

## CHAPTER 1: KEY MESSAGES

- *Bank regulation* refers to the rules that regulate the establishment and operations of banks. *Bank supervision* refers to the implementation of those rules and regulations.
- The goals of bank regulation and supervision are to provide for the stability of the overall financial system, protect consumers and investors, and ensure adequate competition in the provision of banking services.
- The banking sector is particularly subject to negative externalities and information asymmetries, which make the simultaneous achievement of these goals challenging.
- A key purpose of regulation and supervision is therefore to limit excessive risk-taking by financial institutions to avoid the negative externalities of financial fragility. Authorities can regulate the disclosure of information to facilitate sound decisions, and even regulate financial products. But designing and enforcing the appropriate policies can be problematic. Safety net policies and interventions need to be designed so they do not undermine the incentives of the private sector to exert strong corporate control over financial institutions and defeat the original purpose of regulation and supervision.
- The 2007–09 global financial crisis was a good example of the difficulties encountered in getting this balance right, and its aftermath ushered in a period of intense regulation, with several initiatives put in motion to address the flaws revealed during the crisis.
- Analysis of the World Bank’s 2019 Bank Regulation and Supervision Survey reveals that reforms after the crisis led to an increase in capital requirements and implementation of new resolution processes for systemically important banks. However, even though regulatory capital ratios are at their highest levels since the crisis, that development has been accompanied by a shift toward asset categories with lower risk weights. Thus, improvements in capital hinge on the extent to which risk weights reflect the actual risk across different asset classes. In addition, most authorities now allow a wider array of instruments to satisfy Tier 1 capital requirements—the regulatory capital component intended to have the greatest capacity for loss absorption. This issue is important since it may lead to deterioration of the quality of regulatory capital in the future. In a similar vein, noncash assets, including borrowed funds, are increasingly allowed to serve as initial bank capital in developing countries, probably weakening the loss-absorbing capacity of bank capital.
- The global financial crisis led to widespread government interventions to rescue distressed banks. Deposit insurance systems around the world expanded and became more generous. The availability and quality of information disclosed as part of bank supervision have not improved significantly. Such factors may have undermined market discipline, reducing the incentives and ability of the private sector to monitor financial institutions. Although, since the crisis, new regulations have been put in place to improve the resolution of systemically important banks, cross-border resolution systems remain underdeveloped, and many of these mechanisms are untested.
- After the crisis, bank supervision became stricter and more complex. But supervisory capacity did not improve proportionally to match the greater complexity of bank regulations. Capacity constraints for bank supervisors may limit the monitoring and enforcement of the rules.
- Overall, since the crisis a growing number of countries have adopted components of Basel II and III. 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. Having undergone a systemic banking crisis is an important factor in explaining a country’s increase in regulatory capital ratios, but it is not significantly associated with the leverage ratios of banks in those countries. Countries are also influenced by neighbors in adopting capital regulation.

# Banking Regulation and Supervision: Conceptual Framework and Stylized Facts

## **BANK REGULATION AND SUPERVISION: FOUNDATIONS AND RATIONALES**

*Bank regulation* refers to the rules that regulate the establishment and operations of banks. *Bank supervision* refers to the implementation of those rules and regulations.<sup>1</sup> Bank regulations cover entry into banking, ownership, the definition and holding of capital, types of permitted activities, information disclosure, corporate governance, the financial safety net, accounting, bank failure, bank resolution, and consumer protection. Supervisory or counterparty discipline is needed to create the incentives for regulated parties to obey the rules. Without oversight and penalties, rules have no teeth. Supervision also entails monitoring the overall banking system, including identifying potential issues outside the current regulatory perimeter. This supervisory monitoring can also be beneficial for the regulatory process (for example, it may inform policy makers), and it provides information that enables market participants to monitor banks. The more skilled and informed the supervisory workforce, the more effective this monitoring can be.

The goals of bank regulation and supervision are to provide for the stability of the

overall financial system, protect consumers and investors, and ensure adequate competition in the provision of banking services. Financial stability is indispensable to having a banking sector that funds a variety of risks, allocates capital efficiently, protects consumers and investors from being victims of fraud and of their own limited understanding of financial products, and provides broad access to financial services. The banking sector is particularly subject to negative externalities (costs borne by a third party for economic activities carried out by banks) and information asymmetries (different information sets for counterparties to financial transactions), which make the simultaneous achievement of these objectives challenging.

Information frictions can induce shocks that propagate through the banking system by contagion. Banks are in the business of asset transformation and liquidity creation because they transform short-term liquid deposits into long-term illiquid assets. Reliance on short-term funding, combined with high leverage, creates an inherently unstable system prone to runs. In their seminal paper, Diamond and Dybvig (1983) model bank runs using demand deposit contracts and depositors' incentives to withdraw their funds at a bank,

depending on the observed withdrawal behavior of other depositors. If depositors in the banking system cannot distinguish between healthy and distressed banks, problems at one bank quickly spread throughout the banking system.<sup>2</sup> Banks are thus subject to negative externalities that can have a significant impact on the wider economy. Moreover, when banks' stakeholders find it difficult to fully understand complex investments or do not factor in the possibility of rare but extreme events, they can make systematic mistakes that can jeopardize the stability of the banking sector. This situation can have adverse implications for people who neither made those investments nor had any influence over those who made the investments. Greater information asymmetry resulting from the growing opacity, complexity, and interconnectedness of financial institutions and the limited abilities of market participants to process information only exacerbate the tendency of market participants to display common behaviors (so-called herding).

Having outside parties capable of and incentivized to monitor bank operations is therefore critical to banking stability. However, many bank creditors are unsophisticated investors with a limited capacity to monitor bank operations. Incentives to monitor bank risk-taking can also be weakened by the financial safety nets that guarantee repayment to bank creditors. These safety nets, coupled with the fact that shareholders' losses are capped to a fixed multiple of their capital holdings because of limited liability, can give banks incentives to take on excessive risk.<sup>3</sup>

Implicit and explicit government guarantees intended to instill confidence and provide stability can also distort the incentives of bank managers and bank liability holders. The incentive distortions are twofold. First, government guarantees incentivize banks to take on riskier investments because economic profits from excessive risk-taking are privately captured by the bank, but losses are socialized through the deposit insurance fund or other guarantees. Second, because depositors and other bank liability holders are protected when a bank fails, their incentives to monitor

the financial condition of their bank are significantly reduced.

Negative externalities associated with excessive risk-taking are especially a concern for large financial institutions. They often do not bear the full risks of and the potential losses associated with their portfolios, and risk exposures at one institution can endanger the survival of other institutions or lead to greater systemic risk for a banking sector because of herding behavior. When a large bank makes risky investments that pay off, it stands to benefit from the profits. But when those investments fail, experience has shown that the bank may not bear the full costs. As described later in this chapter, bailouts of distressed banks during recent financial crises entailed costs that were shouldered by society as a whole, meaning taxpayers who had no connection to the original risky investment decisions. This potential for cascading effects is an important reason to regulate the banking sector by imposing "limits" on risk-taking by banks.

Government regulation and supervision can improve welfare by providing the monitoring functions that dispersed stakeholders (depositors, shareholders, and bondholders) are unable or unwilling to perform.<sup>4</sup> Banks raise funds with retail deposits held mostly by unsophisticated depositors who do not have the incentives, information, or means to perform effective monitoring. Therefore, regulation should mimic the control and monitoring that depositors are unable to provide because of a lack of appropriate information, financial knowledge, and coordination (Santos 2001). For example, Dewatripont and Tirole (1994) developed a model of banks' capital structure that shows how optimal regulation can be achieved using a combination of basic capital adequacy requirements (with external intervention when those are violated) and elements of market discipline as an important complement to (though not a substitute for) this regulation.

Regulatory reform is a slow-moving process that does not match the speed at which the private sector innovates and evolves. The financial sector is dynamic—changing

as information, technology, competition, and regulation change—and therefore its supervision and regulation necessarily must be dynamic as well. The different dynamism in the private sector and prudential regulation generates capacity constraints that should be addressed with an appropriate design of incentive-based regulations. A normative approach might be of limited use because of the speed of innovation, incentives to circumvent too-detailed prescriptions by finding loopholes in financial regulation, or a limited capacity to enforce the rules on systemically important banks. This last point reflects not only regulatory capture but also the lack of options or the implicit constraints faced by bank supervisors during a financial crisis.

### **REGULATORY CHANGE: THE GLOBAL FINANCIAL CRISIS AS CATALYST**

The decade prior to the 2007–09 global financial crisis was characterized by the deregulation of banking sectors in several countries, supervisory shortcomings, and accounting misrepresentations, especially in advanced countries. The onset of the crisis ushered in a period of intense regulation, with several initiatives put in motion to address the flaws that emerged during the crisis (see box 1.1 for a discussion of the policy lessons for developing countries). In doing so, the crisis reignited debates about the right blend of regulation, supervision, and market discipline to ensure the safety and efficient functioning of banking systems.

Whereas much has been written about the global financial crisis and associated changes in bank regulation and supervision from the perspective of advanced countries, there has been less focus on how those changes have affected banking sectors in developing regions.<sup>5</sup> Indeed, there is a lack of evidence on the detailed reforms undertaken by developing countries to decrease the fragility of local banking sectors, while helping to ensure that they support economic growth and financial inclusion as providers of credit.<sup>6</sup> An exception is the work carried out by

the Basel Committee on Banking Supervision (BCBS), the Committee on Payments and Market Infrastructures (CPMI), the Financial Action Task Force (FATF), the Financial Stability Board (FSB), the International Monetary Fund, and the World Bank to address the significant decline in the number of correspondent banking relationships due also to the introduction of anti-money laundering/counter terrorism financing (AML/CFT) regimes.<sup>7</sup> Further, filling this gap in evidence on developing countries is a key objective of this report.

Although the global financial crisis helped focus attention on the importance of regulatory and supervisory changes to curb excessive risk-taking, it is important not to lose sight of other motivations for bank regulation and supervision. Most fundamentally, banks support economic growth by screening borrowers and allocating credit to worthy projects. In trying to curb excessive risk-taking, regulators and supervisors must recognize the potential tension between ensuring stability and promoting growth. Eliminating all risk-taking would come at a big cost in terms of growth, and thus the design and implementation of banking regulation seek to balance these potentially competing objectives. Curtailing all risk-taking could also constrain access to credit in those areas needed to achieve the sustainable development goals.

The financial crisis tilted policy makers' attention toward financial stability, but regulation and supervision are also required to protect consumers and curb anticompetitive behavior. Market misconduct regulation is needed to ensure that participants act with integrity and that sufficient information is available for consumers of financial services to make informed decisions. Greater competition constrains monopoly power and allows efficient allocation of resources and intermediation of funds.

Banking crises often come with enormous costs that exceed the private cost to individual banks.<sup>8</sup> Financial stability is a core objective of the microprudential and macroprudential reforms adopted as a result of the crisis. Microprudential regulation focuses on the

### BOX 1.1 Root Causes of the 2007–09 Global Financial Crisis and Policy Lessons for Developing Countries

What were the root causes of the global financial crisis, and what lessons can be learned by developing countries? Caprio, Demirgüç-Kunt, and Kane (2010) highlight the role of the financial safety net in providing incentives to financial institutions to shift losses onto governments and taxpayers. The authors also discuss how several key factors in the crisis plagued both advanced and developing countries. For example, excessive bank leverage and risk-taking drove the boom and bust in the prices of financial assets (Crotty 2009). The adoption of complex financial regulations, such as some prescriptions in the Basel II capital accord, and the greater reliance on credit ratings in determining bank regulatory capital made it more difficult to hold regulatory authorities accountable. Moreover, failures in the incentives of supervised entities and regulators, as well as limitations in the information environment, were also factors relevant to the crisis. Other key elements discussed by pundits and policy makers are macroeconomic vulnerabilities, the role of nonbank financial intermediaries performing credit intermediation, resolution schemes for financial institutions, agency problems (that is, conflicts of interest), incentives for bank regulators and supervisors and their impact on enforcement, and accounting misrepresentations (see, among many others, Obstfeld and Rogoff 2009; Claessens, Dell’Ariccia, and Laeven 2010; Demirgüç-Kunt and Servén 2010; French et al. 2010; Barth, Caprio, and Levine 2012; and Calomiris and Haber 2014).

In discussing some of the root causes of the crisis, Caprio, Demirgüç-Kunt, and Kane (2010) point to specific regulatory failures that exacerbated or introduced distortions. First, structured securitization (pooling financial contracts to reap diversification benefits and allocate risk “efficiently” to “appropriate” counterparties) failed to provide the intended benefits and increased the risk of contagion in the financial system—see Ashcraft and Schuermann (2008) for an overview of the subprime mortgage securitization process. Moreover, bank capital regu-

lation and arbitrary risk weights provided banks with incentives to move assets into off-balance sheet securitization vehicles. The complexity and opaqueness of securitization made it difficult to price these financial instruments, and the financial institutions that originated these products grew more complex and interlinked with other financial institutions, which made them more difficult to resolve in the event of a crisis and increased their potential claims to safety net subsidies.

Second, credit ratings for financial institutions were inaccurate, in part because those institutions paid the issuers for those ratings, which generated a conflict of interest for credit-rating agencies. In addition, although regulation favored the widespread use of credit ratings, it also limited the contestability of the credit-rating market.

Third, complex regulation had the double disadvantage of making the job of bank supervisors more difficult while also making them less accountable for their actions. Basel II introduced complexity both in the quantification of bank regulatory capital and in the computation of assets weighted for risk exposure. The supervisory review of banks’ capital adequacy (also known as Pillar II) granted national regulators substantial discretion without differentiating across countries with different institutional environments and levels of supervisory capacity.

Finally, regulation aimed at strengthening market discipline (also known as Pillar III) ignored the role of financial deepening and economies of scale in the provisioning of public services. All of these factors contributed to more opportunities for regulatory arbitrage, reduction of transparency, and supervisory forbearance.

Caprio, Demirgüç-Kunt, and Kane (2010) conclude that complex methods for regulating risk-taking largely failed, and thus simpler (but effective) approaches to regulation and supervision are preferred, especially for developing countries. This conclusion ties in well with the concept of proportionality put forth in this report.

determinants of the stability of individual institutions. Macroprudential regulation targets factors that affect the stability of the financial system as a whole. Since the global financial

crisis, macroprudential tools have been included in bank supervisors’ toolkits in order to identify and curb the risks posed by individual banks to the overall financial system.

Macroprudential and microprudential tools differ in their focus and in the skill sets necessary for their effective employment. Moreover, effective use of these instruments by bank supervisory agencies involves the availability of adequate information, resources, and qualified personnel.

The measures undertaken by governments during crises to restore trust in domestic financial systems and avoid their collapse contain important lessons for developing countries. Overall, there is broad agreement that elementary regulatory features—the so-called basics—should be addressed first. This means having well-capitalized banks able to weather “normal” and “distressed” market conditions and establishing a coherent institutional and legal framework that hinges on market discipline, complemented by strong, timely, and anticipatory supervisory action. However, although the financial crisis produced some general lessons for developing countries, that does not imply that the regulation and supervisory practices adopted by advanced countries in the wake of the crisis should be adopted without modification by developing countries. Regulatory policies and supervisory approaches are likely to work differently in different country contexts.

### **PROPORTIONALITY: DESIGNING BANK REGULATION FOR DEVELOPING COUNTRIES**

Sound economic reasons support the view that the state should play an active role in banking systems to mitigate the negative effects of market imperfections. But there are practical reasons to be wary of the state playing too active a role in banking systems. The tensions inherent in these two views capture the complexity of financial policies for the banking sector. Moreover, the same government policies that ameliorate one market imperfection could create other distortions. Regulations can be overly complex, and this complexity often entails worse outcomes because it may lead to manipulation and regulatory arbitrage. In addition, it places a burden on bank supervisors who, particularly in

developing countries, may lack the capacity needed to enforce such regulations effectively.

