

Overview

Over a decade has passed since the collapse of the U.S. investment bank Lehman Brothers marked the onset of the largest global economic crisis since the Great Depression. Drawing on 10 years of data and analysis, this report reflects on the causes of the crisis and the regulatory remedies adopted to prevent future financial troubles. Today, there is widespread agreement that the crisis was caused by excessive risk-taking by financial institutions. Financial intermediaries increased their leverage, drawing heavily on wholesale funding; they lowered their lending standards and, relying on inaccurate credit ratings, invested in complex structured instruments.

The crisis revealed major shortcomings in market discipline, regulation, and supervision, and reopened important policy debates on financial regulation.¹ Since the onset of the crisis, emphasis has been placed on better regulation of banking systems and on enhancing the tools available to supervisory agencies to oversee banks and intervene speedily in case of distress. Examining the key reforms in regulation and supervision since the crisis, specifically the experience of and lessons for developing countries, is what motivates this issue of the *Global Financial Development Report*.

After the onset of the crisis, there was much talk about using the crisis to push through

difficult but needed regulatory reforms. At the global level, the G-20 has mandated the Financial Stability Board (FSB) to promote the coordinated development and implementation of effective regulatory, supervisory, and other financial sector policies. As part of this regulatory reform agenda, the Basel Committee on Banking Supervision (BCBS) prepared new capital and liquidity requirements for banks under the third Basel framework, Basel III. At the national level, many countries have enacted or are still in the process of adopting new laws and regulations in response to the lessons from the crisis. In addition to strengthening microprudential rules, many countries have stepped up efforts in the area of macroprudential policy, as well as put into effect better regimes for bank resolution and consumer protection.

Because the crisis emanated from advanced countries, much of the reform effort focused on reforms in that part of the world, with less emphasis on developing countries. Thus, there is a lack of systematic evidence on the detailed reforms undertaken by developing countries and on their impact on the stability and lending behavior of local banking sectors. Using new data from the World Bank's Bank Regulation and Supervision Survey (BRSS)

around the world, a key objective of this report is to start filling these knowledge gaps.

Bank regulation and supervision—the rules of the game and how they are enforced—are paramount for the effective functioning of domestic banking systems. Banks are in the business of asset transformation and liquidity creation because they transform short-term liquid deposits into long-term illiquid assets. Imperfect information and a reliance on short-term funding, combined with high leverage and limited liability, create a potentially unstable system prone to runs, generating negative externalities that can affect the wider economy (Diamond and Dybvig 1983). Moreover, many bank creditors are unsophisticated depositors with a limited capacity to monitor bank operations. Thus, government represents these stakeholders, providing oversight through regulation and supervision (Dewatripont and Tirole 1994), as well as a safety net to protect them.

Incentives are critical in the financial sector. For effective bank regulation, it is important to complement government oversight with private monitoring. Such market discipline by outside parties capable of and incentivized to monitor bank operations reinforces government regulation. However, implicit

and explicit government guarantees and wider safety net and resolution mechanisms intended to instill confidence and provide stability can also distort the incentives of bank managers and bank liability holders and make them prone to excessive risk-taking. The incentive distortions are twofold. First, government guarantees incentivize banks to take on riskier investments because the economic profits from higher risk-taking are privately captured by the bank, but losses are often socialized through the safety-net guarantees. Second, because in practice not only small depositors but also other bank liability holders are often protected when a bank fails, their incentives to monitor the financial condition of their bank are significantly reduced. Designing policies that align private incentives with the public interest to minimize these distortions is a key challenge of regulation and supervision, as well as of bank resolution regimes.

Where are reforms of bank regulation and supervision a decade after the global financial crisis? A renewed focus on systemic risks and macroprudential regulation, and the need to pay greater attention to incentives in the design of regulation and supervision, were among the early lessons of the crisis. New data from the BRSS (see box O.1 for a

BOX 0.1 The World Bank's 2019 Bank Regulation and Supervision Survey

An important input into this report is the 2019 update of the World Bank's Bank Regulation and Supervision Survey (BRSS). The survey is a unique data set of bank regulation and supervision around the world. In the early 2000s, the World Bank created a global database of bank regulation and supervision (Barth, Caprio, and Levine 2001). The second update of the database was issued in 2003, the third in 2007, and the fourth in 2012. The current update represents the fifth wave and was completed in 2019.

This update of the survey encompasses information on 160 jurisdictions (including two monetary areas and the West African Economic and Monetary Union), 66 high-income countries, and 93 developing

countries. These jurisdictions include all G-20 countries and countries from all the World Bank developing regions.

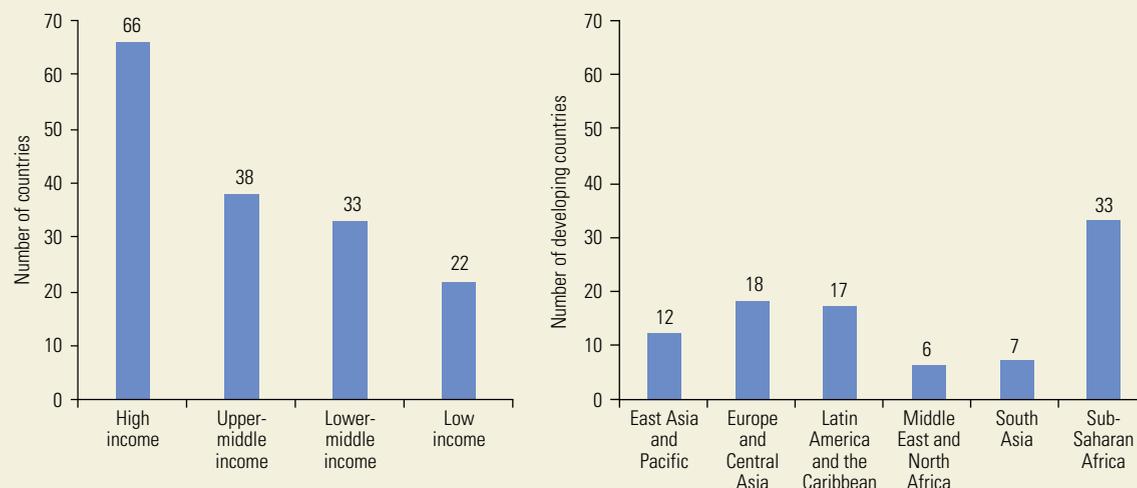
The survey went through a major revision for the 2012 update, but several questions from the 2007 survey were not changed for reasons of comparability. Other questions have been reformulated to generate more precise answers. Several questions were added, in particular on macroprudential regulation and consumer protection.

The current update of the survey questionnaire builds on previous waves by adding new questions on recent regulatory developments that characterized the period 2011–16, such as the Basel III capital

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BOX 0.1 The World Bank’s 2019 Bank Regulation and Supervision Survey (continued)

FIGURE BO.1.1 Geographic Coverage of Bank Regulation and Supervision Survey, 2019



Source: Bank Regulation and Supervision Survey (BRSS), wave 5, <https://www.worldbank.org/en/research/brief/BRSS>.

and liquidity requirements, bank resolution mechanisms, and macroprudential supervision. Specifically, compared with the 2012 wave, the 2019 wave has 91 new questions and a new section on Islamic banking. Just two questions have been discontinued, and 12 questions in the two most recent surveys do not match exactly. The survey design and revisions mobilize the expertise of both supervisors and researchers. Most of the questions have been redrafted or changed to improve clarity and lessen measurement error concerns. The final list of questions included in the fifth wave of the BRSS reflects feedback from several banking experts, both within and outside the World Bank, who suggested rewording of questions from the previous wave and the inclusion of new questions.

