By Viral Acharya, Elena Carletti,
Fernando Restoy and Xavier Vives

Banking Turmoil and Regulatory Reform

CEPR

IESE Business School University of Navarra Banking Initiative

BANKING TURMOIL AND REGULATORY REFORM

The Future of Banking 6

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About the authors

Viral V. Acharya is the C.V. Starr Professor of Economics in the Department of Finance at New York University Stern School of Business (NYU-Stern). He was a Deputy Governor at the Reserve Bank of India (RBI) during January 2017 to 23rd July 2019 in charge of Monetary Policy, Financial Markets, Financial Stability, and Research. He is a Research Associate of the National Bureau of Economic Research (NBER) in Corporate Finance, a Research Affiliate at the Center for Economic Policy Research (CEPR), and Research Associate of the European Corporate Governance Institute (ECGI). He is or has been an Academic Advisor to the Federal Reserve Banks of Chicago, Cleveland, Kansas City, New York and Philadelphia, and the Board of Governors, and has provided Academic Expert service to the Bank for International Settlements, the International Monetary Fund and the World Bank. He is a Scientific Advisor to the Sveriges Riksbank since February 2024, a member of the Climate-related Financial Risk Advisory Committee (CFRAC) of the Financial Stability Oversight Council for 2023-26, an invited member of the Bellagio Group of academics and policymakers from central banks and finance ministries since 2021, and a member of the Financial Advisory Roundtable (FAR) of the Federal Reserve Bank of New York since 2020. His primary research interest is in theoretical and empirical analysis of systemic risk of the financial sector, its regulation and its genesis in government- and policy-induced distortions, an inquiry that cuts across several other strands of research – credit risk and liquidity risk, their interactions and agency-theoretic foundations, as well as their general equilibrium consequences. In recent work, he has also studied the impact of pandemic and climate-change related risks.

Elena Carletti is Professor of Finance and Dean for Research at Bocconi University, where she also serves in the Executive Committee of the newly established Institute for European Policymaking and directs the Unit "Banking, Finance and Regulation" at the Baffi Center on Economics, Finance and Regulation. Ms Carletti is a member of the Board of Directors of Unicredit Group, where she is the Chairwoman of the Internal Controls and Risk Committee, and a Member of the Expert Group on Bank Supervision for the European Parliament. In addition, she is the director of the Banking and Corporate Finance network as well as of the Research Policy Network on European Financial Architecture at CEPR. Ms. Carletti is the founder Director of the Florence School of Banking and Finance at the European University Institute, where she now serves as scientific advisor, and a past President of the European Finance Association. She has been a member of the Advisory Scientific Committee of the European Systemic Risk Board (ESRB) from April 2015 to March 2023 and a member of the Scientific Committee "Paolo Baffi Lecture" at the Bank of Italy from 2015 to 2021. Before joining Bocconi University in 2013, Ms Carletti was Professor of Economics at the European University Institute from 2008 to 2013, holding a joint chair in the Economics Department and the Robert Schuman Centre for Advanced Studies. Prior to that, she was Associate Professor at

Goethe University in Frankfurt and Assistant Professor at the University of Mannheim. Ms Carletti holds a PhD in Economics from the London School of Economics. She has published extensively in the most prestigious international journals on topics concerning financial intermediation, financial crises and regulation, monetary policy transmission, competition policy, corporate governance and sovereign debt.

Fernando Restoy became Chair of the Financial Stability Institute, Bank for International Settlements, on 1 January 2017. He had been Deputy Governor of the Bank of Spain since 2012. Previously, he held other senior positions at the Bank of Spain, which he joined in 1991. From 1995 to 1997 he was Economic Advisor and Head of the Monetary Framework Section at the European Monetary Institute in Frankfurt. Mr Restoy was Vice Chair of the Spanish Securities and Markets Commission (CNMV) from 2008 to 2012 and Vice Chair of IOSCO Technical Committee (now Board). He was the Chairman of the Spanish Executive Resolution Authority (FROB) from 2012 to 2015 and has been a Member of the Supervisory Board of the ECB's Single Supervisory Mechanism from 2014 to end 2016. He holds an MSc in Econometrics and Mathematical Economics from the London School of Economics and an MA and PhD in Economics from Harvard.

Xavier Vives is Chaired Professor of Economics and Finance at IESE Business School. He is a member of the Advisory Scientific Committee the ESRB (ECB), a Fellow of the Econometric Society since 1992, the European Economic Association since 2004, and the Academia Europaea since 2012. He is also a Past President of the European Association for Research in Industrial (EARIE) and the European Finance Association. He was Duisenberg Fellow of the European Central Bank in 2015. He has taught at INSEAD, Harvard University, Universitat Autònoma de Barcelona, Universitat Pompeu Fabra, UC Berkeley, University of Pennsylvania, and New York University. His fields of interest are industrial organisation and regulation, banking, and financial economics. He has published more than a hundred articles in the main international journals and several books, the most recent being *Competition and Stability in Banking*. In 2011-2014 he was Special Advisor to the EU Commissioner for Competition, Mr. Joaquin Almunia, and until May 2020 he was Lead Independent Director of CaixaBank. He has served as an advisor for the World Bank, the Inter-American Development Bank, the European Commission, and the Federal Reserve Bank of New York. He holds a PhD in Economics from UC Berkeley.

Acknowledgements

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The views expressed in this report are those of the authors. They should not be taken to represent any institutions with which they are or have been affiliated, or the individuals mentioned above.

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Conference programme

IESE Business School, Barcelona Campus
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Jordi Canals, IESE
Xavier Vives, IESE
Opening speech: "Banking turmoil: some reflections for prudential regulation and supervision"
José Manuel Campa, European Banking Authority

09:45 **Deposits, liquidity and fragility**
Viral Acharya, New York University Stern School of Business
Discussant 1: Javier Suarez, Center for Monetary and Financial Studies (CEMFI)
Discussant 2: Cornelia Holthausen, European Central Bank
Chair: Thorsten Beck, European University Instituteo

10:45 *Break*

11:15 **Prudential regulation, accounting, and supervision**
Elena Carletti, Bocconi University
Discussant 1: Giovanni Dell'Ariccia, International Monetary Fund
Discussant 2: Margarita Delgado, Banco de España
Chair: Hilary J. Allen, American University Washington College of Law

12:15 **Roundtable**
Michala Marcussen, Societé Generale
Andrea Enria, former Chair ECB Supervisory Board
Stephen Cecchetti, Brandeis
Chair: Xavier Vives, IESE

13:15 *Lunch*

14:30 **Resolution**
Fernando Restoy, Bank for International Settlements
Discussant 1: Elke König, former Chair Single Resolution Board
Discussant 2: Marlene Amstad, Swiss Financial Market Supervisory Authority FINMA
Chair: Diana Bonfim, Banco de Portugal

15:30 **Conclusion**
Jean-Charles Rochet, Toulouse School of Economics

16:00 *Close of meeting*

List of conference participants

Viral Acharya	Professor of Economics, New York University Stern School of Business
Shahnawaz Akhtar	PhD Student, IESE Business School
Hilary J. Allen	Professor of Law, American University Washington College of Law
Marta Alonso	Accounting Post-Doctoral Fellow, IESE Business School
Marlene Amstad	Chair, Swiss Financial Market Supervisory Authority, FINMA
Sophia Bantanidis	Future of Finance Analyst, Citi
Thorsten Beck	Director of the Florence School of Banking and Finance and Professor of Financial Stability, European University Insititute
Roman Biescas Baldellou	Technical Officer at the President's Cabinet, CaixaBank
Diana Bonfim	Senior Economist, Banco de Portugal
Isabella Brancaccio	Ph.D. Student, Bocconi University
José Manuel Campa	Chairperson, European Banking Authority
Jordi Canals	Professor of Strategic Management, IESE Business School
Elena Carletti	Professor of Finance, Bocconi University
Ignasi Casals	Senior Analyst, Banc Sabadell Consulting
Christian Castro Torres	Head of Public Affairs, CaixaBank
Stephen Cecchetti	Professor of International Economics, Brandeis University and ESRB
Cristina Cella	Financial Stability Department Advisor, Swedish Central Bank
Che Chen	PhD Student, IESE Business School
Long Cheng	PhD Student, IESE Business School
David Del Cura	Coordinador de Presidencia, Asociación Española de Banca
Margarita Delgado	Deputy Governor, Banco de España
Giovanni Dell'Ariccia	Deputy Director of the Research Department, International Monetary Fund
Andrea Enria	Former Chair of the SSM, ECB Supervisory Board
Maryam Farboodi	Assistant Professor of Finance, MIT Sloan School of Management

Enric Fernández	Head of Strategic Planning and Research and Chief Economist, Caixabank
Santiago Fernández De Lis	Head of Regulation, BBVA
David Forsman	Head of Banking Analysis, Sveriges Riskbank
Santiago Forte	Associate Professor, Department of Economics, Finance and Accounting, ESADE
Joan Freixa Martínez	Research Assistant, IESE Business School
Mireia Giné	Finance Professor, IESE Business School
Josep Gisbert	Assistant Professor of Financial Economics, IE Business School
Gikas Hardouvelis	Chairman of the Board of Directors, National Bank of Greece
Bryan Hardy	Economist, Bank for International Settlements
Cornelia Holthausen	Director General Macroprudential Policy and Financial Stability, European Central Bank
Vasso Ioannidou	Professor of Finance, Bayes Business School
Lorenzo Isla	Director ALM, Treasury & Funding, CaixaBank
Yichuan Jia	Ph.D. Student, IESE Business School
Alejandra Kindelán Oteyza	Presidenta, Asociación Española de Banca
Elke A. König	Former Chair, Single Resolution Board
Naz Koont	PhD Student, Columbia Business School
Ana Lasaosa	Banking Services, Bank of England
Diego López De Ayala Casado	Head of Deputy Governor's Office, Banco de España
Maria Loumioti	Associate Professor of Accounting, The University of Texas at Dallas
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Fernando Peñalva	Accounting Professor, IESE Business School
Oliver Rehbein	Assistant Professor of Finance, Vienna University of Economics and Business
Rafael Repullo	Professor of Economics and Director, CEMFI
Fernando Restoy	Chairman Financial Stability Institute, Bank for International Settlements

Jean-Charles Rochet	Professor of Economics, Toulouse School of Economics
Joan Rojano	Economist, Banc Sabadell
Maria Josep Sánchez Estadella	Control and reporting, CaixaBank
Javier Santomá	Professor of Finance, IESE Business School
Enrique Schroth	Professor of Finance, EDHEC Business School
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Tammaro Terracciano	Finance Associate Professor, IESE Business School
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Hao Rui Wang	PhD Student, IESE Business School
Zhiqiang Ye	PhD Student, IESE Business School
Jiamin Zhao	PhD Student, IESE Business School

Workshop programme

IESE Business School, Barcelona Campus
Thursday, 18 April 2024

09:25 **Opening Remarks**

09:30 **First Session**, Chair: Elena Carletti, Bocconi
1. "Monetary Tightening and U.S. Bank Fragility in 2023: Mark-to-Market Losses and Uninsured Depositor Runs?" (with E. X. Jiang, T. Piskorski, and A. Seru)
Presenter: Gregor Matvos, Kellogg
Discussant: Zhiguo He, Standford University
2. "Partial Effects of Fed Tightening on U.S. Banks' Capital" (with S. M. Sorescu)
Presenter: Mark Flannery, University of Florida
Discussant: Christian Eufinger, IESE

11:00 *Break*

11:30 **Second session**, Chair: Javier Suárez, CEMFI
1. "Social Media as a Bank Run Catalyst" (with J. A. Cookson, C. Fox, J. F. Imbet, and C. Schiller)
Presenter: Javier Gil Bazo, UPF
Discussant: Hilary J. Allen, American University Washington College of Law
2. "Bank Branch Density and Bank Runs" (with J. Yang and M. Zator)
Presenter: Efraim Benmelech, Kellogg
Discussant: Cecilia Parlatore, NYU

13:00 *Lunch*

14:00 **Third session**, Chair: Viral Acharya, NYU Stern School of Business
1. "Banking on Uninsured Deposits" (with I. Drechsler, A. Savov and P. Schnabl)
Presenter: Olivier Wang, NYU
Discussant: Martin Oehmke, LSE
2. "Destabilizing Digital 'Bank Walks'" (with T. Santos and L. Zingales)
Presenter: Naz Koont, Columbia
Discussant: Maryam Farboodi, MIT

15:30 *Break*

16:00 **Fourth session**, Chair: Fernando Restoy, BIS
1. "Canary in the Coal Mine: Bank Liquidity Shortages and Local Economic Activity" (with R. Iyer and N. Paltalidis)
Presenter: Shohini Kundu, UCLA
Discussant: Alberto Martín, CREI
2. "Corporate Runs and Credit Reallocation" (with E. Carletti, F. De Marco and E. Sette)
Presenter: Vasso Ioannidou, Bayes
Discussant: Enrique Schroth, EDHEC

17:30 *Close of meeting*

List of workshop participants

Shahnawaz Akhtar	MRM candidate in the Production, Technology and Operations Management Department, IESE Business School
Hilary Allen	Professor of Law, American University Washington College of Law
Anna Arnalte	Senior Strategy Consultant, Banc Sabadell Consulting
Thorsten Beck	Director of the Florence School of Banking and Finance and Professor of Financial Stability, European University Institute
Effi Benmelech	Professor of Finance & Real Estate, Kellogg School of Management
Diana Bonfim	Senior Economist, Banco de Portugal
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Stephen Cecchetti	Professor of International Economics, Brandeis University
Cristina Cella	Financial Stability Department Advisor, Swedish Central Bank
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Long Cheng	Ph.D. Student, IESE Business School
Christian Eufinger	Associate Professor of Finance, IESE Business School
Maryam Farboodi	Assistant Professor of Finance, MIT Sloan School of Management
Santiago Fernández De Lis	Head of Regulation, BBVA
Mark Flannery	Professor of Finance, University of Florida
Joan Freixa Martínez	Research Assistant, IESE Business School
Xavier Freixas	Emeritus Professor, Universitat Pompeu Fabra
Ricard Gil	Visiting Professor of Strategic Management, IESE Business School
Javier Gil-Bazo	Associate Professor of Finance, Universitat Pompeu Fabra
Mireia Giné	Professor of Finance, IESE Business School
Josep Gisbert	Assistant Professor of Financial Economics, IE Business School
Olga Gouveia	Lead Economist, BBVA
Gikas Hardouvelis	Chairman of the Board of Directors, National Bank of Greece

Bryan Hardy	Economist, Bank for International Settlements
Zhiguo He	Professor of Finance, Stanford University
Vasso Ioannidou	Professor of Finance, Bayes Business School
Yichuan Jia	PhD Student, IESE Business School
Naz Koont	PhD Student, Columbia Business School
Shohini Kundu	Assistant Professor of Finance, UCLA Anderson
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Olivier Wang	Assistant Professor of Finance, New York University
Zhiqiang Ye	PhD Student, IESE Business School
Jiamin Zhao	PhD Student, IESE Business School

List of abbreviations

AFS	available for sale
ALM	asset and liability management
AMV	asset management vehicle
AOCI	accumulated other comprehensive income
ASC	Accounting Standards Codification
ATI	Additional Tier 1
BCBS	Basel Committee on Banking Supervision
BHC	bank holding company
BRRD	Bank Recovery and Resolution Directive
BTFP	Bank Term Funding Program
CAMELS	Capital, Asset Quality, Management, Earnings, Liquidity, and Sensitivity to Market Risk
CDS	credit default swap
CET1	Common Equity Tier 1
CHF	Swiss franc
CLF	Committed Liquidity Facility
CMDI	Crisis Management and Deposit Insurance
CLFs	committed liquidity facilities
DIF	deposit insurance fund
EBA	European Banking Authority
ECB	European Central Bank
EGRRCPA	Economic Growth, Regulatory Relief, and Consumer Protection Act
EIM	Early Intervention Measures
EPS	Enhanced Prudential Standards
ESM	European Stability Mechanism
EVE	economic value of equity
FASB	Financial Accounting Standards Board
FDI	Federal Deposit Insurance
FDIC	Federal Deposit Insurance Corporation
FINMA	Swiss Financial Market Supervisory Authority
FLOs	Federal Liquidity Options
FSB	Financial Stability Board
FVOCI	fair value through other comprehensive income
FVTPL	fair value through profit and loss
GAAP	Generally Accepted Accounting Principles
G-SIB	global systemically important bank
HQLA	high-quality liquid assets
HFT	held for trading
HTM	held to maturity
IASB	International Accounting Standards Board
ICAAP	Internal Capital Adequacy Assessment Process
IDI	insured depository institution

IFRS	International Financial Reporting Standards
ILAAP	Internal Liquidity Adequacy Assessment Process
IRRBB	interest rate risk on the banking book
LCR	liquidity coverage ratio
LOLR	lender of last resort
LTROs	long-term refinancing operations
MBR	minimum balance at risk
MBS	mortgage-backed security
MLF	Marginal Lending Facility
MRA	matter requiring attention
MREL	Minimum Requirement for own funds and Eligible Liabilities
MRIA	matter requiring immediate attention
NCFD	non-financial corporate deposits
NBFI	non-bank financial institution
NIBTA	non-interest-bearing transaction account
NII	net interest income
NSFR	net stable funding ratio
OBBI	open bank bail-in
P2G	Pillar 2
P2R	Pillar 2 requirement
P&A	purchase and assumption
P&L	profit and loss
PCA	Prompt Corrective Action
PFAS	pawnbroker for all seasons
QE	quantitative easing
QT	quantitative tightening
RWA	risk-weighted asset
SCAP	Supervisory Capital Assessment Program
SEC	US Securities and Exchange Commission
SLR	supplementary leverage ratio
SME	small and medium-sized enterprise
SNB	Swiss National Bank
SRB	Single Resolution Board
SREP	Supervisory Review and Evaluation Process
SRF	Single Resolution Fund
SRM	Single Resolution Mechanism
SSM	Single Supervisory Mechanism
SRMR	Regulation on the Single Resolution Mechanism
SVB	Silicon Valley Bank
TARP	Treasury Asset Repurchase Program
TBTF	too big to fail
TLAC	Total Loss Absorbing Capacity
TLGP	Temporary Liquidity Guarantee Program
wSTWF	weighted short-term wholesale funding

Foreword

This is the sixth report in the series on The Future of Banking, part of the Banking Initiative from the IESE Business School that was launched in October 2018 and is supported by Citi.

The goal of the IESE Banking Initiative is to establish a group of first-rate researchers to study new developments in banking and financial markets, paying particular attention to regulation and competition policy and to the impact on business banking models and the performance of markets. It aims to promote a rigorous and informed dialogue on current issues in the fields of banking and financial markets amongst academics, regulators, private sector companies and civil society.

The first report, published in 2019, assessed the regulatory reform of the banking system after the Great Recession induced by the global financial crisis of 2008-2009, and suggested that the next global crisis might have different origins, possibly in entities that perform the functions of banks but are outside of the regulatory perimeter, or in an emerging market where regulation could well be different from the reformed patterns of the West. It concluded that the system had been made more resilient but that further work remained to be done.

The second report addressed the changes in the business models of banks and identified that the challenges that banks faced in the pre-COVID-19 world – mainly low interest rates and digital disruption – will be made more severe in the post-COVID world. Banks have had to deal with an increase in non-performing loans, albeit with temporary relief from strict regulation and with massive liquidity help from central banks. This has accelerated restructuring in the sector.

The third report studied how climate and natural disaster risk is different from other, more familiar forms of financial and economic risk and how banks, asset managers and central banks are beginning to grapple with these risks. COVID-19 has made us aware of the potentially devastating effect of natural disasters and provides a pointer to the effects that climate change may induce. At the same time, the COVID crisis provided a large-scale natural experiment to address this question, and put natural disasters, whether they be pandemics or climate catastrophes, on the agenda of private institutions, bank regulators and central banks.

The fourth report dealt with the impact of technology on financial markets and institutions and identified the challenges in three specific areas: payment systems, the use of big data and trading in markets. Digital technology has presented formidable tests for incumbent financial intermediaries, firms, exchanges, and regulators. Prominent issues have been the suitability of central bank digital currency, the trade-offs involved in

the massive use of data in terms of efficiency, privacy, and market power, and the changes induced by the electronification of financial markets. It questioned how to balance technology's bright and dark sides to inform regulation.

The fifth report examined the implications of the COVID-19 pandemic and the war in Ukraine for the international economic and financial order. It focused on three major components: the macroeconomic outlook and the changes needed to the economic policy model (fiscal, monetary, and regulatory) to preserve economic and financial stability; the consequences for the international monetary system and the position of the US dollar; and the financial architecture needed to ensure sovereign debt sustainability, with special attention to Europe. The general conclusion was that the pandemic and war have accelerated previous trends, which reveal potential conflicts between policy objectives.

This sixth report considers the 2023 banking turmoil that caused the failures of Silicon Valley Bank, other regional banks in the US, and Credit Suisse and its implications for financial regulation. This banking turmoil was the first major challenge of the Basel III framework and the report examines potential reforms to enhance financial stability. The report centres around three major themes: the changes in digital banking and monetary policy that led to the turmoil, and the reforms needed to deposit insurance and the lender of last resort; the shortcomings of regulation, accounting, and supervision that caused banks that were deemed solvent to fail; and the management of bank failures and potential reforms to resolution procedures.

The report was produced following the Workshop and Conference on "Banking turmoil and regulatory reform", held in IESE Business School's Barcelona Campus on 18 and 19 April 2024, respectively. The conference programme, along with the comments of the six discussants, are included in this report, as is the opening speech by José Manuel Campa. Xavier Vives brought together the team of authors.

The Banking Initiative has benefitted from the keen support of the Dean of IESE, Franz Heukamp, and the former Dean, Jordi Canals. CEPR and IESE are very grateful to the authors and discussants for their efforts in preparing this report and to the conference attendees for their perceptive comments. We are also grateful to Carlota Monner and Estefanía Alarcón for their extremely efficient organisation of the conference and for providing support for the report, and to Anil Shamdasani for his unstinting and patient work in publishing the report.

The views expressed in the report are those exclusively of its authors and do not represent those of CEPR, which takes no institutional positions on economic policy matters, or those of their respective organisations. CEPR and IESE are delighted to provide a platform for an exchange of views on this topic.

Tessa Ogden
Chief Executive Officer, CEPR
May 2024

Xavier Vives
Director, IESE Banking Initiative

Executive summary

The recent banking turmoil, particularly the failures and sharp deposit outflows in regional banks in the United States and the collapse of Credit Suisse, has not only brought the behaviour of deposits and interest rate risk to the forefront of concerns but has also ignited fears of bank instability. This situation demands our attention and prompts us to question whether the regulatory, supervisory, and resolution reforms implemented after the global financial crisis have been uniformly effective in 'fighting the last war' of fragility issues that manifested during 2007-08, and whether they are robustly designed to address newer forms of banking instability in a world with different characteristics from 2008.

After the recent banking failures, several crucial questions arise: What is new and old in these failures? Is it time to reassess the stickiness of deposits? Have digital banking and social media fundamentally altered the banking market and impacted financial stability? What has been the role of monetary policy? Was the failure of Silicon Valley Bank (SVB) in the United States an exception or the canary in the mine? To what extent do we need to reform regulation again after the global financial crisis? Which parts of the implemented reforms seem robust, and which need amendment? How could Credit Suisse be sound from a regulatory perspective and yet be on the brink of collapse? Were the US and Swiss authorities' responses adequate? Is the new resolution framework developed after the global financial crisis fit for purpose? Can we really trust that the crisis of systemic banks can generally be managed without public support?

Major reform proposals are put forward after any relevant financial crisis, such as the 1980s Savings & Loans crisis or the global financial crisis. Indeed, Basel III intends to tackle regulatory shortcomings detected during the global financial crisis. Two major reform proposals re-surfaced after some of the abovementioned crises: forms of narrow banking to end bank runs, and mark-to-market accounting to guide regulatory intervention and supervision. This has also been the case now with Mervin King's 'pawnbroker for all seasons' proposal and the use of market-based signals to solve supervisory forbearance by alerting early of problems.

This report seeks to answer some of these questions, highlighting the unfinished agenda of banking sector reforms as well as their implementation, and discussing some of the reform proposals that can help address the gaps. The general lessons from the report are the following. First and foremost, a holistic approach to regulatory policy is needed. Capital, liquidity, accounting, and disclosure requirements should be set together, and their interactions should be considered. The effects of different quantitative monetary policy regimes – quantitative easing (QE) and quantitative tightening (QT) – on financial stability should also be taken into account, besides the effects of conventional or rate-based monetary policy cycles. This comprehensive approach is crucial for the stability of the banking sector. Second, prudential rules should be applied uniformly to institutions

that pose systemic risk, even if they are small individually but not collectively as a 'herd' or in the aggregate. Proportionality regimes should not compromise the need to preserve systemic banks' safety and soundness. Third, liquidity regulation should be adapted to the changes in the banking market induced by digital technology. Fourth, liquidity insurance should be priced properly, be it with risk-based premiums for deposit insurance or with collateral pre-positioning for lender of last resort support. Fifth, early intervention frameworks and resolution planning should be reinforced, and more attention should be paid to the value of market-based signals as supervisory signals for early intervention or investigative escalation. Finally, a consistent, timely, and complete implementation of global standards across jurisdictions should be given maximum priority.

The report is structured around three major components, each crucial for understanding and addressing the questions: the boom and bust of uninsured deposits and policy responses (Chapter 2), the shortcomings of regulation and supervision (Chapter 3), and the management of bank failure (Chapter 4).

BOOM AND BUST IN UNINSURED BANK DEPOSITS AND POLICY RESPONSE

The banking turmoil of early 2023, initiated by the failure of three mid-sized US banks, highlights systemic vulnerabilities stemming from an over-reliance on uninsured deposits amidst rapid money and market expansions driven by QE. The subsequent interest rate hikes and reversal of QE triggered a liquidity crisis, which eventually became a solvency crisis. SVB's failure, triggered by a massive exodus of uninsured deposits, illustrates the divergent vulnerabilities within the banking sector to the liquidity risks as well as the domino effect within the banking sector, emphasising the fragility across institutions, especially smaller and medium-sized ones. The 2023 banking stress also highlighted the amplifying effect of digital finance on the speed of withdrawals and contagion risk.

This crisis underscores the need to reassess regulatory frameworks, supervision tools, and monetary policy to mitigate similar vulnerabilities in the future. Policy responses should balance containment of spillovers from runs with decreasing their incidence through improved deposit insurance (for which the Federal Deposit Insurance Corporation has made various propositions in the United States), lender-of-last-resort support, and stricter capital and liquidity requirements, which should apply consistently across banks. *Ex-ante* prudential measures, such as capital and liquidity requirements, must be reviewed to check whether they account in a timely manner for interest rate risk, bank liability structure, and information from market values being reflected in supervisory procedures. Stress tests must comprehensively incorporate interest rate risk and the effects of higher-than-usual interest rates, not just for large but also for mid-sized and smaller banks. A comprehensive solution such as the 'pawnbroker for all seasons' proposal aims to mitigate fragility by requiring banks to collateralise short-term liabilities. Still, it faces implementation hurdles and represents a significant departure from the current policy that needs careful scrutiny since it will affect banks' ability to

intermediate financial flows in the economy. In any case, it is also necessary to address the liquidity risk of non-bank financial intermediaries. Adding collateral pre-positioning to the toolbox of liquidity regulation to obtain liquidity support from the central bank should be considered. Overall, the crisis underscores the imperative for proactive measures to safeguard financial stability, mitigate systemic risks within the banking sector, and recognise potential interactions with monetary policy.

PRUDENTIAL REGULATION, ACCOUNTING, AND SUPERVISION

The banking turmoil in the United States and Switzerland was the first significant test of the Basel III framework. While it proved its adequacy in general terms, there is clearly room for improvement. Failures and rescues were not due to regulatory design flaws entirely but at least in part due to weak implementation of global standards and their suboptimal implementation and supervision, with accounting standards playing a critical role. SVB and Credit Suisse had faulty business models with poor risk management and governance. SVB was exempted from liquidity regulation. In both cases, regulatory capital was overestimated. In the SVB case, this was due to the 'accumulated other comprehensive income' (AOCI) filter, which allowed regulatory capital not to reflect losses on the securities book; in the case of Credit Suisse, the filter used to evaluate subsidiaries also played a role. Sometimes supervisors knew the problems but were slow to react or authorities higher up did not react with alacrity when supervisory flags were raised.

The crisis underscored the interplay between prudential regulation and accounting standards, particularly regarding the classification of debt securities and their impact on regulatory capital. The recommendation is that the AOCI filter be removed and that the bank-specific Pillar 2 requirement for interest rate risk on the banking book (IRRBB) should be applied more consistently, possibly incorporating an IRRBB in the Pillar 1 minimum capital requirements. Concerning the liquidity coverage ratio (LCR), the deposit run-off rates should be increased due to the prevalence of digital banking coupled with the impact of social media. The LCR time horizon should be rethought, and a Pillar 2 high-quality liquid assets (HQLAs) add-on should be included depending on the level and the speed of 'run' risk in the bank's liability structure. The aim is to reinforce the LCR and give supervisors time in a crisis. We discuss possible reform options in the direction of mark-to-market measurements, such as improving the disclosure requirements for the (unrealised) losses deriving from held-to-maturity (HTM) securities, a 'mark-to-maturity' approach to HTM securities, facilitating hedge accounting, and considering market signals such as stock prices or analyst forecasts for supervisors.

These lessons for regulation highlight the need for disciplined and consistent approaches, especially regarding interest rate risk and liquidity regulation, to ensure a more effective treatment of systemic risks across jurisdictions. Regarding supervision, these lessons are based on a recognition that the banking crisis of 2023 exposed gaps in early intervention

frameworks and enforcement capabilities, emphasising the importance of timely action and comprehensive risk management assessments. Enhanced governance quality, risk management systems, and broader risk indicators are therefore essential for more responsive and effective supervision.

LESSONS FOR BANK FAILURE MANAGEMENT

The global financial crisis catalysed a pivotal shift in banking policy reform, which led to the creation of a new bank resolution framework. This transformation was driven by the commitment of the Financial Stability Board (FSB) to mitigate the systemic impact of bank failures with the bail-in tool, which empowers authorities to intervene by writing down liabilities or converting them into equity, thereby absorbing losses without resorting to public funds. Yet, implementation remains uneven across FSB jurisdictions, with approximately only half of jurisdictions fully integrating the bail-in tool, underscoring a significant gap between policy intent and execution. Furthermore, failures in 2023 were resolved outside the revised resolution regimes, even though they included Credit Suisse, a global systemically important bank, and all cases, including the mid-size bank failures in the United States, had a systemic impact.

The 2023 banking turmoil underscores the need for regulatory reforms to create more effective and flexible resolution tools and external support when needed. In particular, resolution plans should contain possible combinations of resolution tools (such as sale-of-business and creditors' bail-in) rather than focusing on a single resolution strategy. The need for credible and timely public backstops of liquidity in giving resolution frameworks a chance to be well-implemented should be recognised. Working together, such backstops and resolution frameworks can reduce the need to provide blanket bailouts to failing banks. Bank crises highlighted flaws in the failure management regime and in adequacy of regulatory capital measurement. They pointed to the need to extend resolution planning to all banks that may affect the financial system, including a minimum amount of loss-absorbing liabilities in resolution (preferably with long-term debt instruments), adequately tailored to facilitate the chosen resolution strategy and reconsider using Additional Tier 1 instruments, as currently designed, as regulatory capital.

The Crisis Management and Deposit Insurance (CMDI) proposal marks a significant improvement in the European Union by expanding the resolution scope and refining funding strategies for banks in crises. Still, there is room to improve the minimum requirement for own funds and eligible liabilities (MREL) calibration for sale-of-business strategies, as well as the provision of external support and liquidity in resolution. The overall aim of the reforms should be to strengthen the resolution framework's efficacy, further reduce the need for government bailouts, and introduce the required flexibility to adapt to unexpected challenges in the resolution processes to preserve financial stability. Last but not least, these reforms do not alleviate but rather strengthen the need to complete the European Banking Union.

Banking turmoil: Some reflections for prudential regulation and supervision

José Manuel Campa
Chairperson, European Banking Authority

Good morning and thank you for inviting me to open this conference today in Barcelona to discuss the recent banking turmoil and regulatory reforms.

I believe the Irish writer James Joyce captured very well the essence of mistakes in his quote, "[m]istakes are the portals of discovery". Mistakes can happen because we took the wrong actions or because we failed to foresee the implications of a situation. In both cases, they are a golden opportunity to learn and improve. In my eyes, the agenda set for today strikes very well the issues that may have contributed to the turmoil faced by the banking sector in early 2023 and the actions taken to address it. And I am sure this conference today at IESE will be a portal for discovery.

My understanding of the 'banking turmoil', the title of today's conference, is that we are broadly referring to the failure of a few US regional banks, as well as the emergency acquisition of Credit Suisse by UBS and the actions taken by authorities around those episodes. Reflections on these recent episodes can offer important lessons for the supervisory and regulatory banking community.

INFLATIONARY PRESSURES, THE MONETARY POLICY RESPONSE AND IMPLICATIONS FOR THE BANKING SECTOR

Before discussing the lessons from those specific episodes, allow me a broader reflection. The cracks caused in some banks by the sudden change in the interest rate environment were cited as one of the many reasons behind the banking crisis in March 2023. It is true that as a response to the unusually high inflation rates seen globally in 2022 and 2023, central banks reacted aggressively by increasing interest rates to rein in inflation.

The causes of high inflationary pressures may not be directly relevant to today's conference. Still, it is important to analyse the banking turmoil under the spectrum of the challenges the banking sector was facing. A pandemic had disrupted global supply chains, leading to shortages of goods. In Europe, a war and geopolitical crisis arose that led to additional tensions and further fed the inflationary pressures. This led to a coordinated and rapid increase of interest rates across the Western world after a decade of the lowest interest rates and largest liquidity provision in history.

It is not hard to guess that this mix would have implications for financial institutions. I must admit, and I cross my fingers, that looking at the performance of the banking sector in Europe, and financial markets more broadly, I am pleasantly surprised that the number of negative surprises (or episodes of turmoil) that we have encountered has been limited.

Silicon Valley bank (SVB), the biggest US institution that failed during the banking turmoil in March 2023, was confronted with (by now well-known) problems related to the movement of interest rates, the size of its fixed income portfolio and its management of interest rate risk and its deposit base.

Credit Suisse, because of its size and track record, had been a source of concern for some time. At the time of its acquisition by UBS, Credit Suisse was the second-largest bank in Switzerland and one of the global systemic important institutions. Its failure was a culmination of scandals, management shifts, and significant losses due to the collapse of Archegos Capital and Greensill Capital investment firms. Finally, insufficiencies in managing risks and maintaining a sustainable business model ultimately triggered a lack of investor confidence. Its size and interconnectedness in the global financial system was a source of concern about potential contagion.

I will not try to summarise the lessons learnt from these episodes in my remarks. I will only focus on the key messages that I took from the 'lessons learned' exercises that were undertaken by the US and Swiss authorities in these cases, as well as the Basel Committee on Banking Supervision.[1]

These reports all highlight the importance of failures in the institution's management: deficiencies in its key role of setting a strategy, the credibility of the institution, its business model and risk appetite, and the proper internal risk management and controls. The reports also highlight the importance and timing of supervisory action: its intrusiveness and capacity to provide timely and clear requests for remediation by the supervised entities. The findings also highlight the importance of preparedness, particularly for resolution, and of cross-border cooperation.

In addition, the reports look at the role of the regulatory framework, in two areas in particular: (i) liquidity and interest rate management (the way liquidity is assessed, the role of digitalisation and social media, and the management of interest risk by banks and within the regulatory framework); and (ii) the role that regulatory capital plays, particularly in the valuation of assets (held to maturity versus mark to market), and the ability to absorb losses of the various capital instruments.

1 See BCBS (2023a), Federal Reserve Board (2023) and FINMA (2023).

As we start to think about potential lessons for regulation we could extract from the turmoil, and in particular prudential regulation, we should first remember what prudential regulation is supposed to achieve. Let me remind you that prudential regulation – and Basel III is explicit on this – is not calibrated to produce 'zero failures', but seeks to reduce the likelihood and impact of banking stress. Bank failures should be a natural outcome of poor management or other events. The goal of the regulation is to ensure that the stress caused by bank failures, and in particular systemic crisis, is minimised.

I will argue that, judging by what happened last year, the events were traumatic, as exceptional measures had to be taken by authorities, but overall financial stability was preserved. In that sense, we should be pleased by what has been achieved in the last years. Of course, the exceptional measures that were taken by the authorities involved a significant component of improvisation and ad hoc reaction. In that sense, we could argue that we were not sufficiently prepared. So, we cannot be complacent and we should continue to enhance our ability to provide authorities with the appropriate toolkit to manage these crises. We should also require authorities to do as much planning and preparatory work as possible to avoid them. And if a crisis cannot be avoided, they should at least manage the situation in a manner that is as predictable as possible.

Many of these lessons for management, governance and the regulatory function have been very well discussed in the papers distributed for the conference, and I am sure they will be thoroughly covered in the panel discussions today.

So, I would prefer not to dedicate the rest of my time to addressing them individually, but rather to take advantage of this academic setting at IESE that allows a deeper interaction. Let me, instead, focus on three broad aspects that have arisen from these episodes and which I believe deserve further assessment of how to address them in the future. They are all partially related to bank supervision, but I think they are broader than that in nature. None of them is totally new, but I think they require a new look and more emphasis going forward.

LIQUIDITY AND MATURITY TRANSFORMATION IN A DIGITALISED WORLD

The first theme is how we should view the provision of liquidity and maturity transformation in the future digital world. What is liquidity and who carries out maturity transformation?

Reality is never as cleanly delineated as we draw it in our models or in the regulatory framework. We assume a simple world in which maturity transformation is done by banks that take sight deposits from citizens and lend money over the long term to investors.

At the same time, they are able to guarantee depositors liquidity by having access to the central bank, under heavy supervision by regulators and supervisors. I am afraid this world never really existed so neatly.

There was always an alternative to this transformation by banks: securities markets. But these securities markets also required liquidity to be efficient.

It has been the case over many decades that the role of maturity transformation and liquidity provision has been shifting to financial entities other than banks. This was partially a result of some of the banking regulation introduced after the global financial crisis in 2008.

So far, we have been managing this transformation through a combination of measures. In part, we assume that the banks will ultimately act as intermediaries, providing adequate liquidity to those other financial entities that may need it. In the case of some asset management products, such managed funds (whether for highly liquid funds such as money market funds or for highly illiquid like real estate funds), we also rely on regulation. I mention these two cases because they have been well identified as sources of vulnerabilities in the past and are still in need of proper regulatory treatment.

The last decade has put this model to the test. At the macro level, concerns over the functioning of nonbank financial intermediation are increasing, and the Financial Stability Board (FSB) has just put forward additional warnings on this issue.

The new era has also introduced digitalisation, instant payments, and crypto technology. At one extreme, some academics see the interaction between these technologies as a way in which maturity transformation will be fully decentralised and the matching of savers with investors will be done in a decentralised manner and at all maturity horizons. Savers, as part of their portfolio, will choose the financial assets that will also match their desired maturity of each of their investments. They will rely on financial markets for the intermediation of these financial assets and the generation of liquidity out of them, if needed. If they want risk-free liquidity, they will deposit their savings at the central bank. There will be no need to have financial intermediaries that perform maturity transformation in the economy. Furthermore, there will be no need to provide further guarantees on liquidity other than what the central bank will provide on its deposits. In this scenario, the vast majority of the current banking regulation may not be needed.

I am not sure whether we will see such a future, and if so I am sure it will not be in my professional career. Yet, I think that such a scenario is pointing us in a specific direction, so we need to manage this evolution. Ultimately, we will need to decide whether we think it is desirable or not, and regulate accordingly.

In the interim, we are seeing an increase in the demand for immediacy and speed in the use of deposits and savings in the economy. Innovation has made it faster and easier to move money, from the creation of the ATM to modern digital banking apps, alongside faster payments and reduced settlement windows. Social networks have also made it easier to communicate and to coordinate actions in a manner by which more herd behaviour (rational or irrational) is likely to take place.

If we want to continue down the path of providing continuous, instantaneous access to liquidity (mainly bank deposits, to simplify the argument), we need to make sure that the system is capable of doing this. This starts, of course, with the banks. There is a need to critically assess their behavioural models on deposits, the true source of diversification in their deposit base, the quality, preparedness and availability of their collateral to access central bank liquidity, and their ability to truly liquidate assets at stressed prices.

It also requires actions to be reviewed by the supervisors. There is a need to assess the frequency and type of supervisory evaluation and reporting.

I think we should also question the regulation, and not just its calibration but its principles. For instance, the liquidity coverage ratio (LCR) requires banks to hold sufficient liquid assets to cover a 30-day stress outflow period. A more fundamental question is whether we should still expect banks to be able to survive liquidity stress for 30 days without some sort of intervention, be it public or private.

Which brings the question to other authorities beyond supervisors, starting with the providers of liquidity (the central banks). Beyond the issue I raised before of who should have access to central bank liquidity and focusing exclusively on banks, should we review the way and speed with which liquidity is provided? We have seen in a number of stress cases that the banks involved were not able to operationally generate the liquidity they were expecting from the central bank (operational issues got in the way, collateral was not well documented or not provided on time). Should we require collateral to be prepositioned at the central bank? And how about the central bank? Should its liquidity window be open 24 hours a day, seven days a week?

Resolution authorities also have to reassess the way they interact in this context. We have been discussing the issue of liquidity in resolution for a long time. We have also discussed the time needed for resolution (Is it a weekend? Can it be done overnight?). How about instant resolution? How do I assess 'failing' or 'likely to fail' and carry out a proper valuation of an entity while ensuring instant access to deposits?

Finally, there is a need to review the way deposit insurance schemes function. Evidence suggests that the degree of deposit insurance in the European Union is very high. This may be comforting, but surveys also indicate that the largest concern among depositors is not whether their deposits are safe or not (i.e., where deposit insurance will ultimately work) but whether those deposits are liquid in case the bank goes in liquidation/resolution. When will they have access to the deposits in case liquidation occurs? Assurances to depositors in that regard by the deposit guarantee schemes will help generate confidence.

ROLE OF MARKET PRICES IN SUPERVISORY MANAGEMENT

The second broad area for reflection is even older or more classical. It has to do with markets as a mechanism for price formation and the interaction between market prices and action by supervisory and resolution authorities, which of course includes what the role of market prices in the regulatory framework should be.

Markets play an essential role in price formation and information disclosure.

But as Oscar Wilde observed at the end of the 19th century in *The Picture of Dorian Gray*, "[n]owadays people know the price of everything and the value of nothing" (a quote which today would have been considered plagiarism from the 17th century Spanish poet Francisco de Quevedo, who in 1611 said "solo un necio confunde valor y precio").

Anyway, despite the beauty and wisdom in these words, I will argue that market price is by far the best signal that we have on the future value of any asset at any point in time. At the same time, we should not forget that markets are not always efficient, nor deep enough to reflect what inframarginal value may be for inframarginal transactions, particularly when we know those markets are not sufficiently liquid.

The experience from the banking turmoil last year indicated again how markets interact, and in particular the linkage between equity prices, hybrid instruments of capital (such as AT1) and other markets for debt or credit default assets – all of them traded assets, and all of them in what are likely to be very thin markets.

I see here a number of challenges arising. The first is the use of these prices as automatic triggers for action, be it in risk management by financial institutions or in triggering action by supervisors. Should supervisors allow/encourage this use by banks? When should it be part of the regulatory framework? Of course, this debate is not new, and to some extent it reminds me of the debate on the excessive (and automatic) reliance on the regulation of credit ratings and credit rating agencies of a decade ago. Nevertheless, it is embedded in much of our prudential regulation and we should assess its proper functioning.

A second aspect has to do with the interaction between market prices and accounting or historical prices as determinants for action by supervisory or resolution authorities. Here again, market prices add a piece of information that is unavailable from historical prices which is a forward-looking assessment, an assessment that reflects confidence and expectations, and we need to better understand how to embed that aspect within the regulatory framework. It also poses a large number of questions on the reliance of supervisory (and resolution) authorities on regulatory metrics, the vast majority of which are based on historical information, and their ability to assess timely supervisory and resolution action.

MORE FORWARD-LOOKING ASSESSMENT OF SUPERVISION/REGULATION

Which brings me to the third theme that I would like to reflect upon. How can we improve the introduction of a forward-looking perspective to the supervisory action and regulatory framework?

At present, that forward-looking assessment is introduced in the regulation through three different channels: (i) the use of market prices when available (i.e., the traditional way); (ii) since the global financial crisis, through the performance of forward-looking exercises (mainly ICCAP, ILAAP[2] and stress tests); and (iii) through the assessment of the 'sustainability of the business model' within the supervisory review process. The outcome of these analyses is then incorporated into Pillar 2 supervisory requirements.

Forward-looking assessment needs to be reinforced. I will highlight two immediate examples. How do we properly incorporate climate and sustainability risks into the measurement of risk-weighted assets when all existing methodologies to build regulatory models rely either on market prices (which exist for a limited set of assets) or historical databases of default rates to assess risk? How do we incorporate into the regulation methodologies that rely on scenarios analysis, stress tests or other forward-looking elements? Second, the links between the sustainability assessment of a business model and supervisory action need to be strengthened, particularly if we expect supervisory action to be timely and effective.

Let me conclude. I fear that I have not shed much light on any of the issues that you will discuss in this conference. On the contrary, I have raised a large number of questions – most of which you probably already knew, some of which I hope you may have answers to. But I could not give up this opportunity of being in an academic context to request your efforts to try to address some of these broader themes. I look forward to hearing the discussions over the rest of the day and learning some of those answers.

2 ICAAP: Internal Capital Adequacy Assessment Process; ILAAP: Internal Liquidity Adequacy Assessment Process.

CHAPTER 1

Introduction

The recent banking turmoil, particularly among regional banks in the United States and the collapse of Credit Suisse, has not only brought the behaviour of deposits and interest rate risk to the forefront of concerns, but has also ignited fears of bank instability. This situation prompts us urgently to question whether the regulatory, supervisory, and resolution reforms implemented after the global financial crisis can effectively address instability in a world dominated by digital banking and social media. Up to what point do we have to reform regulation again after what was done following the crisis? Which parts of the implemented reforms seem robust, and which need amending?

The first report in the Future of Banking series[3] assessed the adequacy of the regulatory reforms to ensure financial stability a decade after the collapse of Lehman Brothers. It concentrated on Basel III reforms and their aftermath, resolution procedures to end, or at least limit, 'too big to fail' (TBTF) policies, and the larger role of central banks in guaranteeing financial stability, in particular with lender of last resort (LOLR) facilities and macroprudential policy. The report concluded that good progress had been made in reforming capital and liquidity requirements despite the potential for further development of shadow banking to bypass regulations. Resolution procedures for global systemically important banks (G-SIBs) were put in place. Still, a major issue of liquidity provision in resolution remained, and it was noted that the tendency for market concentration would imply that the TBTF issue would not disappear. It was considered that the expanded central bank remit could raise questions about their independent status.

With the recent banking turbulence, some of the questions previously examined have resurfaced, inviting us to delve deeper into the complexities of the banking system. What is new and old in the failures of some US regional banks and Credit Suisse? Do we have to reassess the stickiness of deposits? Have digital banking and social media changed the banking market and affected financial stability? Was Silicon Valley Bank (SVB) an exception or the canary in the coal mine? How could Credit Suisse be sound from a regulatory perspective yet on the brink of collapse? Were the responses of the US and Swiss authorities adequate? Turbulence has happened in the context of rapidly raising interest rates (quantitative tightening, or QT) after a long period of low interest rates (with quantitative easing, or QE). We can wonder then what role monetary policy has played. While challenging, these questions are crucial for us to understand the banking system's current state and propose effective solutions.

