

Summary

This chapter describes the growth and risks of and regulatory responses to shadow banking—financial intermediaries or activities involved in credit intermediation outside the regular banking system, and therefore lacking a formal safety net.

The largest shadow banking systems are found in advanced economies, where more narrowly defined shadow banking measures indicate stagnation, while broader measures (which include investment funds) generally show continued growth since the global financial crisis. In emerging market economies, the growth of shadow banking has been strong, outpacing that of the traditional banking system.

Although shadow banking takes vastly different forms across and within countries, some of the key drivers behind its growth are common to all: a tightening of banking regulation and ample liquidity conditions, as well as demand from institutional investors, tend to foster nonbanking activities. The current financial environment in advanced economies remains conducive to further growth in shadow banking. Many indications there point to the migration of some activities—such as lending to firms—from traditional banks to the nonbank sector.

Shadow banking can play a beneficial role as a complement to traditional banking by expanding access to credit or by supporting market liquidity, maturity transformation, and risk sharing. It often, however, comes with bank-like risks, as seen during the 2007–08 global financial crisis. Although data limitations prevent a comprehensive assessment, the U.S. shadow banking system appears to contribute most to domestic systemic risk; its contribution is much less pronounced in the euro area and the United Kingdom.

The challenge for policymakers is to maximize the benefits of shadow banking while minimizing systemic risks. This chapter encourages policymakers to address the continued expansion of finance outside the regulatory perimeter through a more encompassing approach to regulation and supervision that focuses both on activities and on entities and places greater emphasis on systemic risk. To begin with, however, important data gaps need to be addressed because even aggregate information about many activities remains scarce in most countries.

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INTRODUCTION

Shadow banking, broadly defined as credit intermediation outside the conventional banking system, constitutes about one-fourth of total financial intermediation worldwide. The official financial community has (through the Financial Stability Board [FSB], of which the IMF is a member) been engaged since 2011 in a global project to monitor and measure shadow banking, and to adapt the regulatory framework to better address shadow banking risks. The United States, the euro area, and the United Kingdom have the largest shadow banking systems according to FSB data (Figure 2.1). In the United Kingdom, shadow banking assets as a share of GDP are more than twice those in any other area, and only in the United States do shadow banking assets exceed those of the conventional banking system. Shadow banking has been growing rapidly in emerging market economies.

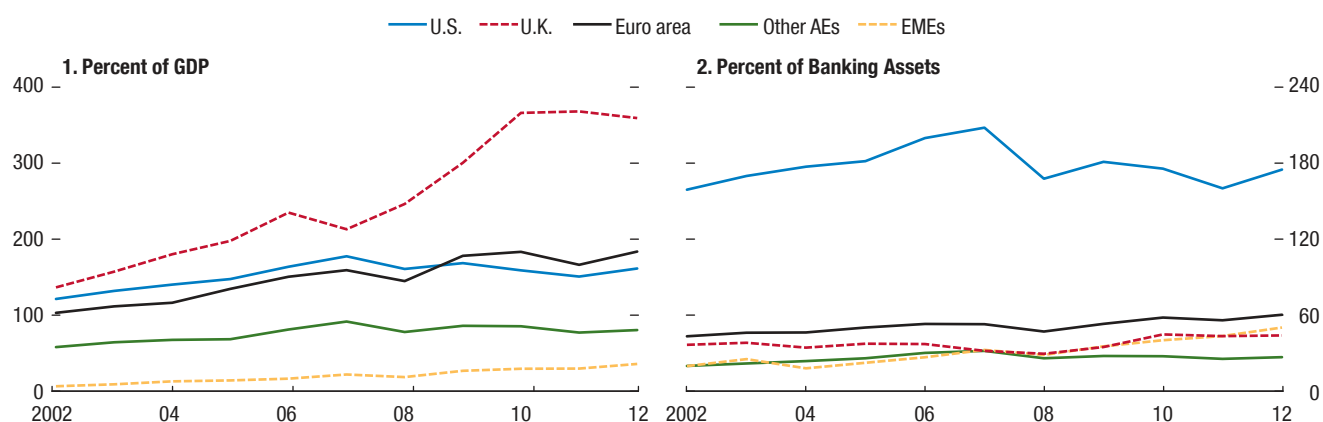
Shadow banking can complement traditional banking by expanding access to credit or by supporting market liquidity, maturity transformation, and risk sharing. For example, in developing economies, finance companies and microcredit lenders often provide credit and investments to underbanked communities, sub-prime customers, and low-rated firms (Ghosh, Gonzalez del Mazo, and Ötker-Robe 2012). In advanced economies, various types of funds have been stepping in (often as intermediaries for insurance companies and pension funds) to provide long-term credit to the private sector while banks have been repairing their

balance sheets and retrenching from certain activities (see the April 2014 *Global Financial Stability Report* [GFSR]). In fact, lending by shadow banking entities contributes significantly to total lending in the United States and is rising in many countries, including in the euro area (Figure 2.2). Finally, shadow banks often enhance the efficiency of the financial sector by enabling better risk sharing and maturity transformation and by deepening market liquidity (Claessens and others 2012). For example, securitization mobilizes illiquid assets, and structured finance techniques can be used to tailor risk and return distributions to better fit the needs of ultimate investors.

However, the global financial crisis revealed that, absent adequate regulation, shadow banking can put the stability of the financial system at risk in several ways. In advanced economies, some shadow intermediaries (such as money market mutual funds [MMFs] and securitization vehicles) were highly leveraged or had large holdings of illiquid assets during the crisis, and were vulnerable to runs when investors withdrew large quantities of funds at short notice. This led to fire sales of assets, which intensified the financial turmoil by reducing asset values and helped spread the stress to traditional banks. Since then, global regulatory reforms coordinated by the FSB have called for greater disclosure of asset valuations, improved governance, ownership reforms, and stricter oversight and regulation of shadow banks (FSB 2013a, 2013b).

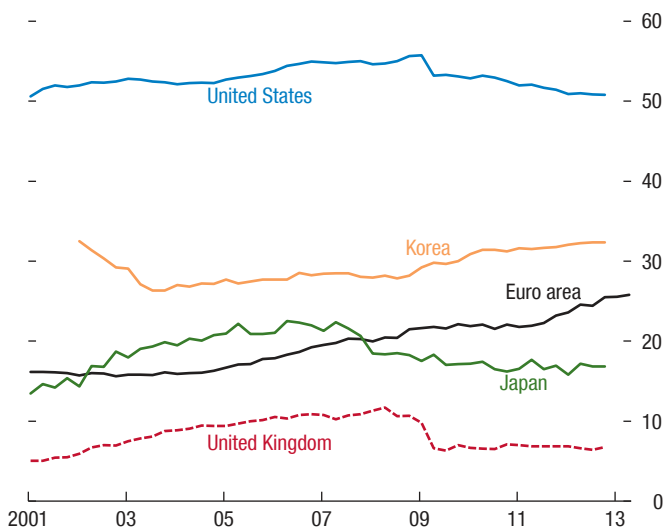
Since the crisis, the ongoing tightening of bank regulations may be encouraging a shift of traditional

Figure 2.1. Broad Shadow Banking Measures



Sources: Financial Stability Board; IMF, World Economic Outlook database; and IMF staff estimates.
 Note: AE = advanced economy; EME = emerging market economy. For sample coverage, see Table 2.3.

Figure 2.2. Lending by Shadow Banks
(Percent of bank and shadow bank lending)



Sources: Haver Analytics; national central banks; and IMF staff estimates.

banking activities into the shadows. The interplay of different regulations (capital, liquidity, activity restrictions, and governance) and increased compliance costs and legal risks may be affecting banks' willingness to support certain activities (for example, lending to smaller enterprises, leveraged loans, project finance, and hedging). Increased scrutiny of the shadow banking system is only beginning to reveal the patterns of these shifts, and their implications for systemic risk are not yet well understood.

This chapter aims to provide a conceptual framework for understanding different types of shadow banking around the world by answering the following questions:

- How has shadow banking evolved since the early 2000s in advanced and emerging market economies?
- What drives the growth of shadow banking? Are there common underlying factors across advanced and emerging market economies?
- When does shadow banking activity become a risk to financial stability?
- What can regulation and supervision do to contain shadow banking risks without unduly stifling financial intermediation?

The chapter highlights key commonalities across vastly differing forms of shadow banking. First, it identifies the different dimensions of risk associated with diverse

shadow banking activities and entities. Second, it compares various measures of shadow banking, including a new one introduced here. Third, it provides a statistical analysis of factors driving the growth of shadow banking, illustrates the findings with country examples, and highlights key similarities. Fourth, it offers a risk scoring of various shadow banking segments and presents a new assessment of the contribution of shadow banking to systemic risk in some major advanced economies. Fifth, it describes various recent shadow banking developments around the world. Finally, it relates the findings to the ongoing regulatory reform agenda and provides new, specific, and generally applicable proposals for further steps.

These are the main findings:

- Although shadow banking takes different forms around the world, the drivers of shadow banking growth are fundamentally very similar: shadow banking tends to flourish when tight bank regulations combine with ample liquidity and when it serves to facilitate the development of the rest of the financial system. The current financial environment in advanced economies remains conducive to further growth in shadow banking activities.
- Most broad estimates point to a recent pickup in shadow banking activity in the euro area, the United States, and the United Kingdom, while narrower estimates point to stagnation. Whereas activities such as securitization have seen a decline, traditionally less risky entities such as investment funds have been expanding strongly.
- In emerging market economies, shadow banking continues to grow strongly, outstripping banking sector growth. To some extent, this is a natural by-product of the deepening of financial markets, with a concomitant rise in pension, sovereign wealth, and insurance funds.
- So far, the (imperfectly) measurable contribution of shadow banking to systemic risk in the financial system is substantial in the United States but remains modest in the United Kingdom and the euro area. In the United States, the risk contributions of shadow banking activities have been rising, but remain slightly below precrisis levels. Our evidence also suggests the presence of significant cross-border effects of shadow banking in advanced economies. In emerging market economies, the growth of shadow banking in China stands out.
- In general, however, assessing risks associated with recent developments in shadow banking remains

difficult, largely because of a lack of detailed data. It is not clear whether the shift of some activities (such as lending to firms) from traditional banking to the nonbank sector will lead to a rise or reduction in overall systemic risk. There are, however, indications that, as a result, market and liquidity risks have risen in advanced economies (see also Chapter 1).

- Overall, the continued expansion of finance outside the regulatory perimeter calls for a more encompassing approach to regulation and supervision that combines a focus on both activities and entities and places greater emphasis on systemic risk and improved transparency. A number of regulatory reforms currently under development try to address some of these concerns (see Annex 2.4). This chapter advocates a macroprudential approach and lays out a concrete framework for collaboration and task sharing among microprudential, macroprudential, and business conduct regulators.

What Is Shadow Banking, and How Should It Be Measured?

Most studies define shadow banking by the nature of the entity that carries it out: it is usually less regulated than traditional banks and lacks a formal safety net (for example, Claessens and Ratnovski 2014). Other definitions focus instead on instruments (McCulley 2007; Mehrling and others 2013) or markets (Gorton and Metrick 2012). The FSB has described it as “credit intermediation involving entities and activities outside the regular banking system” (FSB 2013a—see Annex 2.1 for an overview of definitions used in the literature). This chapter introduces a new definition of shadow banking based on nontraditional (noncore) funding—in this “activity” concept, financing of banks and nonbank financial institutions through noncore liabilities constitutes shadow banking, regardless of the entity that carries it out. For example, according to this definition, securitization is shadow banking; whether it is conducted directly on balance sheet by a bank or indirectly through a special purpose vehicle (SPV) ultimately does not matter under the activity view.

An ideal definition would be precise and all-encompassing—which is difficult given the large differences in shadow banking activities across countries. In advanced economies, shadow banking typically involves a network of financial entities and activities that decompose the process of credit intermediation between lenders and borrowers into a sequence of discrete operations (see the inner quadrant in Figure

2.3 for a simplified schematic representation; for a more comprehensive description, see Pozsar and others 2013). In developing economies, these chains are usually absent, with shadow banking taking a more straightforward intermediation role between ultimate lenders and ultimate borrowers.

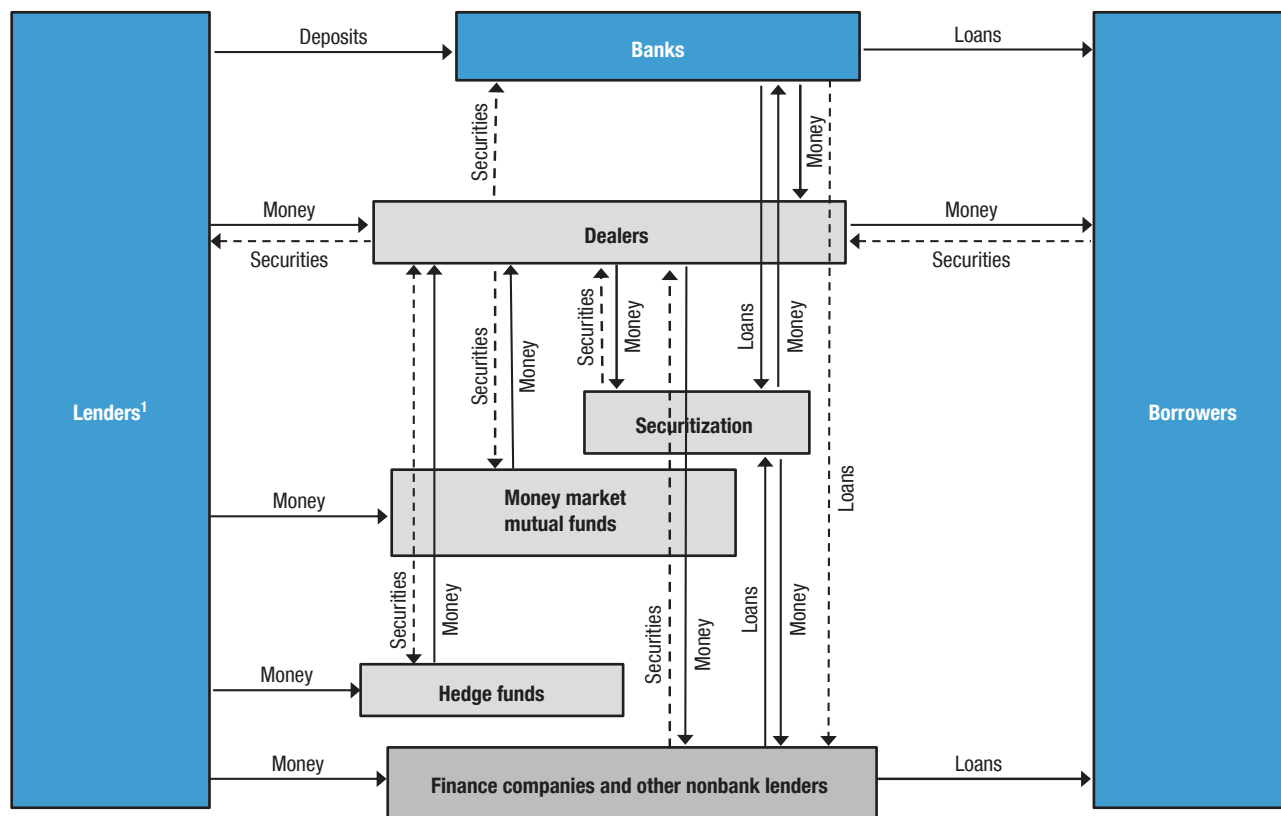
The usefulness of a definition also depends on the extent to which it covers relevant risk dimensions. These include the specific risks of each business model and its potential for spillovers (see Annex 2.2 and the section “Balance Sheet Risk Measures” in this chapter). These are the specific risks:¹

- *Run risk:* Since shadow banks perform credit intermediation, they are subject to a number of bank-like sources of risk, including run risk, stemming from credit exposures on the asset side combined with high leverage on the liability side, and liquidity and maturity mismatches between assets and liabilities. However, these risks are usually greater at shadow banks because they have no formal official sector liquidity backstops and are not subject to bank-like prudential standards and supervision (see Adrian 2014 for a review).
- *Agency problems:* The separation of financial intermediation activities across multiple institutions in the more complex shadow banking systems tends to aggravate underlying agency problems (Adrian, Ashcraft, and Cetorelli 2013).²
- *Opacity and complexity:* These constitute vulnerabilities, since during periods of stress, investors tend to retrench and flee to quality and transparency (Caballero and Simsek 2009).
- *Leverage and procyclicality:* When asset prices are buoyant and margins on secured financing are low, shadow banking facilitates high leverage. In periods of stress, the value of collateral securities falls and margins increase, leading potentially to abrupt deleveraging and margin spirals (FSB 2013b; Brunnermeier and Pedersen 2009).
- *Spillovers:* Stress in the shadow banking system may be transmitted to the rest of the financial system through ownership linkages, a flight to quality, and fire sales in the event of runs (see Box 2.1 and the section “Systemic Risk and Distress Dependence”). In good times,

¹Shadow banking does not only entail risk: it may contribute to financial stability because some entities (such as private equity funds) may be able to lend at very long maturities without facing the risk of a run.

²Ashcraft and Schuermann (2008) describe informational frictions in the securitization of subprime mortgage credit before the financial crisis.

Figure 2.3. Traditional versus Shadow Banking Intermediation



Source: IMF staff illustration.

Note: This simplified representation of the financial sector shows the flow of funds from lenders to borrowers. It does not show the reverse flows, such as bank deposit withdrawals and money market mutual fund redemptions. The blue boxes represent the components of a bank-based economy, with the rest representing the shadow banking sector. The boxes on the outside characterize a simple shadow banking system as might be found in a less developed economy. The lighter colored boxes in the middle reflect the kinds of shadow banking activities and entities usually associated with more advanced economies, with dealers as the hub of most activity. This activity comprises issuing securities on behalf of borrowers (including securitization vehicles, finance companies, and other nonbank lenders), providing prime broker services to hedge funds, and conducting repurchase agreements and securities lending. Securitization vehicles do not generally involve borrowers directly. Securitized assets generally come from banks and nonbank lenders, and securities from dealers. See Annex 2.2 for details on the role of securitization.

¹The lenders category includes institutional investors (such as insurance companies and pension funds) and official sector institutions (such as central banks and sovereign wealth funds).

shadow banks also may contribute substantially to asset price bubbles because, as less regulated entities, they are more able to engage in highly leveraged or otherwise risky financial activities (Pozsar and others 2013).

Recognizing the variation in these risks across countries, entities, and activities, the FSB deliberately starts by casting the net wide, but also offers a narrower definition that focuses on a subset of nonbank credit intermediation in which (1) systemic risk is increasing (in particular, through maturity and liquidity transformation, imperfect credit risk transfer, and leverage) and (2) regulatory arbitrage is undermining the benefits of financial regulation.

However, risk characteristics can differ even across similar activities, depending on the context in which they are conducted. Risk scores may differ by country or regulatory context and may change over time (see the section “Balance Sheet Risk Measures”). For example, risks surrounding repurchase agreements (repos) and securities lending depend on whether there are limits on the reuse of collateral. Similarly, the public in one country may regard shares in fixed-income mutual funds as bank-like deposits (possibly because of perceptions of implicit guarantees by governments or associated banks), but this perception may be different elsewhere and may also change over time. Therefore, risks need to be evaluated in light of country-specific conditions, regulations, and public perceptions.