The survey questionnaire was distributed in March 2017 using the survey platform Qualtrics. It

was sent to the directors of bank supervision units or relevant officials within bank supervisory authorities. Thirty agencies opted to submit their answers on a hard copy of the questionnaire. To limit coding errors, the survey team regularly communicated with the national authorities and clarified the intended meaning of the BRSS questions. Each submission has been checked by the survey team, and there has been follow-up with the relevant agencies to clarify any issues arising from conflicting answers to diverse questions, or consistency between responses in the current survey and the preceding one. The data were finalized in 2019.

For an in-depth description of changes in bank regulation and supervision and an empirical analysis of what drove those changes, see Anginer et al. (2019) and box 1.6 in chapter 1. The sections of BRSS 2019 are as follows:

1. Entry into banking	4. Activities	7. Liquidity and diversification requirements	10. Accounting/ information disclosure	13. Banking sector characteristics
2. Ownership	5. External auditing requirements	8. Depositor (savings) protection schemes	11. Discipline/problem institutions/exit	14. Consumer protection
3. Capital	6. Bank governance	9. Asset classification, provisioning, and write-offs	12. Supervision	15. Islamic banking

description of the database) provide an assessment of progress with the reforms since the crisis. This report examines these new data and both new and existing evidence on bank regulation and supervision to inform policy makers. Because regulatory reform is a very broad topic with many dimensions, the analysis mostly focuses on two key areas: the progress and impact of the reforms on market discipline and bank capital regulation. Nevertheless, the database being released along with this report is comprehensive, and its analysis over the coming years will likely shed light on many other facets of bank regulation and supervision.

Overall, this report sifts through data and research evidence to shed light on important

policy concerns. To what extent are regulatory reforms designed with high-income countries in mind appropriate for developing countries? What has been the impact of reforms on market discipline and bank capital? How should countries balance the political and social demands for a safety net for users of the financial system with potentially severe moral hazard consequences? Are higher capital requirements damaging to the flow of credit? How should capital regulation be designed to improve stability and access? The report provides a synthesis of what we know, as well as areas where more evidence is still needed. Box O.2 provides the main messages.

The views of policy makers and other financial sector practitioners are split on the

BOX O.2 Main Messages of This Report

The 2007–09 global financial crisis has called into question the role of financial policy in general, especially in banking, revealing major shortcomings in market discipline, regulation, and supervision. The decade following the crisis was characterized by intense regulation of banking sectors across the world, especially in advanced countries. The crisis has also reignited the debate about the right blend of regulation and market discipline to ensure the safety and efficient functioning of banking systems.

A key challenge of bank regulation is to align private incentives with the public interest without taxing or subsidizing private risk-taking. Incentives are critical in the banking sector. Effective regulation and supervision need to harness the power of market discipline to curb excessive risk-taking by private parties. Design of safety nets and guarantees, availability of information, and capital regulation—all play a very important role in reinforcing or undermining market discipline.

Government interventions and the expansion of safety nets may have undermined market discipline. The crisis led to widespread government interventions to rescue insolvent banks, reinforcing too-big-to-fail subsidies. Since the crisis, deposit insurance

systems around the world have expanded and have become more generous. The availability and quality of information disclosure have not improved significantly. These developments may have undermined market discipline, damaging both the incentives and ability of market participants to monitor financial institutions and making the job of regulators more challenging. Although, after the crisis, new regulations were put in place to improve resolution of systemically important banks, cross-border resolution systems remain underdeveloped and many of these mechanisms are untested. Moreover, despite these efforts to address too-big-to-fail issues, large banks have continued to become larger and more complex, and systemically important banks' share of global banking assets has increased in recent years.

The Basel III framework and capital regulations after the crisis were intended to increase both the quantity and quality of capital. Regulatory capital ratios are at their highest since the crisis, but analyzing data for 158 jurisdictions and 20,000 banks reveals that this has been driven mainly by a shift toward asset categories with lower risk weights. Thus for many banks, improvements in capital hinge on the extent to which risk weights reflect actual risk across different asset classes. In addition, most

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BOX 0.2 Main Messages of This Report (continued)

authorities now allow a wider array of instruments to satisfy Tier 1 capital—a regulatory capital component that is supposed to have the greatest capacity for loss absorption. This issue is important since it may lead to deterioration of the quality of capital in the future. Furthermore, noncash assets, including borrowed funds, are increasingly being permitted as initial bank capital in developing countries. Therefore, while on the surface it looks like banks may now be holding more equity and safer assets than before the crisis, the numbers may be providing a false sense of security.

After the crisis, bank regulations became more complex, potentially reducing transparency, increasing regulatory arbitrage, and taxing supervisory resources and capacity. Overall, a growing number of countries have adopted components of Basel II and III since the crisis. Developing countries have been shifting out of Basel I, and nearly 40 percent have adopted some aspects of Basel III. Many, however, have also been selective in their adoption, eschewing some of the more complicated aspects, such as using internal models to assess bank risk. Supervisory capacity in the developing world did not improve to keep up with the increasing complexity of bank regulations.

When it comes to regulation, one size does not fit all. This is the “principle of proportionality” in regulatory jargon. The level of public intervention should

not exceed what is appropriate to achieve the social objectives. Thus, regulation and supervision need to be appropriate for the institutional environment, strength of market discipline, supervisory capacity, and business models of banks in a given country.

Less can be more. Especially in developing countries, adoption of sophisticated rules designed for developed countries may not be beneficial. Less complex regulations may mean more effective enforcement by supervisors and better monitoring by stakeholders. Within banking sectors, proportionality would suggest the application of simplified prudential regulations for small or noncomplex institutions to reduce excessive compliance costs.

Regulations also need to be compatible with incentives. Working with the market instead of against it is essential for effective regulation. Generating and incentivizing markets to provide signals would reinforce official supervision. Transparency, disclosure, and incentive compatibility of regulations would harness market forces and improve the effectiveness of regulation. Government interventions in finance need to be incentive-compatible to be effective, but designing and enforcing such regulations are complex tasks, particularly where sophisticated markets do not exist and institutions are underdeveloped. Globalization and technological change are important trends that make it even more challenging to provide effective oversight of banks.

net impact of postcrisis regulatory changes on developing countries. In the latest rounds of the Financial Development Barometer—an informal poll of policy makers in developing countries undertaken for this *Global Financial Development Report* (see box O.3)—most respondents signal that reforms were effective in enhancing financial stability by reducing the transmission of international shocks. Nevertheless, close to 70 percent of the respondents are also concerned that more restrictive regulations have led to regulatory arbitrage and shifted financial intermediation and risks to the unregulated shadow-banking

industry. Moreover, two in five respondents think that risk-weighted capital requirements are too low to ensure financial stability, suggesting that the debate regarding the optimal level of bank capital is far from over. Finally, 55 percent of the respondents believe postcrisis regulations in developing countries either will have no impact or will be detrimental for those countries. Some of these conflicting responses reflect the lack of systematic data on the progress of reform efforts in developing countries. This *Global Financial Development Report 2019/2020: Bank Regulation and Supervision a Decade after the Global Financial*