3 Bolton et al. (2019).

This report will delve into these issues, examining the changes in banking and financial markets leading up to the recent turmoil; identifying potential pitfalls in current regulatory, supervisory, and resolution arrangements; and proposing policy changes to enhance financial stability.

In the rest of this first chapter, we condense the analysis and policy insights of the following chapters. First, we summarise the evidence presented in Chapter 2 on the boom-and-bust pattern in uninsured bank deposits in the United States behind the banking stress of 2023, its drivers, and some (*ex-ante* and *ex-post*) policy options that can help manage banking risk better and improve financial stability. Next, we summarise Chapter 3 and provide a background and critical assessment to understand the 2023 banking turmoil from three perspectives: prudential regulation, accounting, and supervision. We also discuss policy implications for enhancing financial stability. We then summarise Chapter 4, which aims to review the issues that the recent banking turmoil has raised concerning the current policy framework for managing bank crises. Finally, we conclude by summing up the analysis and policy implications.

1.1 BOOM AND BUST IN UNINSURED BANK DEPOSITS AND WHAT CAN BE DONE ABOUT IT

1.1.1 Post-pandemic uninsured deposit boom and bust

The early 2023 collapse of three significant mid-sized US banks – Signature Bank, SVB, and First Republic Bank – highlighted systemic vulnerabilities within the banking sector, largely fuelled by an overreliance on uninsured deposits amid rapid market expansions driven by QE. This episode, resulting from the Federal Reserve's balance sheet policies aimed at countering pandemic-induced economic slowdowns, increased banks' exposure to interest rate risks and the fragility of funding models reliant on uninsured deposits (for example, with a large misalignment between fixed-income assets and interest-varying liabilities). The subsequent interest rate hikes and reversal of QE triggered a liquidity crisis, which eventually became a solvency crisis. Such a crisis underscores the need for a critical reassessment of regulatory frameworks, supervision tools, and monetary policies to mitigate similar vulnerabilities in the future, highlighting the complex interplay between monetary actions and the banking system's funding models.

SVB's dramatic failure, triggered by a single-day exodus of $42 billion in uninsured deposits, exemplified the domino effect of such vulnerabilities, leading to Federal Deposit Insurance Corporation (FDIC) intervention.[4] The crisis revealed a systemic fragility across the banking landscape, with small and medium-sized institutions bearing the brunt of the fallout from uninsured deposit withdrawals, in stark contrast to larger

4 SVB was especially exposed to mortgage-backed securities and tech-sector loans, but a key factor was that over 90% of its deposits were uninsured. Similarly, Signature Bank and First Republic Bank were exposed to crypto assets, commercial real estate loans, and municipal bonds and had high shares of uninsured deposits.

banks, which benefited from a deposit flight to quality. An analysis of the liquidity risk across banks highlights the increasing ratio of uninsured demand deposits to total assets, especially among smaller banks exempt from liquidity coverage ratio (LCR) regulations, and emphasises the sector-wide shift towards riskier liquidity and investment strategies. In the euro area, there is also a correlation between uninsured demandable deposits and banking sector reserves, with some differences by institutions and deposit types.[5]

Concerning monetary policy, QE and fiscal stimulus affect deposit growth differently. On one hand, QE helped drive the growth of non-bank financial and non-financial (corporate) demandable deposits, which are typically uninsured. On the other hand, fiscal stimulus affects the growth of household deposits, which are typically insured.

Notably, the 2023 banking stress underscored the amplifying effect of digital finance on the speed of withdrawals and contagion risk. Research has shown that banks with a lower branch density, and hence greater reliance on digital deposits, struggled to retain uninsured deposits during economic downturns.[6] These dynamics suggest that the evolution towards digital banking and the structural shift in deposit composition have made banks more susceptible to fast-paced runs and contagion, highlighting new vulnerabilities in the banking sector's stability.

1.1.2 Policy: Balancing containment of spillovers from runs and decreasing their incidence

Policy strategies should mitigate the boom-bust cycles in uninsured bank deposits and their systemic risks, focusing on preventive and responsive measures such as improved deposit insurance, LOLR support, stricter capital and liquidity requirements, and judicious use of (conventional and unconventional) monetary policy tools. The policy goal should balance the need to contain spillovers from bank runs once they occur with the need to decrease their incidence in the first place.

In response to the banking crisis of 2023, the FDIC issued a report[7] considering options for deposit insurance reform, including maintaining limited coverage, a targeted increase in coverage, and full coverage. A minimum balance at risk (MBR) scheme has also been proposed, in which a fraction of an uninsured deposit would be unavailable to the depositor for some period. Some analysts favour a targeted increase in coverage for small and medium-sized enterprise (SME) transactions due to its significant economic implications. Each option presents potential drawbacks, including the moral hazard

5 According to Holthausen's discussion, in the euro area, the trend of uninsured deposits growing relative to total assets in easing cycles is less pronounced. Uninsured deposits have instead grown proportionately to insured deposits, and overnight household deposits (which are likely to be insured) grew more in absolute terms than non-financial corporation deposits (which are less likely to be insured).

6 Bank branch density has declined over the past decade in the United States due to increased deposits while many branches closed; see Benmelech et al. (2023), Cookson et al. (2023) and Koont et al. (2023).

7 FDIC (2023b).

of full coverage and the operational challenges of implementing an MBR system. The critique extends to the potential ineffectiveness of eliminating deposit brokering in addressing the fundamental issues of uninsured deposit volatility and the propensity for bank runs, underscoring the need for a nuanced approach to reform.

Other solutions can be derived from a radical reform of LOLR operations. Mervin King's 'pawnbroker for all seasons' (PFAS) proposal would require banks to collateralise their short-term liabilities, eliminating runs and, consequently, the need for deposit insurance. The FDIC report also includes as an option an obligation for banks to collateralise non-covered deposits. This would increase equity and long-term debt as a proportion of bank liabilities because collateral haircuts (to be funded by equity or long-term debt) are typically large relative to currently required ratios. However, PFAS would discourage bank lending against unusual collateral that may attract high haircuts and require real-time supervision for all banks.[8]

PFAS aims to mitigate banking system fragility by compelling banks to internalise liquidity risks and adapt their business models accordingly. By fostering a shift towards better-capitalised banks with a more prudent approach to liquidity risk management, PFAS purports to offer a forward-looking framework for enhancing financial stability. PFAS is equivalent to capital requirements dependent on banks' liability structure. However, it has potential drawbacks and faces implementation hurdles. The first one is that collateral haircuts on runnable liabilities should be at stress-time levels, even in normal times. If the central bank does not get these haircuts right, credit and liquidity in the economy would have huge distortions. Not only that, if haircuts are not adequately fine-tuned, they could induce a flight to quality to banks perceived as safer. Finally, the deeper involvement of the central bank in credit allocation may impair its independence. PFAS represents a very significant departure from the current policy that needs careful scrutiny, since it will affect the ability of banks to intermediate financial flows in the economy. The discussion in Chapter 2 underscores the importance of further exploration of the integration of PFAS within the regulatory landscape.

Ex-ante prudential measures, such as capital and liquidity requirements, must also be reviewed to check whether they properly account for interest rate risk, bank liability structure, and information from market values.

8 The Committed Liquidity Facility (CLF) proposal would allow banks to always obtain liquidity by pledging their high-quality liquid assets (HQLAs) at a discount at the central bank. This scenario would likely raise the relative costs of the more unusual extensions of bank credit as they may not be accepted as collateral for the CLF. Similarly, the Federal Liquidity Options (FLOs) would grant access to the central bank facilities to any bank (or non-bank financial institution) by purchasing options on secured borrowing from the central bank at a predetermined rate and haircut. Furthermore, the central bank would sell sufficient FLOs to credibly commit to providing no additional liquidity in a crisis. If this commitment were credible, crisis bailouts would no longer be necessary, and financial institutions would use FLO prices to internalise the cost of liquidity in stress scenarios.

Stress tests must comprehensively incorporate interest rate risk and the effects of higher-than-usual interest rates, not just for large but also for mid-sized and smaller banks. The stress test should account for the dual potential threats of recession and persistently high inflation. Currently in the United States, unrecognised losses on the banking system's assets, as shown in the regional bank turmoil, reflect the rise of market interest rates. By broadening the scope and enhancing the sophistication of these stress tests, the aim is to bolster the banking system's resilience to future economic downturns and high interest rate environments, thereby enhancing overall financial stability.

In addition to advocating for an expanded and more rigorous stress-testing regime, market data could be used to validate stress tests, recognise the nexus of bank liquidity and solvency assessment, and identify potential discrepancies between regulatory assessments and market perceptions of bank health. It is worth pointing out that some banks that had to be rescued in 2023 continued to meet regulatory standards even as their ability to raise market funding was lost.

Given the experience of recent bank turmoil in the United States, liquidity regulations should (i) apply consistently across banks (small banks should not be exempted); (ii) become more contingent on aggregate circumstances; and (iii) apply on average in specified periods (i.e., regulators could allow a degree of state-contingent tolerance in meeting daily liquidity requirements).

Finally, the utilisation of central bank balance-sheet adjustments (such as QE and QT) as policy tools may affect banks' risk profiles, underlining a complex dynamic that merits consideration in policy formulation. While crucial for maintaining financial stability, central banks' provision of emergency liquidity support engenders moral hazard, including distortions in liquidity pricing, undue gains for entities with central bank access, and skewed credit and investment decisions in anticipation of central bank interventions. Furthermore, the fiscal support that often accompanies these actions poses risks of fiscal dominance, highlighting the intricate balance between immediate financial stability and long-term fiscal and monetary health.

When the banking sector's reliance on central bank support intensifies over time, it raises concerns about the sustainability of such policy measures. If not reversed in a timely and predictable manner, continuous balance sheet expansion by the central bank may encourage banks to increase their reliance on uninsured demandable liabilities. Therefore, a critical reassessment of the effectiveness, duration, and overall strategy of QE is needed, particularly when its marginal benefits diminish.

1.2 PRUDENTIAL REGULATION, ACCOUNTING, AND SUPERVISION

The 2023 banking crises in the United States and Switzerland posed the first significant test of and challenge to the Basel III regulatory framework, proving its adequacy, albeit with room for improvement. Failures and rescues were not due to regulatory design flaws but rather to weak implementation of the global standards and their suboptimal implementation and supervision, with accounting standards also playing a critical role in the dynamics of the crisis.

Both SVB and Credit Suisse had faulty business models with poor risk management and governance. Liquidity regulation did not apply to SVB, and in both cases capital was overestimated. In the case of SVB, this was due to the accumulated other comprehensive income (AOCI) filter; in the case of Credit Suisse, it was due to the filter in the evaluation of subsidiaries. Supervisors knew the problems (in March 2023 there were 31 supervisory openings for SVB, and Credit Suisse had 43 supervisory investigations for enforcement proceedings apart from reprimands and criminal charges). Chapter 3 analyses and discusses these events, focusing on accounting practices, regulatory lessons, supervision effectiveness, and policy implications to bolster future financial stability.

1.2.1 Accounting matters: An important source of potential instability

The 2023 banking crisis shone a spotlight on the critical interplay between prudential regulation and accounting standards. These have two different objectives: financial stability and providing useful information for stakeholders. Accounting practices that categorise debt securities into trading, held to maturity (HTM), or available for sale (AFS) directly affect financial statements and regulatory capital, influencing banks' strategies in response to market conditions. AFS securities lie between trading and HTM securities in that they do not affect financial results through changes in profit and loss accounts but impact regulatory capital. This classification affects banks' ability to manage their regulatory capital efficiently, reflecting broader discussions on the balance between transparency, financial stability, and the accurate portrayal of a bank's financial health. The question arises as to why this classification exists and, in particular, why HTM securities are allowed in the first place. Furthermore, why do regulators allow banks discretion when deciding between fair value and amortised cost measurement criteria?

The 2023 turmoil, notably the collapse of SVB, underscored US banks' strategic use of HTM classifications and the AOCI filter to manage unrealised losses and regulatory capital amidst rising interest rates, starkly contrasting with the situation in European banks.[9] The outcome was an overestimation of capital for a segment of US regional banks. The 'unrealised losses' concern seems more relevant for US mid-sized banks

9 US regulators removed the AOCI filter only for larger banks in 2014 and the Federal Reserve's tailoring rule of 2019 reintroduced the possibility of using the filter for the subset of banks with assets between $250 billion and $700 billion.

than for European banks. The current accounting standards in the United States allow banks to reclassify assets to shield their value from interest rate changes, which plays an important role in risk-taking. This strategic manoeuvring, aimed more at leveraging favourable accounting treatments than reflecting genuine economic intentions, calls for a re-evaluation of current accounting practices to ensure they more accurately reflect banks' financial realities and contribute to overall financial stability.

Additionally, the nuanced relationship between accounting standards, particularly the International Financial Reporting Standards (IFRS) and the US Generally Accepted Accounting Principles (GAAP), reveals significant differences in asset reclassification practices and hedging strategies, affecting banks' financial resilience. The divergent approaches to hedge accounting and the reclassification of assets under these standards highlight regional disparities in how banks mitigate interest rate risk and manage regulatory capital. For instance, US GAAP's restrictive stance on hedge accounting for HTM securities contrasts with IFRS' more flexible guidelines, leading to strategic reclassifications by banks to navigate financial and regulatory landscapes effectively (for example, significant entities directly supervised by the Single Supervisory Mechanism (SSM) of the European Central Bank (ECB) made substantial use of derivatives for hedging purposes).

In response to the crisis, there has been a push for *policy reforms* ranging from enhanced disclosures to more radical shifts aiming to increase disclosure, introduce caps on the amount of HTM assets, adopt a 'mark to maturity' approach, remove the AOCI filter and the FVOCI[10] category, and introduce full fair value measurement. Full fair value measurement may imply early recognition of losses and impact on regulatory capital. It may also induce excessive volatility on banks' balance sheets and reported regulatory capital, foster instability (market movements may serve as coordination signals for runs), and enhance the impact of techniques used to evaluate non-traded assets. Additionally, the call for simplified hedge accounting practices reflects a broader desire to adapt regulatory frameworks to accommodate dynamic risk-management strategies better while preventing speculative misuse, highlighting ongoing efforts to refine the interplay between accounting standards and prudential regulation in the aftermath of financial turmoil.

1.2.2 Lessons for regulation

The 2023 banking turmoil has led to a critical re-evaluation of the Basel III framework's capital and liquidity regulations, highlighting issues such as the treatment of interest rate risk in the banking book (IRRBB) and the varied global implementation of the Basel standards. This scrutiny has revealed the need for more disciplined and consistent regulatory approaches, especially regarding IRRBB, which historically falls under Pillar 2's broader supervisory review process and is subject to widely heterogeneous practices.

10 FVOCI stands for fair value through other comprehensive income.

The crisis has sparked debates on issuing new guidance for IRBB under Pillar 2 or even integrating IRRBB into the Pillar 1 minimum requirements. An intermediate approach would be to include a minimal Pillar 1 requirement for IRRBB, complemented with a bank-specific Pillar 2 requirement. In any case, the aim should be to achieve a more effective treatment of IRBB that could be more consistently applied across jurisdictions.

Additionally, the crisis highlighted the significance of liquidity regulation, questioning the adequacy of the LCR to address rapid deposit outflows and calling for adjustments to reflect better modern banking dynamics (e.g., social media amplification under digital banking) and systemic vulnerabilities exposed by banks like SVB. Policy options include increasing the deposit run-off rates in the LCR; restrictions to HQLA eligibility criteria; introducing Pillar 2 HQLA add-ons (banks with, for example, a high share of uninsured deposits, a concentrated deposit base, or a large share of long-term fixed-rate government securities would be required to hold an additional layer of HQLA); rethinking the LCR time horizon (which would depend on whether LCR aims to prevent bank runs or, as it is more plausible, to buy time for an intervention); and considering compliance at the individual-entity level (in contrast to the consolidated level, which is important given the restrictions to the transfer of liquid resources within banking groups).

These policies should make the banking sector more resilient, ensuring it is better equipped to handle future challenges and mitigate systemic risks in an increasingly interconnected financial landscape.[11]

SVB, exempted from the full application of liquidity regulation and facing little if any constraint in the maturity mismatch between assets and liabilities, lost $42 billion of its deposits in one day and 85% in two days, while it took ten days for Washington Mutual to lose around 10% of its deposits in 2008. The speed of the bank runs at SVB was exacerbated by the concentration of deposit holdings (the top ten depositors alone accounted for close to 8% of total deposits), the similarity of the depositors (mostly corporates in the high-tech sectors), and the amplification provided by social media.

The crisis underscored the disparities in the scope of application of Basel III across jurisdictions, particularly how the US relaxation of the regulation for mid-sized banks after 2018 contributed to vulnerabilities.[12] Different jurisdictions can proportionately apply the Basel framework beyond internationally active banks, including smaller banks. The relaxation in requirements for banks such as SVB led to systemic repercussions and contagion not only in the United States (with subsequent crises at Signature Bank of New York and First Republic Bank) but also in the rest of the world, affecting the demise of Credit Suisse. In Switzerland, the national regulator (FINMA) deviated

11 It is important to note, as Delgado points out in his discussion, that the LCR was designed to work for an average bank so that all banks can implement it. However, a more tailored approach for banks that face different risks and scenarios would be beneficial. Indeed, as Giovanni Dell'Ariccia also points out, the key when imposing liquidity and capital requirements is how systemic that bank is – the greater the contagion risk, the stronger the buffer should be.

12 Another instance is that banks in the United States may use different metrics in the measurement of IRRBB and regulators use the CAMELS rating system based on capital, asset quality, management, earnings, liquidity, and sensitivity to market risk instead of having a specific process for Pillar 2 supervision.

from the standard application of the Basel framework by applying a regulatory filter for the valuation by the parent companies of their participation in financial subsidiaries to calculate regulatory capital. This calls for a more consistent application of the international standards worldwide.

1.2.3 Lessons for supervision

The March 2023 banking turmoil, particularly with the collapse of SVB and Signature Bank of New York in the United States, alongside Credit Suisse's distress in Switzerland, underscored the pivotal role of supervision alongside regulation in maintaining financial stability. Supervisors identified many of the critical issues that were affecting banks in trouble. Still, supervisors were often slow in recognising them in supervisory ratings or faced challenges in acting due to lack of appropriate tools or legal constraints, and they did not address them effectively. Both SVB and Signature Bank had problems with their business models, weak governance, and risk management, and the supervisory response to these deficiencies was not prompt enough to prevent their crisis and demise.

The failures of these banks despite some serious issues being previously identified by supervisory bodies raised concerns about the effectiveness of supervision and the adequacy of early intervention tools. Systemic risks and contagion effects were not sufficiently mitigated, highlighting a gap between recognising issues and implementing corrective measures. The unique situation of Credit Suisse, mired in scandals and mismanagement, further demonstrated the limitations of supervisory actions in driving significant change, partly due to constrained enforcement capabilities.

The effectiveness of supervision relies heavily on early intervention frameworks, which vary significantly across jurisdictions. The United States utilises the Prompt Corrective Action (PCA) regime, focusing on capital and leverage as intervention triggers. The European Union's Early Intervention Measures (EIM) offer a broader scope, including supervisory ratings and significant events, thus granting more discretion to regulators.[13] This difference in approach leads to potential limitations in addressing non-capital-related issues, as seen in the SVB case. It stresses the importance of a balanced, nuanced supervisory strategy that can adapt to complex banking crises.

In response to the crisis, there is a pressing need for supervisory enhancements in governance, risk management, and the development of more responsive and comprehensive early intervention capabilities (to change management behaviour while a bank is still sound).[14] As well as a stronger emphasis on governance quality and risk management systems, this involves integrating broader risk indicators, including market-based measures, into supervisory practices. Indeed, supervisors may want to

13 The EIM regime is under review under the Crisis Management and Deposit Insurance framework, including amendments to allow direct legal basis for the ECB to intervene and the removal of overlap between EIM and other supervisory measures.

14 For example, PCA in the United States relies only on capital and leverage triggers, while EIM in Europe does not foresee any automatic actions.

consider stock prices and price-to-book ratios in their assessments as indicators of the possible need for prompt intervention (however, indicators such as credit default swaps should be handled with care given the opacity of and lack of liquidity in over-the-counter markets where they are negotiated). Additionally, the crisis highlighted the need for greater international cooperation among regulatory bodies to ensure a unified, effective approach to supervision that can pre-emptively address and mitigate systemic risks.

1.3 LESSONS FOR BANK FAILURE MANAGEMENT

The global financial crisis catalysed a pivotal shift in banking policy reform, which led to the creation of a new bank resolution framework. This transformation was driven by the commitment of the FSB to mitigate the systemic impact of bank failures, as discussed in the "Key Attributes of Effective Resolution Regimes for Financial Institutions" (henceforth, Key Attributes). The cornerstone of the framework, the bail-in tool, empowers authorities to decisively intervene by writing down liabilities or converting them into equity, thereby absorbing losses without resorting to public funds. Yet, implementation of these attributes remains uneven across FSB jurisdictions, with approximately half of them fully integrating the bail-in tool, underscoring a significant gap between policy intention and execution. Furthermore, failures in 2023 were resolved outside the revised resolution regimes, even though they included a G-SIB and all cases had a systemic impact.

1.3.1 The management of recent bank failures

The management of bank failures in the United States and Switzerland calls for a re-evaluation of current resolution frameworks, especially considering the potential flaws and gaps these crises reveal. The Unites States' reliance on systemic risk exceptions and the ad-hoc nature of Switzerland's response to the Credit Suisse crisis highlight the importance of adaptability and call for a reconsideration of what constitutes systemic risk and how best to manage it within the confines of regulatory and legislative frameworks. These events stress the necessity for a more comprehensive and flexible approach to bank resolution and a broader policy discussion on revising resolution frameworks to better prepare for and address the complexities of future banking crises.

The FDIC resolved SVB and Signature Bank following a standard procedure: a transfer strategy with a bridge bank for each institution, with all their deposits and most of their assets, and the posterior sale of the bridge banks' assets and liabilities to acquirers. The equity of each bank was wiped out, and the assets and liabilities not transferred to the bridge banks were liquidated. A new liquidity facility that offered favourable conditions to banks was established. The systemic risk exception was used despite the fact that banks were not considered systemic.

The strategy followed by Switzerland for Credit Suisse was unique in that established resolution procedures were not followed, and a commercial transaction was arranged with UBS.[15] The latter was supported by bail-in for some creditors and public guarantees offered by the state. The Swiss authorities thought that the risks involved in the execution of the resolution plan (including the conversion of a large volume of debt instruments into equity) were too high, even considering that the merger of two G-SIBs in a country the size of Switzerland may engender a larger institution that could be 'too big to save'. The measures taken included activating contractual clauses allowing the writing-off of all Additional Tier 1 (AT1) instruments for about CHF16 billion and preserving a residual value of CHF3 billion for equity. The Swiss National Bank (SNB) offered privileged liquidity facilities that were partially guaranteed by the state.

1.3.2 Some issues stemming from the recent turmoil

The rapid transition of apparently solvent banks to failure underscores the urgent need to bolster *resolution planning*. The scope of resolution planning obligations should encompass all banks whose failure could have systemic implications. Furthermore, resolution planning should effectively address cross-border operationalisation challenges, particularly with respect to the application of the bail-in tool. The planning process should also incorporate versatile strategies beyond the singular focus on the application of a single tool. Preparations for both (at least partial) sale-of-business transactions and creditor bail-in would generally be helpful to better manage future bank failures. This approach could offer more flexibility and effectiveness in crisis management across various banking institutions and jurisdictions.

The new resolution framework emphasises the need for systemic banks to maintain sufficient *loss-absorbing capacity* to address failures without jeopardising financial stability. The framework spearheaded by the FSB's Total Loss Absorbing Capacity (TLAC) standards for G-SIBs mandates a minimum level of liabilities that can be converted or written off during a crisis. While the European Union extends these requirements to a broader range of institutions through the Minimum Requirement for own funds and Eligible Liabilities (MREL), so far the United States has not imposed such requirements on non-GSIBs, leaving most banks without specific obligations to hold loss-absorbing resources beyond regulatory capital. Gone concern capital requirements in terms of debt instruments might be more useful than equity, as the latter normally evaporates before resolution is formally triggered. In fact, in a recent consultation, the FDIC proposed to introduce gone concern loss-absorbing requirements to support bank resolution strategies which would consist of minimum long-term debt requirements for all US

15 The chair of the FDIC warned that this was unhelpful as it is important to show shareholders, creditors, and executives that they cannot rely on government bailouts. The former first chair of the Single Resolution Board, Elke König, also argues that not implementing the resolution plan was a wasted opportunity for Europe. From FINMA's point of view, Amstad argues in her discussion that it was important to have an easily understandable outcome by all actors (especially depositors).

banks with a balance sheet above $100 billion. This move underscores the global shift towards enhancing banks' financial resilience through structured and well-calibrated loss-absorbing mechanisms, aiming to facilitate orderly resolution and minimise the need for public financial support in times of crisis.

Calibrating loss-absorbency requirements to facilitate transfer strategies in bank resolutions involves balancing the need for sufficient compensation for acquirers with deposit insurance fund (DIF) support constraints. The latter are normally defined in terms of the net costs for the DIF to pay out covered deposits in a counterfactual liquidation scenario. The effectiveness of asset transfers as compensation depends significantly on the disparity between the value of unencumbered assets and the liabilities being transferred, with external support often playing a pivotal role in bridging gaps. Chapter 4 argues that high ratios of non-covered deposits limit the scope for transfer transactions without exceeding DIF financial caps, especially under EU insolvency regimes where DIF claims are highly protected. However, in the US context, where DIF claims do not enjoy such preferential status, there is more leeway for supporting transfer transactions. Thus, for failing banks with a moderate proportion of non-covered deposits, appropriately calibrated gone concern capital requirements, alongside some DIF support, could make transfer strategies more viable and less reliant on systemic exceptions.

AT1 instruments, designed to bolster a bank's Common Equity Tier 1 capital under stress, exhibit a dual nature, serving both as a pre-resolution loss-absorption mechanism and as regulatory capital. Their issuance conditions, including discretionary coupon suspensions and conversion or write-down triggers, are tailored to ensure banks can reinforce their solvency promptly. However, the effectiveness of AT1 instruments in pre-resolution phases has been questionable, as evidenced by market destabilisation incidents and debates over their treatment during the Credit Suisse crisis. This scenario underscores a broader issue regarding activating AT1 instruments' conversion or write-down clauses in going concern, challenging their role as reliable loss-absorbers before formal resolution processes begin. The complex interplay between contractual terms, regulatory expectations, and practical outcomes invites a critical reassessment of whether AT1 instruments, as currently defined, should remain classified as regulatory capital, pointing to a need for clearer guidelines and possibly revised standards to enhance their efficacy in strengthening bank solvency in anticipation of or during financial distress.

Following the global financial crisis, the resolution framework was designed to reduce taxpayer costs during bank failures. However, recent financial disturbances have shown that external support is sometimes essential to preserve financial stability as regular resolution methods might not always deliver the desired objectives. The difference in support mechanisms between the United States, with its more flexible FDIC support, and the European Union's stricter Single Resolution Mechanism (SRM) procedures

underscores the importance of acknowledging the potential need for external funds in critical situations in crisis management frameworks. In addition, an effective funding-in-resolution facility (backed by a public backstop so that the central bank can provide the necessary support to the bank) is needed.

1.3.3 The European framework

The European Union's approach to bank failure management employs a dual regime, distinguishing among bank failures based on their systemic impact or other public interest considerations. This regime involves resolution for bank failures that pass the public interest test, guided by the SRM and the Single Resolution Board (SRB), and liquidation under national insolvency regimes for others. Despite adhering closely to the FSB standards with stringent requirements for resolvability and resolution planning, such as MREL, the framework faces challenges, particularly regarding access to external funding and the operationalisation of sale-of-business strategies for mid-sized banks. The rigidity of the framework contrasts with more flexible domestic insolvency procedures that have occasionally been applied to significant banks, revealing contradictions and shortcomings in the current system. In the EU context, the elephant in the room is the absence of a common deposit insurance regime in the Banking Union's infrastructure, compromising its ability to denationalise bank risk.

The recent European Commission Crisis Management and Deposit Insurance (CMDI) proposal seeks to refine the European Union's bank failure management framework by clarifying public interest criteria for resolution and enhancing the available financial support for sale-of-business transactions. This reform aims to make resolution the primary strategy for systemic failures and improve the handling of mid-sized bank resolutions by facilitating funding from national deposit insurance funds, thereby addressing existing framework flaws.

The CMDI proposal, however, may limit flexibility in crises. The case of the Venetian banks requiring public support under insolvency illustrated the inconsistency of the current framework. Yet, it also showed that a public backstop might be needed under resolution. While CMDI would strengthen the existing resolution tools, it would effectively ban the provision of liquidation aid under insolvency without allowing the provision of exceptional government support in resolution. This might potentially complicate the management of mid-sized bank failures if the regular resolution tools are ineffective. This is why it may be reasonable to introduce systemic exception clauses or government stabilisation tools as potential backstops as well as mechanisms to provide liquidity in resolution. Furthermore, CMDI does not sufficiently improve the criteria to be used for the determination of MREL to optimise the ability to facilitate sale-of-business transactions together with the available support from the deposit insurance

fund. Importantly, CMDI would not make any progress towards the completion of Banking Union as there is insufficient political support for the creation of a European deposit insurance scheme. The coexistence of European resolution decisions and national funding from deposit insurance funds may prove quite dysfunctional in practice.

In summary, the 2023 banking turmoil underscored the need for regulatory reforms to create more effective and flexible resolution tools and external support when needed. Bank crises highlighted flaws in the failure management regime. They pointed to the need to extend resolution planning to all banks that may affect the financial system, including a minimum amount of loss-absorbing liabilities in resolution (preferably with debt instruments), and to reconsider using AT1 instruments, as currently designed, as regulatory capital. In the European Union, the CMDI proposal represents a significant improvement by expanding the resolution scope and refining funding strategies for banks in crises. Still, there is room to improve MREL calibration for sale-of-business strategies, as well as the provision of external support and liquidity in resolution. The overall aims of the reforms should be to strengthen the efficacy of the resolution framework and further reduce the need for government bailouts, but also to introduce the required flexibility to adapt to unexpected challenges in the resolution processes for the preservation of financial stability.

1.4 CONCLUDING REMARKS AND SUMMARY OF POLICY IMPLICATIONS

Major reform proposals are put forward after any relevant financial crisis, such as the 1980s savings and loan crisis or the global financial crisis of 2007-2008. For example, Basel III is intended to tackle regulatory shortcomings detected in the latter of these two crises. Two major reform proposals surfaced, or rather resurfaced, after some crises: narrow banking to end bank runs, and mark-to-market accounting to guide regulatory intervention and supervision.[16] The recent banking turmoil has been no exception. The 'pawnbroker for all seasons' proposal is gaining traction as it again promises to eliminate runs that are not solvency related (and the need for deposit insurance) with full coverage of runnable bank liabilities through pre-positioning collateral in the central bank.[17] Mark-to-market accounting promises to solve supervisory forbearance by early alerting of problems.

16 Larry White, for example, advocated for market value accounting after the savings and loan debacle (Vives, 1992).
17 In the United States, it would also help to overcome the stigma associated with using the discount window facility.

The PFAS proposal modifies the strict narrow banking model by allowing banks to make risky loans financed by equity and long-term debt. Still, it limits the maturity transformation function of banks with a strong form of the net stable funding ratio requirement. Apart from implementation issues such as the complex task of determining the haircuts for the pre-positioned collateral, larger issues loom regarding the impact on credit availability, the increased role of the central bank in the allocation of financial resources to the real economy,[18] and the impact on financial stability.

A main criticism of the narrow bank is that uninsured short-term debt funding of loans would migrate out of the banking system to reproduce financial instability elsewhere.[19] This also applies to the PFAS proposal. A good property of the proposal is that it prices the insurance provided to banks for liquidity support. In this sense, it can present a schedule to the banks that can penalise (in terms of collateral) a riskier liability structure more. This is akin to implementing advanced risk-based deposit insurance premia. However, we know that full insurance is not optimal because of moral hazard considerations. This calls for adding collateral pre-positioning to the toolbox of liquidity regulation to obtain liquidity support from the central bank, but in a limited way. This would correspond to partial insurance. The objective of eliminating runs is neither realistic nor desirable. Note that PFAS would leave banks completely dependent on the central bank for funding, diminishing the disciplining role of markets for bank risk management.

A current debate in the United States is whether to extend deposit insurance to all accounts with 100% coverage or to target business accounts. The first proposal should be dismissed because of moral hazard considerations. It would incentivise excessive risk-taking, among other factors, by attracting funds from non-bank financial institutions and enticing risky banks to bid higher than more prudent banks for funds.[20] The second proposal merits more attention.

There are arguments in favour of and against mark-to-market accounting when compared with historical cost accounting. The most important argument in favour is that it is provides early warning of possible trouble in a bank and that it may encourage prompt corrective action, such as raising capital or selling assets that have lost value when a crisis looms and there is still time. Furthermore, a persistent divergence of the market and accounting valuations may signal potential trouble (this was the case for Credit Suisse, for example). Similarly, a price-to-book ratio persistently below one could indicate an unhealthy banking business. All this suggests that there is room for supervisors to rely more on market measures. It may also help to recognise the nexus between bank liquidity and the solvency assessment as well as be used to validate stress tests.

18 The central bank's collateral framework can have distortionary effects on financial markets (e.g., Nyborg, 2016). As Holthausen noted in her discussion, setting haircuts too steep would distort economic and credit outcomes, but not being conservative with haircuts may expose the central bank to counterparty losses; see also the discussion by Suárez.
19 See Section 5.4 in Vives (2016).
20 Matutes and Vives (2000).

However, market prices used in fair value accounting are volatile. They may provoke investor overreaction, fire sales, and pro-cyclicality, and they may even represent a public signal that serves as a rallying point for runs.[21] A consistency issue may also arise when assets are measured at fair value and liabilities at historical cost, and they may also introduce too much discretion when there is no market for the asset. The conclusion is that a nuanced position on mark-to-market seems sensible, noting that a higher reliance on it would be warranted. Chapter 3 discusses several possibilities, such as an improvement of the disclosure requirements for the (unrealised) losses deriving from HTM securities, a 'mark-to-maturity' approach to HTM securities (with the measurement of assets dependent on the duration of the funds used to acquire those assets), facilitating hedge accounting, and considering market signals as stock prices or analyst forecasts for supervisors.

In addition to more general adjustments in regulation, we should consider several more specific suggestions for improvement. From Chapter 2, stress tests should consider scenarios where interest rates are 'higher for longer' and where inflation may be persistent. Furthermore, from the US experience, we see that liquidity regulations need to be applied uniformly across banks. They could also be more contingent on aggregate circumstances (for example, in periods of QE or QT) and apply on average in a specified period. The recommendation in Chapter 3 is that the AOCI filter should be removed and also that the FVOCI category could be reconsidered. Concerning the treatment of interest rate risk on the banking book, we advocate for more consistently applied bank-specific Pillar 2 requirements and, possibly, incorporating IRRBB in the Pillar 1 minimum capital requirements. Concerning the LCR, deposit run-off rates should be increased due to the prevalence of digital banking coupled with the impact of social media, the LCR time horizon of 30 days should be reconsidered, and a Pillar 2 HQLAs add-on should be included depending on the level of risk in the liability structure of the bank. The aim is to reinforce the LCR and give supervisors time in a crisis.

From Chapter 4, we learn of the need to create more effective and flexible resolution tools to reduce the bill for taxpayers, while also recognising the need for the existence of public backstops. Recent crises indicate the need to extend resolution planning to all potentially systemic banks, including an appropriate amount of loss-absorbing liabilities. The latter should give preference to debt instruments and be calibrated to facilitate sale-of-business transactions in combination with the available external support. At the same time, the eligibility of AT1 instruments as regulatory capital should be reconsidered. In many jurisdictions, providing liquidity in resolution is an urgently needed reform. In Europe, the CMDI proposal is a step in the right direction to improve the resolution framework. Yet, it does not alleviate, but rather strengthens, the need for completing the Banking Union.

21 Vives (2014).

The general lessons from the report are as follows. First, a holistic policy approach is needed. This includes considering the effects of different monetary policy regimes on financial stability. Capital, liquidity, accounting, and disclosure requirements should be set together and considered in terms of their interactions.[22] Second, prudential rules should be applied uniformly to institutions that pose systemic risk, even if they are small individually but not in the aggregate. Any sensible proportionality regime should not compromise the need to address systemic risk. Third, liquidity regulation should be adapted to the changes in the banking market induced by digital technology. Fourth, liquidity insurance should be priced properly. Fifth, early intervention frameworks and resolution planning should be reinforced, and more attention should be paid to market signals. Finally, a consistent, timely, and complete implementation of global standards across jurisdictions should be given maximum priority.

22 See Vives (2014; 2016) for a study of the interactions and policy proposals.

CHAPTER 2

Boom and bust in uninsured bank deposits... and what can be done about it

This chapter summarises the evidence on the boom-and-bust pattern in uninsured bank deposits that caused the banking stress of 2023 in the United States, and discusses the likely drivers of this pattern. It then presents policy options that can help manage better the resulting liquidity risk: (i) *ex-post* measures (reforms to deposit insurance and lender of last resort; (ii) *ex-ante* measures (stress test design to assess bank capital requirement that recognises interest rate risk and the liquidity-solvency nexus, as well as the use of market data to aid supervisory assessment of banks); and (iii) factoring in financial stability considerations while using expansion and contraction of a central bank's balance sheet as an unconventional monetary policy tool.[23]

2.1 POST-PANDEMIC UNINSURED DEPOSIT BOOM AND BUST, AND ITS DRIVERS[24]

2.1.1 The banking stress of 2023

In March-April 2023, three mid-sized regional US banks – Signature Bank, Silicon Valley Bank, and First Republic Bank (all with over $100 billion in assets) – effectively failed. Together, they had $548.1 billion in assets and over $367.9 billion in deposits. By asset size, in 2023Q1 they were the 29th, the 16th and the 14th largest of the US banks, respectively. On the asset side, these banks were exposed primarily to crypto assets (Signature Bank), mortgage-backed securities and tech-sector loans (SVB), and mortgages, commercial real estate loans and municipal bonds (First Republic).

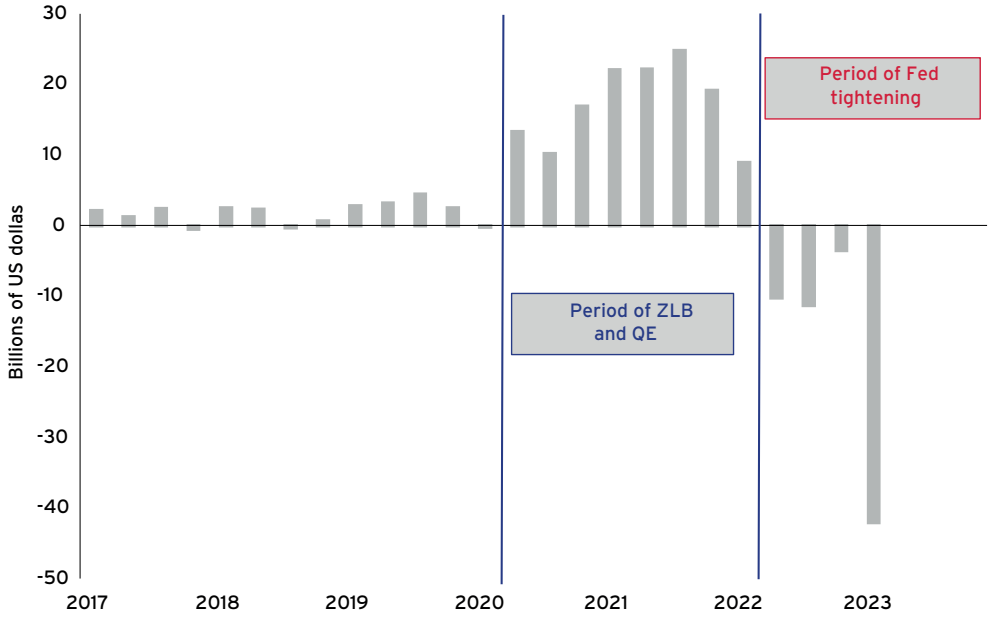
The startlingly swift distress of SVB Financial Group in March 2023, with over $200 billion in assets, gathered the most headline attention. SVB had gained $140 billion in deposits during the period of 2019Q4 to 2022Q1 (see Figure 1) when the US Federal Reserve expanded its balance sheet dramatically. Over 90% of SVB's deposits were

23 Since the focus here is on the banking stress and bank regulatory apparatus of the United States, the applicability of principles proposed to other jurisdictions requires additional analysis of data as well as an assessment of their overall policy mix.

24 The discussion in this section draws heavily on Acharya et al. (2023), Rajan and Acharya (2023) and Acharya and Rajan (2024).

uninsured.[25] The quarterly growth of SVB's deposits in the prior three years was at best modest. SVB had invested the influx of deposits mostly in a long-dated Treasury portfolio with an average maturity of 6.2 years at the end of 2022, 56% of which was in fixed-rate securities and the rest lent out to tech startups, which were also its transaction (typically overnight, uninsured) depositor holders. The pace of expansion was so rapid that both total assets and deposits more than tripled during the period Q1 2020 to Q4 2022.

FIGURE 1 **SILICON VALLEY BANK: QUARTERLY CHANGE IN DEPOSITS, 2017-1Q 2023 (BILLIONS OF US DOLLARS)**



Source: FDIC Call Reports; reproduced from Acharya et al. (2023b).

Note: This figure plots the quarterly change in total deposits of Silicon Valley Bank (SVB Financial Group). The estimate for 2023Q1 is based on Silicon Valley Bank's mid-quarter update.

Following large interest rate hikes starting in March 2022 and a subsequent modest balance sheet shrinkage (QT) by the Federal Reserve, SVB and several other mid-sized and regional US banks suffered runs or significant outflows of uninsured deposits. In particular, the solvency of these banks was under question given the substantial unrecognised losses on their investment securities,[26] and possibly also on tech sector and commercial real estate loans. The solvency risk was amplified by the liability side being excessively fragile due to an overreliance on uninsured deposits. This episode resulted in effective – albeit temporary – backstopping of all uninsured depositors at US banks

25 As noted by Cecchetti et al. (2023), most uninsured deposits of banks tend to be in very large deposits. For example, when SVB failed, its top ten uninsured deposits alone accounted for over $13 billion. This compares to the withdrawal of $42 billion on 9 March 2023, the day before California authorities closed the bank, and with total deposits of $173 billion at the end of 2022.

26 See in particular the speech by FDIC Chairman Martin Gruenberg on 28 February 2023 at www.fdic.gov/news/speeches/2024/spmar0724.html.

and the opening of a generous lender of last resort facility by the Federal Reserve. In particular, the Federal Reserve provided LOLR to banks in March 2023 for one year (i.e., expiring in March 2024) via the Bank Term Funding Program (BTFP), which lent to banks for a one-year term (i.e., potentially up to March 2025) without any haircut (i.e., up to the par value) against eligible collateral at below-market rates. While there have clearly been failures in risk management at individual banks and also supervisory laxity,[27] the problems at SVB and the failed banks seem to reflect those of a large part of the US banking sector in the post-pandemic period.

Panel A of Figure 2 illustrates this starkly using quarterly data from 2016Q1 to 2023Q1. In the three and a half years prior to the repo rate spike of September 2019, US commercial bank uninsured deposits (excluding foreign deposits) in the aggregate exhibited modest quarterly growth (if any). Starting in 2019Q4, growth picked up to about $100-$150 billion per quarter as the Federal Reserve released more reserves in the banking system to ease the repo rates. Starting with the pandemic, however, bank uninsured deposits grew even faster, at an average of close to $400 billion per quarter, for eight quarters in a row, with a gigantic $800+ billion in 2020Q1. Cumulatively, this was a growth of over $3.2 trillion, which caused the share of uninsured deposits in overall bank deposits to grow from around 45% to close to 50% within a short span of eight quarters. As mentioned earlier, these flows started to reverse in 2022Q2 once the Federal Reserve embarked on rate hikes and QT, culminating in the failures of SVB, Signature Bank, and First Republic Bank. In fact, following the banking failures of March 2023, the boom in the uninsured deposit share from 45% to 50% had gone completely bust, reverting to a level below 45%.

2.1.2 Quantitative easing and uninsured demand deposit boom at banks

What explains this uninsured bank deposit boom and the subsequent bust?

Acharya and Rajan (2022) explain theoretically, and Acharya et al. (2023a) confirm empirically, that when the Federal Reserve engages in QE, it buys Treasuries or agency-backed securities from a variety of private institutions other than banks. Typically, the sellers (non-banking entities such as mutual funds, hedge funds, insurance companies, pension funds, family offices, or even high net-worth individuals) deposit the money in their bank, and this results in a large increase in uninsured (typically, financial) demand deposits in the banking system. Of course, the sellers may later buy other financial assets (say, corporate bonds) to substitute for the securities they have sold, but this simply means the demand deposits are transferred to a new holder (say, a corporate, in the form of overnight transaction deposits). Furthermore, if QE has an economic activity multiplier, as is often asserted, or if the injection of reserves relaxes bank liquidity constraints (as

27 See, for example, Barr (2023).

is likely to be the case given that QE is typically adopted during episodes of financial fragility), then deposit multipliers also come into play. Then, the net creation of demand deposits at banks following QE may exceed the one-for-each-reserve mechanical effect described above from an asset swap between the central bank and non-banks.

While these two papers establish an aggregate time-series as well as a bank-panel (cross-section and time-series) relationship between an increase in bank reserves and uninsured demandable deposits, the pandemic also featured fiscal stimulus. In particular, accompanying the QE was a gargantuan fiscal stimulus by the US government. Stimulus cheques and spending can increase bank reserves and deposits by transferring reserve balances out of the Treasury's Federal Reserve account into savings and expenditures by households and corporations. Panels B and C of Figure 2 help separate the roles of fiscal stimulus and the Federal Reserve's QE in affecting the growth of uninsured and insured bank deposits during the pandemic. Panel B examines the relationship between the quarterly change in total uninsured demandable deposits of the banking system and the change in aggregate bank reserves, while Panel C examines the relationship between the change in insured deposits and the change in aggregate bank reserves.

