CHAPTER 2

MONETARY POLICY AND THE RISE OF NONBANK FINANCE

Summary

The structure of financial markets has been changing considerably. Ongoing financial innovation, weakened bank balance sheets following the financial crisis, changes in business models, and strengthened bank regulation have all supported a strong shift from bank lending to bond issuance. This has allowed a larger role for nonbanks, such as insurance companies, pension funds, and asset managers. Nonbanks are very important for financial intermediation in the United States and have become significantly more important in Europe and some emerging market economies.

Has the rise of nonbank financing rendered monetary policy less powerful? Some have argued that the impact of monetary policy action on economic activity has lessened because one of the traditionally key transmission channels—bank lending—has become less important. In theory, nonbanks can either dampen or amplify the transmission of monetary policy. On the one hand, nonbanks may be able to step in to lend in lieu of banks if their funding cost is not as strongly affected as that of banks by changes in monetary policy, or if they are not subject to the same regulatory constraints, potentially dampening the transmission of monetary policy. On the other hand, nonbanks may amplify the transmission of monetary policy if their risk appetite is more sensitive to changes in monetary policy. This chapter explores this important but relatively uncharted territory, first laying out a conceptual framework, and then examining the empirical evidence with novel analyses.

The chapter finds that the increasing importance of nonbanks for financial intermediation has, if anything, strengthened monetary policy transmission over the past 15 years. The potency of monetary policy appears to have risen in various countries and seems to be, on average, stronger in countries with larger nonbank financial sectors. Like banks, nonbanks contract their balance sheets when monetary policy tightens, and, in general, nonbank financial intermediaries contract them more than banks. This behavior is in part explained by the effect of monetary policy on risk taking, particularly in the asset management sector. As a result, bond yields and risk premiums move, affecting the cost of borrowing and real activity. Thus, the composition of the nonbank financial sector matters for the transmission of monetary policy.

The growing role of nonbanks implies that the conduct of monetary policy will need to continue to adapt to changes in the transmission mechanism. The dosage and timing of monetary policy actions must be continuously recalibrated as their impact and the speed of their effect change. For example, as the relative importance of the risk-taking channel grows, the effects of monetary policy changes on the real economy may become more rapid and marked. Although not a focus of this chapter, changes in the regulatory framework are likely to affect the strength of monetary policy transmission because some of the differences in banks' and nonbanks' responses to monetary shocks reflect differences in their regulatory regimes.

The effects of monetary policy on financial stability are becoming more important. For instance, monetary policy actions are likely to have stronger consequences for the financial soundness of banks and nonbank financial institutions because the risk-taking channel seems to be an increasingly important mechanism in driving the responses of financial intermediaries. This suggests the need for greater vigilance by prudential and regulatory authorities.

Monetary policy needs to take into account the size and composition of balance sheets of key financial intermediaries to better gauge changes in financial institutions' risk appetite. Given the growth of the nonbank financial sector, the information contained in the balance sheets of nonbanks is potentially at least as useful as traditional measures of monetary aggregates. For instance, the leverage and changes in leverage of broker-dealers and total assets managed by bond funds can be informative for monetary policy. In this context, closing data gaps on nonbanks is essential.

Introduction

The structure of financial markets has changed considerably since the 1980s. Fast-paced financial innovation and, as a consequence of the financial crisis, weak bank balance sheets, changes in business models, and strengthened bank regulation have driven a strong shift from bank lending to bond issuance (Figure 2.1), which has permitted a larger role for nonbank financial intermediaries (henceforth nonbanks).[1] Nonbanks have recently grown, especially in Europe and some emerging market economies.[2] As banks retrench from certain activities, the role of asset managers has become more dominant (Chapter 3 of the April 2015 *Global Financial Stability Report* [GFSR]). At the same time, with interest rates at historically low levels in many countries, insurance companies have sought to increase returns on assets by intensifying their lending activities (Chapter 3 of the April 2016 GFSR).

Some have speculated that the rise in nonbank financing has weakened the transmission mechanism of monetary policy.[3] Traditionally, banks have played a key role in transmitting monetary impulses to the real economy, and it has been argued that other financial intermediaries may react very differently to monetary policy (Nelson, Pinter, and Theodoridis 2015). Similarly, in the past, leverage (borrowing) in the financial system has played an important role in amplifying the effects of monetary policy. As the role of asset managers with little leverage grows, is monetary policy still able to influence economic activity by affecting risk premiums—the required return on a risky asset relative to a safe asset—and longer-term rates?[4]

In theory, nonbanks can either dampen or amplify the effects of monetary policy. On the one hand, nonbanks may be able to step in to lend in lieu of banks if their funding cost is less strongly affected by monetary policy, if they are not subject to the same regulatory constraints, or if their risk-taking incentives are different. For example, increases in the regulatory gap between banks and nonbanks or in the ability of banks to securitize some of their loan portfolio may dampen the transmission mechanism.[5] On the other hand, nonbanks may amplify the transmission of monetary policy if their risk appetite is more sensitive to changes in monetary policy. Although it is of key policy relevance, so far, the literature on this topic is very scarce.

This chapter uses novel analyses to better understand the influence of nonbanks on the effectiveness of monetary policy by providing a cross-country perspective on the following questions:[6]

- Conceptually, given that banks and different types of nonbanks have different business models and face different constraints, how can the composition of the financial system affect the transmission of monetary policy?
- Empirically, does the presence of nonbanks affect the transmission of monetary policy? Specifically, how does lending by different types of financial institutions respond to monetary policy and what explains the differences?

The chapter lays out a conceptual framework to discuss potential differences in the monetary transmission brought about by a larger nonbank sector. It then conducts empirical analyses at both the aggregate and the microeconomic level.

The chapter finds that the increasing importance of nonbanks for financial intermediation has not weakened the transmission of monetary policy and, if anything, it

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[1]Although both banks and nonbanks are engaged in financial intermediation, a bank issues deposits that must be converted upon demand into cash (central bank money) or deposits in other banks at par. In contrast, nonbanks fund themselves mostly with liabilities at market prices. In this chapter, nonbanks include insurance companies; pension funds; and other financial intermediaries such as asset managers (hedge funds, mutual funds, and other investment funds), finance companies, investment banks (broker-dealers), and securitizers.

[2]Nonbanks are significantly more important in the United States because the process of bank disintermediation started much earlier, in the 1980s.

[3]For example, see Bini Smaghi 2010.

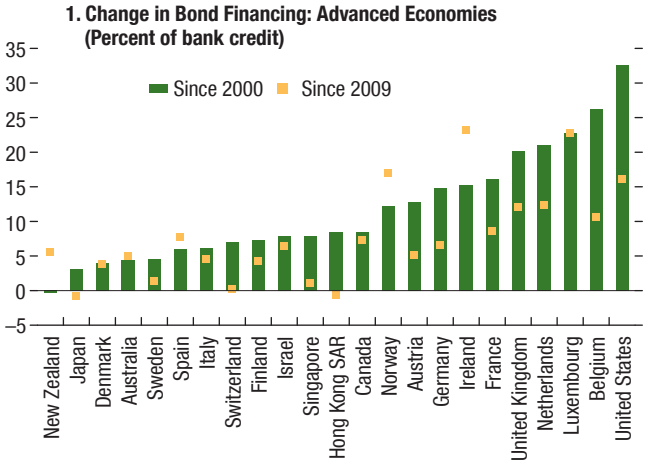
[4]Leverage measures a firm's total borrowing relative to the value of its equity or assets. In a financial sector dominated by asset managers, monetary policy can have large consequences for asset prices even if financial sector leverage is low.

[5]Changes in financial regulation since the crisis have likely tempered the risk appetite of banks and increased the role of nonbanks, dampening the transmission of monetary policy. On the other hand, the growth in securitization since the early 2000s may have lessened the effect of interest rates on credit origination by banks (Loutskina 2011).

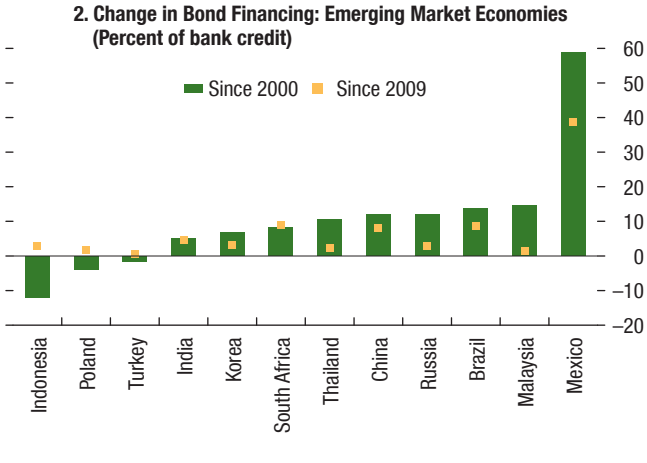
[6]Existing studies mainly examine parts of the financial system and rely mostly on data from the United States (Den Haan and Sterk 2011).

Figure 2.1. The Relative Importance of Nonbank Financial Intermediaries

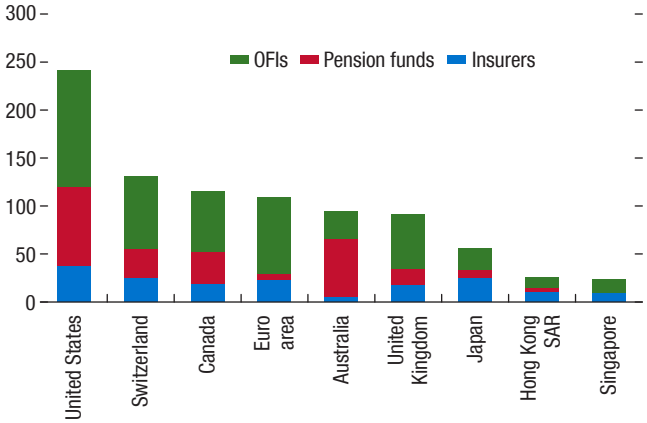
Since the 2007–09 crisis, bond financing has grown relative to bank loans in many advanced economies.



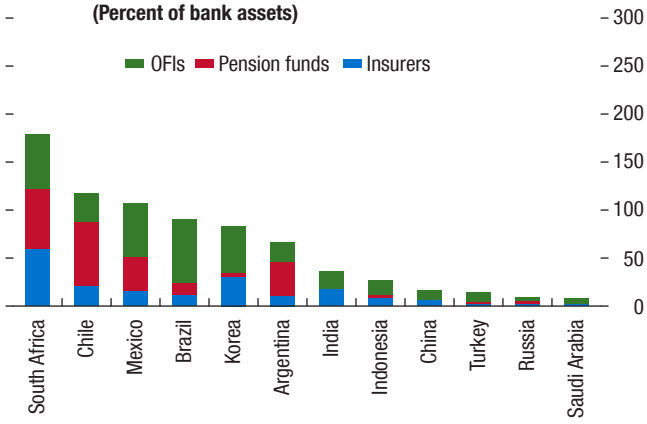
In emerging market economies, bond financing is becoming more prevalent.



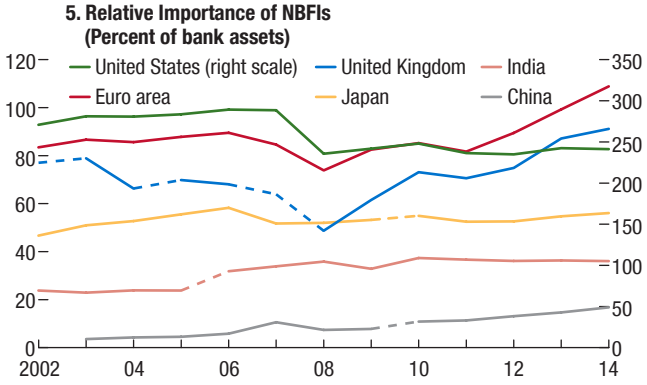
Among advanced economies, nonbanks are relatively less important in Asia.



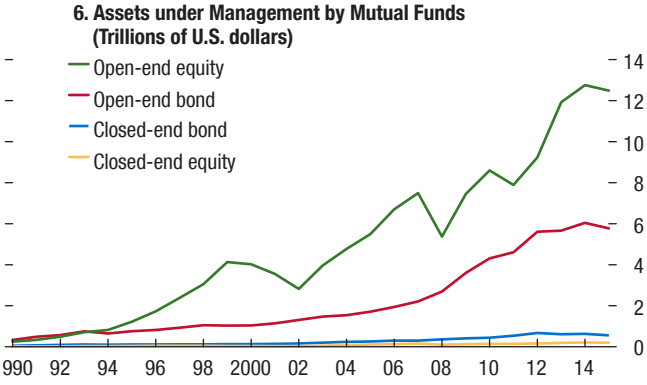
Among emerging market economies, South Africa has the largest nonbank sector relative to bank assets.



In Europe and China, nonbanks have grown in importance since the financial crisis.



Bond funds have become more important since the financial crisis.



Sources: Bank for International Settlements; Dealogic; Financial Stability Board; Organisation for Economic Co-operation and Development; and IMF staff calculations.
Note: Panels 1 and 2 show the change in the ratio of outstanding bonds issued by nonfinancial firms (by parent nationality) to outstanding bank credit to the private nonfinancial sector. The figures may overestimate (underestimate) borrowing in countries that are sources (recipients) of foreign direct investment. Nonbank financial intermediaries (NBFIs) include insurance companies, pension funds, and other financial intermediaries (OFIs). In panels 3 to 5, the relative importance of NBFIs is measured as the ratio of NBFI total assets to bank total assets. Dashed lines in panel 5 signify breaks in the underlying series.

has strengthened it. In particular, the chapter presents the following main findings:

- The transmission of monetary policy seems to have strengthened in many countries and appears to be slightly stronger in countries with larger nonbank financial sectors.[7]
- Banks and most nonbanks contract their balance sheets when monetary policy tightens.
- In general, nonbank financial intermediaries contract or expand their balance sheets more than do banks in response to a monetary tightening or loosening and do not dampen the transmission of monetary policy.
- The risk-taking channel operating through changes in asset allocations seems to play an important role, particularly in the asset management sector.[8] The induced changes in risk premiums also affect banks' ability to lend because they affect their cost of funding.
- Changes in the supply of bank credit induced by monetary policy affect total credit and real activity because nonfinancial corporations find it difficult to substitute market financing (bonds) for bank financing (loans), even in economies with deep financial markets.

The growing role of nonbanks implies that the conduct of monetary policy will need to continue to adapt to changes in the transmission mechanism. The dosage and timing of monetary policy actions will have to be recalibrated continuously, as the impact of monetary actions and the time lags involved change. For example, as the relative importance of the risk-taking channel grows, the effects of monetary policy changes on the real economy may become more rapid and marked. At the same time, changes in the regulatory framework for nonbanks are likely to affect the strength of monetary policy transmission.

Monetary policy needs to take into account the size and composition of balance sheets of key financial intermediaries to better gauge changes in the risk appetite of financial institutions. Given the growth in the nonbank financial sector, the information contained in the balance sheets of nonbanks can be at least as useful as more traditional measures of monetary aggregates. For instance, the leverage and changes in leverage of broker-dealers and total assets managed by investment funds can be informative for monetary policy. In this context, it is important to continue to close data gaps in the nonbank sector.

Policymakers need to be mindful of the changing financial stability implications of monetary policy in light of the growing importance of nonbank lenders. Given that the risk-taking channel seems to be an increasingly important mechanism in driving the responses of financial intermediaries, monetary policy actions are likely to have stronger consequences for the financial soundness of banks and nonbank financial intermediaries. This does not, per se, imply a case for monetary policy to pursue financial stability objectives (IMF 2015), but suggests the need for greater vigilance by prudential and regulatory authorities.

Trends in the Transmission of Monetary Policy

Before embarking in further analysis, this section first takes a look at the evolution of monetary transmission. Has the impact of monetary policy diminished?

Evidence from a sample of 12 countries suggests that, on average, the transmission of monetary policy strengthened after 2000 (Figure 2.2). Compared with the period 1980–99, since 2000, the response of real GDP to changes in the monetary policy rate has increased in Korea, South Africa, Spain, Sweden, and the United States, but has declined in Norway.[9] For other countries, the responses are in general stronger after the year 2000, but not significantly different between the two periods.[10]

[7]The finding that the transmission of monetary policy has strengthened is based on a medium-term analysis; the chapter does not attempt to ascertain the strength of monetary policy at the current juncture in specific countries.

[8]The risk-taking channel of monetary policy describes how central banks can affect the risk-bearing capacity of financial institutions, namely by influencing short-term interest rates (Adrian and Shin 2011).

[9]Other studies for the United States have found a weakening of the transmission (Baumeister, Liu, and Mumtaz 2010; Boivin and Giannoni 2006; Boivin, Kiley, and Mishkin 2011), or no change (Primiceri 2005). However, these studies typically compare the magnitude of the transmission until the late 1970s and thereafter, and do not include recent years. The results shown in Figure 2.2 are broadly in line with the literature, although country studies using different methods have reached different estimates of the response of GDP to a monetary policy change. In the case of Japan, the standard specification seems to have failed to identify monetary policy shocks such that the response after 2000 has the wrong sign. Still, the analysis presented in Figure 2.2 is robust to alternative specifications and different measures of monetary policy. The findings for inflation (not shown) are also supportive of a strengthened transmission. See Annex 2.1.

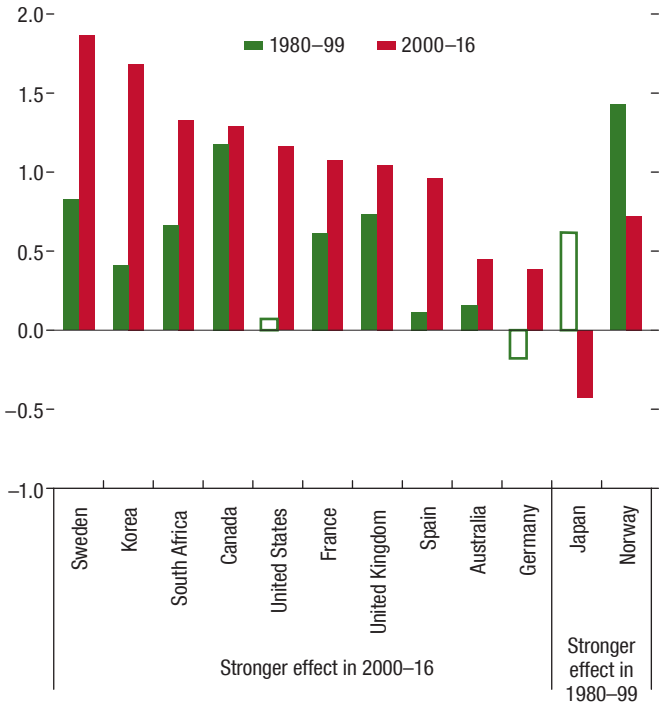
[10]In Figure 2.2, statistical significance is inferred based on one sigma, or 68 percent confidence intervals. In the vector autoregres-

Changes in the strength of monetary transmission and in the time frame of the response can likely be ascribed both to structural changes in the economy and to changes in the practice of monetary policy. Although the reasons behind such changes are multiple and difficult to determine, the literature has discussed three main possible reasons:

- *Changes in the conduct of monetary policy and in the way economic agents form expectations*—Since the early 1980s, the conduct of monetary policy has gradually shifted to better control of expectations and the buildup of credibility.[11] Better anchored expectations may have dampened the transmission of monetary policy (Boivin and Giannoni 2006).[12] However, these developments are consistent with a general weakening of transmission in 1980–99 compared with earlier years (not shown), but do not necessarily help explain developments since 2000.
- *Increased economic and financial integration*—In theory, greater economic openness and denser cross-border financial links should increase the chance for leakage and weaken the domestic transmission of monetary policy. However, the existing empirical evidence is not generally supportive of this mechanism, and it is possible that currency fluctuations induced by interest rate changes amplify the transmission of monetary policy through valuation effects of net long foreign exchange positions (Georgiadis and Mehl 2015). Nevertheless, there is mounting evidence that monetary policy shocks emanating from the United States are transmitted to other countries (especially those with large financial systems) via the global financial system (Rey 2016).[13]
- *Changes in the way financial markets work*—Changes in the regulation of banks and nonbanks, the rise of securitization, improved access to bank and nonbank credit by households and nonfinancial firms, and the ascendance of the asset management industry have transformed financial markets. The possible effects on the transmission of monetary policy of some of these trends are discussed next.

Figure 2.2. Trends in the Transmission of Monetary Policy
(Percent)

In most countries, the strength of the transmission of monetary policy has increased since 2000, especially in Korea, South Africa, Spain, Sweden, and the United States.



Sources: Federal Reserve System; Haver Analytics; IMF, International Financial Statistics database; Organisation for Economic Co-operation and Development; and IMF staff estimates.
Note: The figure shows the peak response of real GDP to a 1 percentage point decrease in the monetary policy rate. The response is estimated from a vector autoregression (VAR) of log real GDP, the log GDP deflator, the log of the nominal effective exchange rate, and the nominal interest rate (shadow policy rates for countries using unconventional monetary policy) using four lags (and a reunification dummy for Germany). The responses are identified using a Cholesky decomposition in which the interest rate is ordered last. Solid bars mean that the response is statistically significant using 68 percent confidence intervals. See Annex 2.1 for details.

Channels of Monetary Policy Transmission

This section discusses how the transmission of monetary policy may be affected by financial institutions. The focus of the discussion is on two main types of mechanisms:

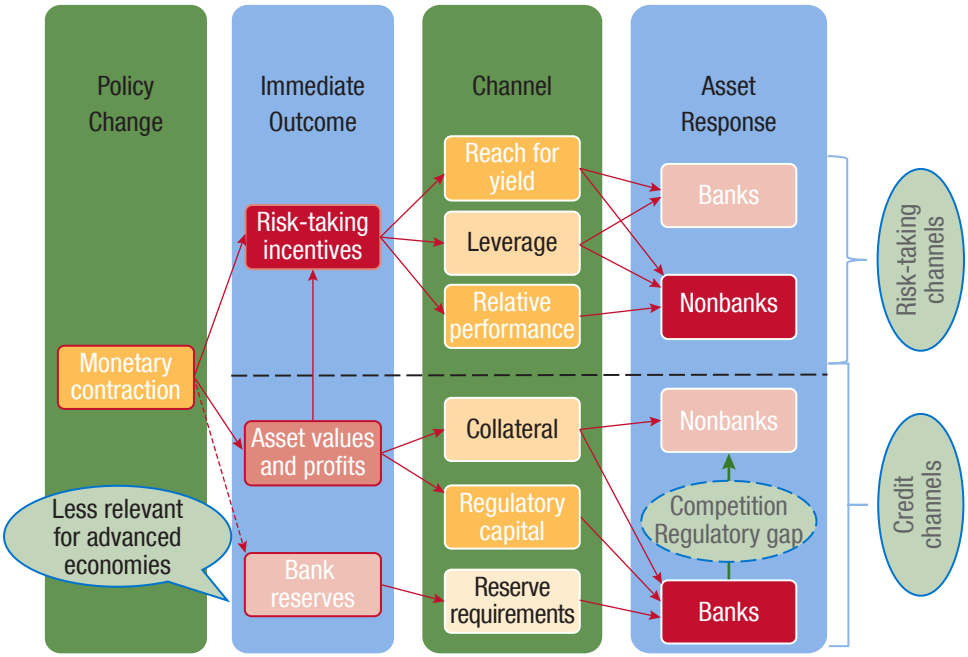
sion literature, which the analysis follows, it is common to infer significance from 68 percent confidence intervals. See Sims and Zha 1999 for a justification.

[11]This process has culminated in many countries with the adoption of inflation-targeting regimes, whereby the conduct of monetary policy is geared toward the management of inflation expectations and implies systematic and aggressive responses to output gaps and deviations from target inflation.

[12]When the central bank responds strongly to deviations of GDP from potential output and to deviations of inflation from its target, expectations for future income and inflation become more stable. Anchored expectations, in turn, cause actual spending to be more stable and to react less to monetary policy shocks (Boivin, Kiley, and Mishkin 2011).

[13]The increase in financial integration and associated monetary policy spillovers across countries complicates the identification of the effects of monetary policy on economic activity, especially after the year 2000.

Figure 2.3. Transmission of Monetary Policy through the Reaction of Financial Intermediaries



Source: IMF staff.
Note: A darker shade signifies a larger response. Red shades or arrows signify an adverse effect or response. A green arrow means that an adverse response from one sector may trigger a positive response from the other. A dashed red arrow means the effect of monetary policy through this channel is disputed.

those that affect the supply of credit by intermediaries and the risk-taking channel of monetary policy (Figure 2.3). In theory, both mechanisms help explain why the transmission of monetary policy may be different when nonbanks are more important.

Transmission through Effects on Aggregate Demand and Borrowers' Balance Sheets

The traditional discussion of monetary policy transmission emphasizes how changes in interest rates affect investment and consumption decisions. These channels operate through changes in the user cost of capital, intertemporal substitution effects, and wealth effects.[14] Similarly, changes in interest rates can induce exchange rate changes and therefore influence net exports. Although important, these channels for the transmission of monetary policy do not assign a particular role to financial intermediaries and, to a large extent, do not affect banks and nonbanks differently.

Monetary policy also affects the supply of loans through the balance sheets of borrowers. Banks and nonbanks lend to nonfinancial firms and households based on the ability of borrowers to post collateral—that is, on the basis of their net worth. By altering the net worth of borrowers and thereby their access to external finance, the effect of interest rate changes can be magnified through the balance sheet channel.[15] The

[14]Interest rates operate through these mechanisms as follows: First, they are an important component of the cost of using one unit of capital for one period (that is, the user cost of capital). Second, they drive the decision to forgo present consumption in order to achieve consumption in the future (that is, intertemporal substitution or saving). Third, they affect the value of households' wealth, changing their incentives to spend. However, the strength of these traditional monetary transmission channels may have changed over time. For instance, increased access to credit by households and firms from both bank and nonbank financial intermediaries may have increased the sensitivity of consumer spending and residential and business investment to asset prices and monetary policy rates via balance sheet effects (Iacoviello 2005).

[15]For instance, a cut in interest rates increases the expected future profits of a borrowing firm and, as a consequence, raises the value of the firm's equity or net worth. A higher value of the firm's equity, in turn, provides positive information to potential lenders about its

balance sheet channel is likely to be more important for nonbank finance because banks try to insulate lending from interest rate fluctuations in order to preserve the long-term relationships they have with their client base (Bolton and others 2016).

Imperfections in the Funding Markets of Financial Intermediaries that Affect Credit Supply

If monetary policy significantly affects the cost of funding for banks and nonbanks, their supply of credit will respond. Regulatory requirements for banks, in particular those regarding capital, may cause them to react differently than nonbanks.

Balance Sheets and the Supply of Credit by Banks and Nonbanks

Monetary policy affects the supply of loans through the balance sheets of financial intermediaries. An increase in short-term interest rates lowers the net worth of banks and nonbanks—because their assets typically have longer maturities than their liabilities—and thereby raises their funding costs (Bernanke 2007). Traditionally, this mechanism has played an important role in monetary policy transmission through banks. The reason is that changes in interest rates induce larger balance sheet changes for institutions with high levels of debt (that is, high leverage), such as banks, because the relative change in net worth is magnified.[16] At the same time, financial institutions with weaker access to capital markets will not be able to borrow when their net worth falls as a result of an interest rate hike. Consequently, their balance sheets will shrink more in response to a monetary policy contraction. The inability to switch to alternative sources of funding is reinforced by uncertainty about the value of financial institutions' assets (Stein 1998). Therefore, financial intermediaries that are smaller, are privately owned, have weaker capital ratios, have less-diversified funding structures, or do not have access to international capital markets will probably respond more to contractionary monetary policy actions.[17,18]

Market-consistent valuation strengthens these balance sheet effects on the supply of loans. Financial institutions that are required to mark to market a significant portion of their assets—that is, record and report the value of their assets at market prices or fair values—are likely to be more responsive to changes in the stance of monetary policy, since their reported asset values move more in tandem with the interest rate. Although banks are also required, in many jurisdictions, to mark to market some of their portfolios, for most, the share of fair-value assets is small and the impact on regulatory capital is slight (Figure 2.4; Badertscher, Burks, and Easton 2011). Thus, the more widespread use of mark-to-market accounting standards among nonbanks in itself will likely contribute to a strengthening of monetary policy transmission as the sector grows (Borio and Zhu 2012).

Bank Capital, Bank Regulation, and the Transmission of Monetary Policy

Monetary policy affects bank lending through its effect on bank capital and profits—the bank capital channel. Following monetary loosening, banks with low capital levels relative to regulatory requirements need to issue equity if they are to increase lending.[19] Raising equity, however, can be costly or even impossible for many banks. Thus, the ability of banks to expand credit is curtailed. Yet, over time, lower interest rates will likely relax the capital constraint for many banks, and the credit response will increase. When

credit risk and the value of available collateral, increasing their willingness to lend at a lower cost. This effect is known as the "financial accelerator" (Bernanke, Gertler, and Gilchrist 1996).

[16]For example, a 1 percent increase in the value of assets increases the net worth of a financial firm by 5 percent when the capital-to-assets ratio is 20 percent and by 10 percent when the capital-to-assets ratio is 10 percent.

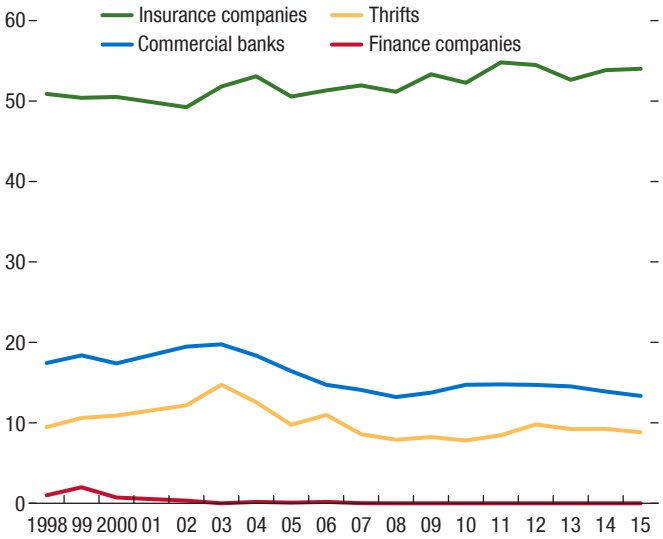
[17]Typically, smaller and unlisted intermediaries find it harder to issue securities because they do not have a track record in accessing bond and commercial paper markets, and are more opaque. Financial firms with lower net worth (that is, a lower market value of equity) will have to pay higher premiums in order to get wholesale funding and will cut lending more. In both cases, asymmetric information about the value of the firm's assets plays a major role (Van den Heuvel 2002).

[18]Imperfect competition in bank markets is an alternative market failure that can affect the transmission of monetary policy, but the effects discussed in the literature are ambiguous. On the one hand, a policy rate hike may increase banks' market power in the market for bank deposits and cause them to further restrict the supply of deposits (Drechsler, Savov, and Schnabl 2016). On the other hand, banks that have market power in the mortgage lending business seem to be less responsive to monetary policy because they dampen the response of lending rates by adjusting markups (Scharfstein and Sunderam 2014).

[19]To keep the same capital ratio, banks need to fund new loans with the same capital-to-debt ratio—hence the need to raise equity to expand lending.

Figure 2.4. Marked-to-Market Assets by Sector
(Percent)

Marked-to-market assets have fallen in banks and remain high for insurers.



Sources: SNL Financial; and IMF staff calculations.
Note: The figure shows the median value of assets recorded at fair value as a percentage of total assets, by sector, using a sample of financial institutions from various countries. Fair-value assets are trading account securities and securities available for sale and are marked to market.

many banks are facing binding capital constraints, the effect of monetary policy through banks can be small in the short term but large in the medium term (Van den Heuvel 2002).[20,21]

[20]Even if banks have enough capital to meet regulatory requirements, bank capital will still affect the transmission of monetary policy. As long as a monetary policy tightening reduces bank profits—either through the maturity gap or through a reduction in the demand for credit—it will make banks more likely to breach the capital requirement in the future. Hence, to reduce the likelihood of having to issue new equity, banks will prefer to shed assets, forgo new lending opportunities, or even contract lending (Van den Heuvel 2007). In theory, this effect will be larger for banks that are more engaged in maturity transformation (that is, retail banks), those that have a positive duration gap (for instance, mortgage banks), and those that rely less on financial derivatives to hedge interest rate risk (such as smaller banks; see Flannery 1981).

[21]According to the academic literature, monetary policy also influences bank reserves and thus their ability to lend—the bank lending channel. A monetary policy contraction through an outright sale of securities reduces the amount of reserves available to the banking system, and, hence, the amount of bank core deposits. If banks cannot substitute core deposits with some other source of funding, they may need to sell or liquidate some of their assets. However, as reserve requirements have become less prevalent and wholesale funding markets have developed, the relevance of this channel has diminished (Bernanke 2007). In fact, many central banks change interbank rates through signaling effects (that is, merely by announcing their target rates) without actually changing bank reserves (Disyatat 2011).

The impact of changes in bank loan supply on real economic activity depends on the degree to which borrowers can substitute bonds for loans (Bernanke and Blinder 1992). As capital markets develop, borrowers should find it easier to issue bonds. However, in many economies, even large firms are still heavily dependent on bank financing. Certain types of nonbanks can provide alternatives to bank financing following a tightening of monetary conditions. For instance, large institutional investors, such as insurance companies and pension funds, are often willing to buy newly issued private debt securities. In addition, investment banks that specialize in the underwriting and marketing of bond issues can facilitate alternatives to bank financing.

