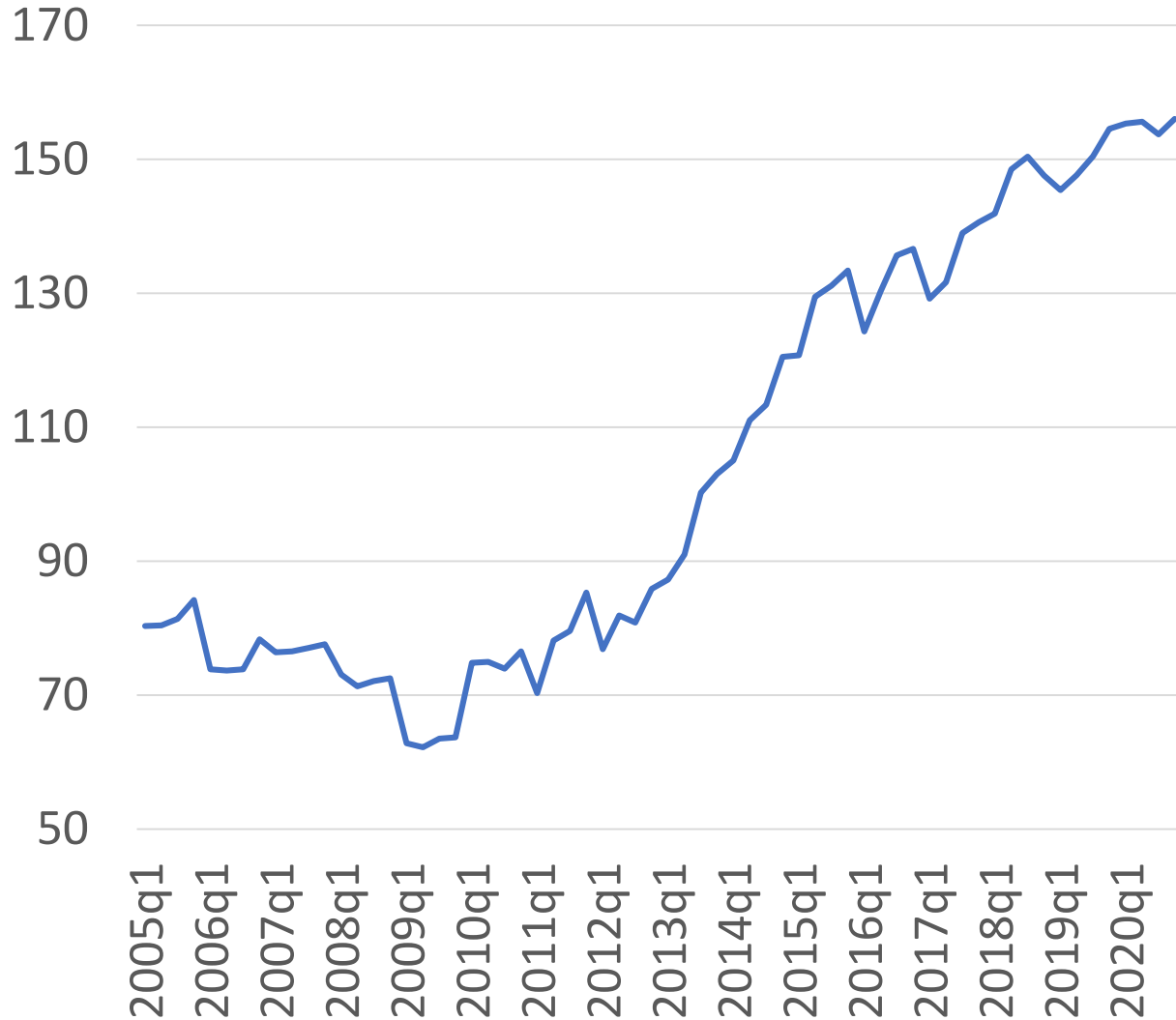


Source: Acharya, Gopal, Jager and Steffen (2023)

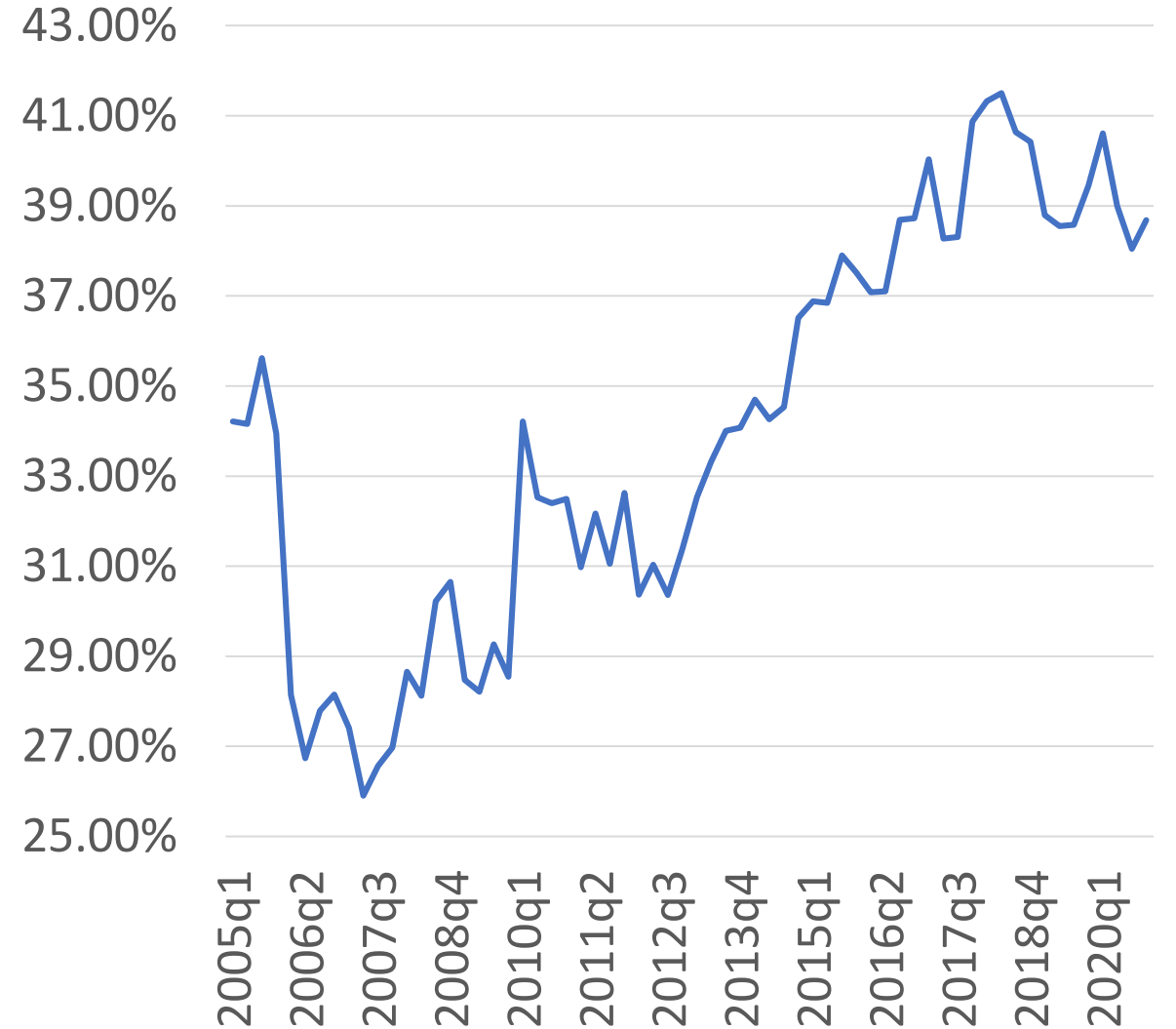
Median Commitment Utilization Rates in 2020Q1

Rating category	Non-financial corporates	NBFIs
AAA -- A	0%	0%
BBB	10%	28%
non-IG	36%	49%
non-rated	36%	30%

Outstanding Commitments to REITs (in USD billion)