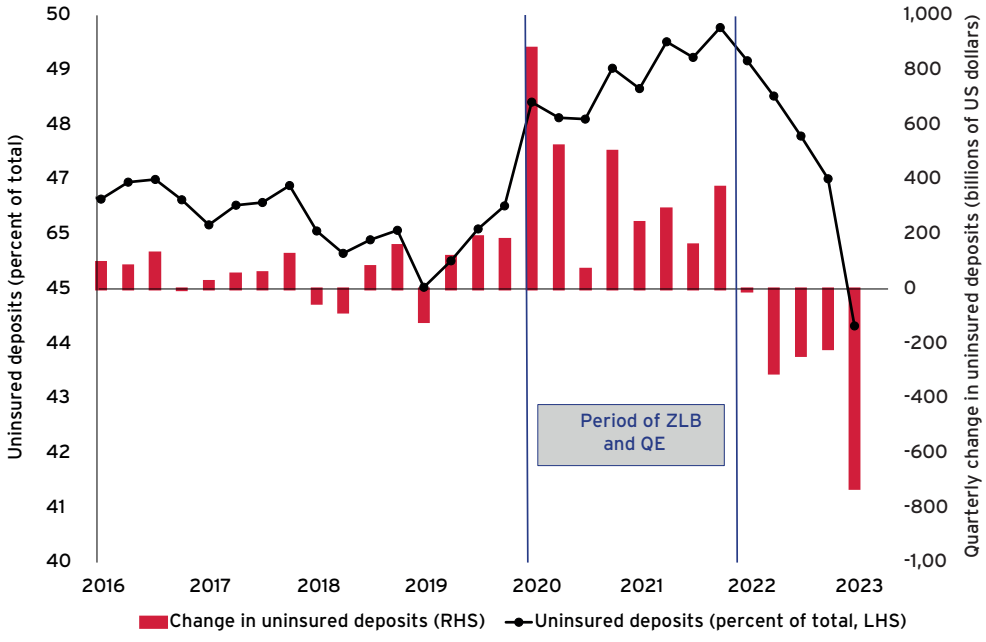
Acharya et al. (2023a) conclude from these figures that while both relationships display a positive correlation over the entire pandemic, the relationship of insured deposits with reserves in Panel C is flat once the quarters of the fiscal stimulus (2020Q2, 2020Q4 and 2021Q1) are excluded, whereas the relationship of uninsured demandable deposits with reserves in Panel B is robust even during the non-stimulus (i.e., QE-only) quarters. Intuitively, the fiscal stimulus drove the growth of household, typically insured, deposits more, whereas QE drove more the growth of non-bank financial and non-financial (corporate), typically uninsured, demandable deposits.

Finally, Acharya et al. (2023a) also document that uninsured demand deposits as a fraction of overall deposits increased significantly in the banking system since 2009 after the Federal Reserve engaged in multiple rounds of QE to spur economic activity following the global financial crisis of 2007-08. More stable time deposits shrank. The authors show that not only uninsured demand deposits, but other uninsured demandable liabilities such as bank credit lines to financial and non-financial corporations grew along with banking sector reserves holdings, drawdowns of which manifested as a vulnerability at the time of the COVID-19 outbreak.[28]

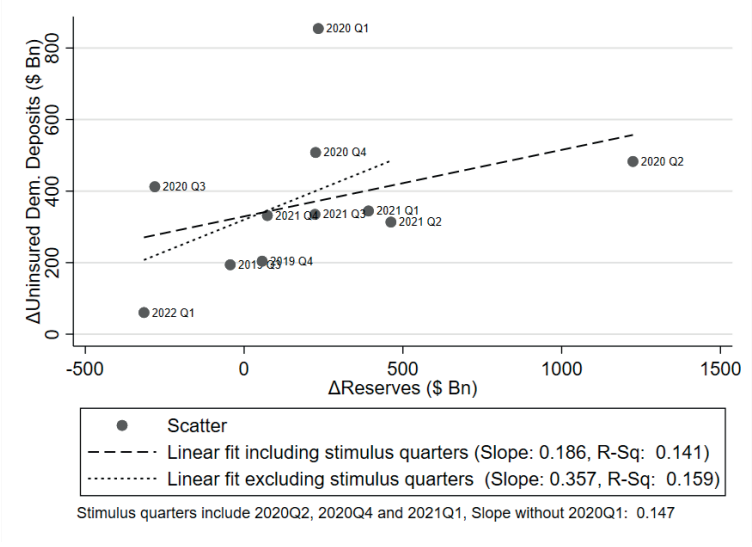
28 Acharya et al. (2021).

FIGURE 2 **AGGREGATE UNINSURED BANK DEPOSITS OF US BANKS DURING PANDEMIC QUANTITATIVE EASING**

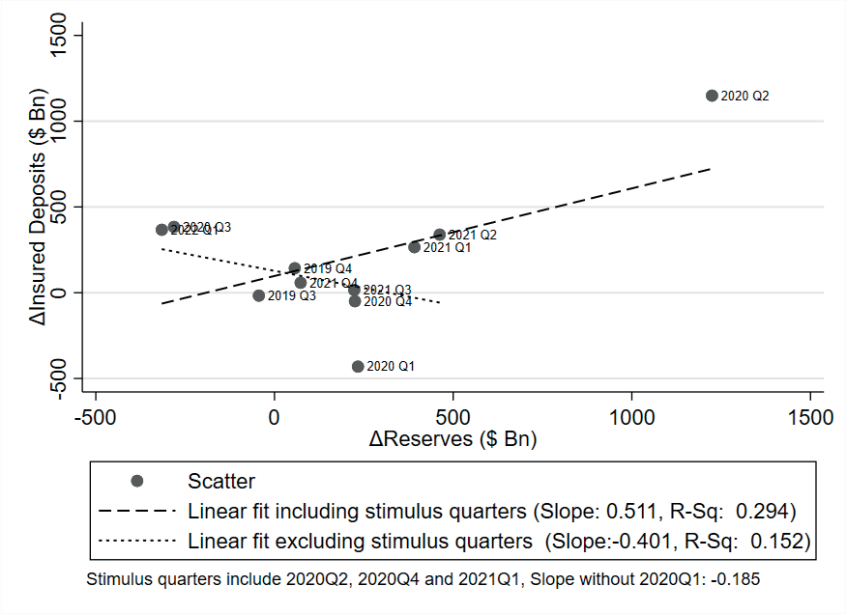
A) Uninsured deposits: Quarterly change (in billions of US dollars) and the share of total deposits (percent of total), 2016Q4 to 2023Q1



B) Uninsured demandable deposits versus reserves



C) Insured deposits versus reserves



Source: FDIC Call Reports and FDIC Quarterly Banking Profile. Panel A is reproduced from Acharya et al. (2023b). Panels B and C are reproduced from the Online Appendix of Acharya et al. (2023a).

Note: Panel A plots the aggregate change in Uninsured Deposits and the percentage of uninsured deposits over total deposits in US commercial banks for the time period 2016Q1 – 2023Q1. The line (left axis) shows the ratio of uninsured deposits to total deposits of FDIC-insured banks. The total includes foreign deposits, none of which are insured. The bars (right axis) show the changes in uninsured deposits in billions of US dollars. Panels B and C plot the scatterplot of quarterly change in aggregate uninsured demandable deposits and insured deposits versus reserves during the pandemic QE period of 2019Q4-2022Q1. Uninsured Demandable Deposits is obtained by subtracting Time Deposits above $250k from Total Uninsured Deposits. Insured Deposits include all deposit accounts with balance below $250k. The slope of the fit line and the R-squared of the regression is displayed in the legend. Panel B plots Uninsured Demandable Deposits against Reserves. Panel C plots the Insured Deposits against Reserves. All variables are sourced from the FDIC Call Reports.

2.1.3 The post-pandemic boom in bank uninsured deposits set up the stage for a bust in 2023

The post-pandemic boom in uninsured deposits at US banks left them highly fragile and vulnerable to asset- and liability-side shocks induced by interest rates,[29] a weakening of the real economy, or both.[30] For instance, tech-sector losses and the value erosion of SVB's bond portfolio induced a loss of $25 billion in deposits in 2022. While this initial loss could be considered somewhat gradual and orderly (see Figure 1), it accelerated to a full-fledged run as large depositors, such as tech venture capital firms, sensed insolvency. After a significant loss of deposits in March 2023, including a single-day withdrawal of $42 billion of deposits on 9 March 2023, the bank failed on 10 March 2023 and was put under receivership by the FDIC. Signature Bank met with a similar fate, while the fate

29 Jiang et al. (2023a); Drechsler et al. (2023a).
30 Chang et al. (2023); Jiang et al. (2023a; 2023b).

of First Republic Bank was uncertain for a few weeks until it too had to be sold off to JPMorgan Chase to avoid further runs at the end of April 2023. The FDIC has incurred losses exceeding $30 billion to date in the process.[31]

As discussed earlier, the problems affecting these banks turned out to be emblematic of small- and mid-sized banks in general but not so much the very large banks, which in fact benefited from a flight to quality in deposits.[32] This dispersion can be best understood by what Acharya et al. (2023a) describe as the 'ratcheting up' of the liquidity risk of small- and mid-sized banks seen in Figure 3.

Panel A of Figure 3 shows the average ratio of uninsured demand deposits to book assets across US banks broken down by three size partitions: banks with assets in 2014Q3 above $250 billion, between $50 billion and $250 billion, and below $50 billion. These size partitions correspond respectively to where the LCR regulation, which requires banks to hold a certain level of highly liquid assets based on their short-term liabilities, was applied (starting in 2014) most severely, moderately, or not at all. The ratio of uninsured demand deposits to bank assets follows an upward trend from 2008Q3 to 2021Q4 for all banks: from 35.8% to 49.8% for the largest banks; from 20.9% to 37.6% for mid-size banks; and from 10.4% to 33.5% for the smallest banks. In other words, the largest increase in uninsured demand deposits as a proportion of balance sheet size was among the smallest banks, i.e., those not subject to the LCR regulations. While the average elevated ratio for the smallest banks was much less than that for SVB, they had also clearly expanded uninsured demand deposits during QE.

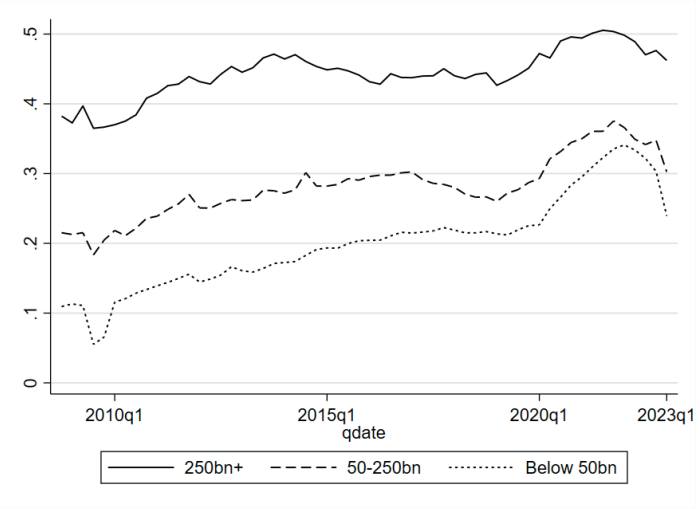
Panel B of Figure 3 shows that at the outset of QE at the end of 2008 and in response to the global financial crisis, banks with less than $50 billion in assets had issued fewer demandable claims, such as uninsured demand deposits, relative to their potential liquidity (holdings of reserves and other Fed-eligible assets such as Treasuries, agency bonds and agency-backed securities) compared to mid-sized and large banks. By early 2022, however, in aggregate, the smaller banks had accumulated uninsured demand deposits that were about one and a half times the size of their liquid assets.

31 See Gruenberg (2023b). These losses are not small by any benchmark. As Thomas Philippon observed in his keynote remarks at the 2023 Wharton Initiative on Financial Policy and Regulation, the losses exceed the annual budget of NASA.

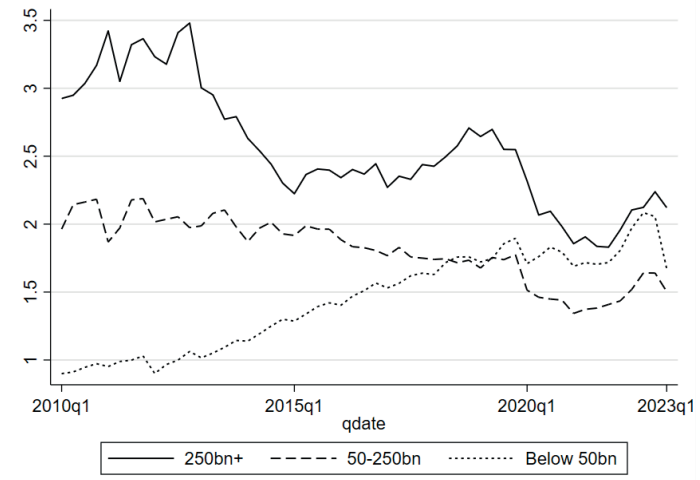
32 The flight to safety of deposits reveals itself not just in deposit quantities but also in bank deposit rates. Acharya and Mora (2015) show that safe banks did not (have to) raise deposit rates during the GFC, while distressed banks – which faced weakened deposit inflows and widened loan-to-deposit shortfalls – did. Caglio et al. (2023) document a similar pattern in deposit rates during the banking stress of 2023.

FIGURE 3 **RATCHETING-UP OF UNINSURED DEMANDABLE DEPOSITS**

A) Uninsured demandable deposits/assets for US banks by asset size



B) Uninsured demandable deposits/(reserves + eligible assets) for US banks by asset size



Source: Acharya et al. (2023a).

Note: Panel A plots the ratio of aggregate uninsured demandable deposits to aggregate book assets of banks that fall within the size buckets of (i) Bank assets above $250 billion in 2014Q3, (ii) Bank assets between $50-250 billion in 2014Q3, and (iii) Bank assets below $50 billion in 2014Q3. Uninsured demandable deposits are defined as the difference between Total Uninsured Deposits and Uninsured Time Deposits. Bank assets refer to total book assets. Panel B plots the ratio of aggregate uninsured demandable deposits to the aggregate sum of bank reserves and eligible assets of banks within aforementioned size buckets. Bank reserves refer to balances due at Federal Reserve Banks. Eligible assets consist of Treasury and Agency securities that were eligible for sale to the Fed for reserves in at least one QE round between 2008Q4-2023Q1. The sample ranges 2008Q4 to 2023Q1. All data are sourced from FDIC's Call Reports data.

In particular, relative to potential liquidity, uninsured demand deposits fell during 2008Q3-2021Q4 from a multiple of 3 to 1.48 for the largest banks and 1.47 to 1.02 for mid-sized banks; for the smallest banks, however, it rose from 0.73 to 1.47. Instead of holding reserves, the assets of the smallest banks were now more weighted towards

long-term securities and term loans, including a significant fraction of commercial real estate lending – assets whose value is particularly vulnerable to interest rate hikes and economic downturns.[33]

2.1.4 Some evidence for the euro area

Does this overall evidence for the US banks hold for euro area banks too?

Panel A of Figure 4[34] documents that the positive relationship of banking sector reserves with uninsured demandable deposits in the form of 'transactions'[35] deposits (and the negative relationship of reserves with time deposits) holds also for the euro area countries since 2010, based on available data in Capital IQ from the balance sheets of stress-tested and systemically important banks. Panels B and C of Figure 4[36] show that in the euro area also, 'small' banks (based on below-median assets on average over the sample period 2010-23) grew their transactions deposits faster than the 'large' banks (above-median assets). In particular, from 2014 to 2021, small banks increased their transaction deposits (relative to total deposits) from 38% to 72%, while large banks increased this ratio from 46% to 69%. Large banks also reduced their transaction deposits more once reserves decreased.

Furthermore, Panel D of Figure 4 plots the time series of monthly reserves of EU banks (left-hand y-axis) and the time series of overnight deposits of non-financial corporates (NFCD) as a percentage of households' overnight deposits over the period January 2000 to March 2024. NFCD is seen to increase relative to household deposits during periods of reserves expansion by the ECB (starting in 2008 and then in 2015 and 2020) and remains somewhat flat during the first period of QT (i.e., before 2015). While NFCD decreases relative to household deposits towards the end of 2023, it still remains substantially higher compared to 2010 and overall mirrors the waxing and waning of euro area bank reserves. The correlation between NFCD to household deposits (both overnight) and reserves is in fact 0.6. Overall, the rise in the overnight corporate deposit share with reserves is strongly suggestive of the mechanism via which QE operates (at least in part, as an asset swap with non-banks which results in reserves for banks and overnight deposits at banks for those non-banks that tender assets to the central bank for the swap).

33 Acharya et al. (2023a) provide some evidence that the incentives for taking on such liquidity risk relate to bank capitalisation: less well-capitalised banks seek to boost their return on equity (ROE) to boost accounting profitability, taking on liquidity risk in the process. Meiselman et al. (2023) document that higher-ROE banks were more exposed to aggregate tail risk during the 2007-09 global financial crisis and the 2023 banking stress. Hanson et al. (2024) argue that over the past 25 years, banks seem to have moved away from information-intensive lending to the real economy to a business model of being 'bond mutual funds', i.e., holding Treasuries and mortgage-backed securities funded by deposits, especially uninsured ones. For a European example of this banking practice, see the discussion in Acharya and Steffen (2015) of Dexia's failure in 2012.

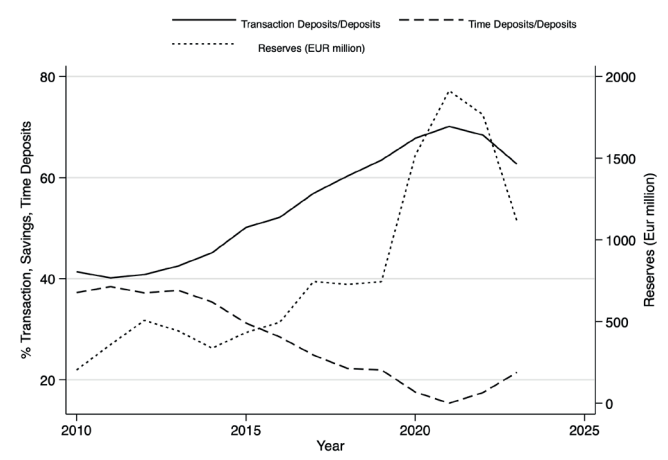
34 From Angeloni et al. (forthcoming).

35 The specific field in Capital IQ for bank-level transactions deposits is as follows: [KeyField:132471, TRANSACTION_ ACCT_DEP] *Accounts in which customers may withdraw money on demand. These accounts may be interest-bearing or noninterest-bearing*. [Financials] / [Deposit Detail] / [Current Accounts].

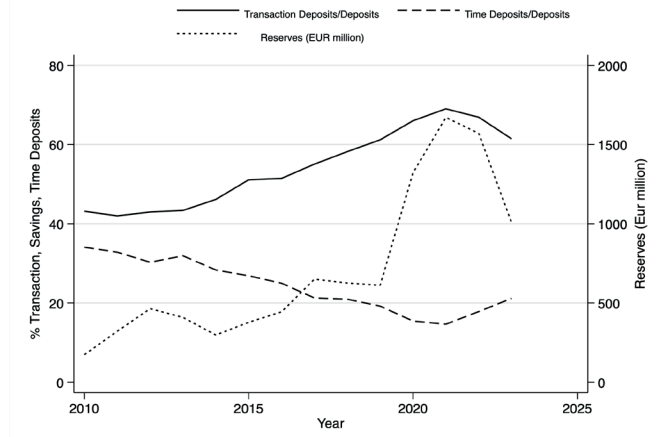
36 Also based on Angeloni et al. (forthcoming).

FIGURE 4 **TRANSACTION, TIME DEPOSITS AND RESERVES FOR EUROPEAN BANKS, 2010-2023**

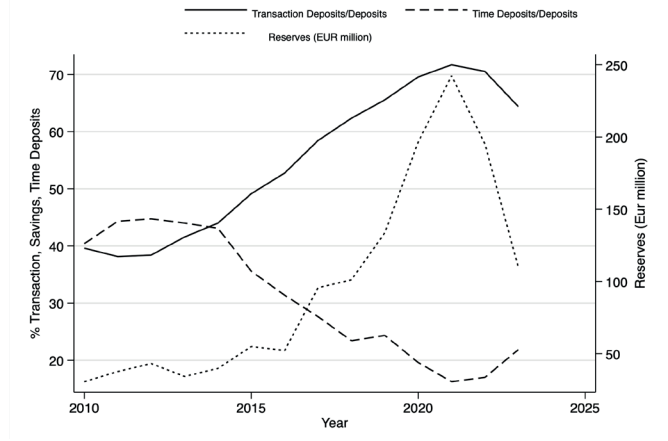
A) Transaction, time deposits and reserves for large European banks



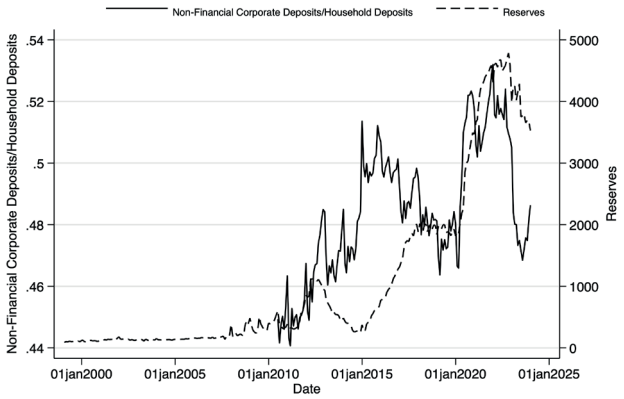
B) Transaction, time deposits and reserves for large European banks



C) Transaction, time deposits and reserves for small European banks



D) Overnight deposits: Non-financial corporate deposits (% of household deposits)



Source: Angeloni et al. (forthcoming) for Panels A-C and ECB Statistical Warehouse (Panel D).

Note: Panel A shows the time-series of transaction and time deposits (all relative to total deposits) and reserves (in million euros) over the 2010 to 2023 period. The sample consists of all 75 European Banking Authority (EBA) 2023 stress test banks and adding the remaining five non-EU G-SIBs, the latter being three from the United Kingdom and two from Switzerland. US subsidiaries included in the stress tests are dropped due to a lack of balance sheet data. The data are sourced from S&P Capital IQ.

Panels B and C from Steffen (2024) replicate Figure 3, Panel B for large and small banks (defined based on median split using average assets of banks over the sample period 2010-2023), respectively. The data is again sourced from S&P Capital IQ.

Panel D plots the time-series of monthly reserves of EU banks (right y-axis) and the time series of overnight deposits of non-financial corporates as percentage of households' overnight deposits (left y-axis) over the January 2000 to March 2024 period. The data are sourced from the ECB Statistical Warehouse. Reserves as indicated below and are in billions of euros.

Variable	Unit	Full Name	Link
Overnight deposits: Non-Financial Corporates Deposits	Millions of euros	Overnight deposits vis-a-vis euro area NFCs reported by MFIs excl. ESCB (stocks) (BSI.M.U2.N.A.L21.A.1.U2.2240.Z01.E)	BSI.M.U2.N.A.L21.A.1.U2.2240.Z01.E | ECB Data Portal (europa.eu)
Overnight deposits: Household Deposits	Millions of euros	Overnight deposits vis-a-vis euro area households reported by MFIs excl. ESCB (stocks) (BSI.M.U2.N.A.L21.A.1.U2.2250.Z01.E)	BSI.M.U2.N.A.L21.A.1.U2.2250.Z01.E | ECB Data Portal (europa.eu)
Reserves	Millions of euros	Loans vis-a-vis the Eurosystem reported by MFIs excl. ESCB (BSI.M.U2.N.A.A20.A.1.U2.1100.Z01.E)	BSI.M.U2.N.A.A20.A.1.U2.1100.Z01.E | ECB Data Portal (europa.eu)

Based on this preliminary and descriptive data exercise, it appears that European banks, and small banks in particular – just as we saw for the US banks – have substantially increased their liquidity risk by shortening the maturity structure of their liabilities. More research is required, however, in order to assess more definitively the dispersion of financial fragility risks in the euro area. For example, it would be useful to replicate the liquidity risk measure in Panel B of Figure 3 (uninsured demandable deposits scaled by reserves and central bank eligible assets) by bank size categories. Furthermore, an

interesting area for future research seems to be what specific differences relative to the United States in capital requirement, liquidity requirement, and supervisory policies led to a lower incidence of banking stress in the euro area in 2023 in spite of significant rises in inflation and interest rates in Europe too.

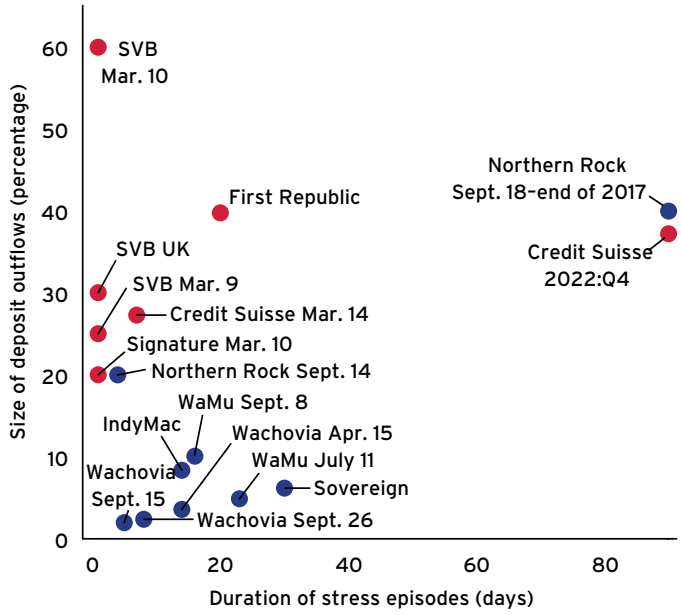
2.1.5 Digital banking: An amplifier of uninsured deposit booms and busts

Conventionally, bank runs were believed to occur due to financial stress leading to loss of confidence among retail depositors. However, Shin (2019) observed a unique scenario in the run on Northern Rock, the fifth largest mortgage lender in the United Kingdom, in September 2007, whereby depositors queued up for withdrawals only after the Bank of England announced support. The stress at Northern Rock stemmed not from retail depositors, who accounted for only 23% of its liabilities by summer 2007, but from the sudden drying-up of short-term funding from sophisticated institutional investors, who withdrew their funds electronically. Schotter and Yorulmazer (2009) investigated spillover effects during the Northern Rock episode and found significant impact on banks relying on wholesale funding, a sort of contagion 'by analogy'.

Indeed, the IMF's October 2023 *Global Financial Stability Report* documents that banks that failed in 2023 experienced faster and larger runs than during the global financial crisis (see Figure 5). An important shift between the 2007-08 bank runs and the banking stress of 2023 has been the increased reliance of banks on digital finance and electronic deposits, which potentially contributes to a heightened speed of withdrawals and amplifies runs and the risk of contagion across banks.

Recent evidence explores this role of digitisation of bank deposit services. Benmelech et al. (2023) note, for example, that bank branch density, defined as branches per total deposits, has declined over the past decade in the United States due to branch closures and a surge in deposits. Banks with low branch density initially benefited from large deposit inflows as the same banks had invested in raising deposits digitally. However, the same banks faced challenges in retaining uninsured deposits during the 2023 banking crisis, highlighting the role of digital banking in facilitating the rapid growth of uninsured deposits that can be volatile and prone to flight during economic downturns and monetary tightening.

FIGURE 5 **LARGER AND FASTER BANK RUNS IN 2023 COMPARED TO THE GLOBAL FINANCIAL CRISIS**



Source: IMF (2023).

Relatedly, Haendler (2022) documents that small community banks which were slow to provide mobile banking apps relative to larger banks lost deposits and, in turn, their share of small business loans. Koont et al. (2023), who study the impact of digital banking on the stability of the banking sector, document that when the Fed funds rate increases, deposits flow out faster and the cost of deposits increases more in banks with a digital platform, reducing the economic value of deposits in ensuring bank solvency. Finally, Choi et al. (2023) analyse contagion effects following SVB's failure, identifying bank-specific vulnerabilities contributing to subsequent declines in banks' stock returns, and noting among other factors significant contagion impact from uninsured deposits.[37]

37 While it is beyond the scope of this chapter to document fully, there was also a surge in bank uninsured deposits – especially jumbo (size exceeding the deposit insurance limit) certificates of deposit (CDs) – in the United States in 1990s. This occurred following the savings and loan debacle in the late 1980s due to regulatory forbearance and bailouts of savings and loans, the FDIC switching to a policy of insuring uninsured deposits in several failed or stressed bank resolutions, and a reinforcement of this perception by the Federal Deposit Corporation Improvement Act (FDICIA) of 1991 that failed banks would be acquired with deposits ('purchase and assumption'), reducing the losses borne by uninsured depositors. See Feldman and Schmidt (2001) and Ohlrogge (2023).

2.2 POLICY: BALANCING CONTAINMENT OF SPILLOVERS FROM RUNS AND DECREASING THEIR INCIDENCE

How should policy respond to the rising spectre of a rapid boom-and-bust cycle of uninsured bank deposits that are used to fund illiquid and/or risky investments. In other words, what reforms can help address the excessive maturity mismatch in the banking sector that results in financial fragility and attendant real-sector spillovers?[38] The policy goal from a financial stability perspective can be considered as one of balancing the need to contain spillovers from bank runs once they occur with the need to decrease their incidence in the first place.

To this end, we consider first *ex-post* measures, namely, deposit insurance and lender of last resort; then *ex-ante* measures, namely, capital and liquidity requirements, as well as the potential role of market-based signals in bank supervision; and finally, the financial stability consequences of unconventional monetary policy tools such as QE and QT.

While pros and cons of specific policies are discussed below as the policies are being described, it should be clear that what matters in practice is the judicious mix of *ex-ante* and *ex-post* policies. Overall policy recommendation arising from the presentation of individual policies below must factor in the need for holistic coherence.

2.2.1 *Ex-post* measures: Evaluating proposals for revision of deposit insurance and lender of last resort, and introduction of partial suspension of convertibility[39]

In terms of deposit insurance, Cecchetti et al. (2023) discuss four options, the first three of which are based on proposals in the consultative report, *Options for Deposit Insurance Reform*, issued by the FDIC on 1 May 2023 following the banking failures of March-April 2023:[40]

Option [DI-1]: Maintain limited coverage. This option maintains the current partial deposit insurance coverage, keeping it well below 100%, but to make the $250,000 cap binding at the level of an individual and simplify coverage, it proposes to introduce an FDIC deposit registry to end the practice of deposit brokering, where individuals use brokers to split their deposits into separate accounts, each eligible for up to the deposit insurance coverage. Deposit insurance coverage limits would then apply per person, not per bank.

38 For a formulation of this policy problem and its implications for monetary policy, see Stein (2012).
39 This discussion summarises the more substantive presentation in Cecchetti et al. (2023).
40 Note that each of DI-1 to DI-4 proposals likely need to factor in how to modify and make more risk-sensitive deposit insurance premia charged to banks, both to improve the adequacy of the Deposit Insurance Fund (DIF) as well as to limit moral hazard of mispriced deposit insurance. This is, however, an entirely separate topic that is beyond the scope of this chapter, but should ideally feature in any holistic policy revision to deposit insurance schemes. See, for instance, Acharya et al. (2010) and Cecchetti et al. (2023).

Option [DI-2]: Targeted increase of coverage. This option would expand on Option DI-1 by raising the coverage cap for the transaction accounts of SMEs – what the FDIC calls 'business payments'. It would also simplify coverage and end deposit brokering by introducing an FDIC deposit registry. Recall that deposits in transaction accounts typically tend to be overnight and uninsured. This proposal is likely inspired by the Temporary Liquidity Guarantee Program (TLGP),[41] under which the FDIC temporarily guaranteed all non-interest-bearing transaction accounts (NIBTAs) starting 14 October 2008 (immediately following the failure of Lehman Brothers).[42]

Option [DI-3]: 100% or unlimited coverage. This option would cover all deposits at insured depositories.

Another option, applicable under DI-1 and DI-2 proposals above, is to consider a suspension of conversion of a part of the deposit claims:

Option [DI-4]: Introduction of minimum balance at risk. Under an MBR scheme, a fraction of an uninsured deposit would be unavailable to the depositor for some period (say, 30 days), which could help absorb losses in the event of a bank failure. In effect, a portion of every uninsured deposit becomes contingent capital that can only be withdrawn if the bank survives for a predetermined length of time. Put differently, an MBR compels those who withdraw early to bear at least some of the losses that their actions impose on more patient depositors. Specifically, Cipriani et al. (2023) propose that the MBR could be 5% of a depositor's maximum uninsured deposit balance over the previous 30 days. So, for example, if a depositor has been holding $1 million of uninsured deposits for the past 30 days, she would be able to withdraw all but $50,000 (5%) of her uninsured deposits immediately. The remaining $950,000 would only be available to her with a delay of 45 days.[43]

Among these proposals, Cecchetti et al. (2023) overall lean in favour of Proposal DI-2, which aims to enhance coverage for SME transaction accounts. They view the potential adverse spillovers to the real economy resulting from outright losses or a sudden lack of immediate liquidity on such accounts as significant. They note for instance that in 2020, there were 245,000 medium-sized firms (between 50 and 5,000 employees) in the United States that employed 52 million people and supported an annual payroll of almost $3 trillion. Even if only one-tenth of these firms had weekly transactions exceeding $250,000, the broader consequences of their bank accounts becoming inaccessible for a

41 www.fdic.gov/regulations/resources/TLGP/

42 As noted by Cecchetti et al. (2023), the Transaction Account Guarantee (TAG) programme, which was extended by the Dodd-Frank Act (DFA) to the end of 2012, was not limited to SMEs but applied to all firms and households. At the end of 2011, TAG covered more than $1.4 trillion in NIBTAs (about 20% of insured deposits). The DFA removed the authority of the FDIC to establish a future guarantee programme without legislative action, a restriction that appeared to bind at the time of banking failures of March-April 2023. See also Vergara (2022).

43 A variant on the MBR has been proposed by Gordon (2023). Originally, McCabe et al. (2013) proposed the implementation of an MBR mechanism to address the systemic risk stemming from money market funds (MMFs)' susceptibility to runs and to safeguard shareholders who opt not to redeem shares hastily during stress situations. Drawing on a comprehensive analysis of historical MMF losses, including novel data from the Treasury and the SEC on losses incurred by MMFs in 2008, the authors determined that an MBR ranging between 3% and 5% would be necessary to effectively diminish run risks on MMFs.

few days could be substantial. In contrast, there seems to be little need to increase the coverage of $250,000 for individual households, for most of whom the coverage is likely sufficient for stress-time needs and who are also less prone to run.[44] Notwithstanding the inevitable arbitrage by SMEs of such a guarantee and the need to ascertain the precise SME status of an entity, Cecchetti et al. believe that proposal DI-2, focusing squarely on the transaction accounts whose likely losses led to bank failures of 2023 being considered, is systemically important to the economy in the first place. Overall, the authors conclude that DI-2 offers the FDIC "*the greatest bang-for-the-buck in reducing run risk and the potential spillovers from a run per unit of increased insurance coverage and premia*".

Cecchetti et al. (2023) conclude that while deposit-broking is worthy of being done away with, as proposed under Proposal DI-1, doing so would not address the starting problem of dealing with uninsured deposit boom and bust, as it would in fact increase the proportion of uninsured deposits while doing little to reduce their incentive to run. In principle, a deposit registry would help resolve bank failures better by providing greater transparency on insured versus uninsured deposit accounts. However, to the best of our knowledge, to date no details on its specific implementation have been spelled out (and it is unclear how coverage would shift across bank accounts of the same individual, who could maintain balances at several accounts, each below the coverage limit but collectively above the limit).

Cecchetti et al. (2023) argue that Proposal DI-3, which expands deposit insurance coverage fully, would not only substantially increase the burden on the FDIC's deposit insurance fund by expanding coverage, but would also significantly increase the moral hazard of bank risk-taking by leaving regulators little *ex-post* choice but to absorb all depositor losses even if the number of bank failures might warrant some form of risk-sharing.[45] The authors also recognise that banks, in their quest for swift access to money for intermediating banking activities, may not rely solely on uninsured deposits but may also turn to wholesale finance such as repo, unsecured commercial paper and asset-backed commercial paper. (This reliance on wholesale finance contributed significantly, for instance, to bank and shadow-bank runs during the global financial crisis).

Finally, Cecchetti et al. (2023) identify two potential drawbacks of Proposal DI-4 (the MBR). First, by making seniority dependent on past transactions, it becomes complex to administer. Second, it would compel all depositors with large gross flows through their deposit accounts to hold sizeable idle balances, making them de facto equity holders without the usual privileges of such ownership. While MBR has not yet been considered in

44 Cecchetti et al. (2023) note that according to the 2019 Survey of Consumer Finance, for all families, the median and mean holdings of transaction accounts were only $5,300 and $41,600, respectively. Even for the *top 10% of households* ranked by income, the median and mean holdings were only $70,000 and $229,000, respectively.

45 For moral hazard consequences of deposit insurance, see Calomiris and Jaremski (2019), who exploit the quasi-random setting created by its adoption by seven states in the US during 1908-1918 while neighbouring states narrowly defeated legislation to support it, along with the heterogeneity of banks operating in a state created by state- and national-chartering; and Calomiris and Chen (2022), who focus on country-level adoption of deposit insurance since the 1960s. Both studies find that deposit-insured banks reduce capitalisation and cash holdings, while becoming fragile also by increasing risky lending.

any regulatory proposals, it is employed *ad hoc* to deal with bank runs in some countries (e.g., India),[46] where the benefit of suspending conversion of deposits beyond a certain amount for a specified period of time is that it allows time to figure out a resolution plan for the stressed bank, replace its management, and enable it to manage its liquidity while regrouping as an ongoing concern without being disintermediated entirely along the way.

While schemes such as MBR might have to be entertained if deposit insurance coverage hits its fiscal, political or economic limits, another approach is to reform the manner in which LOLR funding is being provided to banks, and in particular, by designing it in such a manner that bank liquidity risk is being better managed *ex ante*. Acharya et al. (2024) enumerate three such proposals that would radically alter the LOLR operations:

Option [LOLR-1]: 'Pawnbroker for all seasons'. This approach, proposed by King (2016), substitutes for deposit insurance by making the Federal Reserve into a 'pawnbroker for all Seasons' (PFAS).[47] It aims at several broad regulatory purposes and is intended for both banks and non-banks.[48] The key underlying theme is ensuring a better pre-positioning or advance placement of high-quality collateral against issuance of demandable liabilities by the financial sector. In the context of banks, PFAS would render deposit insurance unnecessary by ensuring that all deposits — and, more broadly, all short-term runnable liabilities — are fully backed by central bank reserves or a claim on reserves at the central bank in the form of eligible collateral at appropriate haircuts, in particular, at haircuts that are suitable even during times of severe aggregate stress. The Federal Reserve, as the LOLR, then guarantees the liquidity of all short-term liabilities at all times.

PFAS would significantly increase equity and long-term debt as a proportion of bank liabilities, because collateral haircuts – which under PFAS have to be funded by equity or long-term debt – are typically large relative to the currently required ratios of equity and long-term debt to assets.[49] However, by requiring that every short-term liability be fully collateralised, the PFAS proposal would discourage bank lending against unusual collateral that would attract relatively high haircuts. Furthermore, assuming that the collateralisation requirement is checked frequently, this proposal would effectively induce a certain amount of real-time supervision of banks, including for mid-sized and smaller banks, along the lines of supervising the liquidity coverage ratio of large banks.

46 For instance, to deal with the distress of a large private bank (Yes Bank), the Reserve Bank of India imposed a moratorium on March 5, 2020 restricting depositor withdrawals at Rs 50,000 (approximately $600 at the current exchange rate), which was subsequently removed, enabling customers to access full banking services from 19 March 2020. A similar measure was undertaken by the RBI to deal with the distress of Punjab and Maharashtra Co-operative Bank in September 2019.

47 See King (2016, p. 271) for a description and analysis of the 'pawnbroker for all seasons'.

48 A close variant has recently been proposed in Hanson et al. (2024) for banks.

49 See Nelson (2023, p.7) for more details.

Option [LOLR-2]: Committed liquidity facilities. Under this proposal, banks would post collateral to 'committed liquidity facilities' (CLFs) at central banks against which, in the future, they could borrow funds at predetermined haircuts and rates. To incentivise banks to post collateral to these facilities, the amounts that banks could draw down on these facilities would count as HQLA in satisfying liquidity coverage ratios.[50] The existence of CLFs would likely raise the relative costs of the more unusual extensions of bank credit. To explain, say that accounts receivables from a particular corporation were accepted as collateral by the CLF at a certain haircut, while investor commitments to a private equity fund were not accepted at all. Then a bank lending against accounts receivables could post them to the CLF and gain HQLA equal to their ex-haircut value. By contrast, a bank lending against investor commitments would have to commit additional funds to claim the same quantity of HQLA.

Option [LOLR-3]: Federal liquidity options. Along similar lines to PFAS and CLFs, but before these two proposals, Tuckman (2012) proposed that any bank or non-bank financial institution (NBFI) should be able to purchase options on secured borrowing from the central bank at predetermined haircuts and rates. Furthermore, the central bank would sell a sufficient quantity of FLOs so that it could credibly commit to provide no additional liquidity in a crisis. If this commitment were indeed credible, then *ad hoc* crisis bailouts would no longer be necessary and banks and NBFIs would use FLO prices to internalise the cost of liquidity in stress scenarios.

The first of these LOLR proposals, PFAS, is the one we will focus on for discussion, though similar considerations arise for the CLF and FLO proposals. PFAS is also the proposal covered in detail by Cecchetti et al. (2023), who view it favourably but with caveats.[51]

There are several attractive features to PFAS regarding how it balances the *ex-post* risks of runs against the *ex-ante* moral hazard consequences of insuring liabilities that run.[52]

First, if collateralised well, uninsured liabilities such as corporate transaction deposits do not need to run under PFAS. This would reduce the need for regulatory backstops to be arranged as emergency rescues.

Second, while PFAS may reduce the regulatory and supervisory burden overall, the key is that it would make their interventions more timely, as uninsured runnable liabilities have to be adequately collateralised *each* day.[53] This necessitates daily bank supervision and monitoring of bank assets to ensure collateral pre-positioning. In this sense, it is

50 See Nelson (2023).
51 Overall, Cecchetti et al. (2023) prefer Proposal DI-2 to expand deposit insurance coverage to SME transactions accounts given its ease of implementation and given deposit insurance is a global phenomenon, whereas PFAS has not yet been implemented in any jurisdiction.
52 See also the justifications for considering it presented in Hanson et al. (2024).
53 We thank Paul Tucker for clarifying this point to us.

akin to a LCR requirement being carried over to *all* (including smaller) banks, and in principle also to NBFIs. Indeed, as originally proposed by King (2016), PFAS aims to harmonise collateral haircuts for all demandable funding in bank and non-bank parts of the financial system.[54]

Third, since haircuts would have to be met by banks with equity or long-term bonds in their capital structure, PFAS combines a capital requirement that is dependent on the liability structure of banks (akin to the solvency-liquidity nexus in the stress test design in the following section). This reflects a consideration of the nexus between solvency risk and liquidity risk in policy design and aims to have both risks be simultaneously internalised by private agents who own and manage banks.

The key challenge for PFAS to achieve all these advantages effectively is setting collateral haircuts on runnable liabilities at stress-time levels, even in normal times, so that a sudden emergence of stress does not render the liabilities in need of a backstop again or create a scramble for collateral due to haircut revisions. This challenge is certainly formidable and not entirely dissimilar to that of ensuring that capital requirements based on stress tests adequately factor in stressed scenarios. Conversely, if the central bank does not get these haircuts right, it would have huge distortions on credit and liquidity outcomes of the economy. Again, one could argue that this risk is already a feature of LOLR and deposit insurance designs in how haircuts, rates, premia, and so on are set.[55] As Cecchetti et al. (2023) point out, however, an even more profound role for central banks in bank credit and liquidity allocation may raise political economy concerns and ultimately raise issues around their independence from politics and/or their operational autonomy.

Finally, Rajan (2024) raises concerns related to situations where haircuts might not end up being adequate: there could be a flight to quality towards banks that have more pre-positioned collateral, strengthening bank incentives to hoard liquidity and exacerbating the 'run' scenario. Drawdowns of contingent liabilities, such as bank credit lines, could add to such stress.[56] Note, however, that some market discipline of a flight-to-quality nature may in fact be desirable, especially as runs that occur in a regime of pre-positioned collateral against demandable liabilities with appropriate haircuts are less likely to be sudden stops or liquidity-risk induced runs and more likely to be solvency-based runs (i.e., the resulting failures are likely to be more suitable for resolution and receivership than for LOLR and bailout).

54 In the spirit of the 'congruence principle' of Metrick and Tarullo (2022).

55 In fact, prudential bank regulation also affects credit outcomes by varying liquidity and capital requirements based on asset class, for example by setting low regulatory risk-weights in capital requirements for domestic or same-currency government bonds, residential mortgages and residential mortgage-backed securities.

56 For a review of stress-time drawdown patterns on bank credit lines, see Acharya et al. (2023e).

Overall, notwithstanding the concerns raised above, PFAS represents a significant departure from the existing policy toolkit of deposit insurance and LOLR, which do not seem, over the past century, to have been successful in ruling out bank fragility. Indeed, the scale and scope of government bailouts and LOLR have grown significantly over the past four decades, from 'too big to fail' to 'too systemic to fail', 'too interconnected to fail', and now to 'too many to fail'. Hence, it is reasonable to conclude that the growing shadow of resulting moral hazard has also contributed to the fragility being witnessed in banks and markets of late. As shown in Figure 3, several banks are undertaking a high level of liquidity risk on the back of uninsured demandable deposits. Reducing their illiquidity by pre-positioning of more liquid collateral or raising their solvency by substituting uninsured deposits with equity capital or long-term bonds, both of which would be a private response compatible with PFAS, appears to be a desirable outcome in the interest of financial stability.

Given these considerations, without necessarily considering all elements of PFAS, policy proposals that are targeted to addressing uninsured deposits and other runnable liabilities of banks and the financial system as a whole, in a manner that seeks to get banks and NBFIs to internalise their liquidity risks, appear worthy of consideration. It is unsurprising that such consideration has started to emerge in one form or another in several policy proposals, in academia as well as policy (at the G30, for example).

2.2.2 *Ex-ante* measures: Redesigning capital requirements, the case for embracing market values, and expanding the coverage of liquidity requirements

Regardless of revisions to *ex-post* measures to deal with bank failures, the presently employed *ex-ante* measures (namely, capital and liquidity requirements) seem ripe for scrutiny regarding their adequacy in accounting for interest rate risk, adjusting for bank liability structure, and factoring in market values in some capacity. Equally importantly, should smaller and mid-sized banks continue to remain exempt from liquidity coverage ratio, as is presently the case in the United States? We address next some of these policy questions concerning *ex-ante* measures.[57]

First, we advocate for stress tests to factor in not only the risk of a recession, as in the current design, but also the risk of higher-than-usual and higher-for-longer interest rates, i.e., to factor in the risk of a *stagflation*, covering not just the largest banks but also mid-sized and some of the smaller banks.[58] Reflecting current stresses would also entail factoring in the commercial real estate decline since COVID, especially in office space.

57 The discussion that follows draws heavily upon Acharya (2023). Note also that in August 2023, FDIC proposed two additional reforms: (i) comprehensive resolution planning rules for banks with assets greater than $100 billion (first rollout in 2025); and (ii) minimum levels of long-term debt (akin to TLAC for G-SIBs) for banks with assets greater than $100 billion.

58 As of 19 April 2024, the Chicago Mercantile Exchange (CME) Fed Watch tool, which calculates unconditional probabilities of different rate 'band' outcomes based on Federal Fund futures prices for different maturities, attached a greater than 70% probability to the Fed Funds rate on 30 April 2025 being above 4.5%, and a greater than 90% probability to it being above 4.25% (the present Fed Funds rate being in the target range of 5.25% to 5.5%). See https://www.cmegroup.com/markets/interest-rates/cme-fedwatch-tool.html for details on this tool.

