Evolution of liquidity risk in an environment of higher interest rates

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NYU Stern School of Business

Seventh ESRB Annual Conference - 16 November 2023

"This collection of essays by some of the leading experts in the field masterfully covers all the bases with respect to current challenges facing the banking system. It provides a thoughtful treatment of the economics of banking, the missteps by management and regulators that led to SVB's failure, the implications for the industry going forward, and the difficult tradeoffs facing policymakers. It will be enormously valuable for anyone in the public or private sector with an interest in the industry."

- Jeremy Stein, Moise Y. Safra Professor of Economics Harvard University, and former member of the Board of Governors of the Federal Reserve System

"This volume is a must read for anyone who wants to understand the regional bank turmoil of 2023. In this compilation of essays, leading scholars lucidly explain just what went wrong, why the problems are not yet behind us, how policy makers can enhance the resilience of the banking system, and the dangers that lurk should policy makers learn the wrong lessons from this episode."

- Kathryn Judge, Harvey J. Goldschmid Professor of Law, Vice Dean for Intellectual Life, Columbia Law School

"This new book by leading academicians continues the Stern tradition of analyzing the frailties of our financial system and proposing remedies to promote financial resilience. It will be of great use to scholars, market practitioners and policymakers alike."

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"The NYU analysis is the definitive guide to the reasons for the bank failures in early 2023 and to the changes in bank regulation that are now needed in their wake."

- Mervyn King, former Governor of the Bank of England

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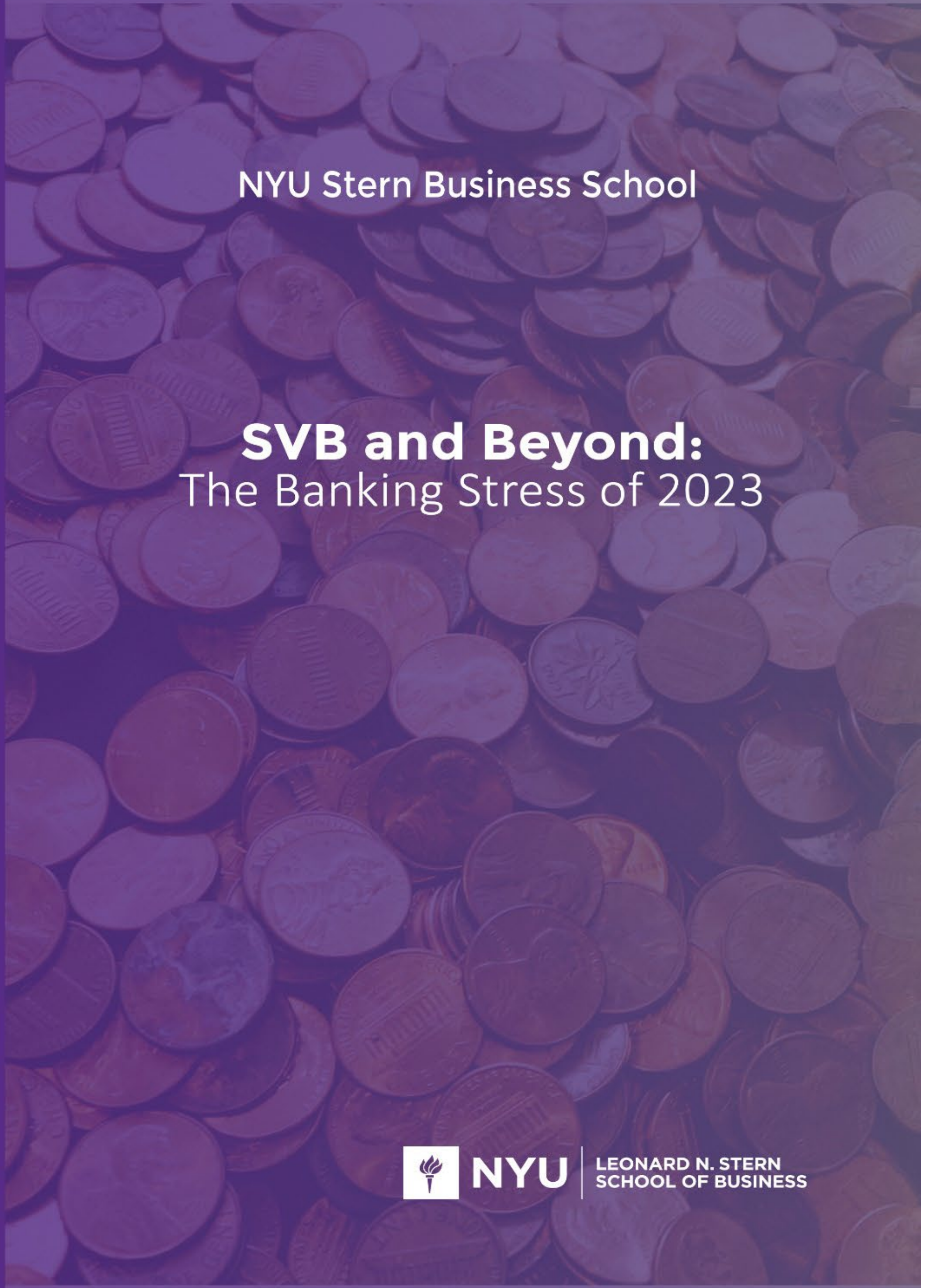
SVB and Beyond: The Banking Stress of 2023

