SYSTEMIC RISK, CRISES, AND MACROPRUDENTIAL REGULATION

Xavier Freixas, Luc Laeven, and José-Luis Peydró

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Foreword

Macroprudential is the latest buzzword in economics. But it means different things to different people. For some, macroprudential policy is about managing the economic cycle. For others, it is about controlling financial stability stemming from systemic financial institutions. For others, it is simply an empty term. These skeptics hold the view that macroprudential policy has no teeth because the political economy of booms is such that financial regulators will always find it hard to smooth them, as booms bring large benefits (in the form of wealth and employment) while they last. Some go even further and claim that macroprudential policy may bring new risks when misused. Unfortunately, there is much confusion about what constitutes macroprudential policy and little agreement about how to operationalize it, in part because its objective is not clearly defined and in part because there is scarce historical experience about the use of macroprudential tools to gauge their effectiveness and calibration. Moreover the measurement and the theory of financial fragility and systemic risk of the financial system is still in its infancy, and there is little agreement on the scope of financial regulation and the institutional framework for macroprudential policy. What are the strengths and limitations of the current prudential policy framework and how should it change? What are the differences between micro- and macroprudential policy? What is the boundary of financial regulation? Should it cover all institutions that engage in the provision of financial services? What are the limitations of current theories of financial fragility and systemic risk? And how can systemic risk be measured and monitored in real time? What lessons can be drawn from the history of the financial crises, including the most recent one, for the management of credit and asset price bubbles and bursts? How should macroprudential policy interact with macroeconomic policy? Is there any role for monetary policy for

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combatting systemic risk? Does macroprudential regulation always reduce excessive risk-taking or can it also encourage it?

The purpose of this book is to offer a framework to operationalize macroprudential policy. We will define systemic risk and macroprudential policy, discuss its differences with microprudential policy and its interactions with macroeconomic policies (notably monetary policy), and describe the macroprudential toolkit and experiences around the world with a view to operationalize macroprudential policy to fit to country circumstances (whether emerging economies or advanced economies). We conclude with a list of challenges in the implementation of macroprudential policy and discuss its limitations.

To our knowledge, this is the first and only book on this topic. By design, some topics are covered in more detail than others. This is in large part because our knowledge on these issues is still limited, as this is a new field. In particular, there is disagreement about the optimal policy mix and the measurement of systemic risk. And there is large uncertainty about the unintended consequences of macroprudential policy on systemic risk and the constraints imposed by polical economy forces. But there is much that we can offer, based on a growing body of academic and policy-oriented literature, the history of financial crises, and the limited historical experience with the use of macroprudential policy. Moreover much has happened since the global financial crisis of 2008 to shape a new regulatory framework for deposit-taking financial institutions with a view to build a system of regulations that take a more macro perspective of the financial system with a focus on managing systemic risk rather than the risk of individual financial institutions, and macroprudential authorities have been established in a number of countries with responsibilities in the area of macroprudential policy.

This book has grown out of our desire to offer clarity in an area of much confusion, drawing on our combined knowledge in this area based on academic research, policy and advisory work. Our focus is on the United States and Europe where much of the debate about macroprudential policy has centered, but we will also cover topics relevant to other parts of the world, including the role of macroprudential policy in managing foreign capital flows and the need for global coordination of macroprudential and monetary policies.

But knowledge and sweat and tears from hard work alone cannot create a book. It requires close cooperation and team work, and the joy of working together, which in our case has translated into new

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friendships. Being physically located in different parts of the world did not help, but Skype and occasional trips offered solutions. A book like this one always takes more time than originally envisaged. This book would not have been possible without the continued support and professional editorial work of Jane Macdonald and Emily Taber at the MIT Press. The diligent editing work by Dana Andrus at the MIT Press and the editorial assistance from Maria Jovanovic and Patricia Loo at the IMF are also gratefully acknowledged.

We would also like to thank Olivier Blanchard, Christian Brownlees, Charles Calomiris, Stijn Claessens, Charles Goodhart, Enrico Perotti, Raghu Rajan, and Fran R. Tous for commenting on earlier drafts of the book. The sometimes long debates with our colleagues and friends have markedly improved the quality of this book. Part of this book has been taught at the Barcelona GSE professional course on Systemic Risk and Prudential Policy that Xavier and José-Luis organized and we thank all the participants (mainly from central banks and supervisory agencies) for all their comments and suggestions. Above all our thanks go to our families who gave us the precious time to work on this book. José-Luis especial thanks go to his wife, Lambra Saínz Vidal, and his parents.