We also provide a simple way to build in the interaction between bank solvency and liquidity risks. Next, to ensure that the regulatory stress test does not fail the market test (for instance, because regulatory risk weights are 'arbitraged' by banks but they continue to maintain significant economic risk exposures), we propose market data-based alternative stress tests that can be used as benchmarks by bank supervisors to assess the regulatory stress test outcomes. Finally, we propose some reforms to the implementation of liquidity coverage ratio for banks.[59]

Lessons from the stress test (Supervisory Capital Assessment Program) of 2009

What worked to restore financial stability in the aftermath of the global financial crisis, i.e., during the autumn of 2008 to the autumn of 2009, can provide a useful starting point for revisiting the adequacy of stress test design. The *ex-ante* policy goal can be considered as one of ensuring confidence in the banking system, so that banks can perform their critical functions in implementing payments, providing credit to healthy borrowers, and serving as a reliable counterparty in other transactions.

Experience from rescue measures adopted in the autumn of 2008 following the collapse of Lehman Brothers suggests that simply guaranteeing deposits and backstopping bank creditors may be insufficient to achieve broad financial stabilisation. Depositors may flee to better-capitalised banks providing better transaction services than capital-starved banks, and corporate clients and households borrowing from banks can also engage in such a 'flight to safety'. Acharya et al. (2011a) show that key market barometers of financial instability – such as bank CDS spreads and option-implied volatilities – remained abnormally high following the failure of Lehman Brothers in September 2008 until March 2009. This persisted despite the adoption of measures in the autumn of 2008 such as the expanded coverage of deposit insurance by the FDIC (both raising of the insurance limit and guaranteeing of transaction deposits for three years), generous LOLR by the Federal Reserve, and the injection of public capital into banks by the US Treasury via the Treasury Asset Repurchase Program (TARP).

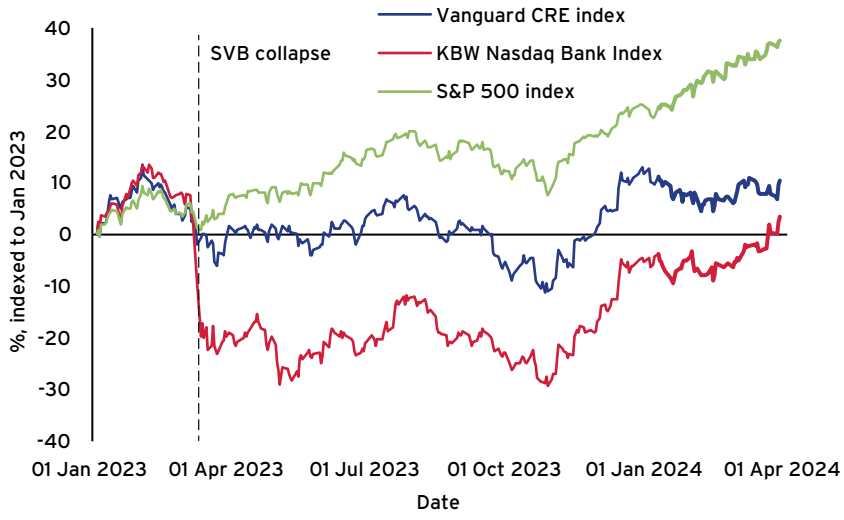
What eventually restored confidence was the successful stress test of the largest 19 banks that the Federal Reserve began in February and disclosed in May 2009. By examining the impact of further adverse conditions on these banks' balance sheets, the Supervisory Capital Assessment Program (SCAP) provided transparent estimates of each bank's capital shortfall and incentivised them to raise equity. Importantly, knowing that the Federal Reserve had backup funds from Treasury that could be used to recapitalise banks as needed, observers treated the Federal Reserve's capital shortfall estimates as credible, helping to restore equity market confidence. Until the SCAP disclosure in May, banks had not issued new equity since the Lehman failure in September 2008. Shortly after the

59 For a fuller treatment of LCR, see the accompanying chapter in this report.

disclosure, they were able to raise around $75 billion in private capital, diminishing fears of further financial fragility without further use of the Treasury's recapitalisation fund. Put simply, SCAP served as an extraordinary and credible disclosure mechanism that altered the macroeconomic state.

While confidence in the US banking system has been restored in the aggregate following the US Treasury backstop and Federal Reserve's LOLR (BTFP) measures of March 2023, not all has necessarily reverted to normalcy as far as mid-sized and smaller banks are concerned. For instance, the KBW Nasdaq Bank Index, which many of these banks are part of, fell by over 25% after SVB's collapse, even as the S&P 500 rebounded robustly following the backstops (see Figure 6). In other words, bank stock prices suggest that a potential banking crisis may only have been converted into a slow-burning problem for banks as deposit flight has stopped but banks have now begun to recognise and absorb the losses on their balance sheets.[60] Similarly, Figures 6 and 7 both show an underperformance of the Vanguard CRE Index relative to S&P500 since the SVB collapse. Indeed, in January-March 2024, New York Community Bancorp, which bought parts of the failed Signature Bank in 2023, disclosed significant commercial real estate-related losses. Since March 2023, this troubled state of smaller banks has weighed on their traditional clients, namely, small and medium-sized firms. As one indication, the Russell microcap index of small companies, like the KBW Nasdaq Bank Index and Vanguard CRE Index, has significantly underperformed the S&P 100 index of the largest companies, and even the Mid-Cap index, since March 2023 (see Figure 7).

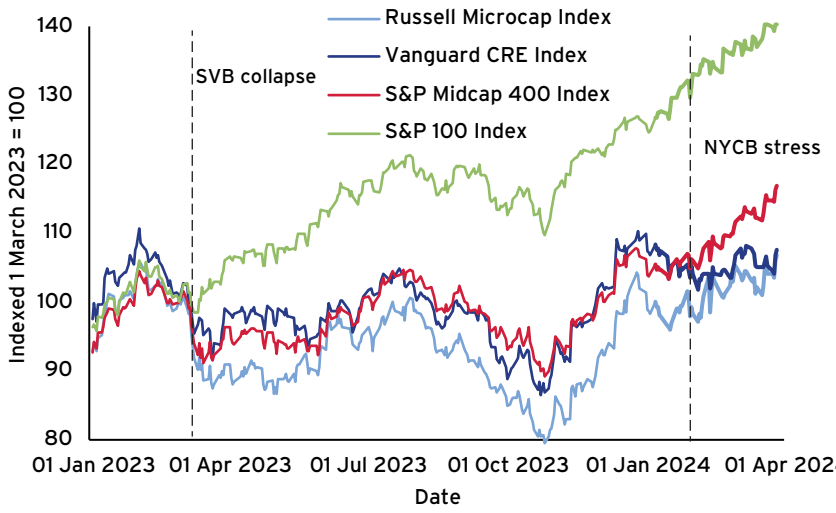
FIGURE 6 **BANK STOCKS SINCE THE SVB COLLAPSE**



Source: Acharya and Rajan (2024). Original data from Yahoo Finance, reproduction of original chart by Apollo Chief Economist Dr Torsten Slok, with addition of the Vanguard Commercial Real Estate (CRE) index.

60 See, for instance, the speech by FDIC Chairman Martin Gruenberg on 7 March 2024 on the Fourth Quarter 2023 Quarterly Banking Profile (https://www.fdic.gov/news/speeches/2024/spmar0724.html).

FIGURE 7 **BANKING CRISIS HAS NEGATIVE IMPACT ON SMALL AND MEDIUM-SIZED COMPANIES**



Source: Acharya and Rajan (2024). Original data from Yahoo Finance, reproduction of original chart by Apollo Chief Economist Dr Torsten Slok, with addition of the Vanguard CRE Index.

Given these challenges, it is useful to pay attention to the key lesson from the successful SCAP exercise of 2009, which is that bank capital is a form of private deposit insurance that restores market confidence in bank solvency and in turn enables the banking system to perform efficient intermediation to the real economy. If economy-wide risks from bank runs are not to be entirely socialised, then bank capital will likely have to play a substantial role in the aftermath of the banking stress of 2023, given that regulators seem to have embraced blanket guarantees of uninsured deposits at an early stage of the stress.

Specifically, given the present juncture of above-target inflation and high policy rates, existing scenarios in Federal Reserve stress tests appear to be anachronistic and need to be modified – even if as a one-off exercise – to reflect the risk of a stagflation scenario (i.e., a recession amidst higher-than-usual and higher-for-longer inflation and interest rates). Marking capital honestly, stressing it plausibly, and raising it adequately based on a such a scenario, and in a credible manner that builds upon and repeats the success of the 2009 asset quality review and recapitalisation, could be a feasible and useful regulatory plan of action.

Stagflation stress test (or one that reflects present and clear dangers to financial stability) The Federal Reserve can use its existing stress-testing framework (based on the Dodd-Frank Act of 2010) to perform a (possibly one-off) *asset quality review*. In the current scenario, the review could be simpler because, aside from specific credit risks like commercial real estate that require careful supervisory scrutiny, currently unrecognised losses on the banking system's assets reflect the product of their asset duration and the

rise of market interest rates, as well as the losses on credit card and auto loans that are likely to occur in a typical recession (the baseline stress test scenario without higher-for-longer inflation and interest rates). Modelling such risks and studying their impact on bank portfolios is not rocket science.

A key complication, however, would be that the Federal Reserve should ideally stress test the risk of a stagflation scenario in the *entire* banking system, or at least a large part of the banking system, and certainly not just the largest banks. While not recommending a specific cut-off or other means of determining the universe of banks to stress test, it is important to point out the trade-off between including a large set of banks to restore confidence and the operational difficulty and costs, both for the Federal Reserve and for the banks, associated with broadening the coverage. For instance, setting a threshold of assets above $10 billion would imply stress-testing 158 banks in the United States (based on bank asset sizes in June 2023). The bulk of the interest rate risk resides in this group of banks. Below the $10 billion threshold, however, there are more than 4,500 banks. The largest of these community banks that have substantial exposure to commercial real estate loans, in some cases over 30% of their lending book, may also need to be included in a stagflation stress test. While these banks may not be as systemic as the largest banks in a financial contagion sense, their debilitating health could nevertheless induce a credit crunch with substantial spillovers to the real economy.

Furthermore, regulators have effectively announced implicit guarantees for all uninsured depositors and thereby acknowledged that even smaller banks – as a herd or due to information contagion or given their special role in commercial real estate and small business lending – may be systemically important. This could impose undue burden on the FDIC's Deposit Insurance Fund if there are too many banks to fail. This is another reason why it is crucial for regulators to encompass a larger part of the banking system than was covered during the SCAP exercise of 2009, when only the largest 19 banking institutions were included in stress tests.

To make such broad coverage feasible, regulatory authorities besides the Federal Reserve, such as the FDIC and the Office of the Comptroller of the Currency, might also have to be involved in the exercise to cover banks under their supervision. Perhaps more importantly, supervisory capacity and experience may lack the depth and breadth to apply the stress test methodology well to several hundred or more banks. For all these reasons, the test would have to be simpler and more practical (say, with a further increase of interest rates by 100 or 200 basis points on interest rate risk, and with region-specific loss assumptions that apply to broad categories of assets such as commercial real estate, e.g., around a base case of 30% loan loss) rather than the detailed, elaborate and costly stress tests that are typically applied only to the largest banks.

Keeping in mind these complex coverage and design issues, the stagflation stress test would at a minimum need to have the following important features:

1. **High rates in the stress scenario**. In the currently employed regulatory stress scenarios in the Federal Reserve stress tests, economic recessions are associated with low interest rates that boost the value of banks' securities investments. This is, however, counterfactual at present given interest rate expectations and uncertainty.[61] Reflecting reality, the stress scenarios need to feature an economic slowdown with a high level of rates, and possibly even further rate hikes, that may be essential to arrest stubborn above-target inflation. In particular, on the interest rate risk front, the goal in the US bank regulation should be to consider the risk on an ongoing basis rather than only as a one-off exercise.

2. **Marking to market in the stressed regulatory capital**. Given their proximate role in causing fears of bank insolvency during the banking stress of 2023, mark-to-market losses on investment securities of banks (available-for-sale or held-to-maturity) should be transparently recognised and made to flow into stressed capital calculations (i.e., no 'filter' to be applied to unrecognised gains/losses).

3. **Capital and liquidity nexus**. A key question that regulators are likely to contend with is whether banks with truly stable (e.g., insured) deposit bases should receive some recognition while making estimated losses flow into the stressed regulatory capital. Some concession in marking to market could be considered formulaically based on whether the bank has a stable, insured retail deposit base. For example, the size of a bank's investment portfolio that is assumed to be held-to-maturity and not marked to market could be limited to 80% of the size of its fully insured deposits. Another alternative would be to simply cap the hold-to-maturity portfolio to a fixed share (say, 25%) of the total investment securities portfolio. This approach, along the lines of the 'mark to maturity' principle of Brunnermeier et al. (2009), would recognise the nexus between bank liquidity and solvency assessment, i.e., that an assessment of a bank based on mark-to-market consideration is likely to arise if it relies heavily on uninsured deposits, as its assets might have to be liquidated at market prices in case of a run.

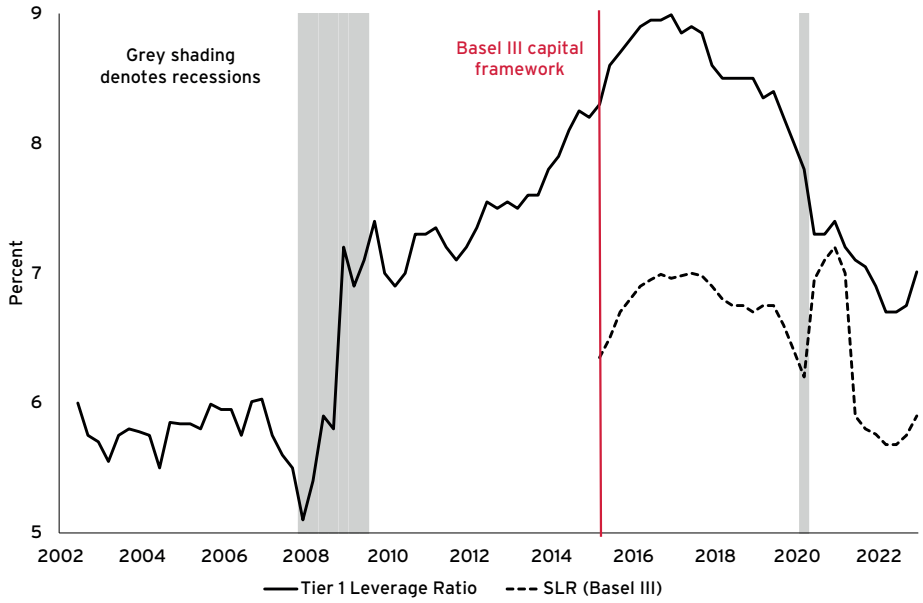
Regulatory actions in response to stress test results

The largest banks with high asset quality and diversified lines of business will likely fare well in a stagflation stress test along the lines proposed above, given that regulatory and supervisory standards were better applied to them. However, there might be some surprises as in the summer of 2009, since (i) some large banks also seem to have invested significantly in low-yielding mortgage-backed securities during the 2020-2021 period;

61 See, for instance, the March 2024 Summary of Economic Projections of the Federal Reserve at www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20240320.pdf.

(ii) large banks have an indirect exposure to commercial real estate via provision of term loans, and especially credit lines to real estate investment trusts (REITs) that are significant holders of commercial real estate;[62] and (iii) there has been a general reduction in prudential capital standards for the G-SIBs since 2017 (see Figure 8).

FIGURE 8 **REGULATORY CAPITAL RATIOS FOR US BANKS, 2002-2022 (PERCENT)**



Source: Based on, including interpolation of, Chart 1 from Pellerin (2022).

Note: SLR is the supplementary leverage ratio. The brief increase of the SLR between March 2020 and June 2021 reflects a temporary change in the denominator.

How should banks that appear vulnerable in terms of stressed capital ratios be treated? First, banks that have invested more heavily in long-term bonds may be capital-deficient and should be asked to raise public equity without further ado. The required absolute amount of capital to be raised should bring stressed capital ratios back to prudential standards. These banks should be incentivised to do so, within a pre-specified time period following the stagflation stress test, by providing that the Treasury would inject capital otherwise by diluting bank equity holders. Of course, the US Congress would need to authorise this in advance, as it did for TARP in October 2008. Second, the most exposed banks might even look entirely decapitalised and may have to be sold to healthier banks that are willing to pay to 'purchase and assume' their deposit and loan franchises. Some banks sales may require some backstop from the authorities (FDIC), as

62 See Acharya et al. (2023d). Recent evidence suggests that some large banks have significant direct exposures, and have already incurred a rise in write-offs, due to CRE loans (without including their exposure to REITs). See, for instance, "BofA, PNC lead Q1 rise in non-performing CRE loans: Commercial real estate write-offs also increased, driven by office loans", by Joshua Walker, 24 April 2024, Risk.net.

seen in the bank resolutions of 2023 and more generally when there are systemic risks from bank runs. Finally, small or mid-sized capital-deficient banks may not be able to access public markets and may have to be handled by the FDIC's PCA and/or Orderly Resolution Authority frameworks.

If done right, these capital-raising and asset-and-deposit reallocation measures would stabilise the system as well as the economy. As in 2009, government guarantees might not be utilised in the end, reducing the burden on the taxpayer. Some might consider an asset quality review at the present juncture to be unnecessary, as there is a risk that the review in itself could trigger concerns about bank health in the US financial system. The counter-argument is that unrecognised losses at banks remain large, data suggest there is visible collateral damage to small firms, and there is a risk of 'extend and pretend' (zombification) in commercial real estate lending. Given the relative strength of the US economy and capital markets, recapitalising the banking system now can in fact be considered a countercyclical, 'no regret' prudential measure.

Do regulatory stress test results line up with market stress tests?

As was the case with the runs during the global financial crisis of 2007-2009, some banks that either filed for bankruptcy or required rescue by the authorities in 2023 continued to meet regulatory standards even as their ability to secure market funding dried up. Put differently, these banks failed the *market* capital stress test even if they passed the regulatory or supervisory tests. Usually, when regulatory capital exceeds the market value of capital for a prolonged period, this suggests that the regulatory measure is overstated.[63]

To create a safety valve against such divergence persisting in the regulatory stress tests (and more generally, in supervisory outcomes), supervisors can compare the stressed capital ratios of banks against market data-based measures of capital shortfall (for the set of stress-tested banks that are publicly traded). The idea would not be to weave market-based measures into the stressed capital estimates for regulation *per se*, but rather to use the divergence between regulatory and market-based stress measures to identify possible gaps and weaknesses in the assumptions of the regulatory stress test. In other words, market data can be complementary inputs for supervision to regulatory stress tests, especially for larger banks whose publicly traded equity or senior unsecured debt or subordinated debt (or CDS spreads on such debt) provide valuable signals of bank risk and fragility.

63 Another case in point here is the failure of Dexia Bank within months of being ranked among the best-capitalized banks in 2011 by the European Banking Authority (EBA). Yet, Dexia ranked among the weakest banks on the basis of NYU Stern's SRISK measure or equivalent market-implied risk-weight of its assets. For more details on the generality of this problem, see Acharya et al. (2014).

For instance, NYU Stern's *SRISK* measure[64] is calculated as:

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

where *Crisis* is taken to be an aggregate market stress scenario (e.g., a 40% correction to the S&P 500 or MSCI Global index over a six-month period from time 0 to t); D_t denotes all non-equity liabilities at t assumed to be constant between time 0 and t for simplicity; E_t denotes market equity of the bank (or financial institution) at time t; *LRMES* is the long-run marginal expected shortfall, i.e., the percentage loss in market value of equity of the bank in the crisis scenario, which is estimated using dynamic conditional beta econometrics; and k is a prudential capital ratio relative to which the capital shortfall *SRISK* is computed (e.g., 8%). One interpretation of k is that it is the fraction of total non-equity liabilities of the bank that are due and payable with immediacy at the time of stress.

Figure 9A shows the *SRISK* for ten stressed or failed banks during 2023.[65] These institutions typically relied on uninsured deposits to finance longer-maturity securities and loans. In some cases, their assets exposed them to the downturn in the tech, crypto or commercial real estate sectors. Benchmarking regulatory stress tests to such market data-based stress tests can thus create a point of supervisory validation and a basis for inquiry into divergences.

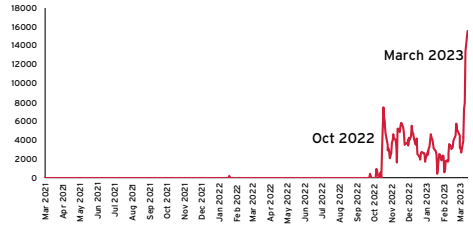
Similarly, as regulators assess how much additional capital would be adequate to raise for large and small banks, *SRISK* changes since the onset of the banking crisis in March 2023 can again provide useful information. For instance, Figure 9B shows that *SRISK* for US banks with assets greater than $50 billion (as of the end of the first quarter of 2023) more than doubled from $394 billion at the end of 2022 to $867 billion as of 18 May 2023. For other banks and non-bank financial institutions, the percentage rise in *SRISK* was even greater (from $124 billion to $302 billion). Combining all banks, the rise of *SRISK* during this brief interval exceeded $650 billion. While *SRISK* for US banks as a whole has come down since then, it was still at $650 billion as of 19 April 2024, well above the level observed immediately prior to the banking stress of 2023.

64 Acharya et al. (2012). The measure is available at https://vlab.stern.nyu.edu/srisk.

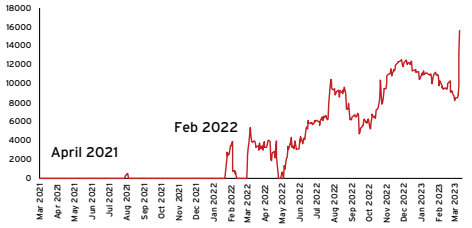
65 The banks were First Republic Bank, Silicon Valley Bank, Silvergate, Comerica, Western Alliance, KeyCorp, First Foundation, Signature Bank, PacWest, and Truist.

FIGURE 9A **SRISK OF STRESSED OR FAILED US BANKS, JANUARY 2021-MARCH 2023**

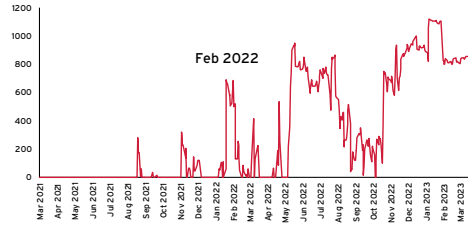
First Republic Bank



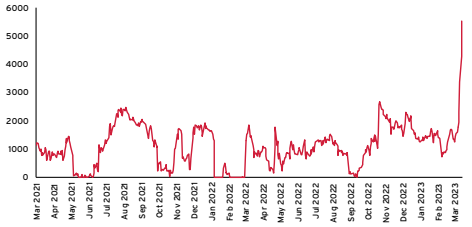
Silicon Valley Bank



Silvergate

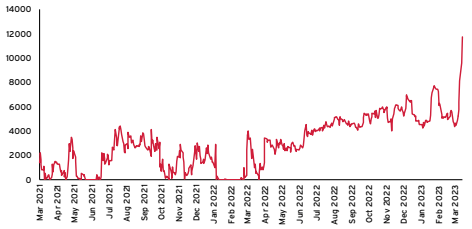


Comerica

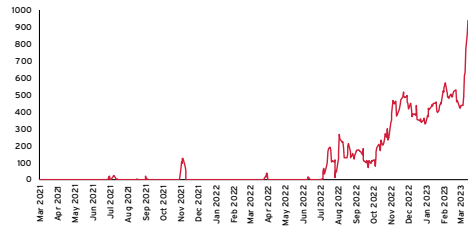


Western Alliance

KeyCorp



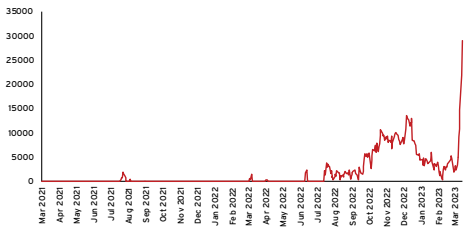
First Foundation



Signature

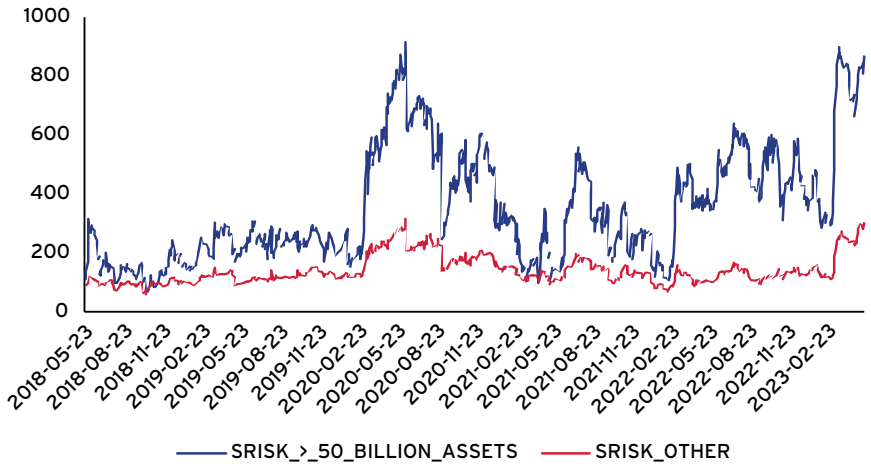
PacWest

Truist



Source: NYU Stern V-Lab (vlab.stern.nyu.edu/welcome/risk).

FIGURE 9B **SRISK OF US BANKS AND FINANCIAL INSTITUTIONS, MAY 2018-MAY 2023 (BILLIONS OF US DOLLARS)**



Source: NYU Stern V-Lab (vlab.stern.nyu.edu/welcome/risk).

Furthermore, it is straightforward to amend such market-based capital shortfall estimates to recognise the capital-liquidity nexus. For instance, the SRISK definition can be modified to compute $SRISK^{uninsured}$ by factoring in that the fraction of non-equity liabilities that become due and payable with immediacy under stress will be greater if the fraction of bank deposits that is uninsured ($Deposits^{uninsured}/TotalDeposits$) is higher:

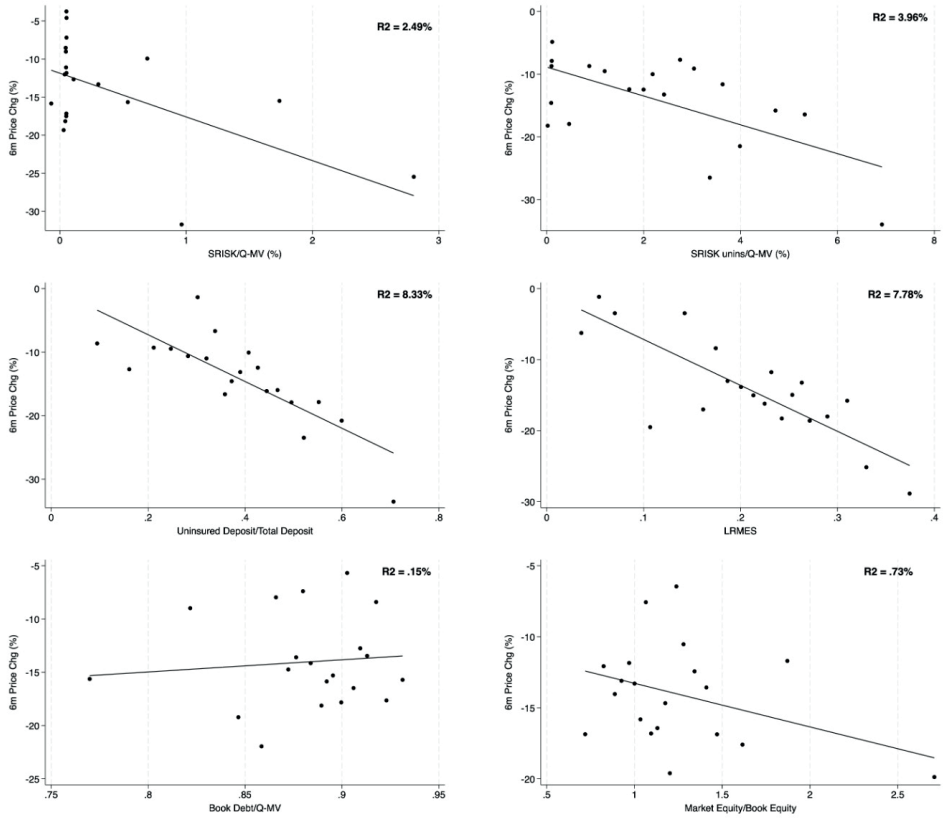
$$SRISK^{uninsured} = k.(1 + Deposits^{uninsured}/TotalDeposits)D_0 - (1 - k).(1 - LRMES).E_0$$

This is equivalent to requiring a proportionally higher capital requirement for those banks with a greater uninsured deposits component in their total deposits, effectively rewarding banks that have stable deposit franchises, all else being equal.

Figure 9C shows that incorporating the liquidity risk of bank uninsured deposits in this manner improves the ability to explain eventual bank stress. The charts in the top panel show that bank stock returns using closing prices from 30 September 2022 to 31 March 2023 (i.e., the six-month period of banking stress) relate better in a bin scatter-plot of banks to $SRISK^{uninsured}$ than to *SRISK*, with both measures computed as of 30 September 2022 (i.e., before the measurement of stock returns). The charts in the middle panel help understand that *LRMES*, which can be interpreted as a stress-time or downside 'beta' of the bank's stock return, explains the cross-section of bank stock returns well (higher *LRMES* implying more negative return for the bank), contributing to the explanatory power of both measures. However, it is the strong negative relationship of $Deposits^{uninsured}/TotalDeposits$ with bank stock returns that explains the better performance of $SRISK^{uninsured}$ relative to *SRISK*. The charts in the bottom panel show that neither book debt (relative to quasi-market value of assets, i.e., book debt plus

market equity) nor the market-to-book ratio of equity have much success in explaining bank stock returns during this period of stress, highlighting the important role of stress-time exposure of bank's equity as well as the fragility of bank deposits as measured by the share of deposits that are uninsured.

FIGURE 9C **STOCK MARKET PERFORMANCE OF US BANK HOLDING COMPANIES DURING OCT 2022-MARCH 2023 AGAINST SRISK, *SRISK*^{UNINSURED} AND THEIR COMPONENTS AS OF 30 SEPTEMBER 2022**



Source: NYU Stern V-Lab (vlab.stern.nyu.edu/welcome/risk) and Acharya et al. (2024).

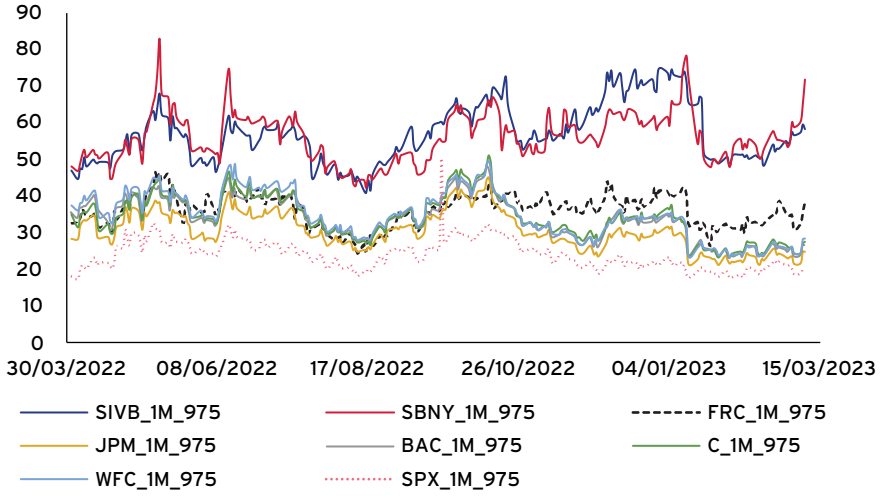
Note: The sample includes all listed bank holding companies in the United States, totalling 274 firms. y-axis is the 6-month closing-price change from Sep 30, 2022, to Mar 31, 2023, and x-axis are 6 variables (*SRISK*, *SRISK*^{uninsured}, uninsured deposits/total deposits, book debt/quasi-market value, *lrmes*, and market equity/book equity) measured as of 30 September 2022. *quasi-market value* equals book debt + market equity. *SRISK* is computed by $k(ba - be) - (1 - k)(1 - lrmes)\, mv$, where k = 8%, *ba* represents total assets, *be* stands for book equity, so that $(ba - be(ba - be$ is book debt. *lrmes* is the long-run marginal expected shortfall from NYU-Stern VLAB (vlab.stern.nyu.edu/srisk), and *mv* denotes market equity. *SRISK*^{uninsured} modifies the *SRISK* formula by setting:

$$k = \left(1 + \frac{\textit{uninsured deposits}}{\textit{total deposits}}\right) * 8\%.$$

The variables are all winsorised at the 1% level. The binned scatter plot groups bank holding companies into 20 bins by x variables and plots the average 6-month price change within each bin, controlling for total assets. R-squared value is the coefficient of determination of the model obtained by regressing y on x.

Other market-based alternatives might also come in handy. As Figure 10 shows, near at-the-money implied volatilities from bank stock options revealed, in advance of their failures, the greater vulnerability of SVB, Signature Bank and First Republic Bank relative to the top four banks (JPMorgan Chase, Bank of America, Citigroup, and Wells Fargo). In particular, the implied volatilities of SVB and Signature Bank are significantly higher than those of the other banks throughout April 2022 to March 2023, diverging especially since the fourth quarter of 2022, at which point First Republic Bank also seems to break out from the top four banks (which, in turn, are always trading at higher implied volatility than the S&P 500 index).[66]

FIGURE 10: **IMPLIED VOLATILITY OF FAILED US BANKS (SIVB, SBNY, FRC) RELATIVE TO TOP FOUR BANKS (JPM, BAC, C, WFC), 1 APRIL 2022 TO 23 MARCH 2023 (ANNUALISED PERCENTAGE)**



Source: Bloomberg.

Note: 1M_975 refers to implied volatility from one-month, near at-the-money (strike price / forward price = 0.975) put options on the bank stock. S&P 500 implied volatility is shown as a benchmark. The pattern is similar for implied volatility based on out-of-the-money put options (e.g., strike price / forward price = 0.8).

Expanding coverage, state-contingency and intertemporal averaging of liquidity requirements

While liquidity regulations, such as the LCR, are covered in greater detail in other chapters in this book, there are two reforms that follow immediately from the uninsured deposit boom and bust data presented in Section 2.1. Indeed, the lower incidence of interest rate risk-related stress in the euro area where, unlike in the United States, banks are uniformly subject to the LCR regardless of size also lends support to the reforms below.

66 Out-of-the-money implied volatilities are found to confirm this pattern as well. In other words, options markets seem to have reflected early warning signals regarding the location of risks in the banking sector.

First, liquidity regulations need to be applied uniformly across banks. As seen in the 'ratcheting up' of uninsured deposits by bank size in Figure 4, LCR-eligible banks – especially the largest banks, which have to hold greater reserves against flighty, uninsured demandable deposits – have experienced an improvement in their liquidity risk, while the non-LCR-eligible banks – the smaller banks – have ratcheted up their growth of uninsured demandable deposits. This appears to be a natural consequence of the non-uniform approach that needs to be addressed. In fact, the case for applying the LCR seems stronger for the smallest banks given their weak access to funding markets (such as repo and equity). This is especially true as the perception that they are systemically less important has been quashed by the banking stress of 2023, during which they turned out *ex post* to be systemic 'as a herd'.

Second, liquidity regulations may need to become more contingent on aggregate circumstances as well as more forward-looking. For instance, individual banks could be required or incentivised to maintain a longer duration of deposits, especially during QE when we observe durations shortening (see Figures 1 to 4).

Finally, policy measures aimed at ensuring a relatively unconstrained flow of liquidity between banks would also mitigate liquidity stress. In particular, there tends to be a fear of adverse supervisory action in response to a bank's intra-day overdrafts,[67] which can accentuate the phenomenon of reserve hoarding by surplus banks.[68]

To prevent such hoarding, regulators could allow some state-contingent tolerance in meeting liquidity requirements on a daily basis (say, +/- 5% or a 10% band, as is employed in some jurisdictions such as India with reserve requirements), while always insisting that requirements be met on average over, say, a fortnight. Such 'reserves averaging' could also reduce surplus banks' worries about falling short if they lend into high inter-bank rates in times of stress. They would then reallocate liquidity in times of stress rather than hoard it.

2.2.3 Implications for the use of the size of the central bank balance sheet as a policy tool

As discussed earlier, Acharya and Rajan (2022) theoretically, and Acharya et al. (2023) empirically, suggest there is a trade-off between monetary and financial stability objectives while employing the size of the central bank's balance sheet (expansion in QE and contraction in QT) as a policy tool. The adverse side of the trade-off arises due to the fact that QE leads to an expansion of the uninsured demandable deposit base of commercial banks, which does not reverse entirely during QT. The resulting trade-off, summarised below from their work, seems worthy of incorporation into policy debates.

67 Nelson (2019; 2022).
68 Bank of England (2022); Copeland et al. (2021).

While a primary function of a central bank is to provide emergency temporary liquidity support to maintain financial stability,[69] moral hazard – individual and collective – remains a key *ex-ante* cost of repeated emergency liquidity infusion. The moral hazard can manifest as distortions in the price of liquidity; windfall gains to those with access to central bank-provided liquidity or who can game or time central bank liquidity intervention; and distortions in private sector credit and investment when the private sector anticipates the central bank's readiness to intervene whenever liquidity bets go sour.[70] There might also be fiscal moral hazard since repeated central bank purchases of government bonds can be tantamount to monetisation of fiscal deficits.

The *ex-post* concern highlighted by these authors is that of 'liquidity dependence' of the banking system on the central bank over time. Central bank balance sheet expansion followed by contraction can create a continuing liquidity mismatch between assets and liabilities of the banking system. The central bank may be forced to address this by providing a durable infusion of additional reserves into the market, typically through a balance sheet expansion. In other words, financial stability concerns may induce central bank actions that offset its ongoing monetary actions such as QT. Therefore, unless the central bank's balance sheet expansion at the time of intervention is quickly and predictably reversed, commercial banks – issuing uninsured demandable liabilities to finance reserves or to improve short-term profitability – will continue ratcheting up the need for a larger central bank balance sheet over time.

In anticipation of this risk of banking fragility and liquidity dependence of the banking system on the central bank, the authors recommend revisiting the scale, scope, duration and desirability of QE, especially when QE is 'pushing at the string', i.e., it is being pursued even after the initial announcement effects have delivered the desired economic and financial stimulus, and when further growth benefits are barely visible or hard to attribute solely to the central bank's balance sheet policy.

Last but not the least, can QT of the central bank balance sheet be structured in a manner that automatically reverses the creation of uninsured demandable deposits during QE by the central bank? One possibility is to inject liquidity in the form of term repos – for example, as long-term refinancing operations (LTROs), first adopted by the ECB in 2011 – rather than via open market purchases. Term repos such as LTROs reverse the central bank's liquidity injections with the same counterparties that received liquidity, creating a programmed point of liquidity risk management for these recipients. In contrast, open market operations, through which QE is typically executed, inject liquidity into the broader market. Consequently, when QT is implemented later, liquidity is not necessarily taken out from the same balance sheets that initially received it during QE. Intuitively, this leaves liquidity shortages at the time of QT as 'someone else's problem' and *ex ante*

69 Goodhart (1988).
70 See Acharya et al. (2011b), Diamond and Rajan (2012) and Farhi and Tirole (2012).

runs the risk of greater ratcheting-up of liquidity risk by banks. This also seems an open area for further research and policy discussions, as we seek to understand better how central bank balance sheet expansion and contraction give rise to uninsured deposit boom-and-bust cycles at banks, and how to manage these cycles.

2.3 CONCLUSION

It is clear, a little over a decade after the central bank balance sheet tools of quantitative easing and quantitative tightening were adopted, that the US banking system has witnessed a significant surge in overall deposits, and especially in the uninsured demandable share of deposits. Not only is the boom in these fragile deposits unmistakably large, its dispersion across banks – the growth being especially large in small and mid-sized banks – has already posed, and continues to pose, a significant threat to financial stability. Acknowledging this fragility seems an important first step towards addressing it. For the latter, a judicious policy mix is called for, one that likely entails (i) some prioritisation of what official backstops and lender of last resort ought to support *ex post* versus what they should incentivise as prudent *ex-ante* liquidity management, not just for the largest banks but for the banking sector at large; (ii) recognition of interest rate risk (and of other manifest risks such as commercial real estate stress) in assessment of bank asset quality and capital requirements; (iii) use of market data in supervision to avoid blind spots caused by the slow-moving nature of book equity and the arbitrage of regulatory capital requirements; and finally (iv) a reconsideration of QE and QT operations as effective monetary policy tools, by appropriately factoring in their impact on liquidity risk of the banking system and attendant medium-term consequences for financial stability.

CHAPTER 3

Prudential regulation, accounting and supervision

3.1 INTRODUCTION

The 2023 turmoil in the United States and Switzerland has represented the first real test for the wide regulatory apparatus introduced with Basel III after the global financial crisis. Overall, we can argue that the test has been passed, albeit perhaps only with a sufficient grade.

While it is true that the turmoil led to some of the largest failures in history in the United States and the dramatic rescue of a G-SIB bank in Switzerland through a last-minute state-supported acquisition, these circumstances seem to have been triggered by some weaknesses in the regulatory design and, perhaps even more importantly, by weak implementation of the global standards, especially in the United States, and by ineffective supervision lacking powerful enforcement tools.

Accounting standards also bear a large weight in the events experienced in 2023. The way in which banks can classify their assets, together with the use of prudential filters that supervisors may grant in some circumstances, have contributed significantly to non-reporting of unrealised losses in the levels of regulatory capital.

In this chapter, we provide a critical background to better understand the 2023 banking turmoil from the perspectives of prudential regulation, accounting, and supervision. With this background in mind, we then discuss policy implications that can be useful to enhance financial stability in the future. The chapter proceeds as follows. Section 2 provides an overview of the main accounting matters that emerged after the recent banking turmoil, namely, the accounting treatment of debt securities and the use and limitations of hedge accounting. Section 3 discusses the lessons for regulation, with respect to capital regulation, liquidity regulation and the global implementation of the Basel III framework. Section 4 addresses the issues related to supervision, with a focus on the supervisory responses to the 2023 events and the existing early intervention frameworks in place. Section 5 concludes.

3.2 ACCOUNTING MATTERS: AN IMPORTANT SOURCE OF POTENTIAL INSTABILITY

Prudential regulation is at the core of financial stability. Its design has been analysed deeply both in policy and academic circles, as well as its interaction with other public policies, such as monetary policy. One aspect that remains less analysed, despite its importance, is the relationship between prudential regulation and accounting standards. While the two have different objectives, they are clearly interrelated, given that the output of financial reporting systems is used as a basis for the application of prudential rules.[71]

To understand the role that accounting standards play in financial stability, it is important to note that accounting standards and prudential regulation are designed according to different objectives. As stated by the International Accounting Standards Board (IASB), the regulatory body in charge of issuing International Financial Reporting Standards (IFRS), "*the general purpose of financial reporting is to provide financial information about the reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions relating to providing resources to the entity*".[72] By contrast, the mandate of the Basel Committee on Banking Supervision (BCBS), in charge of developing the Basel framework for the prudential regulation of banks, is "*to strengthen the regulation, supervision and practices of banks worldwide with the purpose of enhancing financial stability*". It is evident that the two objectives – providing useful information to stakeholders and preserving financial stability – do not necessarily coincide and, more importantly, may not necessarily be aligned.

With this premise in mind, the following sections discuss the main accounting topics that played an important role in the 2023 banking crisis and are now highly debated, namely, the classification and measurement of debt securities and the main accounting principles for hedging.

3.2.1 Classification and measurement of debt securities

As illustrated in Table 1, accounting rules allow banks to classify debt securities into three categories: *held-for-trading* securities, HTM securities and AFS securities. Although there exist differences between the accounting standards applied in the United States (US GAAP) and those applied in Europe (IFRS), it can be argued that the classification depends, at least partially, on managers' intentions when acquiring the securities.[73]

71 For a discussion of these topics, see, for example, Acharya and Ryan (2016), Gao and Jiang (2018) and Bertomeu et al. (2023).

72 IASB Conceptual Framework (1.2). A similar purpose is stated by the Financial Accounting Standards Board (FASB), the body responsible for the issuance of the United States Generally Accepted Account Principles under the Accounting Standards Codification (ASC) framework (see FASB Concepts Statement No. 8).

73 In the United States, the accounting guidance for securities stems mainly from ASC 320, (formerly known as FAS 115). In the European Union, the accounting guidance for securities stems mainly from IFRS 9 (which almost completely superseded the previous standard, IAS 39).

Trading securities are acquired with the intent of selling them, thereby making a profit from this trading activity. Trading securities are measured and reported on the balance sheet at fair value, with changes in fair value booked to profit and loss (fair value through profit and loss, or FVTPL). Fair value should reflect "the price that would be received to sell an asset in an orderly transaction between market participants at the measurement date".[74] Therefore, in each accounting period, the fair value of trading securities can change as a function of their market value, irrespective of whether the securities have actually been sold yet (and thus the change in value is 'realised'). This process is also sometimes referred to as 'mark-to-market' accounting. Such realised and unrealised gains or losses on trading securities are booked in the bank's P&L. Therefore, they affect the bank's net income (and equity), and consequently impact the bank's regulatory capital.

TABLE 1 **ACCOUNTING TREATMENT OF UNREALISED GAINS/LOSSES ON DEBT SECURITIES**

Security classification	Balance sheet valuation	Unrealised gains/losses recognition	CET1 capital impact
Held for trading (FVTPL)	Fair Value	P&L	Yes
Available for sale (FVOCI)	Fair Value	Other comprehensive income	Yes*
Held to maturity (AC)	Amortised cost	-	-

Note: *Assuming the absence of AOCI filter.

HTM securities are bought with the intent of holding them until maturity to collect contractual cash flows.[75] HTM securities are measured and reported on the balance sheet at amortised cost. At initial recognition, the amortised cost is given by the cash outflow disbursed to buy the security (comprehensive of discounts/premia incurred if the security was not trading at par). Importantly, in each subsequent accounting period, the amortised cost does not take into account changes in the market value of the security (unless these changes are due to a change in the credit risk of the counterparty, which may entail a decrease in the value of the securities even when measured at amortised cost). Thus, differently from the case of trading securities, any unrealised changes (gains

74 IFRS 13.9.

75 Accounting standards specify detailed criteria under which an asset can be classified as HTM, i.e., measured at amortised cost. For example, under IFRS 9, an asset can be measured at amortized cost only if it passes both the business model test (i.e., the bank has the intent and ability to hold the asset until maturity) and the SPPI test (i.e., the contractual cashflows must be represented solely by payments of principal and interest).

or losses) in the value of HTM securities are not booked in the bank's P&L or in the balance sheet and, as such, they do not affect the bank's regulatory capital. However, for transparency reasons, companies have an obligation to disclose them in the footnotes to financial statements.

AFS securities are still bought with the intent of collecting contractual cash flows, but the bank retains the option of selling them at a date prior to maturity. AFS securities are measured and reported on the balance sheet at fair value, similarly to trading securities. However, unlike trading securities, the changes in fair value are booked to the statement of 'other comprehensive income' rather than to P&L. For this reason, this accounting treatment is known as 'fair value through other comprehensive income' (FVOCI). An implication of this accounting treatment is that, in each period, realised and unrealised changes in fair value do not affect the bank's P&L (and net income) but they do affect the bank's equity capital (through a specific account named 'accumulated other comprehensive income', or AOCI, reserve). In this sense, AFS securities are in between trading and HTM securities, in that they do not affect financial results through changes in P&L but have an impact on regulatory capital.[76]

From this discussion, it emerges that the main difference among these three accounting classifications resides in the treatment of unrealised fair value gains and losses (as summarised in Table 1). Since accounting classifications have an impact not only on financial statements but also on regulatory capital, banks are likely to anticipate this impact when choosing their preferred accounting treatments.