If the regulatory gap between banks and nonbanks increases, the significance of monetary policy transmission via bank lending may decline. The growth of nonbank financial intermediation has been fostered by tighter bank regulation (Chapter 2 of the October 2014 GFSR). At the same time, important sections of the nonbank financial sector remain lightly regulated.

Monetary Policy and Risk Taking by Financial Institutions

Expansionary monetary policy, such as an interest rate cut, can increase the risk-bearing capacity of financial institutions, thus increasing lending. In addition, incentives related to performance measurement and risk management can further enhance the risk-taking channel and suggest that even financial institutions without significant leverage can amplify the transmission of monetary policy.

Accommodative monetary policy—namely through interest rate cuts—can encourage financial intermediaries to take more risk and thus reduce the cost of borrowing. Through this mechanism, changes in short-term policy rates can have a large effect on long-term rates by reducing term premiums and thereby boosting economic activity, even if expectations about future short-term rates are unchanged.[22] This can happen in several ways.

[22]The macroeconomic response to central bank actions depends a great deal on whether a change in the short-term interest rate is transmitted to long-term rates (which are more relevant for aggregate demand). Under the expectations channel of monetary policy, central banks can affect long-term interest rates—and thereby

First, lower interest rates can encourage risk taking by financial institutions through greater leverage.[23] Since many financial institutions are engaged in maturity transformation, their profits tend to increase when monetary policy rates decline, at least in the short term.[24] This effect, in theory, should be more significant for financial intermediaries that rely more heavily on short-term wholesale funding (such as investment banks) than for those with more stable funding sources (such as commercial banks or thrifts). Higher profits, in turn, enhance their risk-bearing capacity—that is, their ability to take on more debt and expand their balance sheets (Adrian and Shin 2011).[25] Increased lending or asset purchases by these institutions will raise asset prices and reduce the price of risk, thus enhancing the transmission of monetary policy.

Second, accommodative monetary policy can also encourage risk taking by financial intermediaries that promise fixed nominal yields. Lower interest rates may induce financial intermediaries to buy higher-yield but riskier assets (reach for yield), which can drive up the price of risky assets and reduce the cost of borrowing. For instance, publicly traded commercial banks that do not mark to market most of their assets, and that are subject to regulatory capital constraints based on book values, have a strong incentive to boost reported earnings by replacing low-yielding with high-yielding assets (Hanson and Stein 2015). Similarly, insurance companies typically also have an incentive to reach for yield when funding conditions are loose (Becker and Ivashina 2015).[26]

Third, a large asset management industry largely driven by concerns about relative performance can also amplify the transmission of monetary policy. The growth of asset managers since the financial crisis has been remarkable (Chapter 3 of the April 2015 GFSR). Typically, funds are rewarded based on how their performance compares with that of their peers (Chevalier and Ellison 1997). This compensation structure, in turn, leads asset managers to be especially sensitive to changes in short-term rates and to the behavior of other asset managers, thus triggering significant asset price movements (Morris and Shin 2015).[27] In addition, investors may perceive a first-mover advantage when responding to changes in fund performance arising from a change in interest rates; they do not want to be the last to redeem if the fund sells its most liquid assets first (Feroli and others 2014; April 2015 GFSR). When both effects (relative performance concerns of fund managers and quick redemptions by ultimate investors) combine, the magnitude of the effect of monetary contractions on asset prices is further amplified. Thus, as the size of the asset management industry grows, an increase is likely in the effect of monetary policy on asset prices—as well as an increase in the resulting effect on credit and economic activity via the balance sheet channel.[28]

Finally, the risk-taking channel of monetary policy can operate through risk-management models used by financial institutions. A reduction in interest rates boosts asset valuations. One of the expected consequences of rising valuations is a drop in asset price volatility. This, in turn, can encourage risk taking by both banks and nonbanks by relaxing internal risk models based on value at risk (VaR). Thus, a more

aggregate demand—by signaling a path for future short-term interest rates (Woodford 2005). Alternatively, under the risk-taking channel, monetary policy affects long-term interest rates chiefly through its effect on risk premiums.

[23]Evidence in Cecchetti, Mancini-Griffoli, and Narita (forthcoming) suggests that borrowing (or leverage) by banks and insurance companies increases with the length of the period of monetary easing. There is also substantial empirical evidence showing that banks lower their lending standards with more accommodative monetary policy (Dell'Ariccia, Laeven, and Suarez 2016; Jiménez and others 2014).

[24]Alessandri and Nelson (2015) and Busch and Memmel (2015) show that higher interest rates dampen bank profits in the short term but have the opposite effect over the long term.

[25]The difference between this mechanism and the balance sheet effects previously discussed is that the latter relate to the ability to provide more credit because collateral constraints of borrowers are less binding, while the former considers the effect of monetary policy on institutions' willingness to take on risk via leverage targets or monetary policy's effect on target rates of return on investment (see Dell'Ariccia, Laeven, and Marquez 2014).

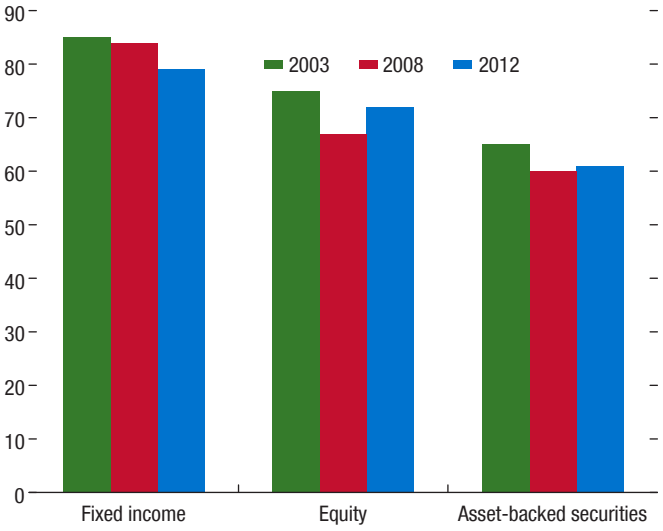
[26]For instance, by taking on poorly assessed tail risks or by buying assets based only on coarse credit rating categories in order to comply with capital requirements.

[27]The strategic interactions, in addition to the ones coming from first-mover advantages and relative performance concerns, can also result from implicit or explicit guarantees provided to asset managers by other institutions (Parlatore 2016). In addition, the presence of leverage among these asset managers will likely enhance the risk-taking channel.

[28]The empirical literature on the effect of monetary policy on asset prices and asset allocation has found that an expansionary monetary policy is associated with higher stock market valuations (Thorbecke 1997) and causes a shift in mutual funds' portfolios away from fixed income and into equity (Hau and Lai 2016).

Figure 2.5. Value at Risk in Risk Management by Asset Class and Year
(Percent)

Value at risk (VaR) has become slightly less popular but is still widely used by financial firms.



Source: Global Risk Management Survey (Deloitte 2004, 2009, 2013).
Note: The figure shows the percentage of surveyed financial firms that report using VaR to assess and manage market risk for fixed income, equity, and asset-backed securities.

pervasive use of such models by nonbank financial intermediaries will likely magnify the transmission of monetary policy. The evidence, however, suggests that these models, although still popular, have become less widespread since the 2007–09 financial crisis (Figure 2.5).

Empirical Evidence on the Transmission of Monetary Policy

This section examines the effect of monetary policy changes on credit provided or total assets owned by banks and nonbanks.

Most of the existing empirical literature on the role of nonbanks in monetary transmission either applies only to the United States or takes a narrow view of the nonbank financial sector. These studies suggest that nonbanks have similar, but more muted, responses to monetary policy relative to banks or may even respond in the opposite direction. For instance, in the United States, securities broker-dealers seem to be less responsive to monetary policy than banks but only money market funds show contrarian responses (Igan and others 2013). Other studies examining U.S. flow-of-funds data find that monetary tightening actually increases asset holdings of nonbank financial institutions (Den Haan and Sterk 2011).

A first look at cross-country evidence suggests that the aggregate macroeconomic response to monetary policy changes is stronger in countries with larger nonbank sectors. This result is based on the analysis of a panel of developed and emerging market economies, controlling for the level of financial market development (Figure 2.6).[29] However, there are important differences across countries in the composition of financial systems and in the characteristics of nonbanks, which cloud the analysis. Therefore, the remainder of this section examines detailed evidence across countries and different types of financial intermediaries.

To identify the effects of monetary policy, the empirical analysis to follow largely relies on two complementary strategies. First, it quantifies the aggregate effect of monetary policy on different types of financial intermediaries by looking at the responses of total real assets—adjusted for valuation changes and excluding equity and government securities—held by banks, insurance companies and pension funds, and other financial intermediaries.[30] Second, it uses microeconomic data to improve the identification of the effect of monetary policy on the supply of credit by different types of financial intermediaries.[31] Last, to gauge the potential for substitution between bank and nonbank financial intermediation, it estimates the ability of nonfinancial borrowers to use bond financing instead of bank loans after a monetary policy contraction.

[29]The results for banks and nonbanks are not necessarily different from a statistical point of view because the responses are not very precisely estimated (see Annex 2.1). Furthermore, the use of the same simple specification for all countries, as is usual in the literature, may mean that monetary policy is not adequately identified for every country.

[30]The results are based on vector autoregression (VAR) analyses. The main problem with the identification of monetary transmission is that the direction of causality between monetary policy and the provision of credit by financial intermediaries is difficult to establish.

[31]The aggregate data analysis can provide a sense of the overall magnitude of the effects, but compared with the firm-level analysis, it offers limited insight into the underlying mechanisms, is less able to deal with endogeneity, and is less robust to changes in the composition of the financial sector.

Analysis Based on Aggregate Data

This section estimates how bank and nonbank subsectors react to monetary policy changes in terms of total credit. The analysis helps to infer how the magnitude of monetary policy transmission is affected by the composition of the financial sector.

For the most part, other financial intermediaries respond more strongly to monetary policy than do banks, insurance companies, and pension funds.[32] Bank assets decline with a considerable lag after a monetary contraction, but the response of the nonbank financial sector varies across countries. In general, the analysis does not corroborate previous empirical studies showing a more muted or even opposite response of nonbanks relative to banks.[33] The results, by country (Figure 2.7), suggest that the difference in responses of other financial intermediaries to monetary policy derives from country-specific characteristics, including different compositions of these nonbank financial sectors. For instance, in the United Kingdom, other financial intermediaries include mostly mutual and hedge funds, which are most likely affected by monetary policy through the risk-taking channel. In the United States, they are composed of investment funds, government-sponsored enterprises, broker-dealers, issuers of asset-backed securities, and finance companies, which respond to monetary policy in different ways.[34]

[32]The analysis uses a VAR with six variables: the natural logarithms of real GDP, of the GDP deflator, and of real total assets (adjusted for valuation effects) of banks, of insurance companies and pension funds, and of other financial intermediaries, and the nominal monetary policy rate. Total assets, which approximate lending by banks and nonbanks, are deflated and adjusted for valuation changes and do not include equity and government securities. The analysis considers data from Australia, Canada, Korea, South Africa, the United Kingdom, and the United States. It extends work by Den Haan and Sterk (2011); Nelson, Pinter, and Theodoridis (2015); and Herman, Igan, and Solé (2015), and is robust to various possible sources of misspecification. See Annex 2.1.

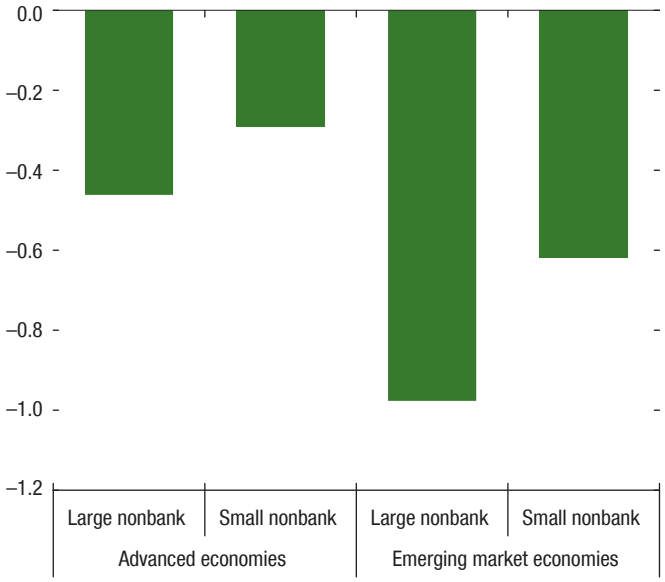
[33]The contrarian reaction of U.S. nonbank credit reported in Den Haan and Sterk 2011 seems to be driven by the narrow definition of credit used in that study—consumer and mortgage credit—as well as the time period, which ends in early 2008. In this chapter's analysis, the responses of other financial intermediaries and banks in the United States are not statistically different.

[34]In Australia, other financial intermediaries mostly comprise securitizers and investment funds; in Canada, the main other financial intermediaries are issuers of asset-backed securities, mutual funds, and other private financial institutions including holding companies; in Korea, other financial intermediaries mostly include finance companies such as credit card and leasing companies, and investment trusts; and in South Africa, other financial intermediaries are represented by investment trusts.

Figure 2.6. Transmission of Monetary Policy and Size of Nonbank Financial Sector

(Percent)

The transmission of monetary policy is slightly stronger in economies with large nonbank financial sectors.



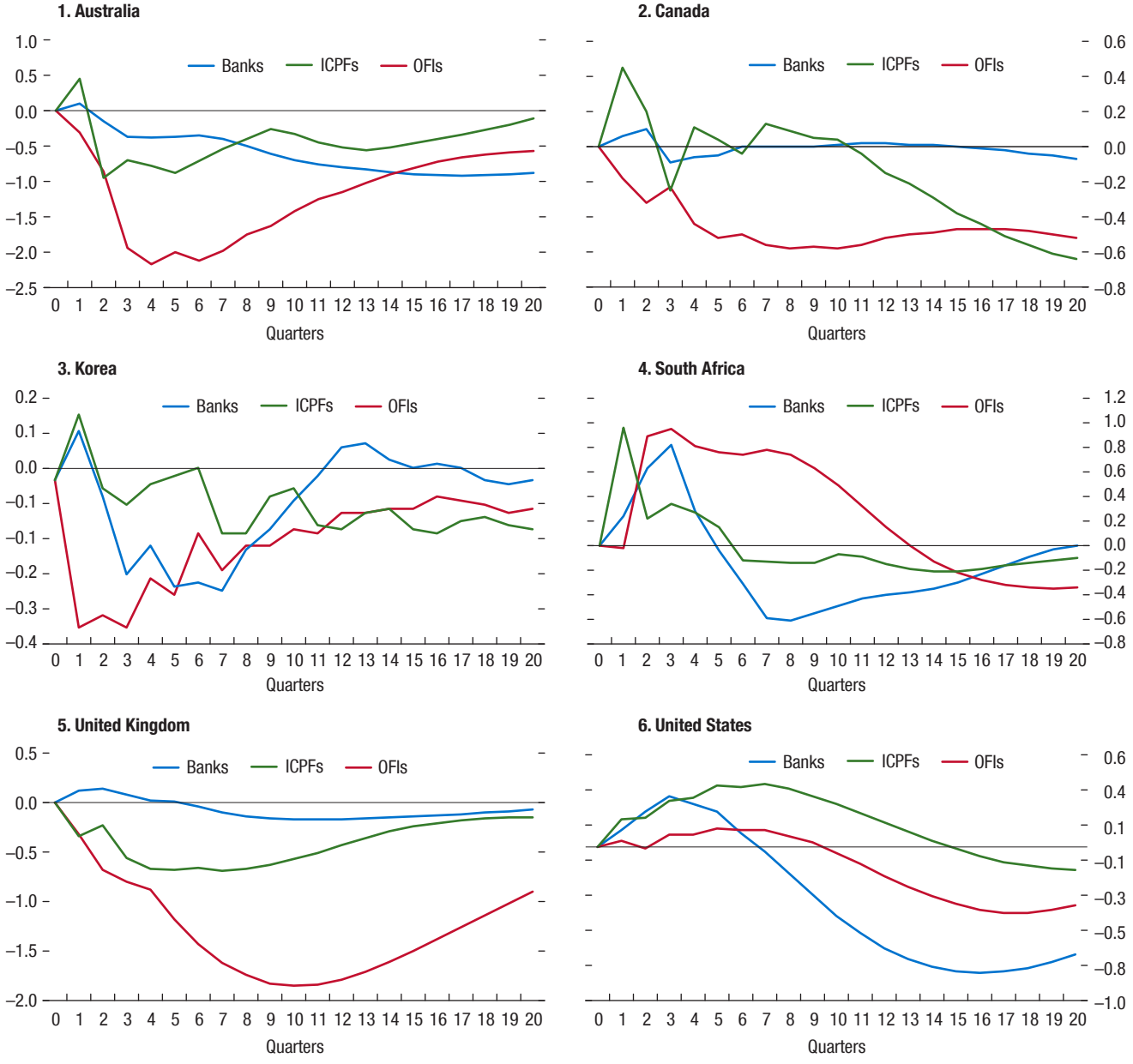
Sources: IMF, International Financial Statistics database; Organisation for Economic Co-operation and Development; World Bank; and IMF staff estimates.
Note: The figure shows the estimated peak response of GDP to a 1 percentage point increase in the nominal interest rate. The responses are estimated using a vector autoregression of log real GDP, log GDP deflator, the log of the nominal effective exchange rate, and the monetary policy interest rate (shadow policy rate for countries using unconventional monetary policy). The responses are identified using a Cholesky decomposition in which the interest rate is ordered last. See Annex 2.1.

Mutual funds, in particular, display responses to monetary policy consistent with the risk-taking channel. A closer look at other financial intermediaries shows that, after an increase in the monetary policy rate, total assets (in real terms) under management by equity funds consistently decline, whereas those of bond funds first decline and then increase (Figure 2.8, panel 1). This result suggests that, with some delay, investors switch from riskier assets (equity) to safer assets (bonds). On the other hand, money market mutual fund assets rise sharply following the monetary policy contraction, which is consistent with both a flight-to-quality effect and the bank-lending channel. Because many mutual funds invest internationally, the observed shifts in asset patterns likely represent an important mechanism for monetary spillovers.

Figure 2.7. Response to a Monetary Policy Contraction

(Percent)

Bank assets decline after a monetary contraction, but with a considerable lag. The response of insurance companies and pension funds (ICPFs) and other financial intermediaries (OFIs) varies across countries.

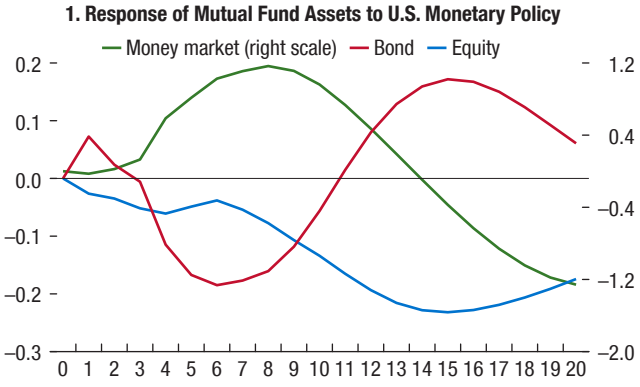


Sources: Bank of Canada; Bank of England; Bank of Korea; Federal Reserve System; Haver Analytics; Organisation for Economic Co-operation and Development; Reserve Bank of Australia; Reserve Bank of South Africa; and IMF staff estimates.
Note: The figure shows the response of total assets by sector to a 1 percent increase in the monetary policy rate. Banks' assets in the United Kingdom include those of the Bank of England. Monetary policy is measured with a shadow policy rate for countries using unconventional monetary policy. The responses are identified using a Cholesky decomposition in which the interest rate is ordered last. The results are robust to many possible sources of misspecification. ICPFs = insurance companies and pension funds; OFIs = other financial intermediaries. See Annex 2.1 for details.

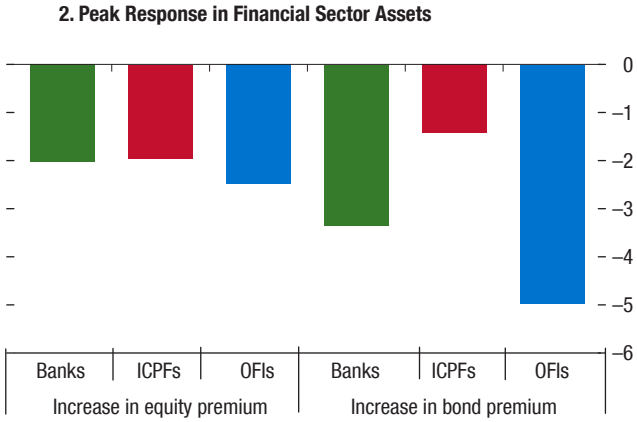
Figure 2.8. Risk Taking and Monetary Policy in the United States

(Percent)

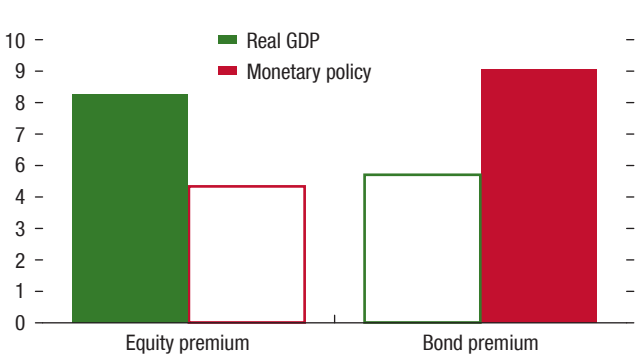
U.S. mutual funds display behavior consistent with the risk-taking channel of monetary policy.



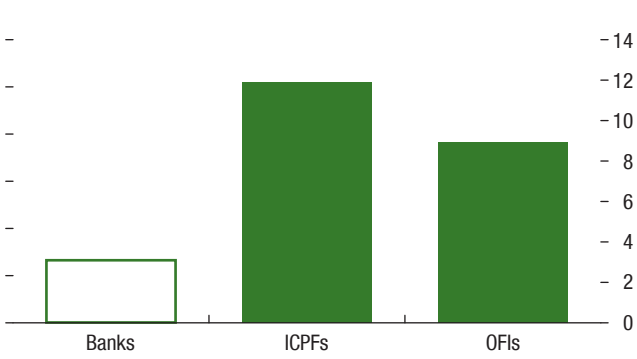
All financial intermediaries are affected by changes in risk premiums in the United States.



U.S. monetary policy seems to matter more for risk appetite in fixed income markets.



Nonbanks contribute more to the behavior of the excess bond premium in the United States.



Sources: Federal Reserve System; Haver Analytics; Organisation for Economic Co-Operation and Development; and Thomson Reuters Datastream.
Note: Panel 1 shows the response of total assets net of valuation by type of mutual fund to an orthogonal monetary policy innovation. The response is estimated with a vector autoregression (VAR), which also includes real GDP, the GDP deflator, shadow rate, total assets for the banking, and insurance and pension sectors, and a trend with a break in the postcrisis period. Panel 2 shows the peak response of each variable on the *x*-axis to orthogonal shocks to the equity and bond premiums. The VAR, in this case, includes real GDP, the GDP deflator, total assets for each financial subsector, the U.S. shadow policy rate from Ichiue and Ueno 2016 to take into account the use of unconventional monetary policy, the Gilchrist and Zakrajšek 2012 excess bond premium, and the equity risk premium from Absolute Strategy Research. Panel 3 shows the contribution of real GDP and monetary policy to the behavior of risk premiums, using a 16-quarter-ahead forecast-error variance decomposition based on the preceding VAR (solid bars are statistically significant at the 68 percent level). Panel 4 shows the contribution of each financial subsector to the behavior of the excess bond premium, using the same method as in panel 3. ICPFs = insurance companies and pension funds; OFIs = other financial intermediaries. See Annex 2.1 for details.

At least for the United States, the risk-taking channel of monetary policy seems to operate mostly through nonbank financial intermediaries. An extension to the aggregate analysis discussed earlier shows that a drop in the risk appetite in credit markets—measured by a rise in the return that investors require to hold bonds in excess of the risk-free rate of return, that is, a rise in the bond risk premium[35]—is followed by a large decline in total assets owned by other financial intermediaries, in the United States (Figure 2.8, panel 2).[36] This sug-

[35]The bond risk premium is captured by Gilchrist and Zakrajšek's (2012) excess bond premium.

[36]However, the responses to increases in the equity risk premium—the return that investors require to hold equity in excess of the risk-free rate of return—are more muted.

gests that nonbanks are very responsive to changes in risk appetite. The bond risk premium, in turn, is significantly affected by monetary policy (Figure 2.8, panel 3) and by nonbanks (Figure 2.8, panel 4). An open question is whether the risk-taking channel of monetary policy will remain significant as monetary policy normalizes and interest rates increase.

Digging Deeper: Micro Data on Bank and Nonbanks

To better understand the differences behind the behavior of heterogeneous nonbank sectors and to better identify some of the mechanisms discussed earlier, this section estimates the response of bank and nonbank financial intermediaries to policy shocks, exploiting firm-level characteristics.

With the exception of finance companies, both banks and nonbanks reduce their balance sheets three years after an interest rate increase (Figure 2.9, panel 1). In particular, peak responses tend to occur 12 quarters after the monetary policy shock and are statistically significant for all types of financial intermediaries.[37] Investment banks and insurance companies react in the same direction as banks, and appear to respond more strongly.[38] The reaction is different for finance companies, supporting the view that they act as substitutes for banks and dampen the monetary transmission mechanism. However, the substitution between banks and finance companies is unlikely to be relevant for the aggregate economy because the latter usually represent a relatively small share of financial sector assets. Furthermore, evidence based on stock returns confirms that banks' and nonbanks' reactions to unconventional monetary policies are not substantially different overall (Box 2.1).

The response of banks and nonbanks to monetary policy depends on their leverage, size, and access to wholesale funding. First, smaller banks are more responsive to monetary policy (Figure 2.9, panel 3), but there is no consistent relationship with size for nonbanks (whose different sizes may in fact represent very different business models). Second, a higher reliance on wholesale funding by banks and life insurance companies seems to dampen the response to monetary policy (Figure 2.9, panel 4).[39] Since financial institutions that are able to access wholesale markets easily are the least financially constrained, these findings are broadly in line with the channels of monetary policy that emphasize the presence of imperfections in the market for debt and equity issued by financial intermediaries. However, just as in Xie 2016, this study finds no consistent relationship between the percentage of assets marked to market and the response of total assets to monetary policy.

The substitution between banks and finance companies is stronger in countries with stricter bank regulation. In countries with stricter bank capital regulation, in response to monetary tightening, banks reduce their total assets more than banks subject to less-strict regulation. In line with greater substitution between bank and nonbank credit, finance companies increase their assets more when bank capital regulation is stricter (Figure 2.10).

The behavior of mutual funds in response to monetary policy changes is consistent with the risk-taking channel. Fund-level data on portfolio allocations by equity and bond mutual funds in the United States show that fund managers tilt their allocations toward riskier assets after an expansionary monetary policy change (Figure 2.11).[40] In particular, in response to monetary policy loosening, bond funds significantly increase their allocations to high-yield and long-term bonds in their portfolios. In addition, U.S. bond funds and, to a smaller extent, U.S. equity funds increase their investments in countries with speculative-grade sovereign credit ratings.

How Easily Do Borrowers Substitute Market Financing for Bank Financing?

This section examines how nonfinancial firms' reliance on bank and nonbank financing changes in response to monetary policy actions. If this substitution is seamless, the impact of monetary policy on real activity through its effect on the relative supply of credit by banks (as opposed to nonbanks) is likely to be unimportant.

[37]Although the average response of banks is not significant at the 90 percent confidence level, those of investment banks, finance companies, and small banks are significant (Figure 2.9, panel 3). The analysis found no robust evidence of asymmetric responses to monetary policy contractions and expansions.

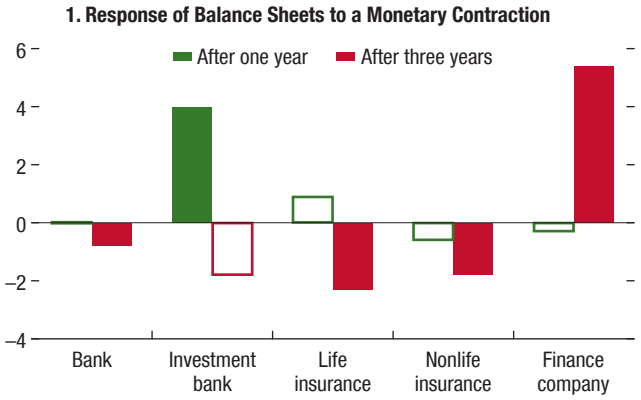
[38]The estimates are not precise enough to be unequivocal.

[39]The finding that greater access to wholesale finance dampens the response of banks and life insurers remains significant at a 90 percent significance level. However, the relationship between capital and monetary policy is no longer significant (Figure 2.9, panel 2). Furthermore, there is no consistent relation between the change in assets following monetary policy changes and the proportion of liquid assets.

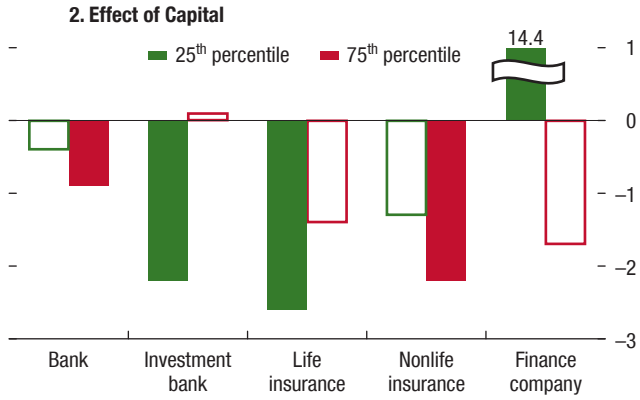
[40]Hau and Lai (2016) report similar findings for European mutual funds.

Figure 2.9. Monetary Policy and Total Assets Owned by Financial Intermediaries
(Percent)

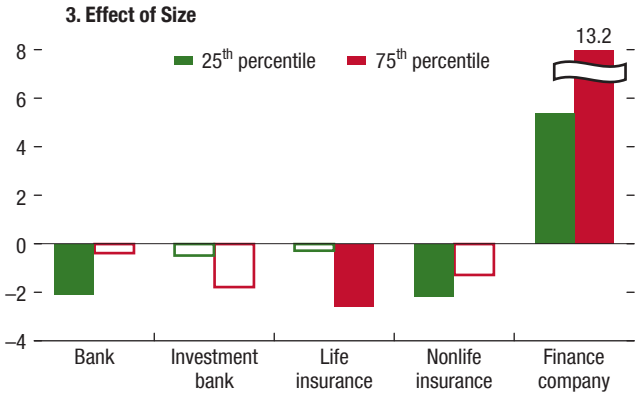
Banks', investment banks', and insurers' balance sheets shrink following a monetary contraction while finance companies show the opposite reaction.



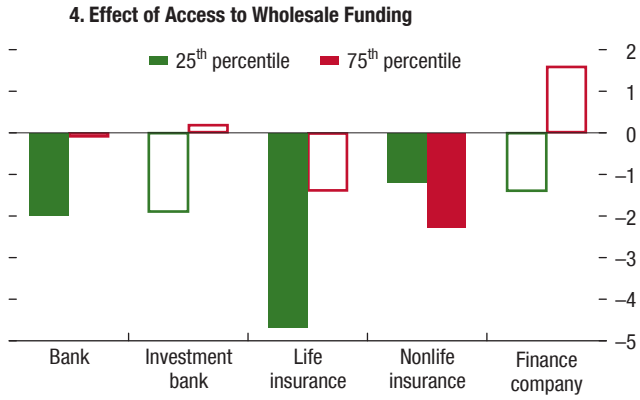
More highly capitalized banks contract lending more in response to a monetary contraction while more leveraged finance companies expand more.



Smaller banks are more responsive but the opposite holds true for finance companies.



More wholesale funding dampens the response to monetary policy.



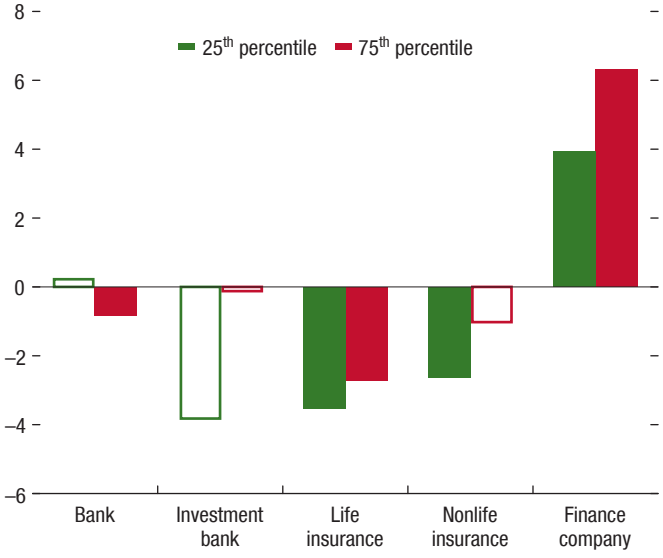
Sources: SNL Financial; Thomson Reuters Datastream; and IMF staff estimates.
Note: Panel 1 shows the estimated response of total real assets of financial institutions to a one percentage point monetary policy change. Panels 2 to 4 show the impulse responses after three years at the 25th and 75th percentiles of the interaction variable (that is, the equity to asset ratio, balance sheet size, and wholesale funding ratio, respectively). The responses are drawn from impulse responses based on a firm-level panel vector autoregression (VAR). The monetary policy measure is the orthogonal innovation to the monetary policy rate from a VAR analysis that also includes real GDP and the real GDP deflator. The VAR uses the shadow policy rate for countries using unconventional monetary policies. The sample covers listed financial institutions from advanced economies from 1998 to 2015, at quarterly frequency. Solid bars mean the responses are significant using a 68 percent confidence interval. See Annex 2.2 for details.