BOX 0.3 Views on Regulation and Supervision by Practitioners: Financial Development Barometer

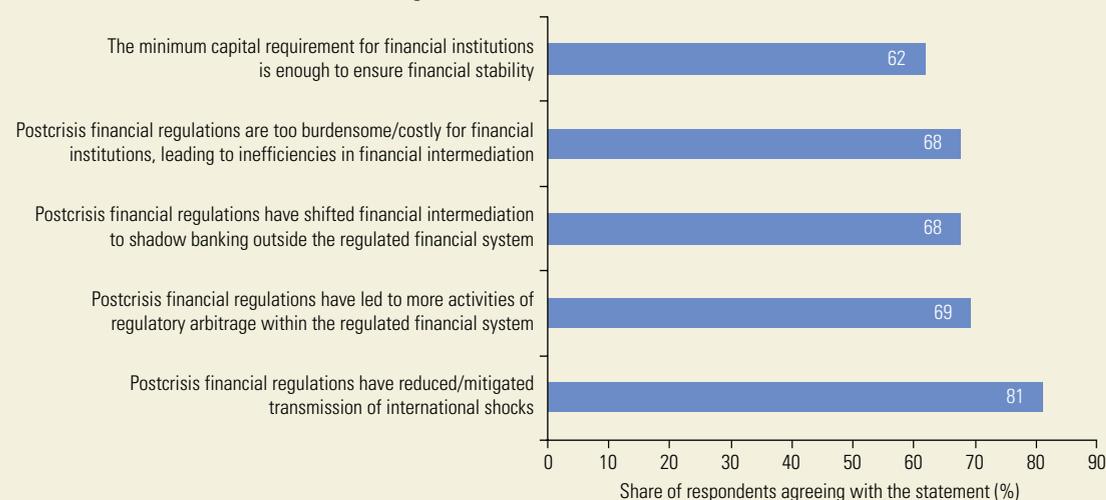
To examine trends and sentiments on key financial sector policy issues, the *Global Financial Development Report* team has used the Financial Development Barometer survey since 2012. The barometer is an informal global poll of financial sector practitioners focusing on development issues. This poll examines trends and sentiments on financial sector issues that are under policy debate. The latest two rounds of the barometer, conducted in 2017 and 2018, include questions on current bank regulations and the efficacy of regulatory changes enacted after the global financial crisis. The responses to these polls reveal interesting insights from central bankers, finance ministry officials, regulatory and supervisory authorities, market participants, and international financial organization practitioners. For the 2017 and 2018 barometers, 179 individuals were polled and 102 responded—on average, for most questions, 42 developed and 60 developing countries responded.

Responses to the barometer questions (figure BO.3.1) suggest that over 80 percent of respondents consider the postcrisis financial reforms to have mitigated the transmission of international shocks. However, almost 70 percent of respondents also think

that postcrisis financial regulations have led to more regulatory arbitrage within the regulated financial system. Another 68 percent believe the new regulations have shifted financial intermediation to entities outside the regulated financial system to shadow banks. Similarly, 68 percent consider the postcrisis regulations to be too burdensome/costly for financial institutions, leading to inefficiencies in financial intermediation. Also, only 62 percent of respondents think the current minimum capital requirement for financial institutions is enough to ensure financial stability.

Participants also have different attitudes toward the likely net impact of regulatory changes enacted after the global financial crisis on the sustainability of financial sector development in developing countries. As reported in table BO.3.1, 19 percent of respondents think that recent regulatory changes are mostly detrimental for developing countries, with another 36 percent believing there will be little impact. Only 45 percent are hopeful that the net impact of the regulatory changes will be mostly positive for developing countries.

FIGURE BO.3.1 Views on Postcrisis Regulations



Source: Financial Development Barometer, 2017–18 (database, World Bank).

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BOX 0.3 Views on Regulation and Supervision by Practitioners: Financial Development Barometer *(continued)*

TABLE B0.3.1 Views on Net Impact of Postcrisis Regulatory Changes

What is your view on the likely net impact of regulatory changes postcrisis for developing countries?

The likely net impact of regulatory changes after crisis for developing countries is	Percentage of respondents agreeing with the statement
Mostly detrimental	19
Little impact	36
Mostly positive	45

Source: Financial Development Barometer, 2017–18 (database, World Bank).

Crisis brings new data and research and draws on available insights and experience to inform the policy discussion.

THE RATIONALE FOR REGULATION AND SUPERVISION

Government's role as regulator and supervisor of banking is key for promoting the stable and efficient functioning of the financial system. Economic theory provides several good reasons for this role. One central reason is the existence of "market imperfections," such as the costs and uncertainties associated with acquiring and processing information that influence all financial contracts and transactions. These imperfections often cause the actions of a few people or institutions to adversely affect many others throughout society. Preventing such externalities is one reason that government's role as regulator and supervisor can improve the functioning of the financial system.

How do these information issues motivate government oversight? Consider the case of "contagion," where the failure of one bank or weakness in one part of the financial system can cause distress in other banks or parts of the financial system. For example, when one bank fails, depositors and creditors may become nervous about the health of other banks. They may seek to withdraw their investments from these otherwise healthy

banks, triggering a cascade of failures—that is, a classic bank run. In this way, weakness in one part of the financial system can stress healthy parts of the system, leading to problems for both individuals and firms that rely on those institutions.

There are also externalities associated with risk-taking that motivate government oversight. For example, cars and trucks rolling down a busy road are more likely to get into a crash when they travel too fast, resulting in costs for all innocent parties involved in the crash. Likewise, financial institutions that take excessive risks are more likely to fail and cause problems for the rest of the system. The larger the truck and the faster it goes, the more costly the crash is likely to be. Thus another way to think of bank regulation is as a "speed limit" or a "speed bump" that limits excessive risk-taking, particularly for large institutions whose crashes are likely to be most costly.

There are additional reasons for imposing such limits. Governments are often forced to bail out troubled banks, which means that financial institutions often do not bear the full risk of their activities. For example, when a large bank makes risky investments, and the bets pay off, the gains are private, in that the bank's owners reap the profits. However, when such gambles fail, the losses are often socialized—that is, the government pays for some of the losses. Bailouts of troubled banks

through guarantees and inefficient resolution practices spread the costs of failed gambles to taxpayers who had no part in the original risky bets. Society often demands some protection, particularly for those depositors who are unable to assess risks by themselves, despite the fact that such protection may make banks even more likely to take excessive risks—a behavior associated with “moral hazard.” This is another reason governments intervene and introduce speed bumps and limits.

Aside from unsophisticated depositors’ inability to assess risk and monitor financial institutions, the complexity of financial instruments, the inability to appreciate the possibility of rare and extreme events, and the tendency of some people to follow the crowd (herding) can lead even sophisticated investors to make systematic mistakes. Such behavior can jeopardize the stability of the economy and can again cascade through to people with no part in or influence over the initial investments. This is another reason governments may take an active role in regulating financial institutions and markets.