After this brief overview on the accounting classification of debt securities, a natural question arises: why does this classification exist and, in particular, why are HTM securities allowed in the first place? And given the existing classification, why can banks have discretion in deciding between fair value and amortised cost measurement criteria?

The debate around bank balance sheet accounting is decades long and is related to several old disputes in the accounting field, such as the trade-off between relevance and reliability of financial statements, which have always been largely debated.[77] From a classical accounting perspective, Penman (2007) highlights that HTM accounting exists because it helps represent the value 'created' by firms by buying inputs at a certain cost and reselling them at a higher price. Therefore, fair (market) values are not appropriate whenever the firm performs this type of 'arbitrage', that is, whenever the firm's business model 'adds value' to market prices. In contrast, fair value is appropriate when value comes from property rights and obligations, and value is added or lost (solely) from fluctuations in the market values of those rights and obligations.

76 As discussed below, some US banks were allowed to apply a so-called AOCI filter.
77 Laux and Leuz (2009).

It can be argued that banks do perform an 'arbitrage' through their core business: they buy inputs (that is, money) through deposits and then sell outputs (in the form of loans and other financial products) at a higher price through their lending activity. The outcome of this business activity is captured by net interest income (NII), a line item included in the P&L statement. Importantly, deposits are also measured at cost. Specifically, core deposits are comparable to intangible assets for other corporations as they represent the ability to obtain funds at a lower rate than the market from demand, savings and small denomination time deposits. This intangible asset is often referred to as 'deposit franchise'.[78] However, under cost accounting, this intangible asset is not recognised in the balance sheet. When interest rates increase, the value of assets typically declines but the value of the deposit franchise typically increases. This implies that if the assets are fair valued but core deposits are not, then earnings and balance sheet values will be artificially depressed.[79]

In line with the argument above, another reason often invoked for the existence of HTM classification and amortised cost accounting is that unrealised gains and losses are not relevant if the bank has the ability and the intention to hold securities until maturity and there are no changes in credit risk because the bank will receive the promised contractual cashflows. In this sense, amortised cost accounting should provide the most useful information to stakeholders.[80] In addition, the franchise value of deposits represents an 'economic hedge' for securities accounted for at amortised cost insofar as they are assumed to be sticky due to depositors' behaviour.

Finally, economists have also debated the use of HTM securities from the perspective of financial stability. In particular, it has been argued that fair values could lead to unnecessary liquidation of bank assets when low market valuations are due to market illiquidity (or cash-in-the-market pricing) and do not therefore reflect fundamental asset values.[81] In this sense, fair value accounting may have played a role in exacerbating the 2007-09 financial crisis.[82] In a similar spirit, Vives (2014) discusses fair value accounting as a public signal and thus as a coordination device for the occurrence of runs.

78 See, for example, Drechsler et al. (2023a).
79 Penman (2007).
80 Kim et al. (2023).
81 Allen and Carletti (2008).
82 See, for example, Laux and Leuz (2010).

Prudential filters: The case of the AOCI filter

The accounting issues described above and, more generally, banks' financial reporting choices are important because they can affect financial stability.[83] A key channel through which this occurs is capital regulation. Accounting rules determine the value of book equity, which generally serves as the starting point to compute banks' regulatory capital. However, regulators can apply 'prudential filters' to make adjustments, for example by excluding certain items from the calculation of capital for regulatory purposes, like intangibles and deferred tax assets.[84]

One prudential filter that played an important role in the 2023 banking crises and that is strictly connected with the classification of debt securities is the so-called AOCI filter. This prudential filter removes AOCI, the main component of which are the unrealised gains and losses on AFS securities, from the calculation of banks' Tier 1 regulatory capital.[85] In other words, banks adopting the AOCI filter are allowed to not include unrealised changes in fair value of AFS securities in the regulatory capital. While the rationale behind the use of this filter is to prevent fire sales and downward spirals when the fair value of AFS securities falls, it is clear that it can also reduce managers' incentives to take timely corrective actions in response to such value declines. As such, its desirability has often been questioned.[86]

Under Basel II, it was possible to apply the AOCI filter in both the European Union and the United States, and this affected banks' classification of securities. For example, Argimón et al. (2018) analyse European country-level adoption of the AOCI filter and find that this led banks to classify more securities as AFS, possibly as a way to avoid changes in the fair value of these securities impacting regulatory capital.

Following the debate around the AOCI filter, Basel III removed the possibility to apply it as it was identified as an obstacle to the early identification of problems during the global financial crisis. While the Basel indications were followed for all banks in Europe, US regulators adopted a different approach, removing the filter only for larger banks. In particular, in the initial implementation of Basel III in 2014 it was decided to remove the AOCI filter only for advanced approaches banks, while leaving it for all others.[87] In addition, the Federal Reserve's tailoring rule of 2019 reintroduced the possibility of using the AOCI filter for the subset of advanced approaches banks with assets between $250

83 See, for example, Acharya and Ryan (2016).
84 Bischof et al. (2021).
85 Kim et al. (2023).
86 Kim et al. (2019); Bischof et al. (2021); Kim et al. (2023).
87 The Advanced Approaches Capital Framework applies to large, internationally active banking organizations, generally those with at least $250 billion in total consolidated assets or at least $10 billion in total on-balance sheet foreign exposure (Federal Reserve, 2017).

billion and $700 billion or foreign exposures below $75 billion as of 31 December 2019. All the five banks belonging to this subset decided to apply the AOCI filter again.[88] As a result, the large majority of US banks (4,707 out of 4,765) do not book unrealised gains and losses on AFS securities in regulatory capital.[89]

These differences in the application of prudential filter as well as differences (as discussed further below) in the possibility for banks to hedge HTM and AFS securities led to important differences in terms of unrealised losses between European and US banks, with important consequences also in terms of regulatory capital purposes, as we describe next.

IFSR versus GAAP: The case of assets reclassification

Another important accounting element with prudential implications concerns the possibility for banks to reclassify financial assets from one category to another. Although this possibility is foreseen only in specific circumstances in both the United States and Europe, there are important differences in the two jurisdictions.

In Europe, IFRS 9 specifies that any reclassification can occur only due to a "change in the bank's business model" and clearly states that a change in management intentions related to particular financial assets (even in circumstances of significant changes in market conditions) is not enough to drive a reclassification.[90] In contrast, US GAAP rules distinguish according to the type of reclassification. For reclassification out of the HTM category (or sale of HTM assets prior to maturity), US GAAP provide for the so-called 'tainting rule', under which an entity cannot sell HTM securities or transfer the securities to other categories without tainting (i.e., triggering the same reclassification for) the whole HTM portfolio. In fact, when an entity's HTM portfolio is tainted, pursuant to ASC 320 the entire portfolio should be reclassified as AFS.

Despite this general rule, ASC 320 foresees a limited number of circumstances under which the tainting requirement is lifted and an entity may thus sell HTM securities/transfer them to another category without tainting the HTM portfolios.[91] However, an even more important exception concerns the reclassification from AFS to HTM securities, for which the US GAAP standards do not prescribe any limitations. In other words, while US banks can reclassify securities from HTM to AFS without applying the tainting rule only in specific circumstances, they can do the opposite (i.e., reclassify from AFS to HTM) without apparent accounting limitations. It follows, as we discuss more

88 Kim et al. (2023). See further discussion on the tailoring rule in Section 3.3.

89 Flannery and Sorescu (2023).

90 IFRS 9 provides the following example of a change in business model: "*An entity has a portfolio of commercial loans that it holds to sell in the short term. The entity acquires a company that manages commercial loans and has a business model that holds the loans in order to collect the contractual cash flows. The portfolio of commercial loans is no longer for sale, and the portfolio is now managed together with the acquired commercial loans and all are held to collect the contractual cash flows*".

91 ASC 320-10-25-6 allows an entity to transfer securities out of HTM only in six circumstances. ASC 320-10-25-9 allows an entity to transfer securities out of HTM without taint due to an event that is "isolated; nonrecurring; unusual for the reporting entity; could not be reasonably anticipated."

below, that US banks excluded from the possibility of applying the AOCI filter may have had an incentive to reclassify assets from the AFS to the HTM accounting in response to the recent increase in interest rates, with the purpose of shielding the AOCI (and shareholders' equity) from unrealised losses due to higher interest rates.

It is worth mentioning that IFRS and US GAAP also differ for the accounting treatments of reclassified assets from AFS to HTM. In particular, under IFRS, the reclassified asset is measured at the reclassification date as if it had always been measured at amortised cost. In contrast, under US GAAP, all accumulated unrealised gains or losses remain in AOCI and are amortised over the life of the security. Therefore, IFRS provisions are more beneficial to banks as they allow an instantaneous increase in the reported shareholder equity, the magnitude of which depends on the size of the unrealised losses on the transferred securities.[92]

It is also worth noting that accounting reclassifications may also impact the bank's dividend distribution decisions. Even if unrealised gains and losses on AFS assets do not impact the P&L directly, and thus net income (which is the usual base for the setting of shareholders' distributions), they do affect total shareholders' equity and count towards regulatory capital (for banks that cannot apply the AOCI filter). Therefore, to the extent that banks want to keep their regulatory capital constant, sizable negative impacts arising from unrealised losses could cause them to revise (downwards) their dividend distribution, with all the connected consequences. This could constitute an additional rationale for banks to reclassify assets from AFS to HTM.

Unrealised losses in US and European banks: Amounts and reclassifications

The 2023 turmoil in the US banking sector highlighted the importance of the accounting standards and their interrelations with prudential regulation and ultimately financial stability. Following the losses realised by SVB, there was increasing concern over the amounts of assets that banks had classified, for accounting purposes, as HTM assets and measured at amortised cost. The concern was that this accounting choice allowed banks to not recognise in P&L any potential economic loss incurred on these securities (coming from the increase in interest rates), thus generating large amounts of 'unrealised losses'. The problem might have been even more relevant for US mid-sized banks that in addition could benefit from the AOCI filter, thus also excluding from regulatory capital unrealised losses on assets classified in the AFS category.

The concern proved to be motivated for US banks mostly, and to much less extent for European banks. In fact, (gross) unrealised losses on securities amounted to $683.9 billion in Q3 2023[93] for US banks, with an increasing trend from previous quarters due to lower values of mortgage-backed securities purchased by banks, and only to €116 billion as of February 2023 for significant institutions in the euro area directly supervised by the

92 Coehlo et al. (2023a).
93 FDIC (2023e).

SSM.[94] The trends documented by regulators are overall consistent with the empirical evidence provided by academics. In the United States, Drechsler et al. (2023b) estimate unrealised losses on debt securities of $780 billion due to the increase in interest rates from January 2022 to March 2023; this estimate raises to $1.7 trillion if we also include loans. Similarly, Flannery and Sorescu (2023) find total unrealised losses of $1.13 trillion resulting from the interest rate increases as of the end of 2022. Using a slightly different methodology, Jiang et al. (2023a) estimate higher total unrealised losses of $2.2 trillion on real estate loans and debt securities owned by US banks as of the first quarter of 2023.

How can we explain the difference in the amounts of unrealised losses between US and European banks? The reasons are multiple, but certainly the characteristics of the US accounting standards described above, and in particular the possibility to reclassify assets to shield their value from interest rate changes, can help understand at least some of the root causes.

As found empirically by Granja et al. (2024), US banks reclassified almost $1 trillion of securities from AFS to HTM during 2021 and 2022 as a consequence of the increased interest rates, thus shielding their regulatory capital from unrealised losses. The extent of the reclassifications was more pronounced for banks with lower capital ratios, a higher share of run-prone uninsured depositors and with longer duration securities portfolios.

In a similar spirit, Kim et al. (2023) find consistent results over a longer sample period (2012–2022), showing that US banks classified fixed-rate debt investment securities as HTM rather than AFS when HTM classification provided favourable accounting and regulatory capital treatments, not because they had a distinct economically motivated intent and ability to hold the securities to maturity. In particular, advanced approaches banks increasingly classified securities as HTM during the phase-out period of the AOCI filter and continued to do so afterwards. Instead, the five banks that reinstated the filter thanks to the tailoring rules in 2019 behaved similarly to advanced approaches banks prior to 2019, but then reversed their behaviour after 2019. Indeed, they started reclassifying securities back into the AFS category after they were allowed to use the filter again. The authors also find that all banks increased their classification of securities as HTM during the interest rate rise period.

Policy implications

The 2023 banking turmoil has opened a debate about the classification and measurement of debt securities, in particular concerning the desirability of HTM accounting and the use of the AOCI filter. We now describe the main policy options currently under debate, grouping into those affecting HTM (1-3) and those related to fair value accounting (4-6).

94 ECB (2023). As explained more below, European banks made increasing use of hedges to partially offset their unrealized losses, implying that *net* unrealised losses were approximately €70 billion as of February 2023, thus approximately €40 billion below the *gross* unrealised losses.

1. **Increase in disclosure.** A first proposal would be to increase the extent of reporting related to (unrealised) losses deriving from HTM securities and/or securities in AFS in the presence of the AOCI filter. In fact, while in practice this information is already disclosed in the notes to financial statements, a common criticism is that it could be made more explicit and easier to find than is currently the case. This would certainly improve transparency, but it remains doubtful whether it would be sufficient, as it has been argued that reporting is not an adequate substitution for recognition in financial statements, in terms of both the bank's internal management and external parties' monitoring of the bank.[95]

2. **Introduction of a cap on the amount of assets classified as HTM**. A second proposal would be to introduce a cap on the maximum amount of assets that can be classified as HTM and measured at amortised cost. Such a limit was used in India for example, where banks could classify investments into HTM up to a limit of 25% of total investments.[96] Potentially, the cap could also be made dependent on the share of uninsured deposits, but it might be difficult to define a precise threshold value.

3. **Adoption of a 'mark to maturity' approach**. This approach would require the accounting measurement of assets to be dependent on the duration of the funds used to acquire those assets.[97] While in this way banks would be incentivised to rely on more stable and long-term sources of funding, in practice it is unfeasible to ascribe a particular group of liabilities to a group of particular assets, since typically all liabilities indistinguishably and *pari passu* finance all assets.

4. **Removal of the AOCI filter**. Another, easy to implement proposal would be to remove the AOCI filter in jurisdictions where it is currently allowed in order to align with Basel III. This proposal has been advocated by many, not only within academia.[98]

5. **Removal of the FVOCI category**. Another alternative would be to maintain the amortised cost and FVTPL criteria to measure assets, while removing the FVOCI criterium. According to some, this would represent a feasible 'compromise' between reducing discretion and preserving meaningful accounting representation of banks' underlying economics.[99]

95 See, for example, Kim et al. (2023).
96 This limit was removed, however, by the Reserve Bank of India starting from April 2024 (Reserve Bank of India - Master Direction - Classification, Valuation and Operation of Investment Portfolio of Commercial Banks (Directions), 2023).
97 Similar to the 'mark to funding' approach in Brunnermeier et al. (2009).
98 See, for example, Barr (2023) and Kim et al. (2023).
99 See, for example, Kvaal et al. (2023).

6. **Introduction of full fair value measurement**. The final, more radical, approach would entail the complete elimination of amortised cost accounting, thus allowing banks to only use fair value accounting.[100] While this would maximise recognition of gains and losses on banks' balance sheet and thus of regulatory capital, in practice this could be problematic for several reasons. First, as described above, full fair value measurement might lead to excessive price volatility and unnecessary bank liquidations in times of market illiquidity.[101] Second, numerous bank assets (e.g., loans) are usually not traded and would require a Level 3 Fair Value measurement, which entails a high degree of management discretion. A potential way to limit excessive discretion could be to prohibit banks from reporting a fair value which exceeds the historical cost by a high margin.[102] Third, a switch to full fair value measurement on the asset side would require the same change on the liabilities side. However, fair value measurement for liabilities has always been a controversial topic in the accounting literature,[103] especially for what concerns the treatment of changes in fair value related to 'changes in own credit risk'.[104]

While it is difficult to rank the various policy proposals in order of feasibility and/or desirability, the most straightforward changes include the increased disclosure requirements for unrealised losses deriving from HTM securities and also the removal of the AOCI filter in line with the indications of Basel III. Other measures, such as a reconsideration of the AFS classification, might also be considered.

3.2.2 Hedge accounting

The value of debt securities, especially those with a long maturity, is typically exposed to interest rate risk. Banks have the possibility to manage this exposure through derivatives, such as interest rate swaps, thus protecting themselves against excessive value fluctuations. In practice, however, they resort to this possibility to different extents depending on their jurisdictions. One reason for this refers back to the existing accounting rules concerning the treatment of derivative instruments as well as underlying securities.

For accounting purposes, a derivative instrument is generally measured at FVTPL. However, if the derivative is meant to hedge the interest rate risk of an asset not measured at FVTPL, an accounting mismatch occurs. For example, fair value changes of AFS securities do not go through the P&L (but through other comprehensive income, or OCI),

100 See, for example, Calomiris (2023), Kim et al. (2023) and Kotlikoff and Miller (2023).
101 Allen and Carletti (2008); Vives (2014).
102 Zhang and Zheng (2024).
103 See, for example, Barth et al. (2008).
104 Related to this, all unrealized gains and losses that result from changes in the fair value of liabilities that are due to changes in the bank's own credit risk are currently excluded from Common Equity Tier 1 according to the Basel Framework CAP30.5.

while the fair value changes on the derivative instrument do. This accounting mismatch will result in additional volatility in the bank's P&L, which is usually undesirable for banks also for its impact on regulatory capital. A similar problem would occur also for HTM securities.

This accounting mismatch can be (at least partially) solved if the bank adopts 'hedge accounting'. Under hedge accounting, the changes in value of the derivative instrument and of the hedged item offset each other, and, as a consequence, the bank's P&L remains unaffected. Accounting standards – both IFRS and US GAAP – set out specific requirements for banks to be able to apply hedge accounting. In particular, these requirements apply to eligibility of the hedging instrument (e.g., an interest rate swap), eligibility of the hedged item (e.g., a debt security) and eligibility of the hedging relationship (which, among others, has to be clearly stated and documented in the bank's risk management strategy).

In the context of the recent banking turbulence, the main dispute related to fair value hedges of HTM debt securities, specifically in the United States. While fair value changes due to interest rate changes on HTM securities do not impact the P&L, they still influence the economic value of such securities, and thus banks may want to hedge this risk. However, doing so through derivatives would expose the P&L to additional volatility because hedge accounting for HTM is explicitly prohibited according to US GAAP. The rationale behind this prohibition is that hedging the interest rate risk of a security classified as HTM is inconsistent with the held-to-maturity classification itself, which requires the reporting entity to hold the security until maturity regardless of changes in market interest rates.

To the extent that banks dislike volatility in P&L, the current accounting rules discourage the usage of interest rate derivatives for HTM debt securities in the United States. In line with this, Granja et al. (2024) find limited usage of interest rate swaps both prior and during the period of monetary policy tightening in 2022 in the United States. Interest rate swap usage remained concentrated among larger banks (i.e., with assets greater than $250 billion), which tend to classify more securities as HTM rather than AFS compared to smaller banks.[105] Turning to AFS portfolios, Greenwald et al. (2023) find instead that at the beginning of the monetary policy tightening cycle at the end of 2021, around 19% of AFS securities were hedged, with banks primarily using fair-value hedges against interest rate risk (86% of all contracts). Approximately two-thirds of all hedges applied to Treasuries, with agency mortgage-backed securities (MBS) accounting for another 15%.

Under IFRS 9, there does not exist such an explicit provision. Instead, banks are allowed to apply the guidance of IFRS 9 (for micro-hedges, i.e., hedges of a specific asset) and IAS 39 (for macro-hedges, i.e., hedges of a generic monetary amount related to a portfolio of assets). Under this guidance, assets classified as HTM and measured at amortised

105 Granja et al. (2024) report that the average HTM security to asset ratio for the largest banks is more than four times higher than that for smaller banks (i.e., banks with assets below $10 billion) at the end of 2022.

cost can qualify as 'hedged items' and therefore hedge accounting can be applied to the related interest rate derivatives. As reported by the ECB,[106] significant institutions in the euro area directly supervised by the SSM made substantial use of derivatives for hedging purposes: considering only micro-hedges, European banks were able to offset approximately €40 billion of the total €116 billion gross unrealised losses on their bond portfolios, as of February 2023.

Policy implications

1. **Facilitate the use of hedge accounting**. The 2023 turmoil highlighted the limited use of interest rate hedging by US banks. A rather straightforward implication, then, is to adopt policy measures aiming at facilitating such hedging in the United States as well by providing more flexible accounting guidance for hedging instruments. However, this is not an easy task. In practice, hedging is a dynamic process where the position being hedged and the portfolio of derivatives held by a bank can change frequently. Moreover, banks can use derivative instruments not only for hedging purposes but also for speculative ones, and they may exploit hedge accounting rules opportunistically to inflate reported profits. Therefore, it is crucial to design accounting rules in such a way that does not give rise to unintended incentives to take excessive risk. Related to these issues, the IASB is currently developing a new set of accounting rules for hedge accounting with the goal of enabling investors to better understand the effect of a company's dynamic risk management, with a focus on changes in value due to changes in interest rate.[107] Finally, it is important to highlight that hedge accounting is a 'convenient scapegoat' for US banks' low usage of derivatives, but most likely not the only cause.[108]

3.3 LESSONS FOR REGULATION

Obviously, the 2023 banking turmoil urged regulators to question the appropriateness of the current prudential frameworks. Below, we highlight the main areas of concern, namely: capital regulation, with specific reference to IRRBB; liquidity regulation, with a focus on the LCR; and the heterogeneous application of Basel III regulation across different jurisdictions.

106 ECB (2023).
107 For further details, see www.ifrs.org/projects/work-plan/dynamic-risk-management/.
108 Granja et al. (2024).

3.3.1 Capital regulation

Capital regulation falls within the Basel III framework for supervision and regulation. The framework is based on three pillars: Pillar 1 (minimum capital and liquidity requirements), Pillar 2 (risk management and supervision) and Pillar 3 (disclosure and market discipline). The minimum capital requirements regulated in Pillar 1 express bank regulatory capital (Common Equity Tier 1, Additional Tier 1 and Tier 2) as a percentage of risk-weighted assets (RWAs) calculated taking into account only three specific types of risks: credit risk, market risk and operational risk. Banks are obliged to observe these requirements in order to be able to operate.

Other risk types, such as interest rate risk, and other factors such as the risk assessment process are contained in Pillar 2 approach. Differently from Pillar 1, Pillar 2 requires supervisors to conduct periodic reviews of the overall functioning of a bank and set specific capital requirements. For example, in Europe supervisors conduct the Supervisory Review and Evaluation Process (SREP) every year and, based on the informed obtained, require banks to satisfy the Pillar 2 Requirement (P2R), which sets a level of CET1 that banks are required to satisfy in order not to incur restrictions on dividend payouts, share buybacks and variable compensation.

The 2023 banking crisis brought the attention of the regulators and the public to interest rate risk on the banking book. IRRBB refers to the effects of interest rate changes on the exposures included in the banking book of a bank (including those exposures measured at amortised cost and FVOCI). As such, this risk is quite different in nature from credit and market risk as it is inherent to the core business of banks, which, by definition, engage in maturity transformation and therefore bear this type of risk due to a duration mismatch between their assets and liabilities.

The Basel framework considers two (current and prospective) impacts of interest rate changes for banks: the impact on earnings (i.e., the effects of changes in interest rates on NII), and the impact on capital (i.e., the effects of changes in interest rates on the underlying value of a bank's assets, liabilities and off-balance sheet items under the economic value of equity (EVE) approach).[109] In this respect, banks with a change in EVE equal to or above 15% of their CET1 capital are considered 'outlier banks'; as such, they are subject to increased scrutiny and/or additional regulatory capital.

The rapid and steep increase in interest rates in the last years caused the revival of some old concerns about the appropriateness of a Pillar 2 approach for the regulation of IRRBB. This approach was established in 2015 as the outcome of a consultation process with the banking industry.[110] At the time, the BCBS presented two alternatives for the regulatory treatment of IRRBB: a Pillar 1 approach (minimum capital requirement) or an enhanced Pillar 2 approach (complemented with disclosure requirements as part of

109 Basel Framework, SRP31.
110 For more details, see BCBS (2015a).

Pillar 3). Industry feedback mainly highlighted the heterogeneous nature of IRRBB, which can depend heavily on the specific bank's business model. This would make it difficult to formulate a standardised measure of IRRBB across different banks, ultimately questioning the optimality and feasibility of a Pillar 1 approach. The BCBS agreed with this view at the time, and adopted a Pillar 2 approach for IRRBB, recently reviewing some specific measurement issues but not questioning the overall framework.[111]

The 2023 turmoil raised instead more fundamental concerns over the appropriateness of the overall Pillar 2 approach for IRRBB. Two specific issues are currently debated, namely, the adequacy of the approach itself and the implementation of Pillar 2 across different jurisdictions. Advocates for a Pillar 1 regulation of IRRBB stress how such an approach would bring more discipline to risk management, eventually avoiding losses being borne by taxpayers. However, given the feedback received in 2015 by the BCBS and the specific nature of IRRBB, the likelihood of this scenario seems quite remote at the time of writing.

Advocates for a more stringent implementation of Pillar 2 stress the importance for supervisors of following rigorous and structured procedures for the identification and measurement of IRRBB as well as for the possibility of requiring Pillar 2 capital add-on. Not all countries have adopted specific Pillar 2 procedures. For example, unlike other jurisdictions (e.g., the European Union, Canada), the United States has not formally implemented the Basel III standard related to IRRBB (i.e., Basel Framework, SRP31).[112] The measurement of IRRBB is conducted on the basis of a regulation dating back to 1996, which does not require US banks to compute the same metrics used in the Basel framework. Thus, US banks may use different metrics and/or assumptions in their models, posing issues of comparability across countries regarding the measurement of IRRBB. In addition, the United States does not have a specific process for Pillar 2 supervision, relying more generically on the Capital, Asset Quality, Management, Earnings, Liquidity, and Sensitivity to Market Risk (CAMELS) rating system. This framework consists of a confidential supervisory rating system for all insured depository institutions that are subject to FDIC, thus including banks. Supervisors use the CAMELS framework to assess the overall health of a bank and issue periodic supervisory ratings. However, as also highlighted as a consequence of the 2023 turmoil, the approach has some shortcomings, namely, the lack of public disclosure of the supervisory ratings, the delay with which downgrades are issued,[113] the lack of specific reference to IRRBB, and finally the lack of capital add-ons connected to the ratings that banks receive.

111 For more details, see BCBS (2023b).

112 According to the BCBS, in the United States "*the IRRBB standard is substantially implemented within existing U.S. supervisory policies and other directives (i.e., the Joint Agency Policy Statement: Interest Rate Risk and the Interagency Advisory on Interest Rate Risk; together, the IRRBB guidelines).*" See further details in BCBS (2019).

113 See further discussion on supervisory ratings in Section 4.

Policy implications

1. **Strengthen the Pillar 2 approach for IRRBB**. The 2023 turmoil has highlighted the importance of IRRBB being properly measured and assessed, in particular in times of sudden and rapid increases in interest rates. As a minimum this would require that all jurisdictions implement the Basel framework with respect to Pillar 2, i.e., a structured and rigorous approach entailing the possibility of specific capital add-ons.

2. **Include IRRBB in Pillar 1 minimum capital requirements**. A more radical view is to include IRRBB in Pillar 1, thus enlarging the types of risks considered in the calculations of RWAs for minimum capital requirements. While having also the merit of standardising the treatment of IRRBB across jurisdictions, this approach may not be consistent with the specificities of IRRBB and the dependence of such risk on the specific bank's business model.

3. **Include a minimal Pillar 1 requirement for IRRBB, complemented with a bank-specific Pillar 2 requirement**. An intermediate and potentially preferrable solution would be to complement the first two proposals. This would have the advantage of a minimum consistent treatment of IRRBB across jurisdictions, while at the same time leaving scope for more discretionary approaches depending on the specificities of the different bank business models.

3.3.2 Liquidity regulation

Liquidity regulation was introduced with Basel III after the global financial crisis of 2007-09 as a way to try and avoid the fire sales experienced by banks in those years.

The regulation comprises two standards that have separate but complementary objectives. The first standard, the LCR, promotes the short-term resilience of banks' liquidity by ensuring that they have sufficient liquid assets to survive a significant stress scenario lasting 30 days. The second standard, the net stable funding ratio (NSFR), aims at promoting resilience over a longer time horizon by creating additional incentives for banks to fund their activities with more stable sources of funding. Specifically, the NSFR has a time horizon of one year and aims at ensuring a sustainable maturity structure of assets and liabilities.

The 2023 banking turmoil saw massive sudden deposit withdrawals accompanied by an inability of banks to cope with these sudden liquidity outflows. For this reason, the current debate centres around the desirability and design of the LCR rather than the NSFR. In addition to this, previous literature highlighted that the NSFR could be redundant, at least in a static bank balance sheet model, since the LCR and NSFR are linked through an accounting identity.[114] Therefore, the remaining part of this section will discuss liquidity regulation with a specific focus on the LCR.

The LCR is defined as the ratio between high-quality liquid assets and the total net cash outflows expected over the next 30 calendar days. The numerator (HQLA) is computed as the sum of each liquid asset multiplied by its specific liquidity factor.[115] Three classes of assets can enter HQLA: Level 1 (i.e., cash, central bank reserves, and government securities, which receive a liquidity weight of 100%); Level 2a (i.e., government-sponsored enterprise securities, which receive a liquidity weight of 85%); and Level 2b (i.e., investment corporate and municipal bonds and Russell 1000 equities, which receive a liquidity weight of 50%). Loans and other fixed assets cannot qualify as HQLA. The denominator (total net cash outflows expected over the next 30 calendar days) is computed as the difference between expected cash outflows and inflows.[116] Expected cash outflows equal the outstanding balances of various categories of liabilities multiplied by the rates at which they are expected to run off or to be drawn down. Therefore, expected cash outflows are affected not only by the maturity of the liabilities, but also by the run-off rates applied to them. Expected cash inflows equal the outstanding balances of several categories of receivables (fully performing) multiplied by the rates at which they are expected to flow in.

The LCR definition poses issues of harmonisation between the measurement of debt securities under accounting standards and the treatment of such securities for LCR purposes. While all the assets entering the numerator of LCR (HQLA) have to be measured at an amount not greater than the current market value, some of these assets might be classified as HTM from an accounting perspective, and thus measured at amortised cost. For example, MBSs can qualify as Level 2a HQLA and at the same time be classified as HTM, if the bank purchased these securities with the intent to hold them until maturity.

114 Vives (2014); Bolton et al. (2019).
115 Basel Framework, LCR 30.
116 Basel Framework, LCR 40.

While it is true that certain haircuts and thresholds apply to the market values and amounts of assets that can be included in Level 2 HQLA,[117] this does not address the lack of harmonisation between accounting and LCR rules, an issue that was mentioned by regulators in the aftermath of the recent crisis.[118] In particular, Barr (2023) stated that: "[...] we should re-evaluate the stability of uninsured deposits and the treatment of held to maturity securities in our standardised liquidity rules and in a firm's internal liquidity stress tests".

As accounting standards typically forbid the sale of HTM securities except in some specific circumstances, including securities classified as HTM and valuing them at market values for the purpose of calculating the LCR may appear a contradiction. However, such securities could be used to obtain liquidity from the central bank and thus their market values could provide an indication of the haircut that could be applied to the collateral values.

The tightening of monetary policy in recent years and the banking turmoil in 2023 represented the first test for the effectiveness of liquidity regulation, and highlighted the challenges deriving from a proportional application of the standards. In fact, while in Europe liquidity regulation came into force in 2015 (with a phase-in period of three years) and applied to all banks irrespective their size, in the United States it was first applied to all banks in September 2014 (with December 2017 as final compliance date), but it was subsequently relaxed for some banks according to some proportionality criteria. In particular, following the deregulation wave initiated by the passage of the Economic Growth, Regulatory Relief, and Consumer Protection Act (EGRRCPA) in 2018 and the subsequent 'tailoring rule' in 2019, banks with assets below $250 billion were relieved of liquidity regulation completely or subjected to more relaxed standards, depending on the size of their weighted short-term wholesale funding (wSTWF). Banks with wSTWF lower than $50 billion were not required to compute and respect any liquidity ratios, while those with wSTWF greater than $50 billion were only subject to a reduced monthly LCR.[119]

Notably, SVB was exempted from the full application of liquidity regulation. This implied that the bank was not facing any limits concerning the maturity mismatch between assets and liabilities. As a result, it started to invest massively in long-term bonds, whose value decreased due to the increased interest rates, while at the same time raising a large majority of its funds in the form of uninsured corporate deposits. In March 2023, when the turmoil started, the bank had nearly 57% of its assets in fixed-income securities such as Treasuries and agency mortgage-backed securities, of which 76% was accounted in the HTM and 22% in AFS accounting, and over 90% of its total deposits were uninsured. In addition, the bank had applied the AOCI filter, so that any

117 Basel Framework, LCR 30.42-30.46.
118 See, for example, Barr (2023) and BCBS (2023).
119 We will go back to the 2019 tailoring rule in Section 3.3 below.

unrealised loss in the AFS portfolio was not accounted for in the regulatory capital. In the span of a few days, after it sold the AFS securities realising a loss of $1.8 billion and it announced an (unsuccessful) associated effort to raise capital, the bank experienced the most dramatic run in history and was put into receivership soon after. As shown in Table 2, SVB lost $42 billion of its deposit in just one day, and 85% in just two days.[120] Just for comparison, the second fastest run occurred in National City in 2008, where depositors withdrew just above 5.1% of its deposits in two days, while it had taken ten days for Washington Mutual to lose slightly above 10% of its deposits in 2008. The speed of the bank run at SVB was exacerbated by the concentration of deposit holdings[121] and the similarity of depositors (mostly constituted by corporates in the high-tech sectors). Notably, social media also played an important role in amplifying the bank run. In this regard, Cookson et al. (2023) provide evidence that higher Twitter exposure before the crisis predicts large bank stock losses and deposit outflows in the run period, and that Twitter pre-exposure interacts significantly with the percentage of uninsured deposits and a proxy for unrealised losses on bank assets.

TABLE 2 **DEPOSIT OUTFLOWS**

Institution	Start of outflow	Duration of outflow	Size of outflow	Deposit base	Percent outflow	Monthly rate (hypothetical)
Wachovia	15/4/2008	2 weeks	$15bn	$414bn	3.6%	7.8%
	15/9/2008	5 days	$8.3bn		2.0%	11.8%
	26/9/2008	8 days	$10bn		2.4%	9.0%
Washington Mutual	11/7/2009	23 days	$9.1bn	$186bn	4.9%	6.5%
	8/9/2008	16 days	$18.7bn		10.1%	18.6%
National City	15/3/2008	2 days	$5bn	$98bn	5.1%	55.6%
	11/7/2008	5 days	$4.5bn		4.6%	25.3%
	15/9/2008	25 days	$4.5bn		4.6%	5.7%
Sovereign	11/7/2008	?	$0.74bn	$47bn	1.6%	
	1/9/2008	1 month	$2.9bn		6.2%	6.2%
IndyMac	27/6/2008	2 weeks	$1.55bn	$18.5bn	8.4%	17.6%
SVB	9/3/2023	1 day	$42bn	$173bn	24%	100%

Note: The table shows deposit outflows for large US institutions during the 2008 crisis[122] versus SVB.

120 BCBS (2023).
121 The top ten depositors alone accounted for almost 8% of total deposits, according to Gruenberg (2023b).
122 Rose (2015).

Policy implications

The LCR was not intended as a tool to detect severe and rapid deposit outflows like those observed in March 2023. However, these events highlighted the need to reassess the adequacy of the current LCR framework in various directions, listed below from the highest to the lowest priority.

1. **Increase in the deposit run-off rates**. Basel standards consider the run-off rates of deposits to be in the range of 3% to 40%, generally lower than those of other liabilities. The idea is in fact that deposits are 'sticky'.[123] However, the bank runs in March 2023 questioned the validity of such an assumption, in particular with reference to uninsured deposits. In an era of digital banking where social media exacerbates the speed of information circulation, the current deposit run-offs might need to be reconsidered, in particular those applied to uninsured deposits upwards.

2. **Rethinking the LCR time horizon**. LCR rules currently consider a time horizon of 30 days. While it is undeniable that nowadays bank runs can materialise in a matter of hours, if not minutes, the LCR is not currently designed to prevent (all) bank runs and tail events. However, the 2023 turmoil urged regulators to think more carefully about the intended scope of the LCR going forward.[124] If the LCR is intended as a tool to prevent bank runs, regulators should consider changing the time horizon to a shorter period. If, on the other hand, the LCR is meant as a way to 'buy time' while waiting for authorities' intervention in a time of liquidity stress, the current 30-day period could be left unchanged. In this case, however, regulators might want to complement the LCR with other supervisory mechanisms for the early detection of liquidity-related stress events.

3. **Introduction of Pillar 2 HQLA add-ons**. Regulators could also decide to intervene through a Pillar 2 requirement on a case-by-case basis. In this scenario, at the discretion of the regulators and based on the characteristics of the specific bank (e.g., very high share of uninsured deposits, very concentrated deposit base), the bank would be required to hold an additional layer of HQLA. Characteristics of existing HQLA (e.g., a large share of long-term, fixed-rate government securities with high exposure to interest rate risk) could also be used to determine the presence and the extent of HQLA add-ons.[125]

123 Sundaresan and Xiao (2024).
124 BCBS (2023).
125 Coehlo et al. (2023a).

4. **Restrictions to HQLA eligibility criteria**. Different categories of assets may classify as HQLA, including certain long-term debt securities measured at amortised cost for accounting purposes. As discussed, this poses harmonisation issues; one possibility could be to exclude these assets from the calculation of HQLA. While doing so would solve the harmonisation concerns, it could prove excessively costly for banks which could, in turn, constrain their credit supply and/or rely more on expensive and less stable short-term market funding.[126]

5. **Compliance at the individual entity level**. Although perhaps not so relevant in the 2023 turmoil when mostly regional banks were under stress, the crisis has also raised attention to the perimeter for the application of liquidity regulation. In particular, the Basel framework applies on a consolidated basis. Formal compliance at the consolidated level, however, does not ensure effective compliance at the individual entity level. This is particularly relevant in the case of managing liquidity risk, where the fungibility and management of liquidity across the group is of vital importance for the substantial compliance with the rules. For example, there can exist limits to the free transferability of liquid resources within banking groups across single entities located in different countries that may arise due to different reasons (e.g., banks internal rules for intra-group transactions, national laws). These limits can seriously hinder the ability of banks to effectively manage their liquidity in times of stress. Although the Basel framework already considers the existence of such limits,[127] regulators could take further steps to strengthen liquidity risk management within banking groups. For example, regulators could enhance banks' disclosure of existing liquidity transfer restrictions or mandate LCR compliance at the individual entity level.

3.3.3 Global implementation of the Basel framework and prudential filters

The 2023 turmoil highlighted how the Basel framework had not been implemented uniformly across jurisdictions. It also showed the importance of prudential filters, such as the already described AOCI filter in the United States – that is, filters applied by prudential regulators that allow banks to deviate from accounting standards with the consequence of relaxing certain rules or information disclosure. In this section, we analyse both of these issues in turn and derive some policy implications.

The Basel framework is an internationally agreed set of measures developed by the BCBS. While it develops global regulatory standards, its implementation falls under the responsibility of the different jurisdictions around the world. As a consequence, the standards may not be uniformly implemented and thus banks may de facto be subject to different rules in the different jurisdictions.[128] In particular, while the rules may be

126 Restoy (2023b).
127 LCR 10.7-10.8.
128 To monitor the global implementation process, the BCBS established a comprehensive Regulatory Consistency Assessment Programme (RCAP) in 2012. For more details, see www.bis.org/bcbs/implementation.htm.

implemented more uniformly for the large systemic banks, there may be significant differences in terms of their application to smaller entities, as different jurisdictions may apply different proportionality criteria. A striking example of this was the deregulation wave that occurred under the Trump administration, which led to significant relaxation in the application of the Basel III framework to mid-sized banks in the United States.

The Dodd-Frank Act passed in 2010 was meant to curb and prevent the financial and regulatory shortcomings that had been blamed for causing the 2008 crisis. While not fully aligned with Basel III standards, the Act shared the need to strengthen financial institutions by making capital and leverage regulation more stringent and introducing liquidity regulation. After a few years of its implementation, however, the difficulty of implementing the enhanced rules to all banks alike became evident. In fact, the principle of proportionality usually adopted in prudential regulation calls for the implementation of the rules to follow a proportionality criterion whereby less significant institutions are allowed a less stringent adoption of the regulatory standards.

With this principle in mind, in 2018 the US Congress passed EGRRCPA, the aim of which was to provide regulatory and supervisory relief to smaller and mid-sized banks in an attempt to encourage these institutions to expand lending and stimulate economic activity. In particular, EGRRCPA amended Section 165 of the Dodd-Frank Act by raising the $50 billion minimum asset threshold for general application of stricter prudential standards concerning capital and liquidity requirements to $250 billion. Additionally, EGRRCPA provided the Federal Reserve with discretion to rebut the statutory presumption and apply the stricter standards to bank holding companies (BHCs) with assets of between $100 and $250 billion (Category IV). As a result, one year later the Federal Reserve finalised the implementation guidelines (known as the 'tailoring rule') which entailed that the highest regulatory standards, i.e., the enhanced prudential standards, had to be applied to G-SIBs, while for the remaining banks the requirements had to be 'tailored'.

The tailoring rule established four categories of banks based on several factors, including asset size, cross-jurisdictional activity, reliance on short-term wholesale funding, nonbank assets, and off-balance sheet exposure, as displayed in Table 3. Each tier is then subject to a tailored set of prudential standards that are commensurate with the risk posed by the institutions in that category.

TABLE 3 **US TAILORING RULE: RRISK-BASED CAPITAL AND LCR**

	Category I *US G-SIBs*	**Category II** *≥ $700bn total assets or ≥ $75bn in cross-jurisdictional activity*	**Category III** *≥ $250bn Total Assets or ≥ $75bn in nonbank assets, wSTWF, or off-balance sheet exposure*	**Category IV** *Other firms with $100bn to $250bn total assets*	**Other firms** *$50bn to $100bn total assets*
Risk-based capital	- GSIB surcharge - Advanced approaches - Countercyclical buffer - AOCI filter not allowed	- Advanced approaches - Countercyclical buffer - AOCI filter not allowed	- Countercyclical buffer - AOCI filter allowed	- AOCI filter allowed	- AOCI filter allowed
Liquidity coverage ratio (LCR)	- Full daily LCR (100%)	- Full daily LCR (100%)	- If wSTWF < $75bn: Reduced daily LCR - If wSTWF ≥ $75bn: Full daily LCR	- If wSTWF < $50b: No LCR - If wSTWF ≥ $50b: Reduced monthly LCR	-

Note: This table shows the requirements introduced by the US tailoring rule with respect to risk-based capital and the LCR.
Source: Adapted from www.federalreserve.gov/aboutthefed/boardmeetings/files/tailoring-rule-visual-20191010.pdf.

As shown in Table 3, banks belonging to Category III and below (i.e., banks with maximum assets of $700 billion) were given the possibility to apply the AOCI filter, i.e., to exclude the unrealised gains and losses counted in AOCI from their regulatory capital calculations.[129] Additionally, Category IV banks (like SVB) were subject to very limited or totally absent liquidity regulation: banks with wSTWF lower than $50 billion were not subject to any liquidity ratios, while banks with wSTWF greater than or equal to $50 billion were only subject to a reduced monthly LCR. In this sense, EGRRCPA and the subsequent tailoring rule established a clear demarcation between the less regulated mid-sized banks and their larger counterparts, which continued to be subject to a more stringent regulatory framework.

The tailoring approach also called into question the criteria used to define the proportional application of prudential regulation. Jurisdictions are free to apply the Basel framework beyond G-SIBs, including to smaller banks, in a proportionate manner. However, the way in which this proportional application is implemented can have serious implications and consequences. SVB fell into Category IV according to the tailoring rule. Yet, its crisis triggered a series of events that had severe systemic repercussions and contagion effects not only in the United States (subsequent crises of Signature Bank of New York and First Republic Bank) but also in the rest of the world.

Policy implications

A consistent implementation of prudential rules across different banks of different countries is of key importance to prevent scenarios of crises like the recent one. The points below outline, in order of priority, areas of discussion related to the achievement of this objective.

1. **Increased harmonisation of global standards across jurisdictions**. Individual jurisdictions have full responsibility for deciding on the scope of Basel III framework application beyond internationally active banks. Ideally, prudential frameworks should apply globally in a consistent way to all institutions that could pose a threat to global financial stability. Achieving this is not easy, especially in a scenario of increased international tensions like the current one. Further efforts towards cooperation and coordination among countries are needed to transition to a more homogenous application of the Basel framework worldwide. Since financial stability is a global outcome, it should be approached from a global perspective, going beyond the interplay of many complex dynamics, including considerations of political nature.

129 See further discussion on the AOCI filter in Section 2.1.

2. **Stringency of proportionality criteria**. Criteria to define the proportional application of prudential rules mainly take into account bank size characteristics (e.g., total assets), as in the case of the tailoring rule. Regulators could introduce complementary approaches for the definition of thresholds that go beyond size, also encompassing characteristics of banks' business models. Indeed, the recent turmoil proved that even banks of moderate size can pose threats to the resilience of the global financial system.

3.4 LESSONS FOR SUPERVISION

Together with regulation, supervision is a key element to ensure financial stability, even more so in a period of high stress like the one observed in March 2023. The rest of the section below provides an overview of the main events from the supervisory perspective occurring around the mid-sized US banks and Credit Suisse in the years prior to their distress. The focus will be on the challenges supervisors experience in the enforcement of their findings and recommendations. In fact, the events of March 2023 both in the United States and Switzerland were the result of a series of deficiencies that, in many instances, were known to supervisory authorities prior to the turmoil. The main policy implications are then discussed in turn.

4.1 The 2023 banking turmoil: Did supervisors see it coming?

SVB was a subsidiary of Silicon Valley Bank Financial Group. On 9 March 2023, the bank experienced a massive bank run on its deposits, which led first to its closure as declared by the California Department of Financial Protection and Innovation on the following day, and then to its bankruptcy on 17 March.[130]

Several issues brought SVB to its final collapse, ranging from its business model to weak governance and risk management. SVB experienced fast and significant growth over the past few years: between 2019 and 2021, the group tripled in size and saw a significant increase in deposits (largely uninsured), coming mainly from venture capital funds and the technology sector.[131] The top management and the board of directors proved unable to effectively manage the risks arising from this fast-growing business due to a weak governance system and poor risk culture.

As highlighted by recent regulatory reports,[132] the risk management function at SVB lacked resources, while the board was unable to monitor risks appropriately due to insufficient expertise (only one member had a background in the banking industry) and a lack of accurate and timely communication from the management. In addition, the bank's overall strategy had an excessive focus on short-term objectives (for example,

130 Federal Reserve (2023).
131 Ibid.
132 BCBS (2023); Federal Reserve (2023).

starting from March 2022, SVB started to remove interest rate hedges to realise short-term profits), and there were not sufficient risk metrics in compensation packages. As a result, the bank invested massively in long-term Treasury and mortgage-backed securities, the value of which fell rapidly as a result of the monetary policy tightening.