Box 2.1. The Run on the Shadow Banking System and Bank Losses during the Financial Crisis

This box analyzes risk transmission in the shadow banking system as a chain of interlinked, risk-adjusted balance sheets. It shows that risks of shadow banks' reliance on short-term funding caused adverse spillovers to banks and guarantors, which had provided liquidity backstops and debt guarantees to these shadow entities.

Until 2007, shadow banking activities in the United States and Europe had grown very rapidly, but many of them collapsed during the financial crisis. Over time, the U.S. and European financial systems had come to rely increasingly on repo and securitization financing, through conduits and structured finance vehicles, while money market mutual funds (MMFs) and other funds benefited from inflows due to ample global liquidity (Figure 2.6). Eventually, rapidly rising defaults in the U.S. housing market in 2007 led to a liquidity crisis in the markets for private-label securitization and asset-backed commercial paper (ABCP) as investors refused to roll over their holdings (Acharya, Schnabl, and Suarez 2013). MMFs experienced a run in September

2008 after the default of Lehman Brothers, and MMF sponsors were unable to absorb the losses.¹

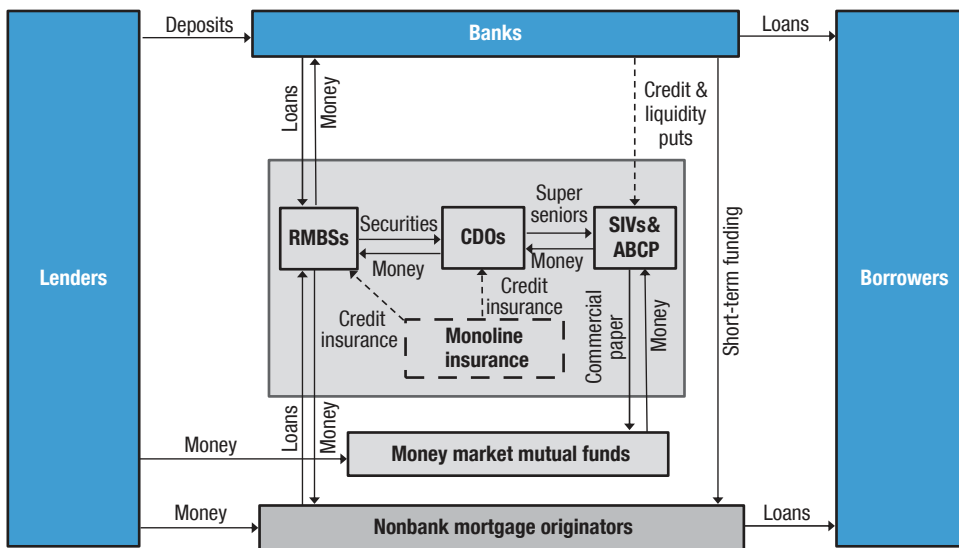
Contingent claims analysis (CCA) can be used to model banks' relationships with the U.S. shadow banking system. In essence, CCA models the financial system as a chain of interlinked, contingent claims (that is, risk-adjusted balance sheets). The claims include cross-holdings of risky prime and subprime debt. They also include residential mortgage-backed security tranches held in asset-backed commercial paper conduits and structured investment vehicles (SIVs) financed by short-term funds (Figure 2.1.1). Banks provided explicit liquidity and credit guarantees to ABCP conduits and SIVs and short-term loans to nonbank mortgage originators. "Monoline" insurers provided insurance against losses on ABCP and SIV borrowing.

In each risk-adjusted CCA balance sheet, assets equal equity and risky debt. An entity's equity can be modeled as an implicit call option on its assets. Risky debt equals the default-free value of debt minus

¹For a review of the causes of the crisis in the United States, including the evolution of shadow banking, see FCIC (2011).

The author of this box is Dale Gray.

Figure 2.1.1. U.S. Shadow Banking System



Source: IMF staff.

Note: This is a simplified schematic of the precrisis U.S. financial sector showing the flow of funds from lenders to borrowers and the interlinkages between them and shadow banks. Securitization vehicles include asset-backed commercial paper (ABCP) conduits, collateralized debt obligations (CDOs), residential mortgage-backed securities (RMBSs), and structured investment vehicles (SIVs). See notes to Figure 2.3 for further explanations.

Box 2.1 (continued)

the expected loss due to possible default and can be modeled as an implicit put option. If a third party (say, a bank or a monoline insurer) is providing a debt guarantee, the value of this guarantee can also be modeled as an implicit put option. For example, if commercial paper lenders provide short-term funds to an SIV with credit puts from a bank, the commercial paper provider is “long” the default-free value of the short-term debt, but the bank is “short” the implicit put option—that is, it provides a guarantee.²

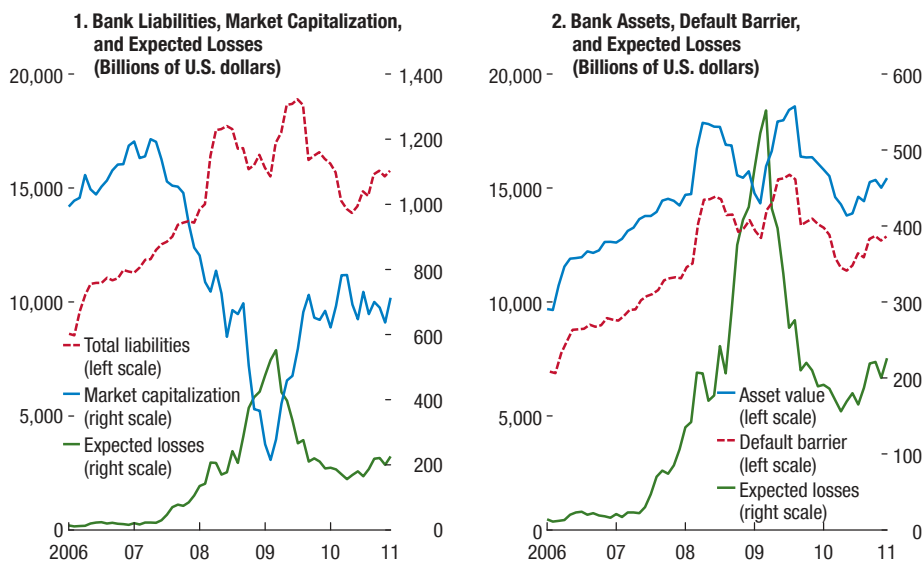
The CCA model of major U.S. and European banks captures a significant increase in expected losses as the crisis unfolded (Figure 2.1.2). From August 2007 to March 2009, bank liabilities rose by 32 percent (in part because they brought SIVs onto their balance sheets), and total market capitalization fell by 74 percent. Expected losses embedded in their liabilities (that is, implicit put options with three-year horizons) peaked at \$550 billion in March 2009 and averaged \$395 billion between September 2008 and August 2009. The activa-

tion of bank credit puts (guarantees) provided to ABCP and securitization vehicles contributed to this severe negative financial shock to the banks. Moreover, as housing prices began to fall in 2007, widespread mortgage refinancing led to a “refinancing ratchet effect” because higher interest rates applied to the refinancing, which dramatically increased mortgage defaults. Banks suffered directly from losses on residential mortgages because of a severe underestimation of the correlation between house prices and mortgage default (Khandani, Lo, and Merton 2013). This increased potential residential mortgage losses to \$1.7 trillion (inferred from implicit put options on mortgage debt) from June 2006 to December 2008.

This analysis highlights the ability of CCA analysis to provide timely information on the severity of bank losses as the crisis developed, unlike financial statements, which become available only with considerable lags. In this case, it also demonstrates how rapidly risk can increase for banks when they guarantee their off-balance-sheet vehicles when the latter engage in a search for yield that relies on short-term funding and funding backstops from parent banks.

²For more details on the CCA approach, see Gray, Merton, and Bodie (2008).

Figure 2.1.2. Contingent Claims Analysis Simulations of Implicit Shadow Banking Puts



Sources: Moody’s CreditEdge; and IMF staff estimates.
 Note: Data represent aggregates for Citibank, JPMorgan Chase & Co., Bank of America, Deutsche Bank, Credit Suisse, UBS, Barclays, and Royal Bank of Scotland. Total liabilities comprise debt and deposits. Expected losses are the sum of the implicit puts. Asset value equals equity and risky debt, which is measured as the default-free value of debt minus the expected loss from possible default. Default barrier is the default-free value of debt and deposits, estimated to be short term, plus one-half of long-term debt in the Moody’s framework.

Given these difficulties, no single definition or measure of shadow banking is likely to suffice for all purposes, and as a starting point, this chapter uses three different approaches to measure shadow banking. The first two measures are entity based; the third is activity based and derived from the noncore-financing definition of shadow banking.

- *Flow of funds measure:* Data from flow of funds accounts capture the financial assets of other financial intermediaries (OFIs). OFIs consist of (1) all non-bank financial corporations and quasi corporations engaged mainly in financial intermediation and (2) entities providing primarily long-term financing.
- *FSB measure:* Using flow of funds and sectoral accounts, the FSB constructs a broad measure of shadow banking activity based on nonbank financial intermediaries (NBFIs) engaged in credit intermediation activities, and a narrow measure, excluding NBFIs that do not provide credit intermediation directly—such as equity investment funds—and NBFIs that are prudentially consolidated into banking groups.³
- *The size of noncore liabilities:* This is a new measure, based on the funding definition of shadow banking presented earlier. It includes noncore liabilities both from banks and from “other financial corporations.”^{4,5} A *narrow* measure of noncore liabilities excludes those confined to the financial sector; it is thus a proxy for the intermediation between ultimate lenders and ultimate borrowers—that is, between the financial sector and the real economy. The difference between the broad and narrow measures represents an estimate of the amount of credit intermediation conducted *within* the shadow banking sector (Annex 2.1).^{6,7}

³Our proxy for the narrow FSB measure only excludes equity funds.

⁴For example, securitization can be seen as a way for intermediaries to tap nondeposit funding by creating securities that can be pledged as collateral (Shin 2010).

⁵See Harutyunyan and others (forthcoming). The measure is based on IMF member countries’ reporting of monetary data through the Standardized Report Form (SRF). However, only 36 of 142 SRF reporting countries provide data on other financial corporations. See also Annex 2.1, which discusses the reason for excluding insurance and pension funds and non-money-market investment funds from both the banking and shadow banking sectors.

⁶Noncore liabilities of the U.S. financial system are sometimes also used as proxies for global liquidity (IMF 2014b).

⁷The financial stability implications of the reliance by financial institutions on noncore liabilities depend on the degree to which these occur within group structures, such as conglomerates (especially if they span national borders).

These measures are conceptually somewhat different and can be expected to yield different size estimates.⁸ Each measure has its own merits and can be used to capture specific issues of interest (Table 2.1). For various analyses in this chapter, the chapter also examines specific shadow banking activities and entities in more detail, depending on data availability.

Whereas the flow of funds and the noncore measures exclude non-MMF funds, the FSB measure includes them. Both approaches have their merits. On the one hand, fund asset managers manage assets on behalf of clients. As opposed to bank deposit holders, clients bear gains and losses directly, rather than asset management firms. Therefore, as opposed to banks (which accept deposits with a liability of redemption at par and on demand [OFR 2013]), funds have typically not faced capital requirements; and studies have often excluded them from shadow banking measures (Bakk-Simon and others 2012; Adrian and Ashcraft 2012). However, more recently, concerns have been expressed that many of these funds can pose bank-like risks. For example, they can issue money-like liabilities; they can be vulnerable to runs in the event of an investor confidence crisis, particularly if they hold illiquid assets; and they often are subject to easy redemptions (OFR 2013; Feroli and others 2014). Runs can be transmitted through the rest of the financial system through fire sales, especially in the presence of leverage, and in the presence of high concentration in the industry. Herding into certain asset classes can magnify market volatility (Chapter 1). This chapter therefore considers both approaches.

How Much Is It Growing?

Main Facts

FSB estimates point to a recent pickup in shadow banking activity in the euro area, the United Kingdom, and the United States, while narrower gauges of shadow banking suggest stagnation. The different measures share a similar growth trend until 2007, when their paths markedly diverge (Figure 2.4). After a mild drop around 2008, the FSB measures show varying degrees of recovery in the United States, the euro area, and the United Kingdom. In contrast, the flow of funds and noncore liabilities measures remain broadly constant, which reflects two opposing forces: the decline in the

⁸The broad FSB measure is based on both disaggregated sectoral data and flow of funds statistics and hence may differ from the flow of funds measure.

Table 2.1. Comparison of Shadow Banking Measures

	Flow of funds	Financial Stability Board	Noncore liabilities
Coverage	Nonbank financial institutions <ul style="list-style-type: none"> Engaged in financial intermediation Providing long-term financing 	Nonbank financial institutions <ul style="list-style-type: none"> Engaged in financial intermediation Providing long-term financing 	Banks <ul style="list-style-type: none"> Nonbank financial institutions MMFs
	Excludes non-MMF investment funds	Includes non-MMF investment funds	Excludes non-MMF investment funds
	Advanced economies Former emerging market economies	Advanced economies Emerging market economies	Advanced economies Few emerging markets
Source	Flow of funds statistics Quarterly, long history, starting 1980s	Flow of funds and sector data, FSB Annual, short history, starting 2002	IFS Quarterly, short history, starting 2001
Entities/ Activities	Money market mutual funds	Money market mutual funds	Narrow measure includes: <ul style="list-style-type: none"> Restricted and nonresident deposits Securities Loans MMF shares/units
	Financial leasing corporations	Finance companies	
	Securitization vehicles	Securitization vehicles	
	Broker/dealers	Broker/dealers	
		Investment funds (bonds, equity, mixed)	
		Hedge funds	
	Country-specific entities <ul style="list-style-type: none"> Financial holding corporations Development capital companies Other entities 	Country-specific entities <ul style="list-style-type: none"> Financial holding corporations Private development banks Other entities 	Broad measure consists of narrow plus the following intra-financial-sector positions: <ul style="list-style-type: none"> Securities MMF shares/units
Venture capital corporations	Other (not specified)		
Features	Entity based (narrower entity set) Entity breakdown not always available Balance sheet breakdowns available Somewhat more country specific	Entity based (broader entity set) Broad and narrow measures No balance sheet breakdowns More cross-country consistency Not publicly available Data more subject to valuation effects (due to importance of investment funds)	Entity and activity based Broad and narrow measures No balance sheet breakdowns Somewhat country specific Relates to financial fragility literature Captures shadowy banking activities

Source: IMF staff.

Note: FSB = Financial Stability Board; MMF = money market mutual fund; IFS = IMF, International Financial Statistics database.

role of certain activities after the crisis, such as securitization and lending via repos and securities (Box 2.1), and a concomitant rise in other activities, including those of country-specific entities. The pickup in the FSB measures can be partly explained by positive valuation effects from the growth in the investment fund industry. The large difference between broad and narrow noncore funding measures in the United States (more than \$6 trillion in 2013) and in Japan and the euro area (about \$4 trillion in both cases) reflects significant activity within the financial system that is not fully captured by other shadow banking measures.⁹

In advanced economies, shadow banking seems to be shifting to less-well-monitored activities. Only investment funds, especially bond funds, country-specific entities, and “other” entities continued to grow after 2008 (Figure 2.5). The growth of the “other” entities could imply a shift in financial stability risk

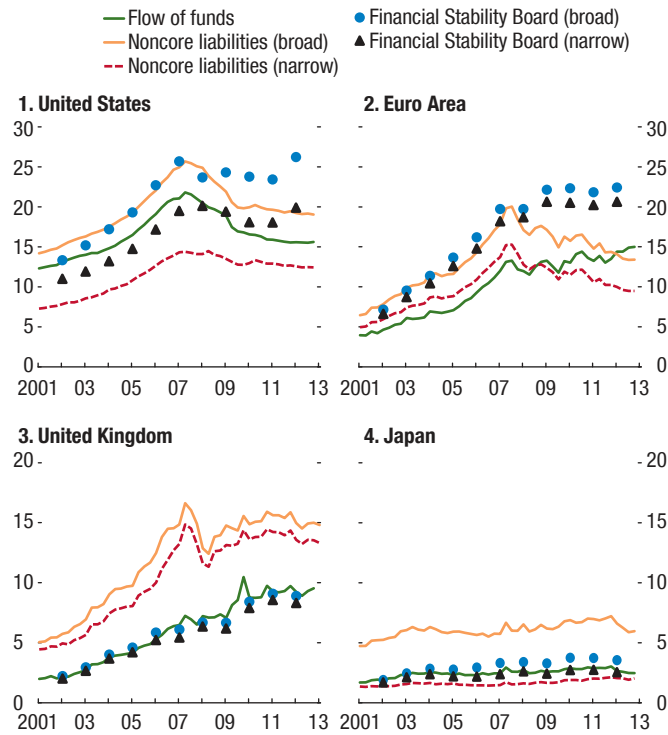
⁹The difference is small for the United Kingdom, but this is mainly related to a lack of disaggregated data. The large differential for Japan is attributable to the significance of noncore liabilities issued by public financial institutions.

toward activities that are not as well understood. Box 2.2 suggests that these may comprise new forms of direct lending and over-the-counter derivatives trading.

In emerging market economies, overall shadow banking continues to grow strongly. Shadow banking assets as a proportion of GDP expanded from 6 percent to 35 percent between 2002 and 2012 (see Figure 2.1), while banking sector assets grew from 30 percent to 70 percent of GDP over the same period.¹⁰ To some extent, an increase in shadow banking activities is a natural part of domestic financial deepening in these economies (April 2014 GFSR). The expansion of shadow banking was significantly driven by the growth of broker-dealer activities and finance companies as well as the growth of entities similar to MMFs (Figures 2.5 and 2.6). In some countries, including Brazil and South Africa, mutual funds have also been growing strongly; in others, including Mexico and Turkey, real estate investment trusts have expanded especially

¹⁰This growth is broad-based across emerging markets (FSB 2013c).

Figure 2.4. Alternative Measures of Shadow Banking Size
(Trillions of U.S. dollars)



Sources: European Central Bank; Financial Stability Board (FSB); Haver Analytics; IMF, International Financial Statistics database; and IMF staff estimates.
Note: FOF = flow of funds. The FSB broad measure includes all nonbank financial intermediaries; this figure's proxy for the narrow FSB measure excludes equity funds, but not entities prudentially consolidated with banks (for example, structured investment vehicles and retained securitization). The broad (narrow) noncore liabilities measure includes (excludes) intra-financial-sector liabilities. For the definition of U.S. flow of funds shadow bank entities, see Adrian and Ashcraft (2012). For the definition of euro area FOF shadow bank entities, see Bakk-Simon and others (2012). Euro area noncore liabilities cover liabilities of banks and, within the nonbank financial sector, only liabilities of financial vehicle companies, which explains the decline after 2008.