NYU Stern Business School



Outline of the talk

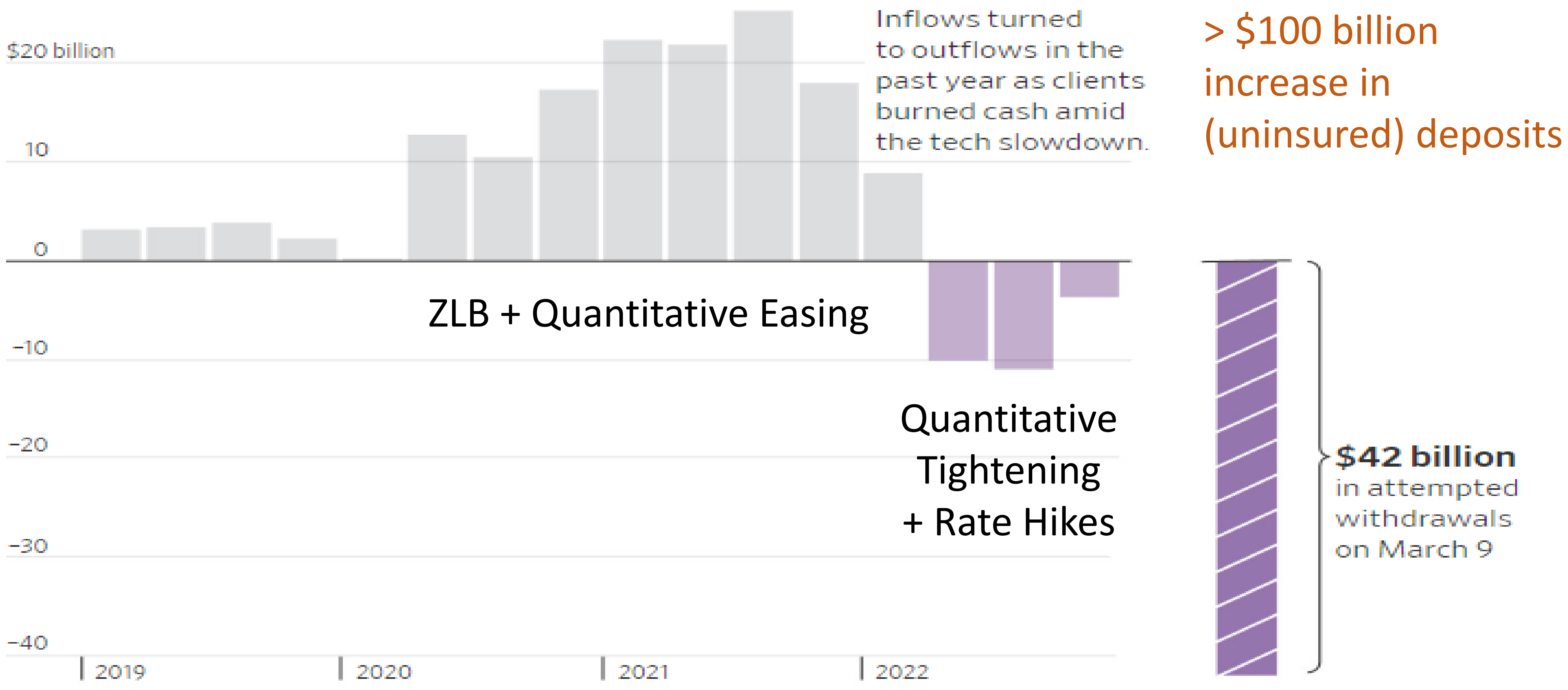
I. Banks and Uninsured Deposits –

- The Role of Quantitative Easing (Chapters 1-2 and based on "Liquidity Dependence and the Waxing and Waning of Central Bank Balance Sheets", by Viral V Acharya, Rahul Chauhan, Raghuram G Rajan and Sascha Steffen)
  - Earlier version "Liquidity Dependence: Why Shrinking Central Bank Balance Sheets is an Uphill Task", presented at Jackson Hole Economic Symposium 2022)

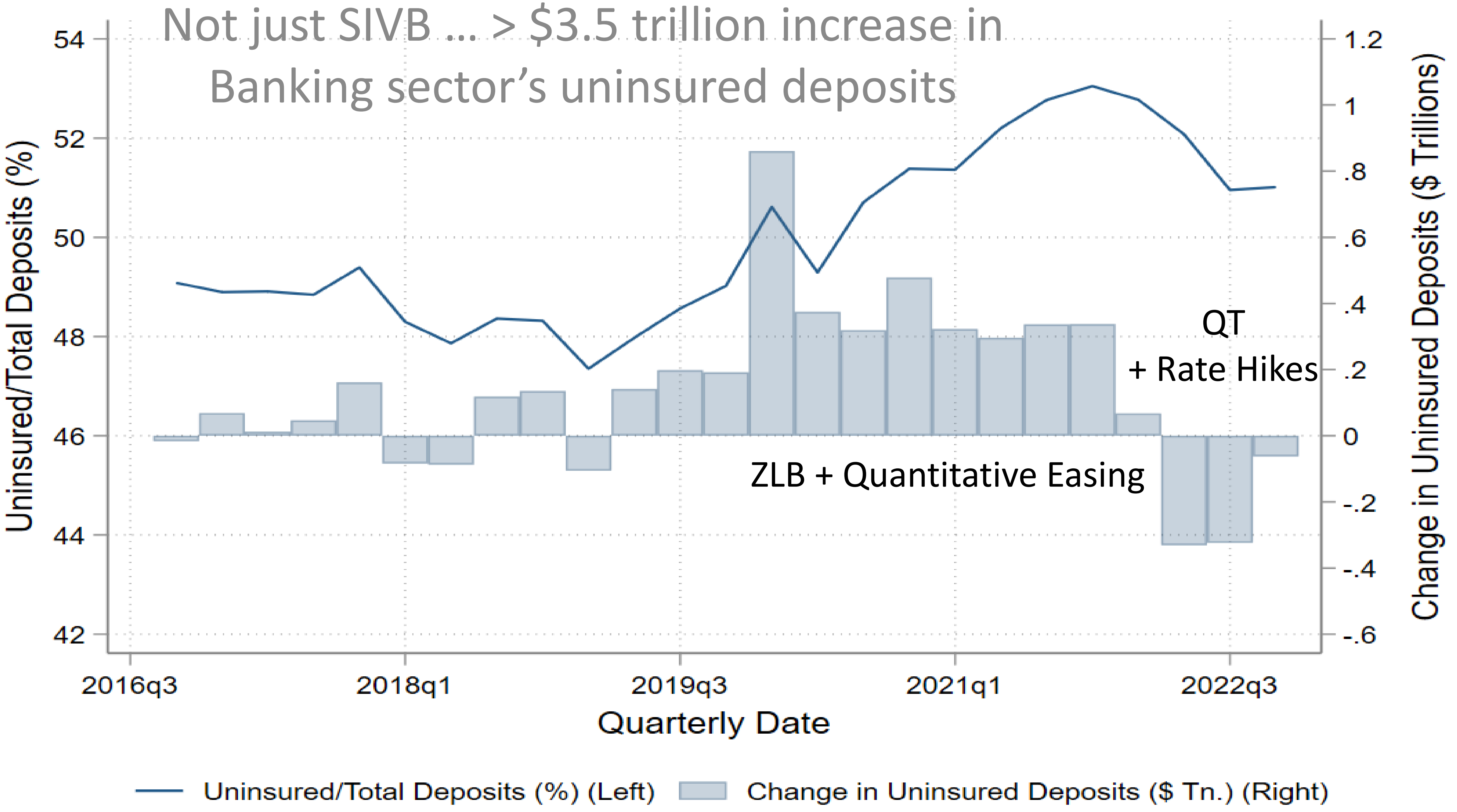
II. Banks, Uninsured Deposits and Interest-rate Risk –