The supervisory response to these deficiencies was not enough to prevent the crisis. SVB was supervised by the Federal Reserve Bank of San Francisco. As of March 2023, SVB had 31 open supervisory findings, almost three times as many as its peers.[133] Supervisors identified many of the critical issues that were affecting the bank, but they were slow in recognising them in supervisory ratings and they did not address them in an effective way, ultimately being unable to drive the needed changes.[134]

A few years prior to SVB failure, the Federal Reserve Bank of San Francisco had in fact identified issues regarding governance and controls, liquidity risk management and capital, with specific reference to interest rate risk.[135] Governance and controls were rated as "Satisfactory-2" from 2017 until 2021 in the RFI ratings, notwithstanding repeated observations of weakness.[136] The rating was eventually downgraded to "Deficient-1" only in August 2022.[137] Similarly, interest rate risk deficiencies were highlighted in the 2020, 2021, and 2022 CAMELS exams, though without the issuance of any supervisory findings (i.e., "matter requiring attention", or MRA, and "matter requiring immediate attention", MRIA).

Similar problems affected Signature Bank of New York, which experienced a bank run and was closed by the New York State Department of Financial Services on 10 March 2023. As outlined in a recent FDIC report,[138] the main causes of Signature Bank's failure were again poor management and governance. As in the case of SVB, the bank pursued rapid growth but did not develop risk management practices and controls adequate for its growing size, increased complexity and risk profile. This made the bank vulnerable to interest rate risk and contagion effects deriving from the failure of SVB. As highlighted by the FDIC, the primary federal regulator of Signature Bank, on the one hand Signature Bank management was slow and unresponsive to the supervisory concerns raised over the years (e.g., with respect to liquidity risk); on the other hand, the FDIC itself admitted that supervisory actions could have been escalated sooner.

The case of First Republic Bank presents some differences compared to the previous two. First Republic Bank was closed on 1 May 2023 by the California Department of Financial Protection and Innovation. Unlike SVB and Signature Bank, First Republic had in place infrastructure, controls, and risk management processes that, according to the

133 Federal Reserve (2023).
134 As detailed in Federal Reserve (2023), Silicon Valley Bank Financial Group and SVB were subject to three main rating systems: CAMELS (SVB), RFI (SVBFG, until 2021) and LFI (SVBFG, from 2021 onwards).
135 Federal Reserve (2023).
136 RFI ratings are based on a five-point numeric scale as follows: 1 - Strong; 2 - Satisfactory; 3 - Fair; 4 - Marginal; and 5 - Unsatisfactory.
137 LFI ratings are based on a four-point, non-numeric scale as follows: Broadly meets expectations (BME); Conditionally meets expectations (CME); Deficient - 1 (D-1); and Deficient - 2 (D-2).
138 FDIC (2023a).

supervisor, were appropriate to its size and risk profile.[139] However, the bank had similar balance sheet characteristics to SVB (a high share of uninsured deposits and substantial unrealised losses) and operated in the same geographic market.[140] After the failure of SVB and Signature Bank, First Republic experienced dramatic contagion effects that resulted in severe liquidity stress mainly due to runs from uninsured depositors.[141] This case stresses the importance for supervisor to not focus only on the characteristics of the individual bank itself but to also consider, to the extent possible, the possibility of contagion.

Turning to Europe, in March 2023, Credit Suisse experienced a dramatic crisis of confidence which led it to the edge of an imminent resolution. On 19 March 2023, in agreement with Swiss public authorities, UBS announced the state-backed takeover of Credit Suisse. While the turmoil in the United States contributed to worsening the situation of Credit Suisse, its crisis was the result of years of scandals, poor strategies, repeated losses and numerous changes in management, which were known to FINMA, the competent regulator and supervisory authority, prior to 2023.

Credit Suisse witnessed a series of scandals, especially from 2018 onwards (the Mozambique case, the espionage affair involving a former CEO, the Greensill and Archegos failures, the money laundering case related to Bulgarian drug dealers, to name the most significant). The Swiss bank also reported repeated losses for the years 2015, 2016, 2021 and 2022.[142] Furthermore, Credit Suisse risk management and governance mechanisms were inappropriate. As highlighted by Eggen et al. (2023), there was no clear definition and enforcement of responsibilities between management and board of directors, the management culture was poor, there were deficiencies in the area of conflicts of interests, and compensation schemes were not designed properly so that salaries remained high even when the bank was reporting severe losses. Finally, the bank also suffered from deficiencies in its financial reporting systems and internal controls: publication of the 2022 Annual Report was delayed after the US Securities and Exchange Commission questioned the certain accounting policies employed for the preparation of the 2019 and 2020 financial statements.[143]

The relationship between Credit Suisse and FINMA was also problematic. First, the bank showed a lack of transparent communication towards the supervisor, which opened numerous enforcement proceedings against the bank for inadequate information and reporting. Despite this, due to the frequent scandals that involved the bank, FINMA's attention on and scrutiny of Credit Suisse was very high,[144] as confirmed by the number of supervisory actions initiated over the years: since 2012, FINMA had conducted 43

139 FDIC (2023c).
140 In the case of First Republic Bank, unrealised losses were mainly coming from its loan portfolio (FDIC, 2023c).
141 FDIC (2023c).
142 Source: Credit Suisse Group AG Annual Reports (2015-2022).
143 Credit Suisse (2023).
144 Eggen et al. (2023); FINMA (2023).

preliminary investigations for potential enforcement proceedings, issued 9 reprimands, filed 16 criminal charges, and completed 11 enforcement proceedings against the bank and 3 proceedings against individuals.[145] Nonetheless, these supervisory actions were not effective either in driving real changes at the bank or in restoring market confidence regarding the soundness of the Swiss bank. FINMA highlighted how the lack of appropriate tools and legal basis to implement more effective measures was at the core of the problem.[146]

4.2 Early intervention frameworks

The events described above point to the importance of the effectiveness of the toolkit supervisors have at their disposal for both their examinations and actions they can undertake during the normal supervisory cycle of a bank. This toolkit, which is commonly called 'early intervention', refers to supervisors' ability to change management behaviour (e.g., through formal supervisory actions or moral suasion) while the bank is still in sound financial condition. Importantly, while the term is commonly used, early intervention regimes are quite different across jurisdictions with respect to the indicators used to trigger early interventions as well as to the powers and discretion supervisors have available.

In the United States, the formal early intervention regime is represented by PCA introduced in 1991. PCA was introduced with the aim of intervening in institutions before bankruptcy, thus preventing bank failures from resulting in losses to the deposit insurance fund. Importantly, PCA relies solely on capital and leverage triggers, that is, it foresees supervisory provisions only in case a bank shows deficiencies in terms of capital and leverage requirements. In the scenario in which capital and leverage triggers are breached, PCA mandates intervention and formally prescribes the actions – both mandatory and discretionary – to be taken (restricting asset growth, limiting certain types of operations such as M&As, prohibiting any material change in accounting methods, etc.).

However, while criteria based on capital are certainly important, they do not encompass all situations of distress. For example, thanks to the AOCI filter, SVB did not breach any capital thresholds before experiencing massive runs. This case shows that by the time a bank becomes undercapitalised, it might be too late for supervisors to intervene and bring it back to a healthy condition.

In the European Union, the current regime is represented by the EIM. The EIM regime considers a wider set of indicators compared to the US PCA, which is not confined only to capital but encompasses, among others, SREP supervisory ratings and "significant events".

145 FINMA (2023).
146 Ibid.

However, while PCA prescribes mandatory remedial measures upon the breach of capital triggers, EIM provides more discretion to supervisors. This aspect, which is linked to the old debate about the appropriate balance of rules and discretion, clearly has pros and cons. While on the one hand it leaves more freedom of intervention to supervisors, on the other it does not codify either the trigger or tool for intervention, thus potentially risking a more passive attitude. Currently, the EIM regime is under review as the European Commission is discussing the CMDI package. This set of reforms includes amendments to the EIM regime, in particular direct legal basis for the ECB to intervene; removal of the overlap between EIM and other supervisory measures; and alignment of the conditions to use supervisory measures and EIM.[147]

Policy implications

The 2023 banking crisis highlighted the importance of the role played by supervisors in ensuring financial stability. Below, we discuss the main areas where some improvements might be desirable.

1. **Increase (and formalise) scrutiny on governance and risk management**. The recent events highlighted that beyond capital and liquidity regulation, solid governance and risk management systems are fundamental prerequisites to enhance the resilience of the financial system. Supervisors scrutinise these aspects within (more or less) formalised processes (e.g., SREP in the European Union and CAMELS ratings in the United States) and may require additional capital in case of deficiencies (e.g., Pillar 2 capital requirements in Europe).

   Yet, a push for increased and more pervasive scrutiny beyond a simple 'compliance with the rules' approach would be desirable. This should encompass many areas of governance and risk management, enhancing board diversity while ensuring a sufficient knowledge of the core banking business and risks among directors, strengthening the monitoring role of the board, and setting compensation of executive directors and senior management in a way that does not incentivise excessive risk taking. Effectiveness of internal audit functions, adequateness of reporting systems, and the definition of clear responsibilities and delegations to management consistent with the established risk appetite are also key to ensure a strong risk culture throughout organisations. Supervisors should also be capable of recognising 'outlier' banks (with respect to anomalous business growth, depositor base concentration, excessive exposure to certain sectors, etc.) in a timely manner and effectively assessing the sustainability of banks' business models in a forward-looking way, giving sufficient consideration to emerging risks.[148]

147 For further details, see www.bankingsupervision.europa.eu/ecb/pub/pdf/annex/ssm.sp231016_1_annex.en.pdf
148 Dahlgren et al. (2023).

BOX 1 **HETEROGENEOUS APPLICATION OF THE BASEL FRAMEWORK: THE CASE OF SWITZERLAND AND CREDIT SUISSE**

Credit Suisse, a G-SIB headquartered in Switzerland, experienced a significant crisis of confidence during March 2023 which led it to the edge of resolution. Eventually, the bank was acquired by UBS with the help of the state. Even though the nature of the Swiss crisis was different from the US one (see Section 4 for further details), in Switzerland the national regulator (FINMA) also deviated from the standard application of the Basel framework. Indeed, FINMA granted Credit Suisse various forms of relief, including the application of regulatory filters for regulatory capital calculation (in a similar vein to the AOCI filter granted to some US banks).

FINMA was obliged by national Swiss laws (in line with the 'too big to fail' regime) to provide these regulatory relaxations, notwithstanding its numerous and public attempts to do otherwise. [149]More specifically, the regulatory filter that FINMA granted to Credit Suisse related to the valuation of the bank's subsidiaries. In 2015, the Swiss accounting standards were amended in such a way that subsidiaries could not be valued anymore on a portfolio basis but rather had to be valued individually. While UBS, the other major Swiss bank, was already applying the individual valuation method, Credit Suisse was not.[150]

The implementation of this accounting change had negative consequences for Credit Suisse's balance sheet. However, from a regulatory capital perspective, these negative consequences were effectively neutralised by the regulatory filter conceded by FINMA (with unlimited duration). Importantly, the application of this regulatory filter and its effects were known to the market, as Credit Suisse had to provide public disclosure on a quarterly basis. The value of this regulatory filter was considerable, as highlighted by Eggen et al. (2023): in the third quarter of 2022, the net impact of the filter amounted to more than one-third of the reported CET1 capital (CHF 11.9 billion).

While FINMA regularly conducted checks on the valuations of the individual subsidiaries, the presence of the regulatory filter effectively contributed to a significant reduction in capital requirements for Credit Suisse as compared to other banks. Indeed, absent this filter, the Swiss bank would have been severely undercapitalised.

2. **Strengthen remedial actions and early intervention frameworks**. As noted above, supervisors were able to recognise (at least partly) warning signs that eventually led to the 2023 banking turmoil. Yet, they were not successful in designing proper remedial actions and enforcing them. This could be partly explained by a lack of 'willingness to intervene' by supervisors (e.g., due to a poor supervisory culture and/or insufficient resources), and partly by a lack of adequate frameworks favouring early intervention.

149 FINMA (2023).
150 Eggen et al. (2023).

Going forward, it is important to enhance early intervention regimes in two directions. First, supervisors should be entitled to take actions in a wide range of circumstances, and not only those strictly codified by capital deficiencies. Second, supervisors should have appropriate intervention tools and measures to ensure enforcement of their remedial actions. As described in Box 1, the lack of appropriate early intervention tools was evident in Switzerland, where currently a number of reforms are under discussion including the introduction of a Prompt Corrective Action regime and the possibility of 'naming and shaming' (i.e. publicly disclosing supervisory enforcements against banks).[151]

3. **Enhance cooperation among supervisors in different jurisdictions**. Effective supervision and early intervention would also benefit from greater cooperation among supervisors in different jurisdictions. Given the high level of interconnectedness in the banking industry, information sharing among supervisors is a key mechanism to preserve financial stability at the global level. While the BCBS played a key role in facilitating timely information sharing among its members during the 2023 turmoil,[152] supervisory authorities may consider the development of more formal protocols for coordination, with specific agreements regarding the sharing of highly confidential information.

4. **Consideration of market signals**. The recent turmoil made it evident that markets can move very rapidly from a balance sheet view to a mark-to-market view of bank risks. In order to enhance the effectiveness of supervision, authorities may therefore take into account a larger set of indicators, including market signals. Some examples of indicators that can be of use are below.

   Market-based measures of risk: There are various market indicators of risk. A prominent one is SRISK,[153] a measure of systematic risk at the individual bank level which considers the bank's expected capital shortfall in the event of a systemic crisis.

   Stock prices and price-to-book ratios: Movements in equity market prices may convey information that supervisors may want to consider, although with care. Similarly, supervisors could take into account price-to-book ratios, in particular for those institutions with values persistently lower than one.[154]

   Trends of this sort should be carefully considered by supervisors as indicators of a (probable) need for prompt intervention.

151 Eggen et al. (2023).
152 BCBS (2023).
153 Acharya et al. (2012); Acharya et al. (2017); Bronwlees and Engle (2017).
154 IMF (2023).

Analyst forecasts: These tend to reflect short-term consensus regarding a bank's future performance, and as such may be useful in predicting financial stress of individual banks. An example of the attempt to incorporate analysist forecasts in supervision is the forward-looking Key Risk Indicators framework recently proposed by the IMF, which incorporates short-term consensus on future bank balance sheet, valuation, and profitability metrics.[155] However, these forecasts heavily depend on analysts' assumptions, which are typically not publicly available, and they may also be strongly affected by the guidance bank managers themselves provide to the market.

BOX 2 MARKET SIGNALS FROM STOCKS AND CDS MARKETS: THE CASE OF DEUTSCHE BANK

Supervisors tend to focus almost entirely on regulatory measures and disregard, or at least not act upon, market risk indicators. The recent turmoil has shown however that investors can turn quickly to a mark-to-market view of bank risks and, as such, act upon market indicators rather than regulatory ones. This raises the question as to whether supervisors should also take more account of market signals. At the same time, however, it has to be recognised that market signals may be the result of speculative attacks, and as such they may not reflect the fundamentals of a financial institution. This may be particularly the case for indicators based on illiquid markets, as the prices of credit default swaps. In such situations, supervisors should rather help restore market confidence.

Single-name CDSs are derivative instruments that provide insurance against the credit risk of a borrower (e.g., a bank). CDSs are quoted in terms of spread, i.e., the number of basis points charged on the total amount (notional) insured; the higher the spread, the higher the perception of credit risk.

Over the past five years, the volume of trading in single-name CDSs ranged between $405 billion and $1.1 trillion per quarter.[156] CDS markets have different characteristics compared to stock markets. In particular, they are very opaque (CDSs are negotiated over-the-counter), very shallow and very illiquid. The 'thinness' of CDS markets (i.e., the low number of trades) implies that even a small CDS trade can have a sizable impact on the CDS price. Additionally, the 'opaqueness' of the CDS markets might favour speculative behaviors, for example joint trades of CDS in conjunction with short positions on the equity. These dynamics are difficult to monitor and might perpetuate financial instability, as highlighted by Andrea Enria, former Chair of the Supervisory Board of the ECB, in April 2023.[157]

For these reasons, many argue that signals from CDS markets are 'unreliable'. Nonetheless, CDS prices can still convey meaningful information, which is also likely to propagate to the stock market and thus could influence depositors' withdrawal decisions. Therefore, it is up to the supervisory authorities to adequately monitor CDS spread dynamics and, when necessary, take action.

155 Ibid.
156 ISDA (2023).
157 Interview available at www.bankingsupervision.europa.eu/press/interviews/date/2023/html/ssm.in230428~4c2b6f7fa2.en.html.

BOX 2 **CONTD.**

The case of Deutsche Bank

During the afternoon of Thursday 23 March 2023, and the following morning, the price of Deutsche Bank CDSs exhibited a significant spike, reaching the highest level since late 2018, as shown in Figure 11. This was accompanied by an intra-day decline of almost 13% of the bank's stock price on 24 March 2024. The movement was apparently induced by some US hedge funds that could move the CDS price very substantially with a relatively small bet.

FIGURE 11 **DEUTSCHE BANK CDS SPREAD, FEBRUARY 2022 TO FEBRUARY 2024**

Source: Refinitiv.

The event was so abrupt that it also caused turbulence in the equity values of other European banks. However, unlike Credit Suisse, Deutsche Bank was not experiencing fundamental issues. As markets reopened on the following Monday, the tensions evaporated and calm was restored.

CHAPTER 4

Lessons for bank failure management

4.1 INTRODUCTION

One of the most relevant policy reforms that emerged from the great financial crisis was the creation of a new bank resolution framework. Under the slogan "avoid the perception of too-big-to-fail banks", the Financial Stability Board established new standards aimed at reducing the impact of systemic bank failures.

The FSB's Key Attributes contain the main elements of the new framework. The attributes aim at facilitating an orderly resolution of systemic entities (i.e., avoiding a major impact on the economic system) without exposing public funds to losses. A key component of the new resolution regime is the bail-in tool that would allow resolution authorities to write down liabilities or to convert them into equity in order to absorb losses and, in some cases, recapitalise a firm in resolution. The Key Attributes are being implemented in FSB jurisdictions, although this is still an ongoing process. In fact, it is somewhat striking that around half of the FSB jurisdictions have not yet fully implemented the bail-in tool.[158]

In some jurisdictions that have applied the Key Attributes, a new resolution framework for systemic banks co-exists with existing domestic failure management regimes which are applied to the entities that do not meet the criteria to be subject to the new procedures. In the European Union, legislators have extended the application of the new resolution standards to all banks with the potential to generate a systemic impact (i.e., that pass a public interest test) when failing. In the United States, the new resolution legislation (contained in Title II of the Dodd-Frank Act) is only applied to large, complex bank holding companies categorised as systemically important financial institutions. The new arrangements complement the existing regime, contained in the Federal Deposit Insurance (FDI) Act, under which banks are subject to an administrative insolvency regime managed by the FDIC. Under this regime, the FDIC typically manages bank failures through 'purchase and assumption' (P&A) transactions, with possible support from the DIF. That support is subject to strict restrictions – including a least-cost test for the DIF – which can only be waived in exceptional circumstances (systemic exception).

158 FSB (2023b).

Before the failure of Credit Suisse, the new resolution regime for systemic banks had been applied only on a few occasions. In the European Union, this was the case in the failures of Banco Popular Español in 2017 and Sberbank in 2022. No application of Title II of the Dodd-Frank Act has taken place in the United States so far. By contrast, the FDI Act regime has been used frequently. In particular, during the global financial crisis, the FDIC dealt with the failure of around 500 banks.[159] In almost all cases, the FDIC was able to manage the failure of those banks using its ordinary powers, without the need to invoke the systemic exception.[160]

During the 2023 bank turmoil, crisis management frameworks in both the United States and Switzerland were directly tested. In the United States, the failure of two regional banks – SVB and Signature Bank – required the use of a systemic exception as authorities felt that the preservation of financial stability justified waiving the restrictions on DIF support in order to guarantee all the deposits of those banks. Moreover, a special liquidity facility (the Bank Term Funding Program) was established by the Federal Reserve to ease potential system-wide funding pressures.

In Switzerland, the crisis of Credit Suisse, a G-SIB, was not managed under the new resolution framework but rather through a series of ad hoc measures taken to facilitate the absorption of the bank by UBS without it being formally declared a failing institution. Moreover, although the measures adopted outside resolution included a substantial bail-in of some creditors, they also entailed the provision of public guarantees to support the liquidity and solvency of the resulting institution.

Arguably, the actions taken by the authorities met the primary objective of preserving financial stability. At the same time, those actions did not follow the usual procedures and, contrary to the objectives of the post-crisis reforms, required different forms of public support. The same occurred when authorities in the European Union, where the resolution regime is particularly strict, had to deal with the crisis of two Italian banks in 2017.

Recent events therefore provide good motivation for a general reflection on possible gaps and flaws in the prevailing bank failure management frameworks in different jurisdictions.[161] That reflection is already taking place in several jurisdictions. In particular, in the European Union, the European Commission has recently proposed a far-reaching reform of the crisis management framework.

159 FDIC (2017).
160 The exceptions were Wachovia in September 2008, Citigroup on 23 November 2008 and Bank of America on 16 January 2009 (FDIC, 2017).
161 Carstens (2023).

This chapter aims to review some of the issues that the recent turmoil and other relevant bank failures have raised in relation to the current policy framework for bank crisis management. Thus, it complements the work already conducted[162] or which is still ongoing by different national and international organisations. A section is devoted to the EU bank failure management regime, where the general issues common to other jurisdictions are complemented by the specific challenges posed by the multinational character of the Banking Union.

The rest of the chapter is structured as follows. Section 2 briefly describes the procedures followed to manage the failure of several regional banks in the United States and Credit Suisse in Switzerland. Section 3 reviews some of the issues raised by the recent bank failures and points to areas in which policy reform might be warranted. Section 4 focuses on the existing crisis management procedures in the European Union and assesses the recent reform proposal by the European Commission. Finally, Section 5 concludes.

4.2 THE MANAGEMENT OF RECENT BANK FAILURES

In the United States, actions taken by authorities upon the failure of SVB and Signature Bank were very much influenced by intense bank runs and the signs of contagion affecting regional banks. This prompted the FDIC and the Federal Reserve Board to propose to the US Treasury that it activate a systemic risk exception, allowing the FDIC to extend its protection to all deposits of those two banks. Despite this, another bank, First Republic Bank, subsequently failed.

The approach followed by the FDIC to resolve SVB and Signature Bank consisted of a transfer strategy entailing the creation of a bridge bank for each institution, composed of all their deposits and most of their assets, and the subsequent sale of those bridge banks' assets and liabilities to suitable acquirers. The equity of each bank was fully wiped out, and the assets and liabilities that were not transferred to the bridge banks remained in the failing banks for liquidation. Consequently, unsecured creditors – except depositors – are likely to lose all their investment. The bank acquiring SVB's assets and liabilities[163] benefited from a loss-sharing agreement with the FDIC. In the case of First Republic Bank, there was no need to create a bridge bank or to apply a systemic risk exception. A suitable acquirer was quickly found, allowing for a standard P&A transaction to be swiftly executed.

In the case of Credit Suisse, the strategy followed by the Swiss authorities was unique. Rather than triggering statutory resolution, a commercial transaction was orchestrated under which UBS would take full control of Credit Suisse. That transaction was supported by a number of actions taken ad hoc by the authorities outside a formal resolution

162 See, for example, BCBS (2023), FSB (2023a; 2023b) and Eggen et al. (2023).
163 The UK subsidiary of SVB was resolved by the Bank of England following a resolution procedure under which the bank's shares were transferred to an acquirer after writing down all equity, AT1 and Tier 2 capital instruments.

procedure. These included (i) the adoption of emergency legislation that allowed the Swiss government to waive the obligation under Swiss law for the merger operation to be endorsed by the shareholders of both institutions; (ii) the provision of a public second-loss guarantee to UBS for certain Credit Suisse assets;[164] (iii) a partial write-off of equity that preserved a residual value of CHF 3 billion; (iv) the activation of contractual clauses that allowed the writing-off of AT1 instruments (around CHF 16 billion) once the bank received public support; and (v) the provision by the Swiss central bank of privileged liquidity facilities.[165]

The issues raised by these resolution cases are quite different. In the case of the failure of US banks, the measures taken by authorities did not require the adoption of new rules, procedures or any sort of emergency legislation. Indeed, all actions were performed in accordance with the FDI Act, including the invocation of a systemic risk exception. The only innovation was the adoption by the Federal Reserve of a new and highly flexible liquidity facility to help contain the threat of additional bank runs and the pressure on weak banks to (fire) sell their assets.[166]

As the failing regional banks were not subject to the regulatory and supervisory regime that applies to systemic banks, the focus of the policy reflection should arguably be the apparent contradiction implied by the use of systemic risk exceptions to manage the failure of banks that were not considered systemic in life. This suggests possible flaws in the prevailing regulatory and supervisory regime (see Chapter 3), but it could also indicate the need to revise the perimeter of banks that should be considered systemic when failing and, therefore, to enlarge the scope of application of at least some elements of the new resolution framework. We will come back to this in Section 3.

The case of Credit Suisse is much more complex. Like all G-SIBs, the bank already had in place a detailed resolution plan that entailed the application, in this case, of a single-point-of-entry resolution strategy based on an open bank bail-in (OBBI). This 'preferred resolution strategy' would allow the bank to continue performing its critical functions independently once resolved and recapitalised through creditors' bail-in (see Box 3 on different resolution strategies). This strategy was thoroughly prepared by the bank's crisis management group, composed of authorities in those jurisdictions where Credit Suisse had material subsidiaries. If authorities had followed the resolution plan, they would have imposed the conversion into equity of all of Credit Suisse's bail-in-able liabilities – not only AT1 instruments, but also other junior debt securities (called bail-in bonds) amounting to CHF 40 billion. Under this approach, equity would have been fully written

164 The guarantee would cover losses up to CHF 9 billion for certain assets after the first CHF 5 billion in losses to be assumed by UBS. The federal loss-protection guarantee agreement was terminated by UBS on 11 August 2023.

165 These included a liquidity facility from the SNB of up to CHF 100 billion with no collateral requirement (but granting SNB enhanced creditor status) and another facility of CHF 100 billion guaranteed by the state.

166 The Bank Term Funding Program offered loans of up to one year to lenders pledging collateral including US Treasuries and other 'qualifying assets', which were valued at par.

off in accordance with the hierarchy of liabilities in insolvency, but the conversion of bail-in-able liabilities would have led to a post-resolution total capital ratio of around 44% of RWAs. That large amount of capital would probably have been necessary to fund the post-stabilisation restructuring of Credit Suisse's business.

BOX 3 **RESOLUTION STRATEGIES AND TOOLS**

Open bank bail-in (OBBI)

The failed bank is recapitalised through the write-down or the conversion into equity of selected liabilities – including certain creditors' claims – before reaching balance sheet insolvency. In addition, shareholders' equity is wiped out (absorbs losses fully). The tool facilitates the stabilisation of a failing bank and the preservation of its critical functions with private funds.

Transfer strategies

A partial or full transfer strategy, which entails the assignment of ownership of some or all assets, rights, obligations and liabilities without the explicit consent of shareholders and creditors, aims to achieve a prompt sale of all or part of the failed bank and to protect critical economic functions. Such transfers can be effected to a private sector purchaser (sale of business or P&A tool), a bridge bank or an asset management vehicle (bad bank tool).

Sale of business

Transferring good assets and sensitive liabilities (such as deposits) to a healthy bank has clear upsides relative to direct liquidation and deposit payouts. Experience in the United States demonstrated that such a transfer tool can help improve going-concern asset and franchise values. Notably, depositors retain access to their accounts, whilst minimising the risk of further runs in other peer banks. Executing such transfers to a qualified acquirer at an acceptable price may often prove challenging, especially within a restricted time, without external support.

Intermediate bridge bank

When a sale of business is not feasible, a transfer to a bridge bank provides temporary breathing space for the resolution authority to effect a subsequent sale (or sales) whilst preserving those operations that have been transferred. Specific assets and liabilities are transferred to the bridge bank, which is managed by the authorities until its sale. The rest of the assets and liabilities will remain in the failed entity in liquidation, together with a claim on the proceeds of the sale of the bridge bank. As all non-transferred liabilities will normally absorb losses in the liquidation procedure, a bridge bank offers a means of effecting a 'closed bank bail-in'. While the FSB Key Attributes also set out reverse transfer powers from a bridge bank, these should be used under strict conditions and time periods (for example, to remedy valuation errors).

Asset management vehicle (AMV)

Asset transfer to an AMV is an expedient way to segregate impaired assets and cleanse the balance sheets of failing banks. The failing bank (or its successor entities) transfers those assets to the AMV in exchange for cash which typically represents the estimated economic value of the transferred exposures. An AMV will typically be used to facilitate and support another resolution strategy – either OBBI or sale of business.

Despite all preparations to execute the resolution plan, authorities chose to follow a different route outside resolution. As explained in a public communication,[167] the Swiss authorities felt that a deep restructuring involving massive bail-in would have been a risky strategy, failure of which could have led to the liquidation of the bank's domestic business in accordance with regular insolvency procedures. At the same time, according to FSB (2023a), the US Securities and Exchange Commission (SEC) could not guarantee *ex ante* that the issuance of new shares required for the conversion of US-held debt instruments into capital would have been exempt from the prospectus obligations under US securities legislation. Without that exemption, the envisaged bail-in might not have been operationalised within the tight time frame available in resolution. Moreover, the stability of the institution the day after resolution was also uncertain, as clients and market participants could remain sceptical – despite the large recapitalisation – about the future of an institution with a highly dispersed ownership (composed of the holders of bail-in-able debt securities before resolution) and structural vulnerabilities.

The above arguments provide some support for the decision by the Swiss authorities to opt for a strategy based on a commercial transaction that was deemed over the critical weekend to be less disruptive than the one developed in the resolution plan. After all, there is no way in which all the circumstances shaping a bank's crisis situation can be fully anticipated when conducting resolution planning. While authorities can perceive in advance that a merger operation between two G-SIBs in a mid-sized country should not be the preferred resolution strategy for dealing with a crisis affecting one of them, in the circumstances of the failure, it could still be considered a safer strategy for protecting financial stability than the alternative.

That said, assuming that a departure from the preferred resolution strategy could be warranted does not fully explain why the whole operation was conducted outside of the resolution framework. Legislation implementing the international standards for resolution in Switzerland and other jurisdictions contemplates the possibility of implementing a resolution strategy other than the preferred strategy provided for in the resolution plan. More concretely, the Swiss resolution authorities could have employed their statutory powers, upon declaring that the bank met the conditions for resolution, to implement bail-in (through the write-down or conversion into equity of all or specific classes of bail-in-able liabilities) and combine it with the sale of all or parts of Credit Suisse businesses to a suitable acquirer. This was the strategy followed by European resolution authorities to deal with the failure of Banco Popular Español. Moreover, in Switzerland, legislation also allows for the provision of public support for banks in resolution.

167 FINMA (2023).

It is true, though, that resolution involving creditors' bail-in would have been incompatible with the preservation of any residual value for equity holders, and it would not have allowed the waiver of the rights of UBS's shareholders to approve the acquisition of Credit Suisse. Moreover, the provision of liquidity by the SNB after resolution would still have required an ad hoc decision on public guarantees, as Switzerland – like many other jurisdictions – had not yet established a specific regime to provide funding for banks in resolution.

In any case, the policy discussion following the Credit Suisse failure should not focus just on the pros and cons of adopting specific measures, but should also consider why the failure was managed through the activation of contractual clauses and emergency legislation supporting a commercial transaction rather than through the use of existing resolution statutory powers. That discussion could help inform the debate about what aspects of the new resolution framework might need to be revised.

The next section focuses on some of those features that may be worth revisiting in the light of recent experience.

4.3 SOME ISSUES STEMMING FROM THE RECENT TURMOIL

4.3.1 Resolution planning

The speed with which apparently solvent banks became failing banks, particularly in the United States, points to the need to strengthen resolution planning.[168] This should first be achieved by enlarging the scope of application of meaningful resolution planning obligations to all banks that can be systemic in failure. Currently, in the United States all insured depository institutions (IDIs) with a balance sheet above $100 billion are subject to resolution planning under the FDI Act. Only bank holding companies with a balance sheet above $250 billion must submit detailed living wills under Section 165(d) of Title I of the Dodd-Frank Act. Unlike Signature Bank, SVB had submitted its IDI resolution plan in 2022, but it had not yet been reviewed thoroughly by the FDIC. The detailed DFA living will obligations did not affect any of the failing regional banks. Moreover, current rules in the United States do not envisage any loss-absorbing requirement (such as TLAC) for mid-sized banks (see below) beyond required regulatory capital.

In addition, resolution plans for international banks should address practical issues relating to the operationalisation of resolution actions – particularly bail-in – in a cross-border context. Given that securities qualifying as TLAC are typically issued in international financial centres, it is important that resolution decisions – such as a conversion of debt securities into equity – be effective in all relevant jurisdictions.

168 FDIC (2023b).

In the case of resolution plans based on sale of business or, more generally, transfer transactions (which also includes the creation of bridge banks), specific preparations involve the early identification of potential acquirers; the availability of reliable data to facilitate timely and speedy due diligence; the adaptation of banks' balance sheet composition to meet the likely demand by acquirers; efficient and sufficiently flexible bidding requirements; and, importantly, the availability of external support.[169]

Resolution plans should contemplate different options and not focus on just a single resolution strategy.[170] In the case of Credit Suisse, the preparatory work conducted around the development of the entity's resolution plan proved very useful for managing the failure of the bank, even if the plan was not ultimately implemented. Yet, the process would have been facilitated if, in addition to contemplating a massive bail-in, the plan had included provisions for a possible full or partial sale of business. While, in general, a cross-border sale of business is a highly challenging operation (particularly if there is public money involved), a domestic corporate operation should appear in the future as a reasonable resolution instrument – possibly complementing others – in many jurisdictions, and not only for mid-sized banks but eventually also for some larger banks or even G-SIBs, particularly if they are organised as a group of largely self-sufficient subsidiaries that can be resolved independently (i.e., follow a multiple-point-of-entry resolution strategy).

4.3.2 Loss absorbency

One of the main ingredients of the new resolution framework – and of the new resolution planning and resolvability requirements – that emerged from the crisis is the availability of sufficient resources within systemic banks' balance sheets to absorb losses and, if needed, recapitalise the institution after resolution is triggered. In particular, the FSB has issued standards for TLAC that should be satisfied by a G-SIB. The standards establish a minimum amount of bail-in-able liabilities that would be written off or converted into equity in resolution. Eligible liabilities could be both equity and debt securities that satisfy certain conditions.

In jurisdictions where the new resolution framework is being applied beyond G-SIBs, such as the European Union, there is a version of the TLAC standard, the MREL, that is also binding for other institutions. In other jurisdictions, such as the United States, no TLAC-type requirement is applied for non-G-SIBs. Therefore, most US banks – including those failing in the recent turmoil – had no specific obligation to hold liabilities that could absorb losses in resolution beyond the capital requirements established in prudential regulation.

169 Baudino et al. (2023).
170 FSB (2023b).

The application of MREL to mid-sized institutions in the European Union was initially envisaged to facilitate the operationalisation of an OBBI resolution strategy. While, in principle, mid-sized banks could be subject to a different strategy (such as sale of business), uncertainty regarding the availability of a suitable buyer induced resolution authorities to consider OBBI as an alternative strategy that should be prepared as a back-up.[171] More recently, however, EU resolution authorities have been asked by EU legislation[172] to adjust MREL for banks with a preferred sale-of-business strategy. This adjustment is meant to reflect the lower capital needed to preserve the critical operations of failing institutions whose resolution implies market exit.

So far, however, there has been no explicit recognition of the role that appropriately calibrated loss-absorbing requirements could have in facilitating the success of sale-of-business resolution strategies. Arguably, banks with more liabilities that would not have to be transferred to the acquirer, but rather would be left behind in a residual entity to be liquidated, would be better positioned to be resolved through transfer transactions. By leaving liabilities behind, those banks would have more assets that could be transferred to the acquirers as compensation for assuming sensitive liabilities. Therefore, the availability of non-transferred liabilities would generally reduce the need for external support to the acquirers and would thus save costs for the deposit insurer. In the United States, this argument would also imply that requirements to hold sufficient loss-absorbing resources when a bank is declared unviable would make use of the systemic risk exception (to allow the FDIC to waive its least-cost restriction for support provided to transfer transactions) even more exceptional.

This logic inspired the recent proposal by the FDIC[173] to require banks with more than $100 billion in assets to satisfy minimum long-term debt requirements. The counterpart of those debt instruments on the asset side could be transferred to the acquirer, but the debt instruments themselves would be left in the residual entity to be liquidated. This would make those debt instruments act as gone-concern capital supporting the transfer transaction. The requirements are calibrated as the maximum of 3.5% of total liabilities, 6% of RWA or, for banks subject to the supplementary leverage ratio (SLR),[174] 2.5% of total leverage exposure under the SLR. Therefore, as is currently the case in the United States, the FDIC proposal would entail the introduction of gone-concern capital requirements to US mid-sized banks that would complement the existing ones (TLAC) for G-SIBs.

171 Restoy (2018).
172 Directive 2019/879/EU on bank recovery and resolution (BRRD II).
173 Gruenberg (2023a); FDIC (2023d).
174 The SLR was implemented in the US as part of the Basel III reforms. The ratio's numerator is Tier 1 capital, and the denominator comprises all on-balance-sheet assets (including US Treasuries and deposits at Federal Reserve Banks), some off-balance-sheet items and derivative exposures. Only relatively large banks (Categories I-III in the regulatory classification) are required to maintain an SLR of 3% (SVB and Signature Bank were not in those categories). G-SIBs are subject to an additional 2% enhanced SLR buffer requirement.

Yet, important differences would remain. MREL in the European Union has two parts: (i) a loss-absorption amount that broadly coincides with required regulatory capital; and (ii) a recapitalisation amount that depends on the preferred resolution strategy. The latter component is the one which is conceptually closer to the long-term debt requirements in the FDIC proposal.

The set of EU banks for which MREL include a material recapitalisation amount is larger than that of US banks that would be subject to long-term debt requirements. In the European Union, there is no cap on the size of the balance sheet for banks subject to the recapitalisation amount as part of MREL. In practice, only MREL for (small) banks that are expected to be subject to liquidation if they fail would have a zero or low recapitalisation amount.

The recapitalisation amount in MREL is, on average, substantially larger than the long-term debt requirements stipulated in the United States.[175] However, while the proposed US requirements can only be met with debt, MREL targets in the European Union can be met with a variety of eligible liabilities that include equity, debt and even some non-covered deposits. In reality, many small and mid-sized institutions in the European Union cover a large part of their MREL requirements with equity instruments.[176] This is likely due to the fact that it is difficult for those banks, given their lack of experience and specific business model, to tap regulated debt markets.

From a conceptual point of view, there is merit in establishing gone-concern capital requirements in terms of debt instruments. Experience shows that equity instruments tend to disappear quite quickly as a bank approaches the point of non-viability and during the resolution process itself as hidden losses emerge in the balance sheets.[177] Therefore, equity, being the most powerful loss-absorbing instrument in going concern, might simply not be available in gone concern. Similarly, as uninsured depositors can easily run as soon as the bank is perceived to be vulnerable, they are highly unlikely to remain on the balance sheet when the bank is in resolution. Therefore, while purely debt-based gone-concern requirements could increase the pressure faced by small and mid-sized institutions to comply with those requirements, excessively flexible eligibility criteria might not be the optimal instrument for facilitating the resolution of those banks.

175 According to SRB (2023), the average recapitalisation amount for banks following a resolution strategy based on transfer transaction is around 10% of risk-weighted assets, i.e., 4 percentage points above the long-term debt requirement stipulated in the United States.

176 SRB (2023) shows that for (significant) banks under the SRB remit classified as 'non-Pillar 1', equity instruments represent on average more than 60% of the resources used to meet MREL requirements.

177 In fact, this is partially recognised in the FSB TLAC Term Sheet, as it contains an expectation that at least 33% of the TLAC requirements will be met with debt securities.

4.3.3 How to calibrate loss-absorbency requirements to facilitate transfer strategies

The success of a transfer strategy consisting of the assumption by a suitable entity of a failing bank's sensitive liabilities (such as deposits) requires that the acquirer be offered sufficient compensation for taking over the new obligations. This compensation normally takes the form of a transfer of assets from the failing bank to the acquirer and some external support either in the form of cash or different types of loan-loss guarantees.

The ability of asset transfers to compensate acquirers depends on the difference between the value of unincumbered assets and that of the transferred liabilities. External support is normally provided by the DIF, subject to the afore-mentioned financial cap (or least-cost constraint) determined by the cost (net of recoveries) that the DIF would have assumed if it had to pay out covered deposits in the case of the bank's liquidation. Naturally, the more senior (junior) the DIF claim in insolvency, the tighter (looser) the least-cost constraint. In that regard, jurisdictions where DIF claims are 'super-protected' and rank above other deposits (as in the European Union) implicitly impose a particularly tight financial cap for DIF support. By contrast, in jurisdictions where both DIF claims and non-covered deposits rank *pari-passu* (as in the United States), there is more room for the DIF to facilitate transfer transactions through funding. Moreover, the more efficient the liquidation procedures and the higher (lower) the amount of non-insured liabilities, the lower (higher) the costs in insolvency and therefore the tighter (looser) the least-cost constraint.

Based on the above, Restoy (2023a) proposes a stylised model to derive the loss absorbency required to facilitate a transfer transaction of all of a failing bank's deposits under different conditions while respecting the financial cap for DIF support. That amount depends crucially on the seniority of the DIF claim in insolvency and three parameters: (i) the proportion of non-covered over total deposits; (ii) the market value discount (over accounting values) of the failing bank's assets; and (iii) the liquidation value discount on the bank's assets.

The Annex describes the results of applying this model to determine the gone-concern capital requirements of a fictional bank with some of the characteristics of SVB, including a high ratio of non-covered deposits (around 90%). This is done for two scenarios: (i) an EU-type of insolvency regime with 'super-protection' of DIF claims in insolvency; and (ii) a US-type of insolvency regime where all deposits rank *pari-passu*.

The results indicate that, with high proportions of non-covered deposits, there is little scope to perform transfer transactions under any insolvency regime. In that situation, the ability of the DIF to provide support without breaching the financial cap (i.e., without invoking the systemic exception) is quite limited, and this cannot be compensated by an affordable volume of gone-concern capital requirements.

The situation changes when the ratio of non-covered deposits is lower. While the outcomes in the EU regime remain broadly the same, in the US regime the lower ratio of non-covered deposits allows the DIF to provide more significant support depending on the value preservation coefficient in liquidation. This implies that the required volume of gone-concern capital could remain at moderate levels and still facilitate, together with the DIF support, the transfer transaction without the need to invoke any systemic exception.

These illustrative calibrations suggest that gone-concern capital requirements can facilitate transfer transactions. However, the feasibility of that resolution strategy would also require appropriate constraints on the proportion of banks' non-DIF-covered deposits and that, crucially, the available support from the DIF is not overly restricted. The latter condition would not normally hold if DIF support is subject to a rigid least-cost constraint and the DIF enjoys an excessively privileged status in insolvency.

4.3.4 The role of AT1 instruments

Additional Tier 1 (AT1) instruments are issued under specific conditions that allow the bank to generate Common Equity Tier 1 (CET1) capital in the event of stress through the discretionary suspension of coupons and the conversion into equity or the full or partial write-down of the principal.

Triggers for conversion or write-down could be either quantitative or qualitative. The quantitative trigger is a contractual clause that provides for an automatic conversion or write-down of the AT1 instrument if the issuing bank's CET1 position falls below a specified level, typically 5.125%. The qualitative trigger, on the other hand, allows authorities to convert or write down the AT1 instruments if they believe that the issuing bank has reached the point of non-viability, defined as the earlier of: (i) the decision of the relevant authority that a conversion or write-down is needed to restore the viability of the issuing firm; or (ii) a decision by the public sector to provide support to restore the viability of the issuing firm.[178]

The contractual terms under which these instruments are issued make them quite suitable for use in resolution. Investors should normally understand that these instruments will lose value – or even be fully written off – if the bank is declared failing or likely to fail. Yet, AT1 instruments are also meant to absorb losses before resolution as they qualify as (going-concern) regulatory capital. The BCBS requires the terms and conditions of AT1 instruments to ensure that coupon suspensions, conversions and write-downs can take place to strengthen the solvency of the bank when needed. Holders of those instruments can therefore gain no return and lose part or all of their investment if this is required to facilitate recovery and, therefore, to avoid resolution.

178 Coelho et al. (2023b).

So far, experience with the use of AT1 instruments to strengthen firms' solvency position before resolution is not overly positive. The quantitative triggers have not been activated to date as resolution is normally triggered before CET1 reaches the established threshold. In addition, fears of coupon suspensions for AT1 issued by Deutsche Bank in 2016 destabilised the whole market for these instruments. More recently, the write-off of Credit Suisse's AT1 instruments amounting to CHF 16 billion in the context of the Credit Suisse crisis has given rise to much debate as it was not preceded by a complete wipe-out of equity holders. This decision, which triggered substantive (albeit relatively short-lived) turbulence, pushed EU authorities to issue statements explaining that this would not be possible in their jurisdiction and is being currently challenged by investors in Credit Suisse AT1.

However, when the conversion or write-down of AT1 instruments takes place before resolution upon activation of contractual provisions, there should be no presumption that there will be an accompanying administrative decision to wipe out equity. In fact, in most cases, a statutory decision to curtail the economic or political rights of equity holders would be legally impossible before resolution is triggered.

In the case of Credit Suisse, as the bank was not subject to a formal resolution procedure, the write-down of AT1 instruments did not follow a statutory decision by Swiss resolution authorities. Rather, it was triggered by the contractual terms of the instrument, which require AT1 to be written down as soon as the entity receives extraordinary public support,[179] regardless of whether equity was wiped out or not. Indeed, this is fully in line with the requirement in the Basel standards for instruments to be classified as AT1. Moreover, the substantial loss of value for equity holders of Credit Suisse was not statutorily imposed, but rather was decided as part of the commercial agreement between Credit Suisse and UBS.

The case in the European Union is somewhat unique, as the legislation bans the discretionary conversion or write-down of AT1 instruments through the activation of qualitative triggers if equity is not previously wiped out. However, since the authorities cannot wipe out equity before resolution, they cannot activate the qualitative triggers on AT1 either. The corollary is that AT1 instruments cannot really be written down before resolution.

This leads to a rather fundamental discussion about the eligibility of AT1 instruments (such as contingent convertible bonds) as regulatory capital. Given the practical – and, sometimes, legal – difficulties in activating the conversion or write-down clauses in AT1 contracts and therefore making them absorb losses before resolution, a review of their treatment as going-concern regulatory capital might be warranted.

179 As discussed before, the government offered guarantees to facilitate the provision of liquidity from the SNB to Credit Suisse and the absorption of this entity by UBS.

4.3.5 Public support

The foundational principles of the new resolution framework developed after the global financial crisis included the objective to minimise the cost of bank failure management actions for taxpayers. However, experience – including the recent bank turmoil – shows that there are instances in which some form of external support is required to preserve financial stability and the continuity of the systemically critical functions of failing banks. Thus, it cannot be guaranteed that the failure of any bank can be managed in all circumstances by transferring deposits and other sensitive liabilities to an acquirer or maintaining the critical operations of the bank by converting liabilities into equity. In the first case, external support may be needed if the available assets are not sufficient to convince any suitable acquirer to assume the sensitive liabilities. Likewise, when the failing bank's business model cannot easily accommodate the issuance of large amounts of bail-in-able liabilities and there are no suitable acquirers, external support might be required, at least temporarily, in order to provide the bank with the resources required to continue conducting its critical operations.