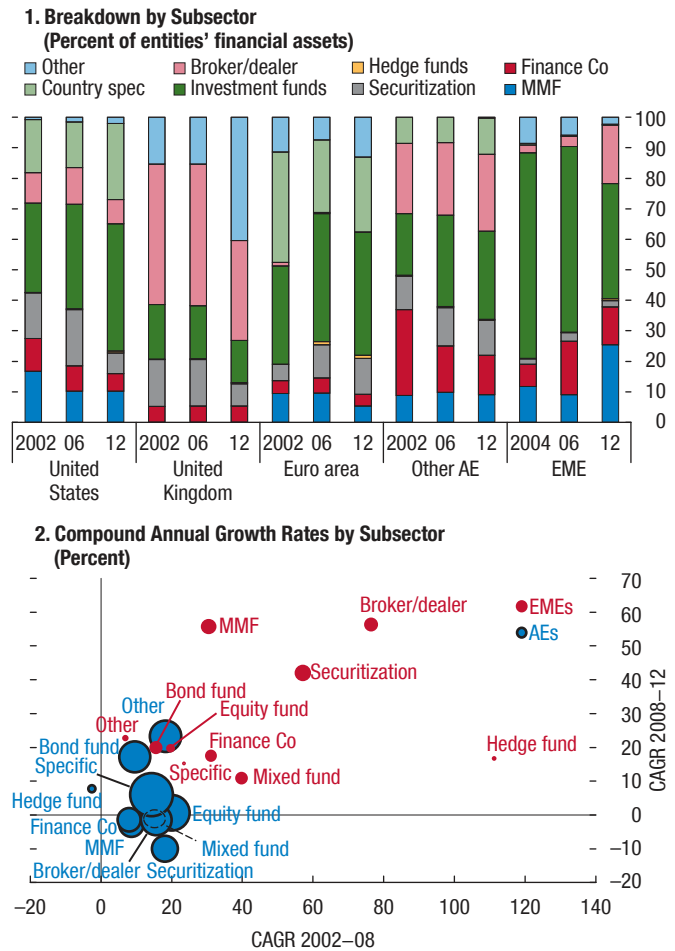
fast (albeit from a low base). In dollar terms, China's shadow banking sector became the fifth largest among FSB jurisdictions in 2012 (see Boxes 2.2 and 2.3).

What Contributes to Shadow Banking Growth?

This section identifies key drivers of the growth patterns just discussed, stressing commonalities across advanced and emerging market economies. Both quantitative analyses and concrete country examples are presented.

The literature suggests that a search for yield, regulatory arbitrage, and complementarities with the rest of the financial system play a role in the growth of shadow banking. First, when government bond yields are low

Figure 2.5. Shadow Banking Subsectors

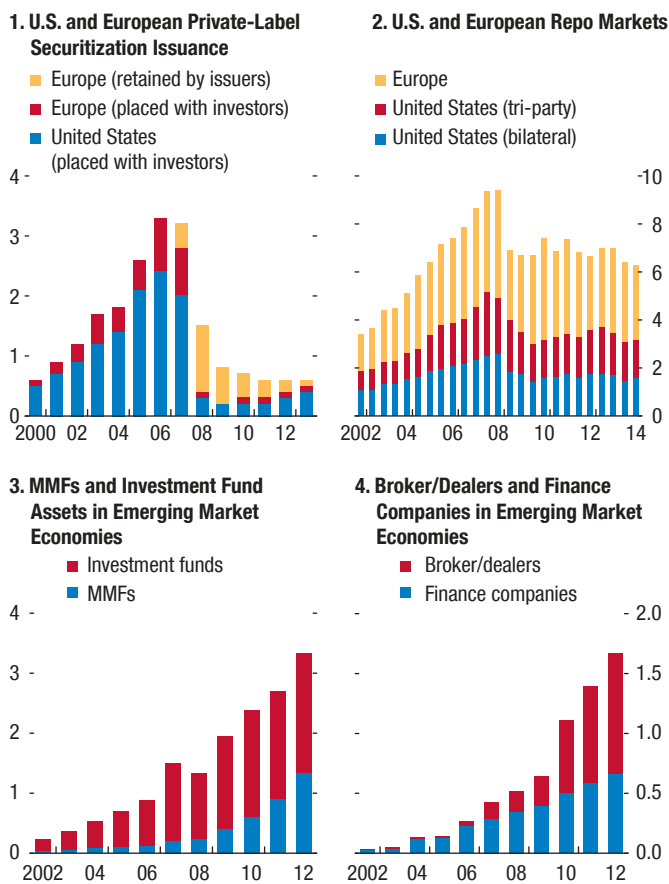


Sources: Financial Stability Board; European Central Bank; Hedge Fund Research (HFR); People's Bank of China; and IMF staff estimates.
Note: AE = advanced economy; CAGR = compound annual growth rate; Country spec/Specific = country-specific shadow entities, such as U.S. holding corporations, Dutch special financial institutions, and Swiss mortgage bond institutions; EME = emerging market economy; Finance Co = finance companies; MMF = money market mutual fund; Other = residual category. Investment funds in Figure 2.5 include bond, equity, and mixed funds. FSB data have been supplemented with hedge fund data from HFR, and some subsector trends have been extrapolated to produce this figure. An estimate of China's shadow banking sector was inferred from various issues of the China Financial Stability Report and WIND Info, and includes data on wealth management products, finance companies, trust loans and entrusted loans, securities investment funds, and bank acceptances. Growth rates are scaled by the subsectors' financial assets in 2012. For emerging market economies, CAGR in the first subperiod is for 2004-08 instead of 2002-08. For sample coverage, see Table 2.3.

and investors are looking for higher-yielding assets, it is the shadow banking system that often supplies those assets—the search-for-yield effect.¹¹ Some have stressed

¹¹See Jackson (2013); Caballero (2010); Goda, Lysandrou, and Stewart (2013); Goda and Lysandrou (2014); and Lysandrou (2009, 2012).

Figure 2.6. Size of the Shadow Banking Markets
(Trillions of U.S. dollars)



Sources: Association for Financial Markets in Europe; Board of Governors of the Federal Reserve System; Federal Reserve Bank of New York; CRE Finance Council; Financial Stability Board; Inside Mortgage Finance; International Capital Markets Association; JPMorgan Chase & Co.; and IMF staff estimates.
Note: MMF = money market mutual fund. For U.S. tri-party repurchase agreements (repos), data between 2002 and 2005 were interpolated.

the international dimension of the effect, pointing to the role of shadow banks in intermediating capital flows (Shin 2010; Mehrling and others 2013). Second, tighter bank regulation encourages institutions to circumvent it through nonbank intermediation.¹² This phenomenon has long been recognized in the literature on financial repression in developing economies (Vittas 1992). Third, growth of shadow banking can be complementary to the rest of the financial system. In emerging markets, the growth of pension funds and insurance companies has often come along with the growth of investment funds and other nonbank intermediaries

¹²See Kanatas and Greenbaum (1982); Bernanke and Lown (1991); Udell and Berger (1994); and Duca (1992, 2014).

(April 2014 GFSR). In the United States, argues Pozsar (2011), shadow banking grew from the demands of so-called institutional cash pools for alternatives to insured deposits and safe assets.¹³ However, to some extent, this, too, can be regarded as a special case of a reaction to regulations (that is, limits on deposit insurance) in an environment of ample liquidity. No comprehensive empirical assessment of the drivers of shadow banking appears to have been conducted yet.

Econometric evidence

Econometric analysis supports the role of these factors in explaining shadow banking growth. Given its broader coverage and higher frequency, this chapter uses the flow of funds measure (in national currency) as a proxy for the shadow banking system.¹⁴ Although many of the findings are consistent with causal interpretations as discussed above, the chapter does not claim to overcome potential endogeneity problems, and the results should be interpreted primarily as correlations. The main findings of the econometric assessment are that higher growth of shadow banking is associated with the following factors (Figure 2.7, Table 2.2, Annex 2.3):¹⁵

- *Bank regulation*: More stringent capital requirements, for example, are associated with stronger growth of shadow banking. This is consistent with the notion that banks have an incentive to shift activities to the nonbank sector in response to certain regulatory changes.

¹³Institutional cash pools include the liquidity tranche of foreign exchange reserves, corporate cash pools, institutional investors, and securities lenders' cash collateral reinvestment accounts.

¹⁴This sample largely comprises advanced economies, but given the significant time coverage, it also includes a number of countries emerging market economies in earlier years of the sample. The FSB measure (covering fewer countries, a shorter time span, and at a lower frequency, but comprising more emerging market economies) is also used in a robustness check (Annex 2.3). A separate estimation for emerging market economies was not possible due to lack of data. Estimations with the noncore liabilities measure yielded broadly similar results. For flow of funds estimations, all variables are measured in national currencies; hence, results are not affected by currency fluctuations. FSB data are measured in U.S. dollars; however, controlling for exchange-rate movements did not affect any of the findings reported here.

¹⁵Panel regressions were conducted to assess the potential role of these factors over the period 1990–2013. The level of real interest rates and the term spread were used to measure financial conditions, a variety of regulatory variables (from World Bank surveys on bank regulation and supervision) to measure the impact of regulation, and the growth of banking and insurance companies' and pension funds' assets to measure complementarities. To control for valuation effects, stock market returns were included in the model, but this did not affect the significance of any of the factors under examination.

Box 2.2. New Shadow Banking Developments

In advanced economies, nonbank lending is rapidly growing as banks are apparently withdrawing from certain activities in response to strengthened regulations.

- *Direct corporate lending in Europe and the United States:* New lenders comprise a wide and growing range of nonbank entities, including pension funds and insurers. Moreover, U.S. entities (such as private equity and distressed debt funds) are increasingly providing European firms with long-term funding. In the United States, according to market sources, the

nonbank share of leveraged lending rose from about 20 percent in 2000 to 80 percent in 2013, and loan funds expanded from \$80 billion to \$160 billion between 2010 and 2013 (Figure 2.2.1, panel 1).¹

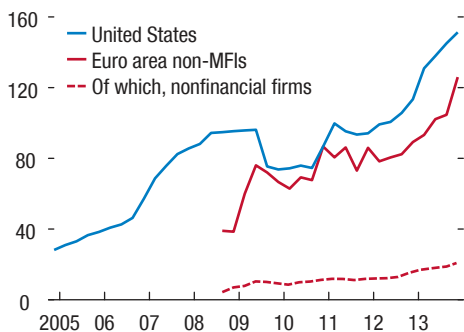
- *Peer-to-peer online lending platforms:* Although this market is currently small—about \$6.5 billion outstanding at the end of March 2014—its potential for growth is large (Kirby and Worner 2014). So far, most activity is taking place in the United States and the United Kingdom and is focused on loans to

The authors of this box are Nicolas Arregui, John Kiff, and Samar Maziad.

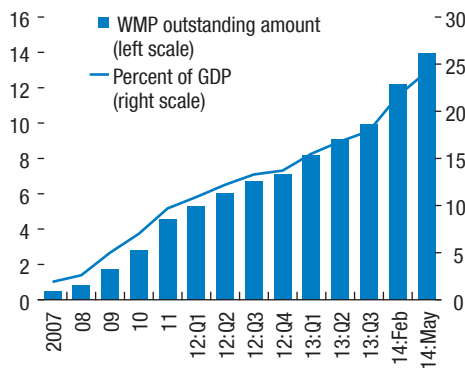
¹This is in line with the substitution effect found between investment funds and traditional banks in the preceding section.

Figure 2.2.1. New Shadow Banking Developments and Risks

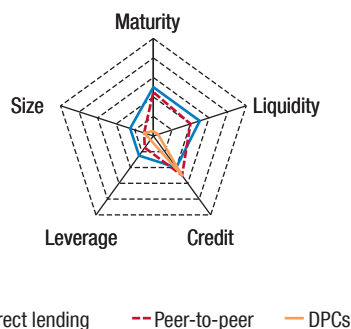
1. Mutual Fund Loans in the United States and Euro Area¹
(Billions of U.S. dollars)



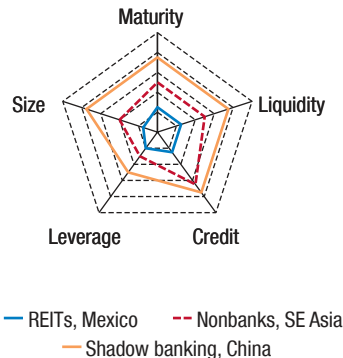
2. China: Wealth Management Products
(Trillions of yuan)



3. Risk Scoring in Advanced Economies



4. Risk Scoring in Emerging Market Economies



Sources: CEIC Data; China Banking Regulatory Commission; Haver Analytics; local media; and IMF staff calculations.

¹In Europe, mutual funds are typically limited to participations.

Note: DPC = derivative product company; MFI = monetary financial institution; REIT = real estate investment trust; SE = southeast; WMP = wealth management product. Panels 3 and 4 depict qualitative risk scoring of new shadow banking activities from low (toward the center) to high (on the edges of the figures), based on discussions with market participants, policymakers, and IMF staff, and on various research reports.

Box 2.2 (continued)

households and small businesses, although various institutions are seeking to securitize these loans, expand toward riskier borrowers, and form partnerships with banks (McCrum 2014; S&P 2014).

- *Mortgage servicing rights (MSRs)*: MSRs are rights to receive a portion of mortgage interest and fees collected from borrowers in return for administering loans. In the United States, banks have been selling MSRs to lightly regulated nonbank specialty servicing firms because of increased capital risk weights. Nonbank servicers accounted for \$1.8 trillion remaining principal balance on U.S. mortgages at the end of March 2014 versus nearly none at the end of 2010 (Kroll 2014). MSRs carry significant short-term risks in terms of compliance and operational factors (such as interruption of servicing or delays in transfers).
- *Derivative product companies (DPCs)*: DPCs are special-purpose companies set up by banks, jointly with private equity firms and hedge funds, to trade with non-affiliated counterparties in non-centrally cleared derivatives to avoid higher capital charges on the latter (Whittall 2014). Since DPCs may be rated higher than parent banks, they may attract business from rating-constrained counterparties and also help banks reduce their required liquidity buffers. So far, only a few DPCs have been newly established.

Among recent developments in emerging market economies, growth in shadow banking in China stands out.

- *Rapidly growing and varied shadow banking in China*: As of March 2014, shadow banking social financing had risen to 35 percent of GDP and is expanding at twice the rate of bank credit.² Entrusted loans and trust loans, originated outside the highly regulated banking system, account for a large share of shadow banking social financing.³

²Total social financing (TSF) is a broad measure of credit from the financial sector to the real economy computed by the People's Bank of China. Shadow banking social financing is defined as TSF minus bank loans, equity-like items, and bond issuance.

³Entrusted loans are loans between firms with banks or finance companies as payment agents. Trust loans are loans by trust companies that in turn structure these loans into trust schemes or wealth management products and sell them to investors.

Banks have also been issuing wealth management products (WMPs), which share some of the characteristics of structured investment vehicles and collateral debt obligations used by U.S. banks before 2008 to keep loans off their balance sheets.⁴ WMPs offer higher yields than bank deposit rates and are promoted as a low-risk instrument (see Box 2.3). In early 2014, WMPs accounted for 25 percent of GDP, growing by 50 percent since early 2013, and threefold since early 2011 (Figure 2.2.1, panel 2). Furthermore, retail payment platforms recently instituted a method of sweeping cash balances into money market mutual funds that in turn may (partly) invest in short-term commercial paper issued by local government financing vehicles. The growth of the latter form of shadow banking has been exponential, and it is subject to run risk because the money can be instantly redeemed, which would require the money market mutual fund to sell assets.

- *Real estate investment trusts (REITs) in Mexico*: With Mex\$16 billion in assets, the industry is small relative to the financial sector (less than 2 percent of banking assets). However, its importance is increasing rapidly. In 2013, REITs accounted for more than one-third of the funds raised by Mexican companies in the domestic equity market. Risks seem contained at this point; bank loan financing is low, and the authorities recently established limits on leverage and interest coverage ratios.
- *Lending by nonbanks in Southeast Asia*: In Malaysia, this activity accounted for roughly one-quarter of the increase in household debt since 2008, and in Thailand for nearly 30 percent of the increase since 2007.⁵ Because it has focused on lower- to middle-income households, it may be more risky than bank lending, although the authorities have taken mitigating action. Another trend in this region is the financing of large (cross-border) infrastructure projects through finance companies, funded by long-term institutional investors.

⁴Off-balance-sheet bank WMPs package various underlying assets, such as bonds, loans, or discounted bills that are sold to investors. WMPs by securities firms package fixed-income securities, equity, or loans.

⁵Household debt as a proportion of GDP rose in Malaysia from 60 percent in 2008 to 87 percent in 2013, and in Thailand from 55 percent in 2007 to 82 percent in 2013.

Box 2.3. China: Bank Characteristics and Wealth Management Product Issuance

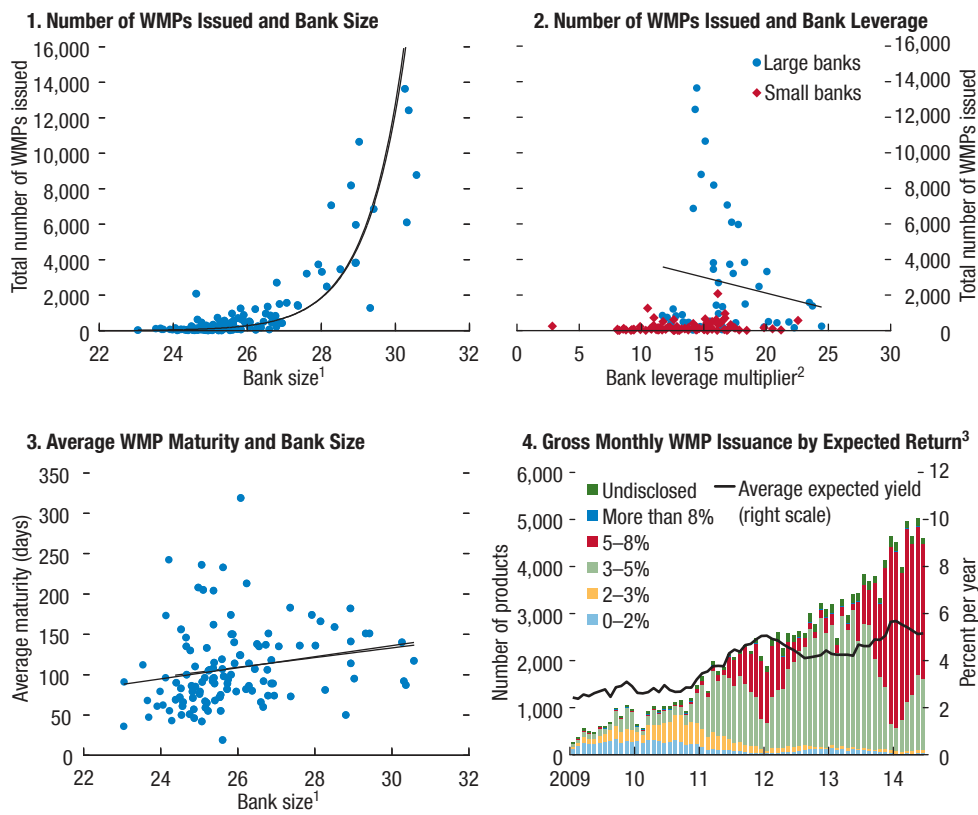
The growth of wealth management products (WMPs) is related to the size of Chinese banks (Figure 2.3.1, panel 1), implying that they may generate potentially higher financial stability risks for large banks. The majority of new WMPs are offered by banks, and larger banks tend to issue proportionally more. Because WMP yields are much higher than bank deposit rates or repo rates, and a significant number of them have guaranteed returns,

WMPs may entail a shift away from bank deposits and affect bank funding patterns and costs.