- Not clear that Deposit Insurance is the necessary or even sufficient remedy (but see Chapter 8)
- Recommendation: Stagflation Stress-Test, cross-validated with Market Equity Values (Chapter 6)

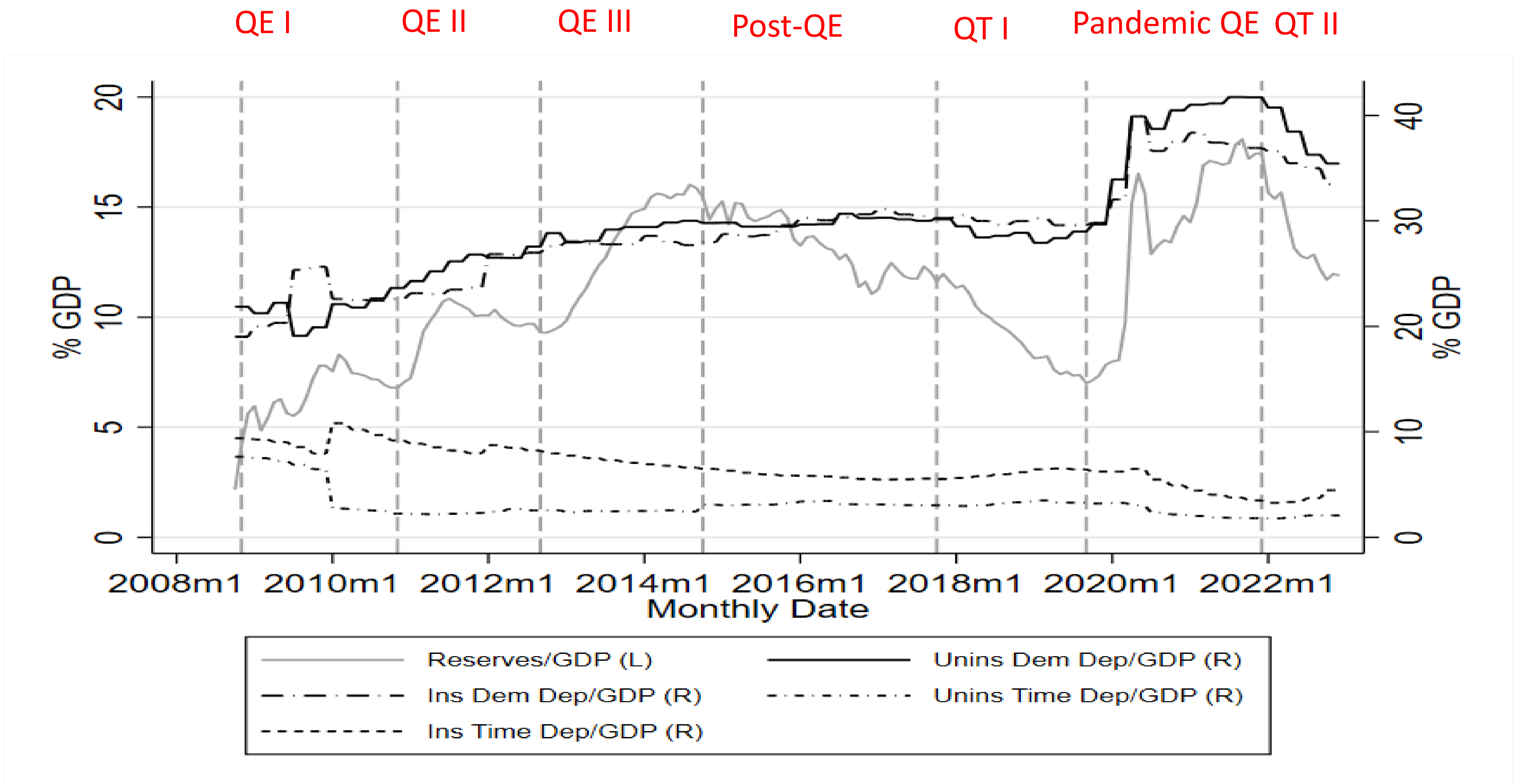
I. Leading example: SIVB deposits, quarterly net change



Sources: company filings (quarterly); California regulators (March 9)


Not just SIVB … > $3.5 trillion increase in
Banking sector's uninsured deposits
Uninsured/Total Deposits (%)
54
52
50
48
46
44
42
Change in Uninsured Deposits ($ Trillions)
1.2
1
.8
.6
.4
.2
0
-.2
-.4
-.6
QT
+ Rate Hikes
ZLB + Quantitative Easing
2016q3
2018q1
2019q3
2021q1
2022q3
Quarterly Date
Uninsured/Total Deposits (%) (Left)
Change in Uninsured Deposits ($ Tn.) (Right)

Uninsured/Insured Demandable/Time Deposits (Prop. of GDP)



A Key Insight

- Unprecedented expansion of central bank balance sheets since the GFC
- Such QE is not just an expansion of central bank balance sheets

- <u>QE is typically also an expansion of commercial bank balance sheets, on the liability side via the growth of uninsured deposits</u> (see next slide)

Typical QE: Purchase from public/non-banks

Initial Balance Sheet Conditions

FEDERAL RESERVE	
Assets	**Liabilities**
Treasury securities	Reserves held by banks Cash held by the Treasury

BANKING SECTOR	
Assets	**Liabilities**
Treasury securities Reserves at the Fed	Deposits Capital

PUBLIC	
Assets	**Liabilities**
Deposits Treasury securities	Net worth

The Fed Purchases Assets from the Public

Balance Sheet Effects

FEDERAL RESERVE	
Assets	**Liabilities**
Treasury securities +$1	Reserves held by banks +$1 Cash held by the Treasury