Proportionality should therefore be a guiding principle in the design of bank regulation and supervision in developing countries. The concept of proportionality, which is deeply embedded in legal systems throughout the world, holds that the level of public intervention in the form of rules, restrictions, or sanctions should not exceed what is appropriate to achieve the desired social objectives.<sup>9</sup> In the context of designing bank regulation and supervision for developing countries, this report therefore defines *proportionality* as a set of regulations and supervisory tools and approaches that are appropriate to the institutional environment, supervisory capacity, and business models of banks in a given country.<sup>10</sup>

Proportionality can refer to differences in the appropriate regulatory/supervisory frameworks across countries or in the treatment of different banks operating within the same country.<sup>11</sup> Within banking sectors, proportionality can be used to justify the application of simplified prudential requirements for small or noncomplex institutions to reduce excessive compliance costs. Some observers make a distinction between proportionality in regulation, which refers to reducing the costs of compliance for banks, and proportionality in supervision, which focuses on the adjustment of supervisory intensity to the risk profile and size of individual banks. This report uses a data-driven approach to describe proportionality in both regulation and supervision. Because it focuses on differences in banking regulation and supervision across countries in the wake of the global financial crisis, most of the discussion of proportionality focuses on differences in appropriate frameworks across countries.

Proportionality implies that one-size-fits-all policies are not appropriate, especially in developing countries where the adoption of sophisticated rules designed for developed countries may not fit local circumstances. As briefly summarized in box 1.2, the Basel Committee on Banking Supervision (BCBS) is the main standard-setting body for bank regulation and supervision, and it is dominated

### **BOX 1.2 A Brief Historical Perspective on International Coordination and Harmonization in Banking Regulation and Supervision**

The recent history of international coordination and harmonization in banking regulation and supervision dates back to 1986, when the U.S. Federal Reserve Board and the Bank of England agreed on a novel approach to regulating bank capital. Instead of simply enforcing a capital ratio computed as a bank's equity relative to the sum of its assets and off-balance sheet exposures, the U.S.–U.K. accord introduced a new denominator based on the weighting of assets according to exposure to credit risk (see chapter 3, table B3.1.1, for the key characteristics of regulatory capital instruments). This bilateral agreement influenced the first international set of capital standards issued in 1988 by the Basel Committee on Banking Supervision (BCBS), a committee of central bank representatives established by the central bank governors of the Group of 10 countries (G-10) at the end of 1974. This first accord, known as Basel I (BCBS 1988), focused on capital adequacy for internationally active banks and was intended for member countries, although most banking authorities worldwide ended up adopting its principles and enforcing the capital standards in all domestic banks. The overarching goal was to strengthen the stability of the international banking system and create a level playing field by removing a source of competitive inequality stemming from differences in national capital requirements.

Over time, the membership of the BCBS increased, reaching 45 members from 28 jurisdictions and 9 observers, including by the end of 2016 central banks, supervisory groups, international organizations, and other bodies. The BCBS also saw an increase in the number of standards covering distinct aspects of the banking business, such as a broader range of risks (for example, market and operational risk) and effective risk disclosure. In the years that followed, the BCBS agreed on two new capital frameworks. Proposed in 2004, Basel II was finalized in 2006 (BCBS 2006). And Basel III, which comprised updated standards for capital regulation, was agreed to in 2010. It was revised in June 2011 (BCBS 2011) and updated in December 2017 (BCBS 2017a). Within the Basel III framework, two new liquidity standards—the liquidity coverage ratio and

the net stable funding ratio—were revised in 2013 (BCBS 2013) and 2014 (BCBS 2014), respectively. These liquidity ratios are described in more detail later in this chapter. Most “developing” countries are not signatories to the Basel Accords and have no obligation to adopt the guidelines. Nevertheless, as explained in box 3.6, developing countries often adopt international standards to signal sophistication and strong domestic regulatory standards.

The 2007–09 global financial crisis highlighted the need for further international cooperation to promote stability in the international financial system. In 2009, the Financial Stability Board (FSB) replaced the Financial Stability Forum, which was established in the wake of the 1997–98 Asian crisis, and membership was expanded from the G-7 to the G-20 countries. The FSB now includes large emerging economies (such as Brazil, China, India, and Indonesia), and it has core responsibilities in monitoring and assessing vulnerabilities affecting the global financial system. Specifically, the FSB has coordinated the main financial reforms in the G-20 countries in the following priority areas: improving the resilience of financial institutions (such as through the Basel III reform agenda); addressing the too-big-to-fail issue (such as through resolution frameworks and minimum total loss absorbency requirements); increasing the safety of derivatives markets (such as through central clearing); enhancing the resilience of nonbank intermediation (also known as shadow banking); proposing sound compensation practices for large financial institutions; and strengthening adherence to international financial standards (FSB 2018b). The FSB has also evaluated the effects of reforms on specific areas, such as infrastructure finance and the clearing system for over-the-counter markets of financial derivatives. The financing of infrastructure by the financial sector is especially important for developing countries to support trade and economic development. The FSB evaluation found that there are no significant negative effects on the availability and cost of infrastructure finance because of the G-20 financial regulatory reforms in emerging and developing countries (FSB 2018a).

by a handful of advanced countries. Thus, policy designed for advanced countries may not reflect the idiosyncrasies of developing countries in terms of the purposes and powers of the regulatory agencies. At the same time, regulation and supervision proportional to different banking features can be difficult to design and enforce, resulting in greater financial fragility. Correcting market imperfections is a complicated task that requires considerable information and expertise to design, implement, and enforce sound policies. Government interventions in finance need to be risk-sensitive, but measuring risk properly and enforcing risk-based regulations are also complex tasks.

Complex regulation and supervision of the banking sector can be costly for smaller and less developed countries if there are economies of scale in the provision of public sector services. For example, over the last few decades central banks have taken on a more prominent role as lenders of last resort. However, the ability of central banks to provide liquidity in times of distress is limited in developing countries, especially when public and private debts are denominated in a foreign currency. Similarly, information generation and provision of ancillary financial services, such as credit ratings, tend to have high fixed costs. These require a certain level of market development, which can be difficult to achieve in developing countries because of a lack of scale and insufficient market depth.

Although proportionality is an important guiding principle, political considerations often influence the design of bank regulation and supervision. The dynamic outcomes of banking sector regulation stem from the supply and demand of regulation. Government is often the main supplier of regulation, and consumers and the banking industry are the main demanders. The industry has a disproportionate influence on the demand for regulation because benefits for other actors are dispersed, whereas the costs and benefits for the industry are concentrated. It follows, then, that bankers and the politically well-connected will have a marked influence on interaction with the government to determine the exact shape and

purpose of regulation. Politicians and regulators are often subject to intense pressure from regulated firms to modify regulations, which can result in suboptimal regulation and supervision (Laffont and Tirole 1993). Accordingly, the political/regulatory capture view advocates a greater reliance on market discipline, information disclosure, loose regulation, and significant oversight of the regulatory process itself (Stigler 1971; Shleifer 2005). A country's banking system and its regulatory framework can therefore be characterized by the degree to which they are consistent with the institutions that govern the distribution of political power (Calomiris and Haber 2014). This report recognizes the importance of political economy in the design and adoption of bank regulation and supervision and attempts to identify the factors that drove regulatory and supervisory change in the wake of the global financial crisis.

Regardless of the level of development of a country and its banking sector, or the complexity of its approach to regulation and supervision, the independence of supervisors is crucial to achieving a banking system that functions well. This independence provides credibility, helps avoid political pressures, and limits regulatory forbearance. Bank supervisors assess who is appropriate and qualified to enter the banking industry, help banks exit when they fail to comply with the various rules, and verify the accuracy of the information that banks publish. In general, the incentives and accountability of bank supervisors for their decisions and actions will have an important bearing on the effectiveness of regulation and supervision.

### **NARROWING THE FOCUS: CAPITAL, PRIVATE MONITORING, AND SUPERVISION**

The global financial crisis called into question the role of financial policy in banking, revealing major shortcomings in market discipline, regulation, and supervision. The immediate reaction was to fix alleged deficiencies and weaknesses in bank regulation and supervisory monitoring to contain the crisis

and to prevent repetition of those events. The postcrisis reforms called for more and better-quality bank capital and higher bank liquidity. Nevertheless, as revealed by previous crises, the regulatory reform cycle eventually runs its course, reaching a point at which the distant memory of the crisis and confidence in the measures introduced to avoid a financial crisis can generate a false sense of safety and accomplishment. The focus should, however, always remain on the implications of the regulatory changes for incentives and competition.

Bank capital regulation, market discipline, and bank supervision are interrelated and may complement or substitute for each other in different contexts. Bank capital regulation curbs the adverse incentives created by deposit insurance. Market discipline may complement bank capital regulation by identifying undercapitalized credit institutions relative to risk exposure and exerting pressure on a bank's risk-taking behavior. Supervision of bank leverage and asset quality can also influence a bank's risk-taking behavior, and it may substitute for stricter capital regulation and greater scrutiny by market participants. Along the same lines, continuous scrutiny by market participants adds a shorter time horizon to the medium- to long-term perspective often adopted by bank supervisors. For example, market discipline may work as a restraining device and substitute for government regulatory oversight of banks.<sup>12</sup>

A key purpose of bank capital regulation is to internalize the social costs of potential bank failures. The imposition of capital requirements can have a stabilizing effect on banks because such requirements give bank owners *ex ante* incentives to improve risk management and curb excessive risk-taking. As noted, because of limited liability, shareholders of a defaulted bank can lose up to their initial investment. This upper bound for potential losses prods bank shareholders to take on more risk than is socially optimal. If shareholders were liable for all the unpaid debts of a failed bank, their risk-taking behavior would be sharply curtailed. Consistent with this argument that identifies bank capital as a key "incentive" mechanism, several

theories emphasize that higher capitalization improves the borrower screening and risk monitoring functions of banks, thereby reducing individual bank risk-taking (Holmstrom and Tirole 1997; Coval and Thakor 2005; Allen, Carletti, and Marquez 2011; Mehran and Thakor 2011).

Depositors and creditors also influence banks' risk-taking behavior. Binding capital requirements affect the liability composition of banks, and, depending on the heterogeneity of bank debtholders, debt can be an effective disciplining device for banks' excessive risk-taking behavior. According to Diamond and Rajan (2000, 2001), optimally banks would have a fragile capital structure, relying on demand deposits to force them to behave well, thereby avoiding a bank run. Nevertheless, in the presence of uncertainty, an all-debt capital structure could be too fragile, and bankers must invest some equity to trade the disciplining role of debt off against the fragility it creates. Moreover, and as noted earlier, monitoring by debtholders has its own limitations. Aside from hurdles related to the lack of information and expertise, asset risk is not priced fairly by banks' creditors (such as depositors and bondholders) because of the implicit or explicit financial safety net, and thus banks do not fully internalize asset losses in their risk-taking behavior. The state of the world therefore matters in choosing the appropriate combination of debt and equity, leading to efficient transfers of control to creditors and encouraging portfolio diversification and truthful revelation of investment outcomes, all of which can reduce funding costs.<sup>13</sup> In short, important context-specific trade-offs must be considered in designing the right blend of capital requirements and monitoring by banks' creditors.

Bank supervision can enable bank monitoring by depositors and market participants by increasing the information available for monitoring. In this regard, it is important to build up supervisory capacity to enforce existing rules and, as a by-product, produce information useful for a risk assessment of banks. New challenges are constantly emerging in the private sector that regulators and

supervisors have to address, such as the regulation and supervision of new services and products using financial innovations and the risks associated with financial technology (see box 1.3 for an illustration of the challenges

in regulating and supervising fintech and cybersecurity). By the same token, accounting standards should enable a faithful representation of bank operations and provide useful information to facilitate banking supervisors'

### BOX 1.3 Regulation and Supervision of Fintech Companies and Cybersecurity

Fintech companies and challenges related to cybersecurity have recently been on the minds of regulators. *Fintech* can be defined as technologically enabled innovation in financial services that could result in new business models, applications, processes, or products affecting financial markets, institutions, and the provision of financial services (FSB 2017a; BCBS 2018b). Fintech covers a large number of technologies (cryptography, cloud computing, and data analytics, among others), products, and services. However, a specific current challenge for bank regulators is the outsourcing of functions and processes to entities not subject to bank regulation and supervision. Examples are cloud computing and multiple entry points for the payment system (such as mobile and Internet payment providers).

The challenge for prudential regulation and supervision is how to define the regulatory perimeter and supervise the outsourced activities of regulated financial intermediaries. Fintech is transforming the way in which traditional financial institutions run their back offices and front-line procedures. Often, regulated financial intermediaries enter into partnerships with third-party providers for services. These providers assume specialized roles that can vary widely, from credit scoring to prepaid account management or data storage. Third-party providers are often unregulated, or they are regulated by national regulators other than the financial sector regulator, or regulated in home countries. In such instances, a large segment of the “financial production chain” is outside of the regulatory perimeter, and questions about system safety, data ownership, and access remain unresolved. If third-party providers are regulated by a nonfinancial sector regulator or a home supervisor, challenges of coordination between supervisors can emerge. Reliance on a large body of data and technology also makes financial institutions vulnerable to cyberattacks.

Fintech has led to the emergence of new players, primarily technology firms, that have started pro-

viding financial services, from payments to loans and investment opportunities. Examples are Apple, Tencent, and Ant Financial. Because the authority of most regulators is defined by the type of firms they oversee, these new entrants fall outside of the existing regulatory perimeters. Such providers could become systemically important, especially in the payment system, because they can create critical interdependencies for other institutions. To allow for experimentation and yet limit the emergence of systemic risk, several regulators have decided to create test environments for fintech, including sandboxes. For example, the Financial Conduct Authority in the United Kingdom launched a regulatory sandbox in June 2016 to test new products and services in a customized regulatory environment, and Mexico established a sandbox for fintech companies in 2018 through the Law Regulating the Financial Technology Institutions (the Fintech Law).

Cybersecurity is a very different kind of operational risk that recently became a top priority for banks and bank regulatory agencies. As defined in the Basel II capital framework, *operational risk* is the “risk of loss resulting from inadequate or failed internal processes, people and systems or from external events” (BCBS 2006). In 2016 and 2017, financial services was the sector most frequently attacked, experiencing 27 percent of total security incidents and 17 percent of attacks respectively (IBM 2018). In 2016, for example, 4 of 35 fake instructions sent via the Swift network were enough to steal US\$81 million from the account of Bangladesh Bank at the New York Federal Reserve Bank (*New York Times* 2018). In 2017 the massive exfiltration of data from a major U.S. credit reporting firm affected more than 145 million persons (*Register* 2018). As the reliance of the financial services sector on information technology increases, including in the management of customer relationships, its information security challenges are likely to become even more prominent. In view of the spread of highly contagious malware, such as the

(box continued next page)

### **BOX 1.3 Regulation and Supervision of Fintech Companies and Cybersecurity** (continued)

waves of ransomware that temporarily paralyzed the world's leading shipping company (ZDNet 2018) and a major U.S. city in 2018 (CNN 2018), it is not difficult to imagine a similar incident eventually crippling an entire national financial system.

Because cybersecurity is related to disruptions in information technology (IT), perhaps it is not surprising that too many bank senior managers still believe that the solution, if it exists at all, must also be technological. In 2015, for example, a World Bank survey of Eastern European central banks on cyber preparedness found that, although the strongest self-assessments corresponded to technical issues under the charge of IT departments, the weakest ones were related to areas typically in the hands of senior management, the governor, or the board (Almansi 2018a). At about the same time, Accenture found a similar gap among the CEOs and board members of the largest banks in the world (Lumb, Macchi, and Moreno 2016). Inadequate managerial attention to information security issues may not only result in a suboptimal allocation of resources but also hamper the response to cyber incidents. After all, top deci-

sion makers cannot delegate to their IT staff critical business continuity decisions, such as assuming the cost of immediately shutting down an infected system or taking the risk of keeping it going while cybersecurity specialists search for a solution.