However, several mitigating factors are in place. For larger banks, higher issuance of WMPs is associated with lower leverage, suggesting that these banks have larger capital buffers to absorb deposit drains. For smaller banks, there is no apparent relationship between WMP issuance and leverage. Furthermore, larger banks tend to have WMPs with a longer tenor, which reduces liquidity and rollover risk. Moreover, on the asset side, many of the underlying loans are granted to public sector companies, which enjoy some form of implicit state guarantee.

The authors of this box are Viral Acharya, Zhishu Yang, and Shaun Roache.

Figure 2.3.1. Wealth Management Products in China



Sources: RESSET Data Tech Co., Ltd.; WIND Info; and IMF staff calculations.

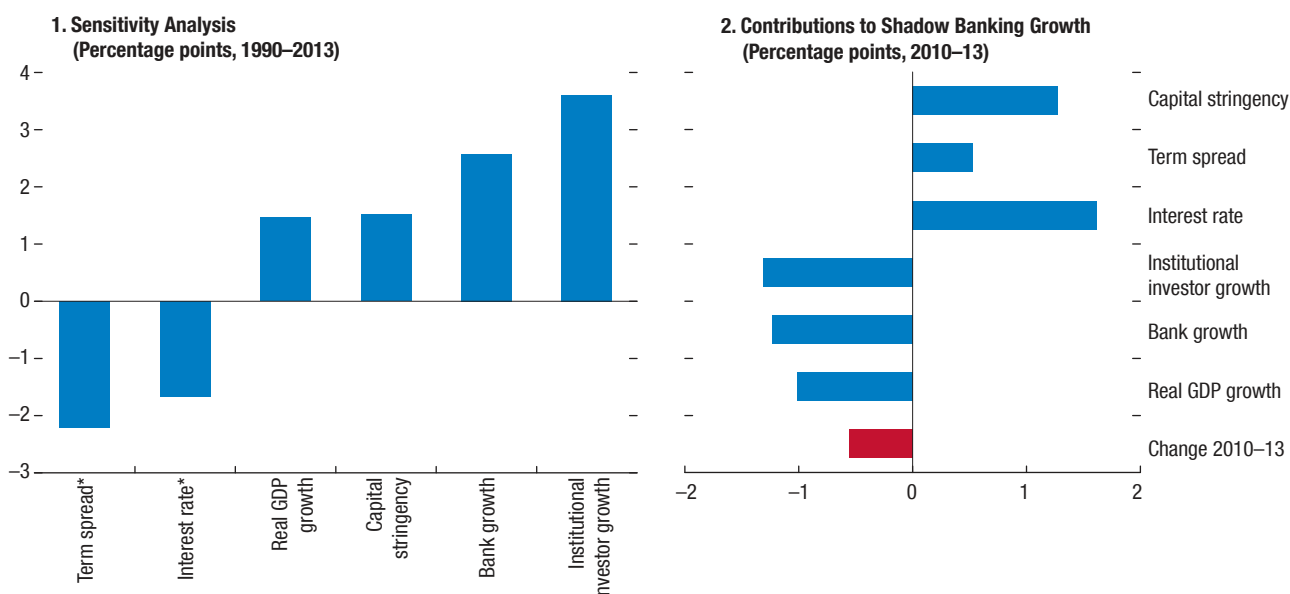
Note: WMP = wealth management product.

¹Log of total assets for 2013.

²Assets/equity for 2013.

³Sample covers all products issued by banks covered in WIND Info.

Figure 2.7. Drivers of Shadow Banking



Source: IMF staff calculations.

Note: Panel 1 shows the impact on growth rates for shadow banking (flow of funds measure) of a 1 standard deviation shock in each of the shown dependent variables (* = post-2008). Panel 2 shows the contribution to the change in average shadow banking growth rates from 2010 to 2013 of the changes in each of the listed independent variables over the same period. All variables are significant at the 5 percent level. The underlying model also includes a systemic crisis dummy. The model is estimated using panel data covering the period 1990–2013 and a sample of 29 mostly advanced economies. For more details on estimations and data, see Annex 2.3.

Table 2.2. Summary of Panel Regression on Shadow Banking Growth
(Flow of funds shadow banking measure)

	Expected sign	Estimate
Macrofinancial variables		
Real GDP growth	+	+
Banking sector size	+	+
Institutional investors size	+	+
Real short-term rate (lag 4)	-	n.s.
Real short-term rate (lag 4, post 2008)	-	-
Term spread (lag 4)	-	n.s.
Term spread (lag 4, post 2008)	-	-
Regulatory variables		
Overall capital stringency	+	+
Capital regulatory index	+	+
Supervisory power index	-	n.s.
Financial statement transparency	+/-	-
Global liquidity quantities (lag 4)	+	n.s.

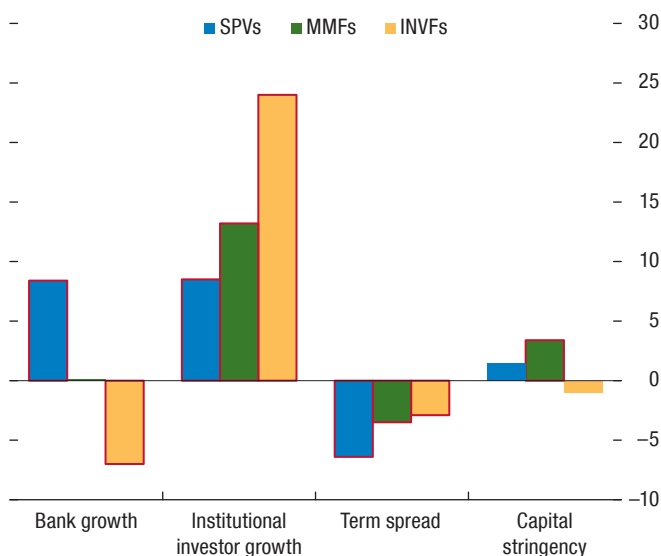
Source: IMF staff calculations.

Note: This table shows the expected and estimated signs of the determinants of the growth of shadow banking assets from panel regression models. If statistically significant at the 5 percent confidence level, the sign of the estimated coefficients is shown (+ or -). The table shows "n.s." if the variable is not statistically significant. Coefficients of macro-financial variables are taken from the baseline regression results (without regulatory variables), whereas coefficients of regulatory and global liquidity variables are taken from a regression where these variables are added one by one to the baseline regression. See Annex 2.3 for further details.

- *Liquidity conditions:* The negative correlation of shadow banking growth with term spreads and interest rates becomes considerably stronger after 2008.¹⁶ This shift is in line with the changed role of the term spread in the context of quantitative monetary easing since then. However, there was no direct evidence for the role of capital flows, possibly because their effects are already captured by the other explanatory variables.
- *Institutional cash pools and financial development:* Stronger growth of institutional investors is associated with higher growth in shadow banking, consistent with complementarities and demand-side effects. Alternatively, this could reflect a general trend in financial development.
- *Growing banking sector:* Countries with higher banking sector growth rates tend to experience higher growth of shadow banking, again suggesting

¹⁶Some studies argue that, at least in the United States, other effects related to the quantitative easing by the Federal Reserve have played a role in this period (Pozsar 2011; Singh 2013b).

Figure 2.8. Sensitivity Analysis by Subsector
(Percentage points)



Source: IMF staff calculations.

Note: INVF = investment funds (sum of equity, bond, and mixed funds); MMF = money market mutual fund; SPV = special purpose vehicle. The impact on sectoral growth rates for SPVs, MMFs, and INVFs of a 1 standard deviation shock is shown for the independent variables indicated. A red border denotes significance at the 5 percent level. The underlying model also includes a systemic crisis dummy and the year-over-year growth in real GDP. The model is estimated using panel data covering the period 2003–12 and a sample of 17 to 21 advanced and emerging market economies. For more details on estimations and data, see Annex 2.3.

complementarities.¹⁷ Alternatively, the results could reflect a general trend in financial deepening driven by other factors.

To gain further insight into the drivers of growth within subsectors of the shadow banking system, MMFs, investment funds, and securitization were examined separately (Figure 2.8). Because data for these particular shadow banking activities are more limited—they are available only since 2002, on an annual basis, and for a smaller number of countries—their explanatory power is more limited.

- *MMFs and investment funds:* Banking growth is not important in explaining the growth of MMFs, and the correlation is negative for investment funds, in line with the notion that the latter substitute for, rather than complement, the banking system.¹⁸

¹⁷Banks have also often sponsored shadow banking activities (see Mandel, Morgan, and Wei, 2012, for details).

¹⁸For MMFs, the insignificance of the banking sector may also reflect heterogeneity in the composition of MMFs: MMFs with fixed net asset values (NAVs) resemble bank deposits more closely than those with variable NAVs.

However, the growth of MMFs and investment funds is strongly associated with the growth of institutional investors, which supports the cash-pool demand hypothesis. Similarly, the compression of the term spread (capturing search for yield) plays only a small role for MMFs and investment funds.

- *Securitization:* The growth of private-label securitization via SPVs is strongly associated with growth of the banking sector, probably because SPVs are frequently sponsored or owned by banks. As expected, the growth of institutional investors is less correlated with the growth of securitization. Securitization growth is more strongly (and negatively) associated with the term spread than are MMFs. The impact of capital regulations is less important for securitization than for MMFs.

Country-specific evidence

This section complements the previous findings with country-specific examples. Viewed globally, shadow banking is highly varied, but the factors advancing its growth are often very similar.

Advanced economies

- *Regulatory arbitrage* following the 1988 Basel Accord spurred the growth of securitization in Europe and the United States. The Basel Accord on bank capital rules boosted the securitization of low-risk loan portfolios and the retention of high-risk loans because of a lack of differentiation between high- and low-quality loans (Allen 2004). In the late 1980s, regulatory arbitrage also motivated the introduction of collateralized debt obligations (CDOs) and structured investment vehicles (SIVs). The growth in securitization markets strengthened in the low-interest-rate environment in the mid-2000s, in line with the econometric evidence.
- *Bank restrictions, low real interest rates, and demand from institutional cash pools* have been key drivers behind the growth of MMFs in the United States. MMFs originated in the 1970s as a way to circumvent bank interest rate restrictions during times of rising inflation, which made real interest rates on regulated deposits increasingly negative (Calomiris 2013).¹⁹ Today, there is large demand for MMFs

¹⁹In addition, MMFs are exempt from reserve requirements and Federal Deposit Insurance Corporation deposit insurance taxes, and can take on some credit, market, and maturity risk without being subject to the full set of prudential regulation. Moreover, in the United States, MMFs have so far been able to use stable net asset

from so-called institutional cash pools (Pozsar 2011). However, bank regulation, now in the form of limits on deposit insurance, still contributes to demand because the limits induce large depositors to seek higher-seniority claim status with nonbank institutions that offer liquidity similar to that of bank deposits.

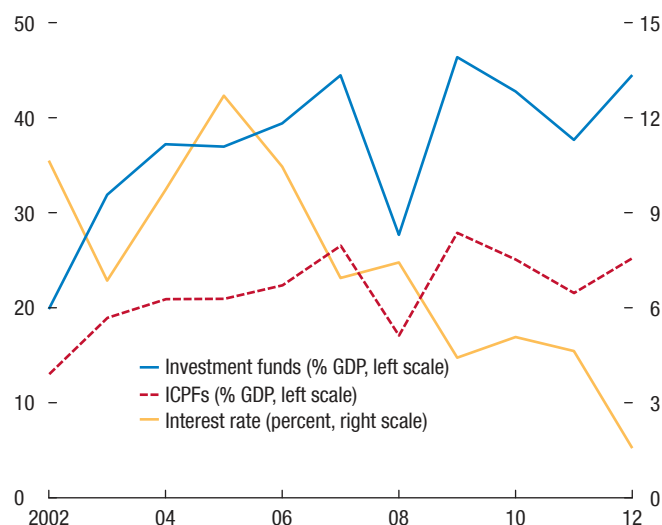
- *Search for yield, which began around the mid-2000s*, accelerated flows into hedge funds and private equity funds and stimulated the rapid growth of structured finance and investment funds. In the euro area, for example, low sovereign yields and ample liquidity in global financial markets were key factors in driving investors to seek higher returns in riskier markets (such as structured finance and leveraged buyouts [ECB 2006]).

Emerging market economies

- *Heightened restrictions on banks*, including on deposit rates, seem to be an important driver of shadow banking in China. In response to the rapid growth of bank lending and concerns about inflation, in 2010, the Chinese government placed significant restrictions on the traditional banking system (including more conservative credit quotas). The intervention slowed conventional lending but not off-balance-sheet loan originations (see Boxes 2.2 and 2.3).
- *Regulatory arbitrage and government support* encouraged the growth of special-purpose nonbank financial institutions (Sofoles) in Mexico. These institutions specialized in mortgage financing to lower- and middle-income households in the informal sector, and they remained outside the regulatory perimeter because they did not take deposits. Moreover, to improve financial access, the federal government provided them with support and backstopping, allowing their mortgage-backed securities to receive the highest credit rating. Severely hit during the global financial crisis, Sofoles had to transform into different legal entities, such as unregulated Sofomes.
- *Banking activity is complemented in India by nonbank financing companies*. Acharya, Khandwala, and Öncü (2013) find that these companies are seen by banks with less-developed branching networks as a way to complement credit allocation in nonurban areas of the Indian economy, in particular to meet their

values for reporting and redemption purposes—which sustained the perception of MMFs as a “safe” asset, although new regulations may alter this feature.

Figure 2.9. Brazil: Investment Funds, Insurance Companies and Pension Funds, and the Interest Rate (Percent)



Sources: Financial Stability Board; IMF, International Financial Statistics database; and IMF staff estimates.

Note: ICPF = insurance companies and pension fund. The interest rate is the real money market rate.

assigned targets for lending to priority sectors.²⁰

Hence, nonbank financial institutions sometimes are more able than banks to reach out to certain groups of borrowers.

- *The demand from institutional cash pools* appears to have played a role in the growth of investment funds in Brazil, where assets increased from 25 percent of GDP to 50 percent between 2002 and 2013. This growth was due in part to an increase in institutional investors (such as pension funds and insurance companies), which account for roughly 40 percent of the funds’ investor base (Figure 2.9). A search for yield in a period of falling real interest rates also likely contributed. Relative to total financial assets, however, the share of investment funds fell slightly.

Where Are the Risks, and What Is New?

This section assesses the various risks surrounding shadow banking entities. It analyzes systemic risk and interconnectedness in the financial sector for the euro area, the United Kingdom, and the United States. It also discusses benefits and risks related to recent devel-

²⁰“Priority sectors” are those that may not get timely or adequate credit in the absence of a special policy, and hence lending targets have been established for them.

opments in the shadow banking systems of advanced and emerging market economies (see Chapter 1).

Balance Sheet Risk Measures

Data from flow of funds and sectoral accounts can provide a quantitative approximation of various sources of shadow banking risk and their evolution. Specifically, in addition to size, rough approximations of maturity risk (based on whether assets are of long or short duration), liquidity risk (based on whether assets are liquid and easy to trade), credit risk (based on the share of loan assets that carry substantial credit risk), leverage (total assets to equity), and interconnectedness (how these entities are exposed to banks through asset holdings or liabilities) can be inferred from the flow of funds and sectoral balance sheet breakdowns.²¹ Using this information, rough risk scores can be constructed based on simple ratios for various entities in the euro area, Japan, and the United States.

Although useful, a risk analysis based on this type of data has limitations. Aggregation at the sectoral level can mask important vulnerabilities at the entity level. Some risks, such as fire sale and run risks, cannot be easily quantified, nor can some risks associated with the environment in which shadow banks operate (such as the extent of regulation and supervision and the availability of backstops). Moreover, risk scores of individual sectors may underestimate both interdependence among shadow banking entities and exposure to common factors, which can result in sudden and disproportional deterioration of these entities' balance sheets (Box 2.1 and the section "Systemic Risk and Distress Dependence" address some of these issues through the use of market prices). Nevertheless, despite its limitations, this level of analysis may be a useful starting point for assessing the magnitude of risks posed by shadow banking entities and for tracking their evolution over time.

A look at some key shadow banking sectors for major advanced economies supports the notion that a granular examination is required to assess risks (Figure 2.10). Even this relatively simple scoring method reveals significant variations in risk dimensions across activities. Moreover, as highlighted earlier, similar types of activities carry different types of risks across countries and over time. For example, euro area MMFs

²¹The method used here largely follows the methodology proposed in FSB (2014).

seem to be more directly connected with banks and have longer-maturity and less-liquid assets than their U.S. and Japanese counterparts.