The book was written while Luc Laeven was a staff member of the IMF. This book represents our own views, not those of the IMF or IMF Board.

Barcelona and Washington, DC, November 2014

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Glossary

ABCP	Asset-backed commercial paper
ABS	Asset-backed security
AMC	Asset management company
AQR	Asset quality review
BIS	Bank for International Settlements
BoE	Bank of England
BoJ	Bank of Japan
BLS	Bank Lending Survey
CCP	Central counterparty clearinghouse
CD	Certificate of deposit
CDO	Collateralized debt obligation
CDS	Credit default swap
CEO	Chief executive officer
CET1	Common equity tier 1
CFO	Chief financial officer
CGFS	Committee on the Global Financial System
CLS	Continuous linked settlement
CoCo	Contingent convertible capital instrument
CPSS	Committee on Payments and Settlement Systems
CRA	Credit-rating agency
CVA	Credit valuation adjustments
DSGE	Dynamic stochastic general equilibrium
DvP	Delivery versus payment
DTI	Debt to income

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EBA	European Banking Authority
EC	European Commission
ECB	European Central Bank
ESRB	European Systemic Risk Board
ESM	European Stability Mechanism
EU	European Union
FDI	Foreign direct investment
FDIC	Federal Deposit Insurance Corporation
FDICIA	Federal Deposit Insurance Corporation Improvement Act
FLS	Funding for Lending Scheme
FPC	Financial Policy Committee
FSA	Financial Services Authority
FSB	Financial Stability Board
FSOC	Financial Stability Oversight Council
GDP	Gross domestic product
GIIPS	Greece, Ireland, Italy, Portugal, and Spain
G-SIFI	Global systemically important financial institution
IMF	International Monetary Fund
IOSCO	International Organization of Securities Commissions
LCR	Liquid coverage ratio
LoLR	Lender of last resort
LTRO	Long-term refinancing operation
LTV	Loan to value
MBS	Mortgage-backed security
MM	Modigliani–Miller
MMMF	Money market mutual fund
NPL	Nonperforming loan
NSFR	Net stable funding ratio
OECD	Organisation for Economic Co-operation and Development
OFR	Office for Financial Research
OLA	Orderly Liquidation Authority
OMT	Outright monetary transactions
OTC	Over the counter

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PD	Probability of default
PvP	Payment versus payment
RBS	Royal Bank of Scotland
RMBS	Residential mortgage-backed security
RTGS	Real time gross settlement
SIFI	Systemically important financial institution
SLOS	Senior Loan Officer Survey
SME	Small- and medium-size enterprise
SOX	Sarbanes–Oxley Act
SPV	Special purpose vehicle
SRM	Single resolution mechanism
SSM	Single supervisory mechanism
TARP	Troubled Asset Relief Program
TBTF	Too big to fail
TIPS	Treasury inflation-protected securities
UBS	Union Bank Switzerland
VaR	Value at risk
VAR	Vector autoregressive
VIX	Chicago Board Options Exchange Volatility Index

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1 Introduction

The global financial crisis that started in 2007 has reinvigorated a debate on how to regulate banks and other financial institutions to ensure financial stability. Central to this debate has been the recognition that financial regulation has been largely microfocused on the risk of individual financial institutions rather than the financial system as a whole. Capital adequacy levels were set on the implicit assumption that, by creating buffers to absorb unexpected shocks at individual banks, the system as a whole was safer. Yet, by responding to capital regulations with only their own interest in mind, banks can potentially behave in ways that collectively undermine the system as a whole.[1] For example, banks hit by a negative shock may prefer to delever when faced with binding capital constraints, causing a credit crunch and a generalized drop in asset prices, thereby exacerbating the initial negative shock. Negative spillovers can be substantial, as financial institutions have incentives to take correlated exposures in credit and asset price bubbles. To control such systemic risk that may jeopardize financial stability with strong negative real effects for the economy, regulation and supervision would need to become more macroprudential, concerning itself with the stability of the financial system as a whole and its relation with the economy at large.

