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Restoring Confidence and Progressing on Reforms

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PREFACE

The *Global Financial Stability Report* (GFSR) assesses key risks facing the global financial system. In normal times, the report seeks to play a role in preventing crises by highlighting policies that may mitigate systemic risks, thereby contributing to global financial stability and the sustained economic growth of the IMF's member countries. Risks to financial stability have increased since the April 2012 GFSR, as confidence in the global financial system has become very fragile. Despite significant and continuing efforts by European policymakers, the principal risk remains the euro area crisis. The current report highlights how risks have changed over the past six months, traces the sources and channels of financial distress with a focus on bank deleveraging and euro area market fragmentation, examines progress on the reform agenda and whether the reforms are contributing to a safer financial system, and analyzes the relationship between financial structures and economic outcomes to determine if certain financial systems are associated with higher or more stable growth.

The analysis in this report has been coordinated by the Monetary and Capital Markets (MCM) Department under the general direction of José Viñals, Financial Counsellor and Director. The project has been directed by Jan Brockmeijer and Robert Sheehy, both Deputy Directors; Peter Dattels and Laura Kodres, Assistant Directors; and Matthew Jones, Advisor. It has benefited from comments and suggestions from the senior staff in the MCM department.

Individual contributors to the report were Sergei Antoshin, Nicholas Arregui, Serkan Arslanalp, Sophia Avramova, Adolfo Barajas, Ana Carvajal, Eugenio Cerutti, Su Hoong Chang, Ken Chikada, Nehad Chowdhury, Kay Chung, Sean Craig, Era Dabla-Norris, Reinout De Bock, Martin Edmonds, Jennifer Elliott, Michaela Erbenova, Ellen Gaston, Jeanne Gobat, Tom Gole, Kristian Hartelius, Sanjay Hazarika, Changchun Hua, Anna Ilyina, Patrick Imam, Marcel Kasumovich, William Kerry, John Kiff, Oksana Khadarina, Michael Kleeman, Alexandre Kohlhas, Peter Lindner, Rebecca McCaughrin, Tommaso Mancini Griffoli, André Meier, Fabiana Melo, Paul Mills, Srobona Mitra, Gianni de Nicolò, S. Erik Oppers, Nada Oulidi, Evan Papageorgiou, Jaume Puig, Lev Ratnovski, André Santos, Jochen Schmittmann, Katharine Seal, Stephen Smith, Tao Sun, Jay Surti, Narayan Suryakumar, Takahiro Tsuda, Nico Valckx, Constant Verkoren, Chris Walker, Rodolfo Wehrhahn, Christopher Wilson, Xiaoyong Wu, Mamoru Yanase, Lei Ye, Luisa Zanforlin, and Jianping Zhou.

Ivailo Arsov, Martin Edmonds, Mehmet Gorpe, Mustafa Jamal, Oksana Khadarina, and Yoon Sook Kim provided analytical support. Gerald Gloria, Nirmaleen Jayawardane, Juan Rigat, and Ramanjeet Singh were responsible for word processing. Joanne Johnson of the External Relations Department edited the manuscript and coordinated production of the publication, with assistance from Gregg Forte.

This issue of the GFSR draws, in part, on a series of discussions with banks, clearing organizations, securities firms, asset management companies, hedge funds, standards setters, financial consultants, pension funds, central banks, national treasuries, and academic researchers. The report reflects information available up to September 14, 2012.

The report benefited from comments and suggestions from staff in other IMF departments, as well as from Executive Directors following their discussion of the GFSR on September 14, 2012. However, the analysis and policy considerations are those of the contributing staff and should not be attributed to the Executive Directors, their national authorities, or the IMF.

The following symbols have been used throughout this volume:

. . . to indicate that data are not available;

— to indicate that the figure is zero or less than half the final digit shown, or that the item does not exist;

– between years or months (for example, 2008–09 or January–June) to indicate the years or months covered, including the beginning and ending years or months;

/ between years (for example, 2008/09) to indicate a fiscal or financial year.

"Billion" means a thousand million; "trillion" means a thousand billion.

"Basis points" refer to hundredths of 1 percentage point (for example, 25 basis points is equivalent to 1/4 of 1 percentage point).

"n.a." means not applicable.

Minor discrepancies between constituent figures and totals are due to rounding.