Regular support for resolution actions is often provided by the DIF. As seen before, that support is normally capped by a least-cost restriction that prohibits the DIF from committing funds exceeding the expected cost (net of recoveries) of paying out covered deposits if the bank were liquidated.[180] Additional support aimed at protecting public interest could be provided directly by the national Treasury or by dedicated funds contributed by the industry. In the United States, extraordinary support for failing large systemic institutions can be provided by an orderly liquidation fund as provided for in Title II of the Dodd-Frank Act. Moreover, under the FDI Act, the least-cost restriction for FDIC support can be waived if a systemic risk exception is applied. In both cases, extraordinary external support can only be authorised through a special procedure requiring the endorsement of the regulatory agencies and the Treasury after consulting the US president.

A completely different model is in place in the European Union, where external support can be provided by the Single Resolution Fund (SRF), built up with contributions from the industry. However, the conditions for access and the available amounts are highly restrictive.[181] Moreover, beyond the SRF, the possibility of the state directly supporting resolution is almost non-existent. Since national insolvency regimes are less restrictive and allow for the provision of public liquidation aid, the failure of some European banks that could have systemic implications was in fact managed through national insolvency procedures, effectively reducing the scope of application of the common resolution framework (see Section 4 below).

180 Costa et al. (2022).

181 Access to the SRF for banks under resolution should be preceded by a bail-in of at least 8% of total liabilities of the institution in resolution. Moreover, SRF support cannot exceed 5% of that institution's total liabilities.

Recent developments show that the minimisation of public support should remain a key objective. However, there should be no ambition to establish a resolution framework that can eliminate any possible need to use external funds to support the orderly resolution of any systemic bank. In fact, the FSB Key Attributes do recognise that, even where resolution regimes are in place, there may be (extreme) circumstances where public funds are needed. Therefore, there could be merit in envisaging a robust regime that would ensure that sufficient extraordinary external support is available in extreme circumstances where it is required to preserve systemic financial stability. That regime should contain sufficiently clear and restrictive – but not overly punitive – conditions for access, rigorous approval procedures that would ensure the preservation of the public interest, and reliable processes for the recovery of the costs incurred.

A specific situation in which some sort of public support would normally be required is the provision of liquidity in resolution. Once a bank has been resolved, there is no guarantee that it will immediately recover the trust of its clients and other fund providers. In particular, when the bank has been resolved under an OBBI resolution strategy, it will have to continue operating after the recapitalisation is performed through creditor bail-in but before any restructuring of the institution can be carried out. As such, the resolved bank will not easily be able to obtain funds in interbank markets and will often not comply with the eligibility criteria to obtain central bank funding through standard facilities. Therefore, there is a need to put in place an effective funding-in-resolution facility, backed by some sort of public indemnity that would allow a bank in resolution to obtain funding from the central bank even when it does not hold all the required collateral.

4.4 THE EUROPEAN FRAMEWORK

4.4.1 The current challenges

In the European Union, bank failure management follows a dual regime. Banks whose failure could provoke adverse systemic implications (i.e., that pass a public interest test) will be subject to resolution. Other banks' failures are handled through liquidation in accordance with regular insolvency regimes. Resolution actions for significant banks in the European Banking Union are implemented through the SRM, which is led by the SRB. Bank liquidation under the insolvency regime remains a competence of member states.

The EU resolution framework constitutes in several respects a relatively strict transposition on the FSB standards. Thus, requirements for resolvability and resolution planning, including MREL, apply to essentially all banks. Access to external funding in resolution is severely constrained. In particular, support from the industry-contributed resolution fund requires a prior bail-in of 8% of the failing bank's liabilities. In addition, as seen before, support from the DIF in resolution is largely irrelevant in practice, given the tight financial cap. Importantly, for countries in the banking union, the SRM effectively bans any form of government support for banks in resolution. European legislation – as

contained in the Bank Recovery and Resolution Directive (BRRD) – contemplates the option for member states to adopt a 'government stabilisation tool' that can be used as a last resort if the objectives of resolution cannot be achieved by other means. However, this tool is absent from the SRMR, which governs the resolution regime for jurisdictions in the Banking Union.

Somewhat paradoxically, the current legislation is more flexible with regard to (non-systemic) bank failures being managed under domestic insolvency rules. In particular, failing banks can receive so-called liquidation aid from national governments provided that the support meets EU conditions for state aid, which mainly aims to preserve fair market competition. The conditions include some burden-sharing arrangements that involve losses for existing junior creditors, but these arrangements fall short of the bail-in requirements for access to resolution funds. Note that the latter are expressed as a proportion of total liabilities and can potentially affect senior creditors, including non-DIF-covered deposits.

In practice, however, national insolvency procedures have been applied to significant banks under the remit of the SRB. Such was the case in the failures of Veneto Banca and Banca Popolare di Vicenza in 2017. The argument used at the time was that, while those banks were locally systemic, this was not enough to conclude that their failure would meet the required public interest criteria, as this test should be performed on the basis of national and European impact. The decision to apply the national insolvency regime rather than resolution allowed the Italian government to use public funds to support the acquisition of a substantial part of the two banks' businesses by Intesa San Paolo.[182] That support would have been impossible under the common resolution framework.

The case of the two Venetian banks' failures clearly showed the internal contradictions of the European bank failure management regime. Importantly, it also illustrated the European Union's lack of an effective regime to resolve mid-sized banks deemed too large to be subject to regular insolvency procedures without extensive public support, but also too small and unsophisticated to issue large amounts of bail-in-able liabilities in order to implement an OBBI strategy or, more generally, to satisfy the conditions required for access to the SRF.[183]

As seen before, a key flaw of the current resolution regime is the absence of effective conditions to operationalise sale-of-business resolution strategies, which are arguably the most appropriate for mid-sized banks.[184] The tight constraints on the provision of external support to facilitate these transactions make them unfeasible in most cases. Arguably, the assets acting as counterparts of MREL could help compensate acquirers. However, strict MREL obligations can be a challenge for many mid-sized banks, which would tend to meet them with equity that – unlike debt instruments – might not be

182 The support consisted of cash injections of about €4.785 billion and state guarantees of a maximum of about €12 billion.
183 Restoy (2016).
184 Restoy et al. (2020).

available when the bank is declared non-viable. Moreover, the Annex shows that unless MREL becomes unrealistically large, sale-of-business transactions would still remain quite uncertain without external support. Under those conditions, the current SRB policy (based on the revised SRMR), which allows MREL to be adjusted downwards for banks with a preferred sale-of-business strategy, may fail to sufficiently support the feasibility of the transaction while, at the same time, falling short of ensuring that the resolved institution can continue operating by itself.

Those deficiencies in the common resolution framework are particularly relevant in a context in which there is no last-recourse source of funds that could be mobilised if resolution actions do not succeed in meeting their objectives and, in particular, preserving financial stability.

In any case, the main weakness of the current European bank failure regime within the Banking Union is the absence of a common deposit insurance regime. Since the main objective of the Banking Union is the denationalisation of bank risk, it can hardly be contested that the absence of a common deposit guarantee scheme renders it not only incomplete but potentially also unable to meet its stated objectives.

4.4.2 The Crisis Management and Deposit Insurance proposal

The legislative proposal by the European Commission[185] for a reform of the current CMDI regime constitutes a valuable attempt to correct some of the main flaws and inconsistencies of the current framework.

As regards the issues analysed in this report, the CMDI contains three relevant proposals.

First, while the dual route for bank failure management (resolution or insolvency) is kept, the definition of 'public interest' criteria to determine the application of one or another regime is clarified. In the proposal, the public interest criteria would include the expected disruption of financial stability "at the national and regional level". Moreover, the CMDI indicates that if the application of insolvency is expected to entail public liquidation aid, "this should lead to a positive public interest assessment" and therefore to a choice of resolution rather than insolvency. Those provisions considerably enlarge the scope of application of the resolution regime.

Second, the external funding of sale-of-business transactions is significantly strengthened by alleviating the existing financial cap for DIF support and the minimum bail-in restrictions for access to the SRF. The formulation of the least-cost constraint on DIF support for sale-of-business transactions remains unaltered. However, in line with the US regime and the proposals made by several observers,[186] the current super-preference for DIF claims in insolvency is replaced by a general depositor preference rule. With that, the

185 European Commission (2021).
186 See, for example, Restoy (2019), Restoy et al. (2020), Gelpern and Véron (2020), Garicano (2020) and König (2021).

expected cost (net of recoveries) for the DIF of paying out deposits in insolvency becomes larger, as does the maximum support for sale-of-business transactions. Moreover, any contribution made by the DIF (together with any bail-in of eligible liabilities) would count towards meeting the 8% minimum bail-in required for SRF access.

Third, while the (now more ample) available external support could not be directly considered for the purposes of MREL determination, the CMDI now formally allows the SRB to adjust MREL for banks with a preferred resolution strategy of sale of business based on a set of pre-established criteria such as size, business model, risk profile, marketability, and so on.

The proposal would certainly provide robustness to the current framework. Resolution would arguably become the default option for all bank failures with any sort of systemic impact. At the same time, improving the available funding for sale-of-business transactions effectively expands the SRB's ability to deal with the failures of mid-sized banks. The CMDI would also end the paradoxical situation under which public funds are more readily available for the failure of non-systemic banks (which are subject to insolvency) than that of those which critical functions for the economy (whose failure should be handled through resolution).

4.4.3 What is still missing?

The clear benefits that the CMDI would bring in terms of consistency may come at the expense of flexibility to deal with financial crises within the Banking Union. The case of the Venetian banks, together with more recent events in other jurisdictions, point to the evident imperfections of the existing procedures for bank failure management, but also illustrate that, in some instances, public support to preserve financial stability may be unavoidable. Under the current EU framework, public support is not an option in resolution within the Banking Union, but it is explicitly available in insolvency within the Banking Union and in both resolution and insolvency outside the Banking Union. In the Italian case, financial stability could be preserved only because government support appeared legally possible since those bank failures could be managed through the national insolvency regime.

The CMDI would not alleviate the existing obstacles to the provision of government support in resolution. Unlike in the EU legislation, the Banking Union regime (as set out in the SRMR) would continue to exclude the government stabilisation tool as a last-resort option. At the same time, it severely restricts the provision of public support in insolvency, as the expected need for liquidation aid could imply a positive public interest assessment, so the SRB should apply resolution rather than insolvency. That means that the approach followed to manage the failure of the two Venetian banks in 2017 would no longer be possible.

Under those conditions, the ability of the legislative framework to preserve the stability of the financial system upon the failure of a mid-sized bank would depend exclusively on the effectiveness of the existing resolution tools. In particular, the available external support from the national DIF and the SRF would need to be sufficient – together with MREL – to facilitate a sale-of-business transaction under which deposits and other sensitive liabilities could be assumed by a suitable acquirer. While the new rules alleviating the constraints on both DIF and SRF support make this scenario more likely, it cannot be excluded that, as happened in the United States, those rules alone could not eventually guarantee the success of the sale-of-business resolution strategy.

It would therefore be reasonable to revisit the possibility of introducing additional backstops to ensure the protection of the public interest when significant banks fail. That could take the form of a well-defined 'systemic exception' that would allow for the current constraints on the provision of DIF and/or SRF support to be waived or for some sort of last-recourse government stabilisation tool to be introduced in the resolution framework for the Banking Union.[187] This should of course follow suitably rigorous governance procedures, like in the United States, and require – as in the current provisions in the EU BRRD – a rigorous proof of the financial stability risks at stake and of the inability of the other resolution tools to address them. While strengthening resolution tools would normally make the need to use those exceptional instruments less likely, the absence of escape clauses under the national insolvency regimes nevertheless makes them more relevant.

In any event, a key deficiency to be addressed is the lack of an effective mechanism for the provision of liquidity in resolution. In the case of Credit Suisse, the orderly resolution of the bank crucially required the availability of credit lines from the SNB of up to CHF 200 billion. At present, there is no guarantee in the Banking Union that banks in resolution could satisfy the conditions required to obtain funding from the ECB/Eurosystem. That would most likely require a sort of public indemnity such as that available in other jurisdictions, including in Switzerland, thanks to the emergency legislation that was passed in March 2023. While the SRF could be used to provide liquidity to banks in resolution, its current resources are worth only €80 billion. It is now foreseen that the European Stability Mechanism (ESM) could provide a backstop to the SRF as soon as the ESM Treaty is properly amended. Yet, even with the (still pending) approval of the backstop, the new maximum lending capacity (of around €140 billion) would remain quite restrictive for managing systemic bank failures in the Banking Union.

187 There could be constitutional obstacles to directly introducing the government stabilisation tool within the Banking Union. It would entail either empowering the SRB to require a member state to provide public funds or reverting the responsibility for the specific resolution from the EU level to the national level. Naturally, although this now seems unrealistic in the foreseeable feature, the cleanest way to address those difficulties would be the creation of a fiscal union.

A second area in which the CMDI falls short of providing a full fix for a possible flaw in the current system is the determination of MREL. In principle, the relaxation of the financial cap for DIF support – derived from the adoption of a general depositor preference rule – should increase the chances of implementing sale-of-business strategies for banks with moderate amounts of bail-in-able liabilities. However, the CMDI explicitly prevents the SRB from taking into account "the potential contribution of DGS ['DIF' in our terminology] in resolution when calibrating the level of MREL". The argument used for the proposal is that DIF support cannot be assumed with certainty *ex ante* as it is decided on a case-by-case basis. Frankly, this argument does not look very convincing. While resolution actions will always face substantial uncertainty in many respects, the deployment of DIF support – in accordance with the concrete procedures and limits established in the CMDI itself – when required to facilitate resolution in no way seems to be among the most material contributors to that uncertainty. But, more importantly, as explained in Section 3, both MREL and DIF jointly contribute directly to the probability of success of sale-of-business strategies. Ignoring the complementarity of those two elements would naturally lead to an inaccurate calibration of MREL that could end up making it unable to facilitate effective resolution.

From a more political point of view, larger banks, which would normally follow a preferred resolution strategy of OBBI rather than sale of business, may fear that they will be discriminated against if MREL for sale-of-business banks takes into account expected support from the DIF. They could claim that they would suffer a double penalty, first by contributing more and benefiting less from the DIF and second by having to face larger MREL obligations. However, the consideration – for the sake of further accuracy – of the expected DIF support in the determination of MREL says little about the average MREL for sale-of-business banks. For instance, the SRB could establish a minimum MREL that would apply to sale-of-business banks and introduce an add-on based on the maximum expected support from the DIF. The minimum MREL (which could vary according to certain bank characteristics such as those already reflected in the CMDI) could well address level playing field considerations if this is deemed relevant. Finally, as maximum DIF support depends very much on specific variables such as the proportion of non-DIF-covered deposits, the consideration of that support when establishing MREL not only contributes more effectively to making sale-of-business transactions possible but also provides banks with powerful incentives to adopt more stable funding structures.

Finally, a third area in which the CMDI could not make any progress with respect to the current situation regards the completion of the Banking Union. The enlargement of the scope of the common Banking Union resolution regime – as opposed to the national insolvency regime – strengthens the European framework. Yet, enhancing the role of national deposit insurance funds in bank resolution makes the lack of a European fund particularly problematic. Arguably, the more resolution relies on domestic funds, the less able it is to contribute to the denationalisation of banks' risks and, therefore, to the objectives of the Banking Union. From a more practical point of view, the combination

of European-level decision making (in the SRB) with the deployment of DIF funds obtained and administered at a national level can create dysfunctionalities and frictions, despite the CMDI provisions aiming at ensuring an adequate coordination of actions. More generally, the CMDI can only illustrate how the objective of improving the crisis management framework in conformity with the objectives of the banking union can hardly be fully achieved without a fully functional European deposit insurance scheme.

4.5 Conclusions

Fully in line with the spirit of the famous Churchillian statement, "never let a good crisis go to waste", the international community has traditionally reacted to different banking crises, albeit with various degrees of ambition, by adopting reforms in the relevant regulatory framework. The banking turmoil of the spring of 2023 should be no exception. Although financial stability was ultimately preserved, the events unveiled deficiencies in the bank failure management regime, despite the far-reaching improvements adopted after the global financial crisis.

This chapter has discussed several possible reforms of bank failure management regimes. In general, adjustments to the current set-up should aim at satisfying two basic objectives: first, improving the resolution framework and resolution tools to make them more effective and therefore reduce the need to provide government support to failing banks in order to preserve financial stability; and second, embedding sufficient flexibility and pragmatism in the arrangements as regards the use of different tools and the availability of external funds.

In particular, there are strong reasons to extend resolution planning obligations to all banks whose failure could have adverse effects on the financial system. Crucially, resolution plans should include well-defined requirements for a minimum amount of loss-absorbing liabilities in resolution. Those requirements should be calibrated to directly support the feasibility of the envisaged resolution strategy (such as sale of business or OPBI) and ideally be composed primarily of debt instruments rather than equity as the latter might well largely disappear before resolution is triggered. Moreover, there could be a case to reconsider the treatment of the currently denominated AT1 instruments as Tier-1 regulatory capital, given the existing evidence on the substantial legal and economic difficulties for those instruments to absorb losses before the bank is considered failing or likely to fail.

In addition, as there is no way to foresee all the possible conditions that might occur in a 'resolution weekend' and affect the feasibility of resolution measures, planned resolution strategies should be more an array of options for the deployment of different tools than a rigid playbook. Very importantly, experience shows that it is wise to put in place well-defined procedures for the delivery of extraordinary external support in extreme circumstances.

In the European context, achieving the resolution objectives is particularly complex given the plurinational character of the Banking Union. Undoubtedly, there are technical improvements than can make the bank failure management regime more effective. In particular, the proposals in the CMDI that enlarge the scope for resolution and introduce more effective funding mechanisms for sale-of-business strategies constitute a significant step forward. However, further improvements could be considered. Specifically, there is a clear scope to increase the effectiveness of the MREL calibration for sale-of-business strategies by explicitly recognising its role – together with DIF support – in facilitating the transfer of the core business of the failing bank to a suitable acquirer. Moreover, it seems unavoidable to consider formulas that, with adequate safeguards and restrictions, would allow the provision of further external support for resolution actions when the application of standard tools fail to deliver the resolution objectives. A truly urgent measure would be to establish a fully effective facility for the provision of liquidity to banks under resolution.

In any event, it should be recognised that, while extremely helpful in delivering consistency in crisis management actions, the existence of a common jurisdiction (the SRM/SRB) for the resolution of significant banks must be completed with appropriate common funding arrangements for resolution actions and for the provision of liquidity in resolution. The availability of purely national funds for SRB actions (such as national deposit insurance funds) appears in that regard a suboptimal approach compared to the introduction of a European deposit insurance scheme.

Annex: How much loss absorption for medium-sized banks?

Restoy (2023b) provides a simplified framework for analysing the volume of gone-concern capital that would be required to facilitate sale of business (or P&A transactions). The author considers a failing bank whose assets (net of asset-backed liabilities and other preferred claims) have an accounting value of A. Those assets are funded by deposits (D) and gone-concern capital (K). Part of the deposits are covered (CD) by the DIF, and the rest (ND) are not covered. Therefore, $A = CD + ND + K$.

It is assumed that all deposits and assets would be transferred to the acquirer under the sale-of-business transaction. The acquirer will also receive support from the DIF with a maximum value of MS. The acquirer will assume the deposits only if the sum of the value of the transferred assets and the support received from the DIF exceeds the volume of transferred deposits. Thus, the transaction would only be feasible if:

$$hA - D + MS \geq 0, \quad (1)$$

where h is the value preservation proportion of the accounting value of the assets for the acquirer (or franchise value).

Support from the DIF is capped by the cost (net of recoveries) that the DIF would have to bear to pay out deposits in liquidation. Therefore, that financial cap depends on the hierarchy of liabilities in the applicable liquidation framework. In particular, it depends on whether DIF-covered deposits – and, therefore, DIF claims in liquidation – rank senior to non-covered deposits and thus are super-preferred (like in the European Union) or rank *pari-passu* as in a general depositor preference regime (like in the United States).

Denoting by m ($m < h$) the proportion of the assets' accounting value that would be preserved in piecemeal liquidation, the net cost of paying out deposits in liquidation under super-preference of covered deposits (MS_{EU}) would be:

$$MS_{EU} = \max(0, CD - mA), \quad (2)$$

since the DIF would only suffer costs if the cash obtained from the liquidation of assets is less than the amount required to pay out covered deposits.

In the US case, the net cost for the DIF in liquidation (MS_{US}) would be:

$$MS_{US} = \max(0, CD - m'A), \quad (3)$$

where $m' = mCD/(CD + ND)$.

Since $A = D + K$, using (2) and (3) we can derive expressions for minimum gone-concern capital (K) under the EU and US regimes.

$$\frac{K_{EU}}{D} \geq \min\left(\frac{1}{h-m}\frac{ND}{D}-1, \frac{1-h}{h}\right)$$

$$\frac{K_{US}}{D} \geq \min\left(\frac{1}{h-m'}\frac{ND}{D}-1, \frac{1-h}{h}\right)$$

where $m' = \frac{CD}{D}$.

Therefore, minimum gone-concern capital requirements depend crucially on three parameters which reflect the valuation of the bank's assets by the acquirer as well as the amount of expected DIF support, if any. Those parameters are the franchise value coefficient in sale of business (h), the proportion of covered deposits over total deposits and the value preservation coefficient in liquidation (m). The higher the valuation of assets by the acquirer, the less the assets required to facilitate the transaction and, therefore, the lower the amount of loss-absorbing liabilities that could be left behind for liquidation that the bank needs to hold. In addition, the larger the proportion of non-covered deposits over total deposits, the lower the support from the DIF as a proportion of transferred liabilities and the greater the need to transfer assets to the acquirer. This can only be achieved by holding more loss-absorbing liabilities. Finally, the larger the value preservation in liquidation, the lower the costs for the DIF in liquidation (thus tightening the financial cap) and, therefore, the greater the need to transfer assets (and therefore the amount of loss-absorbing liabilities required).

The difference between K_{EU} and K_{US} is just that under the US regime, the value preservation coefficient in liquidation appears weighted by the proportion of covered deposits over total deposits, since the proceedings from asset sales should be shared by all deposit holders. This makes the costs for the DIF in liquidation larger and, therefore, increases the support that the DIF can provide for sale of business. As a consequence, in relation to the EU regime, the US regime reduces the amount of assets that need to be transferred under sale of business and therefore there is less need for gone-concern capital.

Tables A.1 and A.2 contain two numerical illustrations of the above model to calculate required gone-concern capital. Table A.1 calibrates gone-concern capital for a bank (like SVB or Signature Bank) with a high proportion of non-covered deposits (90%). It also assumes an acquirers' value preservation coefficient (h) of 85%, similar to that applied by the acquirer of SVB (First Citizens Bank) to the assets that were transferred to it in exchange for the deposits assumed.[188] The calibrations are made for different values of the preservation coefficient in liquidation (m) and consider both the liquidation regime in the United States, where both covered and non-covered deposits rank *pari-passu*, and the European Union, where covered deposits are super-preferred over non-covered deposits.

188 FDIC (2023).

TABLE A.1 **REQUIRED GONE-CONCERN RESOURCES: HIGH RATIO OF NON-COVERED DEPOSITS (*ND/D* = 90%)**

	Max DIF support (% *MS/D*)		Gone concern (% *K/D*)	
m	EU	US	EU	US
0.8	-	.1	17.6	16.9
0.7	-	1.9	17.6	15.4
0.6	-	3.2	17.6	13.9

TABLE A.2 **REQUIRED GONE-CONCERN RESOURCES: LOWER RATIO OF NON-COVERED DEPOSITS (*ND/D* = 60%)**

	Max DIF support (% *MS/D*)		Gone concern (% *K/D*)	
m	EU	US	EU	US
0.8	-	3.7	17.6	13.2
0.7	-	10.5	17.6	5.3
0.6	-	15.0	17.6	0

Note: The value preservation coefficient for the acquirer (h) is set at .85 in all simulations.

Results show first that, in the EU regime, there is no scope for DIF support for the transaction as the financial cap would immediately be binding even for high liquidation costs (low *m*). Consequently, the amount of required gone-concern capital that could permit the transfer of sufficient assets to the acquirer is very large – around 18% of total deposits.

In the US case, the lower protection of covered deposits in insolvency eases the financial cap, thereby allowing for some support from the DIF for the transfer transaction. Still, the maximum support would be moderate – between 0.1% and 3.2% of total deposits. As a consequence, while smaller than in the EU case, the amount of required gone-concern capital remains quite high – between 14% and 18% of total deposits.

The above results suggest that there is little scope to perform transfer transactions with high proportions of non-covered deposits. In that situation, the DIF's ability to provide support without breaching the financial cap (i.e., without invoking the systemic exception) is quite limited, and this cannot be compensated by an affordable volume of gone-concern capital requirements.

The situation changes when the ratio of non-covered deposits is lower. Table A.2 shows the results of recalibrating the required gone-concern capital under the same conditions as in Table A.1, except that the ratio of non-covered deposits is now assumed to be 60% (still above the industry average) rather than 90%.

Table A.2 shows that, in the European Union, the outcome remains broadly the same. There is still no scope for DIF support (due to the tight financial constraint) and, therefore, the amount of required gone-concern capital would have to be unrealistically high to make the transaction feasible. However, in the case of the US regime, the lower ratio of non-covered deposits allows the DIF to provide more significant support (between 4% and 15%) depending on the value preservation coefficient in liquidation. For example, under the relatively conservative assumption that in piecemeal liquidation no more than 70% of the accounting value of the assets could be preserved, the required gone-concern capital would need to represent only 5% of total deposits.

CHAPTER 5

Discussions

5.1 DISCUSSION OF CHAPTER 2, "BOOM AND BUST IN UNINSURED BANK DEPOSITS AND WHAT CAN BE DONE ABOUT IT", BY JAVIER SUAREZ

This rich and thought-provoking chapter contains an excellent account of facts and institutional details, very original conjectures on how quantitative easing (QE) and quantitative tightening (QT) might have interacted with other forces and developments to bring the US banking sector to the point where the banking distress of the spring of 2023 became apparent, and an interesting description and discussion of several *ex-post* and *ex-ante* remedies that have been proposed to deal with banks' funding fragility after the lessons learned from these events. Without aiming to summarise what readers can find in the chapter, I will focus my discussion on two main points: first, the intriguing suggested interaction between QE/QT and banks' funding fragility; and, second, the proposal to deal with banks' funding fragility problem by establishing a 'pawnbroker for all seasons' (PFAS).

Did QE and QT contribute to the distress suffered by US banks last spring?

My first set of comments is about the contribution of QE and QT to the distress suffered by US banks in the spring of 2023. The figures in the Chapter 1 and similar figures and empirical evidence in related work with co-authors suggest that variations in reserves tend to be associated with same sign variations in demandable deposits (especially uninsured non-time deposits), while they appear associated with opposite sign variations in time deposits (and especially uninsured time deposits).[189] Thus, taking the documented associations as causal, one might attribute to the QE–QT cycle observed in recent years (some of) the boom-bust dynamics of uninsured deposits in the United States.

However, there were other important developments occurring in parallel, including the COVID-19 pandemic and the evolution of nominal interest rates, whose contribution to the dynamics of bank deposits might have been equally important and can be very hard to tell apart from that of the evolution of QE and QT indicators. For instance, under prevailing deposit remunerations practices in the banking industry (with markdowns relative to reference market rates and a potentially binding effective lower bound on

189 Acharya et al. (2023a).

deposit rates), the long period of near zero interest rates might in itself explain a gradual replacement of time deposits and non-deposit liquid means of saving (such as money market fund shares) with demand deposits. And, symmetrically, the recent return to positive nominal interest rates might explain the reversal of these substitution patterns.

In any case, as an applied theorist in the field of banking, I found the potential connection between the increase in reserves and the increase in bank deposits, and the hypothesis that the banking system might become 'liquidity-dependent' and more fragile after a sustained period of QE (especially when QE is reversed), most intriguing. Reading recent work on the topic led me to formulate my own explanation about how QE could expand deposits and eventually the amount of maturity transformation (and perhaps financial fragility) in an economy with financial frictions.[190] In my explanation, I distinguish three key classes of agents: a central bank, banks (or 'financial intermediaries' more generally) and a non-financial private sector (henceforth, just 'private sector'). There is also a government with a given supply of government bonds and a rest of the world (RoW), which acts as the deep-pocketed sector in the overall economy and supports some of the net inflows or outflows of funds experienced in the aggregate by the domestic sectors.

A central friction in my explanation is that both financial intermediaries and the private sector operate with some scarce amount of stable funding (think of it as a combination of equity and long-term debt which are given in the short term) and under a regulatory or market-imposed 'net stable funding requirement' whereby each unit of long-term assets in their balance sheet needs to be supported with a minimal proportion of stable funds. The combination of these two elements limits the capacity of financial intermediaries and the private sector to undertake maturity transformation, which, for concreteness, takes the form of investing in long-term government bonds or loans for the financial intermediaries, and long-term government bonds or real assets for the private sector.

When the central bank performs QE in this economy, it buys government bonds from financial intermediaries in exchange for reserves. The bonds may come from the holdings of the financial intermediaries, which, on impact, would see their asset composition shifted towards more liquid (or shorter maturity) assets. Alternatively, the acquired bonds may come from the holdings of the private sector, which replaces them with deposits issued by the banks. Since deposits are a short-term asset, the asset composition of the private sector would also shift towards more liquid assets in this case (while, in the case of the financial intermediaries the part of the increase in reserves matched with the increase in deposits of the private sector would not imply a net increase in their liquidity).

Assuming that the aforementioned stable funding constraints are binding for (a significant part of) financial intermediaries and the private sector, the fact that the central bank absorbs some of the maturity transformation on its own balance sheet (by financing government bonds with reserves) implies that financial intermediaries and

190 Acharya and Rajan (2022).

the private sector have free capacity to invest in other long-term assets. Specifically, the private sector can use the stable funding freed by QE to expand its investment in real assets using bank loans, while financial intermediaries can use their liberated stable funding to expand the provision of bank loans (for example, by attracting extra funding from the RoW in the form of uninsured deposits or other short-term liabilities). Note that according to this narrative, QE would provide stimulus to the economy because it would increase the real investment undertaken by the private sector. And such a stimulus would be *ex-ante* welfare-improving insofar as the properly risk-adjusted net present value of such an investment is positive.

But even if QE were desirable in these terms, it would simultaneously leave the economy exposed to greater maturity transformation risks. Specifically, if an inflationary shock arrives and the central bank decides to increase interest rates and/or start QT, several effects can occur. Due the increase in interest rates, the central bank would suffer (greater) capital losses (than if not previously undertaking QE). The financial intermediaries and/or the private sector would suffer (additional) capital losses depending on how the loans financing the real investment allocate interest rate risk across both sectors. However, financial intermediaries and/or the private sector would avoid the capital losses that they would have otherwise suffered on the government bonds sold to the central bank during the QE phase. So, on net, it is unclear whether sectors other than the central bank would suffer (additional) capital losses because of the previous QE policy.

How about the effects of the reversal of QE? As QT implies incorporating government bonds back into the portfolios of financial intermediaries and the private sector, their price may suffer additional downward pressure, spreading extra losses among holders of these bonds. At the same time, the expansion of maturity transformation capacity of the economy occurring during the QE phase would be reversed. In this sense, the economy might suffer a 'stable funding squeeze' unless financial intermediaries and the private sector accumulate additional stable funding throughout the process (for example, by retaining earnings accumulated during the period of stimulus or, in the case of some banks, some of the profits made thanks to the rise in interest rates in the contractionary phase).

The stable funding squeeze, if it occurs, might imply having to place – potentially at a discount – government bonds (or some real assets and or loans) among investors in the RoW, who, with deep pockets in this story, would be the final providers of liquidity when the central bank retrenches from its maturity transformation/provision of liquidity function. For specific financial intermediaries, the asset valuation implications of the stable funding squeeze could lead to solvency problems; fear of solvency problems can lead to runs among depositors, aggravating the situation. Over the medium term, unless it is offset by the accumulation of new stable funding capacity, QT could then negatively affect the flows of new investment and new loans (as the balance sheets of financial intermediaries and the private sector return to their pre-QE situation).

These and similarly intriguing potential effects of QE and QT leave space for careful theoretical and empirical analysis in the next few years. The potential implications for financial stability are fascinating, but I have the impression that it might still be too early to conclude, as the version of the chapter that I have read does, that we should revisit "the scale, scope, duration and desirability of QE", which entails an apparent negative assessment overall of the impact of QE and QT on financial stability.

Pawnbroker for all seasons

I appreciate the intellectual attractiveness of the proposal to establish a PFAS. However, there are aspects of the description of the proposal that leave me with the impression that it sounds better than it would actually be. The devil is in the details. The promise of making deposit insurance unnecessary and simplifying accompanying regulation and supervision comes in exchange for imposing that all 'runnable' liabilities must be properly covered with eligible collateral subject to 'stress times' haircuts. What is a runnable liability? Are all short-term liabilities equally runnable? If not, are we rediscovering the 'run-off rates' that inform the weights with which liabilities currently enter the denominator of the liquidity coverage ratio of Basel III? If yes, doesn't this proposal ignore the great differences in effective runnability that exist across (uninsured) deposits depending on the demographics of their holders, the market power of their banks, and the existence of (and rates offered by) alternative short-term savings means?

Moreover, which assets would be eligible as collateral? How are 'stress times' haircuts set? If the criteria on collateral are sufficiently strict, the proposal will be very close to narrow banking, except because it would not explicitly call for separating the (internally ring-fenced) narrow bank from the "residual bank". The residual bank would consist of the non-eligible assets (plus the haircut part of the eligible ones) and would have to be fully funded with stable liabilities. Maturity transformation would cease to exist.

My impression is that the proponents of PFAS have a softer version in mind. In this case, the PFAS works as a net stable funding requirement (NSFR) calibrated and supervised by the lender of last resort, that is, the central bank. It would be like an NSFR with asset weights equal to the stress scenario haircuts set by the central bank. Unless these haircuts are fixed once and for all (which might not be right from the central bank's risk management perspective), this is an NSFR with added regulatory uncertainty and discretion, and with governance and enforcement shifted from the regulators and supervisors to the central bank.

Operating this system of haircuts could put considerable pressure on the central bank, which might be tempted to operate the haircuts countercyclically (making them tighter in booms and softer in busts). What might be good for on-the-spot financial stability might not be so from a moral hazard perspective or to preserve the financial independence of the central bank and its credibility in pursuing price stability.

In addition, the arrangement would have a flavour of central planning regarding the determination of which assets are liquid and which are not, and may interfere with asset trading and pricing. Secondary market prices for many assets might depend on central banks haircuts (or their expectation) even more than they already do. And many assets would be effectively encumbered in support of banks' runnable liabilities, potentially adding difficulty to the pricing and placement of banks' stable liabilities (e.g., unsecured long-term debt) among investors.

In sum, I see potential shortcomings of the PFAS proposal relative to an alternative in which an NSFR is imposed on all banks (as in the European Union) and the central bank operates its collateral framework independently.

Having said that, I detect growing interest among authorities involved in liquidity provision in considering the establishment of some form of lending of last resort arrangement that operates with pre-positioned collateral (instead of collateral whose quality and applicable haircuts have to be assessed with urgency once a crisis starts). I do not see such an arrangement replacing deposit insurance or any existing regulation. So, if adopted, it would be a facility additive to most of what we already have. Perhaps it could be thought as a means for banks to voluntary increase their effective high quality liquid assets (HQLA). However, the prepositioned collateral that provides HQLA should have its 'illiquid' (haircut) portion fully covered with stable funding. In a world of scarce or costly stable funding, banks would play regulatory arbitrage and opt for pre-positioning or not depending on how the haircuts of the facility compare with the illiquidity weights of the NSFR.

Summing up

This is an excellent chapter whose reading I strongly recommend. Let me reiterate the bottom line of my two main comments. I support the idea that further research on the interaction between QE/QT and banks' funding fragility is needed, with no presumption that QE and QT may have made negative contributions to financial stability. I also call for caution in assessing proposals such that of introducing a PFAS: they look like radical innovations with appealing features at first sight, but may be less novel, more cumbersome, and potentially more problematic than they seem.

5.2 DISCUSSION OF CHAPTER 2, "BOOM AND BUST IN UNINSURED BANK DEPOSITS AND WHAT CAN BE DONE ABOUT IT", BY CORNELIA HOLTHAUSEN

The banking sector turmoil in March 2023 raised a number of interesting policy questions. One is related to the interaction between monetary policy and financial stability; another concerns lessons for the proper regulation and supervision of banks. Chapter 2 tackles both of these.

The chapter summarises recent research showing that some fragilities of the banking sector that were exposed during the turmoil were a direct consequence of the monetary policy employed in the preceding years, namely, the unprecedented scale of quantitative easing (QE). According to this research, the high share of uninsured depositors in US mid-sized banks was a result of that policy, as the excess liquidity generated by the QE purchases was bound to show up in bank balance sheets, in particular in the form of uninsured deposits.

Subsequently, several possible changes to the regulatory and supervisory setup are discussed, ranging from possible modifications of the deposit insurance framework, to changes to the modalities to banks' central bank access, and finally to the stress testing framework. Some of these proposals have been mentioned notably by US policymakers, but they are also under discussion in international regulatory forums.

Chapter's 2 analysis is focused on the specific situation in the United States. In the following, I will analyse the various issues from a European perspective, studying whether the boom-and-bust cycle documented in the chapter applies in the same extent to euro area banks as it does to US banks, and then analysing some of the considered policy options.

The link between QE and uninsured deposits

When a central bank purchases assets from institutions within its jurisdictions, it creates liquidity within its banking sector in the form of excess reserves held with the central bank. The excess liquidity is only initially linked to the institution that sold the assets, but will flow across the banking system and may end up in other institutions' accounts, as a result of customer transactions. The strong link between the amount of excess liquidity in the system and the level of corporate (uninsured) deposits held in banks has been pointed out by Acharya and Rajan (2022).

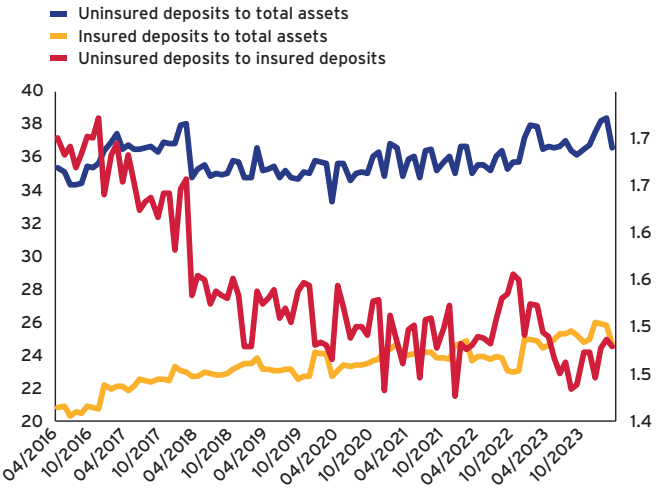
These claims are further documented in Chapter 2 with empirical data which make a link between the growth of uninsured deposits and the QE amounts, using evidence from the United States, in particular for small US banks.

Although the chapter argues that the situation is similar in the euro area, data from the ECB suggest that this is only so to a limited extent. In the euro area, the ratio of uninsured deposits to total assets has increased rather modestly, by around 2 percentage points.

Importantly, when looking at uninsured deposits relative to insured deposits, the growth of both uninsured and insured deposits has been proportionate. Hence, while uninsured deposits may play a somewhat larger role in euro area banks' balance sheets, banks also have gained larger access to stable funding such as insured deposits (Figure 1).

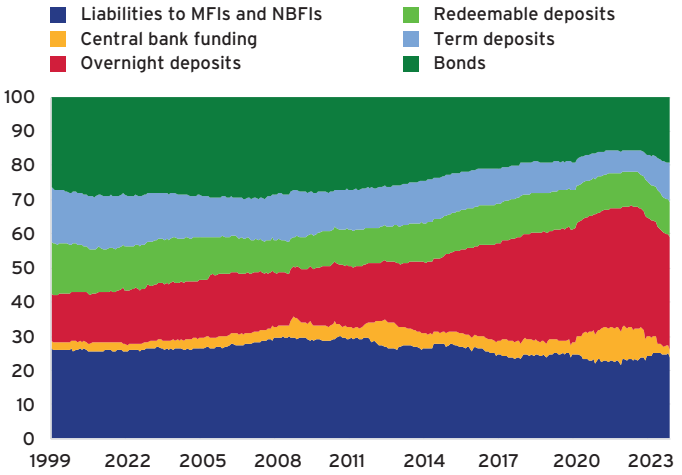
Although Angeloni et al. (forthcoming) find that in the euro area transactional deposits increased in times of QE, the conclusion that the increase in transactional deposits is associated with a higher share of uninsured deposits may not be justified since transactional (or overnight) deposits can be either insured or uninsured, depending on the size of the deposit. Indeed, overnight deposits have gained importance in banks' funding composition during the low-for-long interest rate environment (Figure 2). However, the share of less stable and uninsured funding from other banks and non-bank financial institutions has not become larger. This is because the absolute increase in overnight deposits was the strongest for household deposits, which are likely to be insured.

FIGURE 1 **COMPOSITION OF EURO AREA SIGNIFICANT INSTITUTIONS DEPOSITS, BY INSURANCE STATUS (PERCENTAGE, RATIO)**



Sources: ECB (Supervisory data) and ECB calculations.

FIGURE 2 **COMPOSITION OF EURO AREA BANK FUNDING STRUCTURE (PERCENTAGE, RATIO)**



Sources: ECB (BSI) and ECB calculations

Overall, ECB data suggest that, if anything, the relationship between quantitative easing and uninsured deposits is much weaker in the euro area. Bond purchases and a concomitant increase in uninsured deposits seem to play a smaller role than might be the case in the United States. Instead, a more important driver for the increase of overnight deposits seems to have been the low interest rates on term deposits, which incentivised an overall shift from term deposits to more convenient overnight deposits.

Deposit insurance

Several versions of modified deposit insurance schemes are discussed in the chapter.[191] I very much agree with the authors that a 100% coverage would be undesirable because of the moral hazard it would create. Similarly, the option of a 'minimum balance at risk' seems undesirable, as temporary constraints on withdrawing liquidity would make deposits less cash-like but more equity-like, and thereby undermine the confidence in the system.

More interestingly, one option aims to maintain limited deposit insurance but at the same time create mechanisms to abolish deposit brokering by introducing a common, secure registry of insured depositors. Indeed, in the United States, a single depositor can hold deposits even within the same bank across different deposit types to increase DGS coverage, thereby lowering incentives for proper risk management. In Europe, in contrast, there are only limited ways to increase DGS coverage within a single bank, hence the proposal's primary effect in Europe would be to reduce incentives to distribute deposits across banks to stay below the coverage threshold.

Finally, the authors conclude that the best option among the discussed might be the one of a targeted increase of deposit insurance coverage, notably for transaction accounts of SMEs.

In Europe, possible increases in the coverage of deposits are not currently discussed. A recent report by the European Banking Authority (EBA)[192] argues that increasing coverage would be expensive, while only providing limited value added for financial stability. Instead, European policy discussions aim at being able to better protect uninsured deposits, when needed from a financial stability perspective, by facilitating a sale of the failed bank in resolution. To make this viable, gone-concern loss-absorbing requirements (MREL) are already applied more widely than in other jurisdictions, thereby improving the protection of uninsured deposits.

191 Based on Cecchetti et al. (2023).
192 EBA (2023).

Prepositioned collateral

The second set of policy proposals are centred around the idea that banks should be required to preposition collateral at the central bank, to be able, in real time, to access central bank liquidity facilities and thereby reduce the incentives for a depositor run as well as enable the central bank to act as the lender of last resort for institutions that are solvent but face a liquidity problem due to a run. The options studied are the 'pawnbroker for all seasons' (PFAS) proposal by King (2016), which would require that all short-term runnable liabilities were fully backed by central bank reserves, and which has been taken up in modified versions also by the G30 group (2024). The second option is the proposal by Nelson (2023) for collateral pre-positioning in the form of Committed Liquidity Facilities, where the pledged collateral would count as high-quality liquid assets for the purpose of the LCR. The third is the similar Federal Liquidity Options suggested by Tuckman (2012), who proposed that banks should be able to "purchase options on secured borrowing from the central bank at predetermined haircuts and rates".

The advantages of the PFAS proposal, according to the authors, are that it reduces the likelihood of runs, improves the timeliness of supervision, and links solvency and liquidity risks. Other benefits relate to rendering deposit insurance unnecessary and significantly increasing bank's equity and long-term debt. In addition, it would disincentivise bank lending against "unusual collateral" (due to high haircuts) and the frequent verification of the collateralisation requirement would induce "real-time supervision of banks".

A main concern regarding the PFAS proposal, also considered by the authors, relates to the complexity of appropriately setting haircuts on very different types of assets. These haircuts would be calibrated for stress times but would also apply during normal times. Setting haircuts too steep would distort economic and credit outcomes in the economy, while not being conservative with haircuts may expose the central bank to counterparty losses. Striking the right balance would be a challenge.

In addition, the PFAS proposal would reorient banks from primarily private liquidity sources towards the central bank. The footprint of the central bank, finally in decline since the start of the quantitative tightening cycle, would remain large, and the role of funding markets for disciplining banks' risk management would be downgraded.

Finally, it is unclear to what extent pre-positioning would prevent bank runs, since unsecured and uninsured creditors may still run when they become concerned about the solvency of a bank and possible losses. This would especially be the case if the pre-positioning would only apply to a subset of (runnable) liabilities. And if a run was not prevented, pre-positioning would increase payouts to running depositors at the expense of those that do not run, or of the deposit guarantee scheme. Thereby there seems to be trade-off between decreasing the likelihood of a run and maintaining a high gone-concern value of the bank in question.

The foremost aim of the PFAS proposals seems to be to address the stigma associated with the Discount Window borrowing at the Federal Reserve. Following heavy and persistent usage of the window in the 1980s, its usage was discouraged, and effectively ended with it being stigmatised. In Europe, instead, stigma is not a large concern: in the euro area, a large number of banks tend to obtain liquidity through the weekly Main Refinancing Operations, and all of these banks are automatically qualified to use the Marginal Lending Facility (MLF), the closest equivalent to the Discount Window. The same set of collateral is eligible for both facilities and is effectively pooled and can thus be easily used for the MLF. It seems that by requiring all banks in the United States to set up an account with the Federal Reserve, and to regularly require testing, could be a first step in addressing the issue of stigma.

Stress testing

The authors take a critical view of the role of stress testing for US banks by pointing, first, to the limited coverage of banks involved in regular stress testing activities (23 banks in the 2023 annual exercise). By contrast in Europe an overall significantly larger population of banks is scrutinised every two years by the ECB in collaboration with the EBA.[193]

A second point of critique concerns the scenarios used. The authors consider the applied scenarios as being too mild and as failing to reflect a stagflation narrative. In the Comprehensive Capital and Analysis Review scenario of the Federal Reserve, the rising unemployment rate and the rapid decline in aggregate demand for goods and services significantly reduced inflationary pressures and brought interest rates down to levels close to zero. Instead, the EBA scenario was characterised by soaring and persistently high inflation coupled with highly positive market rates. Moreover, the EBA methodology considerably mitigates the possibly beneficial implications on banks' projected net-interest income of higher nominal rates, a defining characteristic of stagflation scenarios.

Finally, in Chapter 2, the authors make a point in favour of 'market stress tests' as compared to regulatory ones. I would argue that market-based and supervisory stress tests are complementary, as they provide different perspectives on the state and stability of the financial system. Supervisory stress tests assess both the impact of a stress scenario on bank's capital and other liability positions as well as the quality and evolution of banks' assets. Substantial empirical evidence shows that their findings matter for banks' behaviour and their intermediation capacity.