In general, the extent to which firms use bond financing depends on the overall level of financial market development.[41] A number of factors affect firms' choices between bank loans and bonds. First, issuing bonds entails substantial issuance costs, including a large fixed component. Second, bonds may be more difficult to renegotiate in times of stress. Third, banks may be better suited than the public or even institutional investors to obtain information about firms. The data show that the reliance on loan versus bond financing varies significantly across countries. Bond financing is favored in countries with deeper financial markets and by larger firms (Figure 2.12). In addition, firms in countries that have experienced large increases in the relative size of the nonbank financial intermediation sector since 2010—

[41]This section focuses on corporate borrowing because nonfinancial firms have more access to market financing than do households and because of data availability.

Figure 2.10. Bank Regulation, Monetary Policy, and Total Assets Owned by Financial Institutions
(Percent)

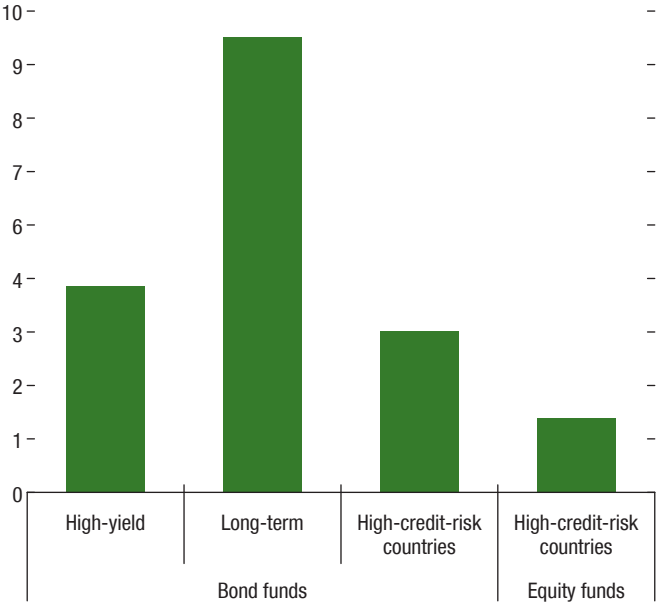
Bank regulation may induce the substitution between bank and nonbank credit.



Sources: Barth, Caprio, and Levine 2013; Thomson Reuters Datastream; and IMF staff estimates.
Note: The figure shows the impulse responses after three years at the 25th and 75th percentiles of the interaction variable (Barth, Caprio, and Levine 2013 index of stringency of bank capital regulations), as in Figure 2.9. Solid bars indicate that the estimate is significant using a 68 percent confidence interval.

Figure 2.11. Risk Taking by Mutual Funds and Monetary Policy
(Percent of total assets)

Mutual funds in the United States increase the riskiness of their portfolios after an accommodative monetary policy change.



Sources: EPFR Global; Lipper Global Mutual Fund Holdings; and IMF staff estimates.
Note: The figure shows the estimated change in the allocations of mutual funds' portfolios into each asset class, after a 1 percentage point decrease in Wu and Xia's (2016) shadow policy rate. The shadow policy rate takes into account the use of unconventional monetary policies. All estimates are significant at least at the 10 percent significance level. See Annex 2.2 for details.

such as Brazil, Canada, Germany, and the United Kingdom—on average reduced their reliance on bank financing significantly more than those in countries where the nonbank sector has not increased (Japan, United States).

Overall, borrowing companies show a limited ability to substitute between market and bank financing following a monetary policy change. An analysis using data for nonfinancial firms in Europe, Japan, and the United States for 1993–2015 finds that the choice between the issuance of bonds and syndicated loans is affected by monetary policy—but the effect is small. On average, an increase in the monetary policy rate of roughly 2 percentage points reduces firms' probability of bank financing in favor of bond issuance by only 3 percentage points (Figure 2.13, panel 1). The evidence of limited substitutability between bond and bank financing is especially significant given that the firms in the sample are very large listed companies that should have relatively easy access to bond markets.[42] The limited substitution between bank and market financing suggests that shocks to the supply of bank loans caused by monetary policy changes can have significant effects on total credit and economic activity.

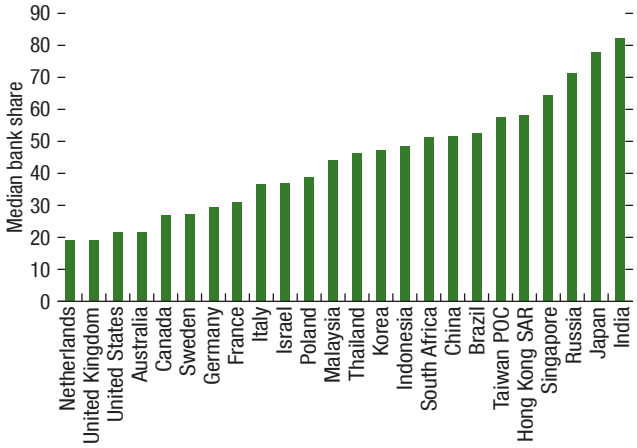
Nonfinancial firms with more tangible assets can more easily switch to market financing after a monetary contraction. Although firm size does not seem to significantly influence the way monetary policy affects firms' financing choices, the amount of tangible assets does (Figure 2.13, panel 2), probably because tangible

[42]The lack of substitution between bond and bank financing reflects difficulty in accessing bond markets even for large firms and borrowing conditions in bond markets that closely mirror those for bank loans. That is, the lack of substitution may reflect either that firms cannot substitute or that they can but do not have an incentive to do so. Unfortunately, empirically it is difficult to distinguish unambiguously between the two possible explanations. However, the fact that firms do not appreciably substitute bonds for loans when banks' lending standards tighten suggests that they cannot easily substitute bank loans.

Figure 2.12. Bond Finance around the World

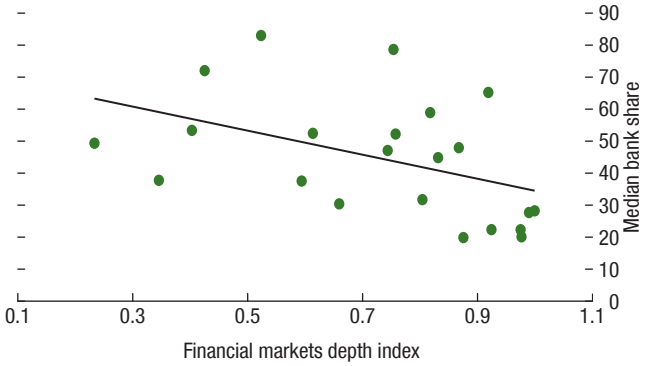
The reliance of listed companies on loan versus bond financing varies significantly across countries.

1. Loan versus Bond Financing, 2014
(Percent)



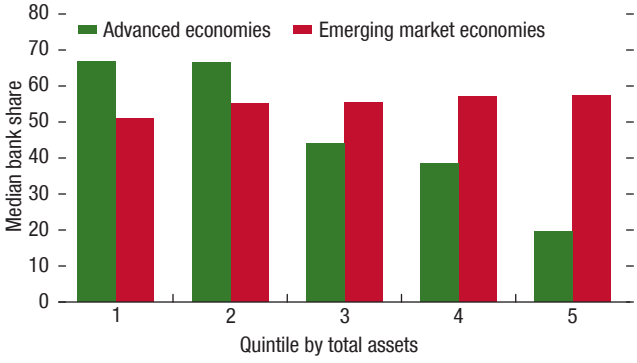
Bond financing is favored in deeper financial markets.

2. Bank Financing and Financial Development, 2014
(Percent)



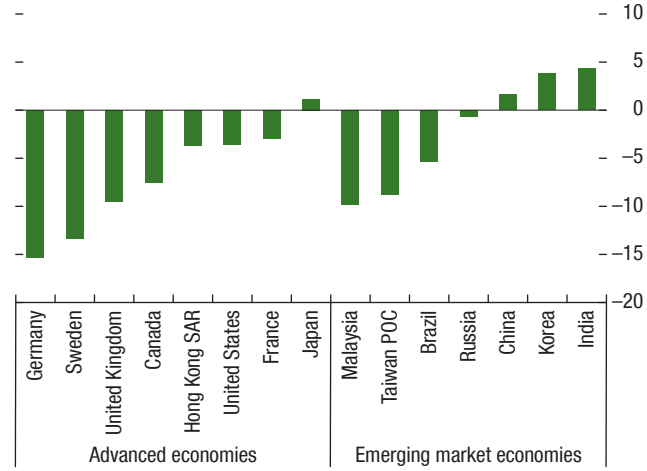
Larger firms rely more on bond financing in advanced economies.

3. Bank Financing by Firm Size, 2014
(Percent)



Bond financing increased in most countries after the crisis.

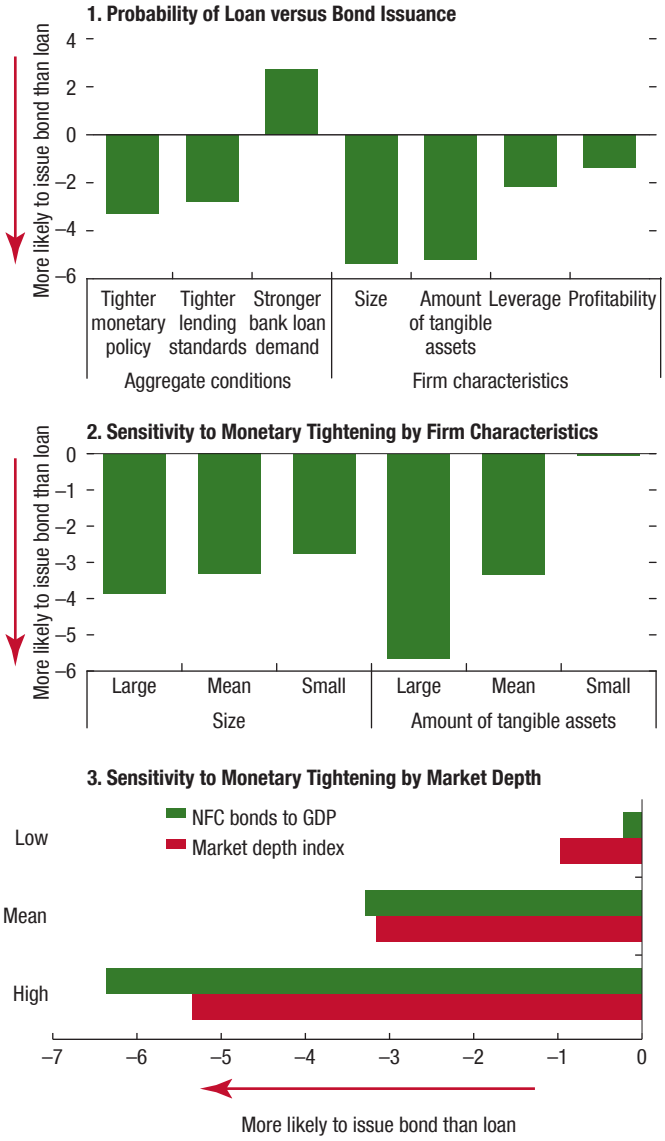
4. Change in Median Bank Financing, 2009–14
(Balanced panel; percentage points)



Sources: Dealogic; FactSet; IMF, World Economic Outlook database; Svirydzenka 2016; and IMF staff calculations.
Note: Firms' reliance on bank financing is computed as the ratio of loan liabilities to the sum of loan, note, and bond liabilities. In panel 2, the financial markets depth index (Svirydzenka 2016) takes into account the depth of equity and bond markets (including government, financial, and nonfinancial bond markets). In panel 3, quintiles are in ascending order by firm size, measured by total assets. Taiwan POC = Taiwan Province of China. See Annex 2.3 for details.

Figure 2.13. Bond Financing and Monetary Policy
(Percentage points)

The effect of monetary policy on the substitution between bank loans and bond issuance is stronger for firms that have more tangible assets and firms from countries with deeper financial markets.



Sources: Bank of England; Bank of Japan; Dealogic; European Central Bank; FactSet; Federal Reserve Board; IMF, World Economic Outlook database; Svirydzenka 2016; Thomson Reuters Datastream; and IMF staff calculations.
Note: Panel 1 shows the estimated response of the probability of a firm taking a loan instead of issuing a bond when each explanatory variable increases by one standard deviation (about 2 percentage points for the monetary policy measure). Panel 2 shows how the sensitivity to a one standard deviation tightening in monetary policy changes by firm characteristics (size and amount of tangible assets). Panel 3 shows how the sensitivity to a 1 percentage point tightening in monetary policy varies with market depth. Panels 1 and 2 are estimated using data for listed nonfinancial firms in Europe, Japan, and the United States during 1993 to 2015. Panel 3 is estimated for 2010 to 2015 using an unbalanced panel of nonfinancial firms in 23 advanced and emerging market economies. For countries using unconventional monetary policies, the monetary policy measure is based on a shadow policy rate. All estimates are significant at least at the 10 percent significance level. NFC = nonfinancial corporation. See Annex 2.3 for details.

assets can more easily be used as collateral. Finally, the formal analysis confirms that firms can more readily resort to bond financing when they are located in countries with deeper markets (Figure 2.13, panel 3).

Policy Discussion

Implications of the Increase in Nonbanks for Monetary Policy Implementation

Regardless of how effective monetary policy may be at the current juncture of very low interest rates, the growth in the nonbank financial sector around the world will have important implications for the conduct of monetary policy.[43] Although the nature of those implications is still not well understood, fears that monetary policy will become less effective because of nonbanks seem unfounded. First, the increasing role of the risk-taking channel through nonbanks may mean shorter transmission lags for monetary policy. Second, changes in the regulatory framework for nonbanks (in particular, efforts to close the regulatory gap with banks) are likely to affect the strength of monetary policy transmission. Third, because other financial intermediaries seem to react more to monetary policy actions, the dosage of such actions will need to be continuously recalibrated as the sector gains in importance.

To better calibrate their actions, monetary policymakers need to monitor the information provided by the balance sheets of key financial intermediaries. In light of the evidence of monetary policy transmission through the risk-taking channel, central banks should be mindful of the level and growth in leverage in financial institutions and of lending in short-term funding markets. Given the growth of the nonbank financial sector, the information contained in the balance sheets of nonbanks may be more useful than more traditional measures of monetary aggregates (Adrian and Shin 2011). Leverage among financial institutions has the potential to amplify the transmission of short-term interest movements to asset prices. The same is true for relative performance concerns among asset managers. Consequently, more than in

[43]It is also plausible that changes in the conduct of monetary policy since the financial crisis have facilitated the growth of nonbanks. For instance, the recent expansion of collateral frameworks to include certain assets made it easier for certain nonbank lenders, such as automobile lenders, to securitize their claims and expand their balance sheets.

the past, monetary policymakers need to monitor the behavior of investment funds, given their role as drivers of sharp fluctuations in risk premiums.

Better data on the activities of nonbanks are needed. Significant data gaps persist concerning the activities and exposures of nonbanks. For instance, most emerging market economies collect very limited data on nonbank balance sheets. The lack of data on the amount of financial intermediation by the nonbank sector may lead to the underestimation of both the level and growth of total credit, with implications for both monetary and prudential policies. There is also limited information on certain exposures, including to foreign exchange risk. The latter gap is especially significant, given the constraints that such exposures may impose on the conduct of monetary policy (Box 2.2).

The Impact of Monetary Policy on Financial Stability

Financial sector supervisors need to be mindful of the changing financial stability implications of monetary policy in light of the growing importance of nonbank lenders. Given that the risk-taking channel seems to be an increasingly important mechanism in driving the responses of financial intermediaries, monetary policy actions are likely to have stronger consequences for the soundness of the financial sector. This does not imply that monetary policy should pursue financial stability objectives (IMF 2015), but it does suggest the need for greater vigilance by prudential and regulatory authorities. It also underscores the need for further research to better understand the impact of monetary policy on risk taking by different financial institutions.

Conclusions and Policy Recommendations

Overall, the chapter finds that the growth of the nonbank financial sector has not weakened the impact of monetary policy on economic activity. The chapter's specific findings are that:

- Over the past 15 years, the transmission of monetary policy seems to have strengthened in many countries.[44] Transmission, on average, appears to be somewhat stronger in countries with larger nonbank sectors, but the differences are small.
- With the exception of finance companies, banks and nonbanks contract their balance sheets when monetary policy tightens. For the most part, nonbanks react more to monetary policy than do banks, but there are important country differences. Therefore, following a monetary policy contraction, a reduction in the supply of credit by one type of financial intermediary is likely to be accompanied by a similar reduction in total credit. Banks and nonbanks with easier access to funding reduce their balance sheets less, dampening the transmission of monetary policy.
- Changes in credit supply by banks remain important for real economic activity because following a monetary policy contraction, even very large nonfinancial firms have a limited ability to issue bonds in order to replace bank loans.
- The risk-taking channel, through changes in asset allocations, seems to play an important role in explaining the strengthening of the transmission of monetary policy. Changes in the asset allocations of funds also entail the potential for international monetary spillovers.

The chapter offers four main policy recommendations:

- *The conduct of monetary policy will need to continue to adapt to changes in the transmission mechanism as nonbank financial intermediation grows.* For example, as the relative importance of the risk-taking channel increases, the effects of monetary policy changes on the real economy may become more rapid and marked. At the same time, changes in nonbank regulation will also affect monetary policy transmission.
- *Monetary policymakers need to monitor the size and composition of key financial intermediaries' balance sheets.* This is important in order to assess changes in the risk appetite of financial institutions.
- *Policymakers need to be mindful of the changing financial stability implications of monetary policy.* Monetary policy actions are likely to have stronger consequences for financial soundness because they increasingly affect the risk-taking behavior of financial intermediaries. This suggests the need for greater vigilance by prudential and regulatory authorities.
- *Data provision on nonbank financial intermediaries needs to continue to be enhanced.* In particular, many emerging market economies should collect more data on nonbank balance sheets.

[44]The chapter did not attempt to ascertain the strength of monetary policy at the current juncture.

Additional research on the role of nonbanks is needed to better design monetary policy responses over the business cycle. Understanding the role of nonbanks in the transmission of monetary policy is important for the proper design and implementation of macroeconomic stabilization policies. Although the overall response to monetary expansions and contractions of financial intermediation by nonbanks is not qualitatively different from that of banks, important gaps remain in our knowledge of how monetary policy can act through nonbanks. In particular, more effort is needed to better understand the risk-taking channel of monetary policy and the role of asset managers.

Box 2.1. Monetary Policy and the Stock Returns of Banks and Nonbanks

Monetary policy influences output and prices indirectly and often with a lag, but its influence on asset prices is straightforward and immediate. This box finds that the stock prices of banks and nonbanks respond similarly to unconventional monetary policy surprises in the United States, consistent with the view that nonbanks are unlikely to weaken the transmission of monetary policy. The analysis also shows that, for the United States, financial intermediaries respond more to positive surprises.

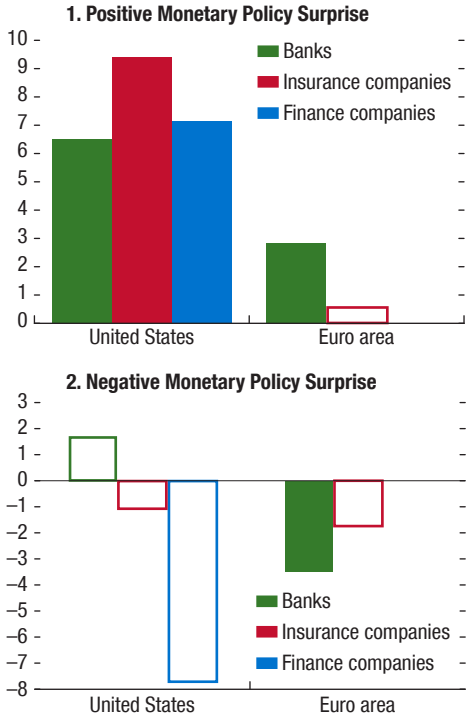
The reaction of the stock market to changes in monetary policy can provide useful insights into the transmission of monetary policy. Unlike balance sheets, stock prices are forward looking: A firm's stock price reflects the value of all its future expected cash flows discounted at an appropriate rate (the risk-free rate plus a risk premium).[1] Therefore, monetary policy surprises can increase stock prices either by improving the expectations about future cash flows, lowering the real risk-free rate, or decreasing the risk premium.

Should the stock prices of banks and nonbank financial intermediaries respond differently to monetary policy? Banks and nonbanks' stock prices may respond differently to monetary policy if they have differential access to debt markets, possibly because some businesses are more transparent than others. Different exposures to interest rate risk, different risk-taking incentives, and different exposure of their client bases to cyclical factors—namely to monetary policy—also affect the way these institutions' stock prices respond to monetary policy. The stock returns of firms that are smaller, have poorer credit ratings, are financially constrained, or belong to cyclical sectors such as technology or communications, are more sensitive to monetary policy (Ehrmann and Fratzscher 2004).

The impact of unconventional monetary policy announcements on equity returns in the United States does not seem to be significantly different between banks and nonbanks. Based on an event

Figure 2.1.1. Stock Price Responses to Unconventional Monetary Policy
(Percent)

In the United States, bank and nonbank stocks respond similarly to monetary policy surprises.



Sources: Bloomberg L.P.; and Thomson Reuters Datastream.
Note: The panels show the estimated response of stock prices (in excess of the aggregate market response) to unconventional monetary policy announcements between November 2008 and December 2013. The stock response is measured by the change in stock return on the day of a monetary policy announcement that cannot be explained by the change in the overall stock market return over the same period. The monetary policy surprise is based on yields for 10-year government bond futures in the United States and a spread between German and Spanish or Italian 10-year government bonds for the euro area. Sufficient data for finance companies are not available for the euro area. Solid bars represent responses that are significant at the 10 percent level.

This box was prepared by Luis Brandão-Marques and Garence Staraci.

[1]Stock prices react quickly to an unexpected monetary policy change because of their forward-looking nature (the expected component should already be incorporated into prices). Although monetary policy seems to affect aggregate stock market returns mostly through the risk premium, its effect on cash flows explains a significant portion of the effect on the cross-section of returns (Maio 2014). Hence, differences in responses by banks and nonbanks offer information about the expected effect of monetary policy on the current and future profitability of each sector.

Box 2.1 *(continued)*

study with daily data, nonbanks (insurance companies and finance companies) and banks tend to respond more to monetary policy than the market average (Figure 2.1.1).[2] There is a considerable degree of asymmetry in the responses to positive or negative monetary surprises. In the United States, responses are stronger for positive monetary policy surprises; by contrast, in the euro area, the stocks of financial institutions are more responsive to negative surprises. Nonbanks tend to have slightly stronger responses than banks but the differences are small and, in general, not significantly different from a statistical perspective. However, in the euro area, banks respond more than insurance companies do to monetary policy surprises.

Overall, the evidence presented here is consistent with the view that nonbanks are unlikely to weaken the transmission of monetary policy. The analysis shows that the stocks of nonbanks and banks react similarly to positive monetary policy surprises. In addition, because finance companies also seem to benefit from monetary expansions to a greater extent than the rest of the market, the results of this analysis suggest that the substitution between banks and finance companies is limited. Therefore, it is plausible that the heightened reaction of financial sector stock prices to accommodative monetary policy signals an expectation of higher future profits and an expansion of balance sheets for the entire financial sector.

[2]The event study controls for market expectations by identifying the surprise component of policy announcements as the change in long-term government bond futures prices (or yields) around the time of policy announcements. The stock price response is measured on a daily basis because the novelty of unconventional policies may mean that it takes time for a policy shock to be properly reflected in asset returns. The time frame considered is November 2008 to December 2013. During this period, there were 47 monetary policy announcements in the United States and 63 in Europe (euro area). Under the term "announcement," the study also includes monetary policy committee meetings with no significant announcement because such decisions can sometimes be considered surprises by the market. The results presented here, albeit using a different method, confirm the findings of Chodorow-Reich 2014 for the United States.

Box 2.2. Exchange Rate Volatility, Monetary Policy, and Nonbanks

This box discusses the effects of monetary policy on financial institutions through changes in exchange rates. For the case of emerging markets, it uncovers the constraints posed by financial structures on monetary policy when the central bank targets the exchange rate.

The exchange rate channel of monetary policy does not work homogeneously across the financial system; financial firms in emerging market economies, on average, seem more exposed to foreign currency changes. Exchange rate changes may affect banks and nonbanks differently, depending on their balance sheet exposures, and their financial and operational ("natural") hedges. Net foreign exchange exposures are indirectly estimated for listed financial firms using the sensitivity of their stock returns to changes in trade-weighted exchange rates.[1] The estimated coefficients (Figure 2.2.1) highlight the different effects that exchange rate variations may have on banks and nonbanks. In the United States, Europe (excluding the United Kingdom), and emerging market economies, the returns of bank stocks are more negatively affected than those of nonbanks following a currency depreciation. Furthermore, the stock returns of emerging market financial institutions are more sensitive to exchange rates than are their counterparts in advanced economies.

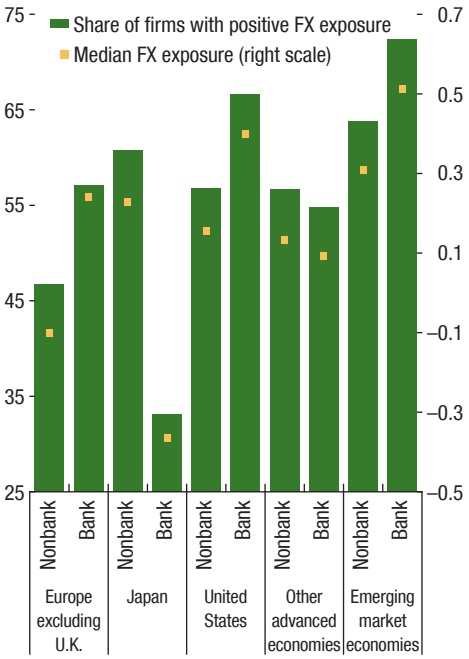
Central banks in emerging market economies may be inclined to avoid large exchange rate fluctuations,

This box was prepared by Nicolás Arregui and Nicolás Magud.

[1]See Adler and Dumas 1984; and Bartram and Bodnar 2007.

Figure 2.2.1. Sensitivity of Financial Firms to Exchange Rate Changes, 1995–2016
(Percent)

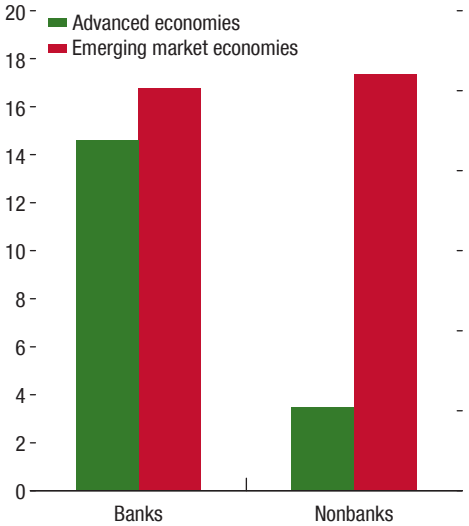
Returns of banks and nonbanks are more sensitive to exchange rate fluctuations in emerging market economies.



Sources: IMF, International Financial Statistics database; Thomson Reuters Datastream; and IMF staff calculations.
Note: Emerging market economies = Brazil, Chile, China, Colombia, Czech Republic, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Poland, Russia, South Africa, Taiwan Province of China, Thailand, Turkey. Other advanced economies = Australia, Canada, Hong Kong SAR, New Zealand, Singapore, United Kingdom. The figure shows the estimated response of expected stock returns to a 1 percentage point appreciation in the trade-weighted nominal exchange rate. The estimates are based on an augmented capital asset pricing model and a sample of listed financial firms in 23 advanced economies and 19 emerging market economies from 1995 to 2015. FX = foreign exchange.

Figure 2.2.2. Foreign Currency Liabilities of Banks and Nonbanks, 2001–14
(Percent of total liabilities)

Nonbanks in emerging market economies have a significantly higher fraction of their debt in foreign currency than in advanced economies.



Sources: IMF, Monetary and Financial Statistics database; and IMF staff calculations.
Note: The figure shows average foreign currency liabilities in percent of total liabilities owed by banks and nonbanks (other financial intermediaries) in emerging market economies and advanced economies. The difference between the average of nonbank foreign currency liabilities in advanced economies and emerging market economies is statistically significant at least at the 10 percent level.

Box 2.2 *(continued)*

given the presence of significant foreign exchange exposures among financial intermediaries. The foreign-exchange-denominated liabilities of nonbanks are significantly larger in emerging market economies than in advanced economies (Figure 2.2.2). Central banks tend to intervene in foreign currency markets, limiting exchange rate volatility, in order to mitigate financial instability and adverse effects on investment—especially during episodes of depreciation. In contrast, advanced economies generally welcome a depreciation of their domestic currency because of its expansionary effect—by stimulating exports and reducing imports. Furthermore, in less-developed financial markets, hedging against currency risk is limited, increasing banks' and nonbanks' vulnerability to exchange rate fluctuations.

Contrary to banks, nonbank financial intermediaries can neither receive liquidity financing from the central bank, nor do they have access to a lender of last resort. Thus, the fragility of nonbanks to large and unexpected oscillations in exchange rates is potentially greater than that of banks and can constrain monetary policy in emerging market economies.

Annex 2.1. Aggregate Vector Autoregression Analysis

Changes over Time in the Transmission of Monetary Policy

The estimates of the response of GDP to a monetary policy change presented in Figure 2.2 are based on a vector autoregression (VAR) estimated separately for two periods: 1980 through 1999, and 2000 through the first quarter of 2016. The responses are estimated using a four-lag VAR model of the level of real GDP, the GDP deflator, the nominal effective exchange rate (all in logarithms), and a monetary policy interest rate or close substitute.[45] For the euro area, Japan, the United Kingdom, and the United States, the study uses a shadow policy rate after the third quarter of 2008 to take into account the effects of unconventional monetary policy (sourced from Krippner 2016 for Japan and from Wu and Xia 2016 for the rest). The data are quarterly and seasonally adjusted, when needed. The responses are drawn from Cholesky decompositions under the assumption that interest rates move last and real GDP moves first. All standard errors are estimated using a nonparametric bootstrap and 200 replications.

The estimates of the change in the transmission of monetary policy are robust to alternative specifications and measures of monetary policy changes. A three-variable VAR that excludes the nominal effective exchange rate and a five-variable VAR that uses real household consumption and business investment, in addition to real GDP, prices, and the interest rate, produce qualitatively similar results (Annex Figure 2.1.1). For the case of the United States, the results are also robust to using the same specification as Boivin and Giannoni 2006—that is, estimating a VAR of detrended log real GDP, inflation (the first difference of the logarithm of the GDP deflator), and the nominal interest rate. In addition, also for the United States, the results are robust to using Gertler and Karadi's (2015) high-frequency identification measure of monetary policy, graciously provided by Peter Karadi.

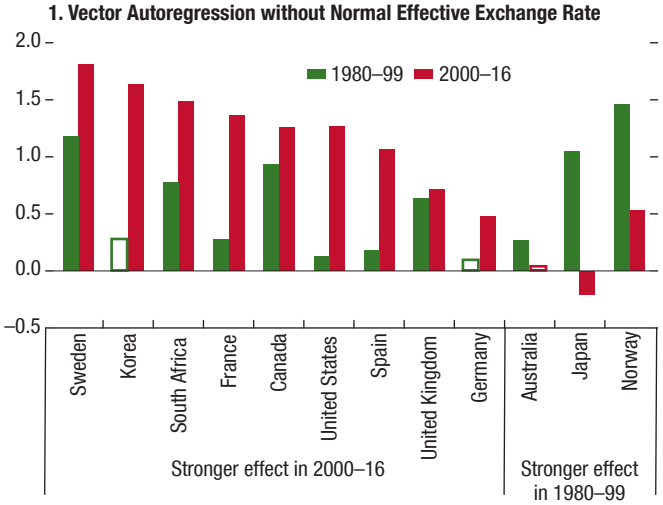
The Transmission of Monetary Policy According to the Size of the Nonbank Financial Sector

The cross-country study of the transmission of monetary policy according to size of the nonbank financial sector is based on a panel VAR of output, prices, the exchange rate, and a measure of monetary policy. Output is measured as the level of real GDP, prices are the level of the GDP deflator, and the exchange rate is the nominal effective exchange rate (all in logarithms). Monetary policy is measured with a monetary-policy-related interest rate (usually a central bank discount rate

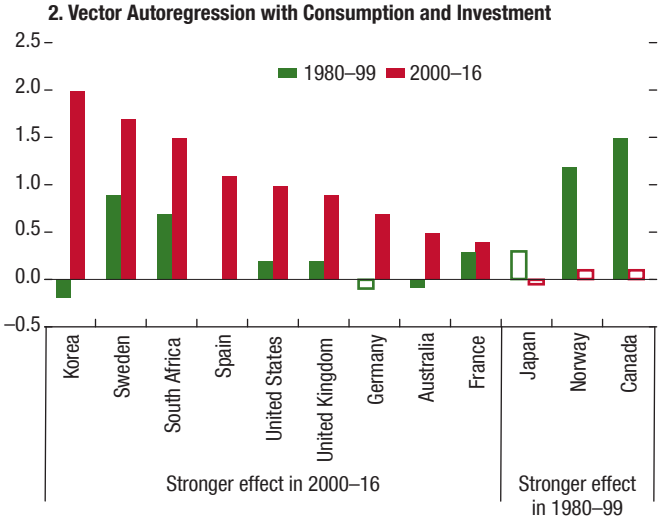
[45]The VAR for Germany includes a dummy for the reunification (1991:Q1). There is also statistical evidence of cointegration relationships, which strengthen the case for estimating the VAR in levels.