Regulation and supervision can constrain the adverse implications of market failures. Governments can limit excessive risk-taking to prevent externalities associated with financial fragility. They can also design the safety nets, associated guarantees, and insolvency resolution systems needed to protect unsophisticated depositors and meet the social demands for a safety net, and yet minimize the moral hazard that arises from such protection by leaving large depositors, creditors, and investors unprotected so they are incentivized to monitor the institutions. Importantly, the authorities can promote information disclosure and transparency to facilitate more informed financial decisions and monitoring by all market participants. They can even regulate financial products—much like that for food and drugs—to protect the consumers of these products. These are all valid and important reasons for regulation and supervision.

However, just because governments can address market failures and improve the functioning of the financial system does not mean they will. Governments can fail as well. Correcting for market imperfections

is complicated, and measuring risks and enforcing risk-based regulations are far from straightforward. Some regulations that reduce one market imperfection can create other distortions. For example, when governments insure the liabilities of banks to reduce the likelihood of bank runs, the insured investors of banks may no longer monitor the banks and bank management, potentially leading to excessive risk-taking and greater instability. Regulators could require banks to hold capital as large as their loans, which would minimize the risk of failures, but then financial intermediation would grind to a halt, because banks would not be able to lend.

An even more complicated issue is whether the government has sufficient incentives to address market imperfections. Governments and regulatory officials do not always use their powers to promote the public’s interests. Sometimes, they use the power of the state to achieve different objectives, such as helping friends, family, cronies, and political constituents. Such government failures—or “regulatory capture,” when they happen—can cause serious harm in the financial sector. This also suggests a wariness about relying solely on the government and the political system’s ability to promote the public good.

Regulatory reform is also a slow-moving process that does not match the speed at which the private sector innovates. This leads to a continuous process of regulation, regulatory arbitrage (through which the private sector finds ways to circumvent the reforms), and re-regulation to close the new loopholes. Regulators and supervisors are at a disadvantage when it comes to catching up with profit-motivated financial institutions. Moreover, in many countries supervisory capacity is quite limited.

To overcome these challenges, effective regulation should cultivate and harness the power of market discipline. A clear lesson from research and practice is that banking regulation and supervision need to be supplemented by the use of incentives and information to maximize the number of well-informed, well-motivated monitors of financial intermediaries. Who are these private monitors? The first group includes the owners

and senior management of the bank, whose net worth should depend on the prudent performance of the institution. The second group comprises all outside creditors, investors, large depositors, and counterparties that should be incentivized to monitor the institution because they cannot be certain they will be “bailed out” in case of failure. For market discipline to be effective, market participants should have not only the incentives to monitor banks, but also access to relevant and timely information and the ability to influence banks’ risk-taking behavior. Official regulators and supervisors are the third group of monitors, which should—through information availability and design of policies—both

incentivize the first two groups to be effective monitors and use the signals generated by them to strengthen their own oversight. Effective market discipline can work as a powerful restraining device and complement the government’s regulatory oversight of banks.

Within this broader context, this overview continues with a discussion of recent reforms and trends in the evolution of market discipline and bank capital, and it highlights the relevant background research. The last section reviews the adoption of reforms by developing countries and discusses policies for an integrated framework of regulation and supervision. To navigate the rest of the report, see the outline in box O.4.

BOX 0.4 Navigating This Report

The rest of this report consists of three chapters that cover important elements of bank regulation and supervision, some key facts, and general guidelines for the role of policy. Within this broad topic, the report focuses on two issues—market discipline and bank capital regulation—and tracks their evolution since the crisis using new data and related current research to inform policies.

Chapter 1 provides the conceptual framework for bank regulation and supervision and presents the latest update of the World Bank’s Bank Regulation and Supervision Survey (BRSS). Using these data, the chapter analyzes the developments in capital regulation, market discipline, and supervisory monitoring since the global financial crisis.

Chapter 2 focuses on market discipline. It first defines market discipline and then analyzes the impact of the global financial crisis on long-term incentives to monitor and discipline banks. The chapter also describes recent regulatory reforms and identifies open issues in financial policy making. It concludes with policy recommendations for maximizing the benefits of monitoring by market participants.

Chapter 3 examines bank capital regulation. It discusses the role and functions of bank capital and different policy approaches. It summarizes the evidence on the effect of bank capital on access to finance, economic growth, and financial stability. The chapter also describes the trends in capital regu-

lations and capital holdings after the global financial crisis and draws out policy implications.

Two statistical appendixes follow. Appendix A presents basic country-by-country data on financial system characteristics. It also reports averages of the same indicators for peer groups of countries, together with summary maps. It is an update of information from the 2017/2018 *Global Financial Development Report*. Appendix B provides additional country-by-country information on selected indicators of market discipline, bank capital regulation, and supervision using information from the latest wave of the BRSS.

The accompanying website (<http://www.worldbank.org/financialdevelopment>) contains a wealth of underlying research, additional evidence including country examples, and extensive databases on financial development, providing users with interactive access to information on financial systems. Users can provide feedback on the report, participate in an online version of the Financial Development Barometer, and submit their suggestions for topics for future issues of the report. The website also presents an updated and expanded version of the Global Financial Development Database, a data set of over 70 financial system characteristics for 203 countries compiled since 1960; and the updated Bank Regulation and Supervision Survey, a unique source of comparable country-level data on how banks worldwide are regulated and supervised.

MARKET DISCIPLINE AFTER THE GLOBAL FINANCIAL CRISIS

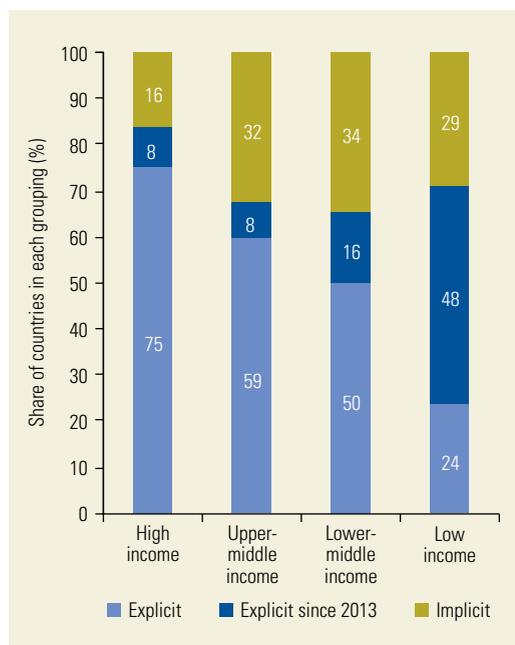
The global financial crisis led to unprecedented interventions by governments to stabilize their economic and financial systems. Significant government support was extended in the form of capital and liquidity injections, guarantees on bank liabilities, and repurchases of impaired bank assets (Laeven and Valencia 2018). Figure O.1 shows the percentage of countries with explicit insurance in 2016 as well as the increase compared with 2013, which is indicated by the dark blue sections of the graph. Over 80 percent of countries in the high-income group now have some form of explicit deposit insurance in place. The percentage of other countries with explicit deposit insurance has also increased since 2013, especially the percentage of those

in the low-income group. Using the latest wave of the BRSS, Anginer and Demirgüç-Kunt (forthcoming) show that there was also a significant expansion in deposit insurance—both coverage and scope—during the crisis, with a number of countries offering blanket guarantees. These trends we observe in the data are worrisome since research suggests that good design of deposit insurance schemes, including limited coverage, is particularly important in weak institutional settings to ensure that deposit insurance actually functions as a useful part of a country’s overall system of bank regulation (Demirgüç-Kunt, Kane, and Laeven 2008).