Calls for a more macroprudential approach to bank regulation can be traced back to the late 1970s on the back of growing concerns associated with the rapid pace of bank lending to developing countries. However, despite numerous financial crises since the 1970s and throughout history, the term macroprudential was little used prior to the recent global financial crisis and its meaning remained somewhat obscure.[2] A Google search of the term “macroprudential” only produces 639 hits prior to 2000, while it generates over 500,000 hits today. Similarly the term “systemic risk” has been relatively new—with only four

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thousand Google hits prior to 2000 and half a million today—and its meaning has been ambiguous: for example, is systemic risk just the risk of financial instability or does it also reflect risks to the real economy?

The reason for writing this book is straightforward. In our daily interactions with policy makers, central bankers, regulators, and academics, we have noticed a generalized confusion of the meaning of systemic risk and macroprudential regulation. Both terms are frequently used as buzzwords in the realm of policy-making. Systemic risk is often equated to the risk of the day, ranging successively from excessive lending to developing countries in the late 1970s, to concerns over financial innovations in the 1980s, to short-term dollar borrowing by East Asian corporations with revenues in local currency in the 1990s, to the procyclicality of the financial system and the implications of the failure of systemically important institutions in the first decade of the twenty-first century, or to problems in global capital flows in emerging economies in the 2010s. And macroprudential policy is often viewed interchangeably as a particular perspective of existing prudential policy or a new policy area in its own right. In part, this confusion stems from the lack of a framework to analyze the optimal design of prudential policy, but it is also due to differences in opinion and ideology about the need to establish a separate macroprudential framework and the possible complications such a framework could cause for the setting of monetary policy. The purpose of this book is to offer a working definition of systemic risk in the financial system, to explain its causes, consequences, and measurement, and to present an operational framework to guide macroprudential analysis and regulatory policy. We base this analysis on a growing body of academic and policy-oriented literature, including on the lessons from the history of financial crises and on the existing experiences of macroprudential policies around the world.

Indeed policy makers are struggling with numerous questions about the institutional design of monitoring systemic risk and about the design and implementation of macroprudential policy and its interactions with other policies. In particular, there are concerns about conflicts between macroprudential policy and monetary policy, and about the institutional arrangements for macroprudential policy-making. What should be the focus of prudential regulation? Should the macroprudential approach be completely separated from microprudential regulation? Should micro and macroprudential regulation be enforced by the same supervisor or under a different construct? What are the

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benefits and the limits of both macroprudential and microprudential policy? How should one measure systemic risk in practice? What are the incentives for banks and other intermediaries to take excessive risks that create a buildup of financial imbalances? What are the main negative spillovers within the financial system, and from the financial to the real sector? Do we need structural reforms in banking? What can we learn from previous financial crises for the setting of macroprudential and regulatory policy? How should one operationalize and institutionalize macroprudential policy? Should other public policies such as monetary and competition policy pay attention to systemic risk? What are the limitations of macroprudential policy? This book will answer these and related questions.

While the focus of the book is on macroprudential policy, it is important to point out from the start that the lack of a macroprudential framework to tame systemic risk is not seen as the only "culprit" to the recent global financial crisis. Regulatory failures and political economy constraints in dealing with the buildup of financial imbalances are by many seen as equally if not more important. A discussion of macroprudential policy therefore cannot occur without consideration of political and regulatory motives especially around the times of financial crises. The book therefore discusses also the politics of financial booms and crises and the challenges in building an effective financial regulatory apparatus.

The answer to what the regulatory response to the recent financial crisis should be very much depends on one's view of the origins of the crisis. On the one hand, some (still) view financial crises as a natural consequence of business cycles. As such, the occurrence of financial crises simply has to be accepted although their ex post negative impact on the economy should be minimized. Regulation plays a minor role in this view, namely minimizing only the fallout on the economy. To the extent that regulation could lower the cost of ex post crisis resolution, for example, by facilitating orderly resolution of failed institutions, regulatory reform should be encouraged. But according to this view, regulation is not seen as needed or effective in (ex ante) preventing financial crises or in managing the cycle.