Although cyber risk is a type of operational risk, the old prescriptions for confronting operational risks may no longer apply. The World Bank has compiled and regularly updates a digest of the growing body of cybersecurity guidance and regulations that national jurisdictions, multilateral agencies, and other organizations have been publishing (Financial Sector Advisory Center 2017). Particularly challenging for old approaches is dealing with the ever-growing outsourcing of information technology services, including the processing of transactions and the storing of data by third-party “cloud” providers. Connectivity among financial sector institutions, and between them and everybody else, necessitates coordination between financial sector authorities and other state agencies, both in the regulation of minimum cybersecurity standards and in the response to cyber incidents (Almansi 2018b).

assessments of bank risk exposures. The overall message is that capital, monitoring, and supervision all influence each other and must work in concert to ensure efficient credit allocation while preserving banking sector stability. The remainder of this chapter therefore describes developments on these three fronts in the wake of the global financial crisis.

#### **LATEST TRENDS IN BANK REGULATION AND SUPERVISION IN DEVELOPING AND HIGH-INCOME COUNTRIES**

Using the latest data released from the World Bank's Bank Regulation and Supervision Survey (BRSS), this report investigates the regulatory reforms undertaken in the 10 years since the onset of the global financial crisis. As summarized in box O.1 in the overview, five waves of the BRSS are available, and the

latest wave summarizes regulatory developments that characterized the period 2011–16. The fourth wave of the BRSS covered the reforms in the immediate aftermath of the crisis, but most of those changes were marginal (Čihák et al. 2012) and did not fully reflect the regulatory reforms subsequently undertaken by countries. However, the fifth wave of the BRSS allows a full assessment of the regulatory reforms enacted in high-income and developing countries in core areas such as capital regulation, regulations enhancing market discipline, and supervisory monitoring. Although financial regulatory reforms undertaken since the financial crisis have touched on different areas, such as cross-border cooperation and the resolution of systemically important banks (SIBs), the analysis in this section focuses on the core aspects of reform that are central to financial regulation (Anginer et al. 2019).

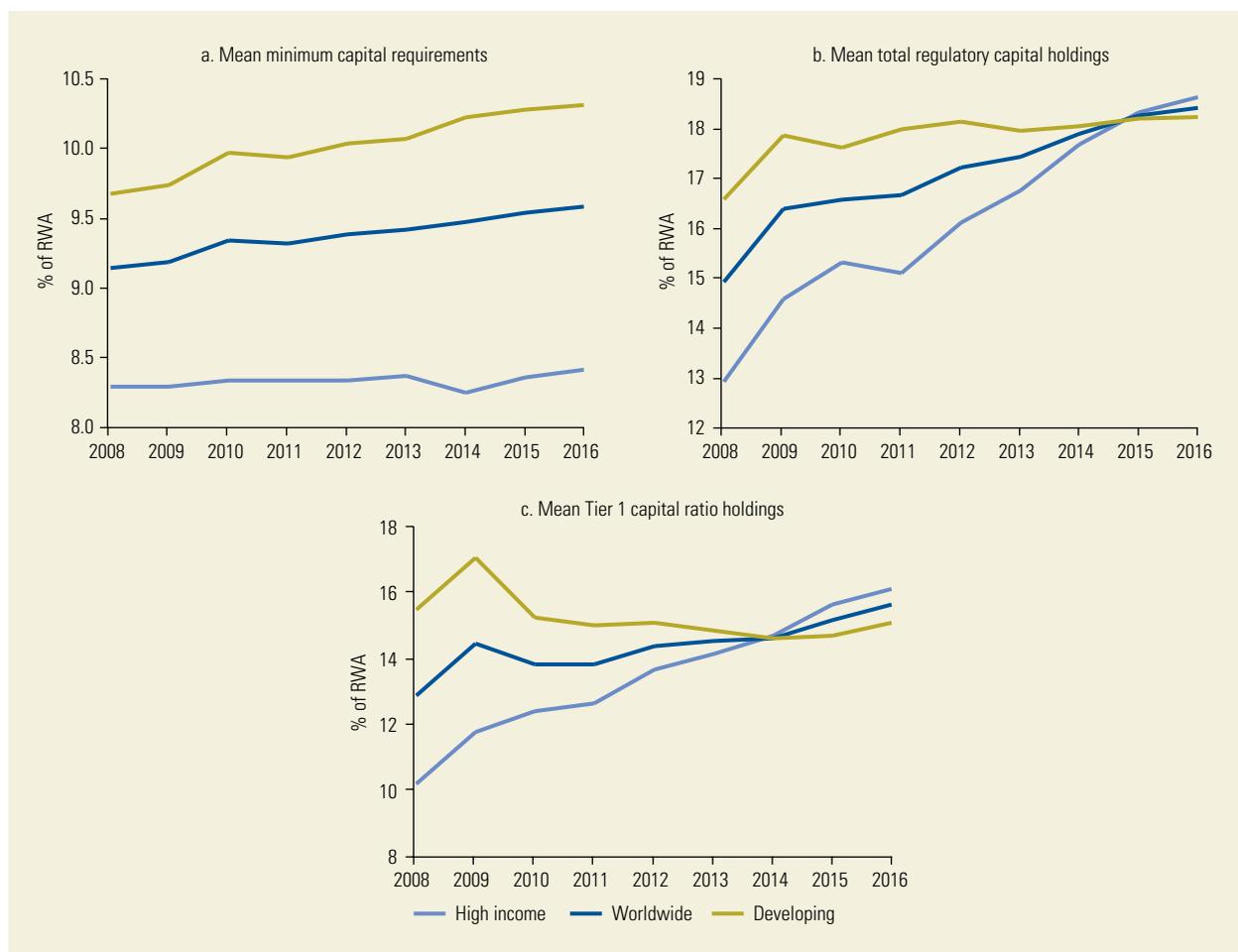
### BANK REGULATORY CAPITAL

The level of bank regulatory capital has increased over time; however, some elements of capital regulations have become more lax. The global financial crisis highlighted the risk of having thin capital buffers to cover unexpected losses. Banks were also found to have low-quality capital in terms of loss absorbency. As explained in chapter 3, bank capital can be defined as accounting capital, regulatory capital, or economic capital. From a financial stability perspective, a key role of bank capital is to increase the resilience of

banks to cope with unexpected losses in their asset portfolios. Basic questions are then how to quantify the amount of capital relative to risk exposures and how to define the items counted as regulatory capital.

Worldwide, there has been a trend toward increasing minimum regulatory capital requirements to improve banking system resilience, although, on average, the trend has been more marked for developing countries than high-income ones. The mean value for high-income countries has changed little (figure 1.1, panel a), but these countries are also more apt to have in place additional capital

**FIGURE 1.1 Banks' Capital Requirements, 2008–16**



Source: Bank Regulation and Supervision Survey (BRSS), waves 4 and 5, <https://www.worldbank.org/en/research/brief/BRSS>.  
 Note: In this figure and subsequent figures, offshore financial centers are excluded from the computations. In panel a, 99 countries for which information is available over 2008–16 are included; in panel b, 82 countries; and in panel c, 65 countries. RWA = risk-weighted assets.

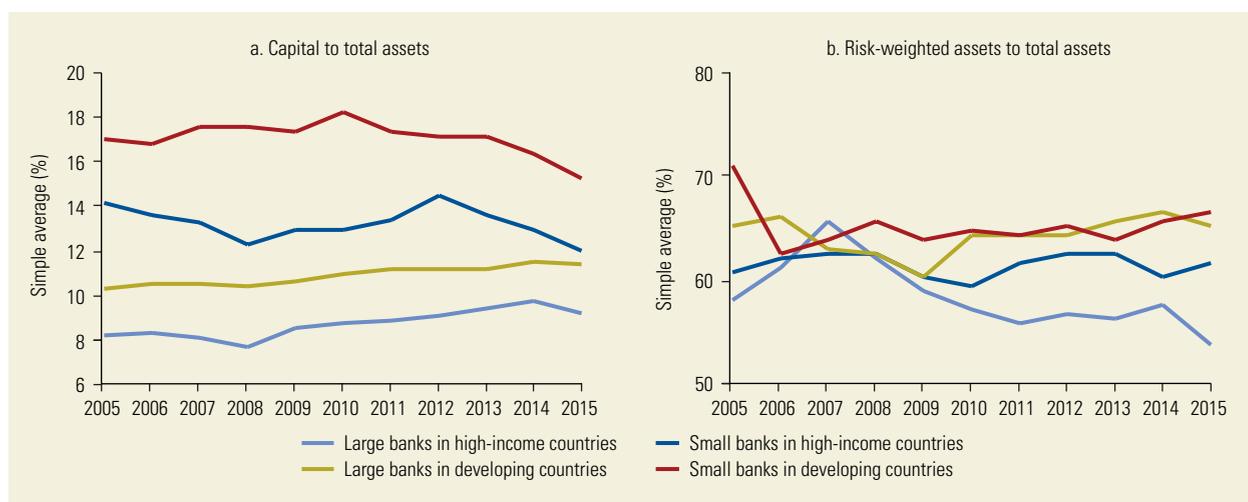
surcharges, meaning that the minimum regulatory capital set for banks is, in practice, higher than before the financial crisis. The increase in the minimum regulatory capital requirement has translated into higher levels of actual holdings of regulatory capital (figure 1.1, panel b). This is particularly true for high-income countries, where capital holdings increased from a mean value of 12.9 percent of risk-weighted assets (RWA) in 2008 to 18.6 percent of RWA in 2016. Developing countries, which began from a higher average level of regulatory capital holdings early in the period, saw an increase in capital through 2011, reaching roughly 18 percent of RWA. Since then, increases in regulatory capital among developing countries have been slower, and in 2016 the mean value of regulatory capital holdings for developing countries was lower than that for high-income countries.

Levels of Tier 1 capital, the regulatory capital component with the greatest capacity for loss absorption, also increased over time, driven by the new Basel III capital framework and regulatory capital reforms enacted at the country level. For the full sample of countries, the mean value of the Tier 1 capital ratio (Tier 1 capital divided by RWA), increased substantially from 2008 to 2016 (figure 1.1, panel c).<sup>14</sup> There were, however, notable differences between high-income countries and developing countries. High-income countries displayed an upward trend in the Tier 1 capital ratio between 2008 and 2016, a trend that began as early as 2005 (earlier years are not pictured in panel c). Because this trend continued through 2016, it indicates that the regulatory push to shore up bank capitalization was not exhausted in the period immediately after the global financial crisis. By contrast, for developing countries the mean value of the Tier 1 ratio was higher in 2008 than in 2016, with a marked downward trend between 2009 and 2014.

The adequacy of capital to cover unexpected losses can be achieved by increasing the level and quality of regulatory capital or by decreasing the regulatory measures factored into calculating total risk exposure. For

the quality of bank capital, the global financial crisis highlighted the crucial importance of defining bank capital narrowly to improve bank performance in times of crisis. For example, the regulatory treatment of sovereign exposures has been the subject of heated debate, especially in Europe following the 2012 sovereign debt crisis because of the zero risk weight attributed to the sovereign bonds of fiscally distressed countries.<sup>15</sup>

Post-financial crisis increases in the Tier 1 capital ratio in high-income countries were accompanied by declines in RWA; improvements in simple leverage ratios were more limited. Large banks in high-income countries showed a modest increase in their leverage ratios (calculated as capital to total banking assets) from around 8 percent in 2008 to around 10 percent in 2014–15.<sup>16</sup> Leverage ratios for large banks in developing countries were generally flat, but with a small upward trend that took the ratio to 11 percent in 2014–15.<sup>17</sup> Their leverage ratios are still at a much lower level than those of small banks, despite the fact that small banks in both high-income and developing countries showed a marked decline in their simple leverage ratios (figure 1.2, panel a).<sup>18</sup> At the same time, the ratio of RWA to total banking assets was declining after the financial crisis for banks in high-income countries, especially for large banks (figure 1.2, panel b). For banks from developing countries, that ratio increased slightly after the crisis for large banks and remained relatively flat but volatile for small banks. Although figure 1.1 suggests that capital buffers increased for banks in high-income countries in the wake of the crisis, figure 1.2 indicates that this conclusion partly hinges on the decline in RWA. Recent academic literature (see for instance Gropp et al. 2019) also indicates that banks react to higher capital requirements by decreasing RWA proportionally more than they increase capital holdings. The accuracy of measures of RWA is therefore a key concern, bearing in mind that regulatory capital requirements set as a proportion of risk exposure were mostly dismissed by market participants at the time of the crisis because those risk exposures did not

**FIGURE 1.2 Leverage and Risk Weights of Large Banks versus Rest of National Banking Systems, 2005–15**

Sources: Archived data from Bankscope (Bureau van Dijk) and World Bank staff calculations.

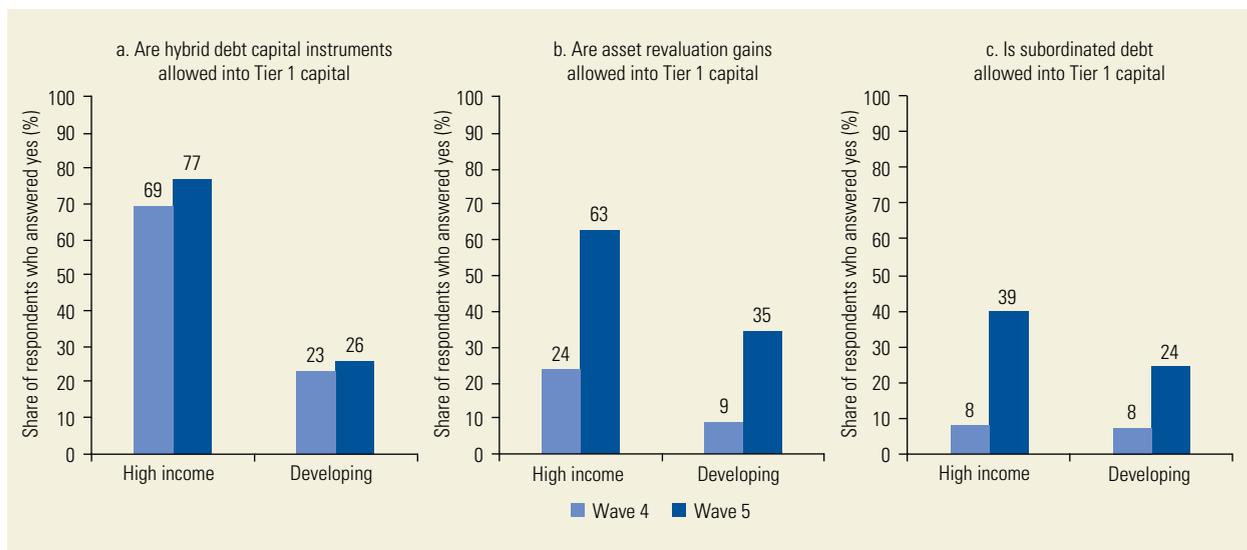
Note: Large banks are defined as those at or above the 80th percentile of banks within each country, in each year, in terms of assets, whereas small banks constitute the rest of the banking system (that is, below the 80th percentile). Country-year observations are dropped if there are data for fewer than five banks. Simple averages are taken across banks to calculate country-level values and across country averages to compute values for income group levels.

adequately reflect actual risk (Demirgüç-Kunt, Detragiache, and Merrouche 2013).<sup>19</sup>

The fourth annual report of the Financial Stability Board (FSB 2018b) on the implementation and effects of the G-20 financial regulatory reforms indicates that large banks have almost doubled their risk-based capital ratios and halved their total assets over Tier 1 capital ratio, in line with findings reported in the 2018 Basel III monitoring report (BCBS 2018c). These results are not directly comparable with the data presented in figure 1.2 because of country coverage, type of banks considered in the analyses, and methodology. We offer an additional perspective because we report results for a larger number of banks and a larger number of developing countries and, among them, countries that are not current signatories to the Basel accords. The analyses in FSB (2018b) and BCBS (2018c) focus on the very largest banks (globally systemically important banks or top internationally active banks) in BIS-member countries, whereas the trends reported in figure 1.2 are computed using bank-level data for approximately 20,000 banks from a larger number of countries at all income levels.<sup>20</sup>

Because minimum regulatory thresholds for bank capital are set as a percentage of RWA, the “weighting” of bank assets to accurately reflect risk exposures is crucial. If banks reshuffle their portfolios toward assets that are truly risky but carry low risk weights (a form of regulatory arbitrage), the meaning of RWA can become distorted. Probing asset quality reviews (AQRs) have been used successfully, particularly in Europe, to dispel doubts about the valuations of bank assets.<sup>21</sup> A supplementary limit on a simple leverage measure has also been introduced in the Basel III international capital agreement (BCBS 2011). Nevertheless, because bank capital is a scarcer and costlier source of funding because of information (Majluf and Myers 1984) and managerial problems (Kashyap, Rajan, and Stein 2008), banks may prefer to meet the regulatory requirements using “hybrid” or “loophole” items or instruments whose capacity to absorb losses is less than that of straightforward shareholder-contributed capital.