Bank balance sheets expand, financed with deposits (typically wholesale or uninsured)

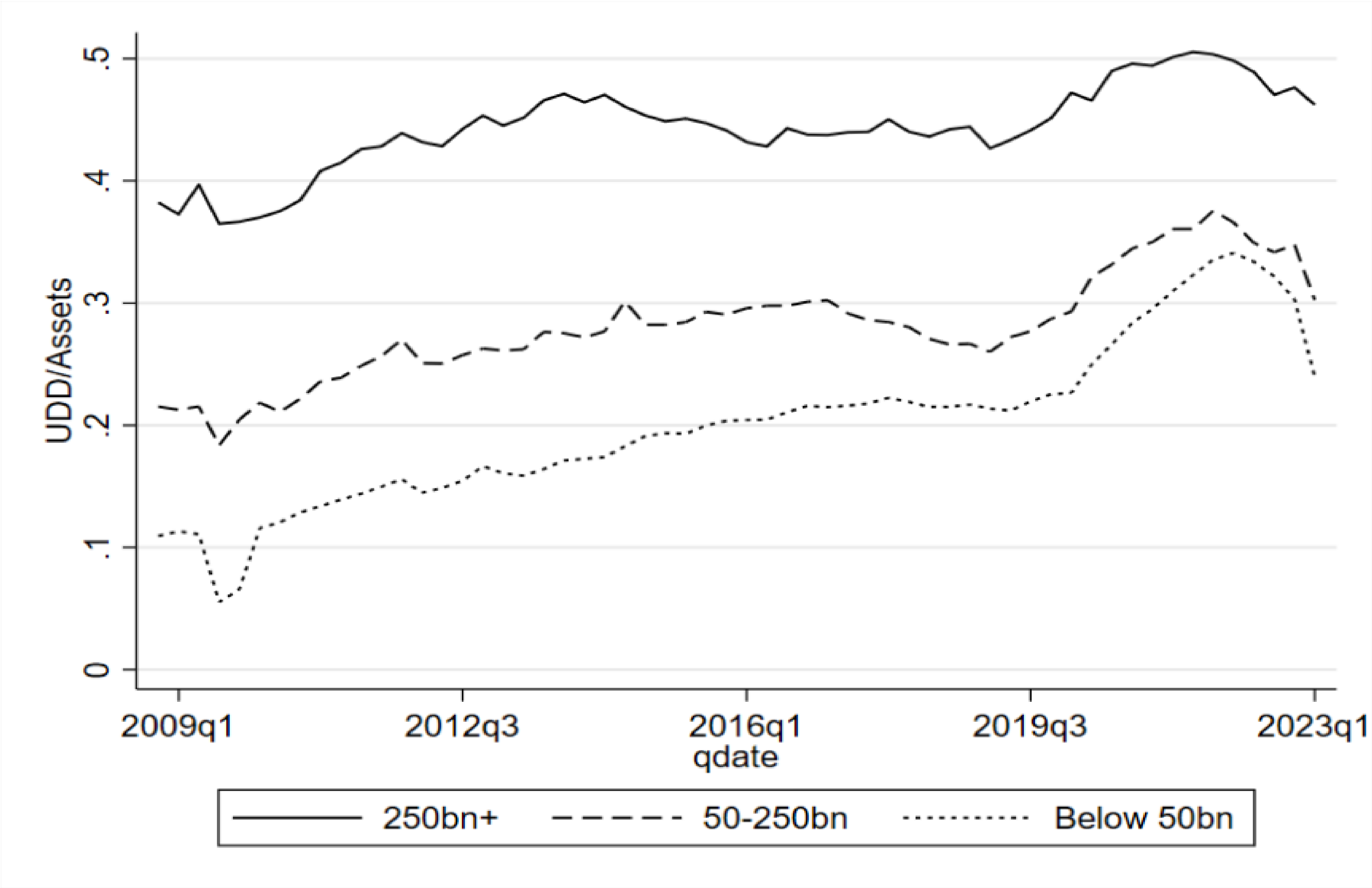
BANKING SECTOR	
Assets	**Liabilities**
Treasury securities Reserves at the Fed +$1	Deposits +$1 Capital

PUBLIC	
Assets	**Liabilities**
Deposits +$1 Treasury securities -$1	Net worth

Source: “How the Fed Changes the Size of its Balance Sheet” (Leonard, Martin and Potter, *Liberty Street Economics,* 2017)