These widespread interventions and the significant expansion of the safety net effectively socialized private losses, distorting the incentives of bank owners, managers, and depositors, and further reinforcing expectations that they would be “bailed out” in case of trouble. Such expectations generally led financial institutions to become more connected and larger in order to maximize their “too-big-to-fail” subsidies. These trends then continued after the crisis. As a result of mergers and acquisitions (some of which were forced or encouraged by supervisors), large banks have grown even larger, and the global banking system has become more concentrated. Moreover, after the crisis, there was a further increase in the organizational complexity of large banks (Lagarde 2018). This growing size and complexity make transparency and information even more important if market discipline is to be effective.

In the postcrisis period, there was a recognition that market discipline was undermined by government intervention in the banking sector. Market discipline was first introduced as the third pillar of the Basel II capital accord as a way to complement and support official oversight of financial institutions. Following the crisis, insolvency resolution schemes were redesigned to incentivize banks’ shareholders and managers to encourage the prudent management of banks. Complementing increased capital requirements, resolution schemes are intended to make it easier to protect essential functions and retail customer needs while

FIGURE O.1 Deposit Insurance Systems Expanded since the Global Financial Crisis, by Country Income Group



Source: Bank Regulation and Supervision Survey (BRSS), waves 4 and 5, <https://www.worldbank.org/en/research/brief/BRSS>.

Note: The figure shows the percentage of countries in each income group that have explicit deposit insurance. The dark blue sections show the increase in percentage since 2013. The green sections show the percentage of countries with no explicit (implicit) insurance scheme. It is assumed that any country that lacks an explicit deposit insurance scheme has implicit deposit insurance.

“bailing in” the uninsured creditors of a failing bank. Such schemes are expected to increase the incentives for prudent management and investment and to reduce moral hazard. For example, progress was made in introducing both a new resolution process for bank-holding companies, implemented through a single point of entry framework, and new requirements for systemically important bank creditors to bear some of the burden of bank default by having a portion of their debt written off (also known as bail-in regulations). Large banks were required to submit plans that detailed a strategy for rapid and orderly resolution in the event of financial distress (living wills). Efforts were initiated to achieve more coordinated cross-border resolution systems, although implementation remains uncertain. Enhanced supervision of risk management and risk-reporting processes were also introduced for banks, including periodic stress tests. According to BRSS data, over one-third of developing countries introduced creditor bail-in initiatives, and close to two-fifths had requirements for bank resolution plans. However, very few developing countries have put in place a formal regulatory framework to deal with the resolution of international banks—confirming the concerns that this is an area of reform that remains weak in general (Lagarde 2018). Also, despite the greater complexity of bank regulation, the supervisory capacity in developing countries did not improve significantly since the crisis. Moreover, BRSS data do not show significant improvements in the quality and availability of information for market participants or to the broader public either, especially in developing countries.

Whether the recent reforms can dampen investor expectations of government support going forward is as yet unknown. Some aspects of these new regulatory reforms, such as higher capital surcharges and requirements to hold bail-in debt and the implementation of procedures to resolve or orderly liquidate large financial institutions, can reinforce incentives for market discipline. Overall, despite the regulatory efforts after the crisis, these newly introduced measures have yet to

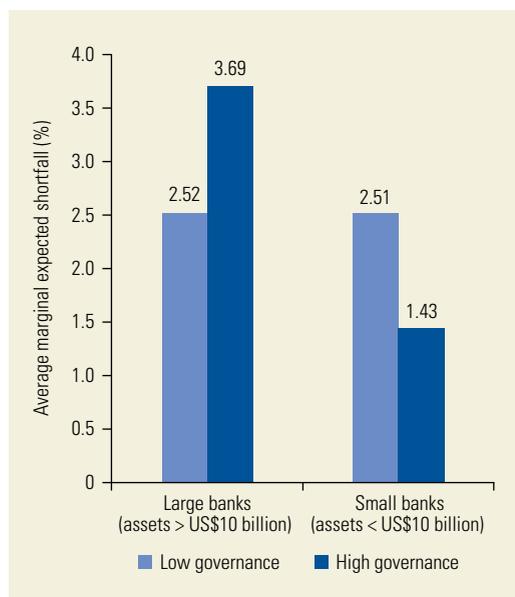
be tested under distress. It remains to be seen if they will be adequate to offset the long-term effects on market discipline of the widespread bailouts and blanket guarantees of the last crisis.

The financial crisis also prompted reforms of bank governance, but these may not be effective or may even backfire if risk-taking incentives are distorted and market discipline is weak. Many countries undertook bank governance reforms after the crisis, implementing changes to boards, executive compensation, and risk management processes. However, improving the corporate governance of banks while generous financial safety nets continue to distort market discipline and risk-taking incentives can backfire. Indeed, recent research suggests that in such circumstances, better-governed banks will simply better exploit the financial safety net, lowering their levels of capital and taking on more risk (Anginer et al. 2018). For example, using data for an international sample of publicly traded banks, Anginer et al. (2018) show that better bank governance—as measured by the size and independence of bank boards—is associated with higher systemic risk measures for large banks, which are more likely to benefit from too-big-to-fail guarantees (figure O.2). Moreover, they show that better governance varies more positively with individual bank and systemic risks in countries with more generous financial safety nets. Shareholder-friendly corporate governance is also associated with lower bank capitalization (Anginer et al. 2016).

BANK CAPITAL REGULATION AFTER THE GLOBAL FINANCIAL CRISIS

An important element of the postcrisis reform effort was the introduction of higher capital and liquidity requirements. Higher bank capital requirements are one way of ensuring market discipline because shareholders that have more “skin in the game” are likely to avoid excessive risk-taking. Sufficient capital also provides a cushion for absorbing losses during a crisis or other times of bank distress and

FIGURE 0.2 Better Bank Governance Is Associated with Higher Levels of Systemic Risk for Large Banks

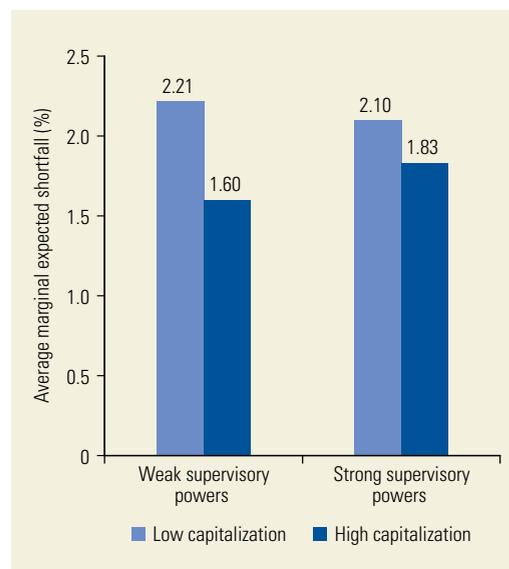


Source: World Bank staff calculations, based on Anginer et al. (2018).
Note: The average marginal expected shortfall (MES) is a measure of systemic fragility, computed as the average stock return of a firm when the market return is in the bottom fifth percentile in a given year. MES is multiplied by -1 so that higher values indicate higher risk. Bank size is based on the book value of total assets. The governance measure draws from 44 individual governance attributes related to board size and composition, compensation and ownership, external auditing, and anti-takeover measures. The sample includes international publicly traded banks over the period 2004–08.

may improve screening and monitoring by banks (Calomiris 2012; World Bank 2012).