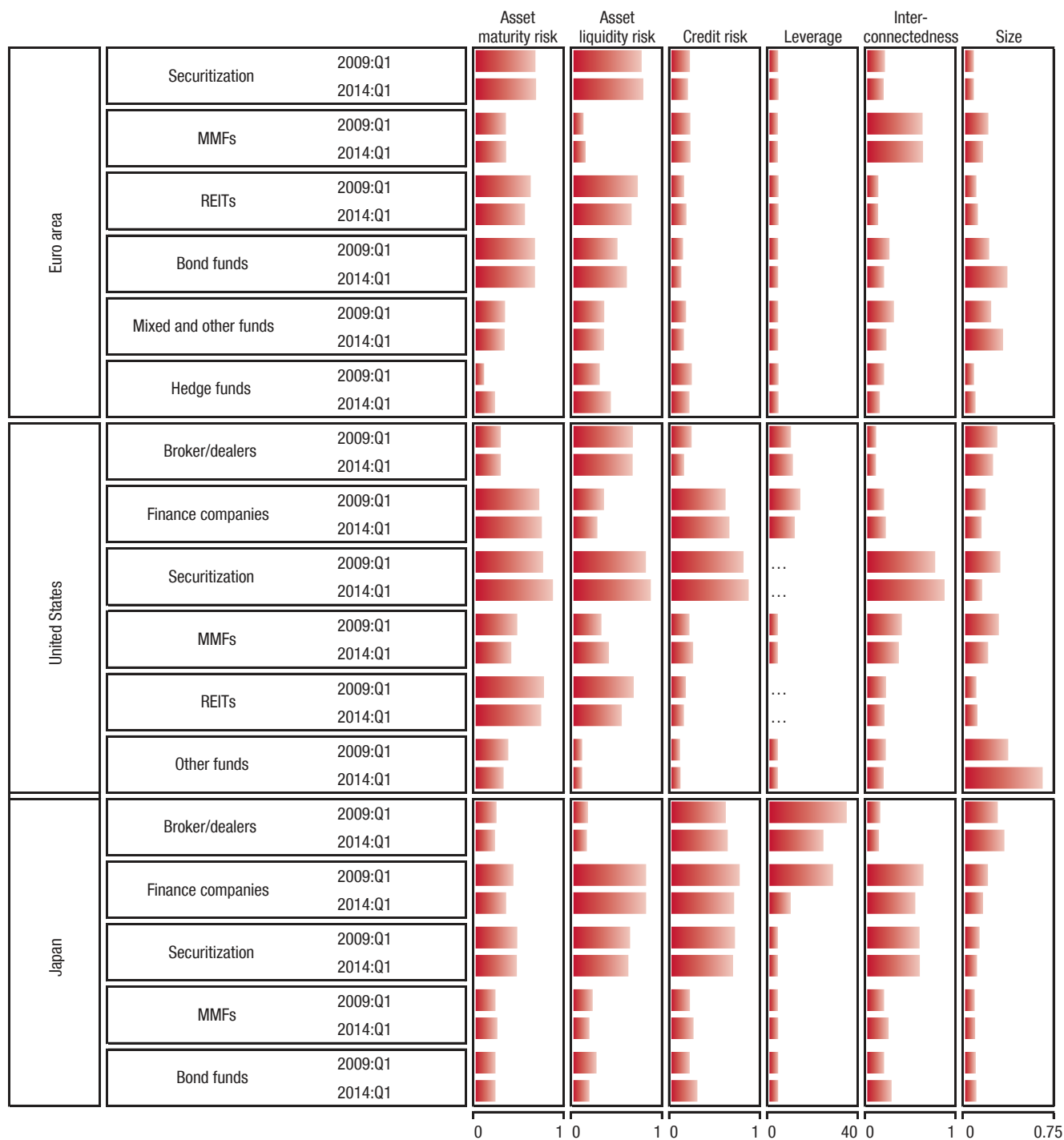
In the euro area and the United States, traditionally less risky activities have been growing the fastest since 2009, but to some extent, they are taking on more liquidity risk. In the euro area, bond, mixed, and other funds grew strongly, whereas securitization and the size of MMFs fell (see Figure 2.10). These funds tend to be exposed to some liquidity and maturity risk but score low on other risk dimensions. At least in the euro area, however, bond funds now tend to hold less-liquid and longer-maturity assets than five years ago. Similarly, in the United States, investment funds—which entail some maturity risk, but do not display high risk scores in other areas—have been the fastest-growing form of shadow banking, expanding from 35 percent to 70 percent of GDP. Their aggregate risk profile has, however, not changed markedly. A caveat to this is that the breakdown between different types of non-MMF funds is not available for the United States, where "other funds" also include equity funds. Chapter 1 highlights the rising asset flows into mutual funds focused on less liquid high-yield fixed-income assets, which can only partially be captured with the type of data examined here.²²

In Japan, broker/dealers (which show relatively high exposure to credit risk and leverage) gained market share. They grew from 25 percent to 31 percent of GDP, mainly because of higher repo holdings related to their market-making activity in Japanese government bonds (JGBs), while other shadow activities either declined or remained relatively small. Compared with U.S. broker/dealers, their Japanese counterparts appear to have higher (albeit falling) leverage and higher credit risk (but lower liquidity risk), but credit exposures pertain mainly to short-term loans and repos collateralized by JGBs. Other shadow banking entities do not seem to be systemically important in terms of size, although on certain risk dimensions they have relatively high scores (for example, finance companies on credit and liquidity risk, and securitization on interconnectedness).

Data limitations prevent computing similar risk scores for many (new) shadow banking activities, although this would be useful for monitoring pur-

²²For some other fund types, even fewer data are available. For example, exchange-traded funds (not included in "other funds") can transmit and amplify financial shocks originating in other parts of the financial system (OFR 2013). These products have grown rapidly, with \$1.7 trillion in combined U.S. assets at the end of March 2014.

Figure 2.10. Shadow Banking Risks in the Euro Area, the United States, and Japan



Sources: European Central Bank; Federal Reserve; Bank of Japan; Haver Analytics; SNL Financial; and IMF staff estimates.
 Note: This figure shows metrics of various sources of risk across shadow banking sectors. Longer bars indicate greater risk. Maturity risk = long-term assets to total assets; Liquidity risk = 1 minus liquid assets to total assets; Credit risk = loans to assets; Leverage = asset/equity multiplier; Interconnectedness = holdings of bank debt and loans to total assets; Size = ratio of sector's assets to GDP; MMF = money market mutual fund; REITs = real estate investment trusts. For U.S. funds and securitization vehicles (asset-backed securities issuers) and for Japanese shadow banking entities, some assumptions were made regarding asset liquidity and maturity, due to lack of disaggregated data. In the United States, "other funds" refers to non-MMF (open-end) mutual funds.

poses. So far, data are generally lacking to systematically monitor new, or even a range of existing, shadow banking activities and entities in most countries along these lines. Box 2.2 provides a qualitative discussion of some recent shadow banking developments around the world, together with a qualitative risk assessment.

Systemic Risk and Distress Dependence

This section estimates the contribution to systemic risk by subsectors of the financial system, including the shadow banking sector. It also estimates the vulnerability to distress of the banking sectors in the euro area, the United Kingdom, and the United States.²³ The financial system is treated as a portfolio consisting of several different subsectors (Segoviano and Goodhart 2009). Asset prices and size information from each subsector are used to estimate a joint probability distribution of portfolio (systemic) losses. This joint distribution allows computation of a measure of “marginal contribution to systemic risk” (MCSR) by each subsector, where systemic risk is measured as the losses to the system that occur with a probability of 1 percent or less.²⁴ A related exercise examines “vulnerability to distress,” defined as the risk that distress spills over to banks from other sectors and entities, either because of direct (balance sheet) exposures or indirect (common factor) linkages. Although the analysis attempts to span a substantial proportion of shadow banking activities, it does not cover all of them, and therefore likely underestimates the sector’s total contribution to risk. In particular, for cross-country comparability purposes, non-sovereign bond funds (discussed in Chapter 1) are excluded here. Moreover, the aggregate nature of the analysis means that not all types of risks can be fully captured; for example, certain funds may offer easier

redemption options than others and therefore be more exposed to run risk.

Nonbank financial intermediaries contribute substantially more to systemic risk in the United States than in the euro area or the United Kingdom (Figure 2.11). According to this analysis, in the United States, the largest MCSR does not come from the banking system but from pension funds and insurance companies and from shadow banks (captured by the sum of mutual funds—money market, equity, and bond funds—and hedge funds).²⁵ In the euro area and the United Kingdom, the banking sector contributes relatively more to systemic risk because of its size and direct and indirect interlinkages; the next most important systemic risks are related to pension funds and insurance companies—most likely because the euro area and the United Kingdom have more bank-based financial systems.²⁶ In the United States at the end of 2013, the shadow banking sector accounted for about 30 percent of systemic risk, about as much as the banking sector. However, for the euro area and the United Kingdom, the shadow banking sector MCSR amounts to only 13 percent and 7 percent, respectively. The contribution of different sectors to systemic risk is fairly stable over time.

The contribution of the shadow banking sector to banks’ vulnerability to distress is more elevated around crises. During stress periods in the United States, the contribution of the asset management sector (especially MMFs in 2007 and hedge funds in 2007–08) appears to increase, likely because of redemption pressures that led to fire sales of their assets. In the euro area, hedge funds as well as insurers seem to have contributed substantially to the vulnerability to distress in the banking sector in 2007–08, but the role of hedge funds was subsequently superseded by that of the equity and bond fund sectors (the latter is in line with the balance sheet risk measures in the previous section). In the United Kingdom, the overall contribution to the banking sector’s vulnerability to distress between 2007 and 2012 appears equally divided between insurance companies, pension funds, and equity funds; subsequently, insurance companies have become the largest contributor.

The growing contribution of the insurance sector to the banking system’s vulnerability to distress may

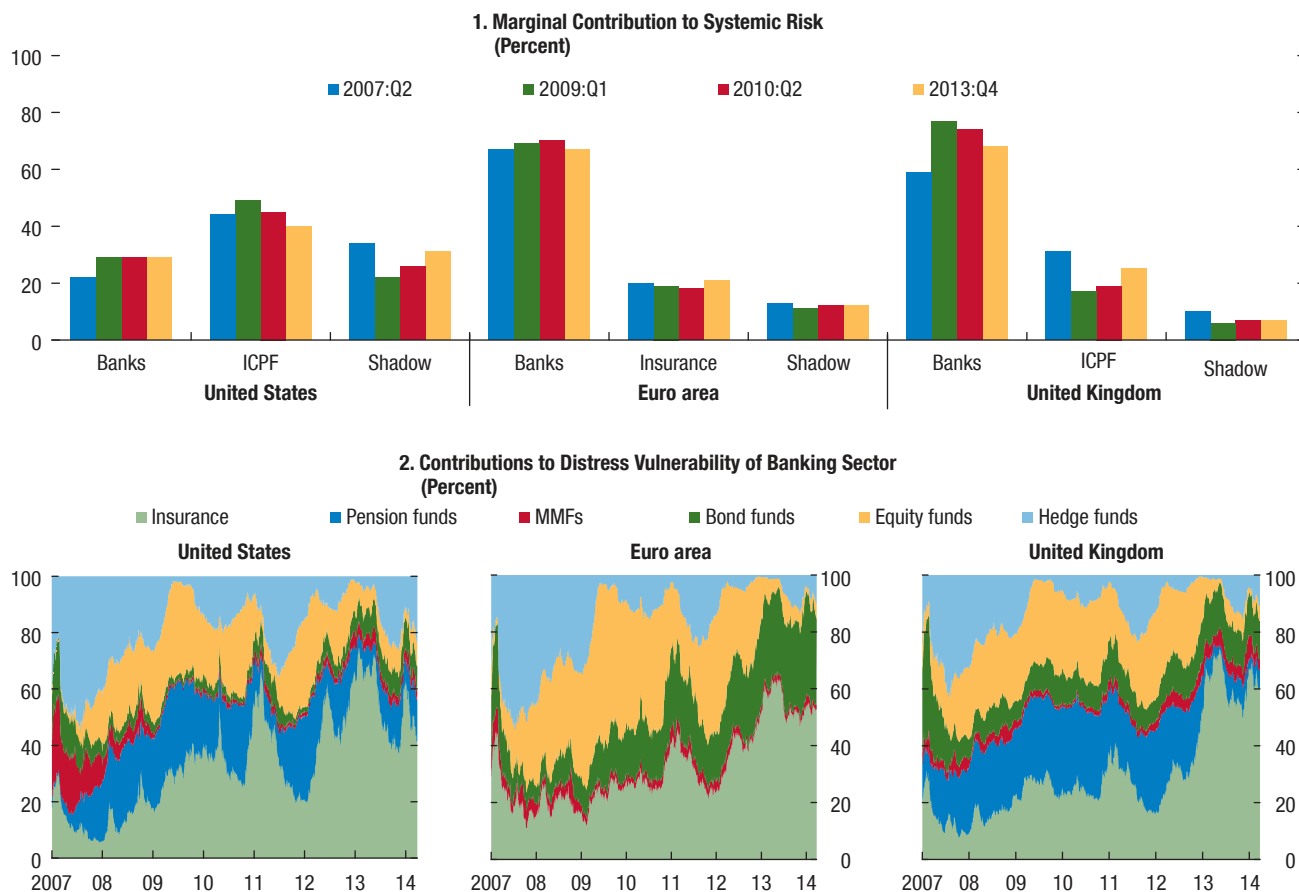
²³See Segoviano and others (forthcoming) for more details on methodology and results.

²⁴The MCSR is not a directional measure—that is, it does not imply causality (for example, it can be driven by a third factor). The MCSR from a particular sector represents the percentage of total systemic risk attributed to that sector. The sum of the MCSR of all sectors equals 100 percent. MCSR is based on the (Shapley-value-based) risk attribution methodology proposed by Tarashev, Borio, and Tsatsaronis (2010). For the purpose of this analysis, the system’s “expected shortfall” (ES) is chosen as the measure of systemic risk in the financial system. The systemic ES takes into account the size of each sector (bank and nonbank) in the system and sector interconnectedness. The ES represents the (average) extreme loss to the system that occurs with a probability of 1 percent (or less).

²⁵This is commensurate with these sectors’ relative sizes and, especially as regards pension funds, with the fact that this sector has large holdings of relatively less liquid fixed-income instruments, such as corporate bonds (similar in size to holdings of U.S. banks).

²⁶The contribution to systemic risk also includes “shadowy activity” by banks.

Figure 2.11. Systemic Risk and Interdependence of Financial Intermediaries



Sources: Bank of England; BarclayHedge; Bloomberg L.P.; European Central Bank; Federal Reserve; International Organization of Securities Commissions; Investment Company Institute; Investment Management Association; Thomson Reuters Datastream; Towers Watson; and IMF staff calculations.

Note: Contribution to the banking sector's vulnerability to distress is defined as the risk of distress spilling over from insurance companies and pension funds (ICPFs) and shadow banking sectors to banks. MMF = money market mutual fund. Shadow = the sum of contributions by mutual funds (money market, bond, equity) and hedge funds. Marginal contribution to systemic risk is defined as the percentage contribution to the expected systemic shortfall, following Tarashev, Borio, and Tsatsaronis (2010). For banks and insurance companies, the sample consists of the largest institutions by total assets. The analysis combines volume data from flow of funds accounts and asset price data. For pension funds, MMFs, and equity funds, asset price data are based on the sector's asset portfolio; data for hedge and bond funds are based on sectoral indices; and for banks and insurers, credit default swap spreads are used.

reflect growing similarities in exposure, partly because insurance companies have been engaging more in lending to companies. As discussed earlier (Box 2.2), this lending has often been channeled through the shadow banking system.^{27,28} Moreover, insurance companies

²⁷A greater exposure to common risks would be reflected in a higher contribution to banking system distress vulnerability, without implying a causal direction. More broadly, the finding is also in line with those of Acharya and Richardson (2014), who argue that the insurance industry is no longer traditional: it now offers products with nondiversifiable risk, is more prone to a run, insures against economy-wide events, and has expanded its role in financial markets.

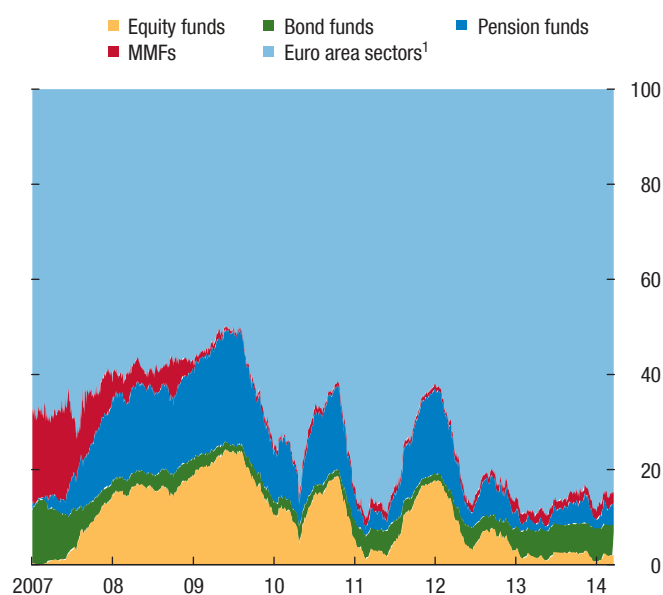
²⁸The International Association of Insurance Supervisors has developed a framework of policy measures for global systemically important insurers to increase their loss-absorbing capacity, mainly

have become the dominant purchaser of collateralized loan obligations as banks' interest in such securities has declined. Similarly, in the United States, life insurance companies are the largest investor in the corporate bond market (see Chapter 1). The insurance sector's overall contribution to systemic risk has, however, remained broadly stable since 2007.

An assessment of cross-border spillover reveals significant but declining linkages between U.S. shadow banks and the European banking system. The euro area banking sector's vulnerability to distress from shocks

because of engagement in nontraditional insurance and noninsurance activities.

Figure 2.12. U.S. Intermediaries' Contribution to Distress Vulnerability of the Euro Area Banking Sector (Percent)



Source: IMF staff calculations.

Note: See the notes to Figure 2.11 for more information. MMF = money market mutual fund.

¹Remaining contributions to the euro area banking sector's vulnerability to distress are from euro area financial sectors (see bottom right panel of Figure 2.11 for the breakdown).

to U.S. financial intermediaries and shadow banks was elevated in the period leading up to the global financial crisis as a result of MMF funding of euro area banks (Figure 2.12) but has recently been falling. Since the start of 2012, the most important contribution from the U.S. shadow banking sector to euro area banking distress vulnerability has come from U.S. bond funds likely seeking exposure to European sovereign risk in the context of enhanced confidence following the announcement of the Outright Monetary Transactions program by the European Central Bank. Still, the relative contribution of these U.S. funds compared with European funds remains much below their pre-2009 levels.

What Should Be the Role of Regulation and Oversight?

The challenge for policymakers is to maximize the benefits of shadow banking for the economy while minimizing its systemic risks. As outlined earlier, shadow banking entails potential externalities and market

failures that are unlikely to be solved privately. Policy-makers must strike the right balance between containing systemic vulnerabilities related to these risks (see the previous section) and preserving the benefits of shadow banks, including the provision of financing to the real economy. Overall, the degree to which shadow banking requires regulation and oversight depends largely on the degree to which it contributes to systemic risk.²⁹

The monitoring of shadow banking should be part of the macroprudential policy framework that aims to address systemic stability risks more broadly. Differences in legal and regulatory structures imply that a type of firm considered to be a bank in one country may be regarded as a shadow bank in another.³⁰ Moreover, as discussed earlier, risk characteristics of shadow banking activities can differ substantially depending on the context in which they are conducted. Therefore, a one-size-fits-all approach to shadow banking regulation is not likely to work.³¹ Nonetheless, this chapter has shown that the drivers of shadow banking growth have been fundamentally similar across countries and types of activities (albeit to different degrees). This suggests the need for an encompassing policy framework to minimize the scope for regulatory circumvention induced by the so-called boundary problem.³² In this vein, macroprudential policy may be best suited to address shadow banking risks, building on recent progress in this area (IIF 2011; IMF 2013). Notably, dedicated macroprudential oversight agencies have been established in many countries, and macroprudential policy frameworks—aimed at identification and

²⁹Investor protection is another motive for regulation and oversight.

³⁰A narrow definition of a bank includes taking deposits and making loans (for example, as applied in the European Union's Capital Requirements Regulation). However, licensing requirements to perform certain activities and therefore the perimeters of banking supervision differ across countries. Countries using a broader definition of a bank require that firms hold a banking license to engage, for example, in factoring, securities underwriting, private equity financing, and extending financial guarantees.

³¹Financial sector entities operate under different legal forms and regulatory regimes, complicating a harmonized treatment.

³²The boundary problem implies that tightening of prudential requirements for entities within the regulatory perimeter comes with incentives to shift activities outside it or to areas where regulation and supervision are weakest (Goodhart 2008; Goodhart and Lastra 2010). Croatia provides a case in point. As a result of a credit growth cap imposed on banks in 2003, bank credit growth slowed, but the annual growth of the loan and financial lease portfolio of domestic leasing companies exceeded 100 percent in 2003 and 40 percent in the next two years (Galac 2010). In 2007, the credit growth cap was expanded to cover funding of leasing companies.

response to nascent threats to financial stability—have improved substantially since the global financial crisis.