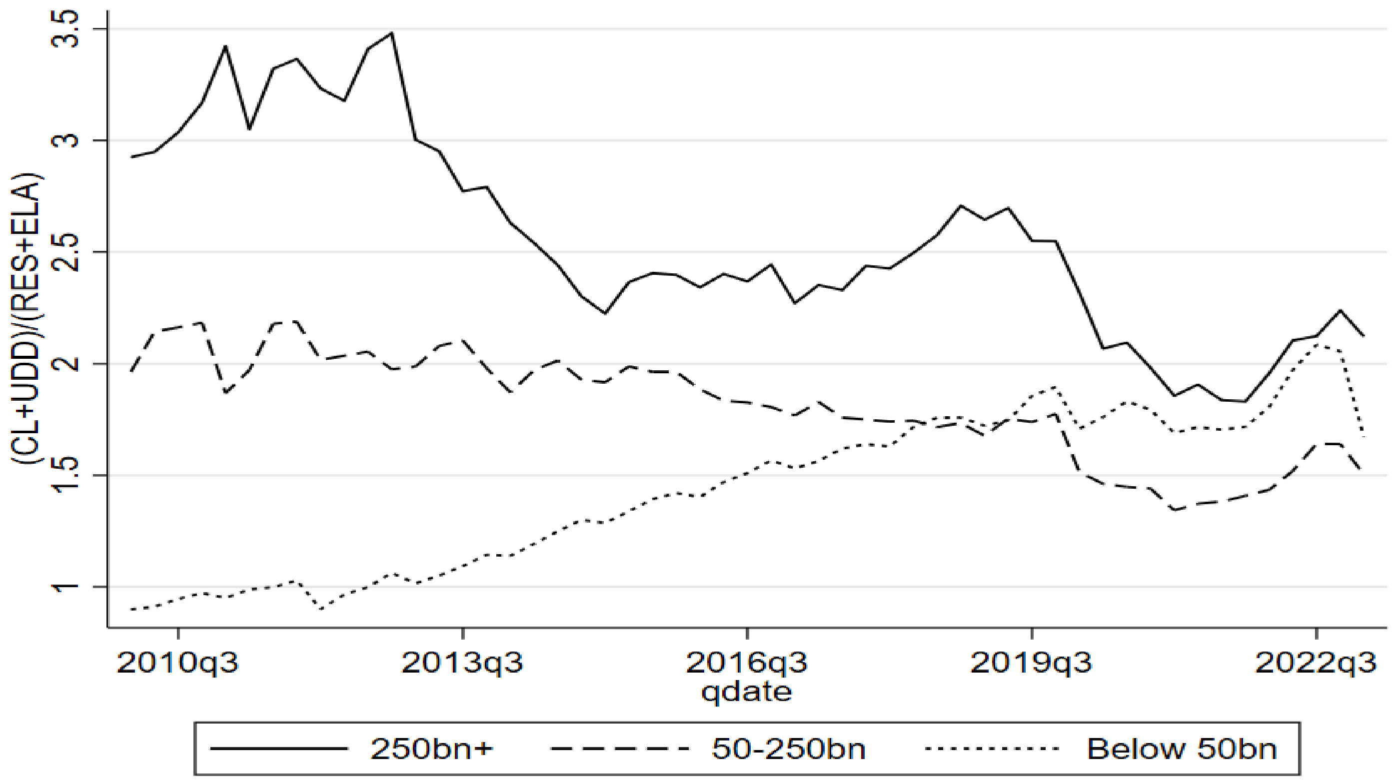
Ratcheting-up of Liquidity Risk (I)

Uninsured Demandable Deposits/Assets



Ratcheting-up of Liquidity Risk (II)

Claims to Liquidity:
(Uninsured Demandable Deposits + Credit Lines) /(Reserves + Eligible Assets)



Largest banks becoming safer, smallest banks increasingly at risk of illiquidity

Uninsured Demandable Deposits part of the ratio shows similar heterogeneity

Policy tradeoffs? Cost of repeated liquidity provision?

- Financial Stability and Monetary Policy tradeoff from central bank b/s tool:

  - Accidents waiting to happen? Not just banks, also shadow banks? E.g., BOE in 2022
  - Agency problems in banks and bailouts? E.g., Fed and Treasury in March 2023
  - Engage in QT while "feeling the stones" for financial fragility
  - Revisit desirable scale, scope, duration of QE: "pushing on a string"?

- Tightening post QE associated with financial fragility despite excess reserves (reverse repo) and even in case of small liquidity shocks.
- Liquidity dependence? Can liquidity support be pursued indefinitely?
- Market underprices liquidity mismatches, enhancing need to intervene.
- Permanent fiscal financing / interferes with monetary function.

Further Queries relating to Deposit Insurance

- Was the intention of QE to expand deposit insurance (quasi-fiscal → fiscal)?
- If not, one should resist the urge to dealing with QE's fallout in QT by DI?

- It is perhaps better to ask and understand first QE-related vulnerabilities…

- Central banks should use regulatory and supervisory tools instead

- Higher interest rates → Bank insolvency? + QE/QT cycle → Bank runs?

II. Market-equity based stress test: $SRISK \ \ vs \ \ SRISK_{unins}$

SRISK = E[Capital Shortfall | Crisis]

= $\mathrm{E}[k * (D + E) - E$ | Crisis]

Formula: $k * (D) - (1 - k) * (1 - lrmes) * mv$

$SRISK: prudential\ level\ k = 8\%$ (publicly available at NYU Stern VLAB)

$$SRISK_{unins}:\ k = 8\%\ (1 + \frac{Uninsured\ Deposits}{Total\ Deposits})$$

D: Book Debt
mv: Market Equity

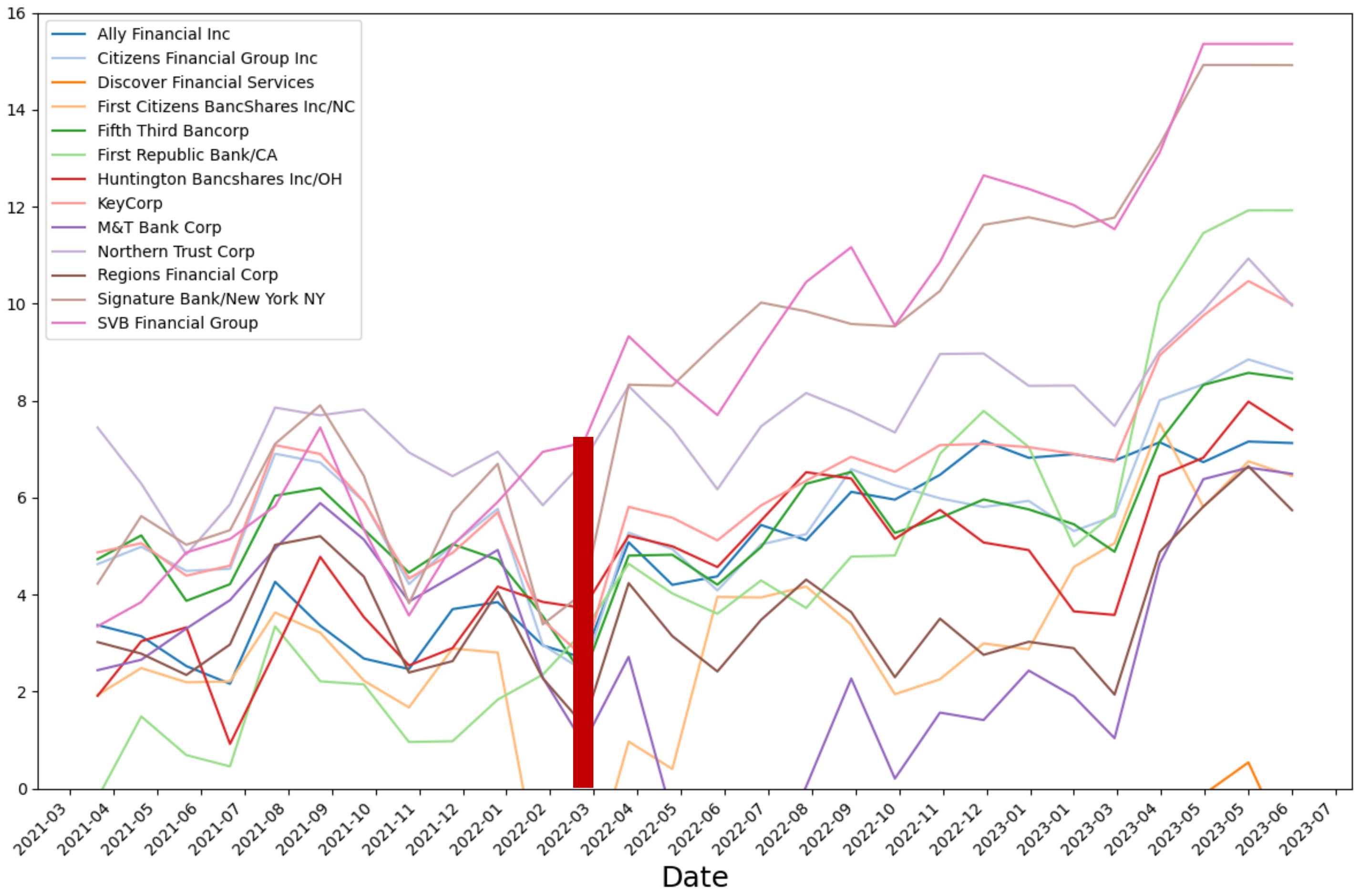
$lrmes$: Long Run Marginal Expected Shortfall