Higher capital requirements may also compensate for weaknesses in private monitoring and weak supervisory capacity, particularly in developing countries. Recent research using data from an international sample of publicly traded banks finds that the relationship between bank capital and systemic risk varies, depending on the institutional environment, information availability, and monitoring efficiency of bank regulators (Anginer, Demirgüç-Kunt, and Mare 2018). These results suggest that in countries with weaker market monitoring and supervisory capacity, having well-capitalized banks is even more important for systemic stability. For example, figure O.3 illustrates that in countries with weaker supervision, an increase in bank capital is associated with a significantly greater reduction in

FIGURE 0.3 The Relationship between Bank Capital and Systemic Stability Is Stronger in Countries with Weaker Supervision



Source: World Bank staff calculations based on Anginer, Demirgüç-Kunt, and Mare (2018).

Note: For a definition of marginal expected shortfall, see the note to figure O.2. Banks are grouped by “low capitalization” (the bank’s capital is in the first quartile of the regulatory capital distribution) or “high capitalization” (bank’s capital is in the fourth quartile of the regulatory capital distribution). Countries are also grouped by those with “weak supervisory powers” (the supervisory power index in the first quartile of the supervisory power index distribution) and “strong supervisory powers” (the supervisory power index in the fourth quartile of the supervisory power index distribution). Supervisory power is an index measuring supervisory authorities’ power to take specific preventive and corrective actions. The sample includes publicly traded banks in 61 countries over the period 1997–2012.

systemic risk, compared with countries with stronger supervisory capacity. These findings suggest that enhancing the quality and quantity of bank capital is likely to be even more important for mitigating the adverse effects of a lack of supervisory capacity and information availability. In countries where regulating and supervising banks can be prohibitively costly, higher capital regulations may compensate for weaker official oversight.

The Basel III capital framework, proposed in 2009 and currently being implemented, aims to increase the quality and quantity of capital. Data suggest that in high-income countries, reforms have indeed led regulatory capital (capital to risk-weighted assets) to increase and catch up with that of developing countries since the crisis—but the ratio of

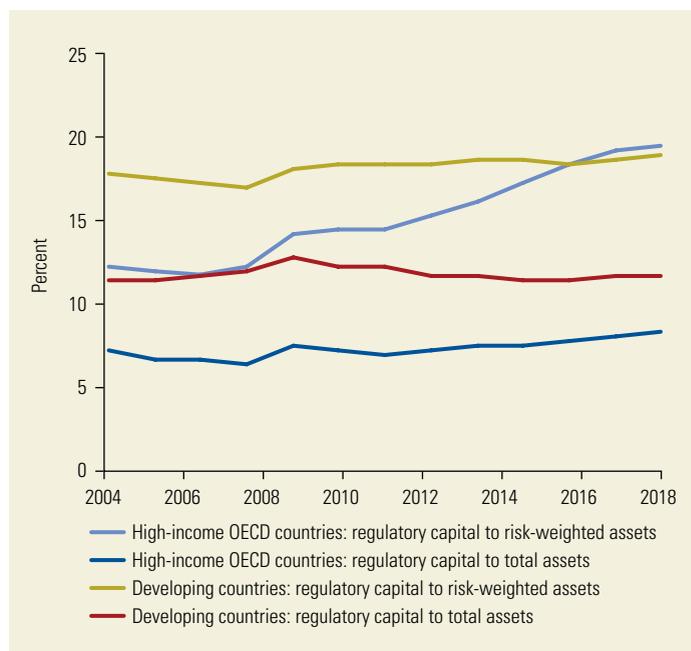
capital to total assets has increased much less (figure O.4).² Therefore, the increases in regulatory capital are mostly driven by a shift toward asset categories with lower risk weights.

We observe similar patterns when we investigate these ratios for banks of different sizes. The largest European banks—and, to a lesser extent, the largest American banks—have increased their capital ratios by at least partially reducing their risk-weighted assets, consistent with the findings of Gropp et al. (2019) and BCBS (2018c). For small banks in high-income countries, and for large and small banks in developing countries, changes over time in these ratios are more muted, resulting in the above-noted aggregate patterns.³

Studies of bank capital during the global financial crisis suggest that investors paid much less attention to risk-weighted capital ratios. Using Bankscope data for an international sample of publicly listed banks, Demirgüç-Kunt, Detragiache, and Merrouche (2013) examine the relationship between bank capital and stock market returns around the time of the global financial crisis. They examine different measures of capital to determine which measure shows the strongest correlation with stock returns. Their results reveal that higher capital was linked with higher stock returns during the crisis and that this relationship is stronger when capital is measured as a simple leverage ratio rather than a risk-weighted ratio, particularly for large banks (figure O.5). This finding may reflect the fact that market participants viewed the risk adjustment under Basel rules as subject to manipulation or at least as not reflective of true risk for large banks. These results also suggest that authorities should be cautious of improvements in capital that hinge on the assumption that risk weights reflect actual risk across different asset classes.

Quality matters. Another finding of this research is that higher-quality capital—Tier 1 capital and common equity—displays a stronger correlation with subsequent stock market returns than lower-quality Tier 2 capital, especially for larger banks. Overall, these findings support the view that a stronger capital position is an important asset during a crisis,