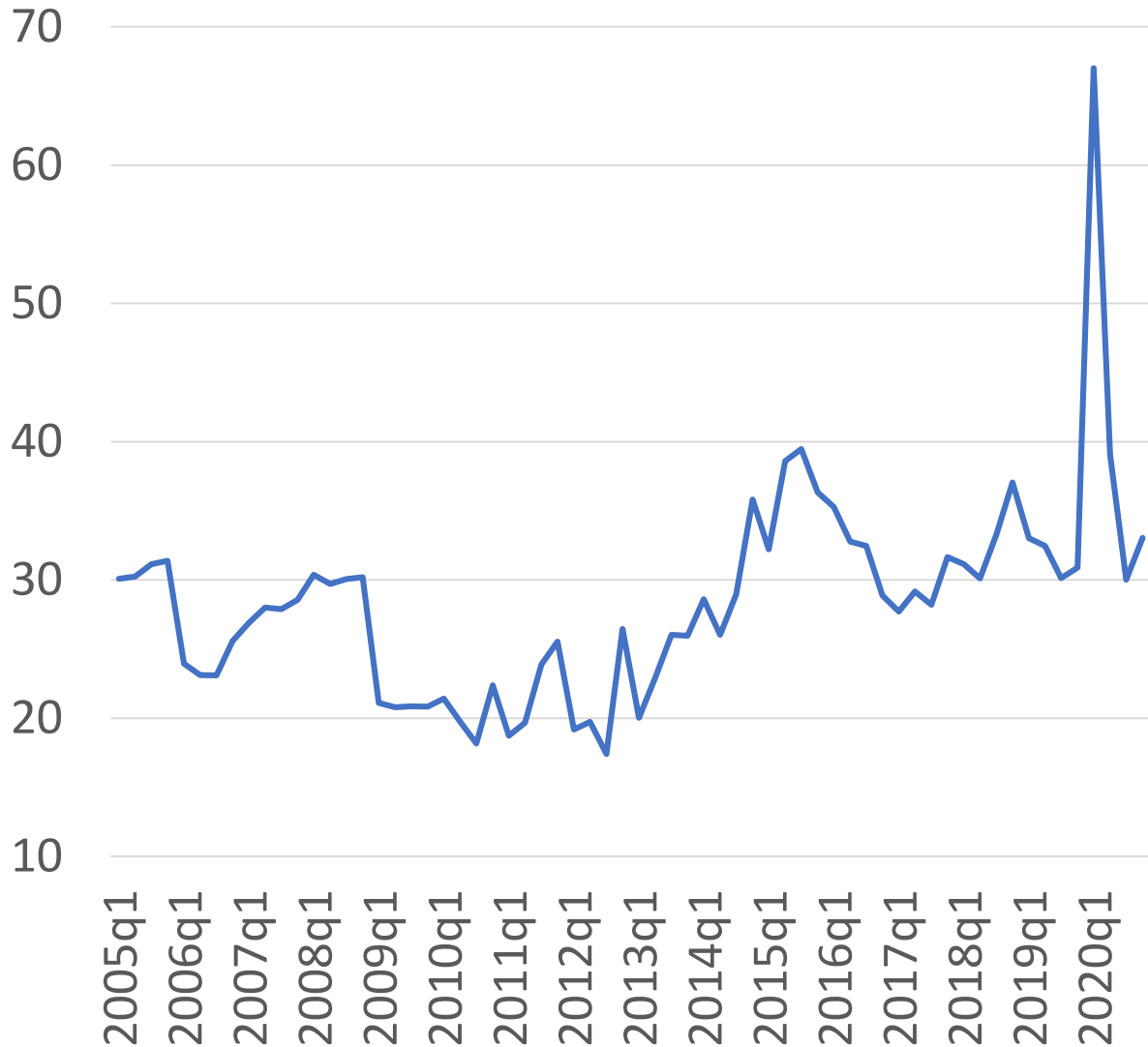


REIT Share of Outstanding Commitments to NBFIs

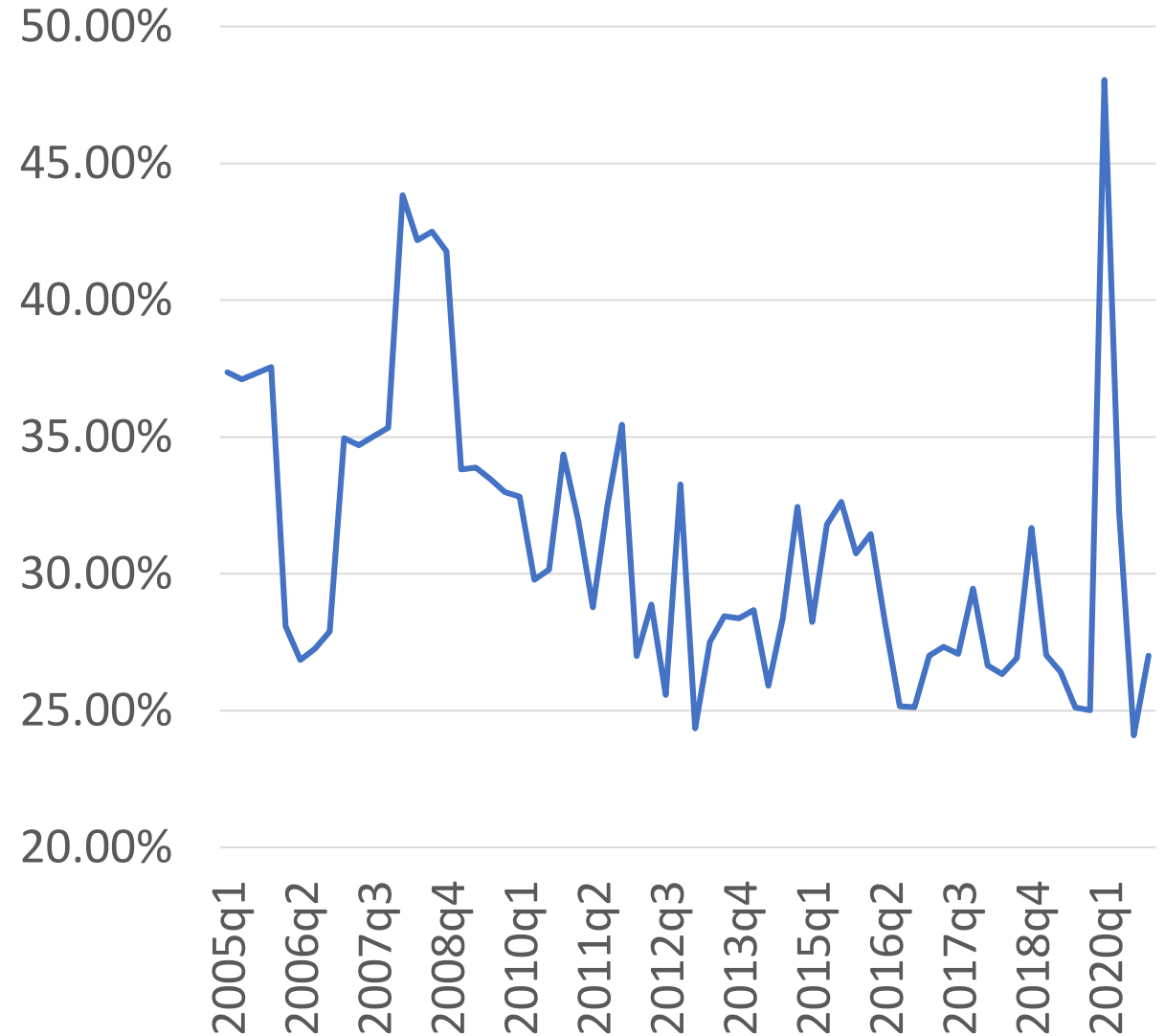


Source: Acharya, Gopal, Jager and Steffen (2023)

REIT Commitment Drawdowns (in USD billion)