Annex Figure 2.1.1. Trends in the Transmission of Monetary Policy—Robustness

The exclusion of the nominal effective exchange rate does not significantly change the response of real GDP to a monetary policy rate cut.



Neither does the inclusion of real household consumption and real business investment.



Sources: Krippner 2016; Organisation for Economic Co-operation and Development; Wu and Xia 2016; and IMF staff estimates.
Note: Solid bars mean that the responses are statistically significant using 68 percent confidence intervals.

or a short-term money market rate). As in the previous analysis, policy rates are adjusted for unconventional monetary policy with the use of shadow policy rates. The total sample consists of 44 countries and uses quarterly data from 1998 to 2015. The sample is split into four groups based on whether their economies have developed (24 countries) or emerging markets (20 countries) and on whether the absolute size of their nonbank financial sector is large or small.[46] The size of the nonbank sector is the sum of corporate bonds outstanding and credit extended to the private sector by nonbank financial intermediaries, as measured by the World Bank's Global Financial Development Database for 2002–13.

The results are robust to the use of alternative estimation methods and definitions of the importance of the nonbank financial sector. The VAR, which yields the results in Figure 2.6, is estimated with four lags using Pesaran, Shin, and Smith's (1999) mean group estimator, which is consistent in the presence of dynamic heterogeneity. The results are broadly the same if the VAR is estimated in first differences, if it excludes the exchange rate, or if it includes the logarithms of investment or M3—a measure of money supply—instead. The panel VAR is also estimated using a least-squares dummy variable estimator, but the results are similar.[47] The results are robust to splitting the sample according to the size of the nonbank sector relative to the size of the banking sector, but only for economies with developed financial markets. In most cases, the differences in the strength of the transmission of monetary policy are small and not statistically significant.

The Transmission of Monetary Policy and the Financial Sector in Select Countries

The single-country VAR study uses claims of three types of financial institutions on private nonfinancial firms and households. Claims are obtained from financial accounts data of six countries. Although the availability of disaggregated data differs across countries, the other types of claims, such as government and foreign bonds as well as interbank loans, are excluded to a large extent. Book values, which are immune to valuation effects, are used for the United States. For the other countries, book values are estimated by accumulating flows to the extent possible.[48]

The VAR uses six variables: the natural logarithms of real GDP, of the GDP deflator, and of real claims of banks, of insurance companies and pension funds, and of other financial intermediaries, and the nominal short-term interest rate.[49] The lag length is four, which is standard for quarterly data. Seasonal dummies are included because the claims are not seasonally adjusted. For the United States, a shadow interest rate estimated by Ichiue and Ueno (2016), instead of the short-term rate, is used.[50] The monetary policy shock is identified using the Cholesky decomposition with the interest rate ordered last.[51] All standard errors are estimated using a bootstrap and 200 replications.[52] The estimates are robust to various possible sources of misspecification, including: (1) adjusting the sample to exclude the crisis and postcrisis period from the estimation, and (2) for the United States (a) using other available measures of monetary policy such as the three-month Treasury bill rate and the measures from Gertler and Karadi (2015) and Romer and Romer (2004); (b) including investment in the VAR; (c) separating mortgage-backed securities from total assets owned by the financial sector; and (d) changing the ordering of the shadow policy rate in the identification of the impulse responses.

The study of the risk-taking channel in the United States presented in Figure 2.8 uses the same VAR

[46]That is, for each type of economy—developed or emerging market—the sample is ranked by size of the nonbank financial sector and divided in half. This procedure yields 12 developed market economies and 10 emerging market economies with a large nonbank financial sector and the same for those with a small nonbank financial sector.

[47]The sample is sufficiently long (72 quarters) and a generalized method of moments estimator is not necessary.

[48]The estimated book value is normalized so that this equals the corresponding stock at the earliest date. If a negative value is obtained, the book values are shifted upward in parallel fashion so that the minimum value equals one-tenth of the maximum value.

[49]The study uses logarithms of levels instead of the growth rates in order to avoid dropping valuable information about the long-term relationship between variables (Sims 1980). See Enders 2010, 396–97, as well.

[50]Ichiue and Ueno (2016) use survey forecasts of macroeconomic variables to estimate the shadow rate. The estimated shadow rate largely followed Wu and Xia's (2016) estimate until 2014. The results using Wu and Xia's shadow rate for the United States are similar.

[51]The average of daily interest rates during the last month of the quarter is used for Korea while the end-of-quarter rate is used for the other countries. The results of the United States are broadly robust to using Gertler and Karadi's (2015) monetary policy shocks.

[52]The data period is 1988:Q2–2015:Q3 for Australia, 1989:Q4–2015:Q4 for Canada, 2002:Q4–15:Q4 for Korea, 1991:Q3–2015:Q4 for South Africa, 1987:Q1–2008:Q4 for the United Kingdom, and 1983:Q1–2015:Q4 for the United States. The data from 2009 are not used for the United Kingdom because the financial accounts data for banks include the central bank, which could seriously distort the results.

representation augmented by measures of risk taking in the equity and bond markets. In particular, the VAR in Figure 2.8 includes a measure of the equity risk premium calculated by Absolute Strategy Research (available from Thomson Reuters Datastream) and Gilchrist and Zakrajšek's (2012) excess bond premium (http://people.bu.edu/sgilchri/Data/data.htm), which are ordered last. The variance decompositions presented in panels 3 and 4 of Figure 2.8 are based on forecast-errors at the 16-quarter horizon.

Annex 2.2. Microanalysis of the Behavior of Financial Firms

Estimating the Transmission of Monetary Policy from Financial Intermediaries' Balance Sheet Data

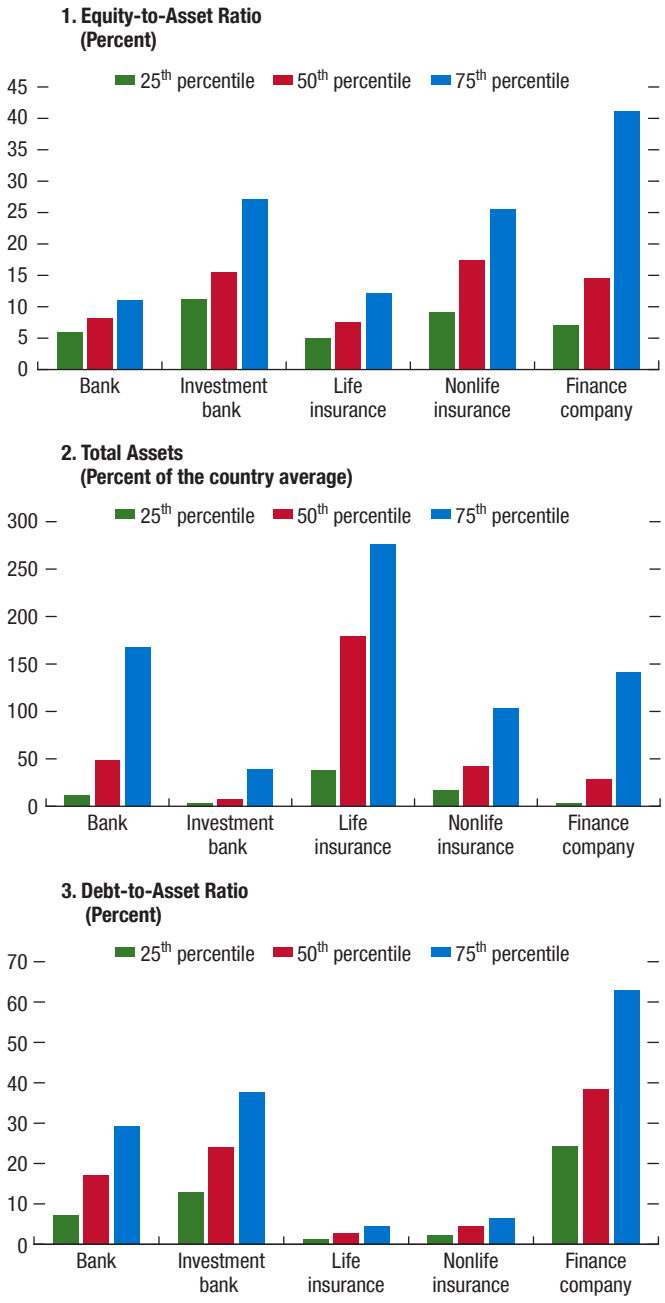
The analysis on the firm-level responses of financial intermediaries to monetary policy changes (Figures 2.9 and 2.10) uses a sample of financial firms from several advanced economies and two emerging market economies. The study uses balance sheet data for 368 publicly listed financial firms from Austria, Belgium, Brazil, Canada, Germany, Finland, Ireland, Italy, Japan, Korea, Mexico, the Netherlands, Portugal, Spain, Sweden, and the United States. Data on total assets at book value for financial companies come from Worldscope via Thomson-Reuters Datastream. Data on the monetary policy rate are nominal policy interest rates or shadow short rate estimates from Krippner 2016. The coverage goes from 1998 to 2015 and is at the quarterly frequency, but coverage by firm varies. The summary statistics are shown in Annex Figure 2.2.1.

The analysis uses the local projection method of Jordà (2005) and Teulings and Zubanov (2014) to estimate the impulse response function of firm assets to a monetary policy shock. Each h step-ahead impulse response is given by β_j^h for each sector j, from the following regression:

$$
\begin{aligned}
L_{it+h} = \alpha_i &+ \sum_{j\in\{sectors\}} \beta_j^h \cdot \varepsilon_t^P \cdot I_{j,i} \\
&+ \sum_{r=1}^{R} \left\{ \sum_{j\in\{sectors\}} \delta_{1j,r}^h \varepsilon_{t-r}^P \cdot I_{j,i} + \delta_{2,r}^h X_{t-r} \right\} \\
&+ \sum_{r=1}^{R} \delta_l^h \cdot Y_{it-r} \\
&+ \sum_{k=0}^{h-1} \left\{ \sum_{j\in\{sectors\}} \gamma_{1k}^h \cdot \varepsilon_{t+h-k}^P \cdot I_{j,i} + \gamma_{2,k}^h \cdot X_{t+h-k} \right\} \\
&+ \eta_{it+h}, \qquad \text{(A2.2.1)}
\end{aligned}
$$

in which L_{it} is the natural logarithm of real total assets owned by financial institution i, ε_t^P is a monetary pol-

Annex Figure 2.2.1. Summary Statistics



Sources: Thomson Reuters Datastream; and IMF staff calculations.
Note: The figure shows the quartiles of each variable, using data for a total of 368 publicly listed financial firms from Austria, Belgium, Brazil, Canada, Germany, Finland, Ireland, Italy, Japan, Korea, Mexico, the Netherlands, Portugal, Spain, Sweden, and the United States from 1998:Q1 to 2015:Q4. For each variable, we first take firm-level medians, and then industry-level medians of the firm-level medians, in order to avoid the overrepresentation of firms with many observations.

icy shock,[53] and for firms from outside of the United States, X_{t+h-k} is the U.S. monetary policy shock (to account for the cross-border effects of U.S. monetary policy). To assist with the identification of the response of financial firms' assets to monetary policy changes, the regression is extended to include interactions with firm-level characteristics. In this case, the conditional impulse response is given by $\beta^h_{1,j} + \beta^{h,z}_{2,j} \cdot z_{i,t-1}$ from the following equation:

$$
\begin{aligned}
L_{it+h} = {} & \alpha_i + \sum_{j\in\{sectors\}} \left\{ \beta^h_{1,j} \cdot \varepsilon^P_t \cdot I_{j,i} + \beta^{h,z}_{2,j} \varepsilon^P_t \cdot I_{j,i} \cdot z_{i,t-1} \right\} \\
& + \sum_{r=1}^{R} \delta^h_1 Y_{it-r} \\
& + \sum_{r=1}^{R} \left[\sum_{j\in\{sectors\}} \right. \\
& \left. \left\{ \delta^h_{1,j} \cdot \varepsilon^P_{t-r} \cdot I_{j,i} + \delta^{h,z}_{2,j} \varepsilon^P_{t-r} \cdot I_{j,i} \cdot z_{i,t-r-1} \right\} + \delta^h_{3,r} X_{t-r} \right] \\
& + \sum_{k=0}^{h-1} \left[\sum_{j\in\{sectors\}} \right. \\
& \left. \left\{ \left(\gamma^h_{1,k} \cdot \varepsilon^P_{t+h-k} \cdot I_{j,i} + \gamma^h_{2,r} \cdot \varepsilon^P_{t+h-k} \cdot I_{j,i} \cdot z_{i,t+h-k-1} \right) \right\} \right. \\
& \left. + \gamma^h_{3,r} X_{t+h-k} \right] + \eta_{it+h}, \qquad \text{(A2.2.2)}
\end{aligned}
$$

in which z_i is a conditioning firm-level variable such as the log of total assets, the equity-to-asset ratio, or the wholesale funding ratio (the ratio of nondeposit debt liabilities to total liabilities). The inference is based on robust standard errors according to Driscoll and Kraay (1998).

The Risk-Taking Channel of Monetary Policy through Mutual Funds

The analyses use monthly data on global mutual funds domiciled in the United States, from 2004 to 2015. The analysis of the response of bond funds in terms of high-yield or long-maturity bonds is based on data from Lipper's Global Mutual Fund Holdings database and covers, at each month, the 50 largest portfolios by total net assets size. The analysis of the response of country allocations of global equity and bonds uses data from EPFR Global on 267 and 30 funds, respectively.

[53]The monetary policy measure is the orthogonal innovation of the nominal monetary policy rate derived from a three-way VAR and identified using a Cholesky ordering. The VAR includes real GDP (in logs), the GDP deflator (in logs), and a policy rate, and is estimated country by country. For some countries, namely the United States, the VAR is extended to include a measure of financial stress (for instance, Gilchrist and Zakrajšek [2012] excess bond premium) but the resulting measure of monetary policy behaves similarly. For robustness, the study also uses the Gertler and Karadi (2015) data based on a high-frequency identification approach, for the United States, with similar results.

The analysis of the response of mutual funds to monetary policy changes consists of several exercises that estimated the fund-level reallocation of portfolios toward riskier assets. The analysis uses the following generic specification:

$$
Alloc^{risky}_{i,t} - Alloc^{safe}_{i,t} = \alpha_i + \beta \Delta MP_t + \gamma R_t + \varepsilon_{i,t}, \quad \text{(A2.2.3)}
$$

where *Alloc* is the percentage of total assets that portfolio *i* has allocated, at month *t*, to risky or safe assets. Specifically, *risky* includes, for bond funds, high-yield bonds (ratings lower than BBB) and longer-maturity bonds (in excess of five years), and *safe* is its complement. In addition, for both bond and equity funds, *risky* can also mean the portfolio weight of investments in countries with speculative-grade sovereign credit ratings. *MP* is Wu and Xia's (2016) shadow policy rate and R_t is the difference between the return of the risky and safe asset classes.[54] The coefficient of interest is β. The results are robust to the inclusion of the portfolio's lagged return as an additional control.

Annex 2.3. Microanalysis of Borrower Behavior

The analysis uses data on bond and syndicated loan borrowings from Dealogic combined with firm-level characteristics (balance sheet and income statement data) obtained from Thomson Reuters Datastream. The analysis focuses on firms that have issued at least one bond and one syndicated loan since 1993, and excludes financial and government-related firms. The focus is on borrowing in each firm's domestic market. That is, the study excludes bonds and syndicated loan deals outside a firm's country of risk, as reported by Dealogic. Public firms typically comply with certain reporting requirements and are larger than nonpublic firms, and are therefore better suited to access bond markets. Data availability determines the country coverage, which includes Japan, the United States, and

[54]For global equity country-level investments, the study uses as *R* the difference between monthly (percentage) returns of the MSCI-G7 and Emerging Market Indices. For global bond funds' country-level allocations, it uses the difference between monthly (percentage) returns of the Citigroup Broad Investment Grade Bond Index and the JP Morgan EMBI Global Total Return Index. For bond fund allocations by credit quality of the investments, the analysis uses the difference between monthly returns of the Citigroup Broad Investment Grade Bond Index and the Bank of America High Yield Corporate Master II index. Finally, for bond fund allocations by maturity of the investments, it uses the difference between the monthly returns of Bank of America Corporate Bond Indexes of one to three years and more than 15 years.

a group of European countries (France, Germany, Italy, Netherlands, Spain, United Kingdom).

The study uses two groups of aggregate variables b to capture the firm's willingness to substitute between bank and market financing. First, data from surveys of senior loan officers are collected from the respective central banks (and the European Central Bank). In particular, the analysis focuses on banks' reported tightening in lending standards or perceived stronger demand for bank loans as reported in those surveys.[55] Second, the stance of monetary policy is measured by the deviation of monetary policy (as measured by shadow policy rates) from target. Monetary policy targets are determined by estimating contemporaneous Taylor rules until the global financial crisis.

The analysis relies on a linear probability model to estimate the firms' choice between (syndicated) loan and bond financing when bank lending conditions change. Following Becker and Ivashina (2014), the analysis excludes firm/quarter observations when no new debt is issued (either in the form of bonds or syndicated loans). That is, the inference is based on firms that have positive demand for external funds. Specifically, given the binary variable D_{it},

$$\begin{cases} D_{i,t} = 1 \text{ if firm } i \text{ obtained a loan at } t, \\ D_{i,t} = 0 \text{ if firm } i \text{ issued a bond at } t, \end{cases} \quad \text{(A2.3.1)}$$

the following model is estimated by ordinary least squares (OLS) with errors clustered by firm/quarter and firm fixed effects:

$$D_{it} = \alpha_i + \beta b_{t-1} + \gamma\, FirmCharac_{it-1} + \delta b_{t-1}\, FirmCharac_{it-1} + u_{it}, \quad \text{(A2.3.2)}$$

using data at the quarterly frequency.[56] The inclusion of fixed effects implies that firm averages are not used for identification, and a β coefficient different from zero would be obtained only to the extent that firms significantly substitute between the two sources of financing. As mentioned, the focus is on firms that have issued at least one bond and one syndicated loan over the sample period. The model includes quarterly dummies, and a crisis and a post-crisis dummy.

The main results are robust to estimating the model separately for Japan, the United States, and the European countries; using standard errors clustered at the industry/quarter level; estimating the model only until the global financial crisis (2008); and computing the deviation from target in a variety of ways.[57] Finally, an analogous exercise is conducted using an unbalanced panel of firms in 23 advanced and emerging market economies from 2010 to 2015 (Figure 2.13, panel 3). The binary dependent variable is defined as one if there is a quarterly increase in a firm's loan liabilities and a decrease in its note and bond liabilities, and zero if the opposite is true. Firm-level data were obtained from FactSet.

[55]The United Kingdom started conducting its credit conditions survey only in 2007. The study therefore considers an additional version that assigns European Central Bank aggregates (dating back to 2003) to all European countries in the sample.

[56]Multiple bond or loan issuances in one quarter are counted as one. Firm-quarter observations with issuance of both loans and bonds are excluded.

[57]The study estimates three different versions using contemporaneous inflation, and real GDP growth, real GDP deviation from a Hodrick-Prescott trend, or real GDP deviation from a cubic polynomial trend. Additionally, it considers the rule proposed by Taylor (1993).

References

Adler, Michael, and Bernard Dumas. 1984. "Exposure to Currency Risk: Definition and Measurement." *Financial Management* 13 (2): 41–50.

Adrian, Tobias, and Hyun Song Shin. 2011. "Financial Intermediaries and Monetary Economics." In *Handbook of Monetary Economics,* Vol. 3, edited by Benjamin M. Friedman and Michael Woodford. Amsterdam: Elsevier.

Alessandri, Piergiorgio, and Benjamin D. Nelson. 2015. "Simple Banking: Profitability and the Yield Curve." *Journal of Money, Credit and Banking* 47 (1): 143–75.

Badertscher, Brad, Jeffery Burks, and Peter Easton. 2011. "A Convenient Scapegoat: Fair Value Accounting by Commercial Banks during the Financial Crisis." *Accounting Review* 87 (1): 59–90.

Barth, James R., Gerard Caprio, and Ross Levine. 2013. "Bank Regulation and Supervision in 180 Countries from 1999 to 2011." NBER Working Paper 18733, National Bureau of Economic Research, Cambridge, MA.

Bartram, Söhnke M., and Gordon M. Bodnar. 2007. "The Exchange Rate Exposure Puzzle." *Managerial Finance* 33 (9): 642–66.

Baumeister, Christiane, Philip Liu, and Haroon Mumtaz. 2010. "Changes in the Transmission of Monetary Policy: Evidence from a Time-Varying Factor-Augmented VAR." Working Paper 401, Bank of England, London.

Becker, Bo, and Victoria Ivashina. 2014. "Cyclicality of Credit Supply: Firm Level Evidence." *Journal of Monetary Economics* 62 (March): 76–93.

———. 2015. "Reaching for Yield in the Bond Market." *Journal of Finance* 70 (5): 1863–902.

Bernanke, Ben S. 2007. "The Financial Accelerator and the Credit Channel." Remarks at The Credit Channel of Monetary Policy in the Twenty-first Century Conference, Federal Reserve Bank of Atlanta, June 15.

———, and Alan S. Blinder. 1992. "The Federal Funds Rate and the Channels of Monetary Transmission." *American Economic Revie*w 82 (4): 901–21.

Bernanke, Ben, Mark Gertler, and Simon Gilchrist. 1996. "The Financial Accelerator and the Flight to Quality." *Review of Economics and Statis*tics 78 (1): 1–15.

Bini Smaghi, Lorenzo. 2010. "Monetary Policy Transmission in a Changing Financial System–Lessons from the Recent Past, Thoughts about the Future." Speech to the Barclays Global Inflation Conference, New York, June 15.

Boivin, Jean, and Marc P. Giannoni. 2006. "Has Monetary Policy Become More Effective?" *Review of Economics and Statistics* 88 (3): 445–62.

Boivin, Jean, Michael T. Kiley, and Frederic S. Mishkin. 2011. "How Has the Monetary Transmission Mechanism Evolved Over Time?" Chap. 8 in *Handbook of Monetary Economics*, Vol. 3, edited by Benjamin M. Friedman and Michael Woodford, 369–422. Amsterdam: Elsevier.

Bolton, Patrick, Xavier Friexas, Leonardo Gambacorta, and Paolo Emilio Mistrulli. 2016. "Relationship and Transaction Lending in a Crisis." *Review of Financial Studies* 29 (10): 2643–76.

Borio, Claudio, and Haibin Zhu. 2012. "Capital Regulation, Risk-Taking and Monetary Policy: A Missing Link in the Transmission Mechanism?" *Journal of Financial Stability* 8 (4): 236–51.

Busch, Ramona, and Christoph Memmel. 2015. "Banks' Net Interest Margin and the Level of Interest Rates." Discussion Paper 16/2015, Deutsche Bundesbank, Frankfurt am Main.

Cecchetti, Stephen, Tommaso Mancini-Griffoli, and Machiko Narita. Forthcoming. "Does Prolonged Monetary Policy Easing Increase Financial Vulnerability?" IMF Working Paper, International Monetary Fund, Washington, DC.

Chevalier, Judith, and Glenn Ellison. 1997. "Risk Taking by Mutual Funds as a Response to Incentives." *Journal of Political Economy* 105 (6): 1167–200.

Chodorow-Reich, Gabriel. 2014. "Effects of Unconventional Monetary Policy on Financial Institutions." *Brookings Papers on Economic Activity* 48 (1): 155–227.

Dell'Ariccia, Giovanni, Luc Laeven, and Gustavo Suarez. 2016. "Bank Leverage and Monetary Policy's Risk-Taking Channel: Evidence from the United States." ECB Working Paper 1903, European Central Bank, Frankfurt.

Dell'Ariccia, Giovanni, Luc Laeven, and Robert Marquez. 2014. "Real Interest Rates, Leverage, and Bank Risk-Taking." *Journal of Economic Theory* 149 (January): 65–99.

Deloitte Financial Services. 2004. *Global Risk Management Survey*, 4th ed. New York: Deloitte.

———. 2009. *Global Risk Management Survey: Risk Management in the Spotlight*, 6th ed. New York: Deloitte.

———. 2013. *Global Risk Management Survey: Setting a Higher Bar*, 8th ed. New York: Deloitte.

Den Haan, Wouter J., and Vincent Sterk. 2011. "The Myth of Financial Innovation and the Great Moderation." *Economic Journal* 121 (553): 707–39.

Disyatat, Piti. 2011. "The Bank Lending Channel Revisited." *Journal of Money, Credit and Banking* 43 (4): 711–34.

Drechsler, Itamar, Alexi Savov, and Philipp Schnabl. 2016. "The Deposits Channel of Monetary Policy." NBER Working Paper 22152, National Bureau of Economic Research, Cambridge, MA.

Driscoll, John C., and Aart C. Kraay. 1998. "Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data." *Review of Economics and Statistics* 80 (4): 549–60.

Ehrmann, Michael, and Marcel Fratzscher. 2004. "Taking Stock: Monetary Policy Transmission to Equity Markets." *Journal of Money, Credit, and Banking* 36 (4): 719–37.

Enders, Walter, 2010. *Applied Econometric Time Series*, 3rd ed. Hoboken, NJ: John Wiley & Sons.

Feroli, Michael, Anil K. Kashyap, Kermit L. Schoenholtz, and Hyun Song Shin. 2014. "Market Tantrums and Monetary Policy." Chicago Booth Research Paper 14–09, Booth School of Business, University of Chicago.

Flannery, Mark J. 1981. "Market Interest Rates and Commercial Bank Profitability: An Empirical Investigation." *Journal of Finance* 36 (5): 1085–101.

Georgiadis, Georgios, and Arnaud Mehl. 2015. "Trilemma, Not Dilemma: Financial Globalisation and Monetary Policy Effectiveness." Working Paper 222, Globalization and Monetary Policy Institute, Federal Reserve Bank of Dallas.

Gertler, Mark, and Peter Karadi. 2015. "Monetary Policy Surprises, Credit Costs, and Economic Activity." *American Economic Journal: Macroeconomics* 7 (1): 44–76.

Gilchrist, Simon, and Egon Zakrajšek. 2012. "Credit Spreads and Business Cycle Fluctuations." *American Economic Review* 102 (4): 1692–720.

Hanson, Samuel G., and Jeremy C. Stein. 2015. "Monetary Policy and Long-Term Real Rates." *Journal of Financial Economics* 115 (3): 429–48.

Hau, Harald, and Sandy Lai. 2016. "Asset Allocation and Monetary Policy: Evidence from the Eurozone." *Journal of Financial Economics* 120 (2): 309–29.

Herman, Alexander, Deniz Igan, and Juan Solé. 2015. "The Macroeconomic Relevance of Credit Flows: An Exploration of U.S. Data." IMF Working Paper 15/143, International Monetary Fund, Washington, DC.

Iacoviello, Matteo. 2005. "House Prices, Borrowing Constraints, and Monetary Policy in the Business Cycle." *American Economic Review* 95 (3): 739–64.

Ichiue, Hibiki, and Yoichi Ueno. 2016. "A Macroeconomic Forecast-Implied Shadow Rate and Unconventional Monetary Policy Effects." Unpublished.

Igan, Deniz, Alain Kabundi, Francisco Nadal De Simone, and Natalia Tamirisa. 2013. "Monetary Policy and Balance Sheets." IMF Working Paper 13/158, International Monetary Fund, Washington, DC.

International Monetary Fund. 2015. "Monetary Policy and Financial Stability." Staff Report, International Monetary Fund, Washington, DC, August 28.

Jiménez, Gabriel, Steven Ongena, José-Luis Peydró, and Jesús Saurina. 2014. "Hazardous Times for Monetary Policy: What Do Twenty-Three Million Bank Loans Say about the Effects of Monetary Policy on Credit Risk-Taking?" *Econometrica* 82 (2): 463–505.

Jordà, Òscar. 2005. "Estimation and Inference of Impulse Responses by Local Projections." *American Economic Review* 95 (1): 161–82.

Krippner, Leo. 2016. "Measures of the Stance of United States Monetary Policy." Reserve Bank of New Zealand. Accessed April 4, 2016. http://www.rbnz.govt.nz/research-and-publications/research-programme/additional-research/measures-of-the-stance-of-united-states-monetary-policy.

Loutskina, Elena. 2011. "The Role of Securitization in Bank Liquidity and Funding Management." *Journal of Financial Economics* 100 (3): 663–84.

Maio, Paulo. 2014. "Another Look at the Stock Return Response to Monetary Policy Actions." *Review of Finance* 18 (1): 321–71.

Morris, Stephen, and Hyun Song Shin. 2015. "Risk Premium Shifts and Monetary Policy: A Coordination Approach." William S. Dietrich II Economic Theory Center Research Paper 075–2016, Princeton University, Princeton, NJ.

Nelson, Benjamin, Gabor Pinter, and Konstantinos Theodoridis. 2015 "Do Contractionary Monetary Policy Shocks Expand Shadow Banking?" Bank of England Working Paper 521, Bank of England, London.

Parlatore, Cecilia. 2016. "Fragility in Money Market Funds: Sponsor Support and Regulation." *Journal of Financial Economics* 121 (3): 595–623.

Pesaran, M. Hashem, Yongcheol Shin, and Ron P. Smith. 1999. "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels." *Journal of the American Statistical Association* 94 (446): 621–34.

Primiceri, Giorgio E. 2005. "Time Varying Structural Vector Autoregressions and Monetary Policy." *Review of Economic Studies* 72 (3): 821–52.

Rey, Hélène. 2016. "International Channels of Transmission of Monetary Policy and the Mundellian Trilemma." *IMF Economic Review* 64 (1): 6–35.

Romer, Christina D., and David H. Romer. 2004. "A New Measure of Monetary Shocks: Derivation and Implications." *American Economic Review* 94 (4): 1055–84.

Scharfstein, David, and Adi Sunderam. 2014. "Market Power in Mortgage Lending and the Transmission of Monetary Policy." Unpublished, Harvard University, Cambridge, MA.

Sims, Christopher A. 1980. "Macroeconomics and Reality." *Econometrica* 48 (1): 1–48.

———, and Tao Zha. 1999. "Error Bands for Impulse Responses." *Econometrica* 67 (5): 1113–55.

Stein, Jeremy C. 1998. "An Adverse-Selection Model of Bank Asset and Liability Management with Implications for the Transmission of Monetary Policy." *Rand Journal of Economics* 29 (3): 466–86.

Svirydzenka, Katsiaryna. 2016. "Introducing a New Broad-Based Index of Financial Development." IMF Working Paper 16/5, International Monetary Fund, Washington, DC.

Taylor, John B. 1993. "Discretion Versus Policy Rules in Practice." *Carnegie-Rochester Conference Series on Public Policy* 39 (December): 195–214.

Teulings, Coen N., and Nikolay Zubanov. 2014. "Is Economic Recovery a Myth? Robust Estimation of Impulse Responses." *Journal of Applied Econometrics* 29 (3): 497–514.

Thorbecke, Willem. 1997. "On Stock Market Returns and Monetary Policy." *Journal of Finance* 52 (2): 635–54.

Van den Heuvel, Skander J. 2002. "Does Bank Capital Matter for Monetary Transmission?" *Economic Policy Review* 8 (1): 259–65.

———. 2007. "Does Bank Capital Matter for the Transmission of Monetary Policy?" *Economic Policy Review* 8 (1): 161–72.

Woodford, Michael. 2005. "Central-Bank Communication and Policy Effectiveness." NBER Working Paper 11898, National Bureau of Economic Research, Cambridge, MA.

Wu, Jing Cynthia, and Fan Dora Xia. 2016. "Measuring the Macroeconomic Impact of Monetary Policy at the Zero Lower Bound." *Journal of Money, Credit and Banking* 48 (2–3): 253–91.

Xie, Biqin. 2016. "Does Fair Value Accounting Exacerbate the Procyclicality of Bank Lending?" *Journal of Accounting Research* 54 (1): 235–74.

CHAPTER 3

CORPORATE GOVERNANCE, INVESTOR PROTECTION, AND FINANCIAL STABILITY IN EMERGING MARKETS

Summary

Emerging market economies have become more financially integrated with the rest of the world, allowing greater access to capital but also exposing them to financial shocks. With this increased integration, have institutional and legal frameworks improved accordingly, helping these economies to be more resilient in the face of a more volatile external environment?

This chapter focuses on the interrelatedness of corporate governance, investor protection, and financial stability across emerging market economies. Corporate governance and investor protection encompass rules and practices at both the country and firm level and deal with ways in which suppliers of financing to corporations ensure that they get a return on their investment. Past financial crises across major emerging market economies underscored how corporate governance deficiencies can contribute to financial instability.

The chapter finds that corporate governance and investor protection have generally improved in emerging market economies over the past two decades. The progress is apparent in both firm- and country-level indicators. Even so, there are important differences across emerging market economies, and there is room for further improvement.