On the other hand, there is the view (to which we subscribe) that financial cycles are distinct from economic cycles, that the buildup of risk is endogenous in the financial system and that financial crises bring about real costs that go beyond those associated with normal economic downturns. Important channels through which financial

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cycles operate include asset price bubbles, excessive risk-taking, credit booms and crunches, debt overhang and deleveraging, balance sheet channels, fire sales, and market and funding illiquidity. According to this view, the level of risk that was undertaken by the banking system prior to the recent crisis was excessively high and the mostly microprudential-oriented regulation in place was unable to identify the endogenous risks associated with it. Macroprudential regulation then is needed to identify and limit systemic risk over the cycle, including a preventive, ex ante role for the buildup of systemic risk.[3]

Banks indeed have a natural tendency to take on excessive risks: it is a natural consequence of shareholder limited liability combined with the fiduciary duties of bank managers to shareholders and not to the debt holders and other stakeholders of the bank, despite that in most banks equityholders are only a very small fraction of the liabilityholders.[4] This, together with the presence of implicit and explicit government guarantees, renders corporate governance in banks flawed. It leads to badly designed executive compensation that rewards excessive risk-taking such as to induce unregulated corporate governance to promote risk-taking at the expense of debtholders, depositors, and taxpayers but to the benefit of banks' shareholders. As Adam Smith put it, the basic postulate of a market economy is self-interest, even greed, which leads to an efficient allocation. It is not from the benevolence of the butcher, the brewer, or the baker, or in this case the banker, that we expect our loans. However, in this process of failed corporate governance and market disciplining in banks, banks also take excessive risks that pose financial stability concerns and are deemed socially excessive. Following the crisis, bank executives have been criticized for their behavior, which has been described as gambling with taxpayer money, and their executive compensation has been viewed by many as having encouraged short-termism and excessive risk-taking.

However, before concluding that such behavior of banks should be confronted with more and better regulation, one needs to ask the question why banks were not adequately regulated in the first place. A bit of history is in order here. In most countries concerns for financial stability of banks followed the Great Depression. However, the subsequent period of tight regulation ended with the wave of deregulation starting in the 1980s. Since then, a rise in financial fragility has been evidenced by numerous incidences of banking crises (Laeven and Valencia 2012). The excessive risk-taking that preceded the most recent

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crisis was in fact not suddenly discovered with the current crisis; such credit and leverage booms preceded most of the financial crises throughout history. Nevertheless, particularly severe this time were the bad incentives created by the recent process of financial innovation and deregulation, combined with poor corporate governance, government safety nets, and weak supervision.

Therefore, once we look beyond the popular view of greedy bankers, we can discern that bank regulations were badly designed in the first place. But why? A benign view of regulatory failures is that the regulatory framework was inadequately focused on microprudential risks and that the monitoring of financial system risks had become increasingly complex.

The failure of appropriate risk management during the recent global financial crisis came in various forms and disguises. There was the creation of "fake alpha," whereby managers of financial intermediaries appeared to create excess returns but in fact were taking on hidden tail risks and illiquid investments, which produced a steady positive return (fees) most of the time as compensation for a rare, very negative return. There were credit booms and asset price bubbles producing high profits in the short run with the risk of generating large potential losses in the medium run. It was inevitable that the herding behavior in correlated risks within the financial system would cause most institutions simultaneously to experience losses in bad states of the world, generating systemic risk.[5] Moreover high correlated risks were substantially increased because financial intermediaries financed themselves mainly from other financial intermediaries using short-term debt, thus creating a fragile and dense network of short-term financial connections among institutions around the world in a globalized financial system. Then again, financial innovation in great part contributed to these credit and asset booms, resulting in a lowering of credit standards and an increased interconnectedness with other parts of the financial system. In addition, a drive for home ownership generated a concentration of banks' loan portfolios in mortgages where an asset price bubble was forming, with banks bound to fail simultaneously as soon as the bubble would burst. In such an environment even medium-size banks were expected to be bailed out as otherwise there would be too many to fail simultaneously. Potential bailouts and compensation structures based on relative performance and convex payoffs (stock options) encouraged ex ante collective excessive systemic risk, as potential losses were low relative to (short-term) profits.[6] Expansive

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monetary policy and the expectation of liquidity assistance by central banks in crises (known as Greenspan put) appear also to have contributed to ex ante excessive risk-taking and the creation of an asset price bubble financed with credit. And there was a kind of "irrational exuberance" in a world of incompetent, overconfident, and/or overoptimistic bank managers and investors with limited memory over past crises, who neglected tail risks and had group behavior biases (Shleifer 2000; Akerlof and Shiller 2009; Kahneman 2011). Deregulation thus enabled larger global financial institutions that were too large, connected, and complex to fail to take excessive ex ante risks and lobby against new regulations. Yet financial regulators failed to identify these risks early on.