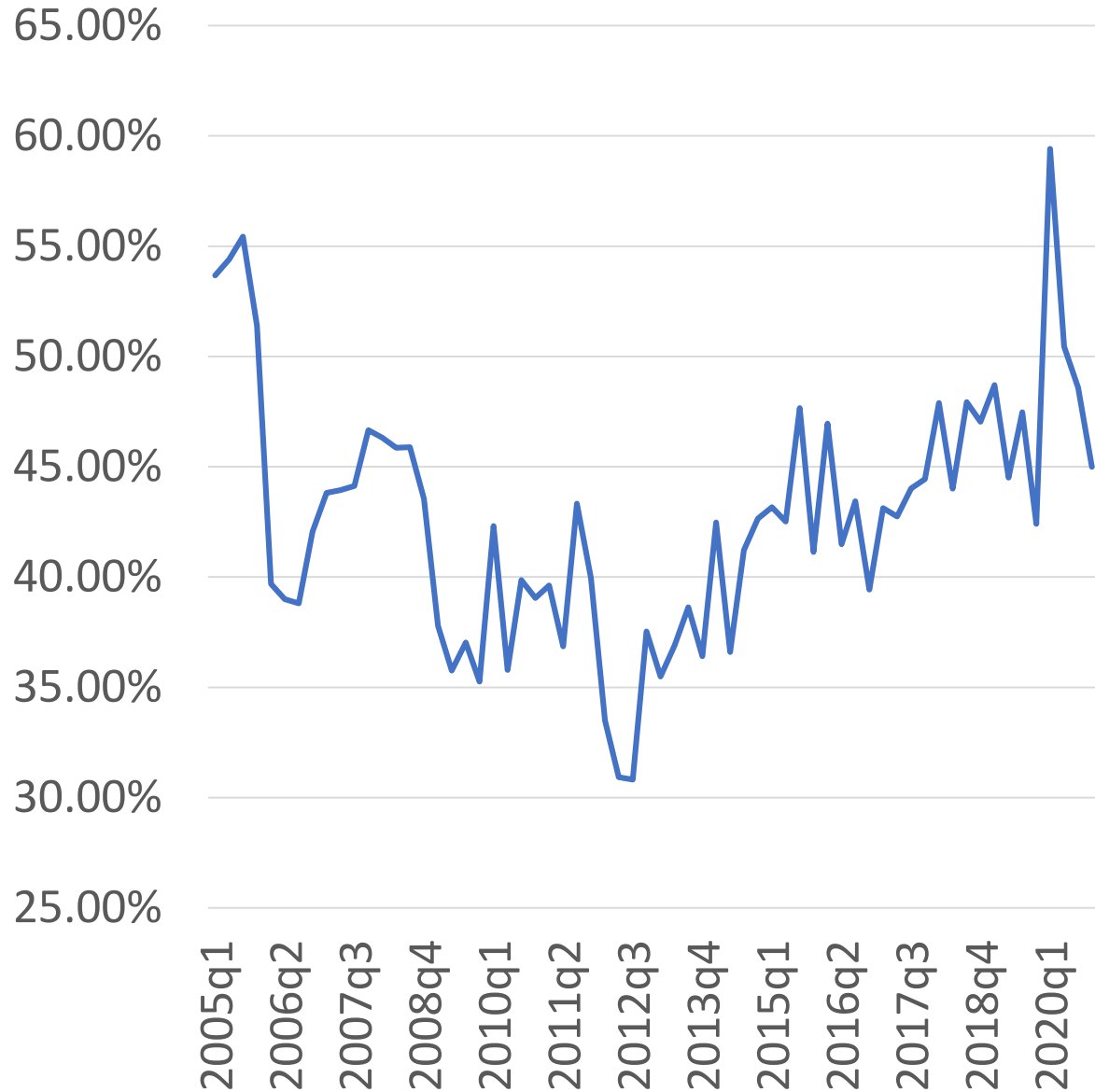


REIT Commitment Utilization Rate

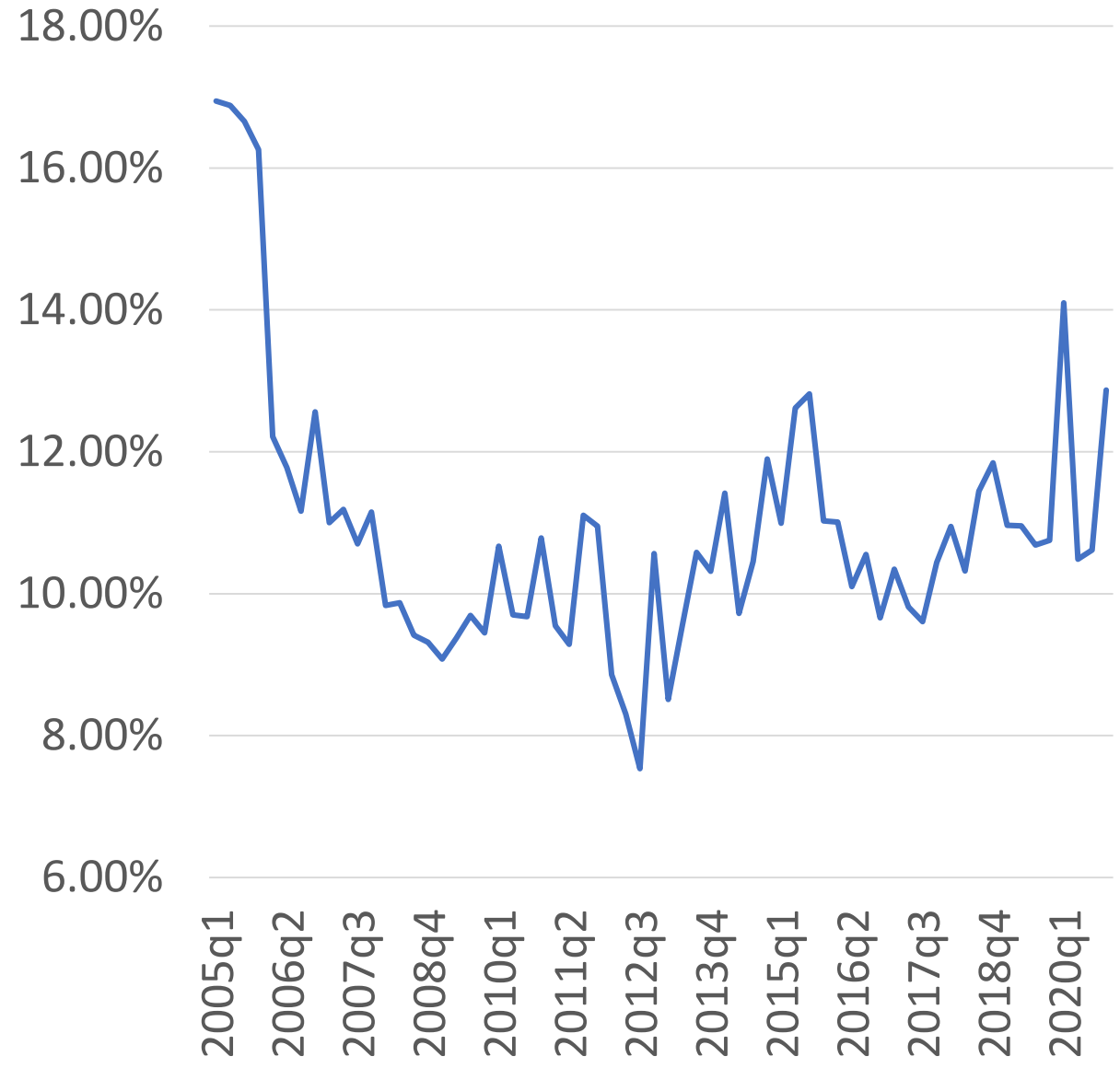


Source: Acharya, Gopal, Jager and Steffen (2023)

Drawdown Ratio of REITs to NBFIs

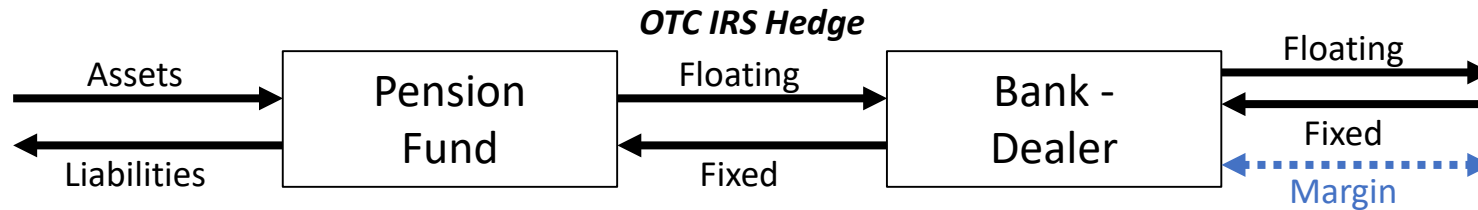


Drawdown Ratio of REITs to All

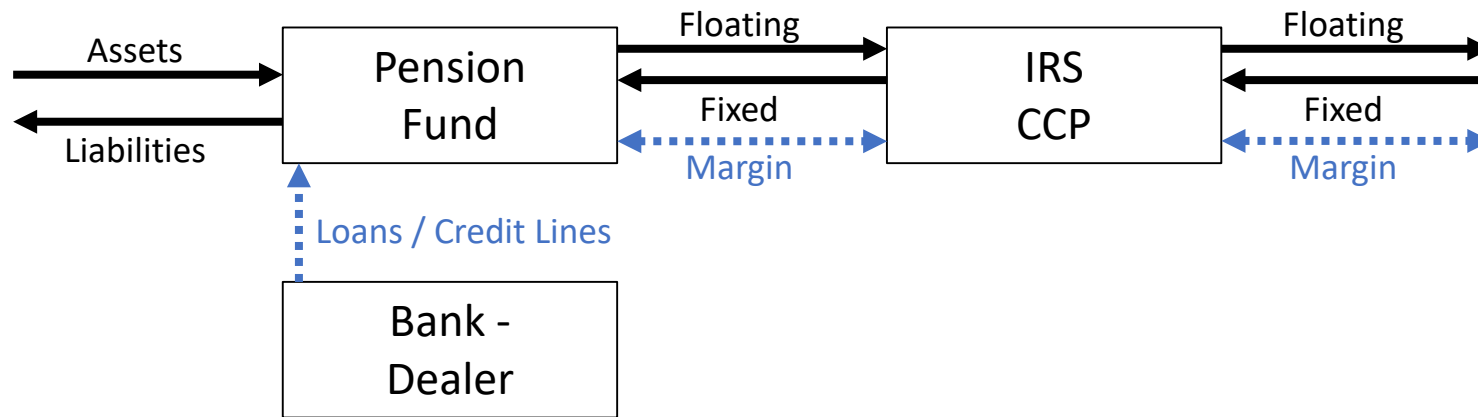


Source: Acharya, Gopal, Jager and Steffen (2023)

Liquidity Risk from Derivatives Clearing: UK Pension Funds



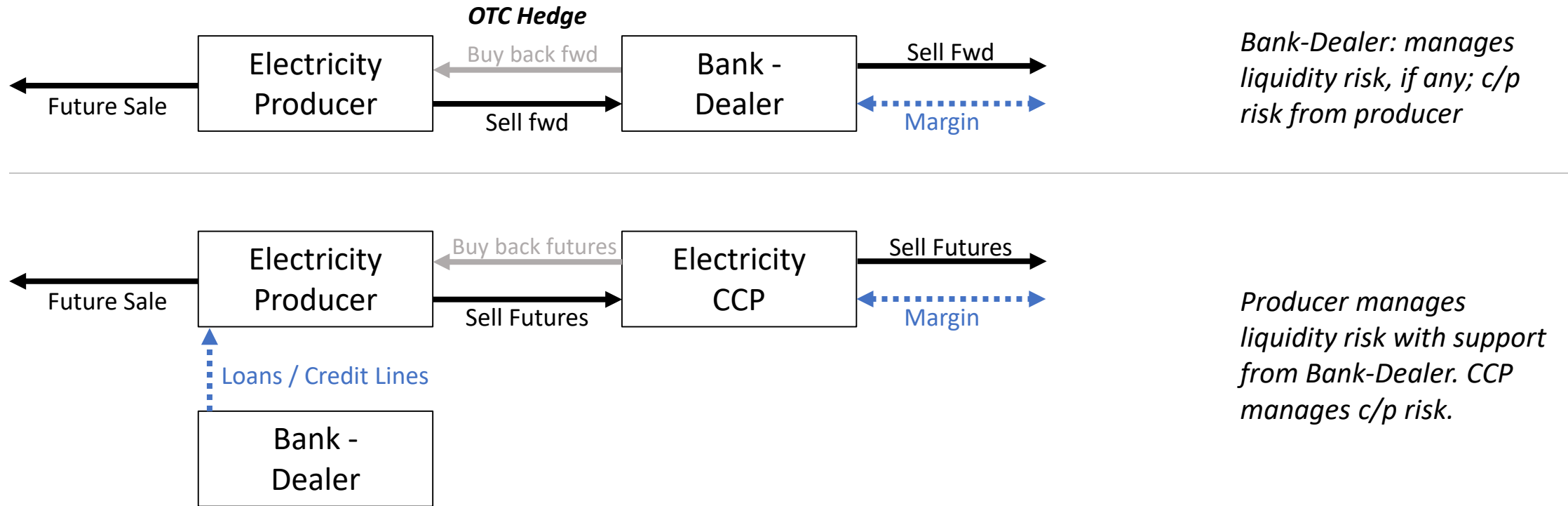
Bank-Dealer: manages liquidity risk, if any; c/p risk from pension fund



Pension fund manages liquidity risk with support from Bank-Dealer. CCP manages c/p risk.