(“downside beta” in 40% market correction)

Quasi-mv = D + mv = Book Debt + Market equity

Time series of $SRISK_{unins}/QuasiMV$

Banks with Book Assets: 100~250bn



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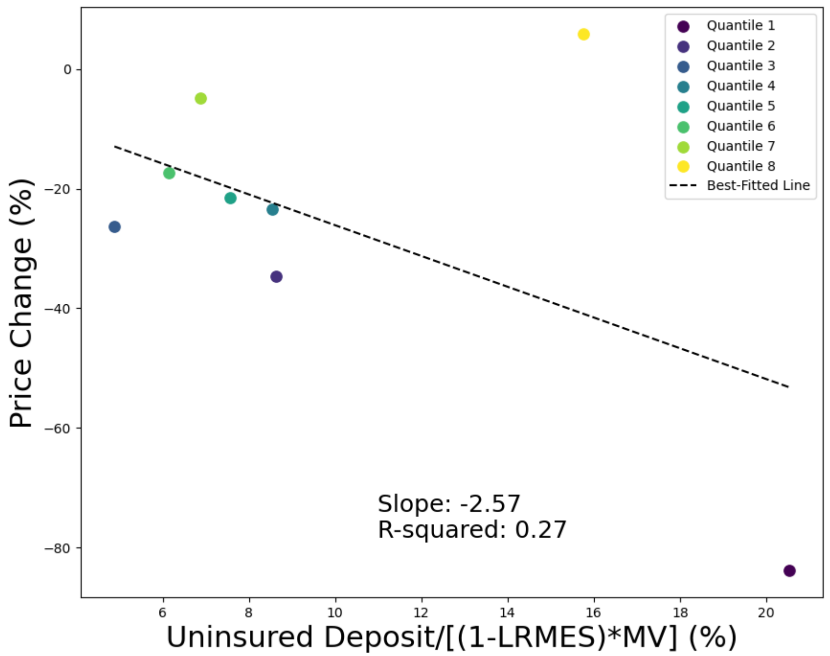
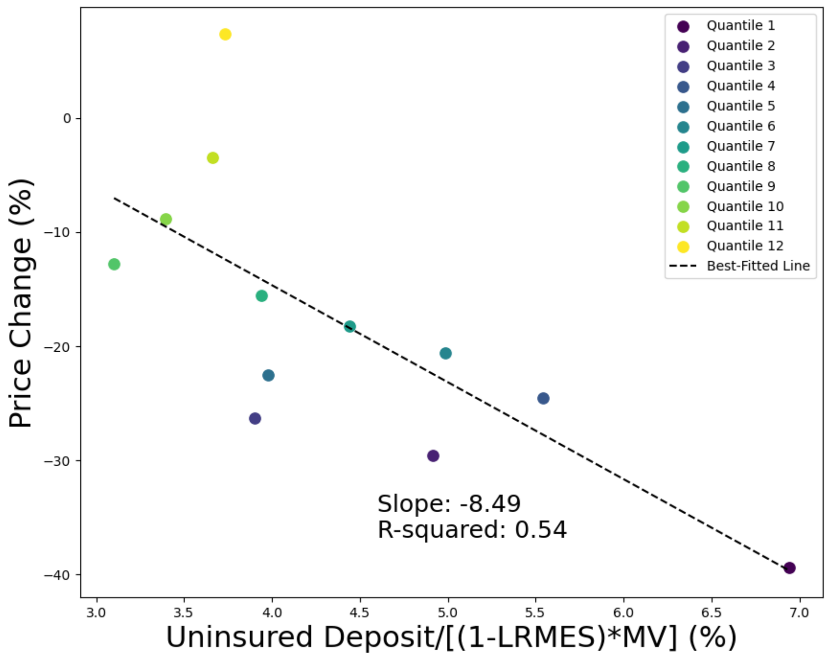
Bin-Scatterplot of $Stressed\ Leverage\ Ratio\ 2\ (as\ of\ 31\ Oct\ 2022)$ By $Price\ Change\ (Nov\ 2022 \sim Mar\ 2023)$