FIGURE O.4 Regulatory Capital-to-Asset Ratios over Time, 2004–18

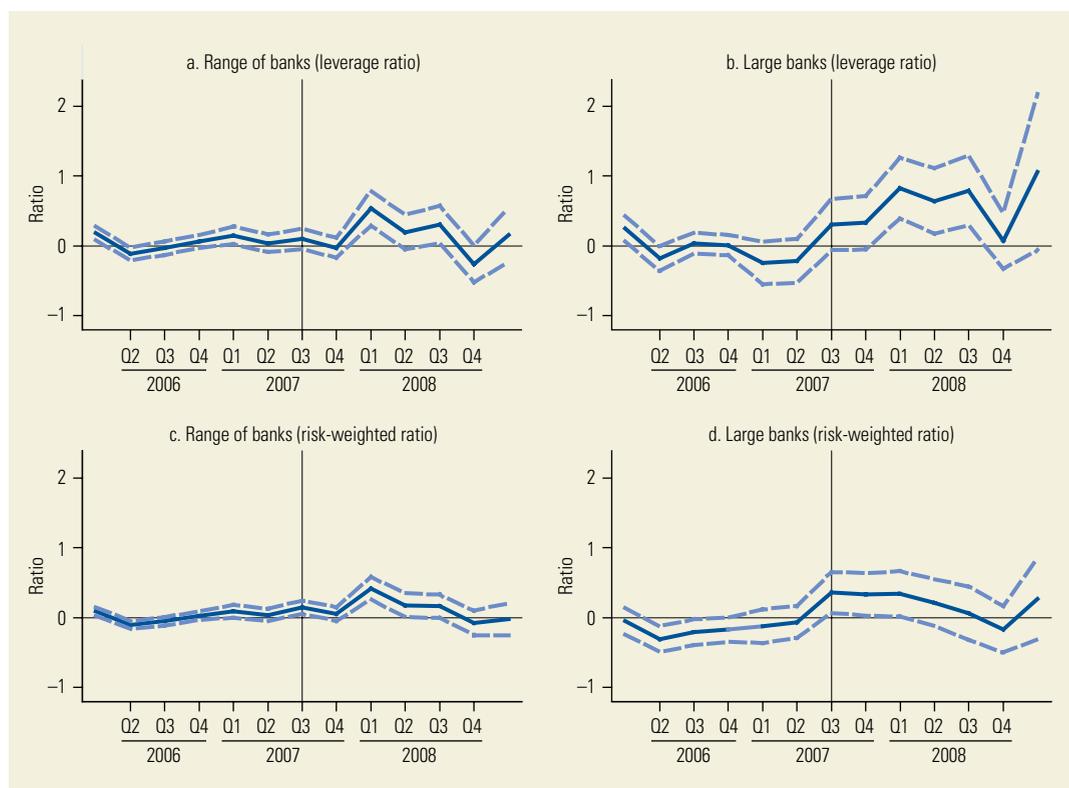


Source: World Bank staff calculations, based on data from Financial Soundness Indicators (FSI), an IMF database: <http://data.imf.org/?sk=51B096FA-2CD2-40C2-8D09-0699CC1764DA>.

Note: The Financial Soundness Indicators (FSI) provide country-level data on total capital and asset holdings of the banking sector, as reported by participating countries to the IMF. All ratios used in the figure are calculated based on the underlying totals. For example, regulatory capital to total assets is calculated as total regulatory capital divided by total assets of the banking sector. Country-level ratios are then averaged across high-income OECD countries and developing countries using a simple average. Weighting FSI data by GDP when averaging across countries leads to comparable trends. Developing countries are those classified as such in the World Bank developing regions. OECD = Organisation for Economic Co-operation and Development.

suggesting that the postcrisis emphasis on strengthening capital requirements is appropriate. Introduction of a minimum leverage ratio to supplement minimum risk-weighted capital requirements is advisable (and is part of the Basel III regulation), because properly measuring risk exposure is very difficult, especially for large and complex financial organizations. Furthermore, a greater emphasis on higher-quality capital in the form of Tier 1 capital or common equity is justified.

Indeed, the ratio of Tier 1 capital to total regulatory capital has increased since the crisis, likely reflecting the regulatory changes. From 2005 to 2017, the ratio of Tier 1 capital to total regulatory capital increased from 75 percent to about 90 percent in high-income Organisation for Economic Co-operation and Development (OECD) countries and from 80

FIGURE 0.5 Response of Bank Stock Returns to Lagged Bank Capital, 2006–08

Source: Demirgüç-Kunt, Detragiache, and Merrouche 2013.

Note: The leverage ratio is measured as Tier 1 + Tier 2 capital to total assets; the risk-weighted ratio is defined as Tier 1 + Tier 2 capital to risk-weighted assets.

percent to 90 percent in developing countries (figure O.6). However, BRSS data also suggest that the definition of Tier 1 capital was broadened in many countries, and now includes hybrid debt capital instruments, asset valuation gains, and subordinated debt. This potentially reduces the quality of Tier 1 capital and its loss absorption capacity in times of distress. There is no evidence that institutions are currently relying on these laxer forms of capital in their composition of Tier 1 capital. However, going forward, this is an issue that also bears watching.

Increases in the quantity and quality of capital can foster financial stability, but there are concerns that increased capital requirements can also reduce access to credit, at least in the short run. There is limited evidence on this relationship, but available research suggests that banks prefer to reduce their lending rather

than raise capital because issuing equity is costly (Aiyar, Calomiris, and Wieladek 2015; Gropp et al. 2019). Several studies point out that the regulation-tightening in high-income OECD countries has led banks in those countries to lend less in developing countries. The effects on lending may be mitigated by allowing banks to use contingent convertible bonds (CoCos), which is less costly than equity capital. However, experience with this instrument remains limited, and it is not clear how well it will perform in distress. It is also not a viable option for countries without developed capital markets. Other studies dismiss the cost reasons and argue that substantially higher equity capital requirements in the long run will not affect the loan supply adversely, but curb excessive risk-taking (Admati and Helwig 2013). How long banks take to adjust to higher capital requirements, the long-term

impact of these changes on loan supply, and whether increasing the capital requirements significantly would change these relationships, are still open questions.

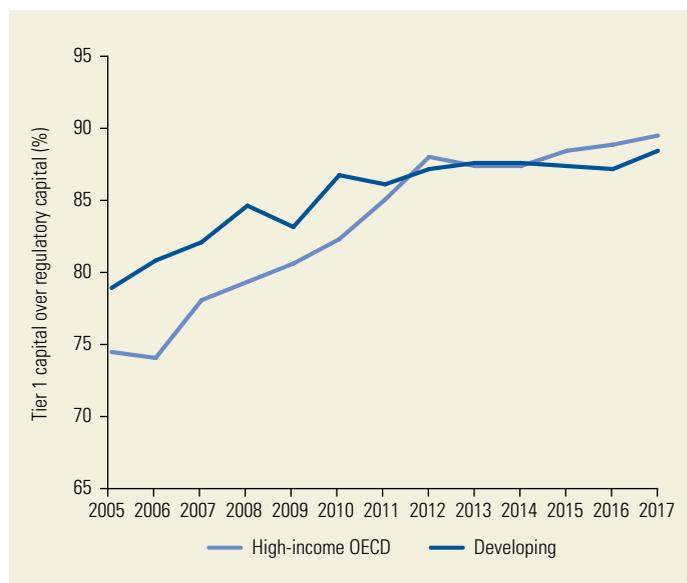
ADOPTION OF REFORMS IN DEVELOPING COUNTRIES AND AN INTEGRATED FRAMEWORK FOR BANK REGULATION AND SUPERVISION

High-income countries have adopted Basel III more quickly than middle- and low-income countries. In the BRSS, all countries reported using one of the Basel regimes, but many were still using Basel I or II. Basel III's adoption is related to country income level, with higher-income countries often having moved to Basel III. More than 80 percent of high-income countries have already adopted Basel III, followed by about half of upper-middle-income countries and one-third of lower-middle-income countries (figure O.7). Only five low-income countries reported using Basel III.

One size does not fit all. The “principle of proportionality” suggests that the level of public intervention should not exceed what is appropriate to achieve the social objectives. Thus, regulation and supervision need to be appropriate to the institutional environment, strength of market discipline, supervisory capacity, and business models of banks in a given country. Both Basel II and III were designed to fit the needs of the more sophisticated banking sectors of Basel Committee members. As such, the rules proposed under these agreements may be overly complex for banking sectors in many developing countries. The reliance of Basel II and III on market discipline and strong supervisory capacity can even have an adverse effect on the banking sectors of countries with weaker institutional environments where market discipline and supervisory capacity are thin. The fact that developing countries are taking a more cautious approach is consistent with proportionality.