- In September 2022, interest rates in the UK spiked up after a budget proposal.
- Pension fund hedges worked re asset-liability management, but the declining values of their IRS led to significant margin calls and fire sales of long-term government bonds.
- The BoE intervened by outright purchases of bonds and by loans to banks- passed through to pension funds, against gilts, linkers, and corporate bonds. This intervention ran counter to monetary policy at the time.

Liquidity Risk from Derivatives Clearing: European Electricity Producers



- Emerging from pandemic lockdowns, Russia supply squeeze, and other industry factors increased energy prices in 2021-2022. Russia's invasion of Ukraine led to particularly sharp increases through August 2022.
- Electricity producer hedges worked, but declining futures prices led to significant margin calls that were met with significant credit extension by banks and dealers. (And some futures hedges shifted to OTC forwards.)
- Many governments provided guarantees to facilitate bank credit provision, including Austria, Czech Republic, Denmark, Finland, Germany, Norway, Sweden, Switzerland, and the United Kingdom.

See, for example, Turnstead (2023), Wilkes and Turnstead (2022), and Wilson and Stafford (2022).

5. Aggregation of Bank and NBFI Risks

- High volatility → Liquidity stress on both NBFIs and banks
 - NBFIs draw down on bank credit lines
 - Some banks directly exposed to NBFI risks as their financiers
 - NBFIs try to sell assets, likely all on the same side of the market; hence need banks
 - Commonality in business model across banks-NBFIs: Banks are liquidity-constrained too
- Fire-sale externalities: Prices determined by aggregate demand and supply of liquidity (“cash-in-the-market” pricing)
 - Banks and NBFIs need not be directly connected nor hold assets in common
- Bank and non-bank balance-sheets need to be considered jointly

Significant network cross holdings

US \$ Billion	Equity	Agency MBS	Bank Loans	Open Market Paper	Corporate Bonds	Government Bonds	Muni Bonds	Cash
Banks	41	3,272	13,693	0	945	1,606	591	3,470
P&C Insurers	505	126	31	4	593	175	246	110
Life Insurers	117	194	850	21	2,701	141	189	130
Money Market Funds	0	492	0	245	6	1,256	113	2,955
Mutual Funds (Equity)	10,548	0	0	23	0	0	0	189
Mutual Funds (Bonds)	0	433	116	9	1,763	1,107	640	73
Mutual Funds (Hybrid)	530	91	24	3	371	233	135	25
Exchange-Traded Funds	4,554	0	0	0	708	381	87	33
Mortgage REITs	0	156	0	0	10	0	0	17
Broker-Dealers	192	68	0	23	13	127	15	1,484
Finance Companies	0	0	1,040	0	84	0	0	32
Hedge Funds	905	11	207	0	459	192	13	225
Pension Funds	3,786	275	22	46	1,116	537	0	580

Source: Flow of Funds, 2022q3

Dominating network externalities

Share of pairwise fire sale exposures driven by network spillovers

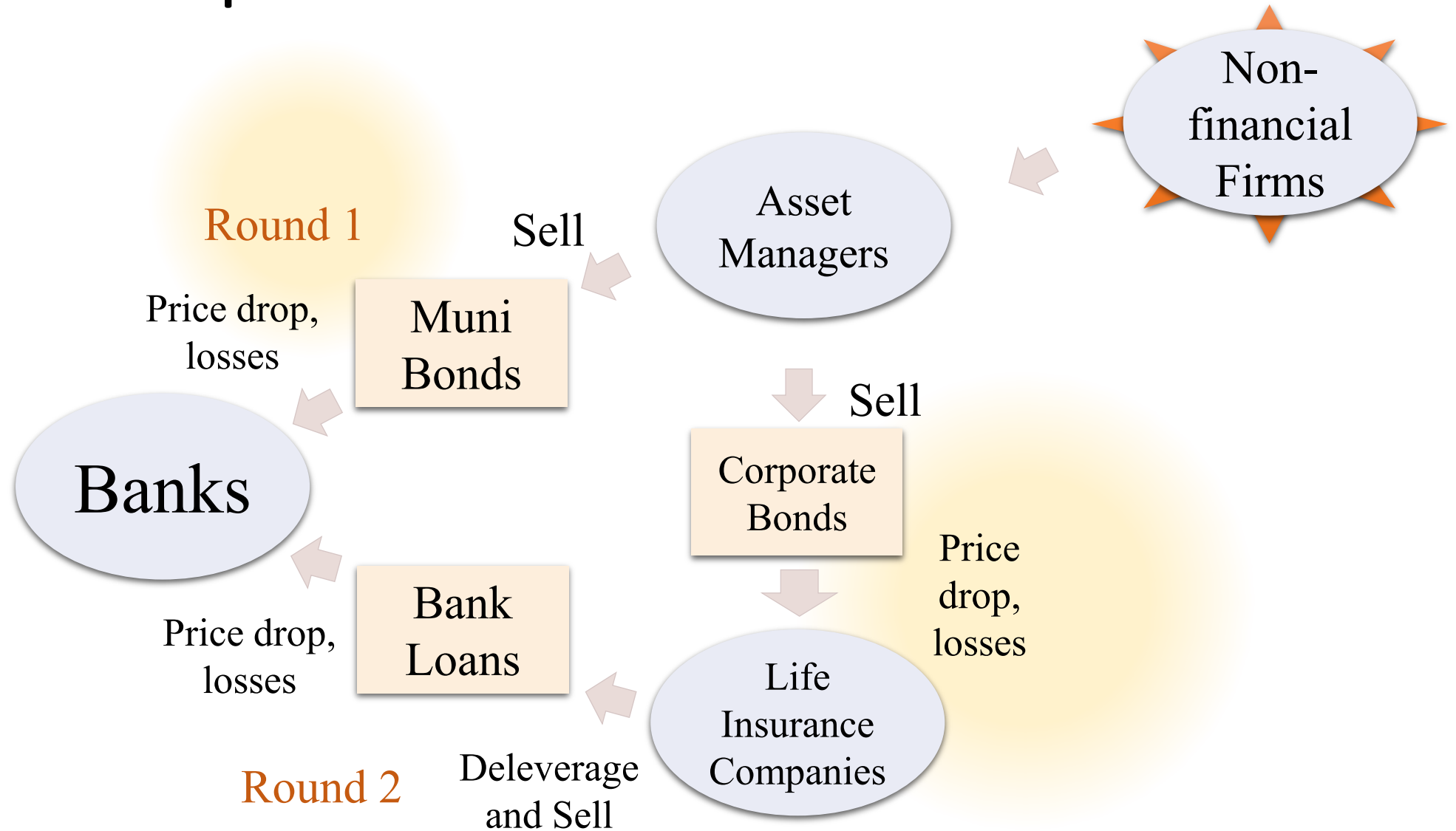
Values in Percent

Final shock received by...

	Banks	P&C	Life	MMF	MFE	MFB	MFH	ETFs	REIT	B&D	FinCo	HF	PF
Banks		89	68	53	98	89	93	96	57	86	32	84	94
P&C Insurers			54	66	36	74	50	44	80	45	97	61	53
Life Insurers				92	94	66	84	85	87	90	93	83	81
Money Market Funds					100	60	82	89	62	55	100	88	81
Mutual Funds (Equity)						100	55	51	100	53	100	55	55
Mutual Funds (Bonds)							89	93	83	88	97	89	90
Mutual Funds (Hybrid)								57	91	58	98	63	61
Exchange-Traded Funds									96	55	98	59	58
Mortgage REITs										73	100	95	87
Broker-Dealers											100	61	59
Finance Companies												94	98
Hedge Funds													63
Pension Funds													

Source: Cetorelli, Landoni and Lu (2023)

Asset-linked Amplification: NBFIs -> Banks



Combining asset *and* liability interconnections

- Aggregation of risks even stronger once liability linkages are also considered
 - Present approaches ignore bank-NBFI liability-side linkages
- Potential for vicious feedback loop effects:

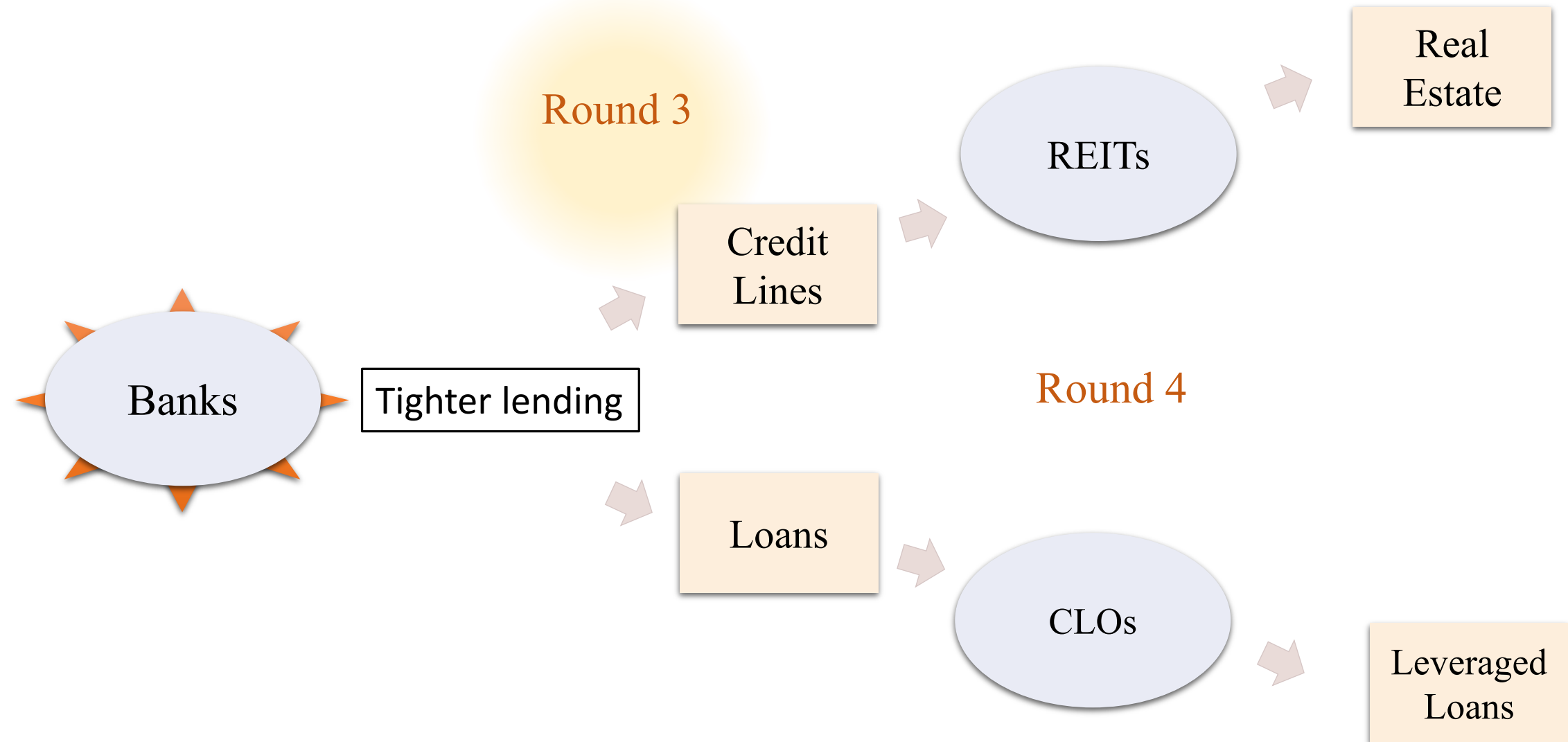
Banks (perhaps due to need to strengthen capital position) may pull support to liabilities of NBFIs ->

NBFI stress and consequent balance sheet adjustment ->

NBFI asset fire sales and tighter lending terms ->

Backfiring impact on banks and the real economy ...

Liability-linked Amplification: Banks -> NBFIs



6. Bank-NBFI Linkages and Systemic Risk Over Time

- Is bank-NBFI interdependence reflected in their systemic risk?
- E.g.: What is the co-dependence in bank and NBFI capital shortfall ([SRISK](#))?
 - Acharya, Engle and Richardson (2012)
- SRISK attempts to measure capital shortfall conditional on a market crash, relative to a prudential capital requirement, using market value of equity:

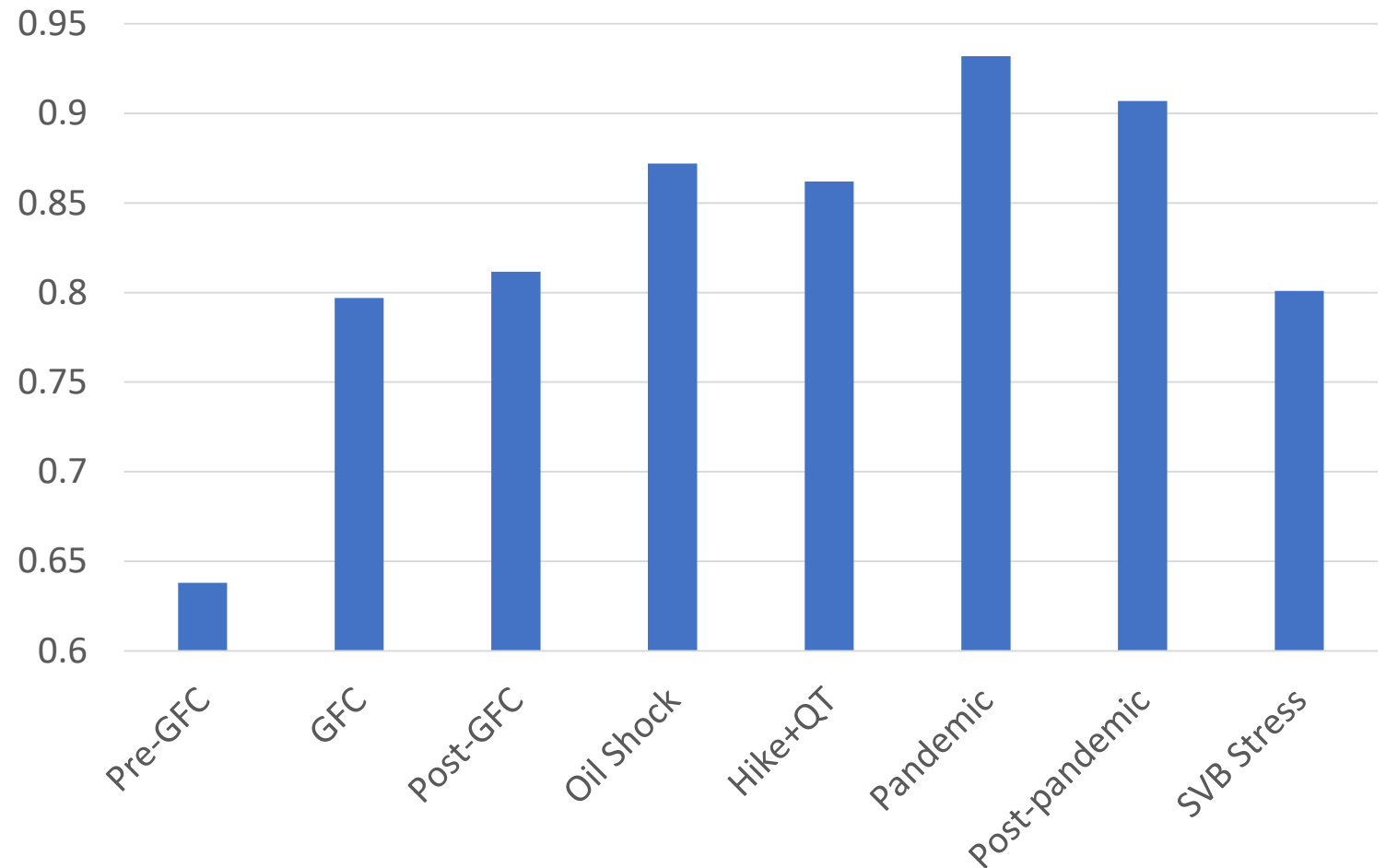
$$SRISK = E_0[k(D_t + E_t) - E_t|Crisis] = k \cdot D_0 - (1 - k) \cdot (1 - LRMES) \cdot E_0$$

- At vlab.stern.nyu.edu/srisk, daily SRISK for publicly traded banks and NBFIs
 - Also components due to Debt, Market Equity, and Risk (LRMES * E)
- How do changes in SRISK for banks and NBFIs correlate over time?
 - Decompositions suggest increasing correlations due to Equity and Risk
 - Interdependence rose post-GFC; Bank equity “causes” NBFI equity more often

Rising Bank-NBFI SRISK Co-movement Over Time

Jan-00	Pre-GFC
1-Aug-07	GFC
1-Nov-09	Post-GFC
1-Dec-14	Oil Shock
1-Jul-16	Hike + QT
1-Jan-20	Pandemic
1-Nov-21	Post-pandemic
1-Jan-23	SVB Stress
1-May-23	

20-day Rolling Correlations between Bank and NBFI
log changes in Sector-wide SRISK



Bank-NBFI Linkages and Systemic Risk (Cont'd)

Granger causality tests (p-values) in Equity changes between Banks and NBFIs

One lag

Period	Bank Causes	Nonbank Causes
	Nonbank	Bank
Overall	0.03	0.00
Pre-GFC	0.72	0.21
GFC	0.06	0.00
Post-GFC	0.00	0.28
Oil Shock	0.96	0.90
Hike+QT	0.41	0.94
Pandemic	0.95	0.07
Post-pandemic	0.32	0.20
SVB Stress	0.71	0.54

Optimal lags

Period	Bank Causes	Nonbank Causes
	Nonbank	Bank
Overall	0.01	0.00
Pre-GFC	0.88	0.29
GFC	0.04	0.07
Post-GFC	0.00	0.69
Oil Shock	0.71	0.90
Hike+QT	0.02	0.36
Pandemic	0.10	0.01
Post-pandemic	0.41	0.11
SVB Stress	0.02	0.15