Some of the regulatory failures could be linked to shortcomings in the regulatory framework, notably the lack of discernment of macroprudential regulation and systemic risks. Indeed, in the aftermath of the current crisis, the consensus among policy makers and academics has been that regulators did not pay sufficient attention to the financial fragility of the financial system— the correlated risks in the financial system arising from perverse incentives—and the necessity to monitor systemic risk by putting in place a macroprudential regulatory framework.

It has become evident that existing banking regulation, with the safety net it provides to credit institutions, is badly equipped to deal with the channels of contagion that link banks to the market and other institutions, such as securitization, asset-backed commercial paper, repos, and credit default swaps among others, and that bank regulators need to improve their understanding of all financial intermediaries and markets. Moreover the poor design of existing regulatory frameworks is now recognized to be the cause of regulatory distortions that contribute to systemic risk, such as the procyclical implications of traditional capital regulation (there are important exceptions that we will explain in the book as dynamic provisioning in Spain and in some Latin American countries) and the arbitrage of capital regulation by banks in creating special purpose vehicles in the shadow banking sector. Additionally it has become evident that regulators did not have adequate powers or tools at their disposals to intervene early on in failing banks and to efficiently resolve (through assistance or closure) those that fail. For example, at the onset of the 2008 crisis many countries did not have adequate resolution frameworks in place to intervene in large and complex financial institutions, whereas others did not

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have sufficient and detailed information (data) on the banks and other institutions.

A more disconcerting view is that the regulatory framework failed because of regulatory failures and weak supervision. Indeed doubts have been raised as to the willingness of and incentives for bank regulators to intervene in failing banks, either because of too big to fail considerations, career concerns, or powerful bank lobbies. Some have argued that self-interested regulators responded to industry pressures and lobbying, closing an eye to regulatory arbitrage and the excessive buildup of risks in the financial system during the boom period and failing to respond to signs of distress early on. Indeed, the UK FSA's response to the failure of Northern Rock (which failed after repeated concerns about its liquidity and solvency position) does not exemplify the reaction of a strong, independent supervisor. And when confronted with costly bank failures, many regulators turned to regulatory forbearance. This engenders fundamental questions about the political economy of banking regulation and its design going forward.[7]

While some of these shortcomings in the regulatory framework are addressed by the Basel III regulations and US financial reform under the Dodd–Frank Act, some fundamental questions remain unaddressed as we explain in the book. For example, resolving the too big to fail problem and the implementation and interactions of macroprudential policy with monetary policy remain open questions.

Financial regulatory reform is thus still very much a work in progress. New powers have been given to federal regulators to intervene in large and complex financial institutions (e.g., the European Central Bank (ECB) in the euro area), but these powers have not been tested thus far and questions remain about the willingness of federal regulators to act in the midst of another systemic crisis. The limits of macroprudential regulation thus appear quite visible. Given these limits, it is our view that macroprudential policy should concentrate on preventing the excessive buildup of booms where its effectiveness is likely most potent. This book offers a framework to guide policy makers in this process of financial regulatory reform.

The book proceeds as follows. In short, chapters 2 to 7 give the building blocks of systemic risk, chapters 8 to 10 cover the implications for prudential and monetary policy, and chapter 11 concludes with the challenges the current regulatory reform agenda faces. More specifically, chapter 2 gives a definition of systemic risk, describes the real consequences of systemic risk, and presents a taxonomy and

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illustration of systemic financial crises throughout history. In the definition and throughout the book, we put a lot of emphasis on the real effects for the economy at large, as systemic risk is not only simply financial instability but a strong impairment of the financial system that causes substantial negative aggregate output and employment effects.