The analysis supports the notion that stronger corporate governance and investor protection frameworks enhance the resilience of emerging market economies to global financial shocks. The chapter develops new firm-level indices of governance in emerging market economies and employs novel empirical approaches. The results show that corporate governance improvements foster deeper and more liquid capital markets, allowing them to absorb shocks better. Corporate governance improvements also enhance stock market efficiency, thereby making equity prices less sensitive to external shocks and less prone to crashes. For example, moving from the lower to the upper end of the country- and firm-level governance indices reduces the impact of global shocks by up to 50 percent for emerging market firms, on average. Emerging market economies with better corporate governance and investor protections generally have stronger corporate balance sheets. In particular, better-governed firms typically display lower short-term debt ratios and default probabilities and are able to borrow at longer maturities. This reduces their vulnerability to dry-ups in funding, enhancing financial stability.

The financial stability benefits associated with improved corporate governance strengthen the case for further reform. Although there is no single model, good corporate governance frameworks have some common characteristics. Accordingly, this chapter makes the following policy recommendations:

- All emerging market economies should continue to reform their legal, regulatory, and institutional frameworks to foster the effectiveness and enforceability of corporate governance regimes.
- Most emerging market economies should continue to bolster the rights of outside investors, in particular minority shareholders.
- Bringing disclosure requirements fully in line with international best practice is needed in many emerging market economies. Promoting greater board independence is also likely to yield benefits.

Introduction

With greater financial integration and the development of local markets, the financial landscape across emerging market economies has changed dramatically over the past two decades. Has institutional progress—including corporate governance and investor protection—kept pace, thereby potentially bolstering their resilience to external shocks? Or do the recent strains in some emerging markets and the accompanying volatility in net capital flows hint at more widespread challenges? The importance of this question is highlighted by a series of financial crises across major emerging markets during the late 1990s, when weak corporate governance was seen as contributing to global financial instability. The Asian financial crisis is a notable example. More recently, during the global financial crisis and the 2013 taper tantrum, emerging market economies with lower corporate governance scores experienced more extreme capital outflows. This year, in emerging market economies with lower corporate governance standards, equity price falls were relatively larger in the wake of Brexit, the June 2016 U.K. referendum result in favor of leaving the European Union (Figure 3.1). These episodes of financial stress in emerging market economies point to the role weak corporate governance may play in exacerbating vulnerabilities.

Theory suggests that weak corporate governance and investor protection can undermine financial stability by heightening vulnerability to external shocks. Corporate governance and investor protection deal with ways in which suppliers of financing to corporations ensure that they get a return on their investment (Shleifer and Vishny 1997). Both concepts encompass firm- and country-level dimensions, including rules protecting minority shareholders, disclosure provisions and practices, the role and structure of the board, and compensation structures.

- Governance deficiencies can allow corporate insiders (managers, controlling shareholders) to expropriate the assets of outside investors (creditors, minority shareholders) by diverting resources for their personal use or by committing funds to unprofitable projects that provide private benefits (Djankov and others 2008b). These problems may quickly gain economy-wide importance in the presence of an adverse aggregate shock. For example, Johnson and others (2000) argue that weaker corporate governance frameworks in some emerging markets were associated with significantly more expropriation of cash and tangible assets by managers during the Asian crisis, which in turn exacerbated capital outflows and the attendant currency depreciations and stock price collapses.
- Lack of corporate transparency may increase financial volatility (Figure 3.2). When global financial conditions are benign, investors are more likely to channel funds into companies and markets that feature higher returns but are less easy to understand (Brandão-Marques, Gelos, and Melgar 2013). During more turbulent times, these investors are likely to retrench first by reducing their exposure to these relatively opaque assets. As a result, less transparent markets may be more prone to boom-bust cycles. Likewise, when opacity interacts with weak corporate governance, controlling shareholders

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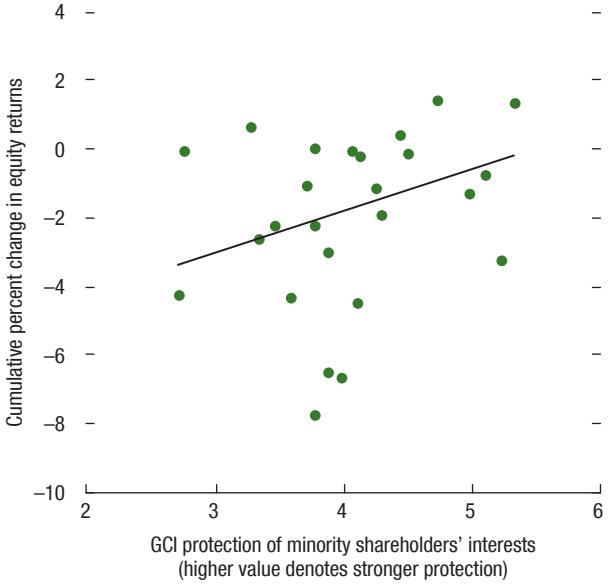
Figure 3.1. Corporate Governance and Equity Returns
(Cumulative changes in dollar returns during Brexit)

Countries with lower corporate governance scores experienced sharper equity return declines after the Brexit vote.



Sources: Thomson Reuters Datastream; World Economic Forum, Global Competitiveness Indicators (GCI) database; and IMF staff calculations.
Note: Cumulative change in equity returns during Brexit corresponds to the equity price movements from June 23 to 29, 2016. Dollar returns are calculated using MSCI price indices and are adjusted by controlling for the public debt-to-GDP ratio and the current account deficit to GDP. Brexit = June 2016 U.K. referendum result in favor of leaving the European Union.

may manipulate reported earnings concealing good and bad news, and individual stock prices may not properly reflect the firm's fundamentals. This can cause stock markets to move together more than warranted by fundamentals and potentially increase the risk of a financial market crash (Morck, Yeung, and Yu 2000; Jin and Myers 2006).

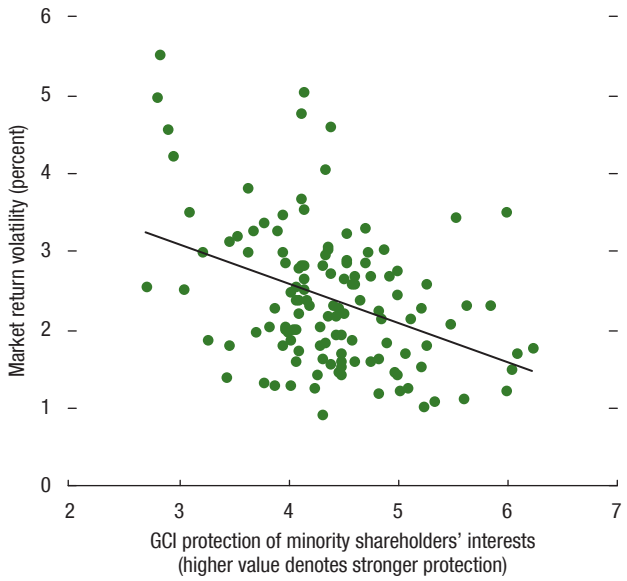
- In contrast, it has been argued that by safeguarding investor rights, better corporate governance helps promote deeper and more liquid capital markets, thereby bolstering financial systems' resilience to external shocks (see Chapter 2 of the April 2014 and October 2015 issues of the *Global Financial Stability Report* [GFSR]).

This interplay of corporate governance with exposure to global financial conditions is of particular relevance for emerging market economies. In general, corporate governance issues are also of great importance for advanced economies. For example, citing the role of banks at the outset of the global financial crisis, Chapter 3 of the October 2014 GFSR examined the relationship between the corporate governance of banks and their risk-taking behavior, mainly in advanced economies. In contrast, this chapter assesses governance aspects of particular importance to emerging market economies and their relationship to these countries' exposure to external financial shocks. In particular, given emerging market economies' relatively weaker institutions, their lower degree of financial market development, and their greater sensitivity to global financial conditions, the link between corporate governance and financial stability is of special relevance for them. Overall, however, empirical evidence on the relationship between corporate governance, investor protection, and financial stability is scarce.

Deficiencies in corporate governance and investor protection may play a role in elevating corporate fragility, but few studies have examined these connections. The quality of corporate governance influences not only the access to and the composition of financing, but also firms' cost of capital, solvency, profitability, and valuations.[1] Outside investors may be willing to provide financing to weakly governed companies only at short maturities or high rates. High short-term debt associated with weaker governance frameworks could compromise financial stability, especially if it is pervasive throughout the corporate sector. Overall, corporate governance and investor protection may affect corporate vulnerabilities in more complex and potentially ambiguous ways. Surprisingly, there is scarce empirical research on the links between corporate governance and financial stability—either at the country[2] or at the firm level[3]—that

Figure 3.2. Corporate Governance and Volatility of Stock Market Returns in Emerging Market Economies
(Market return volatility against minority shareholder protection)

Countries with weaker corporate governance frameworks tend to have more volatile stock returns.



Sources: Bloomberg L.P.; Thomson Reuters Datastream; World Economic Forum, Global Competitiveness Indicators (GCI) database; and IMF staff calculations.
Note: Other corporate governance indices yield a similar picture. Market return volatility is the standard deviation of weekly returns. Sample includes annual observations for 18 emerging market economies between 2010 and 2014 (country-year observations).

[1]See, for example, Gompers, Ishii, and Metrick 2003; Aggarwal and others 2009; and Chen, Chen, and Wei 2009.

[2]At the country level, most of the literature emphasizes the importance of a robust legal framework for strong capital market development and ultimately economic growth (La Porta and others 1997, 1998; Djankov and others 2008b). Gelos and Wei (2005) show that during turbulent times, mutual funds tend to flee to a greater degree from less transparent countries (including those with more opaque corporate sectors).

[3]At the firm level, most of the evidence pertains to advanced economies and explores the link between corporate governance and valuation. Firm-level evidence for emerging markets is fragmented, in part because most studies have focused on individual countries, reflecting the scarcity of comparable cross-country micro panel data on corporate governance. Many studies consider a few countries at most (for a survey, see Claessens and Yurtoglu 2013) or cover only a particular year (see, for example, Klapper and Love 2004).

is comprehensive and includes a broad set of emerging market economies. Likewise, studies on the link between firm-level governance and corporate capital structure, solvency, and crash risk are rare.[4]

This chapter attempts to fill these gaps by addressing the following questions:

- How has corporate governance evolved in emerging market economies, sectors, and nonfinancial firms over the past two decades?
- Are emerging market economies with better corporate governance frameworks less exposed to global financial shocks?
- What is the role of corporate governance and investor protection in reducing corporate fragility? For example, is poor governance associated with higher short-term debt ratios? Is there evidence that better legal frameworks and institutions mitigate the adverse consequences of weaker corporate governance?

To address these questions, the chapter explores the links between corporate governance and key firm- and country-level dimensions of financial stability. First, it develops new firm-level indices of governance in emerging market economies. It then uses these firm-level indices as well as country-level information on governance, combined with other data, to pursue novel empirical approaches. The analysis focuses on dimensions of corporate governance that are of particular relevance for the nonfinancial corporate sector across emerging market economies. The new firm-level index is mainly designed to enable comparisons across firms, and the chapter does not present its country-level averages. For the country-level measures of governance, the analysis relies on data from other institutions. The results are broadly robust to the use of alternative country-level indices of corporate governance, and the overall conclusions do not rely heavily on any single country-level corporate governance index.

The main results of the chapter are as follows:

- Corporate governance in emerging market economies has broadly improved over the past two decades, but large differences across these economies remain, and there is considerable scope for progress.
- Emerging market economies with stronger corporate governance and investor protection frameworks tend to be more resilient to global financial shocks. Improving corporate governance and investor protection help develop deeper and more liquid financial markets, thereby fostering financial stability.
- Moreover, equity prices in firms with governance deficiencies tend to move in tandem, are more sensitive to external financial shocks, and are more susceptible to crash risk. For example, moving from the lower to the upper end of the country- and firm-level governance indices reduces the impact of global shocks by about 20 percent for emerging market economies and 50 percent for emerging market firms on average. Overall, the economic importance of these effects is considerable in terms of increasing the resilience of emerging markets to shocks.
- Better corporate governance and investor protections are associated with stronger corporate balance sheets. These features are linked to lower short-term debt ratios, lower default probabilities, and the ability to borrow at longer maturities.
- In line with these results, firms and countries characterized by weaker corporate governance have been hit harder during recent periods of financial market turbulence.
- The results are generally robust to a variety of methods designed to isolate the effect of corporate governance vis-à-vis other factors and to help establish causality.

In sum, improvements in corporate governance and investor protection across emerging market economies have helped bolster the resilience of their financial systems. Such improvements are analogous to macroprudential policies in the sense that they help enhance the resilience of financial systems. They help reduce the amplitude of asset price swings and the probability of market crashes. This implies that reform efforts should continue on both fronts. Some common elements of good corporate governance are described in the Principles of Corporate Governance issued by the Group of Twenty (G20) and the Organisation for Economic Co-operation and Development (OECD). Guided by the empirical results and these broad principles, this chapter makes the following policy recommendations:

- Countries should continue to strengthen legal, regulatory, and institutional frameworks to promote the

[4]The closest study is by Faccio, Lang, and Young (2010), who focus more on the link between corporate control and leverage for a handful of advanced and emerging market economies in east Asia and western Europe. Chen, Chen, and Wei (2009) look into the cost of capital, using data from 2001.

effectiveness and enforceability of corporate governance regimes.
- Most emerging market economies should continue to bolster the rights of outside investors, in particular minority shareholders.
- Many emerging market economies should bring disclosure requirements fully in line with best international practice.
- Greater board independence could also bring benefits.

Nexus between Corporate Governance, Investor Protection, and Financial Stability

After defining corporate governance and investor protection, this conceptual section discusses the potential links with financial stability and reviews the drivers of corporate governance reform.

Corporate governance and investor protection have some elements in common. Country-level definitions of corporate governance typically center on regulations, such as listing requirements, that govern equity investments in publicly listed firms. Firm-level or internal governance mechanisms are those that operate within the firm and deal with the role of the board and its structure, managers' compensation, and the firm's disclosure policy, as well as the specific rights of shareholders. Investor protection is a more general notion and pertains to how outside investors—minority shareholders and creditors—are protected against expropriation of their assets by insiders (controlling shareholders, management), how well all investors are protected against expropriation from the state, and how their rights are enforced in practice.[5] Corporate governance and investor protection deal with ways in which suppliers of finance to corporations (shareholders, creditors) assure themselves of getting a return on their investment (Shleifer and Vishny 1997). Corporate governance and investor protection are part of, and their effectiveness is partly determined by, the larger institutional setting in which firms operate, including the quality of public policy and the strength of the judicial system.

[5]Government leaders can use the power of the state to expropriate investors by actions ranging from outright confiscation to regulations that favor their constituencies and include redistributive taxes (Stulz 2005).

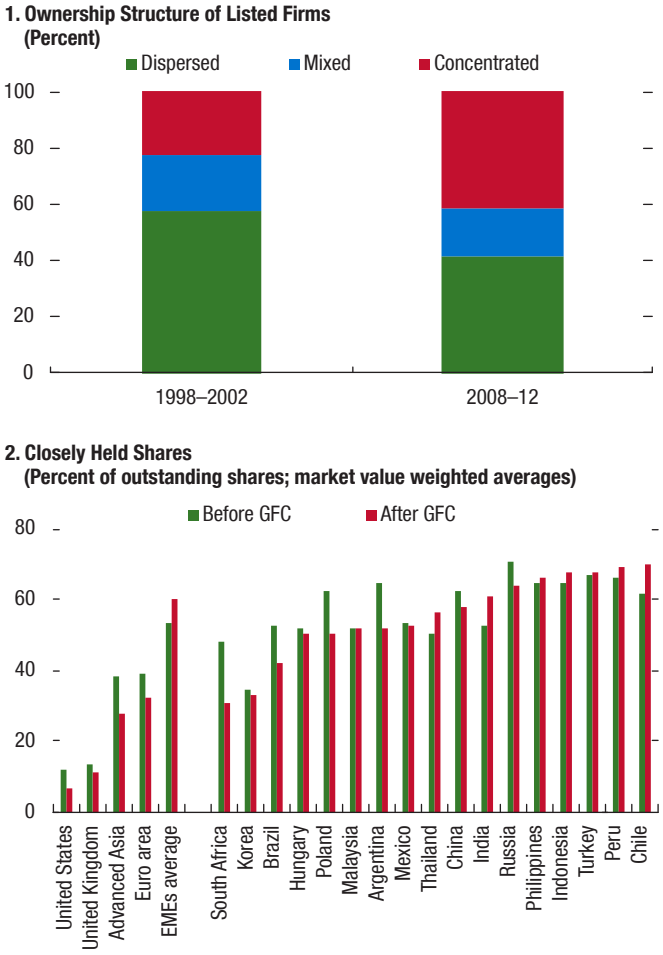
In advanced economies, the traditional focus of corporate governance has been on potential conflicts of interest between shareholders and managers. Difficulty in monitoring management's actions heightens the risk of managers not always acting in the best interest of shareholders (Jensen and Meckling 1976; Shleifer and Vishny 1989). The two typical concerns in the literature are that, from the shareholder's perspective, managers may take on too little risk (forgoing profitable investment opportunities), or they may overinvest in less profitable business lines (engaging in empire building to increase managers' power).

Aligning the interests of managers and majority shareholders does not, however, necessarily protect the interests of creditors, outsider shareholders, or even society at large. Shareholders have limited liability, which means that they are shielded from losses suffered by creditors on debt-financed investment projects; however, they receive all the gains from increased company value when such projects are successful. Thus, shareholders and managers have an incentive to engage in shifting risk toward the firm's creditors by using creditors' money to gamble on risky projects. This problem is worsened in the presence of explicit or implicit government guarantees on the debt (for example, too-big-to-fail issues), particularly if debt markets do not work well and fail to exert a disciplining role. Similarly, if governance mechanisms are weak, controlling shareholders can expropriate minority shareholders in a variety of ways, such as by transferring profits to other companies controlled by majority shareholders (Claessens and others 1999).

Moreover, the relative importance of corporate governance challenges in emerging market economies differs from that in advanced economies.
- The rules, regulations, and laws governing creditor and shareholder rights are only as good as their enforcement. Hence, the tendency for judicial systems to be weaker in emerging markets is the focus of much concern in this context (La Porta and others 1997, 1998).
- The predominance of controlling shareholders is another distinctive aspect of emerging market economies, where large corporations very often have controlling owners, typically wealthy families (Morck, Wolfenzon, and Yeung 2005). Between 2002 and 2012, the average share of global market capitalization nearly doubled, from 22 percent to 41

Figure 3.3. Ownership Structure and Closely Held Shares

The share of countries with concentrated ownership and firms with closely held shares has risen.



Sources: Organisation for Economic Co-operation and Development, Corporate Governance Factbook (2015; panel 1); Thomson Reuters Datastream (panel 2); and IMF staff calculations.

Note: Shares of market capitalization of country groups with different ownership structures are shown in panel 1. Economies included in the dispersed ownership category are Australia, the United Kingdom, and the United States. Economies included in the mixed ownership category are Canada, Germany, Japan, the Netherlands, and Switzerland. Other economies included in the concentrated ownership category are selected major emerging market economies. Closely held shares = shares held by insiders (for example, officers, directors and their immediate families, individuals with more than 5 percent of the outstanding shares) or held by other companies, except those held in a fiduciary capacity; EMEs = emerging market economies; GFC = global financial crisis.

percent, for countries where controlling shareholders are the norm (Figure 3.3, panel 1).

- Moreover, in emerging market economies, where business groups often dominate the corporate sector, control is reinforced through mechanisms such as cross-shareholdings, multiple classes of shares with different voting rights, and pyramidal ownership structures (Oman, Fries, and Buiter 2003).[6] The proportion of closely held shares (which encompass cross-shareholdings) is substantially higher in emerging market economies (Figure 3.3, panel 2).[7] This suggests that the protection of minority shareholder rights matters even more in these countries.[8]

Corporate governance codes can help mitigate these problems. Indeed, the purpose of corporate governance

[6]A pyramid exists when one firm at the top holds a dominant equity share in and thereby controls one or more other firms, each of which in turn has a dominant equity share in additional firms (and so on). Corporate insiders who control the firm at the top of the pyramid (often a holding company) can thus control entire groups of firms (and massive corporate assets) with very little direct equity ownership in the firms lower down the pyramid.

[7]State-owned enterprises (SOEs) are common in emerging market economies and face distinct governance challenges (Box 3.2). The OECD (2015) sets out internationally agreed standards aimed at making SOEs operate with similar levels of efficiency, transparency, and accountability as private enterprises adhering to good practices, as well as ensuring that their competition with private companies takes place on a level playing field. Although a thorough investigation of SOEs is beyond the scope of this chapter (in part because of data limitations), many empirical exercises take them into account either by including an SOE indicator variable (reported when relevant) or via firm fixed effects terms (which capture time-invariant firm-specific factors).

[8]Put differently, the corporate landscape and prevailing ownership structures affect the nature of the agency problems between managers and outside shareholders, and among shareholders. When ownership is diffuse, as is typical in the United States and in the United Kingdom, key agency problems largely stem from the conflicts of interest between outside shareholders and managers. In these settings, providing management with proper incentives to act in the interest of outside shareholders is typically key. In contrast, when ownership is concentrated, it is much easier for the controlling owner to closely monitor management. Instead, the main conflicts of interest there arise between controlling shareholders and minority shareholders (and other outside investors), highlighting the importance of safeguarding minority investor rights. The protection of minority shareholders' interests covers various aspects to minimize expropriation by corporate insiders such as (1) access to internal corporate documents or immediate and periodic disclosure of related-party transactions, (2) shareholders' ability to sue and hold interested directors liable (for prejudicial related-party transactions) and available legal remedies (such as fines and imprisonment), and (3) governance safeguards protecting shareholders from undue board control and entrenchment as well as shareholders' rights and role in major corporate decisions. See Djankov and others 2008b for further details.

includes the maximization of firms' efficiency and profitability by motivating corporate insiders to act in the interest of all investors and limiting abuse of their power over corporate resources. Traditionally, governance mechanisms attempt to align managerial incentives with the interests of the shareholders through the use of bonuses and stock options. A board of directors responsible for monitoring managerial behavior can also exert control on behalf of shareholders.[9] For emerging market economies, key measures include limits on the use of devices such as shares with different voting rights, cross-shareholdings, and pyramidal corporate ownership structures, as well as high disclosure requirements and accounting standards, and their enforcement.

How Can Corporate Governance and Investor Protection Affect Financial Stability?

Improvements in corporate governance and investor protection can promote the development of larger and more liquid capital markets and thereby strengthen the resilience of the financial system. For example, by lowering expropriation risk and increasing transparency, better corporate governance can reassure investors and contribute to the development of stock markets (Djankov and others 2008b), and improvements in debt enforcement can help develop bond markets (Djankov and others 2008a). Similarly, better corporate governance and investor protection, by reducing information asymmetries, should encourage trading activity and lower search costs and thereby improve market liquidity. Larger and more liquid markets, in turn, have been shown to improve emerging markets' resilience to global financial shocks (see Chapter 2 of the April 2014 GFSR).

Corporate transparency can affect financial volatility:

- At the firm level, bad corporate governance practices, including opaque disclosure regimes, make it costlier for outside investors to acquire information about individual stocks. For instance, in an attempt to conceal expropriation, insiders can manipulate earnings statements, thereby discouraging informed trading, hindering price discovery, and reducing market efficiency. Under these circumstances, because stock prices do not fully reflect firm fundamentals, they are likely to become more synchronized with market-wide fluctuations. Moreover, firm-specific shocks may have systemic implications because they can result in contagion to the rest of the market.[10]
- When global financial conditions are favorable, investors may be more prone to take on unknown risks and therefore more likely to channel funds into asset classes whose characteristics are more opaque (Brandão-Marques, Gelos, and Melgar 2013). During periods of elevated financial stress, however, these investors face more scrutiny and tend to reduce exposures to those assets. As a result, opaque markets may be more prone to boom-bust cycles.[11]

Corporate governance and investor protection deficiencies may also play a role in encouraging excessive leverage and tilting financing toward shorter-term debt, with implications for overall financial stability.

- The link between corporate governance and capital structure (for example, leverage) is ambiguous, owing to various confounding effects, as pointed out in the literature (for instance, Berger, Ofek, and Yermack 1997; John and Senbet 1998; John and Litov 2008). The presence of controlling shareholders in emerging market economies, for example, introduces a bias toward debt. These shareholders do not want to dilute their control through equity issuance, but since demand for the company's debt is also likely to be low (for fear of risk shifting), the ultimate outcome is unclear. Similarly, related lending across firms within the same company group may increase the share of debt financing (La Porta, Lopez-de-Silanes, and Zamarripa 2003).[12]
- Theoretical predictions regarding the composition of debt are more clear cut. Specifically, inefficient judicial systems or shortcomings in insolvency regimes may hinder the timely recovery of assets, including collateral, after liquidation. Therefore, creditors may prefer short-term debt that gives them a choice between rolling it over and getting out if necessary

[9]Investor activism, takeovers, and leveraged buyouts are other mechanisms that also keep a tight rein on management, but are more relevant in the context of some advanced economies. See Tirole 2006 for further details.

[10]Albuquerque and Wang (2008) develop a theoretical model predicting that countries with weaker investor protection display higher stock return volatility. Morck, Yeung, and Yu (2000) and Jin and Myers (2006) find that stock returns move closely with the market in countries with weak investor protection and opaque corporate disclosure regimes. Shleifer and Vishny (1997) show that reduced informed trading can aggravate the effect of negative shocks on prices.

[11]On the other hand, increasing disclosure and corporate transparency lowers implicit market barriers, potentially inducing higher comovement of emerging and advanced markets.

[12]Related lending is an example of a related-party transaction.

(Tirole 2006), which makes recipient countries more vulnerable.[13] Likewise, short-term debt may be preferred because predatory actions by the state can lead to bankruptcy, making such actions costlier for political leaders (Stulz 2005).

Drivers of Corporate Governance Reform

An important force working in favor of governance reform is the growing role of institutional investors as suppliers of external funding amidst greater financial globalization. Both international and domestic institutional investors (for example, local pension funds) are moving the process of reform forward. Regarding the former, Aggarwal and others (2011) find that foreign institutional investors based in countries with better minority shareholder rights promote firm-level governance improvements in countries outside the United States. Likewise, with a focus on advanced economies, Albuquerque and others (2013) report that cross-border mergers and acquisitions are associated with improvements in governance and valuation of the target firms.

Similarly, the growing demand for external financing by emerging market firms is also promoting better corporate governance. Firms can issue bonds or list abroad (cross-listing), which subjects them to higher corporate governance and disclosure standards. However, companies with access to international capital markets are more likely to obtain financing at more favorable terms, so they are more motivated to adopt better governance practices. Firms that adopted International Accounting Standards—which are well known and reliable—have been able not only to attract a large pool of investors, but also to lower their costs of capital (Chan, Covrig, and Ng 2009). Likewise, firms can adapt to weaker institutional environments by adopting voluntary corporate governance measures, such as hiring more reputable auditors.

Despite the overall benefits, countries and firms do not always reform their corporate governance frameworks. This is partly because reforms are multifaceted and require a combination of legal, regulatory, and market measures, which are challenging to implement. A more important reason, however, lies in the value of rents political and other insiders extract under the status quo. For example, Claessens, Feijen, and Laeven (2008) show that stocks of emerging market firms that contributed to (subsequently elected) political candidates had higher returns after elections and that these firms were later able to access bank financing more readily. Likewise, the reluctance of entrenched insiders to reform is due largely to the rents they would forfeit. For instance, controlling shareholders who reap more private benefits from control are more reluctant to cross-list their firms on a U.S. exchange (Doidge, Karolyi, and Stulz 2004). This suggests that wealth structures may need to change to bring about significant corporate governance reform, especially in emerging market economies where wealth is particularly concentrated. Lastly, corporate governance has aspects of a public good to the extent that externalities are involved; for example, individual firms will not internalize any benefits enhanced governance may have for economy-wide financial stability.

In response to such challenges to reform, the OECD has developed the Principles of Corporate Governance. These Principles serve as globally recognized benchmarks for assessing and improving corporate governance. The Principles have been adopted as one of the Financial Stability Board's key standards for sound financial systems.

The Evolving Nature of Corporate Governance and Investor Protection

This section documents a general improvement in corporate governance and investor protection frameworks over the past two decades in many emerging market economies, as confirmed by both country- and firm-level indicators.

Over the past two decades, many emerging market economies have reformed parts of their corporate governance systems (Box 3.1).[14] In some cases, major changes occurred in the aftermath of crises, including an overhaul of capital market laws (Black and others 2001). Specific initiatives include the formation of audit committees, requiring a minimum number of independent directors (thereby strengthening the role of the board), and certification of financial statements and internal controls by the chief executive officer/chief financial officer, as well as the introduction of mandatory cumulative voting in director elections, which further empowers shareholders (Claessens and Yurtoglu 2013).[15]

[13]Likewise, because short-term debt comes up for frequent renewal, it can be a powerful instrument to monitor and discipline management (an idea related to Jensen 1986). In fact, Anginer and others (2015) find that corporate governance reforms that strengthen shareholder rights are associated with lower short-term debt ratios.

[14]These trends are in line with those found by De Nicolo, Laeven, and Ueda (2008).

[15]Cumulative voting is a type of voting system that helps strengthen the ability of minority shareholders to elect a director. This method

Reflecting these reform efforts, corporate governance improvements have been broad based across emerging market economies. Despite these achievements, however, on average, emerging market economies still have scope to improve (Figures 3.4 and 3.5). These trends are based on various measures of minority shareholder protection and corporate transparency. A few additional points are noteworthy. First, there is quite a bit of heterogeneity across emerging market economies. Several have corporate governance scores higher than those in advanced economies. Second, corporate governance is difficult to quantify, and despite efforts to reflect the views of survey respondents and experts, the various measures are accompanied by margins of error. Nonetheless, these series still permit meaningful comparisons across countries and over time.[16]

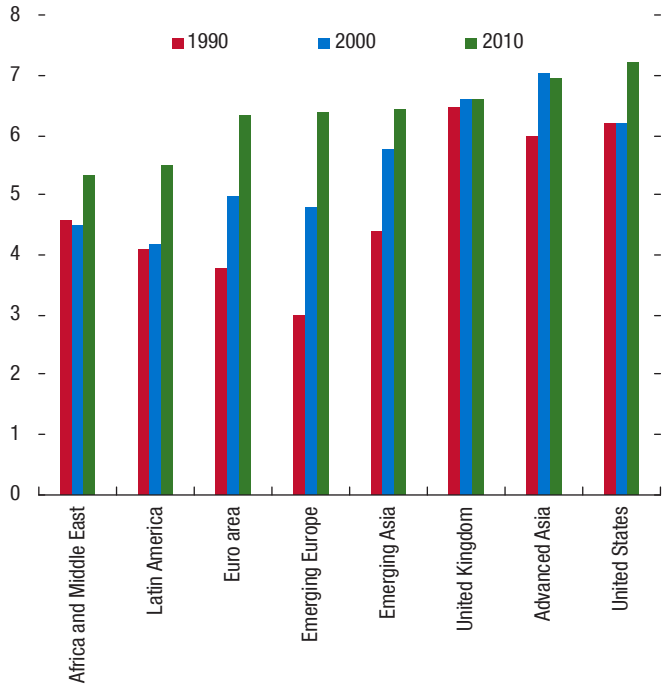
When it comes to measures of legal frameworks and enforcement, the developments are more mixed (Figure 3.5). Again, the heterogeneity in rankings across emerging market economies is noteworthy. Although some emerging market economies score well with regard to corporate governance, they rank lower in terms of property rights and the efficiency of their legal frameworks.

A New Firm-Level Corporate Governance Index for Emerging Market Economies

This chapter develops new firm-level indices of governance for a panel of emerging market economies. An index is constructed using firm-specific governance attributes sourced from the ASSET4 database.[17] These 71 attributes cover various aspects, including board structure and composition, compensation and disclosure policies, and shareholder rights, and are chosen to reflect the main governance challenges confronting emerging market firms.[18] The attributes are split into three subcategories to construct subindices focusing on the role of the board,

Figure 3.4. Minority Shareholder Protection
(Index, higher value denotes stronger protection)

Corporate governance has improved appreciably in emerging market economies in the past two decades.



Sources: Guillén and Capron 2016; and IMF staff calculations.
Note: Africa and Middle East sample includes Egypt, Jordan, Lebanon, Nigeria, Oman, South Africa, and the United Arab Emirates. Latin America includes Argentina, Brazil, Chile, Colombia, Costa Rica, El Salvador, Guatemala, Mexico, Peru, and Venezuela. Emerging Asia includes China, India, Indonesia, Korea, Malaysia, Philippines, Thailand, and Vietnam. Euro area sample includes founding members except Ireland owing to data limitations. Emerging Europe includes Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Slovenia, and Turkey. Advanced Asia includes Australia, Hong Kong SAR, Japan, New Zealand, and Singapore.

allows shareholders to cast all of their votes for a single nominee for the board of directors when the company has multiple openings on its board.