$$Stressed\ Leverage\ Ratio\ 2: \frac{uninsured\ deposit}{(1 - lrmes) * MV}$$

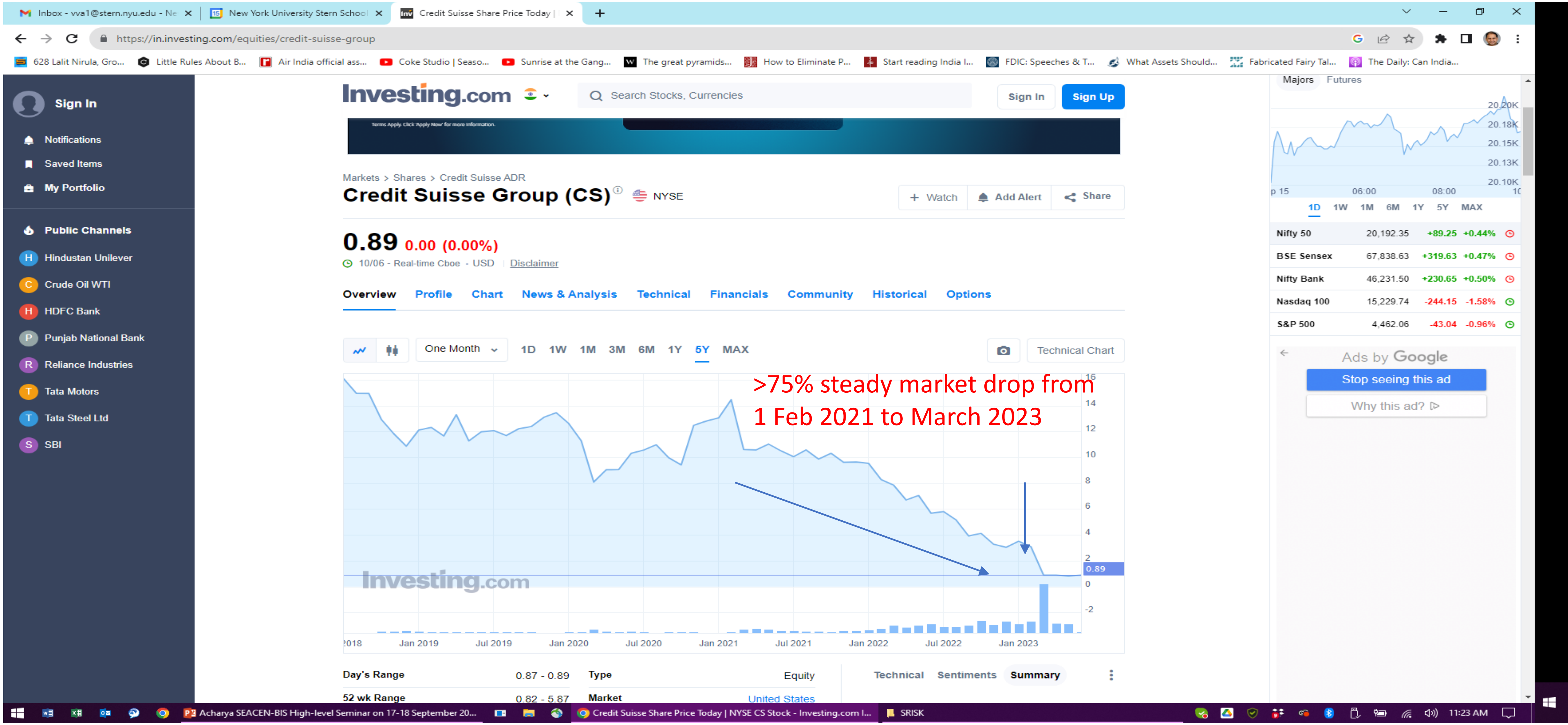


Bank Size: >50bn
Bank Number: 31



Bank Size: 1~50bn
Bank Number: 239

Europe (CS): Pay attention to Market Equity!



So what should be done with banks now?

- Backstop it all, provide guarantees, expand DI?
  - LOLR and DI in midst of a crisis are substitutes – there is LOLR in place, so why is DI needed?
  - FDIC 2008 TAG: Effective, but was a guarantee to corporate deposits for a fee as Fed (CB) should not lend to insolvent institutions
  - This helps stem runs, but does not restore confidence or bring down vol, as in 2007-09
  - Moral hazard of risk-seeking: Remaining under-capitalized. Healthier banks may skip too!
  - The social problem is to produce the "optimal" quantity of deposits, so get risks internalized

- What worked in the past can provide some guidance…
  - TARP, SCAP, Dodd-Frank Act, Resolution Planning, CCAR, LCR, …
  - They seem to have worked out okay when applied persistently
  - Weaknesses arose where rules were relaxed: Mid-size and small banks
  - Unlike in Fall 2008, no toxic assets that are hard to value: Assessing bank capital today easier