Chapter 3 presents a basic theoretical framework of systemic risk to explain its underlying drivers and to guide regulatory policy, in particular, the rationale for macroprudential regulation (and its difference from microprudential regulation). The basic framework incorporates macroeconomic considerations that are not internalized by individual financial intermediaries, such as the aggregate buildup of financial imbalances. The ex ante macroeconomic and financial drivers of systemic risk, contagion risk, the real macro effects of systemic risk, and the measurement of systemic risk are reviewed in depth in the subsequent chapters 4 to 7.

The basic theoretical framework in chapter 3 offers a general approach for thinking about externalities associated with systemic risk and desirable policy responses to mitigate such externalities. In particular, the framework considers the incentives for financial intermediaries' risk-taking and herding (the moral hazard view), the building of financial imbalances, and the role of competition and financial institutions' corporate governance. The discussion covers the classical view of banking crises (Diamond and Dybvig 1983) and the contagion view, with special emphasis on liquidity risk arising from interconnectivity and the interbank market. Moreover the general equilibrium impact of a banking crisis and its feedback and nonlinear effects are explored, thus covering the relation between financial and real crises. Specific regulatory policies and practical considerations to implement such policies are considered in subsequent chapters. Finally, the chapter offers a list of the essential elements that a model of systemic risk should have to allow public policy analysis through (model) counterfactuals, but as the chapter highlights, the existing theoretical literature—based on either banking (corporate finance) or macroeconomic models with a financial sector—has not yet developed models that incorporate all of these key elements. Therefore empirical analysis of existing prudential measures is crucial to guide new policy reforms in the area of macroprudential policy.

Chapter 4 offers a complete overview of the causes of systemic financial crises. Systemic risk is not an exogenous risk, but is endogenously taken by the financial intermediaries. It summarizes the

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literature on credit booms, asset price bubbles and other macro buildup of financial imbalances and the endogenous financial fragility stemming from the financial sector (both the traditional and new models). The chapter covers the role of leverage, especially financial intermediary credit, in systemic crises, and also reviews the particular prominence of asset price bubbles in systemic crises, such as real estate bubbles. It draws on recent episodes of financial crises and on historical evidence. Moreover the chapter also offers explanations of systemic risk based either on distorted incentives of financial intermediaries (agency view) or on behavioral finance explanations (preference view), such as psychological biases including overconfidence, group think, and neglecting tail risks. In particular, it discusses how herding behavior by financial intermediaries can translate into correlated risk exposures among financial intermediaries and create systemic risk. Finally, this chapter also discusses the role of regulatory distortions, financial liberalization (including the creation of too large global banks), financial innovation (including securitization), and other structural changes that influence the buildup of macroeconomic financial fragility.

Chapter 5 presents an overview of the literature on financial contagion, with special emphasis on interconnectedness and liquidity risk. Not only direct contagion is analyzed, but also the so-called second-round effects and liquidity dry-ups and hoarding. While the emphasis is on contagion across banks, contagion in other parts of the financial system—such as insurance, hedge funds, money market mutual funds, and over the counter (OTC) markets for credit default swap (CDS) contracts); (international) contagion between financial intermediaries and markets is also reviewed. Moreover negative liquidity spirals with market and funding liquidity risks, cash in the market asset pricing and fire sales are discussed. Finally, the effects of recent trends in financial globalization on cross-border financial contagion are also summarized.

Chapter 6 describes the consequences of systemic risk for the economy at large. Financial crises are followed by strong and persistent negative effects in terms of aggregate output, as the history of financial crises shows. The main motivation of macroprudential policy is that the market failures that give rise to systemic risk imply strong real effects when systemically important financial crises materialize. The chapter draws on the literature on credit booms and busts, documenting how bank capital and liquidity problems may create a credit crunch for nonfinancial borrowers (both households and firms), which in turn

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reduces aggregate output, employment, and welfare. Other important macrofinancial channels such as debt overhang, deleveraging, crowding-out effects of public debt, zombie-lending, and risk-shifting are discussed in detail. The chapter also reviews the literature on the costs of systemic financial crises and illustrates the real effects of systemic risk by presenting information on the real costs of systemic financial crises in terms of output losses and fiscal costs.