Beyond the levels of the Tier 1 capital ratio, another element for appraising the quality of bank capital is the balance sheet items allowed in the computation of Tier 1 regulatory

**FIGURE 1.3 Quality and Definition of Regulatory Bank Capital**

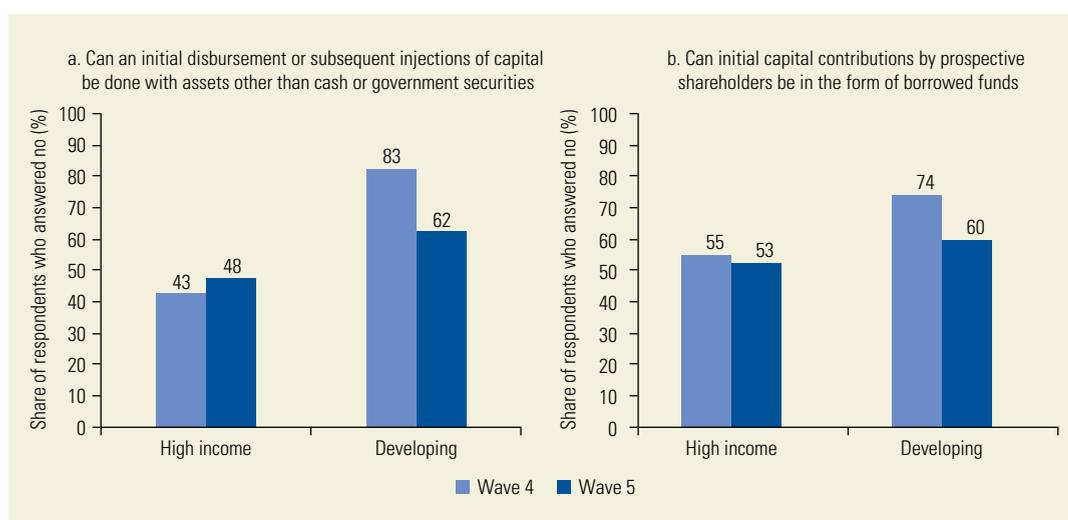
Source: Bank Regulation and Supervision Survey (BRSS), waves 4 and 5, <https://www.worldbank.org/en/research/brief/BRSS>.

Note: In this figure and in subsequent figures, the sample of countries is balanced over time. For example, a country that has information in wave 5 but not in wave 4 is excluded from the computations.

capital. As shown in figure 1.3, between BRSS waves 4 and 5 the number of countries allowing hybrid debt capital instruments, asset revaluation gains, and subordinated debt to be used in the computation of Tier 1 capital rose. Broadening the definition of Tier 1 capital in this way raises at least three concerns, especially for developing countries. First, a broader definition of bank capital may increase opacity for private monitors in assessing bank risk—an issue highlighted by the global financial crisis (see, for example, Haldane 2011). Second, there may be much less liquidity for debt contracts in developing countries where financial markets are less developed. And, third, the valuation of hybrid debt capital instruments, asset revaluation gains, and subordinated debt is inherently complex, placing a greater burden on supervisory authorities, which may lack the information, knowledge, and skills needed to review banks' capital calculations. According to an analysis of archived bank-level data from Bankscope (not presented here), hybrid debt capital instruments, asset revaluation gains, and subordinated debt comprised a small

share of Tier 1 capital through 2015 (less than 5 percent). Concerns about these forms of capital may not therefore be pressing in the near term, although this is an issue that bears watching going forward.

Data from wave 5 reveal that since wave 4, some elements used to define the quality of bank capital have been relaxed, especially for developing countries. For example, 62 percent of developing countries answered that the initial disbursement or subsequent injections of capital cannot be carried out with assets other than cash or government securities—a lower percentage than in wave 4, indicating less stringency in initial capital provision from bank owners (figure 1.4, panel a). In addition, 60 percent of developing countries indicated that initial capital contributions by prospective shareholders cannot be in the form of borrowed funds—a lower percentage than that recorded in wave 4. For high-income countries, those ratios were very similar in BRSS waves 4 and 5. They were, however, substantially lower than for developing countries, indicating that advanced markets continue

**FIGURE 1.4** Definition of Regulatory Capital

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

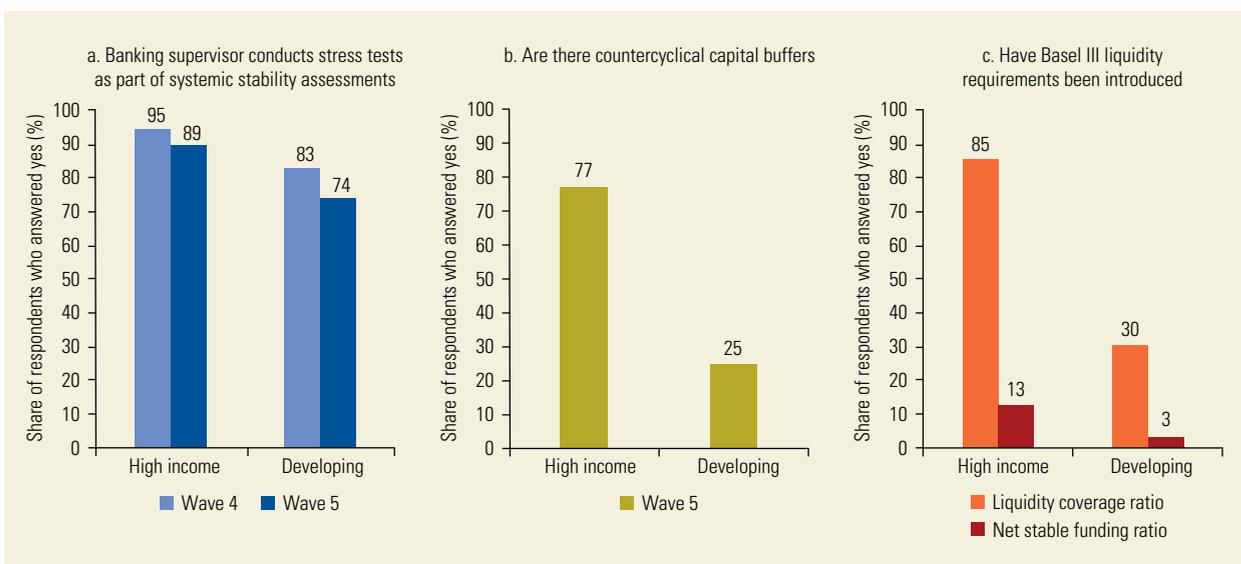
Note: In panels a and b, a higher number entails greater stringency in the definition of capital.

to permit a wider set of options for satisfying initial capital requirements.

In the wake of the global financial crisis, bank capital regulations were complemented with macroprudential tools aimed at increasing systemic stability. Examples of the tools introduced since the crisis are countercyclical capital buffers, stress testing, and liquidity requirements.<sup>22</sup> Countercyclical capital buffers provide banks with additional capital cushions at times of distress. During “good times,” banks can save capital for use during periods of financial distress instead of shrinking their assets or trying to raise new capital under distress. Stress-testing gives bank supervisors a means of forcing individual banks to hold more capital. Capital ratios are projected at the end of one or more periods under a stress scenario (for example, a prolonged fall in housing prices). Bank supervisors can force a bank to hold more capital if the projected capital ratio drops under a predetermined regulatory threshold (Wall 2014). Liquidity requirements address situations in which distress is caused by financial losses that make it difficult for banks to raise funds (funding illiquidity) or to sell assets at non-fire sale prices (market illiquidity). Liquidity crises can affect

all banks indiscriminately rather than being specific to certain institutions (Brunnermeier et al. 2009). By imposing regulatory thresholds that limit maturity mismatches between assets and liabilities, regulators could reduce the risk of bank runs and the freezing of inter-bank markets because of illiquidity.

According to BRSS data, the percentage of countries where stress-testing is conducted as part of their systemic stability assessment decreased between waves 4 and 5. For both high-income and developing countries, slight decreases were observed between the waves in the percentage of countries that employ this tool to assess the macro stability of the banking sector, although the vast majority still reported that they use this tool. In countries that no longer conduct stress-testing, supervisors may have less leverage to compel banks with risky exposures to raise more capital. At the same time, the credibility of the stress-testing approach and the ability of bank supervisors to address potential revealed weakness are crucial factors for the successful use of this tool (Wall 2014). For example, in the European Union in 2010 and 2011, stress-testing undermined the credibility of the supervisory agency in the eyes of market participants

**FIGURE 1.5 Capital Regulations: Complementary Tools**

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

Note: The questions reported in panels b and c were introduced in wave 5 of the BRSS.

because the scenarios used were not realistic. For lower-income countries, it may be wise to learn from the experience of high-income countries before fully implementing this supervisory approach.

A higher percentage of high-income countries than developing countries have introduced countercyclical capital buffers. Only one in four developing countries has added this measure to its bank supervisory toolkit, compared with 77 percent of high-income countries (figure 1.5, panel b). Because adoption of this tool implies the development of sound dynamic analyses to assess whether bank credit growth implies excessive risks, developing country authorities should first consider the implementation challenges in terms of availability of resources and supervisory powers (such as the power to restrict profit distributions) to adapt the use of countercyclical capital buffers to the specificities of their domestic credit cycles.

Basel III liquidity requirements also have been adopted more by high-income countries than by developing countries. A lower percentage of developing countries have adopted both the liquidity coverage ratio (LCR),

which refers to the ratio of unencumbered, high-quality liquid assets to net cash outflows under an acute 30-day stress scenario (BCBS 2011), and the net stable funding ratio (NSFR), which is the minimum amount of available stable funding relative to the required amount of regulatory stable funding over one year. The adoption rate is higher for the LCR because the NSFR was introduced only toward the end of 2014 and the BCBS agreed-on implementation date was January 2018 (figure 1.5, panel c). Moreover, implementing liquidity standards in developing countries could be more difficult because of concentration risk (such as higher holdings of sovereign debt), dependence on wholesale funding, low availability of high-quality domestic securities, and high loan-to-deposit ratios (Basel Consultative Group 2014; Jones and Zeitz 2017).

Overall, although capital ratios are at their highest levels since the financial crisis, supervisors would be wise to interpret them with caution. The increase in the Tier 1 capital ratio for banks in high-income countries has been accompanied by a decline in RWA (as a share of total banking assets). A deeper

understanding of whether and how banks have shifted assets to categories with lower risk weights is likely needed in many country contexts. It may also be wise to question whether lower risk weights are an accurate reflection of actual risk across asset types. Looking forward, BRSS wave 5 responses indicate that a wider array of instruments is permitted to satisfy Tier 1 capital requirements and that noncash assets, including borrowed funds, are increasingly permitted in banks' initial capital formation in developing countries. Even though few banks have relied heavily on the new instruments and noncash options to date, that, too, is an issue worth monitoring. So far, macroprudential tools related to capital and liquidity have not been widely adopted by developing countries, a situation that is likely attributable to the difficulties faced in adapting those approaches to local contexts.

## MARKET DISCIPLINE

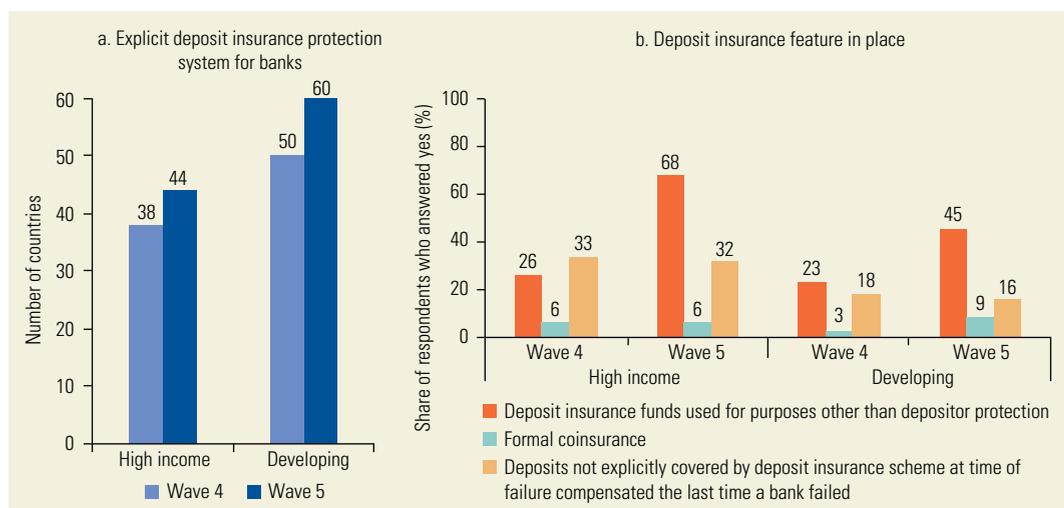
Market discipline may have deteriorated because of bank bailouts that undermine long-term incentives for private monitoring. Based on the latest BRSS responses, market discipline may have waned because of weaker incentives to monitor bank risk-taking. Deposit

insurance coverage has increased, and government interventions in the banking sector to rescue ailing banks have likely weakened the incentives of market participants to monitor banks' risk-taking behavior. This outcome has likely encouraged banks—especially large banks—to take on excessive risk. Moreover, according to the BRSS wave 5 responses, the information available to assess the risk profile of banks is now less expansive than it was in 2008–10, the years covered by wave 4.

Bank monitoring by market participants is influenced by the presence of an explicit deposit insurance scheme, which can reduce the incentives of depositors to monitor banks. Today, many more countries have explicit deposit insurance than before the financial crisis (104 in wave 5 versus 88 in wave 4).<sup>23</sup> Furthermore, the existing schemes have become more generous in some countries because deposit insurance funds can be used for purposes other than depositor protection (meaning that uninsured liability holders might be covered),<sup>24</sup> coverage has been expanded, and the amount insured has been increased.