A decomposition of shadow banking entities and activities by function and level of risk may serve as a guide to identify systemic stability risks (see the section “Balance Sheet Risk Measures” and the FSB high-level policy framework [FSB 2013a]). Credit intermediation activities that involve significant maturity or liquidity transformation, imperfect credit risk transfer, or excessive leverage should be subject to additional regulation and oversight. Moreover, given the role of liquidity conditions and the search for yield in driving shadow banking growth discussed earlier in the chapter, macroprudential policymakers should be alert to interactions with other policies affecting financial stability, including monetary, fiscal, and structural policies (IMF 2013).

Policymakers have essentially four toolkits at their disposal to address financial stability risks related to shadow banking. First, they may impose regulations on shadow banks or address risks indirectly by targeting banks’ exposure to shadow banks. Second, they may address the underlying causes of the growth of shadow banking. Third, they may, under certain conditions, extend the public safety net to (systemically) important shadow banking markets or entities. Fourth, they may change certain features of bankruptcy laws. Depending on the risks to be addressed, these various toolkits may need to be used simultaneously:

- *Regulation:* Policymakers can regulate shadow banks either directly, through tailored regulatory measures, or indirectly, by extending the regulatory boundary, limiting the ability of banks to support shadow banking activities, or by managing the implicit government guarantees of banks (Claessens and Ratnovski 2014). For example, shadow banking growth related to regulatory arbitrage (discussed earlier) could be curbed by applying prudential bank-like regulatory tools such as capital requirements to shadow banks. Specific risks can be mitigated through tools such as redemption limits for collective investment vehicles or restrictions on leverage and maturity or liquidity transformation. Enhancing reporting requirements may raise overall transparency and allow for better risk monitoring. The possibility of cross-border spillovers requires authorities to coordinate closely with their foreign counterparts. The lack of a safety net means that, for a given contribution to systemic risk, more conservative regulatory measures are needed for shadow banks than for banks. The FSB’s regulatory work on

shadow banking regulation, summarized in Annex 2.4, aims to achieve these goals.

- *Addressing the underlying causes:* Supply-side and demand-side measures are a more indirect but potentially powerful way of addressing shadow banking stability risks. Applying such measures would require intensive coordination with authorities in charge of monetary, fiscal, and structural policies. Demand-side measures tackle the factors stimulating the growth of shadow banking, as discussed earlier. For example, the demand for shadow banking assets that arises from safety considerations (such as by institutional cash pools) could be redirected by ensuring a sufficient supply of publicly generated safe assets (Pozsar 2011).^{33,34} However, among other complications, this may entail moral hazard risks, as the private sector may come to expect such demand accommodation by the government (Singh 2013a). Measures on the supply side include imposing restrictions on new instruments. A discussion of the conduct of monetary policy is beyond the scope of this chapter, but evidence presented earlier on the role of the search for yield suggests that, at a minimum, macroeconomic conditions need to be taken into account by policymakers when assessing the development of shadow banking.
- *Access to central bank facilities:* In principle, it is conceivable to extend the lender-of-last-resort function to certain kinds of systemically important shadow banks to protect the financial system against liquidity shocks (Bayoumi and others 2014).³⁵ However, extending access to central bank funding entails substantial moral hazard risks. Therefore, explicit public backstops should be considered only if appropriate regulatory oversight mechanisms are in place, including for collateral and governance.³⁶

³³Claims on the private sector are inherently risky, so public debt may be a better basis for the production of safe assets and may provide better protection against negative aggregate shocks, which tend to degrade private-label safe assets (Bernanke and others 2011; Gourinchas and Jeanne 2012).

³⁴A sufficient supply of public safe short-term assets can be achieved in two ways. First, the sovereign could expand its supply of safe assets. Second, improving fiscal policies could increase the share of existing assets that qualify as safe.

³⁵Emergency lending assistance should be at the discretion of the central bank, involve heightened regulatory intervention, and should have a clear justification in terms of the central bank’s authority. Moreover, it should be appropriately priced and not be provided on more favorable terms than available to banks.

³⁶Expanding the list of nonbank counterparties to which central banks can provide liquidity could have unanticipated consequences for the structure and operation of the financial system (Bayoumi and

- *Changes to bankruptcy regimes and privileges:* Ordinary insolvency law may not provide for the specific recovery and resolution tools needed to manage systemic failures of shadow banking entities or activities. Setting up tailored recovery and resolution frameworks would increase the authorities’ ability to mitigate systemic risk in crisis situations.³⁷ Bankruptcy privileges, such as safe harbor status, allow shadow banks to provide their lenders with safe, money-like assets (similar to insured deposits of regulated banks [Perotti 2010]).³⁸ Prudential policies to contain the risk associated with safe harbor status mostly aim at restricting eligibility. Safe harbor exemptions may also be restricted to certain market segments or transactions, such as claims publicly registered with

others 2014). Liquidity provided to structurally weak and insufficiently robust markets may shift risks to the central banks (Moe 2014). It may also prove politically difficult to establish a public safety net if shadow banking garners little public support on account of limited (tangible) economic benefits, against potentially large contingent liabilities for the government. Moreover, large heterogeneity within the shadow banking sector and difficulty identifying appropriate cost-sharing mechanisms may deter the shadow banking industry from entering into safety net arrangements.

³⁷See FSB (2013d) for details on potential key attributes of effective resolution regimes for shadow banks.

³⁸General bankruptcy law prohibits a lender from taking action to collect the amount owed by the borrower once a firm files for bankruptcy. Claims enjoying safe harbor privileges are granted an exemption to this rule and afford lenders a position senior to those of other investors (Duffie and Skeel 2012; Perotti 2010).

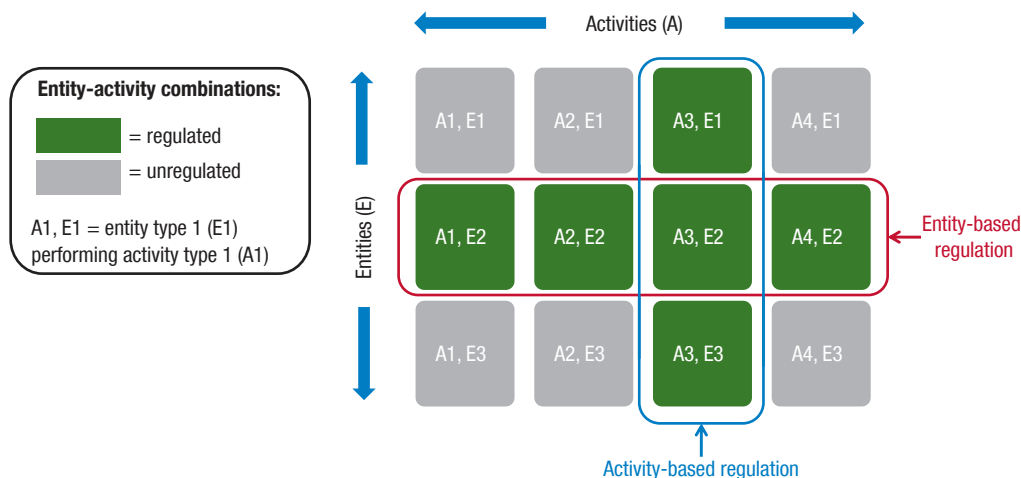
a central repository or backed by liquid collateral (Perotti 2010; Duffie and Skeel 2012; Perotti 2013). Alternatively, to maintain the eligibility of less liquid collateral and to facilitate an orderly resolution, an authority could be established to dispose of collateral (Acharya and Öncü 2012). Pursuing changes to bankruptcy privileges requires a careful impact assessment for shadow banks and could have potentially far-reaching consequences for other sectors as well.

Policymakers will have to better integrate the entity and activity dimensions of shadow banking regulation. Monitoring and risk identification should focus primarily on economic functions and activities, but regulation and supervision have so far mostly focused on entities. This has been recognized by the FSB (see Annex 2.4).³⁹ Doing so may help overcome the boundary problem and reduce the scope for regulatory arbitrage (Figure 2.13) (Greene and Broomfield, forthcoming).⁴⁰ Regulators need to consider the

³⁹For example, the FSB has covered repo and securitization activities, and its work on “other” shadow banking entities is largely activity-functions based.

⁴⁰To account for network effects and to prevent the migration of activities within one sector, the entity dimension should focus on sectors and not on single entities. Similarly, to capture all transactions that fulfill a function, the activity dimension should focus on clusters of activities (for example, lending that is dependent on short-term funding) instead of on a single narrowly defined activity (such as lending funded by commercial paper).

Figure 2.13. Effective Shadow Banking Regulation Must Cover Activities and Entities



Source: IMF staff illustration.

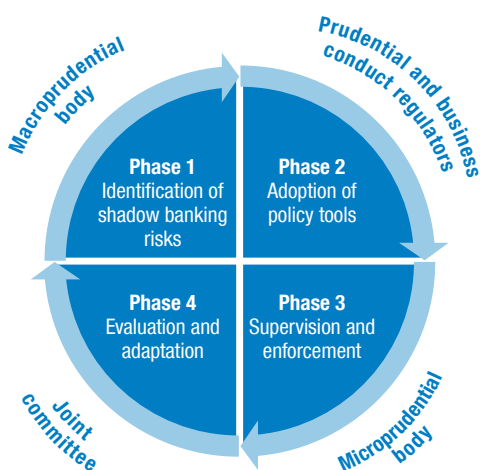
Note: The figure shows four activity types (A1–A4) and three entity types (E1–E3). Entity-based regulation that covers only entity type E2 would miss the migration of, say, activity type A3 from E2 to E1; but that migration would be picked up by activity-based regulation covering A3. Similarly, activity-based regulation that covers activity type A3 would miss situations in which covered entities (E1–E3) migrate to activities, say A2, that are not covered but have similar economic outcomes.

characteristics of the entities pursuing the activities to be regulated. For example, highly leveraged entities engaged in a certain activity may need stricter rules than entities that are less leveraged. In the same vein, certain risky activities may be tolerable if carried out by highly capitalized entities. Moreover, entity- and activity-based reforms influence each other. For example, reforming securities financing transactions might make it unnecessary to impose leverage limits on entities that mainly use repos to obtain leverage. As noted, complex and detailed rules governing entities or activities increase opportunities for regulatory circumvention (Tucker 2014). Indeed, given the dynamic nature of shadow banking, the current architecture of financial regulation may soon need to be revisited (Schwarcz 2014).

Addressing shadow banking risks involves close cooperation with microprudential and business conduct regulators. One possible approach to implement a regulatory response to shadow banking proceeds in four phases (Figure 2.14): (1) identification of systemic risks based on broad financial sector surveillance by the macroprudential authority; (2) consideration and possible adoption of policy measures comprising prudential, business conduct, and nonregulatory measures;⁴¹ (3) supervision and enforcement, relying on the expertise of

⁴¹Nonregulatory measures include targeted communications to the public, improved transparency and disclosure, improved risk governance, and new industry-wide standards (IIF 2011).

Figure 2.14. Policy Framework to Mitigate Shadow Banking Risks



Source: IMF staff.

the microprudential authorities; and (4) an evaluation phase, in which micro- and macroprudential as well as conduct authorities assess the effectiveness of previous policy measures and relay the findings to their international counterparts. Policymakers should regularly conduct this dynamic exercise (perhaps once a year) to update their view on the risks posed by different activity-entity combinations and act on the conclusions drawn, including the adoption of new measures and the removal of outdated ones. The methodology proposed earlier in this chapter may be useful in this respect.

Granular data are a prerequisite for effective regulation and supervision. The assessment of risks in this chapter was limited by the availability of detailed data on assets and liabilities as well as structural features (such as redemption policies or benchmark orientation) at the firm and sector levels. Policymakers should aim to close these data gaps, in particular regarding information that would allow for a more accurate assessment of maturity, liquidity, and credit risks, as well as leverage in the financial system; monitoring of common exposures and interconnectedness; and broad financial system stress tests.⁴² As a first step, sectoral and flow of funds accounts need to be revamped, in the context of the G20 Data Gaps Initiative and the FSB's annual shadow banking monitoring exercise.

Finally, strong international policy cooperation is needed to prevent cross-border regulatory arbitrage and to address risks to global financial stability. Risks are more likely to increase when regulatory initiatives are implemented by only a few countries, or when they are poorly coordinated. Regulatory changes in one country, for example, might lead to spillovers and increased risks in others. Important steps that have already been taken toward international policy coordination include the FSB process for data sharing; peer reviews conducted under the auspices of the International Organization of Securities Commissions on the progress of national regulatory reforms for MMFs; and the establishment of an international oversight group under the nonbank, noninsurer global systemically important financial institutions framework (FSB 2013b). However, although most FSB-led reforms of shadow banking regulation are near completion at the international level, implementation at the national level has advanced substantially in only a few areas (see Annex 2.4).

⁴²See also IMF (forthcoming).

Conclusions and Policy Recommendations

For advanced economies, broad measures of shadow banking point to recent growth, while narrower measures indicate stagnation. This discrepancy is driven by two opposing forces: a decline in the role of certain activities, such as securitization, and a concurrent expansion of investment funds (included only in the broad measures).

In emerging market economies, shadow banking continues to grow strongly. To some extent, this is a natural by-product of the deepening of financial markets, with a concomitant rise in other financial institutions. In emerging market economies, the size and growth of shadow banking activities in China stand out and warrant particular monitoring.

The main factors behind the growth of different types of shadow banking are similar over time and across countries: stringent banking regulation, ample liquidity, and complementarities with the rest of the financial system. Tighter regulation of banks (such as changes in capital requirements) often induces growth in shadow banking activities. Moreover, low real interest rates and a compression of term spreads tend to be associated with more rapid growth of shadow banks, especially in the context of tighter bank capital rules. In addition, complementarities with the rest of the financial system often play a role. The growth of pension funds and insurance companies is associated with higher growth of shadow banks, possibly reflecting the demand for shadow banking services.

Overall, shadow banking is set to grow further in the current environment of tighter bank regulations and low interest rates. Many indications point to the migration of some activities—such as lending to firms—from traditional banking to the nonbank sector. That is, some of the fastest-growing shadow banking activities substitute for, rather than complement, traditional banking. An example is direct lending by or through a broad range of investment funds. In the long run, demographics and population aging may continue to lead to an increase in assets under management by institutional investors and hence contribute to the sustained growth of shadow banking.

Whether these cyclical and structural developments imply an overall increase or decline in systemic risk is difficult to assess at this juncture—but there are some indications of increased market and liquidity risk in advanced economies. Overall, the outcome will, among other things, depend on the degree to which funds engaging in bank-like activities further deepen their liquidity mismatches and become more exposed to run risks, the extent to which these activities involve leverage, and the extent to which concentration increases further (see also Chapter 1). Another factor will

be whether transparency in the system improves, allowing investors to assess risks properly (and reduce herd behavior), and regulatory authorities to take appropriate action when needed. In this context, there appears to be a shift in shadow banking toward activities that are less well understood or monitored, which poses challenges for supervisors and regulators. In any case, the appropriate policy response is not to lower prudential standards for banks, but to ensure adequate standards for shadow banks.

So far, in the United States, the (imperfectly) measurable contribution of shadow banking to systemic risk has been significant, but it remains modest in the United Kingdom and in the euro area. In the United States, the risk contribution of shadow banking activities seems to have been rising while remaining slightly below precrisis levels, while in the euro area and the United Kingdom, this remained more or less constant. Data problems, however, prevent a reliable and comprehensive assessment. The evidence also suggests noteworthy cross-border effects of shadow banking. In emerging market economies, the growth of shadow banking size and activities in China stands out and warrants particular monitoring.

Better integration of the entity and activity dimensions is needed in shadow banking regulation. The current regulatory reform agenda, led by the FSB, has yielded important progress. However, many of the agreed principles have not yet been implemented nationally, potentially leading to a migration of risks across countries (for example, to non-FSB jurisdictions) or sectors. To counter such effects, financial sector regulation needs to take a more encompassing view of the financial system. This chapter advocates a macroprudential approach. Moreover, the entity and activity dimensions of shadow banking should be integrated in supervision and regulation. This chapter lays out a concrete framework for collaboration and task sharing among microprudential, macroprudential, and business conduct regulators. International coordination and information sharing between supervisors and regulators must also be enhanced to safeguard global financial stability.

Finally, data gaps remain challenging and need to be addressed. For example, only five jurisdictions provide statistics on all three shadow banking measures used here. Ideally, balance sheet data on individual entities or sectors would allow for detailed monitoring. A first step forward would be for all country authorities to construct sectoral and flow of funds accounts building on their system of national accounts with sufficient details to assess maturity and liquidity risks as well as interconnectedness. Expanding the reporting of monetary data would also aid in obtaining a macro view of shadow banking. All this would further the understanding and monitoring of different aspects of shadow banking.

Annex 2.1. Shadow Banking Definitions

This annex provides a schematic summary of the different definitions of and perspectives on shadow banking (Figure 2.15) and discusses in detail the new definition based on the concept of noncore liabilities.

Noncore Liabilities Approach to Measuring Shadow Banking

Noncore liabilities provide a measure of the shadow banking system (SBS). Noncore liabilities (funding sources) cover all bank and nonbank financial institutions (Harutyunyan and others, forthcoming).⁴³ Core liabilities represent the traditional financial intermediation function of the banking system. These liabilities are defined as the funding that other depository corpo-

⁴³This approach expands the concept of “noncore” liabilities developed in the recent literature by Shin and Shin (2011).

rations traditionally draw on, namely regular deposits of “ultimate creditors.”^{44,45}

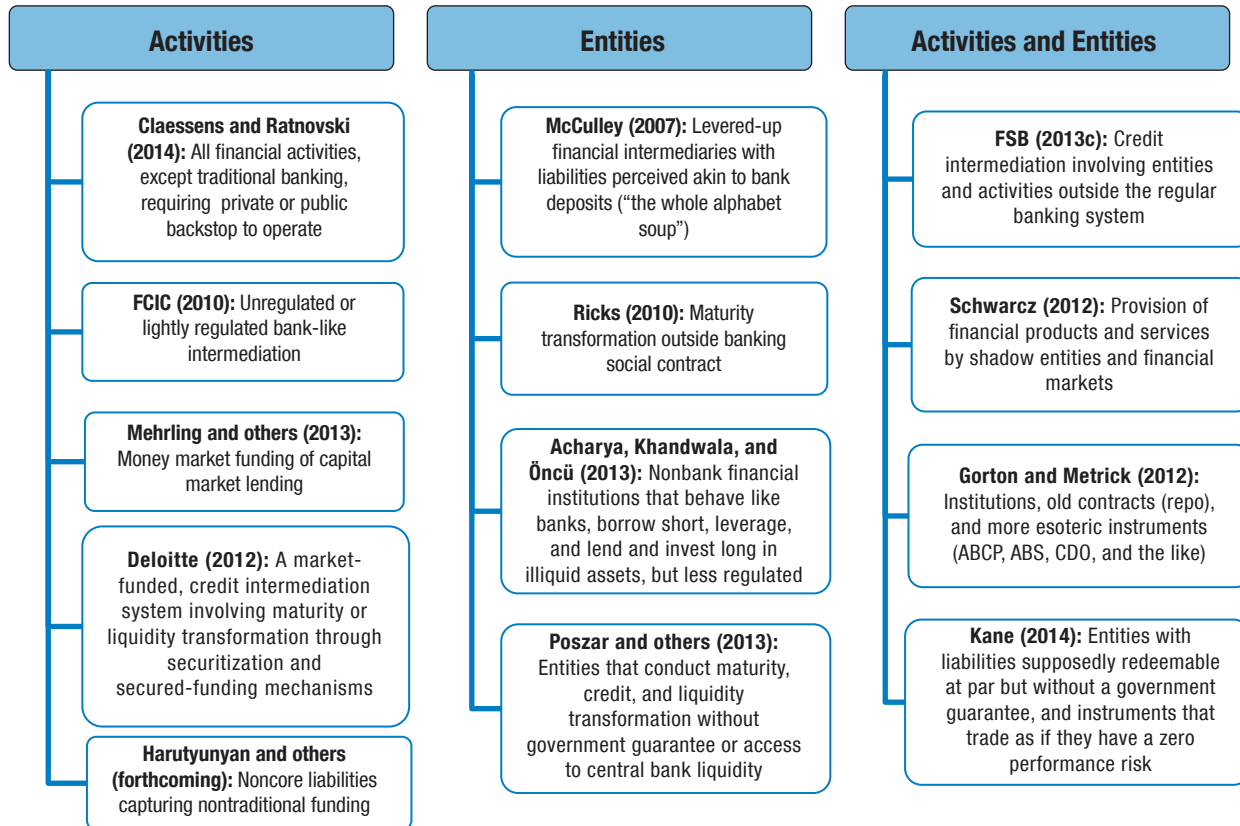
Noncore liabilities encompass sources of funding for the financial system that fall outside the core liabilities definition. The financial corporations that are issuers of noncore liabilities in this approach are also other depository corporations, including money market mutual funds (MMFs) and all other financial corporations⁴⁶ except insurance companies, pension funds, and non-MMF investment funds. The latter three types are

⁴⁴Shin and Shin (2011) define ultimate creditors to include resident households, nonfinancial corporations, state and local governments, insurance corporations, pension funds, and non-MMF investment funds.