Chapter 7 gives an overview of existing methods to measure systemic risk. The objective of this chapter is to provide guidance on how one should measure systemic risk in practice, including in environments with data limitations such as emerging markets and the non-regulated financial system. We discuss methods to develop real time early warning signals to measure excessive credit and other aggregate financial imbalances. We also provide measures based on balance sheet data and on market data, both to analyze contagion risks and macro imbalances, including network analysis. Finally, we summarize how different measures of financial imbalances that are commonly used in policy and academic circles have performed in many financial crises over the twentieth century.

Chapter 8 presents the "old" regulatory framework relying exclusively on microprudential policy and its relevance for future regulatory policy. It offers the rationale for microprudential policy, describes its limitations in managing systemic risk, and discusses the impact of the new regulation framework issued by the Basel committee and the Financial Stability Board, as well as its implementations in the Dodd–Frank Act and the new European Directives. Finally, it shows that microprudential policy alone is not sufficient to manage systemic risk, and thus there is the need for a new, complementary framework that includes macroprudential policy.

Chapter 9 presents the "new," complementary regulatory and supervisory framework that relies on macroprudential policy to manage systemic risk. It gives an overview of possible macroprudential tools, drawing on the theoretical framework in chapter 3 and on the drivers of systemic risk in chapters 4 to 6 to explain their rationale. It also discusses the trade-offs involved in choosing an optimal policy mix (including the interaction with existing regulation) and the practical considerations when implementing these tools. It then analyzes whether macroprudential policy should be under the same organization as microprudential policy, or given that macroprudential policy also cares about real effects and not only financial stability, it should be under a

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different organization than microprudential policy. The chapter next presents a critical review of the relevant elements of the new Basel III regulatory framework as well as the latest EU and US financial regulations in dealing with systemic risk. The analysis of macroprudential tools is illustrated with case studies on the effectiveness of existing tools, such as dynamic loan loss provisioning rules in Spain, limits on loan-to-value ratios in Hong Kong, liquidity requirements in Latin America, and speed limits on credit growth in Eastern Europe. Finally, it offers a summary of some evidence of unintended consequences of tightening of macroprudential policy on risk-taking through search for yield strategies.

Chapter 10 analyzes monetary policy and systemic risk, and the interrelation with macroprudential policy. It analyzes the role of monetary policy to reduce ex ante buildup of financial imbalances by leaning against the wind and to combat ex post credit crunches and fire sales in asset prices. It discusses also the importance of short- versus long-term interest rates for financial institutions, notably banks. It explains the risk-taking channel of monetary policy, its relation with the credit channel, and summarizes the empirical evidence around the world on these channels. Moreover the chapter discusses that, as monetary policy affects credit and asset prices (thus influencing systemic risk), coordination between monetary and macroprudential policy is key. It analyzes why macroprudential policy and its objective of financial stability could be in conflict with the price stability objective of monetary policy. These and other issues related to interactions between macroprudential policy and monetary policy, including possible conflicts between policy objectives and institutional arrangements, are taken up in chapter 11.

The book concludes with a summary in chapter 11 of the key aspects of an effective macroprudential regulatory framework, a list of remaining challenges for creating such a framework, and an overview of remaining issues in financial regulatory reform more broadly. The chapter presents key elements that are still missing from an effective macroprudential regulatory framework in most countries, and lists the remaining challenges for financial regulatory policy, including the optimal size and structure of the financial system (as well as a diversity in the financial system among market finance, banks, and other financial intermediaries), a credible mechanism to intervene early on in failing financial intermediaries, a restoration of market discipline at financial intermediaries (including good corporate governance

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standards in banks, disclosure, and accounting reforms), and better macroprudential supervision with systemwide data for supervisors, improved risk models, and real time measures of systemic risk.

Consideration will also be given to the institutional setup and organization of macroprudential policy including the existing set of tools, the regulatory challenges arising from regulatory arbitrage, the multiplicity of regulatory bodies in the United States, the creation of a banking union in the European Union, the supervision and resolution of cross-border financial institutions, and some international policy spillovers, including the impact of monetary policy of the United States and Europe for emerging countries' asset and credit bubbles through international capital inflows. Domestic macroprudential policy may be distortionary, and some international cooperation on macroprudential policies will be essential.

Concluding remarks offer a list of the main takeaways from the book. They emphasize the preventive role of macroprudential policy, the need to complement such policy with higher capital requirements, strong supervision, credible resolution, and sound macroeconomic policies, and the limits and political economy constraints of macroprudential policy.

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