Expansions of deposit insurance coverage and scope may have helped to restore confidence in banking sectors across the globe, but these expansions have likely come at a cost in terms of market discipline. With only

**FIGURE 1.6 Deposit Insurance Protection Scheme**



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

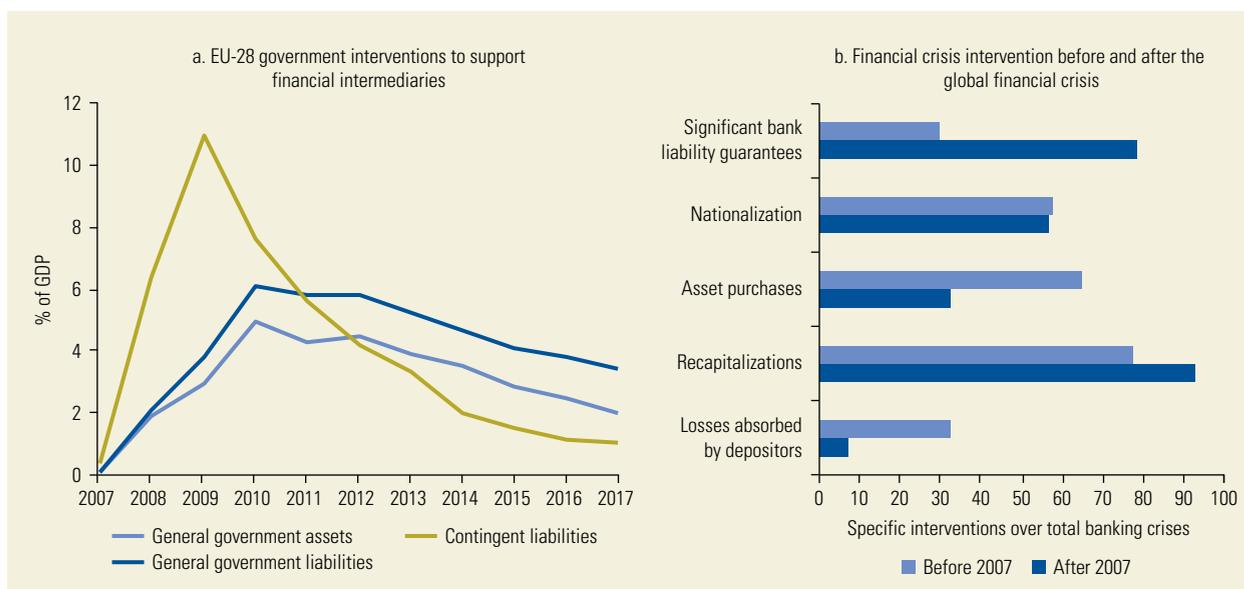
a few exceptions, there have been no contagious runs by retail depositors in recent years (Hasan et al. 2017). Although adequate funding of the financial safety net is crucial for deposit insurance to be credible, an overreaction to restore public confidence in the banking system in the short term can ultimately be destabilizing over the longer term. Limited (but credible) ex ante funding commitments are therefore crucial in three important respects. First, they limit excessive risk-taking incentives by banks. Second, they limit the amount of taxpayer funds potentially at risk. Finally, they help to harmonize insurance schemes in common banking areas to limit regulatory arbitrage.

Government intervention to avoid or curtail a banking crisis can undermine market discipline. Although governments are expected to intervene in a systemic crisis, the approach and the actions taken have a clear link to future moral hazard if banks perceive that they will be bailed out during future crises, thereby increasing their willingness to risk insolvency. By increasing expectations of future rescues, some types of government interventions (such as blanket guarantees and

extensive liquidity support to insolvent institutions) may also undermine incentives for monitoring by market participants (Demirgüç-Kunt and Servén 2010).

The response to the global financial crisis by governments and central banks was quite extensive. Although crisis response policies smoothed the impact of the financial crisis on the real economy,<sup>25</sup> they also extended the safety net to banks' shareholders, executives, and debtholders to an unprecedented degree. Those actions may therefore have intensified moral hazard for banks' decision makers going forward. As reported in figure 1.7, panel a, the contingent liabilities to support financial institutions in the 28 countries making up the European Union (EU) peaked in 2009 at around 11 percent of their gross domestic product (GDP).<sup>26</sup> Government assets and liabilities for crisis support reached around 5 percent and 6 percent of GDP, respectively. Even though the aggregate government support had fallen by 2017, it was still more than 6 percent of the EU-28's GDP. Furthermore, figure 1.7, panel b, documents that bank liability guarantees and recapitalizations were more prevalent during and after

**FIGURE 1.7 Government Interventions to Rescue Banking Sectors**



Sources: Panel a: Eurostat (database, European Commission); panel b: Laeven and Valencia 2018.

the recent crisis than during banking crises before 2007. Losses imposed on depositors were very rare, occurring in less than 10 percent of the banking crises after 2007, whereas depositors suffered losses in more than 30 percent of the banking crises before the global crisis. These government interventions imply that at least part of the real costs of the crisis was not shouldered by the responsible parties.

Although the global financial crisis was a developed country crisis, policy makers and

supervisors in countries at other levels of economic development can gain insights from the experience. According to Laeven and Valencia (2018), of the 24 countries that experienced either a systemic banking crisis or a borderline systemic crisis during 2007–09, just two were lower-middle-income countries—Ukraine (box 1.4) and Nigeria—and two were upper-middle-income countries—Kazakhstan and the Russian Federation. One insight was that as economies grow and

### BOX 1.4 Bank Resolution Cases: The Ukrainian Banking Crises

The Ukrainian banking crises are a clear illustration of the issues associated with resolving distressed banks in developing countries. In the 15 years leading up to the global financial crisis, Ukraine's boom-and-bust cycles were reflected in its banking sector performance. The sector enjoyed very high growth rates in the mid-2000s under a favorable financial and economic outlook. Private sector credit increased exponentially in the run-up to the crisis, from 33 percent of GDP in 2005 to 80 percent in 2008. Foreign lenders financed most of this credit boom, and at the end of 2008, foreign currency loans constituted about half of lending to nonfinancial firms and almost 65 percent of lending to households. Nontransparent ownership structures, pocket banks (banks run by business owners as a vehicle to fund nonfinancial undertakings), ineffective corporate governance arrangements, distorted financial statements, and ineffective bank supervision were also defining characteristics of the Ukrainian banking system.

The first systemic crisis struck Ukraine in 2009. The combination of a sudden stop in capital inflows, the rapid depreciation of the hryvnia, and a precipitous economic slowdown hit the banking sector hard. Banks felt the immediate effects of the drying up of foreign financing in 2009, and the devaluation of the hryvnia and a crisis in the country's sixth-largest bank triggered a deposit run. Amplified by the drastic deterioration of economic conditions—the country contracted by 15 percent in 2009—acute asset quality pressures emerged, with nonperforming loan (NPL) shares increasing from 17 percent to 40 percent. The central bank embarked on a series of emergency measures such as large-scale liquidity support, controls

on early withdrawals of time deposits, restrictions on foreign currency lending, an increase in deposit insurance coverage, and state-funded recapitalization of five banks, while more than 20 banks were liquidated. However, these crisis containment measures were temporary fixes that did little to address the vulnerabilities that had built up in the sector.

Ukraine experienced a short-lived recovery but relapsed into a financial crisis, with the backdrop of a domestic political crisis and external security threats. In 2014 the government began to revoke the licenses of more than half of Ukraine's 180 banks. As of October 2018, 88 banks had been liquidated by the Deposit Guarantee Fund (which in 2012 became the resolution authority), with losses exceeding US\$20 billion incurred by the state and by uninsured depositors. Affected shareholders have on occasion successfully challenged the authorities' decision to take action against banks that are considering failing or otherwise not compliant with regulatory requirements. Meanwhile, the political consensus necessary to bring the owners and management to justice for causing banks to fail was lacking.

Today, together with the International Monetary Fund and the World Bank, Ukrainian authorities are undertaking a sustained effort to restore the long-term health of the banking sector. And yet the aftermath of a cumulative 16 percent decline in real GDP in 2014–15, lingering national security tensions, and downward pressure on the currency continue to stress the Ukrainian financial system, as illustrated by further increases in the NPL ratio, which reached 55 percent of gross loans at the end of 2017. A framework for the resolution and recapitalization of banks

*(box continued next page)*

### BOX 1.4 Bank Resolution Cases: The Ukrainian Banking Crises *(continued)*

has been established in an effort to curb the excessive bank risk-taking. Banks have also been forced to provide a more realistic representation of credit risk, and work has continued to reduce related party exposures and enforce transparency in ownership structures. Bank recapitalization plans and timely enforcement actions have helped to strengthen solvency in the sector, although the resolution of problem banks in a manner that maximizes asset recovery while minimizing costs to the state continues to present a considerable challenge.

The Ukrainian experience provides a sobering illustration of the importance of establishing the

basics of effective prudential supervision. These include issues related to concealed and under-reported related party exposures, shareholder transparency, deficient frameworks for licensing and transfer of ownership of banks, regulatory and supervisory gaps in the recognition of and provisioning for problem assets, and the lack of independence and resources for bank regulatory agencies. Going forward, bank bailouts and a generous deposit insurance system may have the unintended consequences of both undermining the incentives of market participants and encouraging excessive risk-taking behavior by banks.

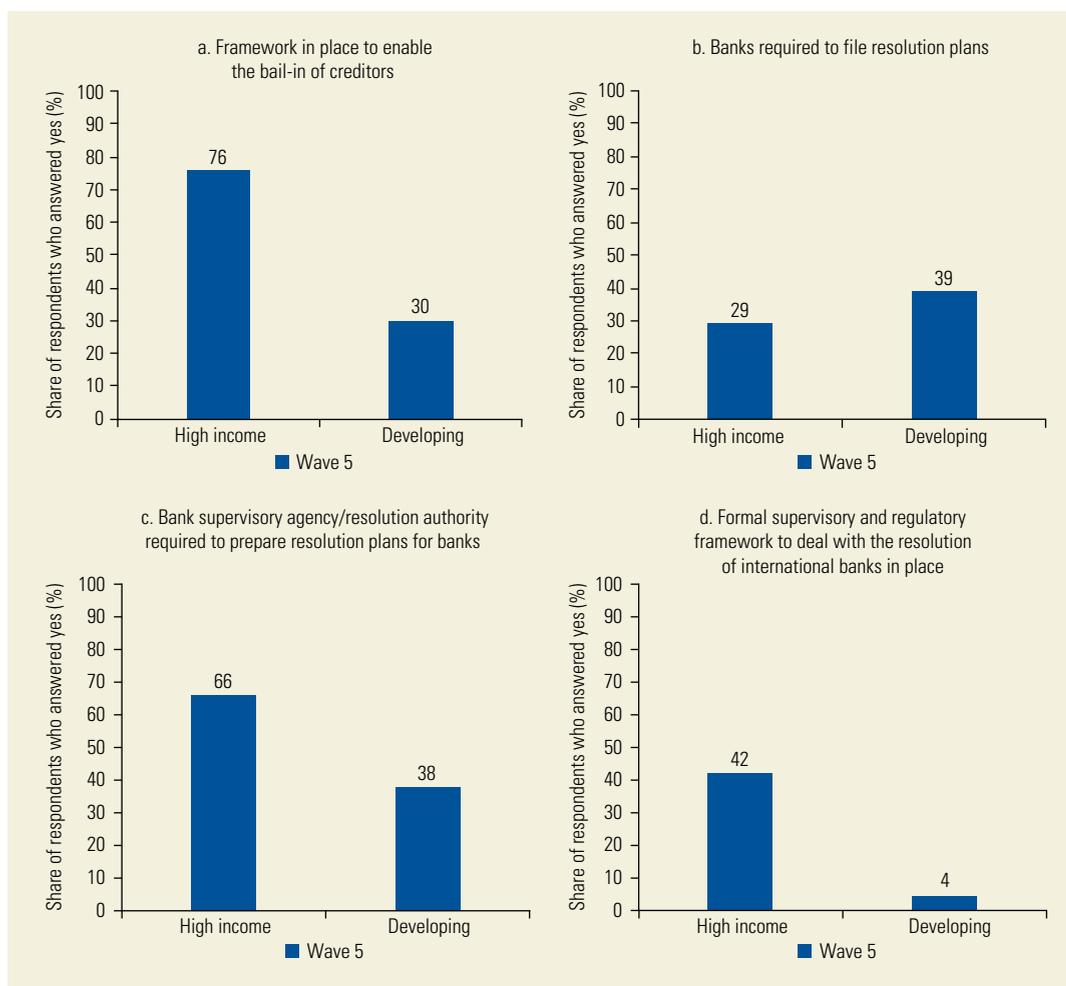
develop their debt and tax capacity, implicit deposit insurance guarantees are likely to reduce the incentives of market participants to discipline bank behavior.

In the post-financial crisis period, there was recognition that market discipline could be undermined by government intervention in the banking sector. An effort to design clear rules to wind down distressed institutions was undertaken by many countries while recognizing the key role of banks for well-functioning economies. Furthermore, there was explicit recognition by the Financial Stability Board and other international bodies that larger and more interconnected banks presented a critical challenge because of the economic and political ramifications of their failure. This effort led governments to shore up resolution frameworks by, for example, creating separate procedures for banks and nonfinancial firms. It remains to be seen how much those frameworks will influence the expectations of market participants that governments will step in to rescue ailing banks, especially considering the frequency and size of recapitalizations and liquidity support during recent crises.

Insolvency resolution schemes were redesigned to give banks' shareholders and managers incentives to encourage the prudent management of banks. For example, some governments introduced regulation that forces

banks' creditors to bear some of the burden of banks' defaults by having a portion of their debt written off (also known as "bail-in" regulations). Calomiris and Herring (2013) argue that the effective design of convertible contingent capital (a type of bail-in instrument) can provide banks with ex ante incentives to measure risk accurately and ex post incentives to raise additional capital in a timely fashion when it is depleted. An important distinction was also made in terms of the size of individual institutions and the potential domestic and international impact of distressed institutions. The Financial Stability Board has been publishing the list of globally systemically important banks (G-SIBs) since 2014. Since 2012, there has also been discussion of adapting the policy framework for G-SIBs to domestic systemically important banks (D-SIBs). Both G-SIBs and D-SIBs are discussed in greater detail in chapter 2.

Also in the postcrisis period, more than three-quarters of high-income countries and nearly one-third of developing countries introduced creditor bail-in initiatives, which should have enhanced market discipline (figure 1.8, panel a). Moreover, to limit disruptions after bank defaults, banks were required to submit plans that detailed a strategy for rapid and orderly resolution in the event of material financial distress or failure (resolution plans

**FIGURE 1.8** New Resolution Rules and Bail-In Debt Requirements

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

Note: The questions reported in this figure were introduced in wave 5 of the BRSS.

also known as “living wills”). As reported in figure 1.8, panel b, almost two-fifths of developing countries had this requirement in place by the end of 2016. Resolution plans could also be prepared by the bank supervisory agency or the resolution authority. As shown in figure 1.8, panel c, two out of three high-income countries opted for this arrangement, whereas the relative take-up by developing countries has been lower. To be sure, until the next crisis bail-ins and “living wills” are untested, and many observers are skeptical that they will work as advertised because of authorities’ reluctance to allow large-scale losses on their watch.

After the crisis, new rules were also put in place to resolve systemically important financial institutions (SIFIs). SIFIs are invariably holding companies that can own both bank and nonbank subsidiaries. This effort addressed concerns that disorderly liquidation of SIFIs could cause significant disruptions in financial systems. Because their failure can cause substantial economic damage, they are viewed by market participants as being too big to fail (TBTF). To strengthen market discipline and to reduce the likelihood that taxpayer funds will be at risk, several countries implemented single point of entry resolution processes for bank holding companies and

added new requirements for systemically important banks to hold bail-in debt following guidelines set by the Financial Stability Board (discussed in greater detail in chapter 2). But new regulations for the orderly resolution of SIFIs are still untested, and because of changes in the way SIFIs are monitored by supervisors and the presumption that those entities would be safe or “saved” in case of distress, investors’ incentives to monitor large or interconnected entities could be undermined.

Domestic regulations and cooperation with host countries for cross-border resolution of international banks are crucial in markets in which a high percentage of the banking system’s assets are held by banks that are foreign-controlled. The banking sectors in many developing countries are dominated by foreign-owned banks, but by the end of 2016 just three developing countries had in place a regulatory framework to deal with the resolution of international banks (figure 1.8, panel d). Although there has been some progress in adopting measures to enhance market discipline, many of the newly implemented mechanisms are still untested. Moreover, because of the complexity of foreign banks in developing countries, there is also a case for greater reliance on leverage ratios because it is difficult for local authorities to determine whether banks are gaming the risk weights used in the calculation of capital ratios.