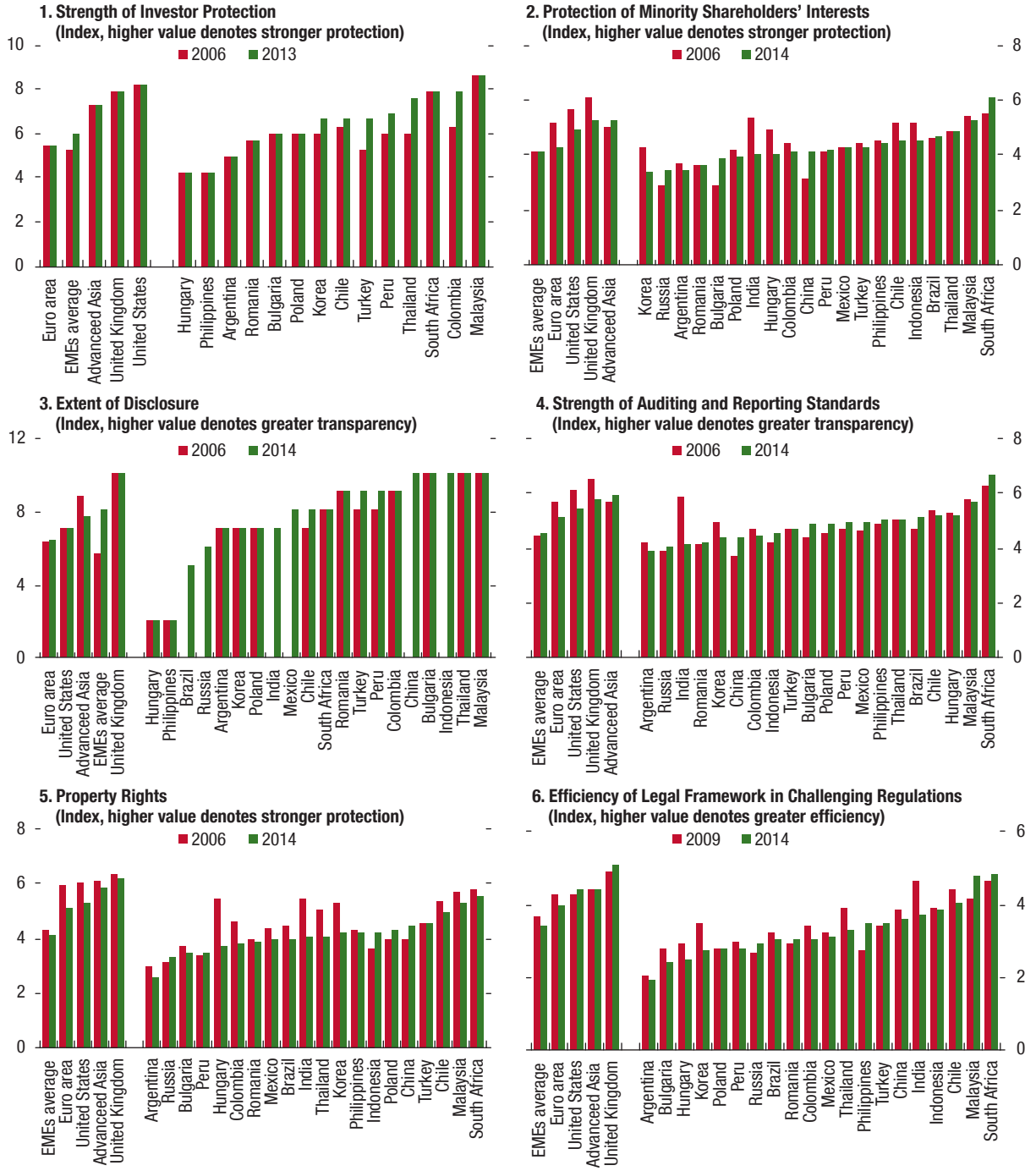
[16]The measures of country-level corporate governance and transparency used in this chapter capture specific aspects of institutional quality that are distinct from mere proxies of economic development. The average correlation between per capita GDP and the credit-to-GDP ratio (measures of economic and financial development) with various country-level measures of minority shareholder protection, corporate transparency, strength of legal institutions, and the rule of law, for example, are 2 percent and 8 percent, respectively, across emerging market economies. The highest correlation is between per capita GDP and the rule of law (54 percent) and is an outlier. Correlations with credit-to-GDP are substantially lower. Likewise, the overall conclusions of the chapter do not rely heavily on any single country-level measure of corporate governance.

[17]Available in the Thomson Reuters Datastream database.

[18]Examples of specific attributes used include the percentage of independent board members as reported by a company (board subindex); whether the company has a performance-oriented compensation policy (compensation subindex); or whether the company has a policy to apply the one-share, one-vote principle in the context of the shareholder rights index. The index assigns a value of 1 to governance attributes if the firm satisfies a criterion, and 0 otherwise. For comparability with past studies (for example, Gompers, Ishii, and Metrick 2003; Aggarwal and others 2009; Albuquerque and others 2013), the index is additive and is expressed in percent: if a firm hypothetically satisfied all criteria, it would have a score of 100 percent for a particular year. In contrast to other indices (which focus on the United States or other advanced economies), the index developed in this chapter does not emphasize attributes pertaining to antitakeover measures because such issues are less relevant in emerging market economies, given, among other factors, the prevalence of controlling shareholders (Bebchuk and Hamdani 2009).

Figure 3.5. Country-Level Corporate Governance and Investor Protection

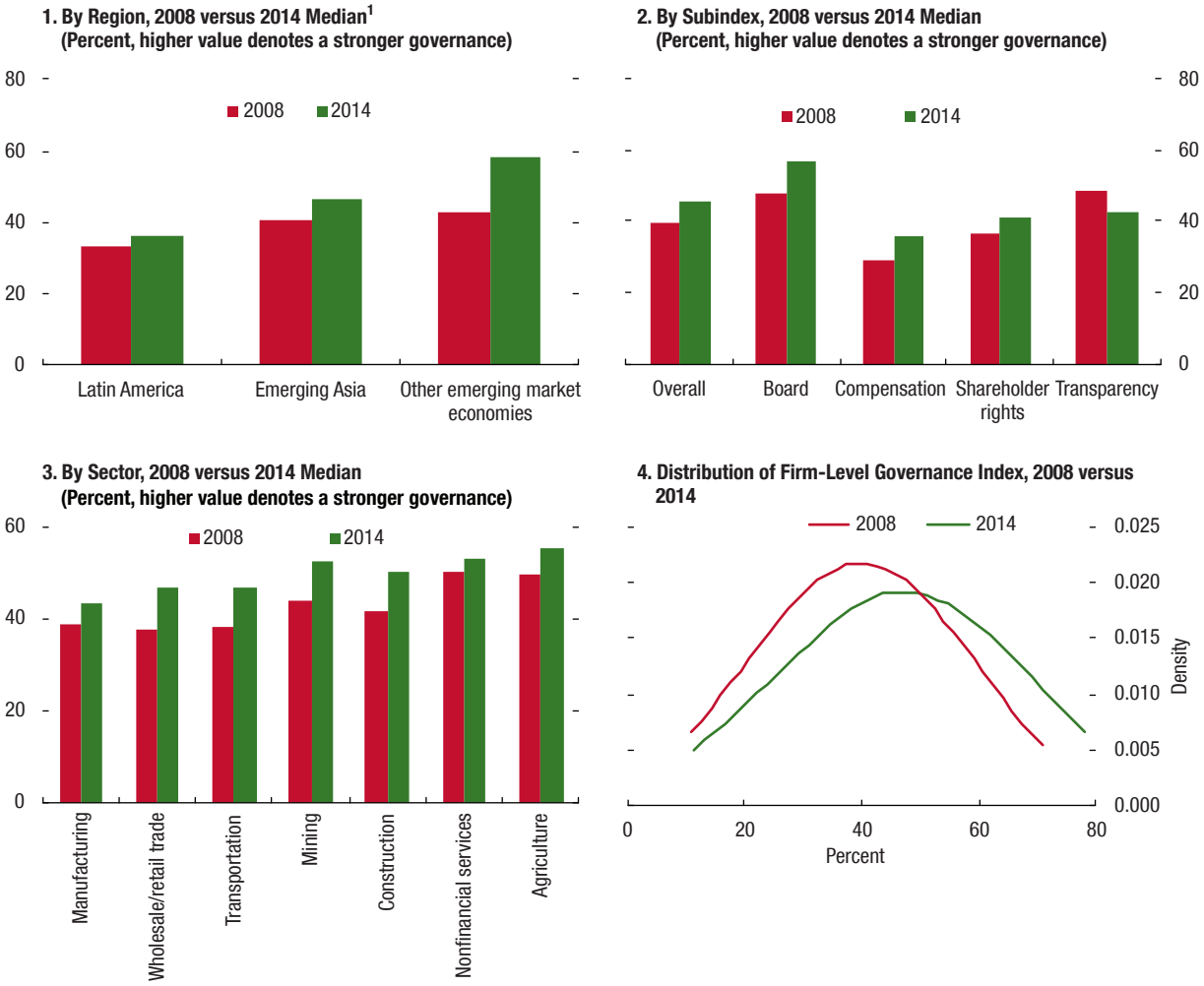
In emerging market economies, corporate governance and investor protection have generally improved.



Sources: World Bank, Doing Business database (panels 1 and 3); World Economic Forum, Global Competitiveness Indicators database (panels 2, 4, 5, and 6); and IMF staff calculations.
Note: The observations for the United States in panels 1 and 3 are based on indices for New York City, due to data limitations. EMEs = emerging market economies.

Figure 3.6. Emerging Market Firm-Level Governance Index

Corporate governance has generally improved across emerging market economies, sectors, and firms, based on a new firm-level governance index for emerging market economies.



Sources: Thomson Reuters Datastream; and IMF staff calculations.
Note: A higher value of the firm-level governance index denotes better governance. Panels 1, 2, and 3 are based on the median firm-level governance index in countries with more than 15 firms.
[1]Latin America includes Brazil, Chile, and Mexico. Emerging Asia includes China, India, Indonesia, Korea, Malaysia, and Thailand. Other emerging market economies include Poland, Russia, South Africa, and Turkey.

compensation practices, and the rights of shareholders. A transparency subindex is also developed, using various attributes across these subcategories. The overall firm-specific index combines these elements and reveals detailed insights into corporate governance patterns for a sample of well over 600 listed nonfinancial firms across 25 emerging market economies (comprising an unbalanced panel of well over 3,000 observations from 2008 to 2014).

In line with country-level trends, governance across emerging market firms has generally improved in recent years (Figure 3.6). This improvement is seen across all major sectors and for the subindices, with the exception of the transparency subindex, which shows a decline. Again, some qualification is in order. First, although the distribution of governance scores improves on average (as indicated by the rightward shift), there is notable variation in governance across

Table 3.1. Firm-Level Governance and Firm Characteristics

	ADR[1]	Other		SOE[2]	Other	
Governance Overall Index	49.8	45.1	*	45.3	46.8	
Board	61.3	56.4	*	58.7	58.7	
Compensation	41.9	34.1	*	32.6	35.8	
Shareholder Rights	43.3	40.6	*	39.8	41.8	*
Transparency	45.0	42.6		42.1	43.4	

	Closely Held Shares[3]	Other		Low Financial Dependence[4]	High Financial Dependence[4]	
Governance Overall Index	42.2	48.4	*	42.5	47.2	*
Board	52.2	60.5	*	53.1	58.1	*
Compensation	30.8	38.6	*	32.6	40.3	*
Shareholder Rights	39.2	42.4	*	37.8	40.5	*
Transparency	37.3	46.4	*	43.0	51.5	*

Sources: Bloomberg L.P.; Thomson Reuters Datastream; and IMF staff calculations.

Note: Asterisk denotes a statistically significant difference of at least 10 percent.

[1] ADR = American depository receipts.

[2] SOE = state-owned enterprises.

[3] Firms with above 10 percent closely held shares.

[4] High (low) financially dependent firms are in the top (bottom) quartile of the index developed by Rajan and Zingales (1998).

firms in general, but also within countries. Second, because of lack of data, the firm-level governance index does not cover all listed firms in a country.[19] Therefore, sample selection may be an issue for some countries—but the index is nevertheless comparable across firms, which is how it is primarily used in this chapter. At the same time, although some emerging market economies have high-quality institutions in general, specific aspects of their corporate governance frameworks may compare less favorably.

Better-governed firms appear to share some characteristics. Emerging market equities that trade on U.S. stock exchanges through American depository receipts (ADRs) tend to have higher firm-level governance scores (Table 3.1).[20] This may reflect the fact that listing in the United States reduces the extent to which controlling shareholders can engage in expropriation (Doidge, Karolyi, and Stulz 2004); at the same time, better-governed firms may find it easier to issue ADRs. Likewise, firms that are more dependent on external financing also appear better governed.[21] Taken together, interactions with foreign investors from advanced economies with stronger shareholder protection seem to play a role in promoting governance improvements in emerging market economies (Aggarwal and others 2011; Albuquerque and others 2013). In general, firms with a significant fraction of closely held shares and state-owned enterprises (SOEs) tend to have lower governance scores (Box 3.2).[22]

In line with the literature, governance as measured by this new index is positively associated with valuation. Firms with higher governance scores tend to have higher valuations (Figure 3.7). This finding is corroborated when country-level measures of corporate governance are used. Furthermore, formal regression analysis indicates that a higher score in the overall index, or in three of the subindices (board, compensation, transparency), results in higher firm-level valuations (Figure 3.8).[23]

[19]Regarding the representativeness of the firm-level governance index, the median stock market capitalization of the listed nonfinancial emerging market firms in the sample is close to 60 percent of their respective country's (nonfinancial) stock market capitalization.

[20]An American depositary receipt (ADR) is a negotiable certificate issued by a U.S. bank representing a specified number of shares in a foreign stock traded on a U.S. exchange.

[21]Dependence on external finance is measured by the index developed by Rajan and Zingales (1998).

[22]Figure 3.3 shows that closely held shares increase in the period following the global financial crisis relative to before the crisis, whereas Figure 3.6 illustrates an improvement in firm-level governance after the global financial crisis.

[23]Tobin's Q (market-to-book assets ratio) and sector-adjusted Q are both considered. Results are robust to a variety of specifications (including instrumental variables approaches), fixed effects, and error clustering.

These results are quite robust and consistent with the literature, underscoring the utility of the index.[24]

Corporate Governance, Investor Protection, and Financial Stability

This section presents evidence suggesting that emerging market economies with stronger corporate governance and investor protection frameworks tend to have stronger corporate balance sheets and show greater resilience to global financial shocks.

Corporate Governance, Investor Protection, and Financial Resilience

Corporate Governance and Capital Market Development

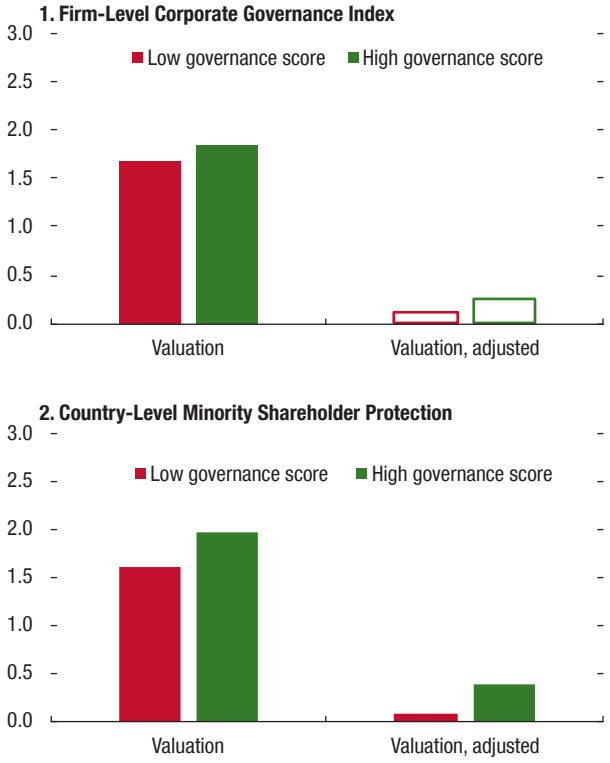
Evidence suggests that stronger corporate governance and investor protection frameworks foster resilience to external shocks by promoting the development of capital markets. Previous research has shown that differences in legal protection of investors across countries shape investor confidence in markets and consequently financial market development.[25] Updated econometric evidence based on a large set of countries reaffirms these findings, underscoring the role sound corporate governance and transparency can play in fostering the development of stock and bond markets (Table 3.2).[26] For example, the results show a robust positive statistical relationship between corporate governance and stock market capitalization. Greater market development, in turn, is associated with greater resilience to shocks (see Chapter 2 of the April 2014 GFSR).

Corporate Governance and Market Liquidity

Better corporate governance helps improve market liquidity, and thus its resilience. By reducing the potential for information asymmetries between corporate insiders and outside investors (which insiders may use to their advantage), better corporate governance and investor protection should encourage trading and thereby improve market liquidity. Regression analysis based on a set of emerging market economies indicates that improving the protection of minority shareholders is indeed associated with higher stock market liquidity (Figure 3.9).[27] An emerging market economy can raise

Figure 3.7. Corporate Governance and Firm-Level Valuation
(Ratio; average)

Firms with stronger corporate governance frameworks tend to have higher valuations.



Sources: Thomson Reuters Datastream; World Economic Forum, Global Competitiveness Indicators database; and IMF staff calculations.
Note: Results are robust to other country-level governance measures such as strength of investor protection. High (low) governance score denotes top (bottom) quartile and tertile of the firm- and country-level governance measures, respectively. Firm-level governance and protection of minority shareholders' interests indices are used. Bars with a solid fill denote a statistically significant difference at least at the 10 percent level. Valuation = Tobin's Q (market-to-book assets ratio); valuation, adjusted = Tobin's Q in excess of firm's sector median.

[24]The average governance of other firms in the same industry and country is used as an instrument (see Aggarwal and others 2009) in the instrumental variables (IV) regressions (where weak exogeneity tests confirm the usefulness of the instrument). The larger size of the IV may reflect that higher (future) growth prospects (as measured by Q) imply more resources to be expropriated, thus suppressing good governance.

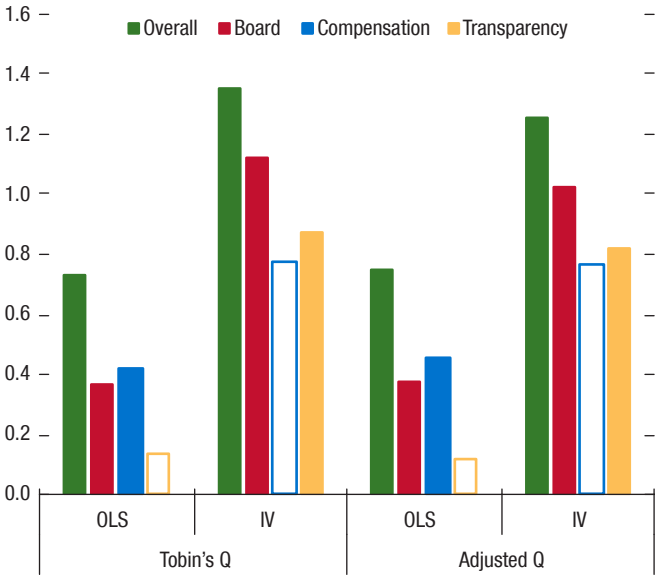
[25]See, for example, Shleifer and Vishny 1997 and La Porta and others 1998.

[26]Specifically, the chapter combines approaches as in, for example, Djankov and others 2008b and Beck, Demirgüç-Kunt, and Levine 2010, in which indicators of market depth and development are linked to measures of corporate governance and corporate transparency.

[27]This section extends Brandão-Marques (forthcoming), which uses a panel of 23 emerging market economies during 2003–14. The (inverse) Amihud 2002 measure of market liquidity (a proxy for the price impact of a trade) is regressed against a measure of minority shareholder protection, as well as against other controls (such as volatility, market depth, macroeconomic and overall institutional environment, and global investor risk appetite).

Figure 3.8. Firm-Level Governance and Valuation
(Percentage points)

Better firm-level governance is associated with higher corporate valuations.



Sources: Thomson Reuters Datastream; and IMF staff calculations.
Note: The figure depicts the sensitivity of Tobin's Q to firm-level governance. The empirical analysis also controls for macroeconomic factors (IV) and country-time fixed effects. Solid bars denote statistical significance at least at 10 percent level. See Annex 3.1 for further details. Tobin's Q = firm's market-to-book assets ratio; adjusted Q = Q in excess of the firm's sector median; OLS = pooled ordinary least squares regression; IV = instrumental variables regression (where the instrument is the average governance of other firms in the same sector and country).

market liquidity by about 15 percent on average by moving from the lower to the upper quartile of the minority shareholder protection index. The results are robust to the inclusion of other aspects of institutional quality and market characteristics.

Equity Price Volatility, Comovement, and Crash Risk—What Role for Corporate Governance?

Weaker country-level corporate governance frameworks are associated with less efficient stock markets and more comovement among stocks. The variation in individual stock returns is decomposed into its firm-specific and market-wide components. If the latter component plays a greater role, it indicates that the firm's equity price moves predominantly in tandem with the market.[28] A higher degree of synchronicity of individual stock returns could reflect either that country factors are dominant in investors' minds or that equity prices are driven more by cross-firm contagion and noise trader activity than by changes in firm-level fundamentals.[29] For

[28]The liquidity of stocks may be affected by the degree of price comovement with the market. On the one hand, trading activities based on firm-specific information could raise the liquidity of the stock. On the other hand, greater comovement with the market may be associated with higher liquidity because it reduces the need for market makers to learn about individual stocks (Chan, Hameed, and Kang 2013).

[29]Country-level risk factors should in principle be diversifiable in integrated global financial markets. See Hsin and Liao 2003.

Table 3.2. Corporate Governance, Investor Protection, and Capital Market Development

		Stock Market		Bond Market	
		Capitalization	Total Value Traded	Private Capitalization	Public Capitalization
All Countries[1]	Minority shareholder rights protection	+++	+++	++	+++
	Corporate transparency	+++	+++	++	+++
	Rule of law/property rights	+++	++	++	+++
Major EMEs	Minority shareholder rights protection	+++	+	++	+++
	Corporate transparency	+++		++	+++
	Rule of law/property rights	+++	+	++	+++

Sources: Guillén and Capron 2016; World Bank, Doing Business database, World Governance Indicators database, and Financial Development and Structure database; World Economic Forum, Global Competitiveness Indicators database; and IMF staff calculations.

Note: The table summarizes over 450 regressions whereby measures of corporate governance (minority investor protection), transparency, rule of law, and property rights are linked to indicators of capital market development including stock market capitalization and total value traded as well as private and public bond market capitalization in percent of GDP. One, two, and three plus signs are used to indicate a positive and statistical relationship, robustness to other indicators of, for example, minority shareholder protection, and robustness to endogeneity based on instrumental variables regressions (using legal origin as an instrument). EMEs = emerging market economies.

[1] Includes advanced and emerging market economies.

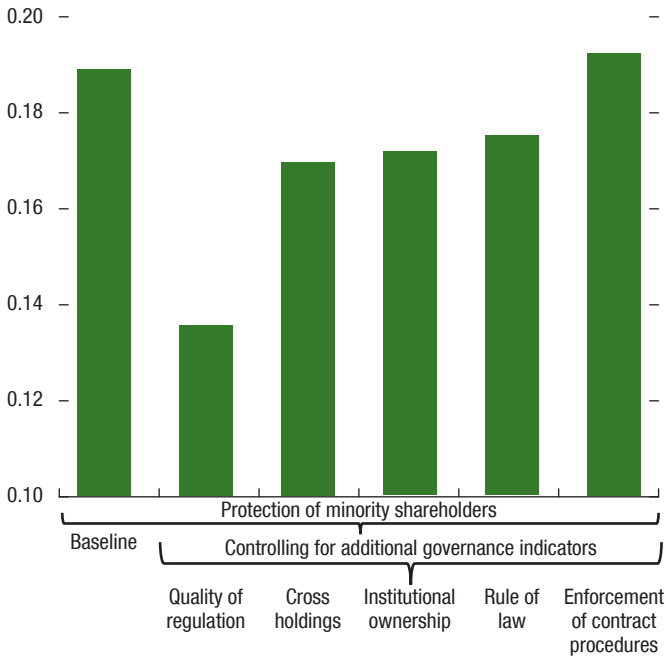
instance, in less transparent markets, insiders can more readily manipulate earnings (possibly to conceal expropriation of outside investors); as a result, price fluctuations say less about firm fundamentals and are thereby more synchronized with the market (Jin and Myers 2006). Indeed, econometric analysis confirms previous findings on the negative relationship between country-level governance scores and stock market comovement (Figure 3.10, panel 1) (Morck, Yeung, and Yu 2000). Likewise, at the firm level, novel econometric evidence reveals that better-governed emerging market firms are less synchronized with the market (Figure 3.10, panel 2).[30] This suggests that equity prices for better-governed and more transparent emerging market firms reflect fundamentals more accurately, helping enhance overall stock market efficiency and resilience.[31]

Reassuringly, the synchronicity of firm stock returns in emerging market economies has been declining over the past 15 years, suggesting improved market efficiency (Figure 3.11). In comparison, stock return synchronicity in advanced economies has stagnated at a lower level, so that the gap between advanced and emerging market economies has been narrowing (Morck, Yeung, and Yu 2013). This may reflect, in part, the fact that corporate governance (including disclosure policies) and investor protection have generally improved across emerging market economies, reaffirming some of the earlier findings.[32]

The empirical analysis also reveals that better governance is associated with lower crash risk in stock returns. If controlling shareholders or managers can keep a portion of a firm's cash flow and hide firm-specific information, it will lead not only to higher comovement with the market but also potentially to higher crash risk. For example, crashes can occur when insiders, who usually conceal information about firm-level fundamentals, are faced with absorbing too much firm-specific bad news and decide to give up, releasing the news (Jin and Myers 2006). At the market level, if investors cannot distinguish well between idiosyncratic and aggregate shocks, the risk that an idiosyncratic shock will spread to the market rises. Regression analysis confirms that emerging market economies and firms with weaker governance are more prone to extreme stock price drops (Figure 3.12). By helping better align price movements with fundamentals, better governance (such as stronger minority shareholder

Figure 3.9. Corporate Governance and Market Liquidity
(Percent)

Better corporate governance helps improve market liquidity.



Sources: Brandão-Marques (forthcoming); FactSet database; IMF, International Financial Statistics database and World Economic Outlook database; Thomson Reuters Datastream; World Economic Forum, Global Competitiveness Indicators (GCI) database; World Bank, Worldwide Governance Indicators database; and IMF staff calculations.
Note: The figure shows the sensitivity of market liquidity to minority shareholder protection (GCI), with and without additional governance controls. The empirical analysis also controls for market capitalization, equity price volatility, GDP growth, inflation, country fixed effects, and country-time trends.

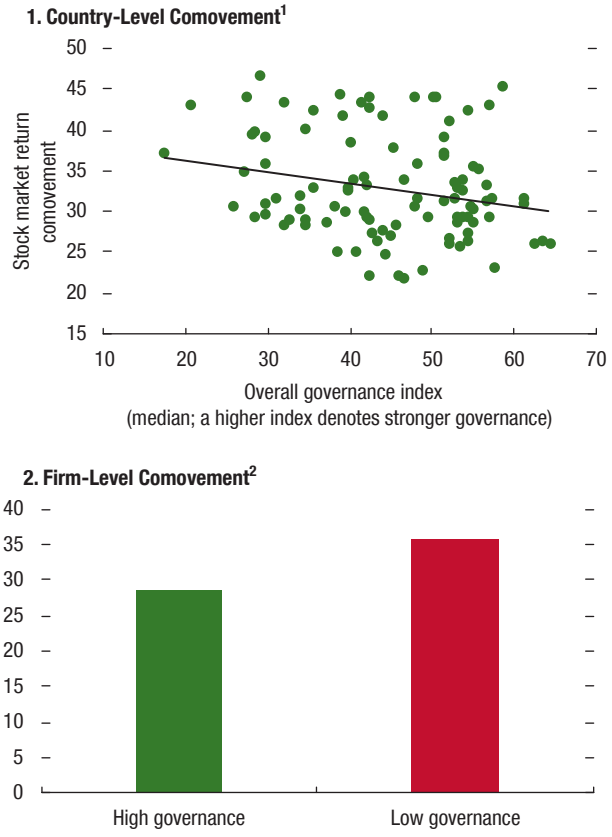
[30]Hutton, Marcus, and Tehranian (2009) find that transparency of financial statements at the firm level lowers synchronization with the market in a sample of U.S. firms. Morck, Yeung, and Yu (2000) and Jin and Myers (2006) find that lower synchronization is associated with higher investor protection and corporate transparency at the country level.

[31]State-owned enterprises appear to be associated with higher synchronization values even after controlling for size, leverage, profitability, and, for example, firm-level governance, which may reflect weak implementation of governance codes. Furthermore, the comovement regressions are robust to the inclusion of country-level governance measures.

[32]While, in principle, other factors may explain the decline in synchronicity, the literature so far has consistently found that corporate governance aspects are its most important determinants; therefore, it is unlikely that the decline is driven by other forces (Hutton, Marcus, and Tehranian 2009; Ferreira and Laux 2007). In particular, the share of each sector in the index has remained relatively constant.

Figure 3.10. Stock Return Comovement
(Percent)

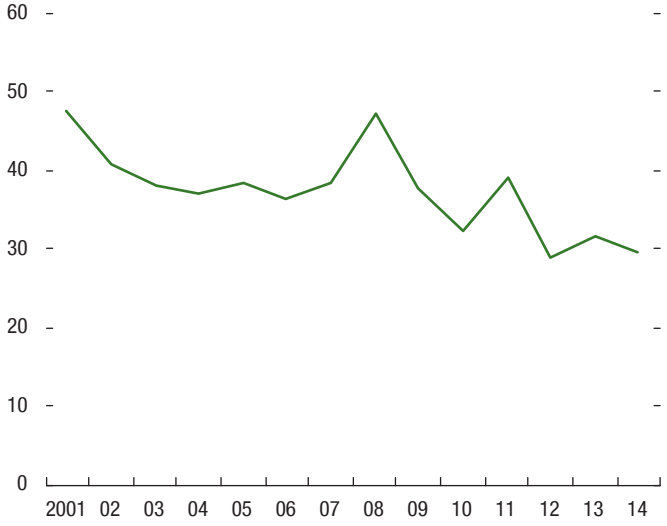
Better-governed and more transparent emerging market economy firms are less synchronized with the stock market, and their equity prices reflect business fundamentals more accurately.



Sources: Bloomberg L.P.; Thomson Reuters Datastream; World Economic Forum, Global Competitiveness Indicators database; and IMF staff calculations.
Note: Using other country-level governance indices, such as the Guillen-Capron minority shareholder rights protection index or the strength of minority investor protection strength (World Bank), yields similar pictures. Stock return comovement is measured by the R^2 of the regression of weekly stock returns on market factors.
[1]Overall governance index is the median of all firms in a given country. Market return volatility is measured by the standard deviation of weekly returns. The sample includes annual observations for 18 emerging market economies between 2010 and 2014 (country-year observations).
[2]High governance = firm governance above 75th percentile; low governance = firm governance below 25th percentile. The empirical analysis also controls for size, leverage, return on equity, state-owned enterprises, and American depository receipts. Results are robust to controlling for country and time fixed effects, and to the use of the firm-level transparency subindex. See Annex 3.2 for further details.

Figure 3.11. Stock Return Comovement (R^2) over Time
(Percent)

The synchronicity of equity prices in emerging market economies has declined.



Sources: Bloomberg L.P.; Thomson Reuters Datastream; and IMF staff calculations.
Note: Stock return comovement is measured by R^2 of the regression of weekly stock returns on market factors.

rights and better transparency regimes) can help lessen investor overreaction to negative shocks and thereby foster financial stability.[33]

Corporate Governance and Global Financial Shocks

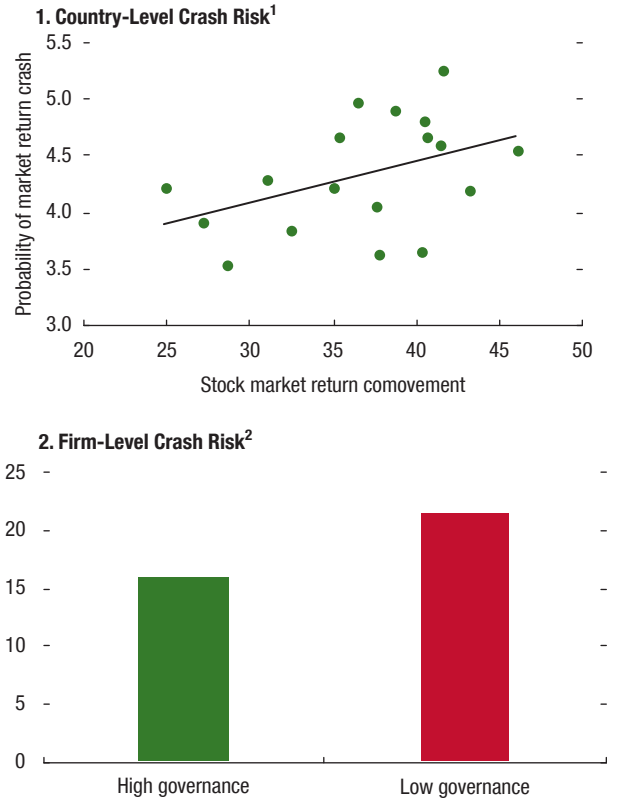
Poorly governed firms experienced sharper equity price declines during episodes of market turmoil. Event studies focus on the global financial crisis, the 2013 taper tantrum, the January 2016 stock market crash, and, most recently, Brexit.[34] Two groups of companies are considered: those that at the outset of the events were in the top and bottom third of the distribution of the firm-level governance index. For each of these cases, indices for both groups are constructed using

[33]Instrumental variables are not used in the literature on comovement (R^2) and crash risk; firm-level governance may be endogenous to average returns of firms (that is, first moments), but is generally considered exogenous in the case of higher moments (for example, comovement or skewness) of stock prices.

[34]The dates of these events are September 15, 2008 (global financial crisis); May 22, 2013 (taper tantrum); January 6, 2016 (suspension of trading after the drop in the Chinese stock market, which reverberated globally across major asset markets—see Chapter 2 of the April 2016 GFSR for further details); and June 24, 2016 (Brexit).