7. Implications for Macroprudential Regulation

- Set the stage: Authorities ARE going to preserve the financial ecosystem because NBFIs failures have consequences for the real economy or banks
 - Were measures of March 2020 indirectly a support of the banking sector?
- Ex-post interventions
 - Either help NBFIs directly (Electricity producer guarantees)
 - Through markets (Fed buying MBS or BOE purchasing Gilts)
 - Through the banking system (Fed financing facilities)

Implications for Macroprudential Regulation (Cont'd)

- Ex ante: Moral hazard in the pricing of NBFIs debt and bank-NBFI linkages
 - i. Monitoring of bank-NBFI linkages and aggregate demandable claims
 - Should be a part of *scenario analysis*: CFTC, BOE “one-off” liquidity stress tests
 - ii. Ex-ante visibility and regulation of “liquidity puts”
 - Committed central bank liquidity facilities for banks: Nelson (2023), also NBFIs?
 - Pawnbroker for all seasons: King (2016)
 - Federal Liquidity Options: Tuckman (2012)

However, regulation unlikely to be able to get ex ante into “all the cracks”

Implications for Macroprudential Regulation (Cont'd)

- State-contingent approach:
 - i. Monitoring of NBFIs and Bank-NBFI linkages should lead to time-varying, state-contingent decision on inclusion in *regulatory stress tests*
 - Dynamic or principle-based designation as Systemically Important (SIFIs)
 - “Systemic as a herd (NBFI type)” rather than by individual size or concentration
 - ii. (Directly or indirectly) Rescued NBFIs are *prima facie* SIFIs
 - Is it tenable, or desirable, for central banks to expand LOLR to NBFIs without expanding regulatory authority?
 - > E.g.: Fed LOLR (TSLF, PDCF) in 2008, some 13(3) facilities in 2020?
 - Put differently, to what extent should NBFIs that effectively receive discretionary LOLR support be subject to regulatory authority? (“Hotel California” principle)

Conclusion

- Banks and NBFIs are NOT substitutes.
- Banks and NBFIs are intimately interconnected, evolving endogenously to business, financial and regulatory environments.
- Bank and NBFIs liability risks, not just asset risks, intersect in a complex manner.

Appendix

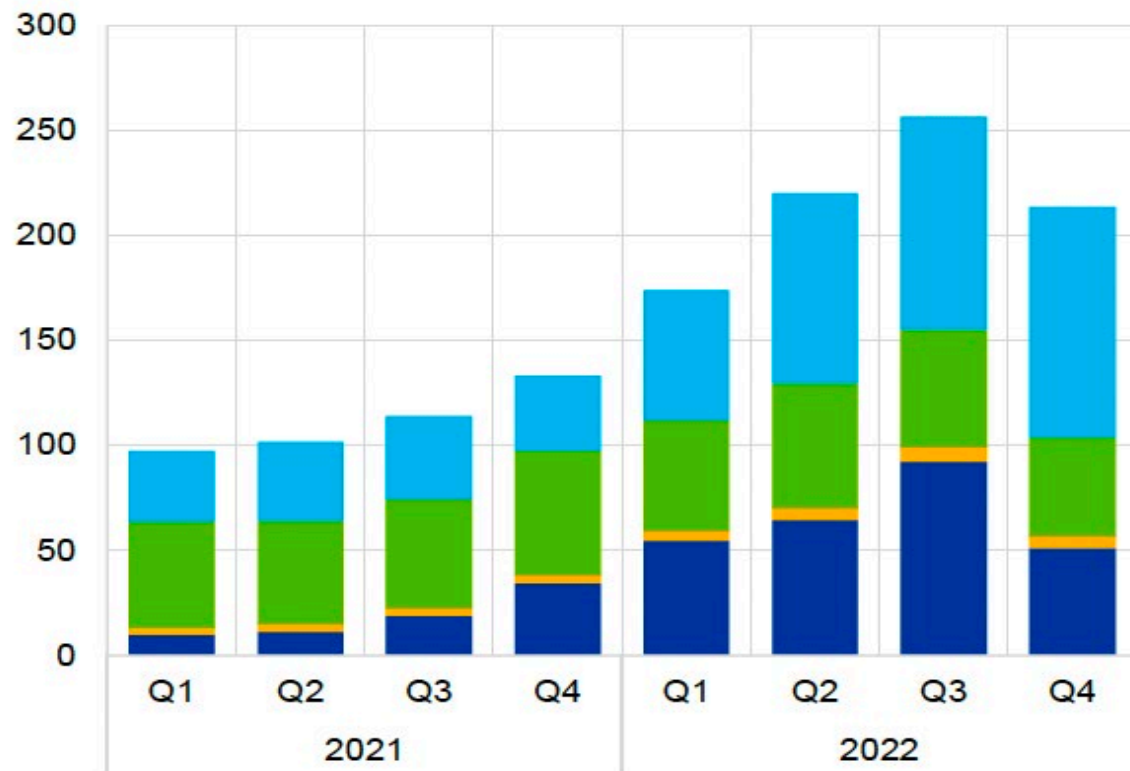
Customer Funds Held in Cleared Swaps Accounts at US FCMs



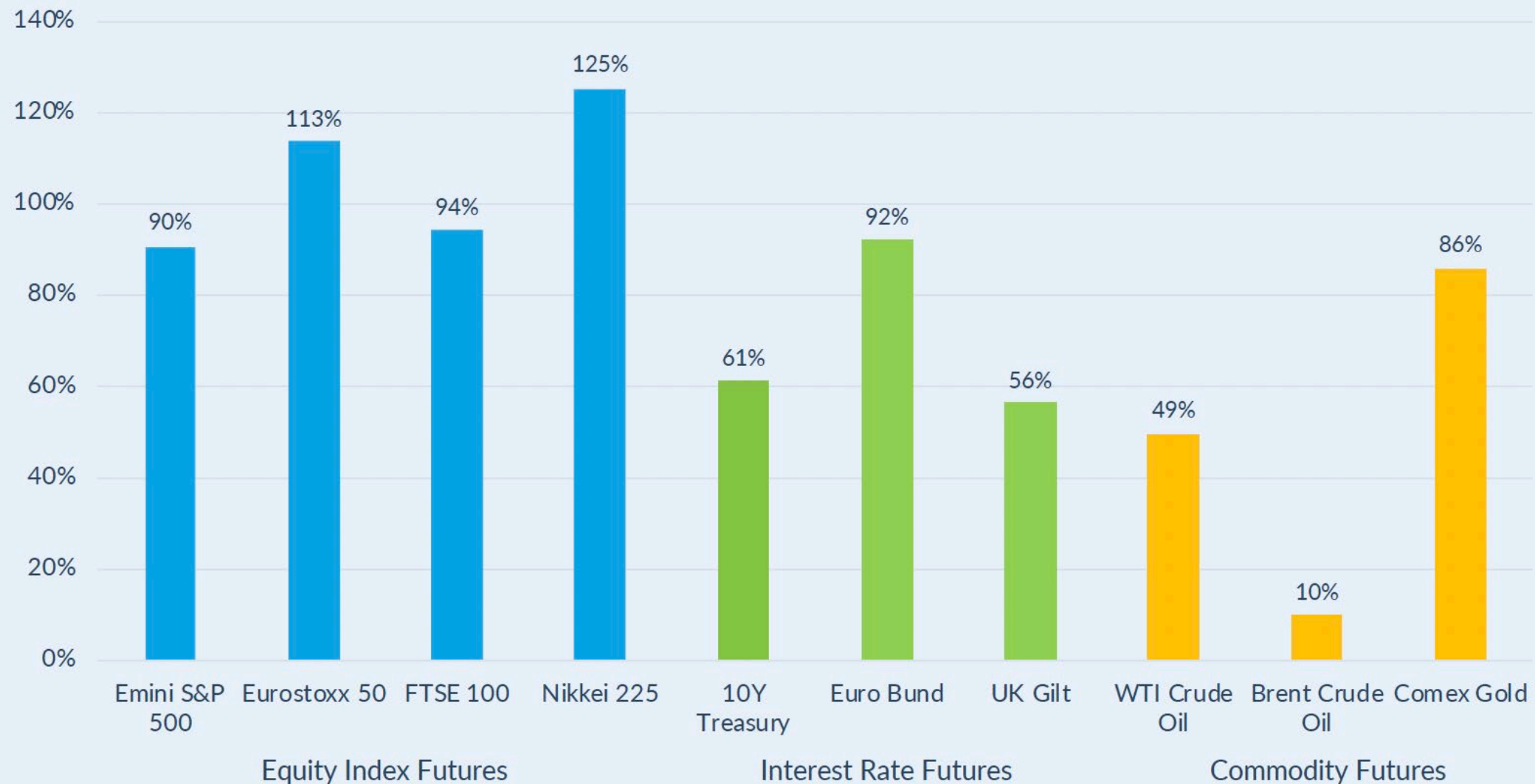
a) Outstanding amounts of initial margin required and excess collateral received by EU27 CCPs for derivatives

(EUR billions)