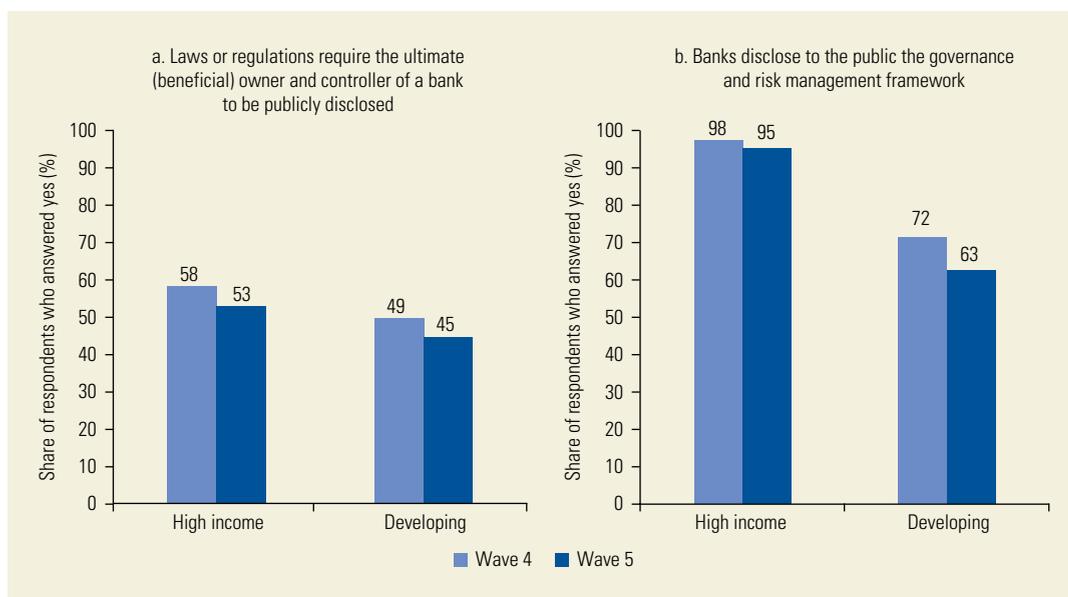
For effective monitoring, market participants must have access to reliable and timely data relevant to the economic condition of a bank. The adequacy of a country’s accounting standards is paramount for the reliable provision and analysis of such data. For instance, the use of International Accounting Standard 39 (IAS 39—Financial Instruments: Recognition and Measurement) may have exacerbated the declines in the value of collateralized debt obligations (CDOs).<sup>27</sup> The latest International Financial Reporting Standards 9 (IFRS 9 Financial Instruments) was introduced as a regulatory response to the unsatisfactory performance of the previous accounting standards. Nonetheless, using the fair value approach to appraise financial assets in many developing countries is problematic because of illiquid

markets and, often, the lack of an observable yield curve. Moreover, stringent disclosure rules, independent outside audits, and the availability of public and private credit rating agencies all increase transparency and allow greater discipline by market participants. In countries with shallow financial systems, the information environment may be weak because of a lack of scale in the production of public sector services. In those countries, it may be wise to rely more heavily on higher capital requirements rather than on market monitoring to increase systemic resilience (Anginer, Demirgüç-Kunt, and Mare 2018).

Developing countries have shortfalls in some aspects of the availability and quality of information. Knowledge of the ultimate owner and controller of a bank facilitates a consolidated assessment of its exposures. But in developing countries, bank supervisors frequently do not have information on the ultimate (beneficial) owner of a bank because the institution sits outside the regulatory perimeter (figure 1.9, panel a). This problem has been noted, for example, by the Financial Market Supervisory Authority of Azerbaijan, and it was a key issue during the Ukrainian banking crises summarized in box 1.4. Disclosure of a bank’s governance and risk management frameworks to the public enables assessment of its risk management approach. For both high-income and developing countries, however, this information was disclosed less frequently in wave 5 of the BRSS than in wave 4 (figure 1.9, panel b).

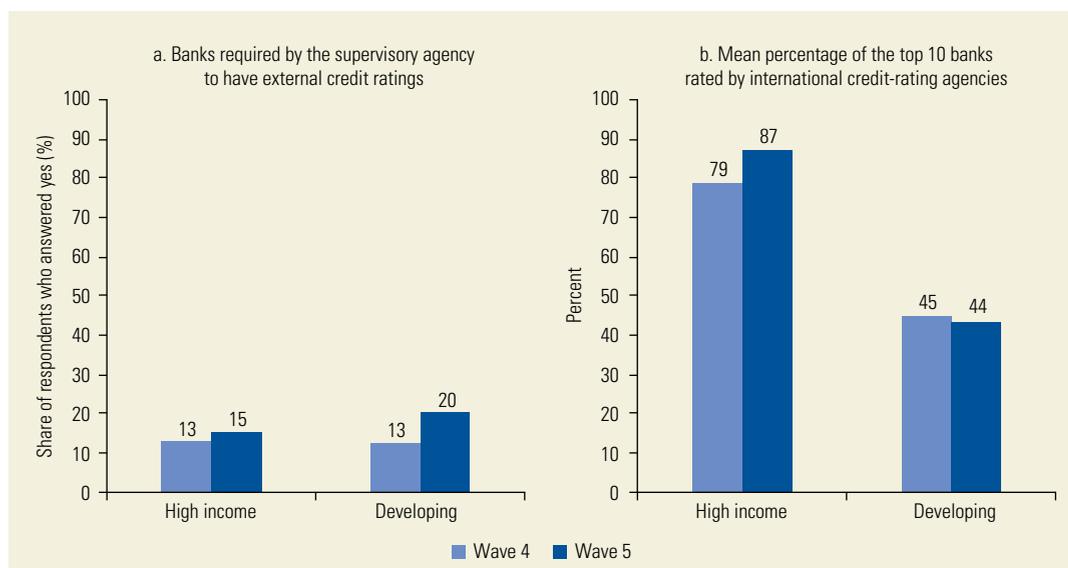
Credit ratings are an important source of information when evaluating the creditworthiness of counterparts, though it should not be the sole source of information to appraise a bank’s risk exposure, as highlighted in the discussion in box 1.1. The BRSS data show a modest increase in the share of countries that require banks to have external credit ratings (figure 1.10, panel a). Although large banks are more likely to demand and be able to afford the cost of external credit ratings, on average less than half the top 10 banks in a developing country have credit-ratings from an international credit-rating agency (figure 1.10, panel b).

**FIGURE 1.9 Banks' Disclosure of Risk Information**



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

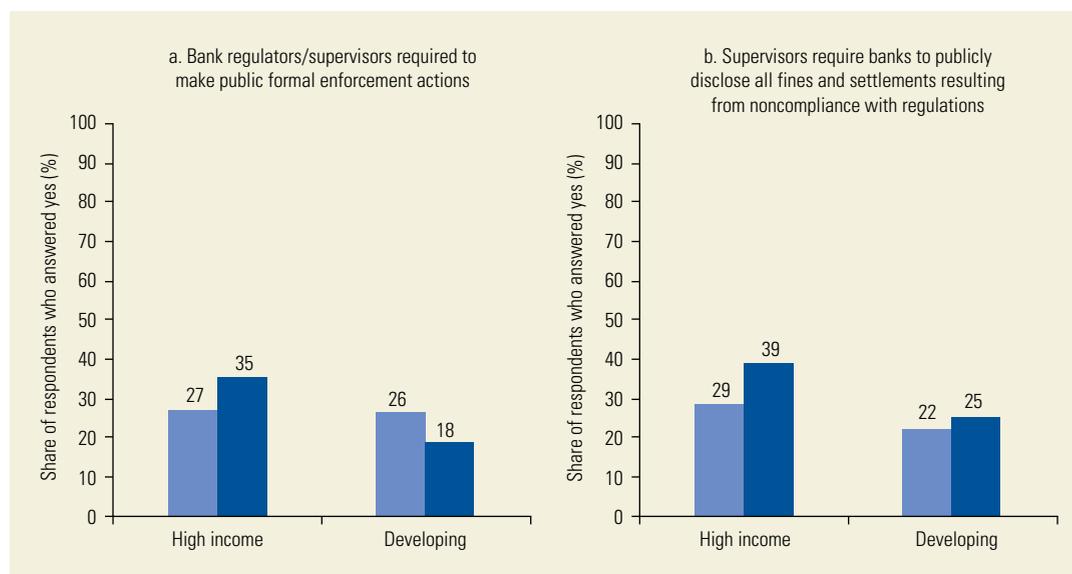
**FIGURE 1.10 Information on Credit Ratings**



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

Bank supervisory reporting is also important for market discipline because it has an indirect influence on banks' behavior and increases the information available to market participants when it is publicly available. For example, disclosure of enforcement actions

has been associated with a decline in the cost of borrowing firms due to the lower reputation of punished banks after enforcement and potential competition from other incumbents (Deli et al. 2019). Information on enforcement actions and on the fines and settlements

**FIGURE 1.11 Public Availability of Supervisory Reporting**

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

resulting from noncompliance with regulations indicates the compliance of individual banks with regulations, the corporate culture of frequently or severely penalized firms, and the extent of bank supervisory agency forbearance. Information on enforcement actions is made public in 35 percent of high-income countries, according to BRSS wave 5, up from 27 percent in wave 4 (figure 1.11, panel a). However, that ratio actually declined for developing countries from wave 4 to wave 5.

It is also an effective best practice for bank supervision to assure the regular and accurate disclosure of financial data to regulators and market participants because it enhances individual bank stability (Demirgüç-Kunt, Detragiache, and Tressel 2008). The share of countries that require banks to publicly disclose all fines and settlements increased, although the gains were greater among high-income countries (figure 1.11, panel b). Overall, however, the data from wave 5 show no strong improvement in the quality of information and its availability to market participants and the broader public, especially for developing countries. These findings are in line with recommendations of recent Financial Sector Assessment Programs (FSAPs) in developing countries to improve poor financial reporting

standards (Vietnam 2014 FSA) and enhance the quality of financial statements disclosed to the public by bank supervisory authorities (Bosnia and Herzegovina 2015 FSA).

Overall, market discipline may have decreased since the global financial crisis because of government interventions during the crisis, expansion of deposit insurance, and some limitations in the information available to market participants. Government interventions during the crisis were large and unprecedented, which could have future ramifications. In the wake of the crisis, deposit insurance frameworks became more expansive. There were also efforts to incorporate bail-in features and improve resolution frameworks, but these measures are a work in progress, and resolving international bank failures remains a key concern. Information disclosure to market participants has not improved, which hampers monitoring. Banks are required to have credit ratings in only a few countries, and even the top 10 banks in developing countries are typically not required to have a rating from an international credit-rating agency. Supervisory actions tend not to be made public, but the availability of this information could be useful for monitoring the behavior of banks and bank supervisory agencies.

## BANK SUPERVISION

Bank supervision has become stricter, and also more complex. Supervisory capacity has not improved proportionally to match the greater complexity of bank regulations. Although there have been increases in the number and complexity of regulations since the crisis, there has not been a corresponding increase in supervisory powers and supervisory capacity. As banks become larger and more complex, there is a growing need for supervisory resources and talent to monitor the risks and the financial soundness of these institutions. New rules requiring disclosure and stress-testing put additional strain on supervisory resources to generate,

process, and disseminate information. Tailored tools, methodologies, and capabilities are also needed to meet the increased focus of bank supervisors on climate-related risks as a source of financial risk and the implications for the stability of the financial system.<sup>28</sup> Finally, new regulations (especially regarding resolution) allow for a significant amount of discretion by supervisors, and thus they require highly experienced and specialized personnel. By the same token, capacity constraints are likely to limit the ability of supervisory agencies in developing countries to take advantage of the latest technological developments, as described in box 1.5.

In many developing countries, a lack of regulatory independence is also a major

### BOX 1.5 Use of Financial Technology in Banking Regulation and Supervision

Rapid advances in financial technology are transforming the provision of banking services. Policy makers are keen to harness the potential benefits of financial innovation while assessing and managing the inherent potential risks. In this regard, the Bali Fintech Agenda developed by the IMF and the World Bank offers insight into key issues that should inform policy discussions.<sup>a</sup> The Agenda provides a high-level framework and comprises 12 elements that policy makers should consider as individual countries formulate their policy approaches.

One of the elements in the Bali Fintech Agenda is the modification and adaptation of the regulatory framework and supervisory practices to facilitate the development of the new products, services, and intermediaries while ensuring the stability of the financial system. Recent technological developments in the collection and processing of information may enhance compliance with bank regulation (regtech) and improve bank supervision (suptech). One definition of regtech (short for regulatory technology) is technology-enabled solutions that enhance compliance with regulations while minimizing associated time and costs (Institute of International Finance 2016). Regtech can be applied to

regulatory reporting, risk management, identity management and control, compliance, transaction monitoring, and trading in financial markets. Suptech (short for supervisory technology) can facilitate and enhance supervisory monitoring and internal processes. Suptech applications have been developed in the areas of market conduct<sup>b</sup> and in general for data collection and data analytics.<sup>c</sup> Both regtech and suptech pose challenges in developing or using the relevant software solutions and computer applications related to data gathering, processing, and management; information technology infrastructure; specialized human resources; and standardized reporting.

Many regtech and suptech solutions are still at the concept or pilot stage, where budget and resource constraints are more severe (Toronto Centre 2017). At this point, the best approach for developing countries could be to build on the experiences of early users to harness the benefits of the new technology-enabled solutions and to understand the challenges and risks posed by the implementation of regtech and suptech in their jurisdictions (for example, operational, legal, and reputational risks; data privacy concerns; and the required supervisory expertise).

a. For more detail, see <https://www.worldbank.org/en/news/press-release/2018/10/11/bali-fintech-agenda-a-blueprint-for-successfully-harnessing-fintechs-opportunities>.

b. See Boeddu et al. (2018) for examples of suptech applications in the United States, Lithuania, and Brazil.

c. See Broeders and Prenio (2018) for an overview of the existing tools.

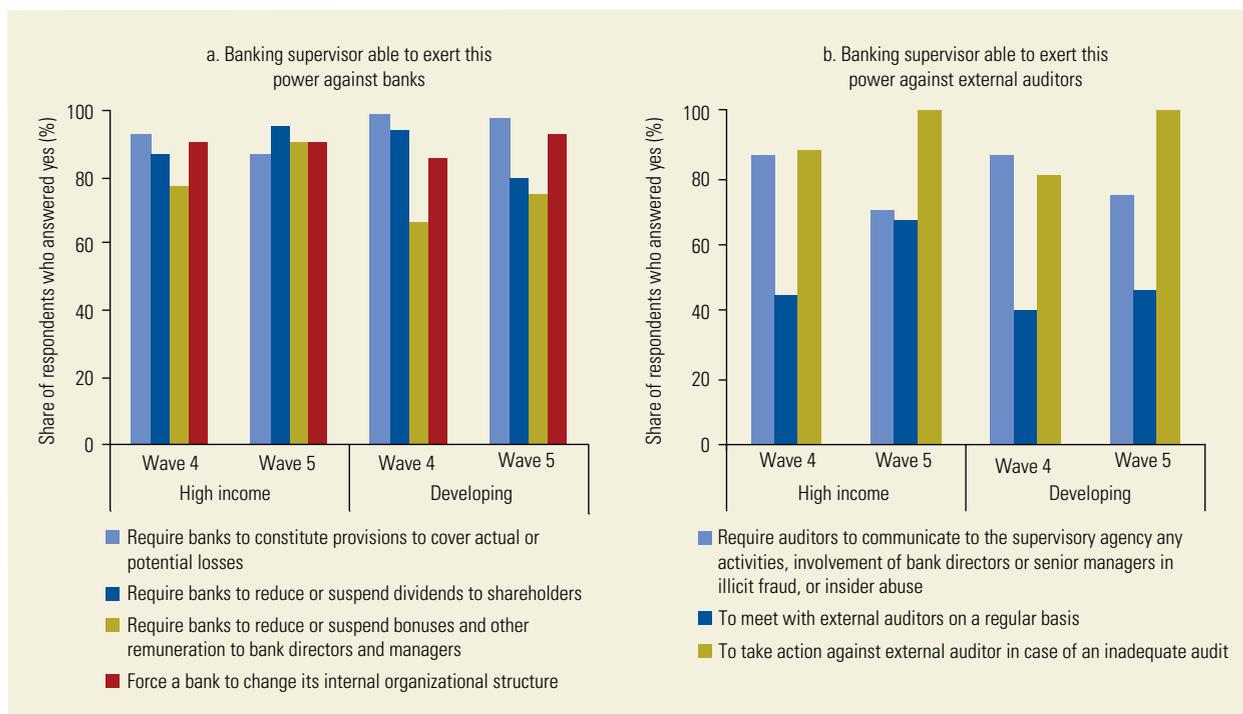
impediment to performing effective banking supervision. The assessments performed during recent FSAPs in several developing countries identified gaps in the legal protection of the senior management and supervisory board members, availability of sufficient independent financial resources, and supervisory powers vis-à-vis state-owned banks. For instance, the 2016 FSAP for Turkey identified issues with the board appointments process of the Banking Regulation and Supervision Agency (BRSA) and the power of the relevant minister to take action against the BRSA. In the same vein, the 2017 FSA for Bulgaria pinpointed a lack of legal protection for staff of all financial oversight authorities.