193 In 2023, 57 euro area banks were involved in the EBA stress test and 41 banks in the parallel SSM stress test.

Market-based measures, such as price-to-book ratios, reflect investors' view on the bank's future profitability and therefore on the market value of its assets net of liabilities. However, market valuations can be subject to distortions (such as herding, strong procyclicality and bouts of market sentiment) and can thus deviate from fundamentals. Nevertheless, supervisory stress test results in conjunction with market-based measures would help supervisors form a holistic view of the stability of banks and of the industry and strengthen each other's findings.

Conclusion

This excellent chapter brings together a wealth of studies in relation to the fall-out of the mid-sized US banks in 2023, pointing out both possible causes as well as implications for the regulatory and supervisory landscape. While the analysis is largely US-centred and perhaps less applicable in the European context given differences in both the regulatory and supervisory framework, the analysis is interesting from a global perspective and can guide policy decisions going forward. The realisation that even mid-sized banks are systemically relevant was perhaps the most surprising lesson from the 2023 events. Regulatory proposals will have to strike a fine balance between the desires to avoid bank runs and the associated losses and to avoid moral hazard and an overly complex regulatory framework.

5.3 DISCUSSION OF CHAPTER 3, "PRUDENTIAL REGULATION, ACCOUNTING AND SUPERVISION", BY GIOVANNI DELL'ARICCIA[194]

I enjoyed reading this insightful chapter. It is a clear dive into the key role accounting standards play in prudential regulation and supervision – a topic mostly neglected by the academic literature on banking and financial stability. The chapter examines the effectiveness of the Basel III regulatory apparatus through the lenses of the recent episodes of financial turmoil in the United States and Switzerland. Perhaps generously, it gives a passing grade to the post-global-financial-crisis regulatory reforms. Instead, it argues convincingly that weaknesses in banking supervision played a critical role in these episodes. It blames an excessively loose application of Basel III standards, primarily due to prudential filters, rather than the regulatory design itself. It then provides concrete options for how to improve the system through some redesign and more stringent application of existing rules. But, maybe intentionally, it stops short of making explicit policy recommendations or ranking the possible policy options.

I am not an accounting expert, and the chapter covers too much ground for anybody to provide here a fair point-by-point discussion of the listed proposals. Instead, I will focus on three high-level issues, heavily relying on work conducted at the IMF over the past few years (the disclaimer still applies that the views in this discussion are my own and do

194 The views in this discussion are those of the author and do not necessarily represent those of the IMF, its Executive Board, or IMF management.

not necessarily represent those of the IMF, its Executive Board, or Management). First, I will provide complementary evidence based on a cross-section of IMF's Financial Sector Assessment Program reports that, while countries have made considerable progress since the global financial crisis in strengthening their financial systems, key weaknesses continue to hinder the will and ability of supervisors to act. Second, considering the US authorities' response to the SVB episode, I will discuss the difficulties in determining *ex ante* what a systemic bank/event looks like and the associated challenges for the principle of proportional application of prudential rules. Finally, I will touch on the potential role for higher capital requirements, an issue that is a bit neglected in the chapter.

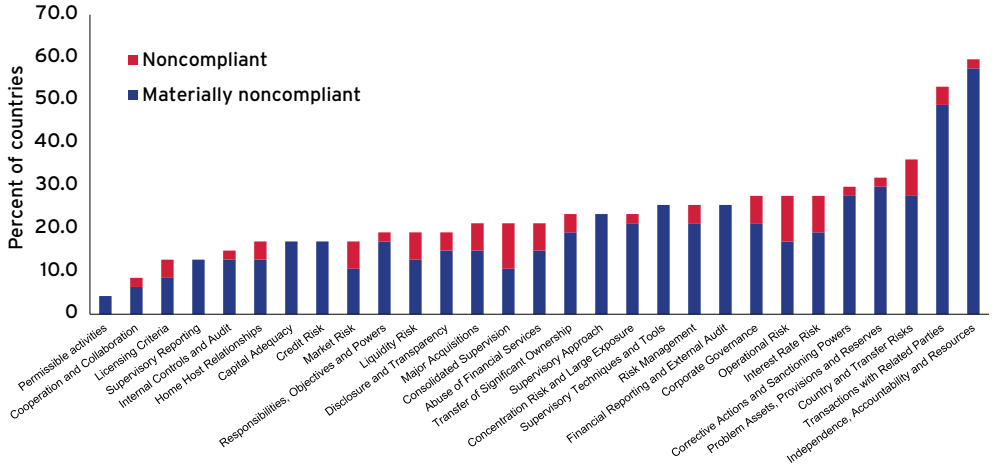
Weaknesses in supervisory frameworks

In the wake of the global financial crisis, there was widespread recognition that to safeguard financial stability, strengthened bank regulation had to go hand-in-hand with improved and intensified supervisory action. The IMF defined "good" supervision as "intrusive, sceptical, proactive, comprehensive, adaptive, and conclusive". Further, supervisors had to have both the ability and the will to act.[195] Good supervision is not just about good supervisors.[196] For supervisors to have the ability and will to act, supervisory frameworks must provide them with the necessary powers and incentive structure to act early and effectively. Elements of such frameworks include the appropriate legal authority and protection, adequate resources, clear mandates, accountability, operational independence, and effective working relationships with other authorities. These characteristics are reflected in the Basel Core Principles for Effective Bank Supervision updated in April 2024.

However, as discussed in Section 4 of the chapter and recognised in the relevant authorities' *ex-post* self-assessments, the events in 2023 cast doubts on both the ability and the will to act of the supervisors involved. Unfortunately, this reflects uneven progress with post-global financial crisis reforms. Most countries have made considerable progress in implementing tighter capital and liquidity regulation. In contrast, several of the elements identified as essential to guarantee effective supervision are lacking in many jurisdictions. Dordevic at al. (2021) draw on the BCP assessments conducted by the IMF in the context of the Financial Sector Assessment Program to provide a snapshot of the limitations in compliance with the Basel Core Principles across countries. Their textual analysis (summarised in Figure 1) reveals that weaknesses in supervisory frameworks remain common, with about 60% of evaluations finding lack of compliance with CP2 (Independence, Accountability, Resourcing, and Legal Protection of Supervisors) and over 30% finding issues with CP11 (Corrective Actions and Sanctioning Powers).

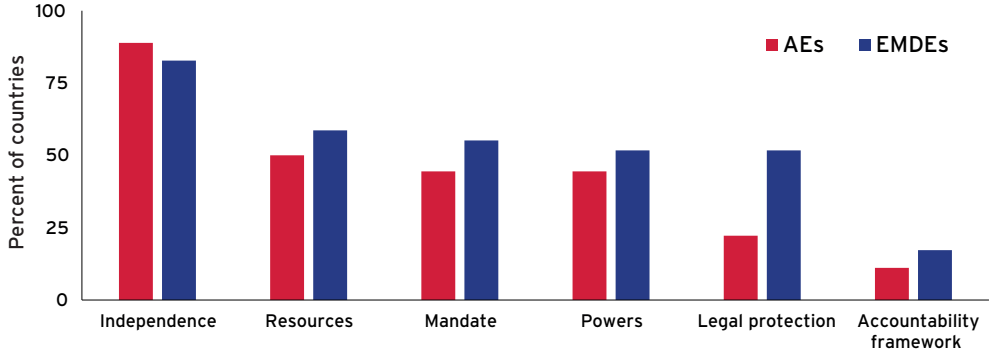
195 Viñals et al. (2010).
196 As noted in Adrian et al. (2023).

FIGURE 1 **LIMITATION IN COMPLIANCE WITH BCP**



Source: Dordevic et al. (2021).

FIGURE 2 **SOURCES OF SUPERVISORY WEAKNESSES**



Source: Adrian et al. (2023).

Focusing on CP2, Dordevic et al. (2021) identified lack of operational independence and a clear mandate, limited resources, and insufficient legal powers as the most common challenges (Figure 2). Insufficient independence often reflected insufficiently transparent and well-governed appointment and dismissal processes. It also stemmed from excessive government influence on decision making through representation in governing bodies, requirements of political approval or review, and lack of budgetary autonomy. And staffing issues (both recruiting and developing personnel) sometimes linked to the lack of budgetary autonomy represented a challenge in many countries. The analysis also found common gaps in legal powers, including the power to intervene or impose remedial actions before minimum requirements were breached. The policy recommendations in the chapter calling for enhanced early-action intervention by broadening the set of circumstances under which supervisors are allowed to act and providing them with appropriate intervention tools are entirely consistent with these findings.

Proportionality and systemic risk

The practice of tailoring regulatory requirements and allocating supervisory resources based on the size, complexity, and risk profile of banks has limits. The idea behind this proportionality is to prevent an undue burden on smaller/simpler institutions while focusing supervisory resources on banks of systemic importance. This is essential given the presence of heterogeneous institutions in most financial systems. However, proportional regulation should not mean less prudent regulation. Moreover, defining what constitutes a small, less complex and, critically, non-systemic institution may be challenging. While balance sheet metrics/thresholds can easily establish whether an institution may pose a systemic risk, they are not particularly useful in ruling out that it will. Determining appropriate thresholds and criteria for applying proportional regulation must go beyond the size of balance sheets and evolve over time reflecting the understanding of the risks posed by different institutions. The failure of SVB and the exceptional measures US authorities had to undertake to protect the rest of the system from its potential spillovers are a stark reminder that, when it comes to financial contagion, size is not the only thing that matters.

Adrian et al. (2023) list three challenges for regulatory proportionality. First, small banks may have business models that require increased supervisory attention. In the case of SVB, excessive reliance on wholesale deposits and client concentration in their loan portfolios made the bank particularly vulnerable to industry-specific shocks and interest rate changes. Weaknesses in governance and internal controls are also more likely in smaller banks.

Second, simplified regulatory requirements and limited supervisory resources often entail less frequent and less intrusive inspections of smaller banks. Consequently, supervisors come to rely on off-site monitoring and more data-driven standardised processes. This may not work when institutions are exposed to idiosyncratic risks or have specific vulnerabilities because of their business model. So sufficient scrutiny should be applied to map vulnerabilities and establish watch lists that do not rely entirely on balance sheet size.

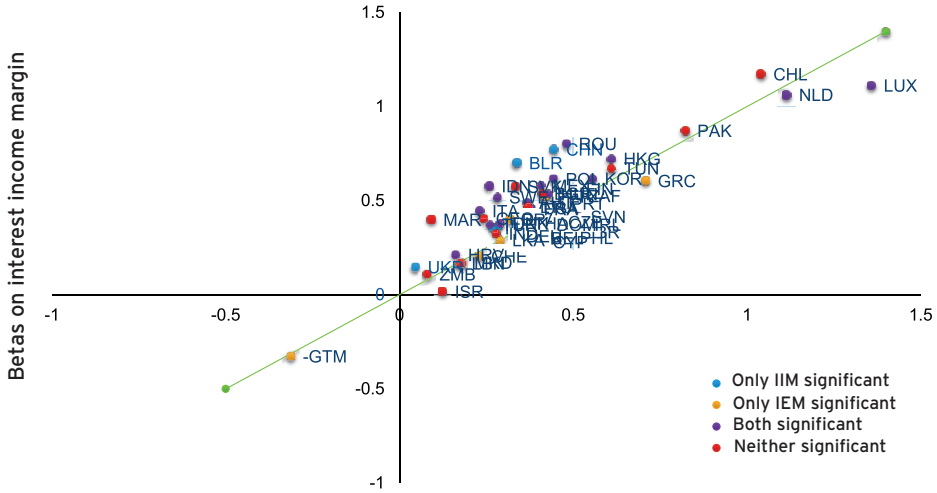
Third and, most critically, the failure of a relatively small bank (or banks) may undermine confidence in an entire (or a large part of) banking system. The public lacks granular visibility into bank portfolios and may infer vulnerabilities based on (perceived) similarities in business models. In periods of heightened uncertainty, uninsured deposits turn from information-insensitive into information-sensitive assets, spurring contagion from the 'patient zero' bank. The result can threaten the entire system through runs from smaller institutions into 'too big too fail' ones, or out of several smaller banks that are systemic as a group, or out of the banking system altogether. An additional challenge is

that it is typically difficult to establish *ex ante* what institutions may lead to information-based contagion when in trouble. As Adrian et al. (2023) put it: "banks that are not systemic in good times may become systemic during a crisis"; hence the need for robust regulation and supervision of smaller banks.

Capital regulation

The chapter discusses at length how capital regulation could be strengthened to better protect banking systems from risks associated with interest rate shocks. Currently, under Basel III, interest rate risk in the banking book (IRRBB) falls under Pillar 2. This means that exposure to interest rate movements does not entail 'automatic' requirements. Rather, based on periodic reviews, supervisors may impose tighter ad-hoc requirements. This approach makes sense from an economic and risk management standpoint given the heterogeneity of banks' exposure to interest rate risk. Indeed, in forthcoming research, Bergant et al. (2024) find that, for most banking systems, net interest margins are on average insensitive to changes in the policy rate, implying that banks are generally hedged against this type of risk (Figure 3), and that vulnerabilities likely reside with a few outliers; although, others have pointed to more widespread vulnerabilities.[197]

FIGURE 3 **INTEREST RATE MARGINS AND POLICY RATES**



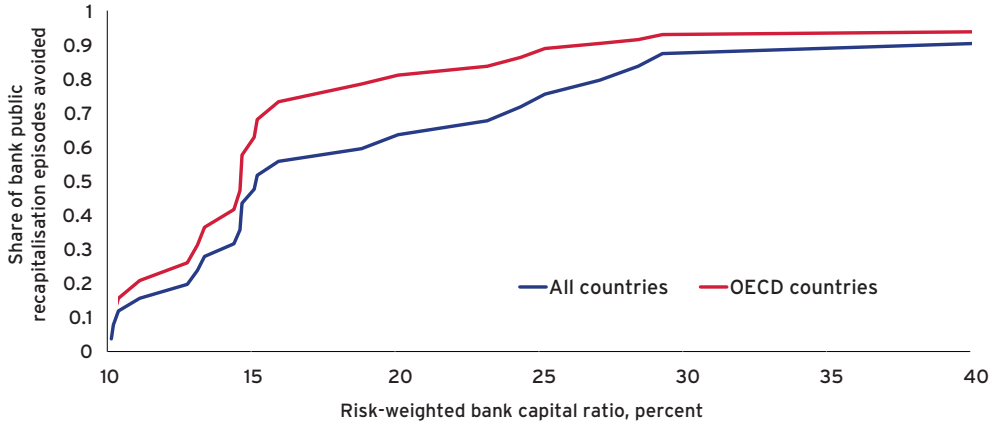
However, an approach that leaves interest-rate risk requirements entirely to the judgement of supervisors exposes systems to the weaknesses discussed earlier here. The chapter attempts to navigate the resulting trade-offs by proposing a stricter application of Pillar 2 (but this is more easily said than done) or by introducing a 'minimal' Pillar 1 requirement for IRRBB while leaving additional capital add-ons under Pillar 2. These

197 Jiang et al. (2023a).

are both sensible proposals. But at the cost of being provocative, I would like to argue that focusing on the risks to capital stemming from interest rate changes may amount to focusing on the latest shiny object. The next shock may come from a different source. Instead, there could be an argument for revisiting the discussion on whether the overall level of capital requirements is the appropriate one.

The financial turmoil of 2023 did not lead to a systemic crisis. But it did force authorities in both the United States and Switzerland to undertake the kind of exceptional actions the post-global financial crisis reforms pledged to eliminate the need for. After the failures of SVB and Credit Suisse, the policy discussion (including in this chapter) has focused primarily on Basel III implementation and the quality of supervision. While this is appropriate given the way distress evolved at both institutions, this is also an opportunity to reconsider the calibration of capital requirements. Evidence since the global financial crisis suggests that the increased requirements at that time did not cause the massive reallocation of activities to unregulated entities feared by some (the portion of assets intermediated by banks versus non-bank financial institutions in the United States has remained broadly constant). In Dagher et al. (2016), we explored the relationship between capital levels and banking crises based on historical data (Figure 4) and found that bank capital in the range of 15–23% of risk-weighted assets would have absorbed bank losses in most past banking crises in advanced economies. Current capital ratios are close to the lower end of that range. It might be time to reconsider.

FIGURE 4 **BANK CAPITAL AND BANKING CRISES**



5.4 DISCUSSION OF CHAPTER 3, "PRUDENTIAL REGULATION, ACCOUNTING AND SUPERVISION", BY MARGARITA DELGADO

The 2023 banking turmoil provided the first testing ground for assessing the impact on the financial system of the reforms undertaken by the Basel Committee in the wake of the global financial crisis. The COVID-19 crisis likewise served as a test for the financial system and the global economy as a whole. However, in that instance, both the underlying causes and the exceptional ad hoc measures taken across various domains can be considered distorting factors that complicate any specific and isolated analysis of the major regulatory initiatives implemented under the Basel framework.

Chapter 3 examines the impact that the 2023 turmoil had on accounting standards, prudential regulation and supervision.

First, it is important to highlight that accounting aspects typically fall outside the scope of supervisory review. Despite this, certain interrelationships mean that they must be considered when assessing a bank's viability from a prudential perspective. It is essential to recognise that accounting serves as the starting point for calculating regulatory capital.

One area of debate prompted by the 2023 turmoil precisely concerns the accounting treatment of portfolios, especially held-to-maturity (HTM) portfolios, since potential gains or losses are not reflected in books and, consequently, nor are they reflected in regulatory capital.

While we lack supervisory competencies in accounting matters, it is important for supervisors to understand the reasoning behind each accounting approach and to be aware of the implications and risks that accounting decisions can have in the prudential sphere.

The market turmoil that started in March 2023 highlighted the importance of prudent liquidity and asset and liability management (ALM) practices at banks.

Embedded losses on fixed-income assets – debt securities in particular – caused by higher interest rates were an important driver (but not the root cause) of the failure of several banks during the March 2023 turmoil. Banks cannot classify all of their debt securities at fair value due to the effects that the artificial volatility would have on their value. The interrelationships between accounting, interest rates and liquidity must all be taken into account, and all this is related to asset and liability management.

On the one hand, one could argue that:

1. financial institutions hold HTM instruments to partially offset interest rate risk through natural hedging; and

2. accounting at amortised cost helps to avoid unnecessary volatility in prudential capital and the P&L account.

Both make economic and management sense. Prohibiting their use would mean limiting one of the tools available to banks for managing their risks.

On the other hand, in many jurisdictions embedded gains and losses on HTM securities are only indirectly captured in prudential requirements through ICAAP or supervisory processes (SREP).

Additionally, one could argue that HTM is more fit for purpose for certain business models, for instance to hedge core deposits.

The key is to assess how executives manage the risks (asset and liabilities concentration, unsecured deposits, liquidity indicators, etc.) and how supervisors oversee banks and impose timely remedial actions as necessary.

There might be areas where we would want to review and perhaps fine-tune the calibration of some of our requirements, but in general I think that the overall framework has shown itself to be robust. In this context, supervisors need to review how banks are managing their IRRBB and how sound and reliable their funding plans are. Supervisory activities review banks' ALM governance and strategies and assess the adequacy of the assumptions underpinning some of the behavioural models.

IRRBB and liquidity risk are highly correlated. Within the SSM, we focused on IRRBB towards the end of 2021. During 2022 we ran a targeted review of interest rate and credit spread risks, focusing on the issue of the economic value of equity (EVE).

Supervisory attention needs to be paid to some specific business models that have extreme features, cases in point being SVB and Signature Bank. In such cases, supervisory tools need to be used to deal with the specific situation rather than recalibrating international standards to fit a very extreme business model.

However, in my opinion, there is also the issue of the accessibility of information. Although the fair value of financial instruments not valued at market value is currently reported in the notes to annual accounts, that information might not be sufficiently straightforward, clear and homogeneous to allow third parties to conduct in-depth analysis and make informed decisions. Such information would also be highly valuable to supervisors, which must keep banks from engaging in any attempts at regulatory arbitrage or cherry-picking.

The second issue addressed in Chapter 3 is liquidity. The LCR is a very good metric, one designed to give authorities a one-month time window to prepare solutions in case the crisis materialises and to plan for a smooth resolution. The goal is for financial institutions to hold sufficient HQLA to meet net liquidity outflows during stress scenarios, based on the situation faced by banks during the global financial crisis.

LCR regulation is stringent because it aims to ensure that short-term needs are managed by each bank without relying on potential ECB assistance.

Regarding the weaknesses of this ratio, I would mention the following:

1. **The single stress scenario**: The ratio considers only one stressed liquidity scenario and is therefore not intended to capture all the various stress events that could occur.
2. **General banking activities**: It is designed to apply to the general banking activities of credit institutions. Consequently, it does not account for risks such as intraday liquidity risk or additional risks specific to specialised business models.
3. **Lack of concentration risk calibration**: Specifically, it does not adequately calibrate concentration of cash outflows. For instance, it does not assume different outflow rates if the funding from a particular counterparty exceeds certain thresholds.
4. **Other considerations**: There are potential regulatory arbitrage issues, such as the 'cliff effect' and the treatment of operational and non-operational deposits.

However, given the limitations of the LCR, other complementary tools are available, such as:

1. **Additional liquidity monitoring tools**: These include the maturity ladder and metrics for concentration of funding by counterparty and by product, concentration of counterbalancing capacity, funding costs and roll-over funding. These tools complement the LCR and are used for continuous monitoring of banks' liquidity risk exposures.
2. **Pillar 2**: Liquidity-related risks must be addressed through Pillar 2 within the context of ongoing supervision and liquidity risk management by banks. In particular, supervisors should recognise that the assumptions within the LCR may not capture all market conditions or stress periods. Therefore, supervisors are free to require additional levels of liquidity if needed.

The 2023 turmoil brought to light several key aspects. For instance:

- Higher unsecured deposit outflow ratios: These ratios have been significantly higher than those anticipated by the LCR.
- Additional liquidity risks not captured by the LCR, such as intraday risk or additional collateral requirements in clearing houses.

These observations highlight the need for complementary tools and supervisory considerations beyond the LCR to manage liquidity risks effectively.

Third, I would like to reflect from my position as a supervisor on the role of supervision during the 2023 turmoil.

All analyses conducted thus far regarding the events in the United States and Switzerland in 2023 point to fundamental failures in risk management and governance within financial institutions. The observed facts highlight significant shortcomings in the management of traditional banking risks, such as interest rate risk and liquidity risk, as well as high concentration risk, inadequate and unsustainable business models, an inappropriate risk culture and ineffective senior management and board oversight. Ultimately, there was a failure to adequately respond to supervisors' comments and recommendations.

Given the significant role played by governance and business models in this crisis, I will briefly review the steps taken by regulators since the global financial crisis.

In 2012, in the wake of the global financial crisis, the Basel Committee agreed upon the Core Principles for Effective Banking Supervision,[198] providing a framework to ensure robust and transparent risk management and decision-making by banks. The Committee recognised that the application of these principles should be commensurate with the size, complexity, structure, economic significance, risk profile and business model of the bank and its affiliated group, as applicable. This allowed for a certain degree of proportionality when adopting these principles.

I would also mention the Corporate Governance Principles for Banks, published in 2015.[199] These principles highlight the importance of a sound internal risk management governance framework supported by appropriate control procedures and processes. This framework should ensure that risk identification, aggregation, mitigation and monitoring capabilities are commensurate with the banks' size, complexity and risk profile.

Moreover, one of the key lessons from the global financial crisis was that inadequate information technology and data architectures at banks hindered comprehensive financial risk management. Consequently, in 2015 the Principles for Effective Risk Data Aggregation and Risk Reporting were published.

In summary, banks themselves must ensure appropriate risk management, considering various scenarios proactively. The banks that failed in 2023 were unable to address challenges or prevent imbalances in their balance sheets, especially in a context where accumulated vulnerabilities were exacerbated by the rapid increase in interest rates.

198 BCBS (2024).
199 BCBS (2015b).

Against this background, the recent sharp rise in interest rates has highlighted the importance of accurately identifying core deposits. Financial institutions have traditionally used simulation models based on historical data. Circumstances have changed, however, and a more forward-looking approach is needed. Essentially, these models tend to overestimate core deposit balances, as they rely on data collected during periods of low and stable interest rates.

From a supervisory perspective, it is crucial that we ensure the appropriate governance of these models, that banks consider so-called 'model risk', and ultimately that the quality of the available information is improved.

Supervisors, at least within the SSM, consider in-depth analysis of governance and business models to be a key element of our supervisory programme (SREP). Governance has been a priority of the SSM since its establishment, and it remains so to this day.

Another key aspect of our analysis of banks' risk profiles is the business model and profitability assessment. The goal is to identify business areas that may have a significant impact on the bank's current and/or projected revenue or profitability and on its balance sheet. The bank's capacity to generate profits is assessed, focusing on two aspects: viability (over a 12-month horizon) and sustainability (over a 36-month horizon).

The recent turmoil brought to light "*the importance of supervisors developing a thorough understanding of the viability/sustainability of banks' business models as part of their supervisory process, including identifying any areas in which a bank is an outlier, so they can identify, assess and take action to address any weaknesses at an early stage*".[200]

As all of the reports analysing the banking crises of 2023 underline, one of the key issues was the banks' failure to adequately respond to supervisory feedback and recommendations. Despite shortcomings having been identified, the banks did not act swiftly enough due to the sluggishness and, in some cases, inefficiency of their internal supervisory processes in decision making. The absence of sufficiently effective supervisory measures also played a role.

Supervisors need effective tools that prompt banks to react when we identify deficiencies. Here I refer not only to quantitative measures (capital or liquidity requirements), but also to qualitative elements.

This is particularly important where higher capital requirements alone would not address the problems identified. A non-viable business model or deficient governance cannot be fixed simply by injecting more capital. Perhaps our supervisory environment has placed particular emphasis on these requirements, but we at the SSM are aware of this issue. Indeed, we have designed an escalation system including qualitative measures in the SREP letters sent to banks at the end of each evaluation cycle.

200 BCBS (2023a).

5.5 DISCUSSION OF CHAPTER 4, "LESSONS FOR BANK FAILURE MANAGEMENT", BY ELKE KÖNIG

This report provides excellent, timely and targeted input into the regulatory debate. We have become used to referring to the failure of some regional US banks and a Swiss G-SIB in the spring of 2023 as 'banking turmoil'. But this wording might send a wrong signal. This was not a crisis of banking at large, but a crisis of certain banks due to their specific business models respectively as the result of long-standing idiosyncratic problems. The financial market overall has proven to be resilient.

This is not least the result of the reforms initiated and implemented after the global financial crisis. The Basel III framework was finalised in 2017 as a response to the crisis. Banks as well as regulators are still implementing the regulation that came into force as a response to the crisis. Fifteen years after the crisis, it is time to move on. Europe as well as the United States should implement the framework they jointly developed faithfully.[201] But of course the bank failures in the spring of 2023 need to be analysed in detail to see where additional regulation or enhanced supervisory scrutiny is warranted.

Chapter 2 of the report focuses on the increase of uninsured deposits on bank balance sheets over the last decade. While the empirical material is clearly US-focused, this increase and the inherent shift in balance sheet composition does not seem to be a US-only phenomenon.[202] The discussion about addressing the accelerated run-risk of uninsured deposits is ongoing, with ideas ranging from a targeted increase of deposit insurance to insuring all deposits.[203] In any case, one lesson for supervisors should be that liquidity risk management must get more attention. Uninsured deposits can be withdrawn within seconds and investors might move 'en masse and in tandem' once concern is rising as the unprecedented speed of withdrawals in spring 2023 demonstrated. The current 30-day LCR needs to be supplemented with a thorough analysis of individual banks' liability structures, assessing in particular the deposit structure. Supervisors should carefully analyse the different categories of deposits and ask banks to model rapid run-off scenarios.[204] In case of high and concentrated amounts of uncovered deposits, supervisors need to be able to request additional buffers (Pillar 2 liquidity requirements) or safeguards on the asset side[205], such as ensuring the bank is prepared to pledge assets in case of liquidity constraints. These assets need to be of high quality and sufficiently liquid during a crisis.

201 See CFA Institute Systemic Risk Council (2024), Comment Letter in Support of Agencies' Efforts to Implement the Basel III International Standards for Large banks, 16 January 2024; European Central Bank, The Supervisory Blog, Blogpost by Campa, M, De Guindos, L and Enria, A (2022), Strong rules, strong banks: let's stick to our commitments, 4 November 2022.

202 Hanson et al. (2024).

203 FDIC (2023b); SAFE (2023).

204 See Hsu (2024).

205 Mervyn King recently reiterated his proposal of transforming the Central Bank into a "pawnbroker for all seasons" as a radical shift. This would entirely change the banking system and most likely shift risk from the private to the public sector. See Driver (2023).

At the same time, we need to remind ourselves that bank regulation and supervision is not designed to avoid any bank failure. Liquidity requirements – like capital requirements – will never be so high that bank failure is impossible. Banks without a viable business model need to exit the market without jeopardising financial stability.

The third chapter of the report addresses in particular the accounting rules for fixed income securities and their impact on regulatory capital. The authors stress the divergent handling of unrealized losses between Europe and the United States. This clearly needs to be addressed based on the lessons learned from 2023. Accounting differentiates between 'held for trading', 'available for sale' and 'held to maturity' assets. While this is in principle reasonable, it should also be clear that held-to-maturity assets cannot back callable liabilities. In this case the banks' ability to hold these assets to maturity should be questioned for financial accounting as well as regulatory accounting. The threshold for any held-to-maturity assets has to stay high. What happens if this is not the case was seen in March 2023. While this is primarily a 'financial accounting topic', supervisors should also pay careful attention and, if need be, address any perceived shortcomings with additional capital charges.

The different financial accounting for held for trading and held for sale focuses on avoiding excessive earnings volatility, but in any case, unrealised losses from both asset classes need to be reflected in (regulatory) capital. The various exemptions from the general Basel framework should be carefully revisited, always considering that capital needs to be available during periods of stress.

The fourth chapter addresses lessons for bank failure management, and I will focus my comments in particular on these considerations.

The 2023 bank failures were addressed differently by the US and Swiss authorities. But in both cases, broad public liquidity support was provided at the point of resolution to instill confidence and stabilise the banks or even the broader financial system.

The resolution framework put in place after the global financial crisis was designed to ensure that taxpayers are not exposed in case of a bank failure. The recapitalisation and restructuring of any failing bank should be 'self-funded' by the bank's shareholders and relevant creditors while protecting financial stability. The framework and its implementation have come a long way to reach this goal.[206] But the FSB's concept[207] was most likely overly optimistic regarding liquidity needs in resolution. 2023 has shown that a credible public liquidity backstop is needed to instill confidence in a resolved bank. Switzerland is now looking at how to address this.[208] Unfortunately, this element – a credible liquidity backstop – is still missing for the Banking Union.

206 FSB (2023a).
207 FSB (2014).
208 Federal Department of Finance (2024).

The report addresses the fact that Switzerland decided against using the resolution framework and instead paved the way for a private merger of the failing bank with its national rival, another Swiss G-SIB. Without judging the reasoning, it is fair to state that it is irritating that the resolution framework was not used. Indeed, a sale of business (share deal) should have been feasible within the resolution framework, too. This would at least be the assessment from a Banking Union point of view. One important difference compared to the chosen path would have been that shareholders would have been wiped out first and entirely.

The report then addresses lessons from the recent bank failures that warrant some additional comments.

Resolution planning is an ongoing process. The speed of failure experienced last year requires resolution authorities to rethink their preparation. Focus on liquidity planning and adequate documentation of any assets that banks can pledge, if need be, should be an integral part of resolution planning.

Recent bank failures were 'solved' by merging the failing bank with another bank established in the same jurisdiction.[209] This is clearly one valuable resolution strategy. But one should not forget that this strategy requires a willing and financially sound buyer at the time of failure. For G-SIBs in particular or any other large systemic bank, such a 'white knight' or 'lifeboat' might simply not be available at all times. In the case of Switzerland, with one remaining G-SIB, another domestic buyer would certainly not be available. It is with reason that the FSB focuses on a 'open bank bail-in' (OBBI), i.e., the recapitalisation of the failing bank and subsequent reorganisation, in its Key Attributes.

I agree with the authors of the report that resolution planning needs to address more than one resolution strategy, but at the same time the resulting resolution plan needs to stay focused. Setting the adequate quantitative and qualitative requirements regarding loss absorbance (MREL/TLAC) and testing the banks preparedness[210] are key. OBBI as the fall-back solution needs to be prepared for all systemic banks, in particular G-SIBs. Sale of business in the form of an asset deal will require particular attention and in-depth preparation if considered as a resolution strategy, but also if considered as subsequent reorganisation step in OBBI.

The United Kingdom as well as the United States have published documents that explain to the public how the resolution of a bank headquartered in their jurisdiction would be dealt with.[211] These kind of 'explainers' should exist for all jurisdictions to ensure that resolution is transparent and understood by all stakeholders.

209 This holds true for the resolution of Banco Popular Espanol in 2017 as well as the 2023 cases in the United States and in Switzerland.
210 SRB (2020a).
211 Bank of England (2023); FDIC (2024).

The authors go into great detail when it comes to loss absorbency, but there might be a misunderstanding when the report states that "EU resolution authorities have been asked by EU legislation to adjust MREL downwards for banks with a preferred sale-of-business strategy". Article 45c of this Directive[212] allows for upward as well as downward adjustments under certain conditions. It is up to the relevant authorities to consider the amount adequate to be able to recapitalise the bank based not just on the preferred resolution strategy, which might not be implementable in time of stress.

I agree with the authors that "there is merit in establishing gone-concern capital requirements in terms of debt instruments". This is in line with the FSB Key Principles. Equity is loss-absorbing in going concern and realistically will be exhausted or nearly exhausted at the point of resolution, in particular when it includes elements that will have to be written down when the bank comes under stress, like deferred tax assets or good will.

I also agree with the sceptical reflection on Additional Tier 1 (AT1) instruments. They are clearly a valid instrument in resolution, but their qualification as going-concern capital should be reassessed by regulators. The suspension of coupon, let alone conversion into equity, has so far not proven to be very effective. This is partially due to the way triggers are set, but also due to the signalling effect any such action might have.

A topic missing in the context of 'resolution readiness' is the question of bank structure, i.e., a reflection on the pros and cons of demanding a clean bank holding company (BHC). This was discussed when the FSB Key Attributes were developed and the United States in particular, but also some other jurisdictions, was clearly advocating for a BHC structure.[213] This would allow the operating/licensed companies that are transferred to a bridge bank in going concern to be recapitalised and restructured, while the BHC would be unwound. The devil is clearly in the detail, but further analysis looks worthwhile for Europe.

The authors also address the divergence between the various jurisdictions in public support in case of a bank failure. These were political choices by the respective legislators. But it is clear and rightly addressed in the report that the Banking Union framework is faced with the additional challenge of combining a European resolution framework with non-harmonised national insolvency and deposit guarantee frameworks. In addition, any state aid (in insolvency) as well as any use of the Single Resolution Fund (in resolution) will have to be scrutinised by the EU competition authority (DG COMP) in line with its still slightly diverging framework. This has been addressed numerous times and hopefully with be tackled and streamlined by the EU legislator rather sooner than later.

212 Directive 2019/879/EU on bank recovery and resolution (BRRD II)
213 See also FDIC (2024), which is based on a BHC structure.

Looking at the current proposal for a Crisis Management and Deposit Insurance reform (CMDI),[214] the authors focus on the interplay between MREL on the one hand and the Deposit Insurance Fund (DIF) on the other hand. These are valuable considerations and in particular the examples are helpful. Nevertheless, it needs to be clear that DIF cannot be seen as a substitute for MREL. Mid-sized banks need to be resolvable without recourse to external funds. The DIF can and should play a role in 'bridging gaps' in case of resolution. For this, the position of the DIF in the creditor hierarchy as well as the so-called least cost test need to be revisited.

The CMDI is a step in the right direction, but more is needed. In this concept the European resolution authority will have to coordinate with one or more national deposit insurers in resolution, and all this based on the respective national laws. This is not an easy recipe for success. Thus, the plea for the third leg of the Banking Union (a joint deposit insurance scheme) and a broader harmonisation of insolvency laws.

To conclude, this report is an excellent stock take of the most relevant conclusions from the bank failures in spring 2023. In principle, the reforms enacted after the global financial crisis have proven successful and strengthened the banking system. Even the failure of a G-SIB did not lead to broader turmoil. The final step of this reform – Basel III – should follow swiftly in all relevant jurisdictions.

At the same time, when it comes to valuation, liquidity requirements, stringent supervision and also the still incomplete resolution framework, the lessons from 2023 should be reflected and embedded in banks' planning, supervision and resolution planning. This will be evolution, not revolution.

5.6 DISCUSSION OF CHAPTER 4, "LESSONS FOR BANK FAILURE MANAGEMENT", BY MARLENE AMSTAD[215]

Introduction

Chapter 4 offers a comprehensive reflection on the banking turmoil of March 2023 and the crisis response by financial sector authorities. This discussion of the chapter will focus on the Swiss experience only, i.e., the failure of Credit Suisse and selected aspects of the response by Swiss authorities and the Swiss Financial Market Supervisory Authority (FINMA) in particular. Other aspects are not discussed, and silence on any matter should not be taken as endorsement. The discussion is organised in three steps. First, I take a look back to discuss the peculiarities of the Credit Suisse case in general. Second, I will describe a range of crisis response options that were, in principle, available last year, and give the reasons that motivated the preference for the merger option. Lastly, I will offer a few reflections on which lessons have been drawn from this experience in the Swiss regulatory discussion.

214 European Commission (2023).
215 I am grateful for the cooperation of Rastko Vrbaski in producing this discussion.

Looking back

When looking back at the recent history of Credit Suisse, we can distinguish the phase prior to October 2022, the months from October 2022, and finally the worsening situation in March 2023.[216]

FINMA generally takes a risk-based approach. This means that greater risks are addressed more frequently and in greater depth. We placed a strong focus on Credit Suisse in our supervisory activities. FINMA has made public six proceedings against Credit Suisse. The problems behind these proceedings were manifold, affecting different business entities and issues. Credit Suisse's accumulation of incidents and scandals severely damaged its reputation.

The second phase began at the beginning of October 2022 with a massive bank run. This was even before Credit Suisse announced its new strategy. The bank recorded outflows of client funds on a globally and historically unprecedented scale. Customer deposits declined by CHF 138 billion in the fourth quarter of 2022 alone.

The markets' assessment of the business model and the future faltered. The share price fell by around 20% from mid-September to early October and CDS spreads exploded. FINMA entered into an even closer, daily exchange with the bank from this point on, and in particular closely monitored the liquidity situation. At the same time, the Steering Committee, chaired by the Head of the Federal Department of Finance was convened for regular meetings going forward. The Committee on Financial Crises, chaired by FINMA, increased the frequency of its meetings. Both committees also include the Swiss National Bank.

As in all cases when a firm is in critical condition, FINMA insisted that Credit Suisse demonstrates contingency measures that could be implemented within a few weeks. Such measures include reducing risks and strengthening capital and liquidity. It is also customary to ask an institution to do everything possible to prepare for a potential sale. It is up to the bank itself to evaluate possible buyers.

FINMA has the authority to impose higher liquidity buffers on an institution than those required by law, and it did so in the case of Credit Suisse in mid-2020. The bank itself also held additional liquidity. It was only thanks to these precautionary, additional liquidity cushions that Credit Suisse was able to survive the 'bank run' in October 2022.

216 For a more detailed discussion and additional data, see FINMA (2023). The following is largely a synthesis of that report.

The turmoil in the US banking sector in mid-March 2023 exacerbated the already existing crisis of confidence in Credit Suisse. The third phase with strong outflows of client funds began in the days leading up to 19 March 2023 – this time also affecting the Swiss entity. At the same time, counterparty limits were reduced and security requirements greatly increased. Up to this point, regulatory capital and liquidity requirements had been met. However, as the weekend approached, it became increasingly clear that Credit Suisse had serious liquidity problems and that a solution had to be found for all eventualities.

Optionality in crisis

Any crisis response needs to be tailored to the specificities of the crisis, and hence the response in the Credit Suisse case needed to fit the underlying crisis of confidence. The ultimate objective is to restore stability as quickly and as efficiently as possible. Hence, it was crucial to find a solution that, in addition to restoring confidence, prevented the bank run from turning into a total collapse of the bank. For this, liquidity support by the central bank was the key ingredient. As Swiss law at the time did not provide for a public backstop for such support, an emergency ordinance was needed to enable this measure. Once liquidity support was secured, it was key to achieve as much optionality as possible. To that end, Swiss authorities (i.e. the FDF, the SNB and FINMA) cooperated closely to identify, and prepare as thoroughly as possible, a number of options. In the end, four options were available: (i) a formal resolution, (ii) a merger, (iii) a 'temporary public ownership', and (iv) a bankruptcy of the group combined with an emergency plan for the Swiss operations. As the temporary public ownership and bankruptcy options were deprioritised, the following discussion will focus on the first two options.

The resolution option

FINMA can activate resolution proceedings if a bank is in a very critical situation. In the Credit Suisse case, the resolution decree and accompanying documentation were ready for execution.[217] In such a scenario, the focus would have been to redimension the bank so it can restore sustainability. This strategy requires measures on three levels.

First, liquidity support was key. In the case of Credit Suisse, this implied liquidity support from the SNB, including liquidity supported by a federal guarantee, i.e. a public liquidity backstop. Note that no option would have worked without such liquidity support.

217 See also FSB (2023a): "This review reaches the conclusion that recent events demonstrate the soundness of the international resolution framework in that it provided the Swiss authorities with an executable alternative to the solution that they deemed preferable in this particular case."

Second, to strengthen capital, resolution would have affected a large volume of securities issued by Credit Suisse, including all outstanding shares and Additional Tier 1 bonds (AT1). These would have been written-down entirely, with shareholders ceasing to be owners of the bank. Bail-in bonds (TLAC bonds) would have been converted into shares, making these bondholders the new owners of the bank. The write-down of equity and AT1 and the conversion of all TLAC bonds would have resulted in a new CET1 of CHF 111.2 billion.

Third, FINMA would have adapted the bank's governance to support the restructuring process. To that end, FINMA would have replaced the chair of the board to signal a fresh start, suspended shareholder rights to prevent interference with the restructuring process, and appointed a restructuring agent to have direct control of that process and be able to intervene as needed.

Resolution would have preserved Credit Suisse as a standalone bank, and resolution actions were technically feasible and ready for execution.[218] The key question, however, was whether, in a difficult market environment, resolution was the option most likely to calm markets and restore broader public confidence rapidly. In March 2023, it was far from certain that this was the case.

The merger option

A merger of Credit Suisse and UBS also maintains all of Credit Suisse's functions. The authorities involved drew up an overall package of measures to enable this merger. These included bolstering the capital of Credit Suisse by writing down all outstanding AT1 bonds. Other instruments, however, were not bailed in. An important difference between a resolution and a merger is the expected impact on the financial markets. The advantage of the merger option is that in UBS, a robustly capitalised and well-organised bank will operate Credit Suisse with all the risks and opportunities this entails. This builds considerable confidence in the marketplace. To strengthen the option of a merger with another bank, FINMA urged Credit Suisse early on to make necessary contingency preparations. As a result, Credit Suisse established a dataroom in order for the merger option to be available if necessary.

218 On the basis of the law as it stands, a 'sale in resolution' might have been an option. Yet, those provisions are intended to be used for mergers of small and midsize banks, not a G-SIB, and had never been tested in Switzerland, unlike a conventional merger. A sale in resolution involving a G-SIB has never been tested anywhere in the world.

Why the merger option was preferred

As a global systemically important institution, Credit Suisse is not just any bank. The nature of the bank's business means it is highly interconnected with other market participants, both in Switzerland and globally. The fragile state of financial markets following monetary tightening in 2022, an uncertain economic outlook, the turmoil in the US banking sector and geopolitical tensions also needed to be taken into account. Against this backdrop, the resolution of a G-SIB could have led to contagion effects and jeopardised financial stability in Switzerland and globally.

With all that in mind, and after carefully weighing the respective advantages and disadvantages of all options, everyone involved came to the same conclusion: Among all available options, the merger option was the one that maximised financial stability, minimised execution risks, and may best prevent a crisis from spreading through the financial sector. As provided for by the mandate of FINMA, creditors were protected, and markets remained functional. Authorities were united behind the decision, and the involvement of a strong player from the private sector was essential for market participants to regain confidence: a key aspect of crisis management is that "private sector solutions are best".[219]

Lessons learnt for regulation and supervision

Switzerland is the first country to have a resolution for a G-SIB ready to be executed.[220] What are the lessons that Swiss authorities take away?

Firstly, several elements of the 'too big to fail' legislation were applied in the Credit Suisse case. The liquidity buffer helped stabilise the bank and buy some time.[221] Otherwise, Credit Suisse might have become illiquid as early as autumn 2022. For the first time, AT1 buffers were used at a G-SIB – they are an essential element in the TBTF legislation.

Secondly, 'too big to fail' legislation in Switzerland was intended to provide optionality: recovery, resolution or bankruptcy with emergency plan. The fact that the resolution was not chosen means one thing above all: based on a careful consideration of risks and opportunities, a better option was available in this case.

Thirdly, all options have an important commonality: in each of them, it was key to bolster the liquidity of the bank. No option would have worked without credible liquidity support. In Switzerland, this implied establishing a public liquidity backstop on the basis of an emergency decree.

219 BCBS (2015c, p. 50).
220 For this purpose, the members of the crisis management group for Credit Suisse were involved in the implementation work at an early stage.
221 The LCR of Credit Suisse as of end 2021 was 203%, the highest among its peer group.

There are other, more general lessons to be drawn. This relates to banks' business strategies, recovery and resolution planning in general, and the role of supervision and enforcement.

Strategic misjudgements on the part of the bank, the failure of the management or losing the trust of clients and investors are not supervisory offences. Supervision sets the rules. Responsibility for business strategy rests with firms. Supervision cannot and should not assume the role of banks' shareholders or directors in that regard.

Moreover, lessons from the Credit Suisse case will inform the assessment of future recovery plans. When assessing recovery plans, time-related aspects will be given a greater weighting, and the feasibility of the measures in different crisis scenarios will be benchmarked against each other. In addition, banks must describe the impact of the stabilisation measures on the individual group companies. FINMA will also require the banks to develop further-reaching measures taking into account liquidity scenarios and the possibility of digital bank runs.

FINMA can use its existing instruments to enforce supervisory law consistently and swiftly in the majority of cases. FINMA is nevertheless in favour of expanding and complementing its range of instruments: the possibility of communicating more actively to the public about supervisory activities, the power to impose fines and a senior manager regime that strengthens individual responsibility. All these measures as well as a series of others are contemplated in the recent report of the Swiss Federal Council.[222]

Finally, the Credit Suisse case again demonstrates the importance of cooperation and information sharing between authorities, both domestically and across borders. FINMA is looking forward to strengthening that cooperation even more in the future.

222 See Federal Department of Finance (2024).

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The sixth report in The Future of Banking series, part of the Banking Initiative from the IESE Business School, examines the 2023 banking turmoil that caused the failures of Silicon Valley Bank, other regional banks in the United States and Credit Suisse, and its implications for financial regulation. This banking turmoil was the first major challenge of the Basel III framework. The report centres around three major themes: the changes in digital banking and monetary policy that led to the turmoil, and the reforms needed to deposit insurance and the lender of last resort; the shortcomings of regulation, accounting, and supervision that caused banks that were deemed solvent to fail; and the management of bank failures and potential reforms to resolution procedures.

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