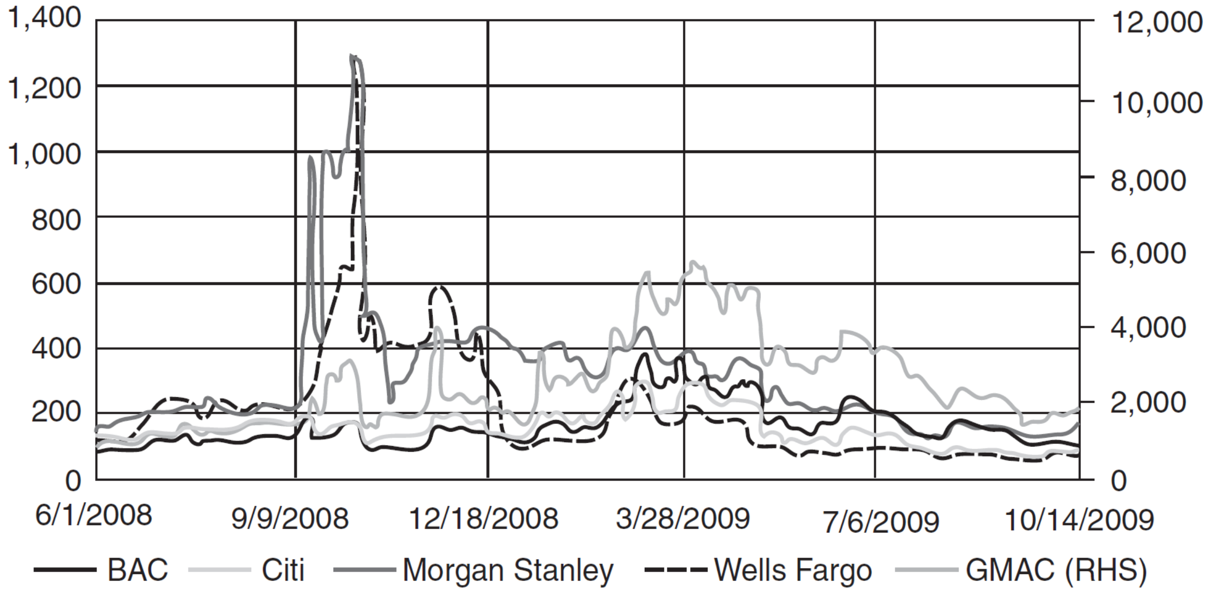


FIGURE 4.1 Five-Year Maturity Senior CDS Spreads, G1

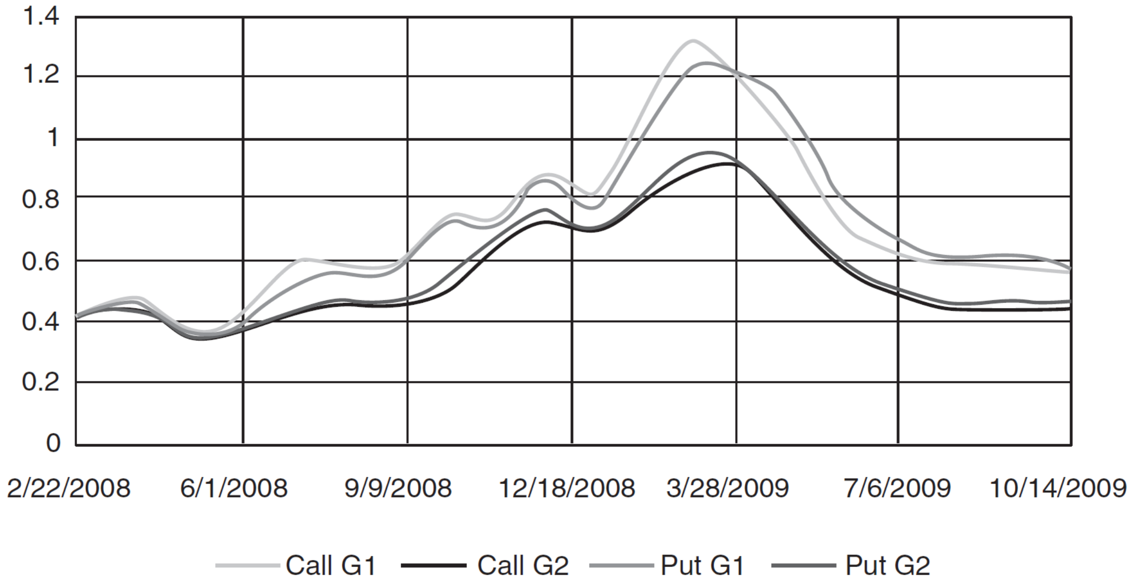


FIGURE 4.3 Average Groupwise Implied Volatilities

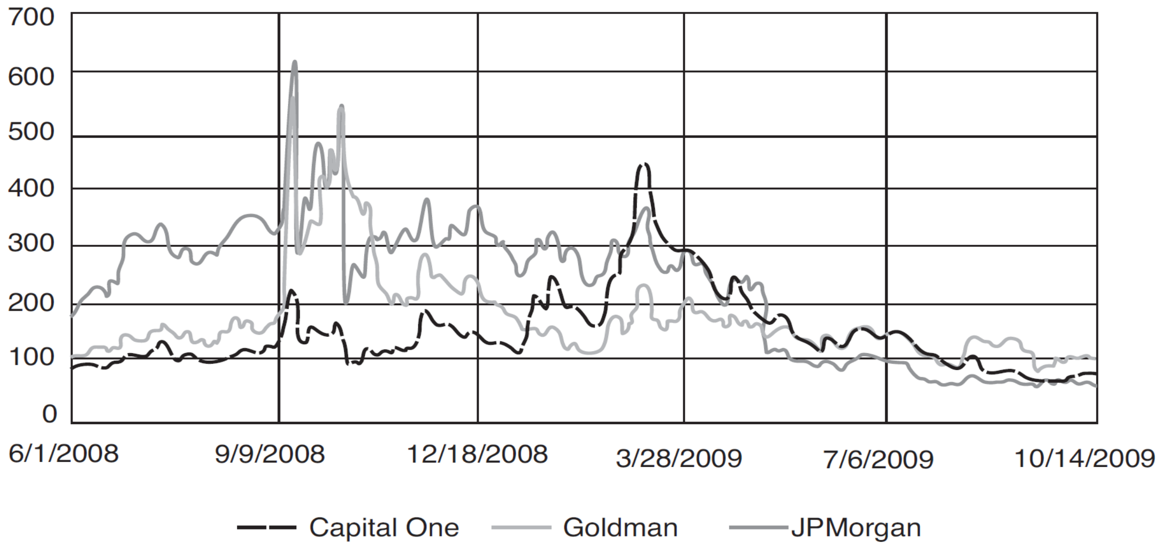


FIGURE 4.2 Five-Year Maturity Senior CDS Spreads, G2

G1: Required to raise capital after stress test of Feb-May 2009

G2: Not required to raise capital after stress test

Source: Chapter 4, “Measuring Systemic Risk”, Viral V. Acharya, Christian Brownlees, Robert Engle, Farhang Farazmand, and Matthew Richardson, in *Regulating Wall Street,* NYU Stern (Wiley), 2011.

The Case for a Stagflation Stress Test

- Stress test + capital-raising, as in Feb-July 2009, for stagflation (poly-crisis)
  - Mark capital honestly in Asset Quality Review for rate hike + recession + house-price declines + decline in commercial real estate (CRE)
    - Stress it for plausible losses and cross-check with independent metrics like NYU Stern's SRISK
  - Get banks to raise capital or sell assets/franchise to more valuable banks
  - If not raise it for them via government-funded (preferred) stakes in equity
  - If done well, government funds might not be required as in 2009

Regulatory Challenge

- Robustness to the <u>risk that risks will change</u>

- Does the stress test capture risks that are present and clear?
  - Higher rates for longer? Stagflation? CRE losses?

- It is best to assume uninsured debts might be all due and payable

  - Diagnosis: (Fragile) Deposit franchise vs Manufacturing tail risk / Carry trades ?
  - Regulation should be robust to this model risk

  - Regardless of the diagnosis, safe to raise bank capital → lower uninsured deposits

  - Recognize the fiscal limits on deposit insurance, guarantees, the size of Fed's put, etc.