To undertake effective monitoring and supervision, authorities must have the power to take timely corrective action. Some elements of supervisory powers have improved, but other elements have deteriorated since the last BRSS wave. Figure 1.12, panel a, shows that a higher percentage of both high-income

and developing countries had the power to require banks to reduce or suspend bonuses and other remuneration to bank directors and managers in wave 5 than in wave 4. A higher percentage of developing countries now have the power to force a bank to change its internal organizational structure. Although from wave 4 to wave 5 the power to require banks to reduce or suspend dividends to shareholders grew more prevalent in high-income countries, it declined in developing countries. Finally, a lower percentage of countries in wave 5 than in wave 4 stated that the supervisory agency has the power to require banks to constitute provisions to cover actual or potential losses in both high-income and developing countries. Thus, figure 1.12, panel a suggests that recent changes in the extent of supervisory powers have been mixed.

In addition to facilitating monitoring by market participants, external audits are an integral part of effective supervision. An external auditor performs audits of a bank's

**FIGURE 1.12 Supervisory Powers**



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

financial statements to ensure that financial statements do not contain misrepresentations of the bank's financial condition and are in compliance with internationally accepted accounting standards. Building effective relationships with external auditors can enhance banking supervision by ensuring that the risks and balance sheet information reported by banks is accurate. The audits may also uncover weaknesses in internal controls related to financial reporting at a bank. Figure 1.12, panel b, shows that the percentage of both high-income and developing countries that require auditors to communicate directly with the supervisory agency about any presumed involvement of bank directors or senior managers in illicit activities, fraud, or insider abuse has declined since the last survey. This suggests that an important source of information is now not available for supervisory purposes in a number of countries. Communication between the supervisor and the external auditor enhances the effectiveness of supervision of the banking sector. Regular meetings with the external auditor and an ability to take disciplinary action against auditors who perform inadequately also contribute to audit quality. A higher percentage of both groups of countries now provide the banking supervisory agency with the right to meet with external auditors on a regular basis and to take action against external auditors for inadequate auditing.

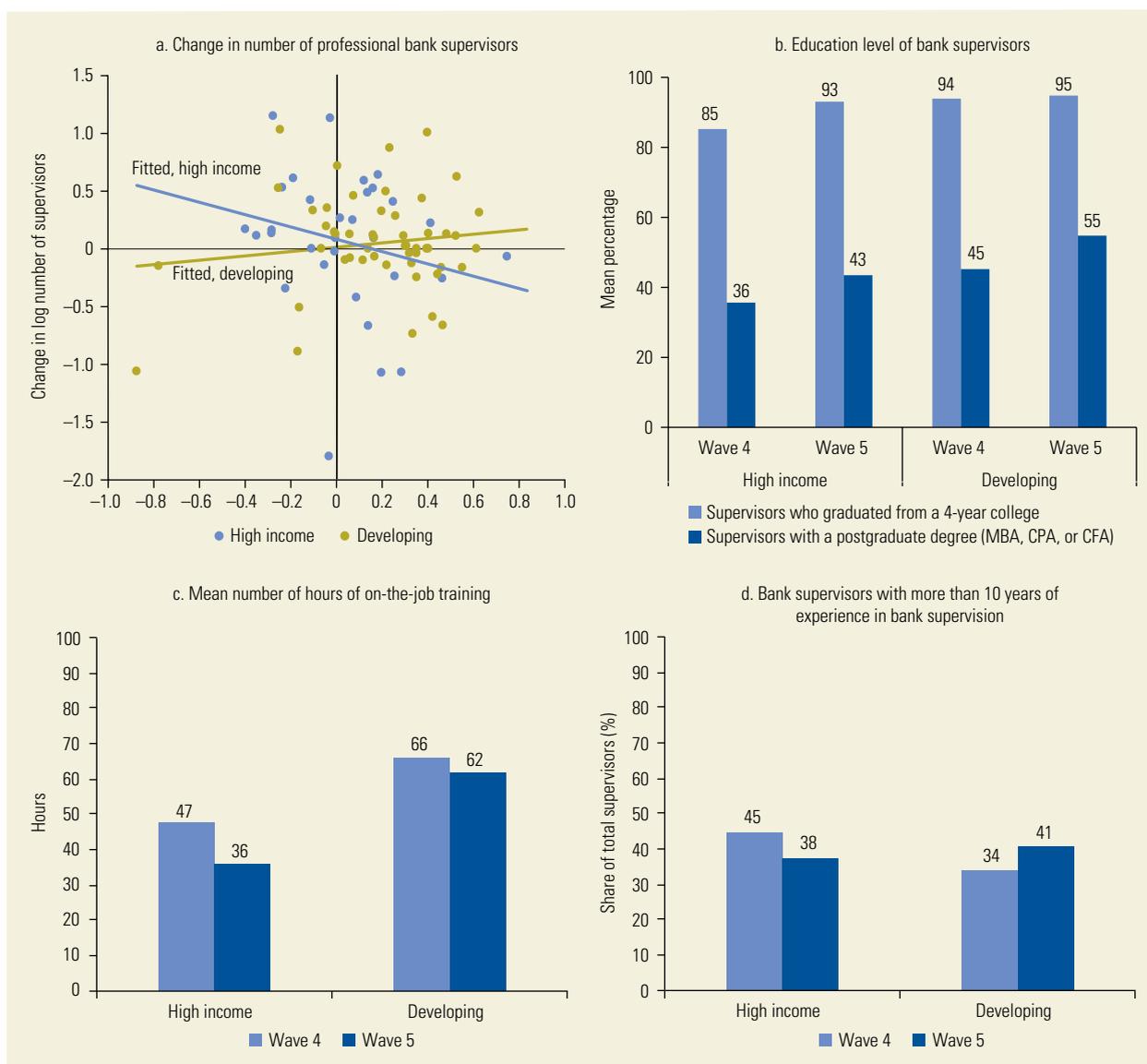
Supervisory capacity has not kept pace with the growing regulations, bank size, and complexity of bank operations. As noted, there was a substantial increase in the number and complexity of regulations in the aftermath of the global financial crisis. With Basel III, greater emphasis has been placed on systemic stability and macroprudential regulation, which requires looking not at the risk of individual financial institutions but at an individual bank's contribution to the risk of the financial system as a whole. Following FSB guidelines, new rules have been proposed and implemented for the resolution of systemically important financial institutions. The new resolution schemes in many countries give supervisors a significant amount of

discretion and flexibility. At the same time, new macroprudential rules require continuous monitoring and stress testing of large financial institutions (see chapter 2). These new capital and macroprudential regulations require a sizable investment in supervisory infrastructure and personnel. Figure 1.13, panel a, shows the log change in the number of supervisory personnel reported in BRSS waves 4 and 5 plotted against the log change in total bank assets for each country, distinguishing by color high-income and developing countries.<sup>29</sup> Although there has been a steep increase in the quantity and complexity of regulations, the figure suggests that there is not even a positive, let alone significant, relationship between growth in bank assets and growth in the number of supervisors who oversee these banks.<sup>30</sup>

The sophistication and complexity of new regulations and bank operations require highly specialized, trained, and experienced supervisors to oversee banks. As reported in panel b of figure 1.13, there has been some improvement in the education levels of supervisory personnel because BRSS wave 5 indicates that a greater percentage now hold advanced degrees than in wave 4. However, on-the-job training appears to be less prevalent than in wave 4 (figure 1.13, panel c), and the mean percentage of bank supervisors with more than 10 years of experience in bank supervision declined in high-income countries between waves 4 and 5, whereas it increased slightly in developing countries (figure 1.13, panel d). Overall, despite some increases in supervisory powers and indications that supervisory personnel are better educated, the BRSS wave 5 survey data indicate that regulatory complexity has advanced more quickly than supervisory capacity.

Greater supervisory resources are required as more developing countries fully implement Basel II and some incorporate elements of Basel III. According to figure 1.14, panel a, a growing number of countries have adopted or implemented components of Basel II and III in the last two surveys. For high-income countries, the shift has been from Basel II to Basel III. Meanwhile, developing countries

FIGURE 1.13 Supervisory Capacity

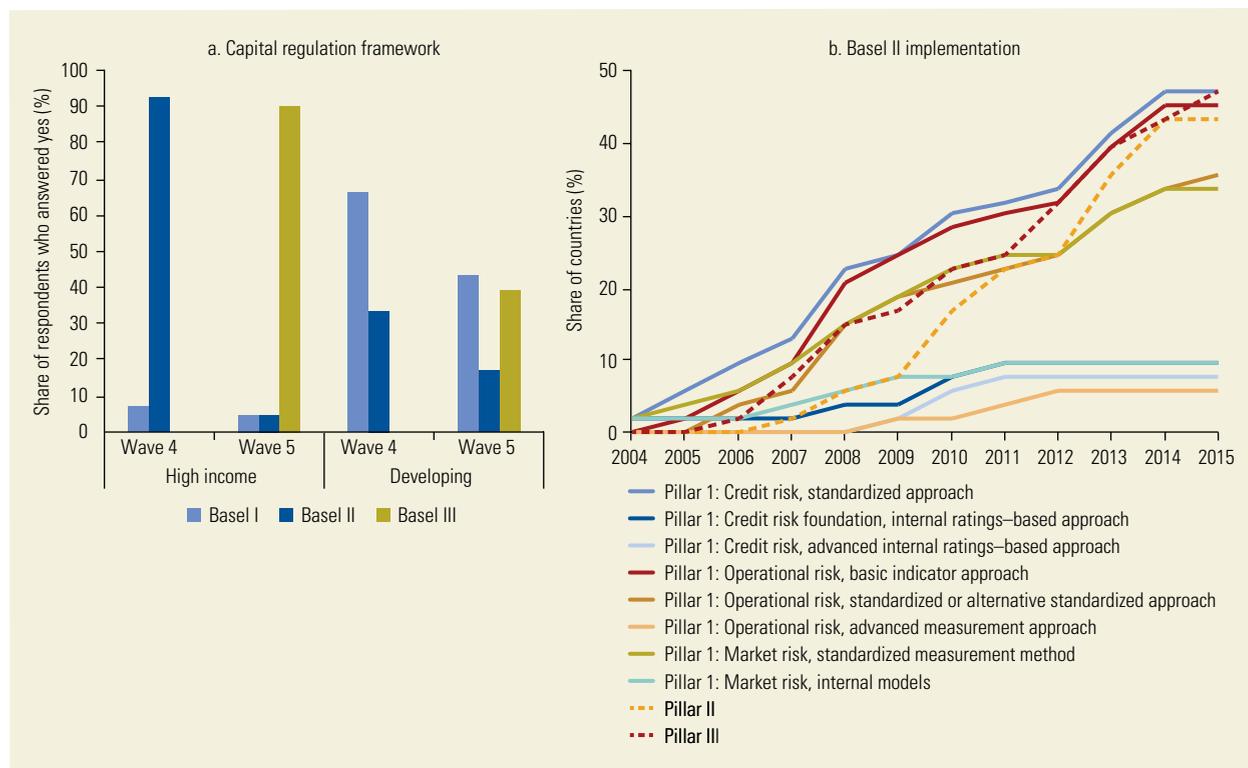


Source: Bank Regulation and Supervision Survey (BRSS), waves 4 and 5, <https://www.worldbank.org/en/research/brief/BRSS>.

Note: The two linear fitted lines in panel a represent the prediction line for high-income countries and developing countries. CFA = chartered financial analyst; CPA = certified public accountant; MBA = master's in business administration.

have been shifting out of Basel I, and nearly 40 percent have adopted some aspects of Basel III. This is not necessarily a bad thing. Most developing countries have been selective in adopting Basel II/III provisions, eschewing some of the more complicated ones, such as using internal models to calculate banks' credit risk (figure 1.14, panel b). And under Basel II, many developing countries still use

the simple standardized approach to computing risk weights. In general, developing countries should focus on establishing a basic robust framework that reflects the characteristics of their local financial systems and refrain from incorporating unnecessarily complex elements. Again, recent empirical studies suggest that during crisis periods, market participants tend to ignore regulatory capital

**FIGURE 1.14** Basel Capital Framework Adoption and Basel II Implementation

Sources: Panel a: new questions introduced in Bank Regulation and Supervision Survey (BRSS), wave 5, <https://www.worldbank.org/en/research/brief/BRSS>; panel b: Financial Stability Institute survey (FSI 2015).

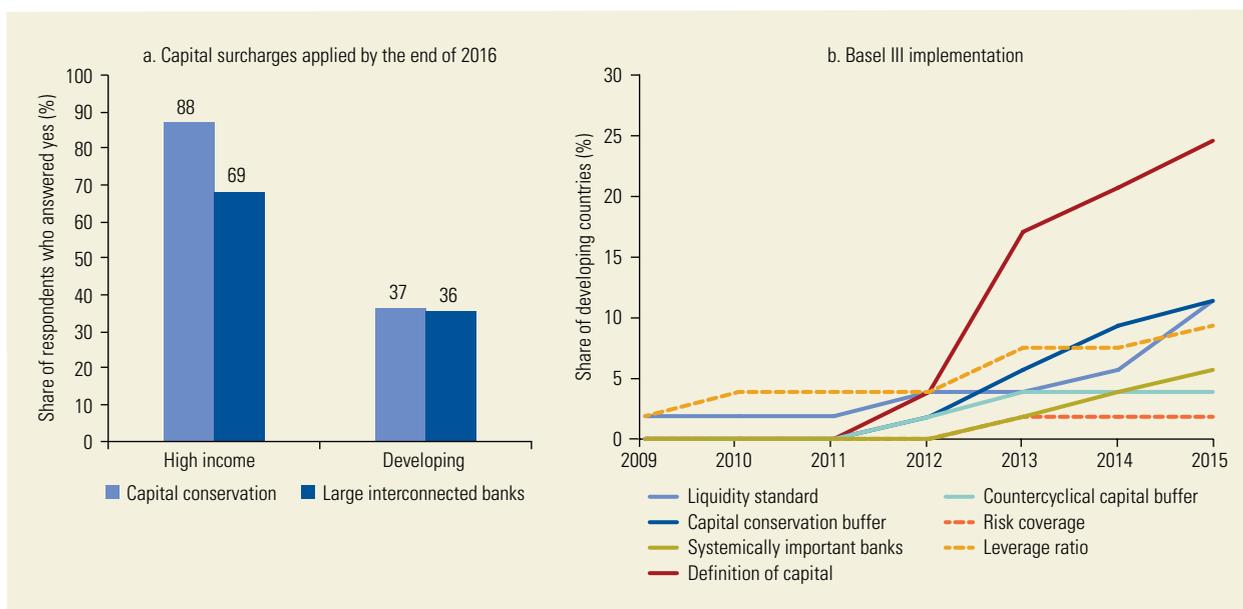
Note: Panel b reports on 53 developing countries, using information from the FSI survey. Adoption of a pillar is defined as whether a country has a final rule in force. The percentage of countries that have adopted a specific Basel II component is then computed.

and focus on simple leverage ratios, presumably because they suspect risk weights may be manipulated to inflate the reported ability of institutions to absorb losses (Demirgüç-Kunt, Detragiache, and Merrouche 2013). There are also arguments against complex regulations that are cumbersome to implement, make crisis control suboptimal (see, for example, Haldane and Madouros 2012), and increase the level of opacity, making it difficult to assess regulatory authorities and hold them accountable (Barth, Caprio, and Levine 2012).