Figure 3.12. Crash Risk
(Percent)

Emerging market economies and firms with weaker governance are more prone to stock price crashes. Better governance fosters financial stability by helping to better align price movements with fundamentals and reduce the risk of extreme price drops.



Sources: Bloomberg L.P.; Thomson Reuters Datastream; World Economic Forum, Global Competitiveness Indicators database; and IMF staff calculations.
Note: Using other country-level governance indices, such as the Guillen-Capron minority shareholder rights protection index or the strength of minority investor protection strength (World Bank), yields similar pictures.
[1]Stock return comovement is measured by the R^2 of the regression of weekly stock returns on market factors. Crash risk is the probability of the weekly market return falling below the 5th percentile for each country under a normal distribution.
[2]High governance = firm governance above 75th percentile; low governance = firm governance below 25th percentile. The empirical analysis also controls for the size, leverage, return on equity, state-owned enterprises, and American depository receipts. Results are robust to controlling for country and time fixed effects. Firm-level crashes are defined as occurrences of firm-specific residual returns falling in the 2.5 percent lower tail of a normal distribution. See Annex 3.2 for further details.

firm equity returns after adjusting for their countries' market returns.[35] The difference in the equity dynamics is quite stark across the two groups: on average, equity prices fell sharply for the firms with weaker governance, whereas firms with better governance fared better (Figure 3.13).

More generally, evidence also suggests that better corporate governance and transparency can systematically help shield emerging market economies and firms from global financial shocks. Augmented capital asset pricing models relating equity returns to measures of corporate governance and changes in risk aversion in global financial centers are estimated at the country and firm levels. Changes in the Chicago Board Options Exchange Volatility Index (VIX) are the main proxy for such global shocks.[36] The regression results indicate that emerging market economies and firms that safeguard the rights of shareholders to a greater extent tend to be less sensitive to global financial shocks (Figure 3.14). In fact, moving from the lower to the upper end of the country- and firm-level governance indices reduces the impact of the VIX by about 20 percent and 50 percent on average for emerging market economies and firms, respectively.[37] The larger firm-level dampening effect may partly reflect the fact that the firm-level index captures several aspects of governance (such as the role of the board, disclosure policies, and the rights of all shareholders), whereas the country-level measure captures mainly one dimension (protection of minority shareholder interests). Further country-level evidence (not shown) indicates that enhanced minority shareholder protections also dampen the impact of global financial shocks on bond spreads, but to a lesser extent (about 10 percent).

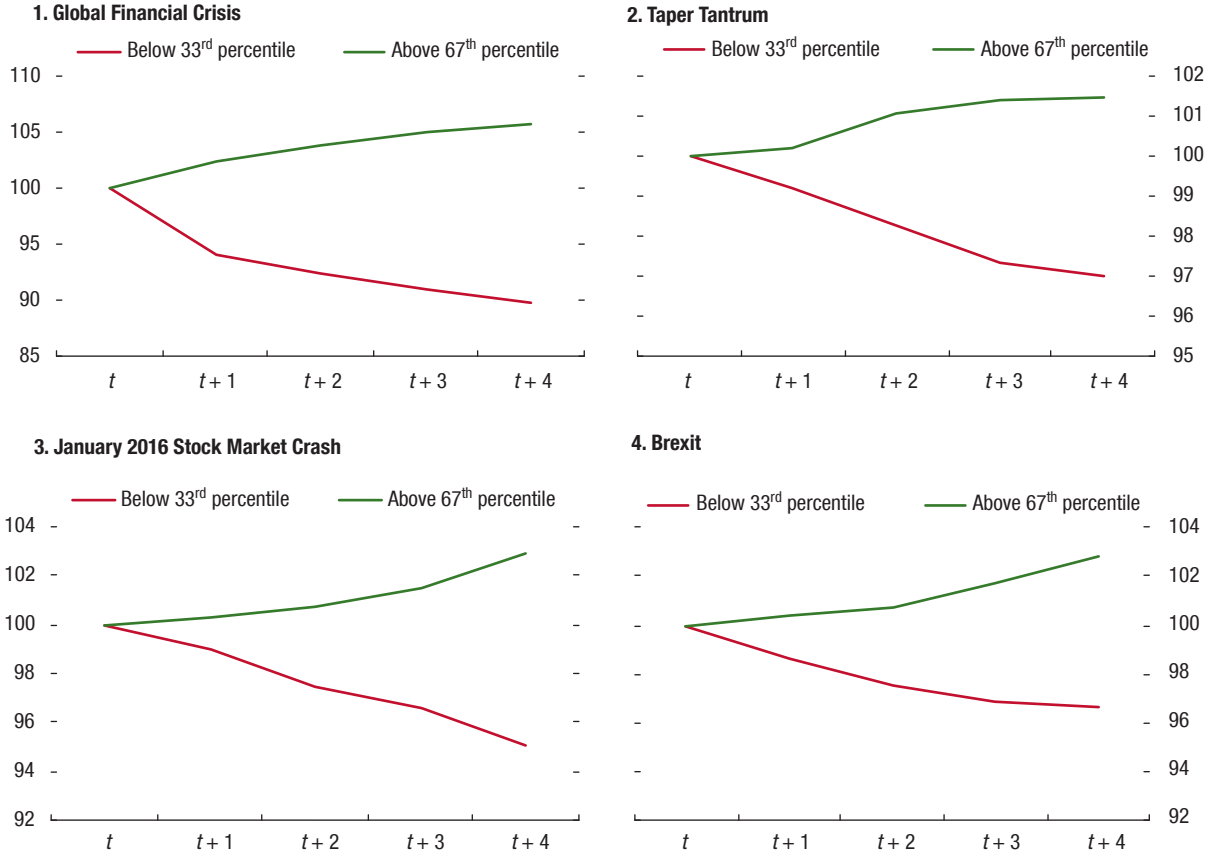
[35]The adjusted returns are residuals from a capital asset pricing model, and thereby account for common country-specific developments; results are robust if unadjusted indices are used.

[36]The hypothesis is that stronger governance frameworks can help dampen the transmission of global financial shocks (Annex 3.3). Opposite effects are also conceivable a priori. For example, firms in which the interests of shareholders and management are better aligned may take on more risk, including higher exposure to global financial conditions. Moreover, better-governed firms may have better access to global financing sources, exposing them more to fluctuations in financial conditions in advanced economies. The country-level analysis follows Brandão-Marques, Gelos, and Melgar (2013) and focuses on corporate governance along with corporate transparency.

[37]Specifically, in the case of the firm-level regressions, a one standard deviation shock (to the change in the VIX, corresponding to about 15 percentage points) lowers firm returns by about ½ percentage point. However, this impact declines to roughly ¼ percentage point for firms that move from the 25th to the 75th percentile of the governance distribution. Similar results are obtained when the global financial crisis or various banking, currency, and debt crises (based on Laeven and Valencia 2012) are used instead of the change in the VIX.

Figure 3.13. Event Study: Firm-Level Governance and Equity Returns
(Index; t = 100)

In response to external shocks, stock prices of firms with weaker governance fared much worse than firms with better governance.



Sources: Bloomberg L.P.; Thomson Reuters Datastream; and IMF staff calculations.
Note: Indices were constructed using firm equity returns adjusted for the market return (adjusted returns are residuals from a capital asset pricing model). The *y*-axis shows the equity market index, where 100 corresponds to the index one trading day before the event. Below 33rd percentile denotes firms in the bottom tertile of the firm-level governance index (overall index); above 67th percentile denotes firms in the top tertile of the firm-level governance index. *t* (time) = the day before the event; *t* + 1 = day of the event. The day of the event (*t* + 1) = September 15, 2008, in panel 1; May 22, 2013, in panel 2; January 6, 2016, in panel 3; and June 24, 2016, in panel 4. Brexit = June 2016 U.K. referendum result in favor of leaving the European Union.

Governance and Corporate Fragility

Corporate fragility can be of systemic relevance if it is widespread. This section explores the link between firm-level balance sheet indicators and corporate governance at the firm and country levels.

Stylized Facts

Stronger corporate governance and investor protection regimes are associated with stronger balance sheets. As discussed earlier, the relationship between governance and financial soundness is not a priori obvious (for example, companies that act in their shareholders' interest may be expected to take on more risk). A first look at the data suggests the following:

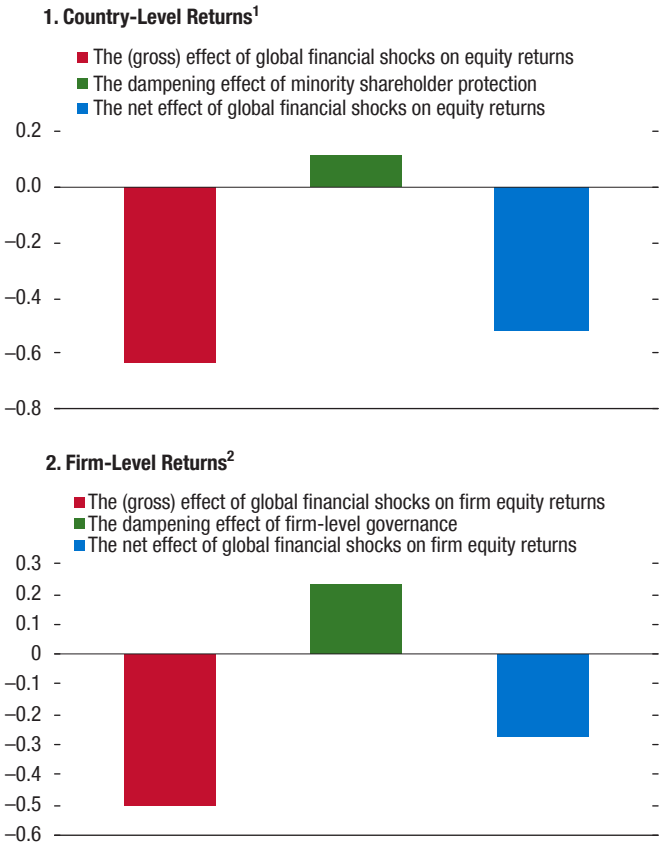
- Better-governed firms and those in countries with better governance outperform their peers in terms of profitability and liquidity (Figure 3.15).
- Likewise, such firms are characterized by sounder capital structures: their leverage and short-term debt ratios are lower.[38]

[38]Conceivably, better financial performance may induce better governance, not vice versa, motivating robustness checks of the econometric estimations using instrumental variables.

Figure 3.14. Impact of Global Financial Shocks on Equity Returns

(Percentage points)

Emerging market economies and firms that safeguard the rights of shareholders to a greater extent tend to be less sensitive to global financial shocks.

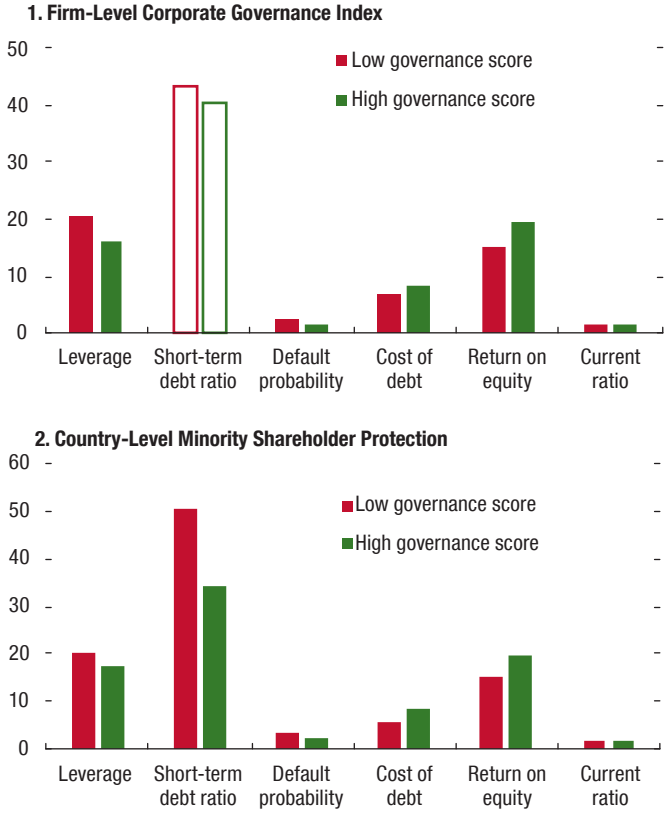


Sources: Bloomberg L.P.; Thomson Reuters Datastream; World Economic Forum, Global Competitiveness Indicators database; and IMF staff calculations.
Note: The dampening effects measure the impact of moving from the lower quartile to the upper quartile of the country- and firm-level governance distributions. VIX = Chicago Board Options Exchange Volatility Index.
[1]The standardized coefficients are statistically significant at least at the 10 percent level and depict the sensitivity of country-level returns to the change in the VIX (proxy for global financial shocks, standard deviation 13 percent). The empirical analysis controls for country fixed effects, Standard and Poor's sovereign credit rating, macroeconomic factors, trade and financial connectedness, and their interaction with the VIX, and U.S. stock market returns.
[2]The standardized coefficients are statistically significant at the 10 percent level (in fact, all are significant at the 1 percent level) and depict the sensitivity of firm-level returns to the change in the VIX. The change in the VIX is the proxy for global financial shocks (standard deviation 15 percent), the standard deviation of the firm-level governance index (overall index) is 8 percent. The empirical analysis controls for country-level returns, firm fixed effects, country-time fixed effects, sector-time fixed effects, and time fixed effects. Results are also robust to controlling for indicators of competition and concentration measures as well as country-level indices of corporate governance. See Annex 3.3 for further details.

Figure 3.15. Corporate Governance and Selected Balance Sheet Indicators

(Percent; average)

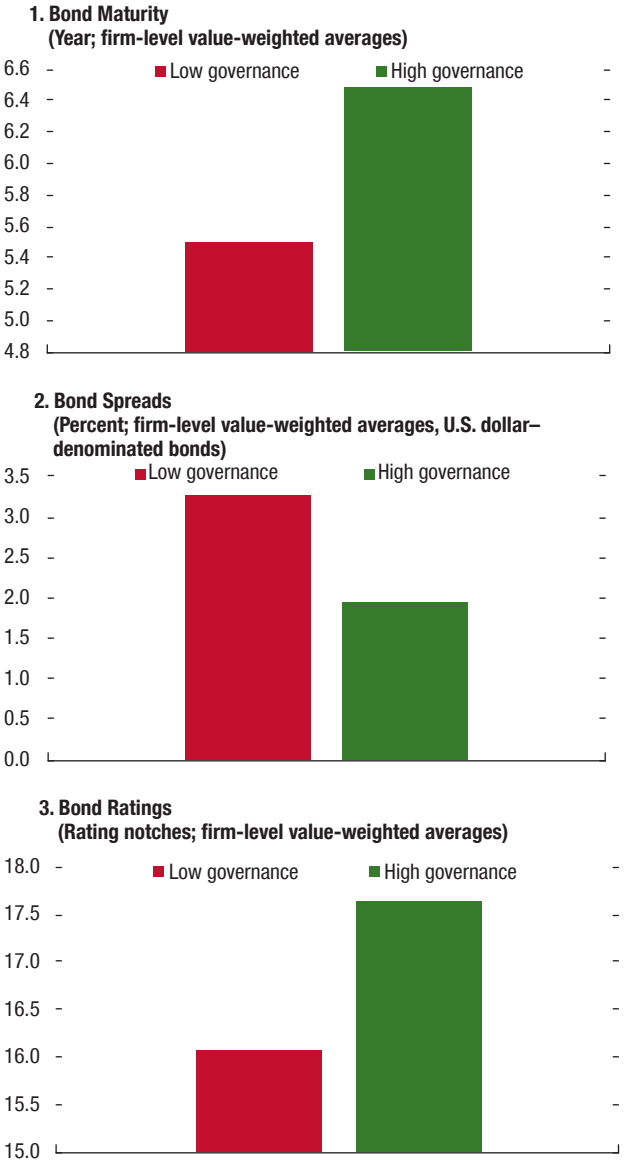
Better-governed firms and those in countries with better governance outperform their peers in terms of profitability and liquidity, and such firms are characterized by sounder capital structures.



Sources: Dealogic; Thomson Reuters Datastream; World Economic Forum, Global Competitiveness Indicators database (GCI); and IMF staff calculations.
Note: For firm-level comparisons, low and high corporate governance scores refer to the bottom and top quartile, respectively. For country-level comparisons, low and high corporate governance scores refer to bottom and top tertile, respectively. Default probability is based on the Black-Scholes-Merton model. Results are robust to other country-level governance measures such as a measure of strength of investor protection (GCI). Solid bars denote a statistically significant difference at least at the 10 percent level. Leverage = total debt to market asset ratio; short-term debt = portion of debt payable within one year, including current portion of long-term debt; cost of debt = average implied interest rate; return on equity = net income before preferred dividends to common equity; current ratio = current assets to current liabilities.

Figure 3.16. Firm-Level Governance and the Bond Market

Better-governed firms that tapped bond markets were able to borrow at longer maturities and had higher credit ratings and lower spreads.



Sources: Bloomberg L.P.; Dealogic; Thomson Reuters Datastream; and IMF staff calculations.
Note: Bond maturity = maturity at issuance; bond rating = issuer's S&P credit rating; bond spread = spreads vis-à-vis the U.S. Treasury bonds with similar maturity; high governance = firm governance above 75th percentile; low governance = firm governance below 25th percentile.

- Better-governed firms that tapped bond markets were able to borrow at longer maturities and had higher credit ratings and lower spreads (Figure 3.16).

Econometric Analysis

More formal analysis shows that various dimensions of governance quality are positively associated with solvency indicators. In particular, the econometric analysis shows that higher values of the governance subindices are associated with lower short-term debt ratios (Figure 3.17, panel 1). This suggests that even limited governance reforms can enhance corporate solvency (and, while not shown, other indicators as well, including profitability). For example, provisions that increase the effectiveness of the board, such as a greater share of independent directors, are likely to result in lower short-term debt ratios.[39] Furthermore, complementary analysis indicates that after leverage, asset tangibility, and valuation, firm-level governance is the most important factor explaining the variation of the corporate short-term debt ratio across firms, followed by other firm- and country-level characteristics, including economic fundamentals, financial development, and, for example, property rights (Figure 3.17, panel 3). Additional analysis shows that firms with greater transparency are associated with lower default probabilities.[40]

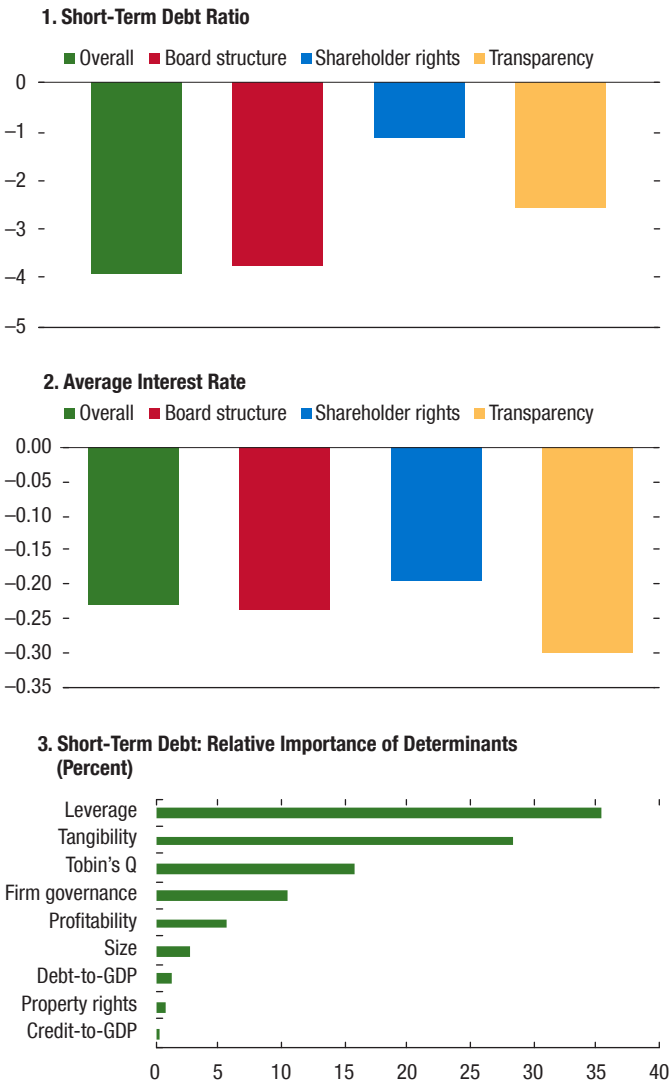
Stronger country-level corporate governance frameworks appear to play an even greater role than firm-level governance in determining short-term debt ratios (Figure 3.18). This finding hints at the importance of good country-level corporate governance regimes, including by encouraging and enforcing firm-level governance initiatives.

[39]Interestingly, governance and leverage are positively correlated. This may reflect the fact that governance improvements assure creditors that they will get a fair return on their investments, thereby improving firms' access to debt financing.

[40]Specifically, instrumental variables analysis suggests that an increase in firm-level transparency results in a lower probability of corporate default, although the relationship is not statistically significant for all firm-level corporate governance indices.

Figure 3.17. Firm-Level Governance and Solvency
(Percentage points)

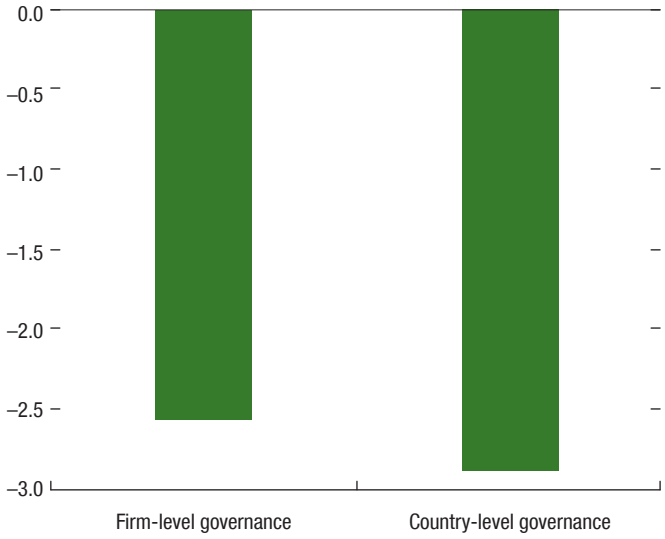
Various dimensions of the quality of governance are positively associated with corporate solvency.



Sources: Thomson Reuters Datastream; and IMF staff calculations.
Note: Short-term debt ratio = short-term debt to total debt; average interest rate = interest expense to total debt. Bars show the effects of a one standard deviation increase in each governance metric on the short-term debt ratio (panel 1) and average interest rate (panel 2). The standard deviation of the overall firm governance index is 13.3 percentage points. Coefficients estimated using pooled ordinary least squares; errors clustered at the country level; all firm characteristics are lagged. The empirical analysis also controls for the size, profitability, tangibility, valuation, leverage, debt-to-GDP, credit-to-GDP, country fixed effects, sector fixed effects, and time fixed effects. Results are robust to the use of different firm-level governance subindices and to the inclusion of other governance and institutional quality measures such as rule of law, protection of minority shareholders' interests, or strength of investor protection index. See Annex 3.1 for further details.

Figure 3.18. Country-Level and Firm-Level Governance and Short-Term Debt
(Percent)

Improved country-level corporate governance frameworks appear to play an even greater role than firm-level governance in determining short-term debt ratios.



Sources: Dealogic; Thomson Reuters Datastream; World Economic Forum, Global Competitiveness Indicators database; and IMF staff calculations.
Note: The figure depicts the sensitivity of short-term debt ratio to firm- and country-level measures of corporate governance. Country-level governance is proxied by the World Economic Forum Global Competitiveness Index (GCI) protection of minority shareholders' interest index; firm-level governance is measured using the overall index developed in this chapter. The empirical analysis also controls for the size, profitability, tangibility, valuation, leverage, macroeconomic factors, and firm fixed effects. Results are robust to the use of other country-level governance indices such as the World Bank index of the protection of minority shareholders. See Annex 3.1 for further details.

Conclusions and Policy Implications

This chapter has presented new evidence on the nexus between corporate governance, investor protection, and financial stability across emerging market economies. It has documented how corporate governance enhancements promote deeper, more liquid, and more efficient capital markets, thereby increasing resilience to global financial shocks and decreasing the likelihood of stock price crashes. Furthermore, it has shown that emerging market economies with better corporate governance and investor protections tend to have stronger corporate balance sheets, as reflected in lower short-term debt ratios, lower default probabilities, and the ability to borrow at longer maturities. These issues matter for overall financial stability.

Many emerging market economies have made notable strides in improving their corporate governance and investor protection frameworks. These improvements are visible both in country-level and firm-level measures. They have occurred across sectors and firms. Nevertheless, there is quite a bit of heterogeneity across emerging market economies. Although on average, emerging market economies still have scope to improve, several of them feature corporate governance scores higher than those in advanced economies.

These broad-based improvements in corporate governance and investor protections across emerging market economies over the past two decades have served to enhance the resilience of their financial systems. Nevertheless, the financial stability benefits of corporate governance highlighted in this chapter strengthen the case for further reforms. In general, countries should strive to adopt the G20/OECD Principles of Corporate Governance. However, even limited governance reforms in specific areas can help.

Emerging market economies should continue with reforms that strengthen the consistency, clarity, and enforceability of the legal and regulatory requirements affecting corporate governance practices. The effectiveness of insolvency frameworks and the enforcement of creditor rights require strengthening, in some cases. Better domestic and international cooperation among regulators and enhanced power, resources, and independence for securities commissions would further strengthen countries' corporate governance structures.

Most emerging market economies should further reinforce shareholder rights, especially for minority shareholders. In general, reforms prioritizing the protection of outside investors, both foreign and domestic, should continue. In particular, the protection of minority shareholders could be advanced by improving redress and ensuring a greater say in board selection, as well as by strengthening rules on related-party transactions, changes in controlling shareholders, and shareholder meetings. In this regard, amendments to company law and further legal clarification may be needed. Such reforms would address some of most important conflicts of interest at the firm level in emerging market economies.

Many emerging market economies should strive to bring disclosure requirements fully in line with best international practices. Specifically, disclosure with respect to related-party transactions, board member information, (beneficial) ownership, control, and group structures could be improved in many countries.[41] Requiring companies to disclose compliance should also be considered. Increasing the securities regulator's resources and capabilities would do much to ensure compliance. Likewise, countries should continue to move toward full adoption of international accounting standards. Greater transparency would enhance the supervision of financial conglomerates and company groups with a presence across many emerging market economies.

Many emerging market economies could benefit from greater board independence and effectiveness. This could be facilitated by expanding board member powers in company law, revising the corporate governance code, or enhancing listing requirements. Likewise, separation of the role of the chief executive officer and the chair of the board should be considered. Critically, emerging market economies that have not yet done so should seriously consider mandatory independent committees to audit the boards of all listed companies. Indeed, audit committees are now obligatory in most countries around the world.

[41]A beneficial owner is a legal person who is entitled to enjoy the economic rights stemming from the ownership, although the ownership has been registered in the name of someone else (the legal owner).

Box 3.1. Examples of Corporate Governance Reforms in Selected Emerging Market Economies

Since the global financial crisis, many emerging market economies have continued reforming their corporate governance frameworks. This box presents a few recent examples from selected emerging market economies.[1]

Some of the most wide-ranging reforms have involved countries' corporate governance codes. For instance, the 2014 Russian Code of Corporate Governance was a comprehensive update of the 2002 Code and includes initiatives to further strengthen disclosure policies and the rights of shareholders. As with other new and extensive reform initiatives, the priority now is full implementation of the updated Russian Code. Likewise, the Malaysian Code on Corporate Governance was amended in 2012 and includes significant provisions on investor protection. Although adherence to the Code is voluntary, listed firms are required to explain the extent of their compliance to the regulator. Compliance in some areas, such as separation of the board chair and chief executive officer, has clearly improved in recent years. An earlier example is the creation of the Novo Mercado corporate governance tiers on the Brazilian stock exchange in 2000—with their higher standards for corporate governance and minority shareholder protection, which are voluntarily adopted in addition to legal requirements—which has resulted in major changes in the equity market.

Many emerging market economies have also improved their corporate transparency frameworks. By 2014 Korea had increased the level of transparency expected from companies regarding managerial compensation. Earlier reforms in Morocco and Peru allow minority shareholders to request access to corporate documents that are not confidential. India and Kazakhstan now require greater disclosure of board member conflicts of interest. Higher standards of accountability for company directors are now mandatory in Vietnam.

Several countries have introduced reforms that better regulate related-party transactions. Related-party transactions are common in the business marketplace. The inherent special relationship between the parties involved may, however, lead to conflicts of interest between corporate insiders and outside investors, requiring regulation. Accordingly, Albania, Kazakhstan, and the United Arab Emirates, for example, strengthened minority investor protections by introducing legal requirements for immediate disclosure of related-party transactions. In Korea, Peru, and Slovenia, measures regulating the approval of related-party transactions and/or making it easier to sue directors when such transactions are prejudicial were introduced. Similar reforms were implemented in India and Nigeria. More recently, emerging market economies, such as Egypt and Lithuania, reinforced their corporate governance frameworks by barring subsidiaries from acquiring shares issued by their parent company.

The author of this box is Selim Elekdag.

[1]For further details, see selected World Bank *Corporate Governance Reports on the Observance of Standards and Codes* and various issues of the World Bank *Doing Business* reports.

Box 3.2. Strengthening Corporate Governance for State-Owned Enterprises in China

Chinese state-owned enterprises (SOEs) face corporate governance challenges that contribute to resource misallocation and financial stability risks. Building on the recently announced SOE reform, decisive implementation is key. Measures should focus on hardening budget constraints, restructuring highly indebted SOEs, and introducing greater competition to state-dominated sectors.

State-owned enterprises face increasing challenges of low efficiency and resource misallocation. In China, SOEs continue to play an important role despite their declining share in the economy. Their total assets account for near 180 percent of GDP, much higher than in other major emerging market economies (Figure 3.2.1, panel 1). But SOEs in China appear less efficient than private enterprises, with rising leverage and weak profitability, raising concern about financial stability and the sustainability of growth (Figure 3.2.1, panel 2). Improving efficiency through measures to strengthen corporate governance is a critical part of SOE reforms.

Empirical evidence supports the notion that Chinese SOEs face corporate governance challenges. While the state as a shareholder can assert positive influence on corporate governance, such as stricter monitoring and auditing (Chen, Firth, and Xu 2009), China's SOEs face corporate governance challenges including the lack of disciplining factors such as possible takeovers or bankruptcies, likely increasing the cost of equity for firms (Ferreira and Laux 2007).[1] Other challenges include possible undue political influence and the pursuit of social objectives that are beyond minority shareholders' interests (Shleifer and Vishny 1994). Preliminary evidence indicates that stock prices of nonfinancial SOEs are more synchronized with the market and reflect less firm-specific information, likely raising the cost of equity (Figure 3.2.2, panel 1). Government implicit guarantees and preferential access to debt finance also contribute to moral hazard and SOEs' overreliance on debt (Figure 3.2.2, panel 2). All of these factors pose potential obstacles for the ongoing ownership reform efforts of SOEs to attract private sector participation.

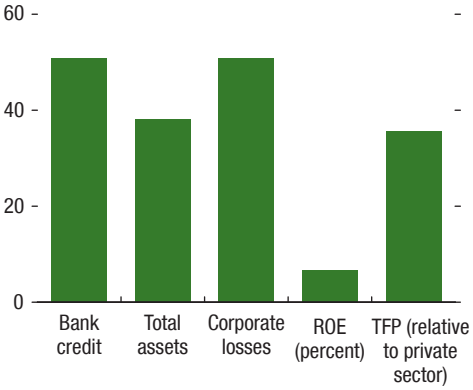
Figure 3.2.1. Selected Emerging Market Economies: State-Owned Enterprises

State-owned enterprises play a more important role in the Chinese economy than in other major emerging market economies. Chinese SOEs have recently had weaker profitability relative to private firms.

1. Key Indicators of SOEs[1] (Percent of GDP)

Country	Sales revenue	Net profit	Asset	Market value	Share in the top 10 firms
China	35	3	176	45	91
Brazil	12	2	51	18	50
India	16	4	75	22	59
Indonesia	3	0	19	12	69
Russia	16	3	64	28	81
South Africa	2	2	3	1	2

2. SOEs in China Dominate and Operate Less Efficiently[2] (Percent of total unless otherwise stated)



Sources: CEIC Data Company Ltd.; Kowalski and others 2013; Ministry of Finance; National Bureau of Statistics of China; People's Bank of China; WIND database; and IMF staff calculations.
Note: ROE = return on equity; SOE = state-owned enterprise; TFP = total factor productivity.
[1]As of end-2015 for China and end-2010 for rest of the economies.
[2]The time frame for bank credit and TFP is average of 2011–15; total assets, corporate losses, and ROE are as of end-2015.

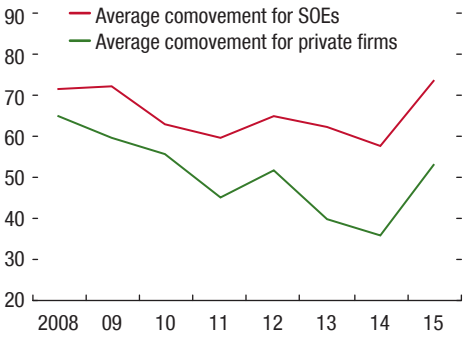
The authors of this box are Alan Xiaochen Feng and W. Raphael Lam.