- Commodities
- Credit
- Currency
- Equities
- Interest rates



Percent increase in initial margin requirement between Jan 1 and Mar 30, 2020



Composition of banks' holdings of nonbanks' liabilities

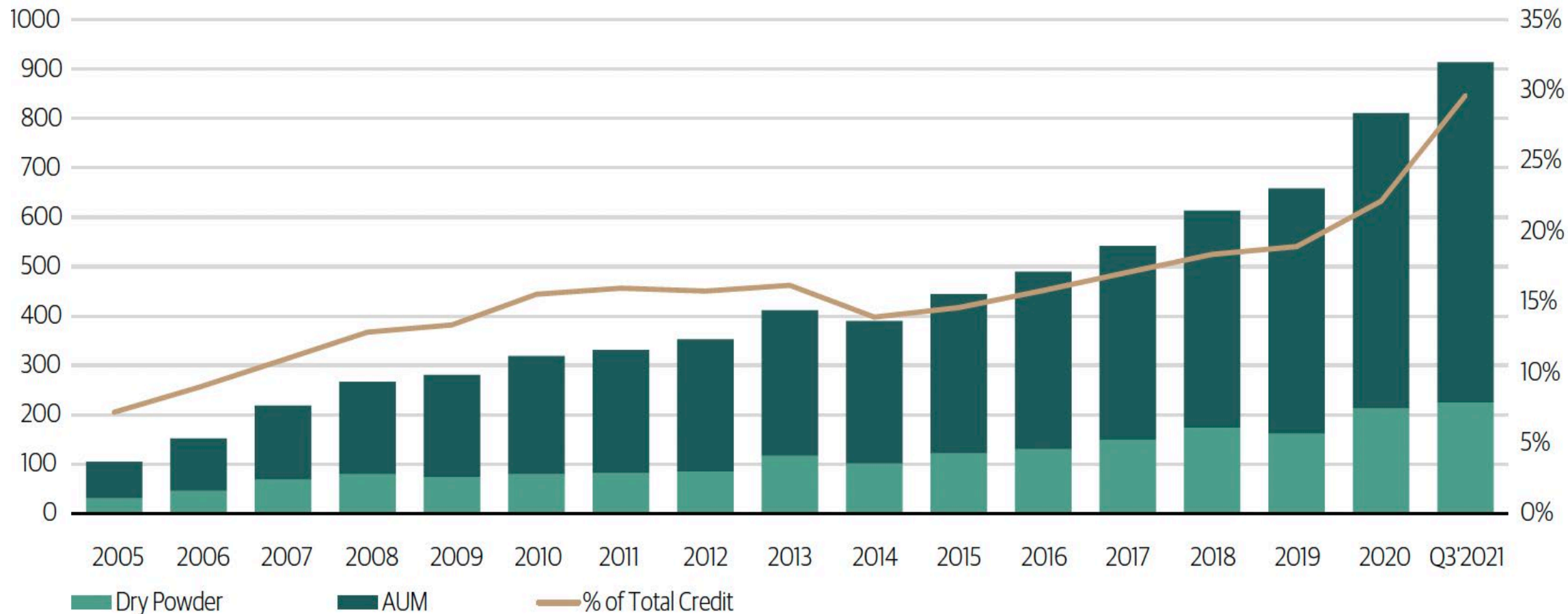
Issuer	Instrument	Composition	Issuer	Instrument	Composition
ABS	Corporate and Foreign Bonds	100%	GSE and Agency	Agency- and GSE-Backed Securities	98%
Broker/Dealers	Misc	69%	GSE and Agency	Misc	2%
Broker/Dealers	Federal Funds and Repos	17%	GSE and Agency	Federal Funds and Repos	0%
Broker/Dealers	Depository Institution Loans N.E.C.	13%	Life Ins.	Life Insurance Reserves	87%
Broker/Dealers	Corporate and Foreign Bonds	1%	Life Ins.	Misc	12%
Equity REITs	Mortg_comm	66%	Life Ins.	Federal Funds and Repos	1%
Equity REITs	Depository Institution Loans N.E.C.	15%	Mortgage REITs	Federal Funds and Repos	61%
Equity REITs	Corporate and Foreign Bonds	10%	Mortgage REITs	Corporate and Foreign Bonds	24%
Equity REITs	Misc	6%	Mortgage REITs	Depository Institution Loans N.E.C.	11%
Equity REITs	Mortg_home	3%	Mortgage REITs	Misc	4%
Finance Companies	Depository Institution Loans N.E.C.	70%	Other Fin. Bus.	Misc	63%
Finance Companies	Corporate and Foreign Bonds	19%	Other Fin. Bus.	Other Loans and Advances	37%
Finance Companies	Misc	11%	Other Fin. Bus.	Open Market Paper	0%
Finance Companies	Open Market Paper	0%	PC Ins.	Federal Funds and Repos	100%
Mutual Funds	Mutual Fund Shares	100%	PC Ins.	Misc	15%

Source: TO BE ADDED

Is Every NBFIs just a SPV of Banks? (Cont'd)

- Direct bank lending to NBFIs, e.g., private equity funds, private credit funds (CLOs), REITs, nonbank mortgage lenders, insurance co's, pension funds
 - Warehouse financing for mortgages, CLOs, and other ABS
 - Subscription finance loans (e.g., to private equity funds). Loans are secured by investor commitments rather than recourse to underlying investments.
 - Allow managers to invest quickly without irregular capital calls to investors.
 - Lending for derivatives (initial) margin.

EXHIBIT 2: US Private Credit Market / % of Total Credit Market



Source: Preqin, Credit Suisse, As of September 30, 2021; Total credit market defined as the aggregate of the high yield bond, senior loan, and private credit markets. Senior loans refers to broadly syndicated loans.

Nonbank Mortgage Origination and Servicing

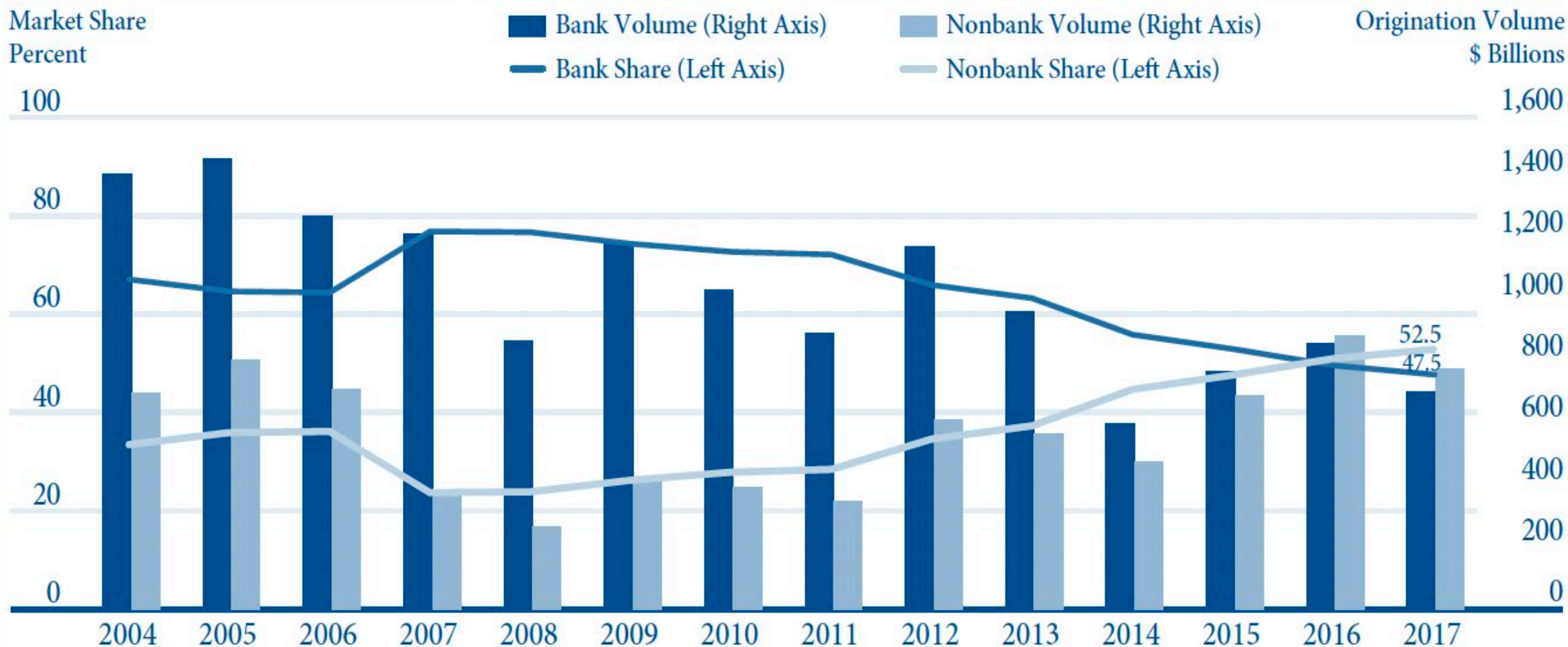
Origination

- Warehousing
 - Make mortgage loans
 - Draw on bank warehouse credit lines
- Securitization
 - Sell loans via GSE MBS
 - Pay off drawn credit lines
- Government-granted forbearance during COVID-19 pandemic
 - Originators normally cannot sell nonperforming mortgages into securitizations.
 - Servicers had to make and finance significant advances.
- GSEs and government insurers created programs to ease funding stress, e.g.,
 - bought loans in forbearance for a fee.
 - bought 2nd liens from originators to cover some delinquent amounts.
 - loaned servicers of some mortgages funds to cover advances.

Servicing

- Performing mortgages
 - Pass mortgage, tax, and insurance payments from homeowners to investors/others.
- Nonperforming mortgages
 - Advance payments to investors/others.
 - Finance payments with securitizations and bank-sponsored CP or bank credit lines.