In the wake of the global financial crisis, there has been a growing consensus that capital requirements should be adjusted to better reflect a bank's idiosyncratic risk and its contribution to system-wide risk. Panel a of figure 1.15 shows that a high percentage of high-income countries are applying capital conservation requirements and additional

surcharges for systemically important banks consistent with the principles of Basel III.<sup>31</sup> Those requirements have been adopted to a significant degree by developing countries as well. But again, as for Basel II, developing countries have been selective in their adoption of Basel III principles. For example, changes in the definition of capital have been much more prevalent than adoption of capital conservation buffers (figure 1.15, panel b).

The adoption of capital regulations is associated with a set of macroeconomic determinants and country characteristics. The likelihood of adopting the Basel III capital framework is higher for countries with higher GDP per capita and larger population. The likelihood of moving from Basel I to a more recent capital framework (in other words, Basel II or Basel III capital frameworks) is negatively related to GDP per capita and to

**FIGURE 1.15 Basel III Adoption and Implementation**

Sources: Panel a, new questions introduced in Bank Regulation and Supervision Survey (BRSS), wave 5, <https://www.worldbank.org/en/research/brief/BRSS>; panel b, Financial Stability Institute survey (FSI 2015).

Note: Panel b reports on 53 developing countries, using information from the FSI survey. Adoption of a pillar is defined as whether a country has a final rule in force. The percentage of countries that have adopted a specific Basel III component is then computed. "Systematically important banks" refers to additional capital buffers for either domestic systemically important banks or global systemically important banks.

the presence of undercapitalized banks. These results therefore reflect that large high-income countries have been moving to the Basel III framework, while developing countries have been moving out of Basel I. It is interesting, however, that developing countries with undercapitalized banks have been more reluctant to move away from Basel I than others. Anginer et al. (2019) also show that countries that experienced a banking crisis in 2007–09 increased their regulatory capital holdings more than those in noncrisis countries and were also more likely to relax their definition of Tier 1 capital (see box 1.6). Crisis countries were not, however, more likely to increase capital holdings when measured by a simple

leverage ratio (banks' total equity divided by total assets).

In conclusion, analysis of new global survey data on the regulation and supervision of banks suggests that important interventions and regulatory changes have had significant implications for market discipline and bank capitalization. Overall, a growing number of countries have adopted components of Basel II and III since the crisis. But many developing countries have been selective in their adoption, eschewing some of the more complicated aspects of regulation. Chapters 2 and 3 of this report investigate in greater depth the implications of these regulatory reforms for market discipline and bank capitalization.

## BOX 1.6 Bank Regulation and Supervision 10 Years after the Global Financial Crisis

Anginer et al. (2019) summarize recent developments in bank regulation and supervision across regions using information from the 2019 Bank Regulation and Supervision Survey (BRSS). The analyses identify bank capital regulation, market discipline, and supervisory monitoring as key areas where financial regulation has undergone significant changes between BRSS waves 4 and 5.

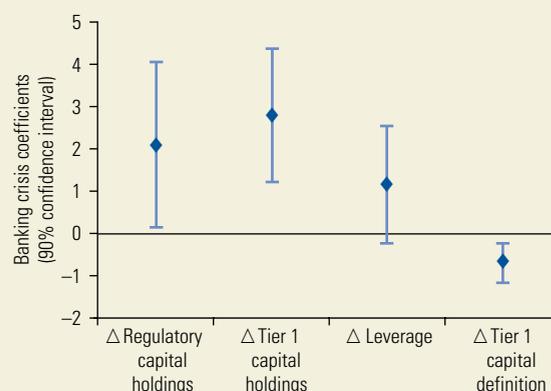
Minimum regulatory capital requirements and Tier 1 capital holdings (both expressed as a percentage of banks' risk-weighted assets) were higher in wave 5 than in wave 4 for all regions except the Middle East and North Africa and Europe and Central Asia. The increase in Tier 1 capital ratios was much more pronounced for banks in high-income OECD countries and was accompanied by declines in banks' reported risk-weighted assets. Whether those weights are an accurate reflection of the riskiness of banks' portfolios is, therefore, a fundamental concern.

In terms of market discipline, deposit insurance coverage has expanded in all regions and government interventions in the banking sector to rescue ailing banks have likely weakened the incentives of market participants to monitor banks' risk-taking behavior, especially in high-income OECD countries. Moreover, the information available to both private market participants and public regulators to assess the risk profile of banks did not improve significantly around 4.

At the same time, banking supervision has become more complex because of increases in the number and complexity of regulations after the crisis. There was not, however, a corresponding increase in supervisory powers or supervisory capacity.

Anginer et al. (2019) also investigate the determinants of changes in bank capital defined as holdings of total regulatory capital (as a percentage of risk-weighted assets), holdings of Tier 1 regulatory capital (also expressed as a percentage of risk-weighted assets), simple leverage ratios (banks' total equity divided by total assets), and an index capturing the stringency of a country's Tier 1 capital definition, with lower values indicating that a wider variety of balance sheet items can be used to satisfy Tier 1 capital requirements. The authors find that banks in countries that experienced a banking crisis in 2007–09 increased their holdings of total regulatory

**FIGURE B1.6.1** Relation between Banking Crises and Bank Capital



Source: Anginer et al. (2019).

Note: The figure shows coefficients (marked with a diamond) for a dummy variable indicating whether a country experienced a banking crisis between 2007 and 2009, and confidence intervals for those coefficients computed at the 10 percent significance level. The cross-country regressions relate changes in the four measures of bank capital described in this box to a set of explanatory variables, including the banking crisis dummy.

capital and Tier 1 capital more than those in non-crisis countries, but crisis countries were also more likely to relax their definition of Tier 1 capital (figure B1.6.1). There is no statistically significant relationship between banking crises and the leverage ratios of banks in those countries. The results indicate that despite the increase in Tier 1 capital ratios in countries that experienced a crisis, there has not been a significant increase in capital holdings, as measured by simple leverage.

Anginer et al. (2019) also analyze the relationship between bank risk and the quality of bank capital using bank-level financial information. They find that defining bank regulatory capital narrowly significantly reduces stand-alone bank risk. This is particularly true for large banks that have greater discretion in assigning risk weights to their assets and are better able to issue a variety of capital instruments (such as hybrid or subordinated debt). Anginer et al. (2019) also find that the decision to adopt the latest capital regulations (for example, Basel III) is associated with adoption by neighbor countries, calling for increased scrutiny to ensure that the regulations that are adopted fit the local characteristics of a country's financial system.

## NOTES

1. In general, a bank is a service institution that receives deposits or close substitutes for deposits, grants credit, and makes investments in securities. In most countries, a law defines what constitutes a bank. A bank's corporate charter contains its legal authorization for banking activity. The commercial bank is the dominant bank type across jurisdictions. It represented on average over 90 percent of domestic banking assets in 2016, according to the latest data from the World Bank's Bank Regulation and Supervision Survey (BRSS). Nevertheless, in each jurisdiction the term *bank* can refer to a wide variety of institutions, depending on the business model (such as retail versus wholesale banks), scope (such as mutual banks), organizational structure (bank holding companies versus unit banks), and ownership type (private versus state).
2. See Brunnermeier et al. (2009). Several papers have used a constrained information asymmetry framework to explain contagion risk and crises (see, for example, Genotte and Leland 1990; Kodres and Pritsker 2002; Hong and Stein 2003; Barlevy and Veronesi 2003; Yuan 2005).
3. Excessive risk-taking can be defined as misallocation of capital. For example, an investment with a very low risk-adjusted return could be considered excessive risk-taking. A bank decision maker might be incentivized to pursue this investment to increase the volume of transactions, eventually benefiting from a larger business (such as through larger bonuses).
4. See, for example, Barth, Caprio, and Levine (2008).
5. In this chapter, developing countries are defined as upper-middle, middle-, and low-income countries following the 2018 classification used in the World Bank's World Development Indicators database. We exclude from this group the countries classified as offshore financial centers (OFCs) in groups II and III by the Financial Stability Forum (2000), which are also classified as such in the latest assessment by the International Monetary Fund (see <https://www.imf.org/external/np/ofca/ofca.aspx>). For the complete list of OFCs, see appendix I in Anginer et al. (2019).
6. A few studies offer limited evidence on the potential impact of the latest regulatory reforms on developing countries. Examples are Briault et al. (2018) on seven developing countries and the Financial Stability Board on the effects of reforms on infrastructure finance (FSB 2018a) and the clearing system for over-the-counter markets of financial derivatives (FSB 2017b).
7. The *Global Financial Development Report 2017/2018* discusses the retrenchment of global banks from providing financial services (for example, clearing of foreign currency transactions), leaving those services and transactions to other financial institutions. It highlights how the unavailability of these financial services poses challenges in terms of business control and bank supervision, threatening financial stability and inclusive growth, especially in developing countries (see box 3.5 of the *Global Financial Development Report 2017/2018* for an in-depth discussion). One factor associated with the reduction in the number of correspondent banking relationships in developing countries is the compliance with regulatory requirements imposed by national/local regulators of cross-border correspondent banks (Stames et al. 2017).
8. See, for example, Boyd, Kwak, and Smith (2005) and Laeven and Valencia (2018). The costs of a crisis can be especially high in developing countries, where the alternatives to bank financing are limited (Dell'Ariccia, Detragiache, and Rajan 2008).
9. See, for example, the remarks made by Fernando Restoy, chairman, Financial Stability Institute, Bank for International Settlements, in London in July 2018 (Restoy 2018).
10. This definition of proportionality is in line with recent policy work. For instance, Ferreira, Jenkinson, and Wilson (2019) posit that developing countries should consider their specific characteristics while adopting international standards, such as the complexity and size of financial institutions, the level of development of financial market infrastructure, the granularity and quality of the available information, and the capacity of bank supervisors.
11. A recent survey by the Basel Committee on Banking Supervision (BCBS 2019) documents that both those countries that are members of the BCBS, as well as those that are not

- members, adopt minimum regulatory standards and supervisory practices to reflect the risk profiles of different types of banks (for example, business models and size).
12. See, for example, Calomiris and Kahn (1991) for the role of demandable debt; Flannery (2001) for how subordinated debt may prompt corrective action by bank owners or managers; and Francis et al. (2019) for the effect of senior bank loans on bank risk-taking.
  13. At the same time, higher bank capital requirements may also entail higher funding costs, which can be transmitted to borrowers through an increase in lending rates (Schliephake 2016).
  14. According to the definition of the Basel Committee on Banking Supervision, Tier 1 capital comprises Common Equity Tier 1 (CET1)—essentially common shares and retained earnings—or additional Tier 1 instruments (AT1)—other regulatory capital instruments that meet the criteria for inclusion in the Tier 1 capital (BCBS 2011). Under the Basel III capital accord, banks need to comply with a minimum CET1 ratio of 4.5 percent of RWAs and minimum Tier 1 ratio of 6 percent of RWAs. Basel III also introduced additional capital buffers, defined in terms of CET1 capital as a percentage of RWAs, namely, a capital conservation buffer, a countercyclical capital buffer, and surcharges for domestically and internationally systemically important banks.
  15. For an in-depth discussion of the issue, see BCBS (2017b). The Basel Consultative Group (2014) also recommends a careful approach to the treatment of sovereign exposures for developing countries that have dollarized economies (meaning a foreign currency is used as payment for transaction purposes, or assets and liabilities are denominated in a foreign currency) or issue a significant amount of sovereign bonds denominated in a foreign currency.
  16. The Basel Committee on Banking Supervision (BCBS 2011) defines the leverage ratio as Tier 1 capital divided by the sum of total assets and off-balance sheet items. We follow that approach here, although we recognize that other financial policy makers and researchers often define the leverage ratio as total bank assets divided by Tier 1 capital.
  17. Within each country, large banks are defined as those in the 80th percentile or above of banks in terms of total assets, whereas small banks are the rest of banks in a national banking system—that is, those below the 80th percentile in terms of assets.
  18. Admittedly, in the wake of the crisis the regulatory focus was on the largest banks. Nevertheless, the capitalization of smaller banks may also be important because they could impose systemic problems if they fail together—that is, the too-many-to-fail problem described by Acharya and Yorulmazer (2007) and analyzed empirically for developing countries by Brown and Dinç (2011).
  19. Le Leslé and Avramova (2012) document unwarranted variation in the computation of RWA across banks and jurisdictions. Acharya, Engle, and Pierret (2014) show that average regulatory risk weights in stress tests are not correlated with market measures of risk, leading to underestimation of portfolio risk and excess leverage. Mariathan and Merrouche (2014) find that banks allowed to employ internal ratings-based (IRB) approaches to compute assets' risk weights underreport risk because of risk weight manipulation. The decline in risk weights is larger for weakly capitalized banks and in countries where banking supervisor powers compared with those of external auditors are weaker and where many IRB-approved banks are found. Behn, Haselmann, and Vig (2016) quantify the extent of RWA “gaming,” concluding that where the challenges accompanying complex regulation are too demanding, simpler rules may enhance the efficacy of financial regulation.
  20. However, when we restrict the sample of banks to the largest banks in terms of total assets and to countries that are members of the BCBS, for banks in Europe and in the Americas (that is, Argentina, Brazil, Canada, Mexico, and the United States), we reach findings consistent with FSB (and BCBS analyses), meaning that we observe increases in regulatory capital holdings accompanied by decreases in risk-weighted assets between 2011 and 2017. FSB's rest-of-the-world sample mixes banks from high-income and developing countries, blurring differences between these two groups, but the results for this group of banks are broadly consistent with our developing-country findings.
  21. Asset quality reviews involve assessment of the value of bank assets, collateral

- valuation, and related provisions. AQRs are costly in terms of setting up the information system recording bank processes, policies, and accounting practices, and acquiring the methodological framework for the assessment of the value of banking assets. Examples of AQRs can be retrieved from the European Central Bank website: [https://www.bankingsupervision.europa.eu/banking/tasks/comprehensive\\_assessment/html/index.en.html](https://www.bankingsupervision.europa.eu/banking/tasks/comprehensive_assessment/html/index.en.html).
22. For a detailed overview of macroprudential policy tools, see Claessens (2014).
  23. China is not included among the countries that adopted a formal deposit insurance scheme in wave 5 because it did not complete section 8—Deposit (Savings) Protection Schemes—of its survey. Nevertheless, since May 2015 a formal deposit insurance system has been in place in China for all deposit-taking institutions.
  24. For example, in wave 5, 11 countries answered that these funds can be used to recapitalize weak banks, clearly undermining the incentives of market participants to monitor bank risk-taking (figure 1.6, panel b).
  25. See, for example, Laeven and Valencia (2013) on the effects of recapitalization measures.
  26. As of the end of 2018, the European Union (EU-28) comprised the following countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, and the United Kingdom.
  27. See, for example, Laux and Leuz (2009) for the advantages and disadvantages of fair value accounting.
  28. The Network of Central Banks and Supervisors for Greening the Financial System (NGFS) was established in December 2017 to address the challenges brought by climate change for the resilience and stability of the financial system. This forum allows central banks, bank supervisors, and international institutions—such as the BIS, the OECD, and the World Bank—to exchange experiences and identify best practices in the supervision of climate-related risks and explore options to scale up green financing. For more information, see <https://www.banque-france.fr/en/financial-stability/international-role/network-greening-financial-system>.
  29. In 2014 the European Central Bank (ECB) assumed its role as single supervisory entity in the euro area (which at that time comprised 18 countries—and 19 countries by the end of 2016). This entailed a transfer of bank supervisors from the national central banks to the ECB. All 19 euro area countries are high-income countries, according to the 2018 classification of the World Bank's World Development Indicators database. Therefore, figures for high-income countries may underestimate the real manpower of bank supervisory agencies in high-income countries.
  30. Although not reported here, there is also no relationship between the growth in the number of banks and the growth in the number of supervisory personnel.
  31. Capital conservation buffers provide a mechanism for rebuilding depleted capital by either reducing discretionary distributions of earnings (such as dividend payments, shares buybacks, and staff bonus payments) or raising new capital from the private sector (see chapter 3 for an in-depth discussion). Additional loss absorbency requirements are imposed on global systemically important banks and domestic systemically important banks to account for the “negative externalities” created by large interconnected banks, as discussed earlier in this chapter (see chapter 2 for an in-depth discussion).