⁴⁵As defined in the IMF’s *Monetary and Financial Statistics Manual*, the other depository corporation subsector consists of all resident financial corporations (except the central bank) that engage in financial intermediation and that issue liabilities included in broad money.

⁴⁶The other financial corporations include resident financial corporations that do not issue liabilities included in broad money.

Figure 2.15. Different Definitions of Shadow Banking



Sources: See works cited in the Chapter 2 references.

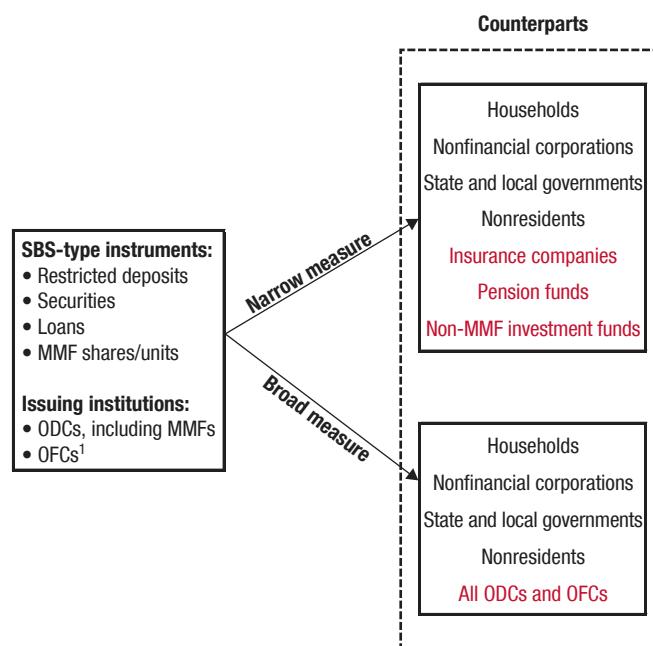
Note: ABCP = asset-backed commercial paper; ABS = asset-backed security; CDO = collateralized debt obligation; repo = repurchase agreement.

excluded because of the specific nature of the financial intermediation services they provide, which is different from both traditional and shadow banking. The main financial instruments that are considered to be components of noncore liabilities are debt securities, loans, MMF shares, and a small portion of restricted deposits (that is, deposits excluded from broad money). Finally, the holders of noncore liabilities consist of the ultimate creditors, as noted above, plus all nonresident sectors.

One advantage of the noncore liabilities approach is that it captures nontraditional financial intermediation that occurs within traditional banks, thus filling a gap in the estimation of the size and interconnectedness of the SBS. For example, if a bank establishes a special purpose vehicle to securitize a portion of its balance sheet, those securities would be captured by existing methodologies attempting to measure nontraditional intermediation. However, on-balance-sheet securitization by banks, including covered bonds, would not be captured. This approach does not distinguish between the institutions that issue the liabilities. Instead, it focuses on funding sources that diverge from the traditional financial intermediation model of collecting deposits.

Another important advantage of this approach is that it can be constructed to include intra-financial-sector positions (the broad measure of noncore liabilities) or exclude them (the narrow measure). Including intra-SBS positions is useful for the assessment of financial stability, because the gross size of the SBS reflects its total exposure and its level of interconnectedness. Nonetheless, including them may overstate the importance of the SBS in the overall financial system, in particular the level of exposure to the real economy or vice versa. Thus, the two measures can be seen as complementary in providing the upper and lower esti-

Figure 2.16. Components of Broad and Narrow Measures of Noncore Liabilities



Source: IMF staff.

Note: MMF = money market mutual fund; ODC = other depository corporation; OFC = other financial corporation; SBS = shadow banking system.

¹Excluding insurance corporations, pension funds, and non-MMF investment funds. The box on the left shows the issuers and types of instruments included in both the narrow and broad measures of noncore liabilities. The distinction between the two measures is derived from the counterparties, shown inside the dashed box on the right. Both measures include ultimate creditors and nonresidents as counterparties. The narrow measure includes only a subset of the OFC sector, while the broad measure includes all OFCs and all ODCs.

mates of the size and interconnectedness of the SBS in a given jurisdiction. Figure 2.16 provides an overview of the broad and narrow measures.

Annex 2.2. Shadow Banking Entities, Activities, and Risks

This annex describes various nonbank financial institutions and activities in the shadow banking system, and it discusses in broad terms the key dimensions of their risks to financial stability.

Money market mutual funds (MMFs) are open-ended mutual funds that invest in short-term debt securities, including government securities, commercial paper, certificates of deposit, repurchase agreements (repos), short-term bonds, and other money funds. In some markets, such as in the United States, MMFs are closely connected to other financial institutions because they play a pivotal role in short-term funding markets. The MMF business model and risk profile are similar to those of banks. They undertake credit risks and maturity and liquidity transformation, although regulations seek to limit MMF exposures to losses due to credit, market, and liquidity risks. While returns to MMFs are typically not guaranteed, their shareholders often perceive them as short-term, liquid, deposit-like instruments. As a result, given their lack of deposit insurance or access to liquidity facilities, uncertainty over their asset value could stress MMFs through large-scale redemptions. When redemptions spread to the broader financial system, the functioning of the short-term funding markets can be severely disrupted.

Other investment funds act primarily as fiduciary agents, investing in a range of assets on behalf of clients, who bear the risk of loss. Asset management companies may maintain proprietary trading positions with limited transparency, but their proprietary balance sheet is typically much smaller than their funds' assets under management. Most mutual funds are not very leveraged and do not directly engage in credit transformation. Most investment funds are open-ended funds whose shareholders may redeem their shares freely at the funds' net asset value. A loss of confidence and massive redemptions—a run—may not necessarily cause a fund failure because it can respond by selling securities and absorbing valuation losses (through a decline in its net asset value). However, such events could lead to a fire sale of portfolio assets—especially when portfolio assets are illiquid—and adversely affect other market players. The fund's parent asset management company can also be affected, as well as other funds in the same family that share redemption lines of credit and risk-management frameworks. Funds may be interconnected with other financial institutions

and therefore propagate shocks, whether they originate in the industry or not. Interconnectedness can stem directly from counterparty risk—for those engaged in securities lending, repos, and derivatives, and from investment in other financial institutions' securities—or indirectly from fire sales of assets held by various financial institutions.

Broker/dealers trade securities on their own account or on behalf of customers. They are usually more highly leveraged than banks through the use of short-term secured lending arrangements, such as repos. In periods of stress, liquidity runs may undermine their funding model and cause system-wide fire sales.

Real estate investment trusts (REITs) are special purpose companies that own income-producing real estate or mortgages. They come in two varieties: equity REITs, which own and manage real estate properties, and mortgage REITs, which rely on short-term funding to finance their mortgage holdings. Mortgage REITs, in particular, engage in leveraged maturity transformation by relying on short-term repo funding—some of which is channeled indirectly from MMFs via securities dealers—to finance their longer-term, less liquid assets (see the October 2013 GFSR).

Securitization is a process that involves repackaging portfolios of cash-flow-producing, illiquid financial instruments (often loans) into special purpose vehicles funded by issuing securities (liquidity transformation).⁴⁷ Credit transformation is achieved through diversification and the use of various credit enhancements. For example, portfolio cash flows can be divided into tranches that pay out in a specific order, starting with the senior (least risky) tranches and working down through one or more “mezzanine” tranches, and then to the equity (most risky) tranche. If some of the expected cash flow is not forthcoming (for example, because some loans default), after any cash flow buffers are depleted, the payments to the equity tranche are reduced. If the equity tranche is depleted, payments to holders of the mezzanine tranche are reduced, and so on, up to the senior tranches. The amount of loss absorption provided by the equity and mezzanine tranches is structured so that it is unlikely that the senior tranches do not receive

⁴⁷Special purpose vehicles are limited-purpose legal entities into which firms transfer assets or through which they carry out specific activities or transactions. The vehicles and conduits fund themselves by issuing securities to investors in the capital markets and are structured so that the transferred assets are not at risk if either the firm or the vehicle or conduit becomes insolvent, so the issued securities are usually viewed as less risky than those of the sponsor.

their promised payments. Credit enhancement is also achieved with credit puts from banks and monoline insurance.

Not all securitization structures involve maturity transformation. Most asset- and mortgage-backed securities and collateralized debt obligations simply pass cash flow through from the loan to the security holders. However, before the recent global financial crisis, some asset-backed commercial paper (ABCP) conduits and most structured investment vehicles (SIVs) issued short-term paper to fund positions in long-term assets. Hence, they were highly exposed to rollover risk. Investor demand for senior tranches was spurred by inappropriate AAA/Aaa ratings assigned by the major rating agencies (Fender and Kiff 2005). Although securitization transactions are not themselves leveraged, until accounting rules were recently changed in many jurisdictions, banks could use securitization to effectively leverage up their balance sheets (Beccalli, Boitani, and Di Giuliantonio, forthcoming).

Hedge funds are investment pools, typically organized as a private partnership, that face few regulatory restrictions on their portfolio transactions. Hence, compared with more regulated institutions, hedge funds use a wider variety of investment techniques in their effort to boost returns and manage risks. Credit-oriented hedge funds undertake long, short, and leveraged positions in fixed-income securities and may also engage in direct lending activities, but typically to a lesser extent. These hedge funds face fire sale risks and possible redemption risks, though the use of redemption gates helps alleviate these risks to some extent.

Private equity funds manage large asset portfolios and may provide direct lending to smaller enterprises and firms that cannot access private capital markets. Private equity funds do not offer early redemptions and thus are not subject to run risk.

Specialty finance companies provide credit in various segments, such as credit cards, automobile financing, student loans, and equipment leases. These credit types are often securitized, with demand depending on credit risk and yields offered. They may be subject to rollover risk in the form of early amortization triggers (that is, provisions in, say, credit card receivables-backed securities that require early amortization of principal cash flows if certain events occur).

Repo agreements are contracts in which one party agrees to sell securities to another party and buy them back at a specified date and repurchase price.⁴⁸ The transaction is effectively a collateralized loan with the difference between the repurchase and sale price representing interest. The borrower typically posts excess collateral (the “haircut”). Dealers use repos to borrow from MMFs and other cash lenders to finance their own securities holdings and to make loans to hedge funds and other clients seeking to leverage their investments. Lenders typically rehypothecate repo collateral, that is, they reuse it in other repo transactions with cash borrowers.⁴⁹

Securities lending involves one party agreeing to lend securities to another party in return for a fee and the posting of collateral in the form of cash or high-quality liquid securities.⁵⁰ Securities lenders are seeking to gain additional revenue from their securities holdings; they may be insurers, pension funds, sovereign wealth funds, and central banks operating through custodians. Securities borrowers are often short sellers who must borrow the securities to trade (since they need to deliver the securities). They post cash collateral to the securities lender in an amount at least as high as the value of the borrowed securities. Securities lenders then reinvest this cash posted as collateral in money and repo markets.

Repo and securities lending transactions involve both maturity transformation and rollover risk, because the terms of the agreements are typically much shorter than the maturities of the underlying securities. Rollover risk can be particularly acute during periods of market stress, when collateral values fall while haircuts increase on counterparty risk concerns.

⁴⁸See the October 2010 GFSR, particularly Box 2.3, for more details on how repo markets work.

⁴⁹Singh (2013a) points out that this collateral reuse effectively “lubricates” the financial system by facilitating financial transactions and by contributing to the supply of credit in the economy. In that sense, the collateral can be viewed as high-powered money, in which the haircut is equivalent to a bank reserve ratio, and the number of reuses is equivalent to a money multiplier.

⁵⁰Broadly speaking, repo and securities lending transactions are very similar, but repo agreements have fixed end dates and repurchase prices, whereas securities lending transactions typically do not (but are subject to termination on a continuous basis).

Annex 2.3. Econometric Results

This annex describes the data sources and the methodology used in the empirical analysis and provides key results and findings.

Sample Coverage and Data

Two data frequencies (quarterly and annual) and three data sources were used to measure shadow banking dynamics.⁵¹ Countries used in the empirical analysis are listed in Table 2.3. Specifics on the data frequencies are as follows:

- *Quarterly data:* The quarterly data set comes mainly from Haver Analytics and the national flow of funds data. For most countries, shadow banking activity is measured as financial liabilities of other financial intermediaries and financial auxiliaries adjusted for

mutual fund shares (see Table 2.4. for more details). The flow of funds data run from 1990 to 2013.

- *Annual data:* The Financial Stability Board (FSB 2013c) is the source for the annual data. The data are based on national flow of funds and sectoral balance sheet data or national authorities' submission to the FSB when the shadow banking activity is measured as financial assets of other financial intermediaries. The sample consists of 24 countries, of which 14 are emerging market economies and the rest are advanced economies. The data set also has detailed data on financial assets of subsectors of the shadow banking system, including money market mutual funds (MMFs), broker/dealers, structured investment vehicles, finance companies, hedge funds, other investment funds (equity funds, fixed-income and bond funds, other funds), and "other." The FSB data run from 2002 to 2012.

⁵¹See Harutyunyan and others (forthcoming) for a more detailed analysis with noncore liabilities.

The main sources of explanatory variables are the IMF's International Financial Statistics and World

Table 2.3. List of Economies Included in the Empirical Studies

Financial Stability Board measure	Flow of funds measure	Noncore liabilities
Advanced economies	Advanced economies	Advanced economies
Australia	Australia	Austria
Canada	Austria	Belgium
Euro area ¹	Belgium	Cyprus
France	Canada	Estonia
Germany	Czech Republic	Euro area ¹
Hong Kong SAR	Denmark	Finland
Italy	Estonia	France
Japan	Euro area ¹	Germany
Korea	Finland	Greece
Netherlands	France	Ireland
Singapore	Germany	Italy
Spain	Greece	Japan
Switzerland	Ireland	Korea
United Kingdom	Italy	Luxembourg
United States	Japan	Malta
Emerging market economies	Korea	Netherlands
Argentina ²	Luxembourg	Portugal
Brazil	Malta	Slovak Republic
Chile	Netherlands	Slovenia
China ²	Norway	Spain
India	Portugal	United Kingdom
Indonesia	Slovak Republic	United States
Mexico	Slovenia	Emerging market economies
Russia	Spain	Mexico
Saudi Arabia	Sweden	South Africa
South Africa	United Kingdom	Turkey
Turkey	United States	
	Emerging market economies	
	Hungary	
	Lithuania	
	Poland	

Source: IMF staff.

¹Euro area data were not used in the panel estimations.

²Financial Stability Board data for China and Argentina were not available. Data for China were compiled by IMF staff.

Table 2.4. List of Variables Used in Regression Analysis

Variables	Description	Data Source
Flow of funds shadow banks	The sum of other financial intermediaries and financial auxiliaries for the flow of funds. For countries that have granular flow of funds data, the following definitions were used: Australia (other depository corporations, MMFs, securitizers, other financial corporations), Canada (total other private financial institutions excluding mutual funds), Korea (nonbanks, collectively managed funds, finance companies, investment institutions, OFI excluding public financial institutions), Norway (MMFs, mortgage companies, finance companies, financial holding companies, and investment companies excluding state lending institutions), Sweden (other monetary credit market corporations; finance companies; OFI, excluding housing credit institutions), and the United States (MMFs, GSEs, ABS issuers, GSE pool securities, net securities lending, overnight repo, open market paper)	Haver Analytics
FSB shadow banks	FSB definition of OFI that is a sum of MMFs, finance companies, structured finance vehicles, hedge funds, other investment funds, money market corporations, broker/dealers, financial auxiliaries, and other nonbank financial corporations	FSB
Real GDP	Series for Poland and Hungary are seasonally adjusted in Eviews using Hodrick-Prescott filter ($\lambda = 1,600$).	WEO
Policy rate	Monetary policy rate	Bloomberg L.P.
Money market rates	IFS is the main data source except for Austria, Belgium, and Greece (1-month euribor from 1999 used); Estonia (EONIA from 2011); France, Netherlands, Portugal, and Luxembourg (EONIA from 1999); Germany (EONIA from 2012); Hungary (overnight bubor); Malta (EONIA from 2008); Norway (1-week interbank rate from 2009:Q3); and Slovak Republic (EONIA from 2009).	IFS
Long-term rates	Long-term interest rates	IFS
Short-term rates	3-month interest rates on T-bills except for Austria and Estonia, where money market rates used.	Thomson Reuters Datastream
Inflation rate	Year-over-year growth rates of consumer price index.	IFS
Institutional investors	Financial liabilities of insurance companies and pension funds from flow of funds data. Assets of insurance companies and pension funds from FSB data.	Haver Analytics; FSB
Global liquidity indicators	Global liquidity indicators, quantity data (volume of credit)	IMF (2014a)
Systemic banking crisis dummy	A banking crisis is defined as systemic if two conditions are met: (1) significant signs of distress in the banking system (as indicated by significant bank runs, losses in the banking system, and bank liquidations); and (2) significant banking policy interventions in response to significant losses in the banking system.	Laeven and Valencia (2013)
Bank regulatory and supervisory variables	Scaled indices of overall capital stringency, capital regulatory index, official supervisory power, and financial statement transparency.	Barth, Caprio, and Levine (2013)

Source: IMF staff.