[1]Ferreira and Laux (2007) show that takeover provisions reduce the information content of idiosyncratic components in the stock price.

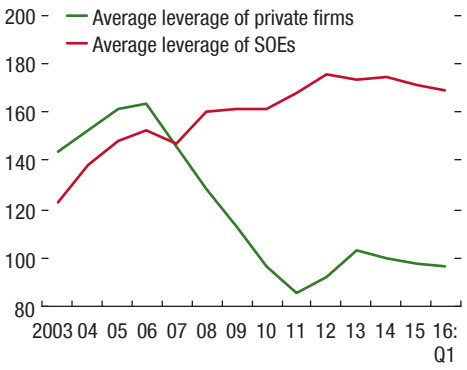
Box 3.2 *(continued)*

Figure 3.2.2. Leverage and Equity Price Comovement of State-Owned Enterprises in China
(Percent)

1. Stock Price Comovement[1]



2. Leverage Ratios of SOEs and Private Firms in China



Sources: Bloomberg L.P.; Thomson Reuters Datastream; WIND database; and IMF staff calculations.
Note: SOEs = state-owned enterprises.
[1]Stock price comovement is R^2 of the regression of weekly equity returns on market and industry factors.

SOE reforms should therefore focus on overcoming these corporate governance challenges. Key principles include aligning incentives of managers and controlling and minority shareholders, maintaining an arm's length relation between management and the board of directors, and eliminating noncore objectives (such as social functions) of SOEs. Greater corporate transparency and board independence would allow minority shareholders to fully exercise their rights.

While the authorities have announced reform elements, specifics still need to be defined and decisive implementation will be critical. Current reform plans include classifying SOEs into commercial (strategic or competitive) and social-function SOEs, and repositioning the state as a capital investor rather than the operator (IMF 2016).[2] While some of the current reform measures are more closely aligned with international good practices, there are still ambiguities, especially about the ultimate role of the state in SOEs' major decisions. It is critical that the SOE reforms focus on hardening SOEs' budget constraints by phasing out implicit guarantees, restructuring highly indebted SOEs by triaging debt, letting nonviable firms exit, and introducing greater competition to state-dominated sectors (Lam and Schipke forthcoming). These reforms would strengthen SOEs' corporate governance, which in turn will improve efficiency and resource allocation.

[2]For example, implicit government subsidies in borrowing costs combined with the too-big-to-fail problem make SOEs prone to issue debt and have high leverage (DeWenter and Malatesta 2001).

Annex 3.1. Emerging Market Corporate Fundamentals and Governance[42]

Using more than 600 nonfinancial firms for 25 emerging market economies during 2007–14 (over 3,000 observations), regressions link valuation, short-term debt, average interest rate (cost of debt), and leverage with the firm-level governance measure developed in the chapter. In the case of valuation (Tobin's Q proxied with the market-to-book assets ratio),[43] the baseline specification is

$$Q_{isc,t} = \beta FGOV_{isc,t-1} + \gamma_1 FIRM_{isc,t-1} + \gamma_2 MACRO_{c,t} + \varphi OTHER + \epsilon_{isc,t}, \quad \text{(A3.1.1)}$$

in which i, s, c, and t denote firm, sector, country, and time, respectively. *FGOV* is one of the firm-level governance indices (overall index; or board structure, shareholder rights, compensation policy, or transparency subindices). *FIRM* includes lagged measures of firm size, profitability, leverage, cash, capital expense, and research and development ratios. *MACRO* refers to country-level controls such as the credit-to-GDP ratio, the debt-to-GDP ratio, real GDP, inflation, rule of law, or the current account deficit as a percentage of GDP. The pooled ordinary least squares and instrumental variables regressions (in which the instrument is the average governance of other firms in the same industry and country)[44] include country, sector, and time fixed effects terms (*OTHER*); standard errors are clustered at the country level (Annex Table 3.1.1).

When the short-term-to-total-debt ratio (STD) is considered, the regression model is

$$STD_{isc,t} = \beta FGOV_{isc,t-1} + \gamma_1 FIRM_{isc,t-1} + \gamma_2 MACRO_{c,t} + \varphi OTHER + \epsilon_{isc,t}, \quad \text{(A3.1.2)}$$

in which *FIRM* includes firm-level measures of size, profitability, tangibility, and valuation; the other controls are the same as those discussed previously.[45] Complementary exercises add the interaction between the firm- and country-level measures of corporate governance (strength of minority shareholder protection) and country-level measures of enforcement (such as the rule of law).

Using a variety of specifications, robustness exercises confirm the results from the baseline regressions. For example, coefficients were estimated with panel data models while controlling for firm and sector time fixed effects (and errors clustered at the country level).

[42]The author of this annex is Adrian Alter.

[43]As an alternative measure, the adjusted valuation, in which the firm's sector average valuation is subtracted from its valuation, is considered as the dependent variable.

[44]*F*-statistics of the weak exogeneity tests exceed 10 and confirm the usefulness of the instrument.

[45]Similar firm characteristics are used when the dependent variable is leverage, interest rate, or default probability. In addition, when interest rate and default probability are considered as dependent variables, the set of firm regressors is augmented by the leverage ratio.

Annex 3.2. Analysis of Firm-Level Stock Price Comovement and Crash Risk[46]

The analysis on stock price comovement and crash risk is conducted in two steps. In the first step, firm-level stock returns are decomposed into market-wide and firm-specific components. Following Jin and Myers (2006), for each emerging market firm in the sample, the analysis considers

$$r_{it} = \alpha_i + \beta_{1i} r_{c,t} + \gamma_{1i}(r_{US,t} + X_{c,t}) + \beta_{2i} r_{c,t-1} + \gamma_{2i}(r_{US,t-1} + X_{c,t-1}) + \beta_{3i} r_{c,t+1} + \gamma_{3i}(r_{US,t+1} + X_{c,t+1}) + \epsilon_{it}, \quad \text{(A3.2.1)}$$

in which r_{it} is the weekly return of firm i, $r_{c,t}$ is the domestic market return, $r_{US,t}$ is the U.S. market return, and $X_{c,t}$ is the change in exchange rate of domestic currency against the U.S. dollar. This set of regressions is repeated for each year between 2008 and 2014.

The second step investigates the relationship between the computed stock price comovement, as well as crashes and the corporate governance indices, following Hutton, Marcus, and Tehranian (2009). Stock price comovement is measured using the logistically transformed *R*-squared from regressions in the first step and considered in the following analysis:

$$\pi_{it} = \delta_1 GOV_{it} + \delta_2 X_{i,t-1} + \eta_t + \xi_c + \epsilon_{it}, \quad \text{(A3.2.2)}$$

in which π_{it} is defined as $\ln[R^2/(1-R^2)]$, in which R^2 is the *R*-squared from equation (A3.2.1), GOV_{it} is the firm-level governance index, η_t and ξ_c are the year and country fixed effects, and $X_{i,t-1}$ includes firm control variables such as (logged) total assets, leverage, return on equity (ROE), and the indicators for whether the firm uses American depository receipts and is a state-owned enterprise (Annex Table 3.2.1). Similar estimates are found using the alternative Fama-MacBeth method that involves running a set of cross-sectional regressions for each year. For crash risk, the following

[46]The author of this annex is Alan Xiaochen Feng.

Annex Table 3.1.1. Firm Governance and Fundamentals: Selected Regressions

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	**Valuation**		**Short-Term Debt**		**Interest Rate**	
Regression Type	OLS	IV	OLS	IV	OLS	IV
Firm Governance						
Overall Index	0.00728***	0.0135**				
	(0.00184)	(0.00576)				
Shareholder Rights Index			–0.104*	–1.136*		
			(0.0587)	(0.662)		
Transparency Index					–0.0137***	0.278
					(0.00509)	(0.439)
Firm-Level Controls						
Total Assets (log)	–0.270***	–0.152***	–4.133***	–3.480***	–0.199**	–0.499
	(0.0193)	(0.0300)	(0.514)	(0.793)	(0.0886)	(0.708)
Profitability	0.0853***	0.0787***	–0.0795	–0.0552	0.00165	0.0383
	(0.00433)	(0.00715)	(0.104)	(0.155)	(0.0182)	(0.0596)
Leverage	–0.000379	0.00370*			–0.0129**	0.000394
	(0.00122)	(0.00190)			(0.00624)	(0.0161)
Cash Ratio	0.0168***	0.0115**				
	(0.00412)	(0.00544)				
Investment Ratio	0.00788***	0.0152***				
	(0.00229)	(0.00331)				
R&D Ratio	0.0567**	0.0935***				
	(0.0279)	(0.0316)				
Tangibility			–0.263***	–0.316***	–0.0138***	0.000730
			(0.0288)	(0.0621)	(0.00448)	(0.0183)
Tobin's Q			1.557**	0.609	0.0410	–0.245
			(0.711)	(1.000)	(0.123)	(0.371)
Country-level Controls						
Private Credit (percent of GDP)		-0.00656***		0.239***		–0.0174
		(0.00150)		(0.0523)		(0.0869)
Government Debt (percent of GDP)		–0.00301		0.356***		–0.0333
		(0.00341)		(0.106)		(0.0634)
Current Account Balance (percent of GDP)		0.166***		2.666**		–3.222
		(0.0271)		(1.114)		(2.159)
Inflation		0.00771		–0.365*		–0.0134
		(0.00749)		(0.196)		(0.120)
Real GDP		–0.0407***		0.922***		–0.107
		(0.0122)		(0.347)		(0.273)
Rule of Law		0.218*		–8.551**		–3.275
		(0.116)		(4.174)		(2.795)
Constant	5.043***	2.187***	178.0***	65.60**	25.34***	23.24**
	(0.427)	(0.459)	(13.58)	(27.11)	(1.967)	(11.32)
Observations	3,186	2,362	3,075	2,275	3,044	2,253
R^2	0.642	0.647	0.361	0.295	0.285	0.464
Time*Country FE	Yes	No	Yes	No	Yes	No

Source: IMF staff estimates.

Note: OLS refers to pooled ordinary least squares estimates; IV refers to instrumental variable estimates. All firm-specific regressors are lagged. Sector- and country-fixed effects are included in all regressions. Robust standard errors are reported. R&D = research and development; FE = fixed effects.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Annex Table 3.2.1. Firm-Level Stock Price Comovement and Crash Risk

	Stock Price Comovement				Crash Risk		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm-Level Overall Governance	–0.134***	–0.097***	–0.073***		–0.140***	–0.113**	–0.0744*
	(0.021)	(0.027)	(0.020)		(0.039)	(0.054)	(0.041)
Firm-Level Transparency				–0.082***			
				(0.027)			
Size	0.028***	0.026***	0.027***	0.024***	–0.01	–0.007	–0.011
	(0.007)	(0.008)	(0.007)	(0.006)	(0.014)	(0.037)	(0.015)
Leverage	0.006***	-0.002	0.007***	–0.001	0.001	–0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)
Return on Equity	0.001	0.0001	–0.001	–0.002**	0.002	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
ADR	0.066	–0.164***	–0.044	–0.267***	0.230***	0.342***	0.085
	(0.045)	(0.051)	(0.043)	(0.047)	(0.085)	(0.102)	(0.089)
SOE	0.425***	0.244***	0.294***	0.151	0.029	0.026	–0.521**
	(0.122)	(0.119)	(0.116)	(0.111)	(0.203)	(0.216)	(0.247)
Observations	3,035	3,035	3,035	3,035	3,027	3,027	3,027
Country FE	No	Yes	No	Yes	No	Yes	No
Year FE	No	No	Yes	Yes	No	No	Yes
R^2	0.05	0.16	0.15	0.26	0.01	0.05	0.02

Source: IMF staff estimates.

Note: ADR = American depository receipts; SOE = state-owned enterprises; FE = fixed effects.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

logit regression of stock return crashes on firm-level governance indices was performed:

$$Prob(Crash = 1 | GOV_{it}, X_{i,t-1}) = \Phi^{-1}(\delta_1 GOV_{it} + \delta_2 X_{i,t-1}), \quad \text{(A3.2.3)}$$

in which crashes are defined as occurrences of firm-specific residual returns from equation (A3.2.1) that fall in the lower 2.5 percent tail of a normal distribution, and $X_{i,t-1}$ includes the same set of firm control variables as in equation (A3.2.2). Function Φ is the logit function.

Annex 3.3. Estimating the Impact of Global Financial Shocks on Firm Equity Returns[47]

The impact of global financial shocks on firms' equity returns is estimated for a sample of more than 600 firms in 25 emerging market economies during 2008–14 at weekly frequency (see Annex Table 3.4.1. for data sources and country coverage). The specification is an augmented capital asset pricing model, which includes country-level returns, changes in the Chicago Board Options Exchange Volatility Index (VIX), and firm-level governance and its interaction term with the changes in the VIX index:

$$r_{i,s,c,t} = \alpha + \beta r_{c,t} + \gamma_1 \Delta VIX_t + \gamma_2 GOV_{s,t} + \gamma_3 \Delta VIX_t^* GOV_{s,t} + \delta_i + \delta_{c,t} + \delta_{s,t} + \tau_t + \epsilon_{i,s,c,t}, \quad \text{(A3.3.1)}$$

in which

- $r_{i,s,c,t}$ is the weekly equity return of firm i;
- $r_{c,t}$ is the country-level equity return corresponding to country c;
- ΔVIX_t is the changes in the VIX, a proxy for global financial shocks (changes in global risk aversion);
- $GOV_{s,t}$ is the overall firm-level governance index (that is, the overall index);
- $\Delta VIX_t^* GOV_{s,t}$ is the interaction term that captures how governance influences the transmission of global financial shocks to equity returns; and
- $\delta_i, \delta_{c,t}, \delta_{s,t}, \tau_t$ are firm, country-time, sector-time, and time quarterly fixed effects terms, respectively.

Various additional specifications for robustness are also estimated, controlling for firm-level controls, including the share of foreign sales in total sales, American depository receipts firms, and concentra-

[47]The author of this annex is Dulani Seneviratne.

Annex Table 3.3.1. Global Financial Shocks and Firm Equity Returns

Dependent Variable: $Return_{i,s,c,t}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Return_{c,t}$	0.602***	0.602***	0.602***	0.603***	0.604***	0.638***	0.652***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Gov_{s,t}$	0.001	0.001	0.001	0.001	0.001	0.001	0.002
	(0.627)	(0.991)	(0.830)	(0.627)	(0.611)	(0.682)	(0.518)
ΔVIX_t	–0.035***	–0.035***	–0.037***	–0.037***	–0.045***		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
ΔVIX * Gov	0.035***	0.035**	0.032***	0.032***	0.025**		
	(0.000)	(0.017)	(0.001)	(0.001)	(0.011)		
ΔVIX * Share of Foreign Sales			0.013***				
			(0.000)				
$Share\ of\ Foreign\ Sales_{i,s,c,t}$			–0.003***				
			(0.007)				
ΔVIX * Herfindahl–Hirschman Index				1.955***			
				(0.000)			
$Herfindahl–Hirschman\ Index_{i,s,c,t}$				–0.53**			
				(0.020)			
ΔVIX * 4-Firm Concentration Ratio					0.026***		
					(0.000)		
$Four\text{-}Firm\ Concentration\ Ratio_{i,s,c,t}$					–0.002		
					(0.581)		
Crisis Dummy						–3.088*	
						(0.061)	
Crisis Dummy * Gov						0.081**	
						(0.043)	
GFC Dummy * Gov							0.012***
							(0.007)
GFC Dummy							–0.513***
							(0.003)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector-Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standard Errors	Robust	DK	Robust	Robust	Robust	Robust	Robust
Observations	214,283	214,283	212,128	214,283	214,283	214,283	204,239
R^2	0.186		0.186	0.186	0.186	0.183	0.178

Source: IMF staff estimates.

Note: Robust *p*-values in parentheses. Panel 2 in Figure 3.14 uses standardized values of specification (1). Crisis dummy corresponds to various banking, currency, and debt crises (based on Laeven and Valencia 2012); GFC dummy corresponds to the global financial crisis. DK = Driscoll-Kraay standard errors; VIX = Chicago Board Options Exchange Volatility Index; FE = fixed effects.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

tion (both through the Herfindahl-Hirschman Index and the four-firm concentration ratio) and through changing the fixed effects structure and using Driscoll-Kraay standard errors (Annex Table 3.3.1). The results remained robust in all specifications, with both ΔVIX_t and the interaction term preserving significance at the 5 percent level in most cases.

Annex 3.4. Data Sources and Country Coverage

This annex provides the data sources of the firm-level, country-level, global variables, and the sample coverage of economies used in this chapter (Annex Table 3.4.1). The set of emerging market economies includes past and current emerging market economies as well as some frontier economies.

Annex Table 3.4.1. Data Sources[1,2,3,4,5,6]

Variable	Description	Source
Firm-Level Variables		
Governance Variables		
Overall Index		IMF; ASSET4
Board Subindex		IMF; ASSET4
Compensation Subindex		IMF; ASSET4
Shareholder Rights Subindex		IMF; ASSET4
Transparency Subindex		IMF; ASSET4
Other Firm-Level Variables		
Tobin's Q	The sum of market value of equity and book value of debt divided by total assets	Worldscope
Return on Equity	Net income divided by shareholders' equity	Worldscope
Leverage	Total debt divided by market value of assets	Worldscope
Cash Ratio	The sum of cash and cash equivalents divided by total assets	Worldscope
Current Ratio	Current assets to current liabilities	Worldscope
Capital Investment	Capital expenses to total assets	Worldscope
Foreign Sales	The ratio of foreign sales to total sales	Worldscope
Size	Total assets in logarithmic terms	Worldscope
Short-Term Debt	Portion of debt payable within one year including current portion of long-term debt	Worldscope
Equity Returns (local currency)	Log difference of the equity indices	Bloomberg L.P.
American Depository Receipts (ADR)	ADR indicates companies that have American depository receipts trading on a U.S. exchange.	Worldscope
Bond Rating	Issuer's S&P credit rating	Bloomberg L.P., Dealogic
Bond Yield	Yield at issuance	Bloomberg L.P., Dealogic
Bond Maturity	Maturity at issuance	Bloomberg L.P., Dealogic
External Financing Dependence	Rajan and Zingales (1998) index measures dependence on external finance as a firm's capital expenditures minus cash flow from operations divided by capital expenditures, sector average.	Worldscope
State-Owned Enterprises		Worldscope
Country-Level Variables		
Governance Variables		
Protection of Minority Shareholders' Interests	Extent to which the interests of minority shareholders are protected by the legal system.	World Economic Forum, GCI
G-C Minority Shareholder's Protection	The degree of minority shareholders' protection	Guillén and Capron 2016
Strength of Investor Protection Index	Protection of minority investors from conflicts of interest and shareholders' rights in corporate governance	World Bank, Doing Business
Extent of Shareholder Rights Index	Shareholders' rights and role in major corporate decisions	World Bank, Doing Business
Extent of Disclosure Index	Transparency of related-party transactions	World Bank, Doing Business
Property Rights	Protection of property rights, including financial assets	World Economic Forum, GCI
Efficiency of Legal Framework in Challenging Regulations	Ease of challenging government actions and/or regulations through the legal system	World Economic Forum, GCI
Strength of Auditing and Reporting Standards	Strength of financial auditing and reporting standards	World Economic Forum, GCI
Government Effectiveness	Reflects perceptions of the quality of public services and policies and the credibility of the government's commitment to such policies	World Bank, World Governance Indicators
Regulatory Quality	Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development	World Bank, World Governance Indicators

(continued)

Annex Table 3.4.1. Data Sources (continued)

Variable	Description	Source
Rule of Law	Reflects perceptions on the quality of contract enforcement, property rights, the police, the courts, and the likelihood of crime and violence	World Bank, World Governance Indicators
Other Country-Level Variables		
Corporate Spread	JPMorgan CEMBI Broad	Bloomberg L.P.
Sovereign Spread	JPMorgan EMBI Global	Bloomberg L.P.
Exchange Rate	National currency per U.S. dollar	Bloomberg L.P.
Equity Returns (local currency)	Log difference of the equity indices	Bloomberg L.P.
S&P Sovereign Risk Rating	Standard and Poor's Rating & Outlook	Bloomberg L.P.
Capital Flows	The previous year's average of total flows (purchases plus sales) of foreign securities between U.S. investor and domestic investor (TIC data)	United States Department of the Treasury
Trade Flows	The previous year's average of total trade (imports plus exports) originating in each country in the sample with the U.S.	IMF, Directions of Trade database
Real GDP	Year-over-year growth of GDP, constant prices	IMF, World Economic Outlook database
Inflation	Year-over-year growth of the consumer price index	IMF, World Economic Outlook database
Current Account Balance	Current account balance in percent of GDP	IMF, World Economic Outlook database
Government Debt	General government gross debt in percent of GDP	IMF, World Economic Outlook database
Private Credit	Claims on private sector in percent of GDP	IMF, International Financial Statistics database
Global-Level Variables		
VIX	Chicago Board Options Exchange Market Volatility Index	Bloomberg L.P.

Source: IMF staff.

Note: ASSET 4 is provided by Thomson Reuters. CEMBI = Corporate Emerging Markets Bond Index; EMBI = Emerging Markets Bond Index; G-C = Guillén and Capron; GCI = Global Competitiveness Indicators; S&P = Standard and Poor's; TIC = Treasury International Capital; VIX = Chicago Board Options Exchange Volatility Index.

[1] Emerging market economies covered in the country-level capital market development analysis are Argentina, Bahrain, Brazil, Bulgaria, Chile, China, Colombia, Croatia, Hungary, India, Indonesia, Jordan, Kazakhstan, Kuwait, Lebanon, Lithuania, Malaysia, Mauritius, Mexico, Morocco, Nigeria, Oman, Pakistan, Peru, the Philippines, Poland, Qatar, Romania, Saudi Arabia, Serbia, South Africa, Sri Lanka, Thailand, Turkey, Ukraine, and the United Arab Emirates.

[2] Firm-level fundamentals analysis is based on the firms in Brazil, Chile, China, Colombia, Egypt, Hungary, India, Indonesia, Kazakhstan, Korea, Kuwait, Malaysia, Mexico, Morocco, the Philippines, Poland, Qatar, Russia, Saudi Arabia, South Africa, Sri Lanka, Thailand, Turkey, Ukraine, and the United Arab Emirates.

[3] Country-level volatility and comovement analyses cover Brazil, Chile, China, Colombia, Egypt, Hungary, India, Indonesia, Malaysia, Mexico, the Philippines, Poland, Russia, South Africa, Sri Lanka, Thailand, Turkey, and the United Arab Emirates, while the firm-level comovement and crash risk analyses include Kuwait, Morocco, and Qatar in addition to the above set of economies.

[4] Firm-level equity return analysis and the event studies are based on the firms in Brazil, Chile, China, Colombia, Egypt, Hungary, India, Indonesia, Kazakhstan, Korea, Kuwait, Malaysia, Mexico, Morocco, the Philippines, Poland, Qatar, Russia, Saudi Arabia, South Africa, Sri Lanka, Thailand, Turkey, Ukraine, and the United Arab Emirates.

[5] Country-level equity return and bond spread analyses cover Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, the Philippines, Poland, South Africa, Thailand, and Turkey.

[6] Country-level market liquidity analysis is based on the same coverage as in Brandão-Marques (forthcoming).

References

Aggarwal, Reena, Isil Erel, Miguel Ferreira, and Pedro Matos. 2011. "Does Governance Travel around the World? Evidence from Institutional Investors." *Journal of Financial Economics* 100 (1): 154–81.

Aggarwal, Reena, Isil Erel, René Stulz, and Rohan Williamson. 2009. "Differences in Governance Practices between U.S. and Foreign Firms: Measurement, Causes, and Consequences." *Review of Financial Studies* 22 (8): 3131–69.

Albuquerque, Rui, Luis Brandão-Marques, Miguel A. Ferreira, and Pedro Matos. 2013. "International Corporate Governance Spillovers: Evidence from Cross-Border Mergers and Acquisitions." IMF Working Paper 13/234, International Monetary Fund, Washington, DC.

Albuquerque, Rui, and Neng Wang. 2008. "Agency Conflicts, Investment, and Asset Pricing." *Journal of Finance* 63 (1): 1–40.

Amihud, Yakov. 2002. "Illiquidity and Stock Returns: Cross-Section and Time-Series Effects." *Journal of Financial Markets* 5 (1): 31–56.

Anginer, Deniz, Asli Demirgüç-Kunt, Vojislav Maksimovic, and Mete Tepe. 2015. "Is Short-Term Debt a Substitute or a Complement to Good Governance?" Chap. 2 in *Global Financial Development Report 2015/16.* Washington, DC: World Bank.

Bebchuk, Lucian A., and Assaf Hamdani. 2009. "The Elusive Quest for Global Governance Standards." *University of Pennsylvania Law Review* 157 (5): 1263–1317.

Beck, Thorsten, Asli Demirgüç-Kunt, and Ross Eric Levine. 2010. "Financial Institutions and Markets across Countries and over Time: The Updated Financial Development and Structure Database." *World Bank Economic Review* 24 (1): 77–92.

Berger, Philip G., Eli Ofek, and David L. Yermack. 1997. "Managerial Entrenchment and Capital Structure Decisions." *Journal of Finance* 52 (4): 1411–38.

Black, Bernard S., Barry Metzger, Timothy O'Brien, and Young Moo Shin. 2001. "Corporate Governance in Korea at the Millennium: Enhancing International Competitiveness (Final Report and Legal Reform Recommendations to the Ministry of Justice of the Republic of Korea)." *Journal of Corporate Law* 26: 537–608.

Brandão-Marques, Luis. Forthcoming. "Stock Market Liquidity in Chile." IMF Working Paper, International Monetary Fund, Washington, DC.

———, Gaston Gelos, and Natalia Melgar. 2013. "Country Transparency and the Global Transmission of Financial Shocks." IMF Working Paper 13/156, International Monetary Fund, Washington, DC.

Chan, Kalok, Vicentiu Covrig, and Lilian Ng. 2009. "Does Home Bias Affect Firm Value? Evidence from Holdings of Mutual Funds Worldwide." *Journal of International Economics* 78 (2): 230–41.

Chan, Kalok, Allaudeen Hameed, and Wenjin Kang. 2013. "Stock Price Synchronicity and Liquidity." *Journal of Financial Markets* 16 (3): 414–38.

Chen, Gongmeng, Michael Firth, and Liping Xu. 2009. "Does the Type of Ownership Control Matter? Evidence from China's Listed Companies." *Journal of Banking and Finance* 33 (1): 171–81.

Chen, Kevin C. W., Zhihong Chen, and K. C. John Wei. 2009. "Legal Protection of Investors, Corporate Governance, and the Cost of Equity Capital." *Journal of Corporate Finance* 15 (3): 273–89.

Claessens, Stijn, Simeon Djankov, Joseph Fan, and Larry Lang. 1999. "Expropriation of Minority Shareholders: Evidence from East Asia." World Bank Policy Research Paper 2088, World Bank, Washington, DC.

Claessens, Stijn, Erik Feijen, and Luc Laeven. 2008. "Political Connections and Preferential Access to Finance: The Role of Campaign Contributions." *Journal of Financial Economics* 88 (3): 554–80.

Claessens, Stijn, and B. Burcin Yurtoglu. 2013. "Corporate Governance in Emerging Markets: A Survey." *Emerging Markets Review* 15 (C): 1–33.

De Nicolo, Gianni, Luc Laeven, and Kenichi Ueda. 2008. "Corporate Governance Quality: Trends and Real Effects." *Journal of Financial Intermediation* 17 (2): 198–228.

DeWenter, Kathryn L., and Paul H. Malatesta. 2001. "State-Owned and Privately Owned Firms: An Empirical Analysis of Profitability, Leverage, and Labor Intensity." *American Economic Review* 91 (1): 320–34.

Djankov, Simeon, Oliver Hart, Caralee McLiesh, and Andrei Shleifer. 2008a. "Debt Enforcement around the World." *Journal of Political Economy* 116 (6): 1105–49.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2008b. "The Law and Economics of Self-Dealing." *Journal of Financial Economics* 88 (3): 430–65.

Doidge, Craig, G. Andrew Karolyi, and René M. Stulz. 2004. "Why Are Foreign Firms Listed in the U.S. Worth More?" *Journal of Financial Economics* 71 (2): 205–38.

Faccio, Mara, Larry H. P. Lang, and Leslie Young. 2010. "Pyramiding vs Leverage in Corporate Groups: International Evidence." *Journal of International Business Studies* 41 (1): 88–104.

Ferreira, Miguel A., and Paul A. Laux. 2007. "Corporate Governance, Idiosyncratic Risk, and Information Flow." *Journal of Finance* 62 (2): 951–89.

Gelos, R. Gaston, and Shang-Jin Wei. 2005. "Transparency and International Portfolio Holdings." *Journal of Finance* 60 (6): 2987–3020.

Gompers, Paul, Joy Ishii, and Andrew Metrick. 2003. "Corporate Governance and Equity Prices." *Quarterly Journal of Economics* 118 (1): 107–56.

Guillén, Mauro F., and Laurence Capron. 2016. "State Capacity, Minority Shareholder Protections, and Stock Market Development." *Administrative Science Quarterly* 20: 1–36.

Hsin, Chin-Wen, and Yuehtzu Liao. 2003. "Stock Price Synchronicities in Emerging Markets." EFMA 2003 Helsinki Meetings Paper, European Financial Management Association, Helsinki.

Hutton, Amy P., Alan J. Marcus, and Hassan Tehranian. 2009. "Opaque Financial Reports, R^2, and Crash Risk." *Journal of Financial Economics* 94 (1): 67–86.

International Monetary Fund (IMF). 2016. "The People's Republic of China: Selected Issues." IMF Country Report 16/271, International Monetary Fund, Washington, DC.

Jensen, Michael C. 1986. "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers." *American Economic Review* 76 (2): 323–29.

——— , and William H. Meckling. 1976. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." *Journal of Financial Economics* 3 (4): 305–60.

Jin, Li, and Stewart C. Myers. 2006. "R^2 around the World: New Theory and New Tests." *Journal of Financial Economics* 79 (2): 257–92.

John, Kose, and Lubomir Litov. 2008. "Corporate Governance and Financing Policy: New Evidence." Paper presented at the American Finance Association 2006 Annual Meeting, Boston, MA.

John, Kose, and Lemma W. Senbet. 1998. "Corporate Governance and Board Effectiveness." *Journal of Banking & Finance* 22 (4): 371–403.

Johnson, Simon, Peter Boone, Alasdair Breach, and Eric Friedman. 2000. "Corporate Governance in the Asian Financial Crisis." *Journal of Financial Economics* 58 (1–2): 141–86.

Klapper, Leora F., and Inessa Love. 2004. "Corporate Governance, Investor Protection, and Performance in Emerging Markets." *Journal of Corporate Finance* 10 (5): 703–28.

Kowalski, Przemyslaw, Max Büge, Monika Sztajerowska, and Matias Egeland. 2013. "State-Owned Enterprises: Trade Effects and Policy Implications." OECD Trade Policy Paper 147, Organisation for Economic Co-operation and Development, Paris.

Laeven, Luc, and Fabián Valencia. 2012. "Systemic Banking Crises Database: An Update." IMF Working Paper 12/163, International Monetary Fund, Washington, DC.

Lam, W. Raphael, and Alfred Schipke. Forthcoming. "Emerging State-Owned Enterprises Reform in China." In *China: Investing in Soft Infrastructure*, edited by Raphael W. Lam, Alfred Schipke, and Markus Rodlauer. Washington, DC: International Monetary Fund.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. 1997. "Legal Determinants of External Finance." *Journal of Finance* 52 (3): 1131–50.

———. 1998. "Law and Finance." *Journal of Political Economy* 106 (6): 1113–55.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Guillermo Zamarripa. 2003. "Related Lending." *Quarterly Journal of Economics* 118 (1): 231–68.

Morck, Randall, Daniel Wolfenzon, and Bernard Yeung. 2005. "Corporate Governance, Economic Entrenchment, and Growth." *Journal of Economic Literature* 43 (3): 655–720.

Morck, Randall, Bernard Yin Yeung, and Wayne Yu. 2013. "R2 and the Economy." *Annual Review of Financial Economics* (5): 143–66.

———. 2000. "The Information Content of Stock Markets: Why Do Emerging Markets Have Synchronous Stock Price Movements?" *Journal of Financial Economics* 58 (1–2): 215–60.

Oman, Charles, Steven Fries, and Willem Buiter. 2003. "Corporate Governance in Developing, Transition and Emerging-Market Economies." Policy Brief 23, OECD Development Centre, Organisation for Economic Co-operation and Development, Paris.

Organisation for Economic Co-operation and Development (OECD). 2015. *OECD Guidelines on Corporate Governance of State-Owned Enterprises*. 2015 ed. Paris: OECD.

Rajan, Raghuram G., and Luigi Zingales. 1998. "Financial Dependence and Growth." *American Economic Review* 88 (3): 559–86.

Shleifer, Andrei, and Robert W. Vishny. 1989. "Management Entrenchment: The Case of Manager-Specific Investments." *Journal of Financial Economics* 25 (1): 123–39.

———. 1994. "Politicians and Firms." *Quarterly Journal of Economics* 109 (4): 995–1025.

———. 1997. "A Survey of Corporate Governance." *Journal of Finance* 52 (2): 737–83.

Stulz, René M. 2005. "The Limits of Financial Globalization." *Journal of Finance* 60 (4): 1595–638.

Tirole, Jean. 2006. *The Theory of Corporate Finance*. Princeton, NJ: Princeton University Press.