Selective adoption of more complex frameworks and higher capitalization are appropriate in settings with limited market

FIGURE O.6 Tier 1 Capital to Total Regulatory Capital, 2005–17

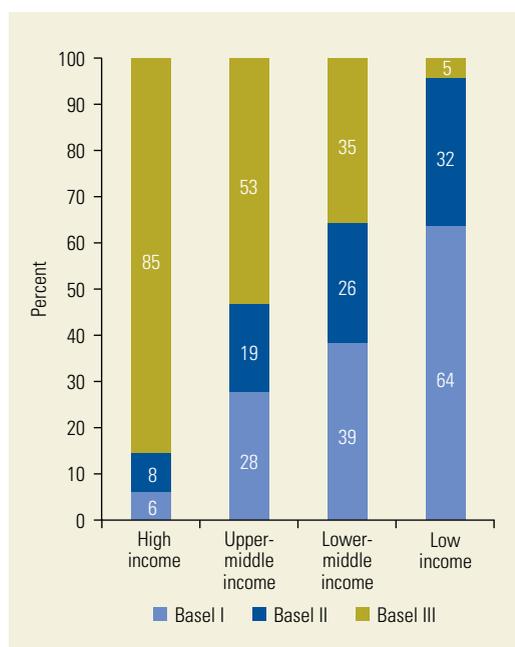


Source: World Bank staff calculations, based on data from Financial Soundness Indicators (FSI), an IMF database, <http://data.imf.org/?sk=51B096FA-2CD2-40C2-8D09-0699CC1764DA>.

Note: The Financial Soundness Indicators (FSI) provide country-level data on total capital and asset holdings of the banking sector, as reported by participating countries to the IMF. All ratios used in the figure are calculated based on the underlying totals. For example, Tier 1 capital to regulatory capital is calculated as total Tier 1 capital divided by regulatory capital of the banking sector. Country-level ratios are then averaged across high-income OECD countries and developing countries using a simple average. Weighting FSI data by GDP when averaging across countries leads to comparable trends. Developing countries are those classified as such in the World Bank developing regions. OECD = Organisation for Economic Co-operation and Development.

discipline and supervisory capacity. Investigating the adoption process and bank capital ratios using the BRSS data, Anginer et al. (2019) confirm this cautious approach, though they show that the ratio of bank equity to total assets also tends to be higher for developing country banks of comparable size. They find that countries at higher levels of economic development, and those that had a banking crisis, are more likely to adopt more advanced levels of regulation. Also influential in this decision are external factors such as FSB membership or widespread adoption by other countries, suggesting that emulating best practice lessons also plays an important role. Furthermore, complementarities matter: countries with more developed institutions, stronger market discipline, and regulatory and supervisory capacity are more likely to adopt more complex frameworks. Finally, research supports the higher capitalization

FIGURE 0.7 Share of Countries Following Each Basel Regime, by Country Income Group



Source: Bank Regulation and Supervision Survey (BRSS), wave 5, <https://www.worldbank.org/en/research/brief/BRSS>.

Note: The figure is based on data from 133 countries.

of banks in developing countries as prudent policy because capital can compensate for weaker private monitoring and supervisory capacity.

Less can be more. After the global financial crisis, bank regulations became more complex, potentially reducing transparency, increasing regulatory arbitrage, and taxing supervisory resources and capacity. Simpler regulations may be more appropriate, particularly in underdeveloped institutional environments with limited information, weak private monitoring, and supervisory capacity. Complex regulatory approaches also generate arbitrage opportunities and are more difficult to enforce. Overall, research supports the view that the emphasis on strengthening capital requirements and introducing leverage ratios was appropriate. But properly measuring risk exposure is very difficult, particularly for large and complex organizations, which calls into question the usefulness of emphasizing risk-weighted concepts of

bank capital. For example, a simple capital ratio—such as the leverage ratio—may be easier to observe and enforce, despite not being able to differentiate for risk. Basel III recognizes this, and introduced a 3 percent leverage ratio (as a complement to the risk-weighted ratio). Whether the minimum value is high enough is a topic for more research—some studies advocate much higher levels (see, for example, Admati 2016).

However, regulations also need to be incentive-compatible. Designing regulations in a way that reduces the incentives of institutions and markets to circumvent them is key to making them effective and breaking the vicious cycle of “regulation–innovation–re-regulation.” Making regulations incentive-compatible is also how regulators can align private incentives with the social good. For example, an alternative approach to risk-based capital regulation would be to have a simple leverage ratio, adjusted upward by the loan spreads banks charge their customers (Calomiris 2011). Using loan spreads to measure loan risk is desirable because these spreads are accurate forecasters of the probability that a loan will become nonperforming and would be an improvement over a simple leverage ratio. This is an example not only of a simple regulation but also of an incentive-compatible one. Banks clearly would not have the incentive to lower their interest rates just to reduce their capital budgeting against a loan, because doing so would reduce their income and defeat the purpose of circumventing the regulation. An added advantage of this approach is that monitoring interest rates is fairly uncomplicated, even in the least developed emerging markets.

An integrated framework for bank regulation and supervision can build on its strengths and compensate for weaknesses. Bank regulations, official supervision, and market discipline are all interrelated. When they work well, the different elements can reinforce and complement each other, strengthening the overall impact. However, with poor design and implementation, regulators and market participants may find themselves at odds, undermining the overall effectiveness of regulation. Therefore,

a key challenge for bank regulators is to design policies that align private incentives with the public interest without taxing or subsidizing private risk-taking.

As memories of the global financial crisis fade away, the determination of regulators and reform momentum tend to decline. Globalization and technological change are also important trends that make it even more challenging to provide effective oversight of banks. Globalization leads to more competition, intensifying the industry pressures on authorities to reduce transparency and accountability. It also contributes to the problem through regulatory arbitrage—since financial institutions are generally able to negotiate less oversight by threatening to move to jurisdictions with lighter regulation. The technological revolution since the crisis has already greatly increased the pace of financial innovation, making it ever more difficult for regulators to catch up with the industry. Fintech, high-frequency trading, and digital currencies all present opportunities but also stability challenges. Furthermore, despite the recent reforms, the crisis experience may have increased the confidence of large banks in their ability to socialize their future losses, leading them to be more creative in seeking new risks. Although it is not possible to predict when and how the next financial crisis will strike, finance is a risky business and crises

will continue to happen. The ultimate goal of public policy is to minimize the frequency and severity of crises. Effective bank regulation and supervision will become more and more challenging in the years to come.

NOTES

1. For an early analysis of the causes of the global financial crisis, see, for example, Caprio, Demirgüç-Kunt, and Kane (2010); French et al. (2010); Rajan (2010); and World Bank (2012) and the references therein.
2. Multiple sources of data—aggregate, country-level Financial Soundness Indicators of the International Monetary Fund (IMF), BRSS data, and bank-level data from 20,000 banks and 158 jurisdictions—reveal consistent patterns in bank capital. These are more comprehensive data sets than those used in earlier investigations (see, for example, FSB’s fourth annual report (FSB 2018b), which focuses on approximately 110 large international banks in its 27 member countries, plus those in the European Union).
3. While analyzing 36 large banks in 9 developing and high-income countries in their “rest of the world” sample, BCBS (2018c) also finds increases in regulatory capital ratios as well as increases in risk-weighted assets. These results are still in line with those reported in figure O.4, however, because the BCBS sample is dominated by developing countries such as China and India.