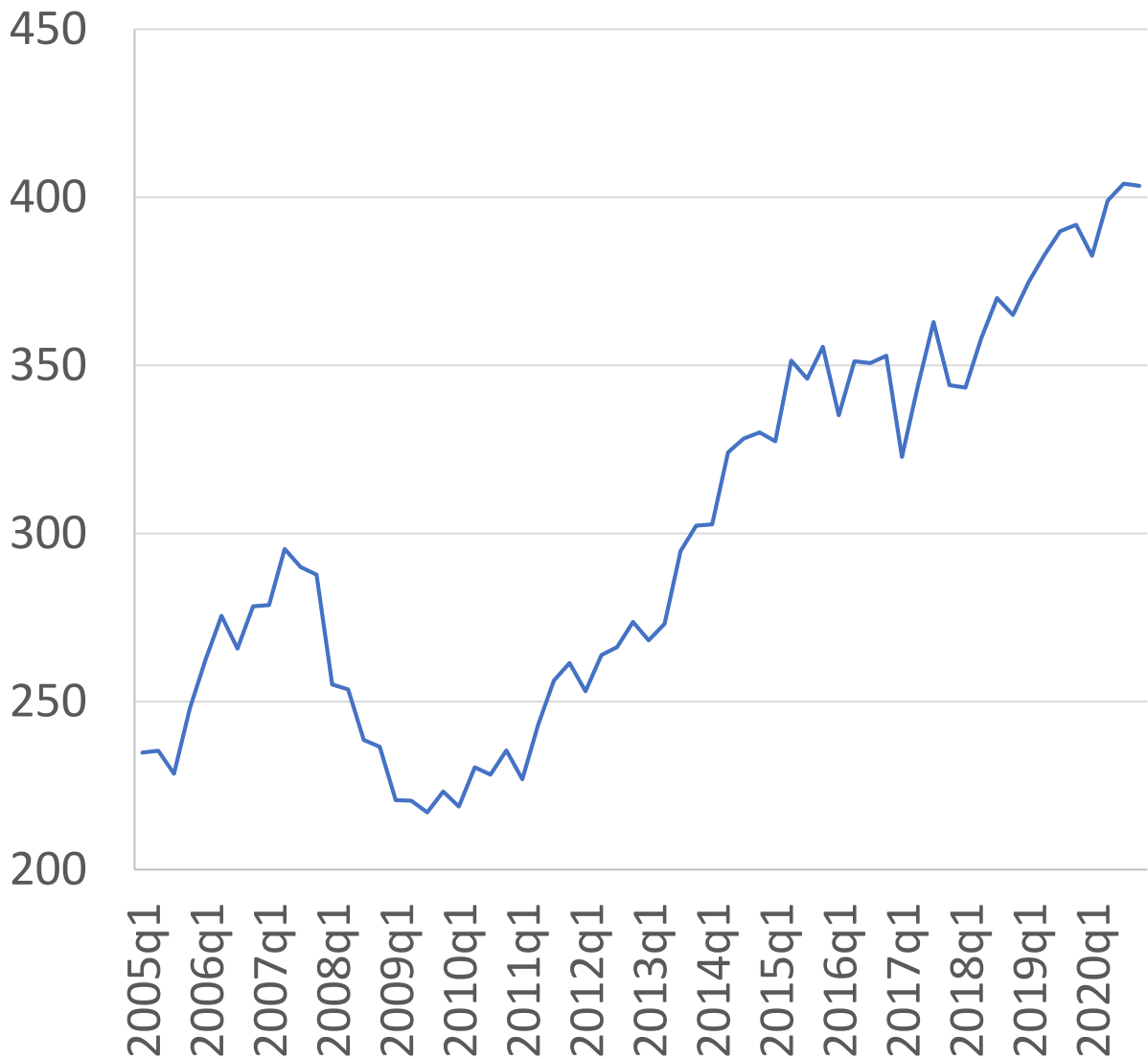
Nonbanks Increased Mortgage Originations After the Financial Crisis



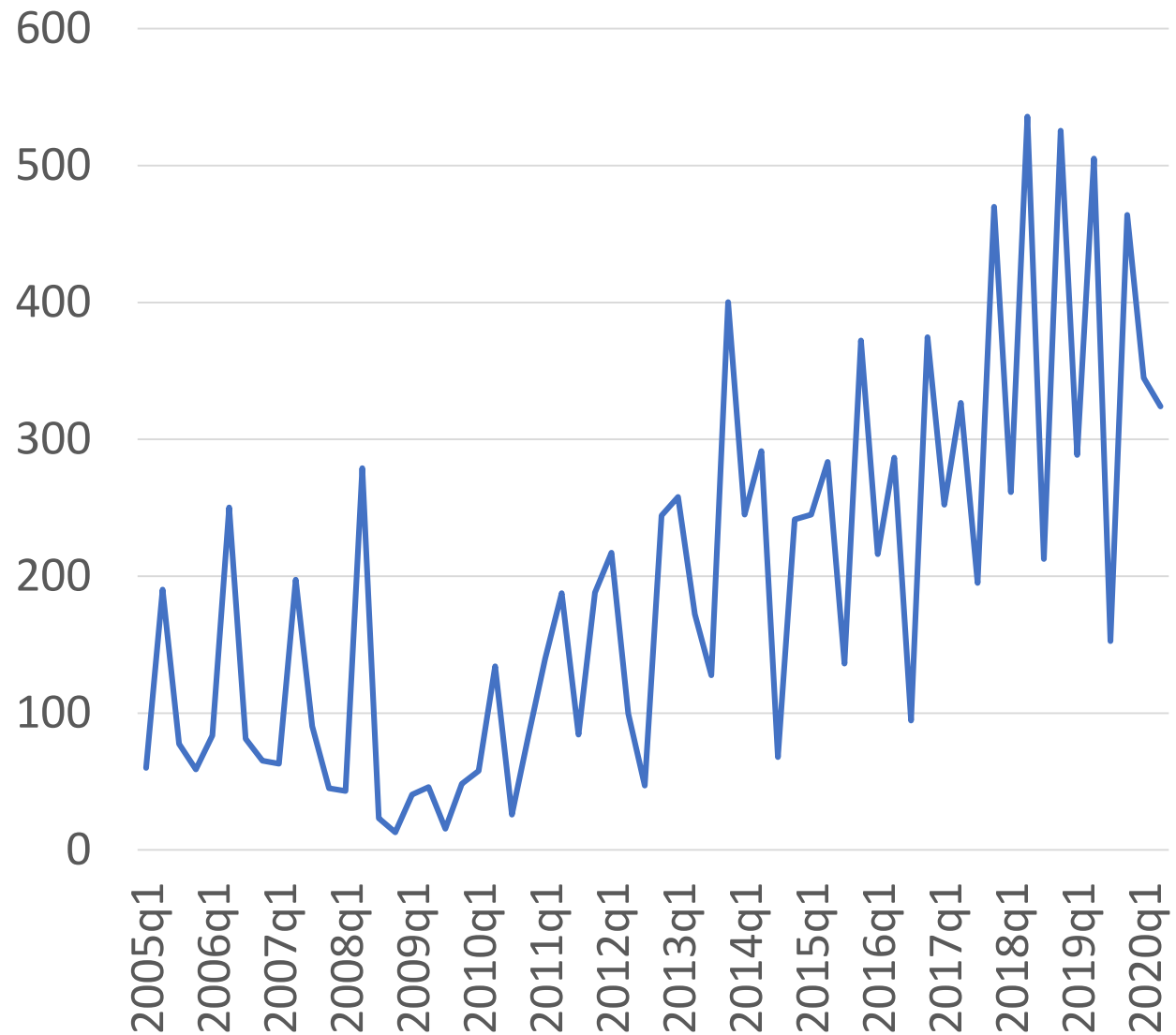
Source: FDIC analysis of Home Mortgage Disclosure Act data.

Notes: Nonbanks include all Department of Housing and Urban Development reporters. Banks include banks, credit unions, and their affiliates. Data are limited to single-family residential mortgage originations, defined as first-lien purchase or refinance loans secured by an owner-occupied, 1-4 family unit, site-built property.

Outstanding Commitments to NBFIs
(in USD billion) [Compustat]



New Commitments to NBFIs
(in USD billion) [Dealscan]



Source: Acharya, Gopal, Jager and Steffen (2023)

Contingent Funding of NBFIs by Banks (Cont'd)

- Case studies:
 1. Provision to, utilization by REITs (others: CCPs/exchanges, CLOs/credit institutions)
 2. UK Pension Funds
 3. Electricity Derivatives

Contingent Funding of NBFIs by Banks (Cont'd)

- Case studies:
 1. Provision to, utilization by REITs (others: CCPs/exchanges, CLOs/credit institutions)
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Contingent Funding of NBFIs by Banks (Cont'd)

- Case studies:
 1. Provision to, utilization by REITs (others: CCPs/exchanges, CLOs/credit institutions)
 2. UK Pension Funds
 3. Electricity Derivatives

Bank-NBFI Linkages and Systemic Risk (Cont'd)

Granger causality tests (p-values) in %SRISK changes between Banks and NBFIs

One lag

Period	Bank Causes	Nonbank Causes
	Nonbank	Bank
Overall	0.78	0.00
Pre-GFC	0.80	0.00
GFC	0.01	0.08
Post-GFC	0.61	0.00
Oil Shock	0.11	1.00
Hike+QT	0.82	0.09
Pandemic	0.90	0.23
Post-pandemic	0.98	0.34
SVB Stress	0.73	0.25

Optimal lags

Period	Bank Causes	Nonbank Causes
	Nonbank	Bank
Overall	0.00	0.00
Pre-GFC	0.01	0.00
GFC	0.01	0.08
Post-GFC	0.61	0.00
Oil Shock	0.11	1.00
Hike+QT	0.82	0.09
Pandemic	0.90	0.23
Post-pandemic	0.98	0.12
SVB Stress	0.00	0.47