Note: ABS = asset-backed securities; BCBS = Basel Committee on Banking Supervision; EONIA = Euro Overnight Index Average; euribor = Euro Interbank Offered Rate; FSB = Financial Stability Board; GSE = government-sponsored entities; IFS = IMF, International Financial Statistics database; IOSCO = International Organization of Securities Commissions; MMF = money market mutual fund; OFI = other financial intermediary; repo = repurchase agreement; WEO = IMF, World Economic Outlook database.

Economic Outlook databases; the source for regulatory variables is Barth, Caprio, and Levine (2013). The definition of the variables and sources are provided in Table 2.3. The analysis uses real money market rates and term premiums to capture the search-for-yield effect. Various measures of bank regulatory and supervisory policies were used to capture the regulatory arbitrage effect. The regressions control for the macroeconomic environment (real GDP growth) and factors that may affect demand for shadow banking products (growth in total assets of institutional investors and traditional banks).

Results

The extent to which regulatory arbitrage and search for yield contributed to the growth of shadow banking is formally assessed for a set of advanced and emerging

market economies. To this end a panel regression is run with different measures of shadow banking activity as dependent variables and possible determinants of shadow banking dynamics found in the literature as explanatory variables. A general specification of a regression model is as follows:

$$\Delta SBS_{jt} = \alpha_1 MONPOL_{jt-1} + \alpha_2 MACRO_{jt-1} + \alpha_3 REG_{jt-1} + \alpha_4 OTHER_{jt-1} + \text{Fixed effects} + \epsilon_{jt}, \quad (2.1)$$

in which α_k ($k = 1, \dots, 4$) are coefficients (or coefficient vectors) to be estimated, and ϵ_{jt} is an error term for the shadow banking (sub)sector in country j at time t . The dependent variable, ΔSBS_{jt} , is the real growth in the size of the shadow banking system.⁵² *MONPOL*

⁵²Year-over-year growth rates using quarterly flow of funds data and annual FSB data are used. Quarterly growth rates on flow of

refers to the general monetary stance measured by real interest rates. In addition to the real interest rate, the term spread is used to capture the search-for-yield effect.⁵³ *MACRO* refers to general macroeconomic and financial market factors (including real GDP growth and global liquidity conditions). *OTHER* captures the real growth rate of the size of other financial sectors to account for possible links between traditional banks and shadow banks and to control for the demand for shadow banking products from institutional investors such as insurance companies and pension funds. *REG* includes variables related to banking sector regulation and supervision, capturing regulatory circumvention.⁵⁴ A separate set of regressions was estimated to examine various interaction effects, such as between the monetary stance and regulatory variables and between regulatory and supervisory variables. Standard errors are Driscoll and Kraay (1998) standard errors robust to heteroscedasticity, autocorrelation with MA(q), and cross-sectional dependence.

The growth rate of shadow banking is affected by search for yield (after 2008) and regulatory circumvention, controlling for macroeconomic, financial, and demand factors.⁵⁵ In the flow of funds data regression, real GDP, the growth rate of banking sector assets, and the growth rate of institutional investors have the expected signs and are significant (benchmark specification, column 1 of Table 2.5). The variables capturing the monetary policy stance, namely the real interest

rate and the term spread, also have the expected signs but appear significant only after 2008.⁵⁶ The benchmark regression is expanded to include regulatory variables for the banking sector (columns 2–5 of Table 2.5). Banks' capital stringency measures have a significant positive impact on shadow banking growth.⁵⁷ High transparency in bank financial statements has a significant negative impact.

The results of the regression using FSB annual data generally support the results using the quarterly flow of funds data. Given their annual frequency, the fact that they are not available before 2002, and their coverage of fewer countries, the FSB data can support only limited inferences. For the aggregate shadow banking measure, results broadly confirm our prior results ("All" column of Table 2.6). Regulatory variables are generally not significant, probably as a result of limited variation in the covered period.⁵⁸ The chapter examined separately the growth in certain subsectors of the shadow banking system: money market mutual funds, investment funds, and special purpose vehicles (remaining columns of Table 2.6). The results suggest that banking growth is not important for the growth of MMFs, is negative for investment funds (in line with the notion that they substitute for, rather than complement, banks), and is positive for securitization (probably because special purpose vehicles have been frequently sponsored or owned by banks). In contrast, the growth of institutional investors is strongly correlated with the growth of both MMFs and investment funds (in line with the institutional cash pool view) but less so with the growth of securitization. The compression of the term spread is significant for all three subsectors, but it is most strongly (negatively) associated with securitization. The impact of bank capital regulations is significant only for MMF growth.

funds data were also tried. The results are almost the same as in the regression with yearly growth rates, but the explanatory power of these models is lower since quarterly rates are in general much more volatile than yearly rates.

⁵³Monetary conditions indices and shadow interest rates (calculated using a simple Taylor rule) were tried instead of real interest rates. Overall, the results do not change by much.

⁵⁴Due to high cross correlation, the regulatory and supervisory variables are added one by one to the benchmark regression that includes real GDP, size of the banking sector, size of institutional investors, real interest rates, and term spread. Moreover, because of high correlation with fixed effects, the regressions with regulatory variables do not contain fixed effects.

⁵⁵Other measures of the dependent variable (the size of the shadow banking system relative to total financial system assets or GDP and the ratio of shadow bank lending to total financial sector lending) yield counterintuitive results: the signs of the coefficients change according to whether fixed effects or trend are included; many regulatory variables have unexpected signs; and many macroeconomic and financial variables are insignificant. Moreover, specifications with interaction terms did not produce consistent results.

⁵⁶Since the flow of funds data set includes mostly advanced economies, no regressions were run on these data to examine advanced versus emerging market economies separately.

⁵⁷The overall capital stringency index measures whether capital requirements reflect certain risk elements and deducts certain market value losses from capital before determining minimum capital adequacy. The capital regulatory index is constructed as a combination of the overall capital stringency index and an assessment of whether certain funds may be used to initially capitalize a bank.

⁵⁸For illustrative purposes, this annex shows the results for the regressions including the overall capital stringency index.

Table 2.5. Panel Regression of Shadow Banking Growth: Flow of Funds Sample, 1990–2013

	Expected sign	(1)	(2)	(3)	(4)	(5)	(6)
Crisis dummy	–	–4.09** (1.73)	0.38 (0.77)	0.15 (0.78)	1.26 (1.19)	1.13 (1.10)	0.58 (1.20)
Real GDP growth	+	0.41* (0.24)	0.53** (0.26)	0.51** (0.25)	0.60*** (0.21)	0.61** (0.27)	0.55*** (0.20)
Banking sector size	+	0.36*** (0.10)	0.34*** (0.11)	0.35*** (0.11)	0.34*** (0.12)	0.39*** (0.14)	0.35** (0.14)
Institutional investors size	+	0.52*** (0.08)	0.43*** (0.08)	0.42*** (0.09)	0.42*** (0.08)	0.40*** (0.08)	0.41*** (0.09)
Real short-term rate (lag 4)	–	–0.04 (0.36)	0.51 (0.70)	0.62 (0.65)	0.43 (0.68)	0.42 (0.79)	0.39 (0.77)
Term spread (lag 4)	–	0.93 (0.71)	1.26 (0.92)	1.33 (0.85)	0.60 (0.66)	0.62 (0.90)	0.93 (0.85)
Real short-term rate (lag 4) and post-2008 dummy	–	–0.81** (0.39)	–1.41*** (0.45)	–1.51*** (0.43)	–1.61*** (0.52)	–1.52*** (0.55)	–1.38** (0.52)
Term spread (lag 4) and post-2008 dummy	–	–1.76** (0.77)	–2.48*** (0.75)	–2.45*** (0.73)	–2.08*** (0.62)	–1.84** (0.91)	–2.07** (0.81)
Overall capital stringency	+		0.84** (0.40)				
Capital regulatory index	+			1.02** (0.47)			
Supervisory power index	–				–0.49 (0.47)		
Financial statement transparency	+/–					–2.69** (1.08)	
Global liquidity quantities (lag 4)	+						0.34 (0.76)
Number of observations		1,501	1,233	1,233	1,234	1,245	1,221
Fixed effects/pooled OLS		Fixed	Pooled	Pooled	Pooled	Pooled	Pooled
R squared		0.29	0.25	0.26	0.25	0.26	0.25
Number of countries		29	29	29	29	29	29

Source: IMF staff calculations.

Note: OLS = ordinary least squares. ***, **, * indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Standard errors are Driscoll and Kraay (1998) robust to heteroscedasticity, autocorrelation with MA(q), and cross-sectional dependency. The estimation period is 1990–2013. Equations are estimated by pooled OLS or fixed effects (within regression). The sample countries are as follows: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Ireland, Japan, Korea, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, the United Kingdom, and the United States.

Table 2.6. Panel Regression of Shadow Banking Growth: Financial Stability Board Sample, 2002–12

	Expected sign	All	MMFs	INVs	SPVs
Crisis dummy	–	–3.28*** (0.98)	–5.30* (2.35)	–3.95 (2.92)	–14.13** (5.57)
Real GDP growth	+	0.13 (0.21)	0.57 (0.64)	0.14 (0.20)	1.13** (0.37)
Banking sector size	+/–	0.43*** (0.04)	0.00 (0.08)	–0.40*** (0.04)	0.48*** (0.06)
Institutional investors size	+	0.53*** (0.05)	0.70*** (0.07)	1.27*** (0.05)	0.45*** (0.06)
Term spread (lag 1)	–	–1.36** (0.46)	–2.69** (0.89)	–2.28** (0.77)	–5.01** (1.87)
Overall capital stringency	+	0.22 (0.23)	2.03** (0.69)	–0.60 (0.61)	0.86 (1.26)
Number of observations		181	153	155	117
R squared		0.68	0.27	0.64	0.58
Number of countries		23	21	21	17

Source: IMF staff calculations.

Note: INVs = investment funds; MMFs = money market mutual funds; SPVs = special purpose vehicles. ***, **, * indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Standard errors are Driscoll and Kraay (1998) robust to heteroscedasticity, autocorrelation with MA(q), and cross-sectional dependency. The estimation period is 2002–12. Equations are estimated by fixed effects (within regression). The countries in the sample are as follows: Australia, Brazil, Canada, China, Chile, France, Germany, Hong Kong SAR, Indonesia, India, Italy, Japan, Korea, Mexico, the Netherlands, Russia, Saudi Arabia, South Africa, Singapore, Spain, Switzerland, Turkey, the United Kingdom, and the United States.

Annex 2.4. Regulatory Developments

This annex provides a global overview of shadow banking regulation reform and its implementation in key jurisdictions.

Developments at the international level have progressed and will be presented to the Group of Twenty in November 2014. The Financial Stability Board (FSB), in cooperation with other international regulatory bodies, carried out work in five areas:

- *Mitigating banks' interactions with shadow banks:* To appropriately capture banks' interactions with the shadow banking sector, the Basel Committee on Banking Supervision (BCBS) has improved its frameworks for (1) measuring and controlling banks' large exposures, and (2) capital requirements on banks' equity investments in funds, and is working toward developing guidance on the scope of regulatory consolidation.
- *Reducing the susceptibility of money market mutual funds (MMFs) to runs:* The FSB endorsed recommendations of the International Organization of Securities Commissions (IOSCO), including the conversion of constant net asset value (NAV) MMFs into floating NAV MMFs where workable. IOSCO recommends that constant NAV MMFs be protected against investor runs through redemption gates, redemption fees, or "side pockets."⁵⁹ IOSCO is conducting peer review of the progress of national regulation.
- *Oversight and regulation of other shadow banking entities:* The FSB issued a policy framework consisting of an assessment of economic functions and activities of shadow banking, adoption of policy tools, and an information-sharing process between authorities, complemented by peer review. Recommended policy tools included primarily prudential measures, such as capital requirements, leverage limits, liquidity buffers, and restrictions on maturity and liquidity transformation.
- *Securitization:* The FSB endorsed IOSCO recommendations to better align the incentives of securitization markets, including issuer risk retention and improved transparency and disclosure. IOSCO is conducting peer review in this area as well. The BCBS and IOSCO are jointly reviewing develop-

⁵⁹Side pockets are special accounts that allow fund managers to separate parts of an investment portfolio from other assets until market conditions allow for proper valuation and liquidation.

ments in securitization markets and discussing criteria to identify simple and transparent securitizations.

- *Dampening procyclicality in repurchase agreement (repo) and securities lending:* The FSB policy recommendations seek to enhance transparency, regulation, and improvements to the structure of repo and securities lending markets and to address risks associated with rehypothecation (reuse of funds in other repo transactions), collateral valuation, and "haircuts" (reduction in the principal paid to creditors).

In addition, the FSB is developing methodologies to identify systemically important nonbank, noninsurer financial institutions. Its first consultation paper on the topic, released in January 2014, proposed separate methodologies for finance companies, market intermediaries, and investment funds. The scope of this work is wider than shadow banking, but it will provide additional regulatory guidance on shadow banking entities. Concrete policy measures will be developed once the methodologies are finalized.

In contrast to the progress on the international level, the national implementation of policies on several issues is still at an early stage. Only a few national regulators have acted in response to the international policy developments, although in specific markets some reform proposals were implemented.

United States

- *MMFs:* In July 2014, the U.S. Securities and Exchange Commission issued final rules for the reform of MMFs, under which prime institutional MMFs will be required to transact at a floating NAV and daily share prices float with the market-based value of their portfolio securities; retail and government MMFs will continue to use constant NAV pricing.⁶⁰ However, in times of stress, all MMFs may impose liquidity fees and redemption gates.
- *Securitization:* U.S. regulators proposed credit risk retention requirements in securitizations and a prohibition against hedging the retained credit risk portion; the actions were taken after the Financial Accounting Standards Board modified its

⁶⁰Government bond MMFs hold cash or invest in government debt. Prime MMFs invest primarily in corporate debt securities. Retail MMFs are limited to investments by natural persons, and institutional prime MMFs are geared toward institutional investors. The latter hold a riskier pool of assets than other funds, such as certificates of deposit, commercial paper, and repurchase agreements.

Table 2.7. Snapshot of the New International Regulatory Initiatives

Key reforms	Elements	Global timeline	National timeline
Banking sector reforms: Banks' interactions with shadow banking entities BCBS: Policy Proposal Based on Work of BCBS Accounting Task Force (FSB 2013e)	Improve international consistency of the scope of consolidation for prudential regulatory purposes and ensure that banks' activities and their interaction with shadow banks are appropriately captured.	Completion in 2014	
BCBS (2013a)	Introduce risk-sensitive capital requirements for banks' equity investments in all types of funds (for example, hedge funds, managed funds, investment funds).	Completed	Effective January 2017
BCBS (2014)	Limit banks' large exposure to single counterparties (including to shadow banking entities).	Completed	Effective January 2019
Shadow banking entity reforms: Reducing susceptibility of MMFs to runs IOSCO (2012a)	Introduce common standards of regulation and management of MMFs across jurisdictions.	Completed	
Other shadow banking entities FSB (2013a)	Assess and mitigate systemic risks posed by other shadow banking entities and activities (credit intermediation activities by nonbank financial entities, involving maturity/liquidity transformation, leverage and/or credit risk transfer), introduce a framework of policy tools and information sharing among authorities.	Completed. Information-sharing process to be completed in 2014.	
FSB (2014)	Prepare methodologies to identify systemically important nonbank and noninsurer financial institutions.	Pending. Consultation ended in April, 2014.	
Shadow banking market reforms: Securitization IOSCO (2012b)	Policy recommendations are related to transparency, standardization, and risk retention requirements.	Completed	
BCBS (2013b)	Revisions to the securitization framework aim at making capital requirements more prudent and risk sensitive. Other objectives are to reduce the mechanistic reliance on external credit ratings and cliff effects.	Pending. Consultation ended in March 2014.	
Securities lending and repos FSB (2013b)	Dampen financial stability risks and procyclical incentives associated with securities financing transactions such as repos and securities lending that may exacerbate funding strains in times of market stress.	Policy recommendations completed. Minimum haircut standards to be finalized in 2014. Implementation January 2017.	Implementation January 2017

Source: IMF staff compilation.

Note: BCBS = Basel Committee on Banking Supervision; FSB = Financial Stability Board; IOSCO = International Organization of Securities Commissions; MMF = money market mutual fund; repo = repurchase agreement.

consolidation rules, and the federal banking and thrift regulatory agencies required banks to include assets of asset-backed commercial paper programs in the calculation of their risk-weighted assets.⁶¹

- *Other shadow banking entities:* The process established by Section 113 of the Dodd-Frank Act for designation of systemically important nonbanks allows for extending the perimeter of prudential regulation and supervision by the Federal Reserve.⁶²

Europe

The European Commission's reform agenda has aimed at transactions between regulated banks and the shadow banking sector, and the improvement of market integrity (EC 2013).

- *MMFs:* Proposed new rules for money market funds include a capital buffer of 3 percent of a fund's assets for constant NAV funds (with a maximum residual maturity of 397 days) or the conversion to variable NAV structures (EC 2013). Other elements contain new requirements on diversification, liquidity, concentration, and the eligibility of assets.
- *Securitization:* Reform measures include better alignment of interest and information between the parties involved in securitization transactions, such as risk retention of at least 5 percent of the securitized assets by the originator, sponsor, or original lender institution. In addition, higher capital requirements will be applied to noncompliant banks. Furthermore, changes to accounting standards on consolidation have been introduced and disclosure requirements for unconsolidated structured entities strengthened.
- *Repo and securities financing:* New rules on reporting and transparency of securities financing transactions

⁶¹Exemptions are granted for mortgage-backed securities backed by residential mortgages that meet certain underwriting standards ("qualified residential mortgages"), as well as by commercial loans, commercial mortgages, and automobile loans.

⁶²By July 2014, three companies had been designated systemically important: American International Group, General Electric Capital Corporation, and Prudential Financial.

are proposed. Planned measures in the area of securities law are meant to limit the risks associated with rehypothecation. Proposed measures also aim to improve investors' understanding of the investment fund risks stemming from their use in transactions that finance securities.

- *Other shadow banking entities:* As of July 2013, the Alternative Investment Fund Managers Directive imposes new rules governing hedge funds, private equity funds, and real estate funds, and it introduces requirements regarding capital, risk and liquidity management, designation of a single depository for asset holdings, transparency, and supervisors' ability to restrict leverage.
- *Monitoring:* Work is under way to improve the collection and exchange of data as part of the September 2013 European Commission road map. Central repositories have been set up to collect data on derivatives within the framework of the European Market Infrastructure Regulation and have been proposed for repurchase transactions. Beginning in 2014, banks must report exposures related to shadow banking to their supervisors, and the European Banking Authority is set to draft guidelines on respective limits by the end of 2014. In addition, the definition of "credit institution" is being reviewed with a view to possible extension of the prudential regulatory perimeter.

Japan

- *Other shadow banking entities:* Consolidated regulation and supervision of broker/dealers was introduced in April 2011. It requires large broker/dealers whose total assets are more than ¥1 trillion to be designated as special financial instruments business operators and their ultimate parent companies as designated ultimate parent companies. Currently, the Nomura and Daiwa groups have been so designated and are subject to bank-like prudential requirements, including intensive supervision and Basel III capital requirements.

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