As used in this volume the term "country" does not in all cases refer to a territorial entity that is a state as understood by international law and practice. As used here, the term also covers some territorial entities that are not states but for which statistical data are maintained on a separate and independent basis.

The boundaries, colors, denominations, and other information shown on the maps do not imply, on the part of the International Monetary Fund, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.

EXECUTIVE SUMMARY

The analysis in this *Global Financial Stability Report* (GFSR) shows that, despite recent favorable developments in financial markets, risks to financial stability have increased since the April 2012 GFSR, as confidence in the global financial system has become very fragile. Although significant new efforts by European policymakers have allayed investors' biggest fears, the euro area crisis remains the principal source of concern. Tail-risk perceptions surrounding currency redenomination have fueled a retrenchment of private financial exposures to the euro area periphery. The resulting capital flight and market fragmentation undermine the very foundations of the union: integrated markets and an effective common monetary policy.

The European Central Bank's (ECB's) exceptional liquidity operations around the beginning of 2012 eased the pressure on banks to shed assets, but that pressure rose again, accompanied by increasing market fragmentation. Subsequently, the statement by the president of the ECB in July, and measures proposed by the ECB in September to increase liquidity support and safeguard an appropriate monetary policy transmission, have been essential in addressing investors' biggest fears and prompted another market recovery. This GFSR updates work presented in the April 2012 report to assess the impact of bank deleveraging under three scenarios—*baseline*, *weak,* and *complete* policies. We find that delays in resolving the crisis have increased the expected amount of asset shrinkage at banks. The largest burden of projected credit supply contractions falls on the euro area periphery, where the combined forces of bank deleveraging and sovereign stress are generating very strong headwinds for the corporate sector.

Where the April 2012 GFSR found the need for euro area policymakers to build on improvements and avoid fresh setbacks, this GFSR finds that more speed is needed now. As detailed in Chapter 1, a leap to the *complete policies* scenario is necessary to restore confidence, reverse capital flight, and reintegrate the euro zone. Key elements at the national level include implementation of well-timed and growth-friendly fiscal consolidation, structural reforms to reduce external imbalances and promote growth, and completion of the banking sector cleanup, including further steps to recapitalize or restructure viable banks where necessary and to resolve nonviable banks.

These national efforts need to be supported at the euro area level by sufficient funding to banks through the ECB's liquidity framework. More fundamentally, concrete progress toward establishing a banking union in the euro area will help to break the pernicious link between sovereigns and domestic banks and help improve supervision. Over the longer term, a successful banking union will require sufficient resource pooling to provide a credible fiscal backstop to both the bank resolution authority and a joint deposit insurance fund.

The unfolding euro area crisis has generated safe-haven flows to other jurisdictions, notably the United States and Japan. Although these flows have pushed government funding costs to historical lows, both countries continue to face significant fiscal challenges, as assessed in Chapter 2. In the United States, the looming fiscal cliff, the debt ceiling deadline, and the related uncertainty are the main immediate risks. Unsustainable debt dynamics remain the central medium-term concern. Japan faces high deficits and record debt levels, and interdependence between banks and the sovereign is growing. In both countries, necessary steps toward medium-term fiscal adjustment need to be laid out without further delay. The key lesson of the past few years is that imbalances need to be addressed well before markets start flagging credit concerns.

Emerging market economies have adeptly navigated through global shocks so far, but need to guard against potential further shockwaves while managing a slowdown in growth that could raise domestic

financial stability risks. Local bond markets have continued to attract inflows even as the euro area crisis intensified. Overall, many countries in central and eastern Europe are the most vulnerable because of their direct exposures to the euro area and certain similarities they bear to countries in the euro area periphery. Asia and Latin America generally appear more resilient, but several key regional economies are prone to the risks associated with being in the late phase of a credit cycle that has featured an extended period of rising property prices and debt. Meanwhile, the scope to provide fresh policy stimulus is somewhat constrained in several economies, which underscores the need to deftly manage country-specific challenges.

The crisis has spurred a host of regulatory reforms to make the financial system safer. Chapter 3 contains an interim report on whether these reforms are moving the financial sector in the right direction against a benchmark set of desirable features—financial institutions and markets that are more transparent, less complex, and less leveraged. The analysis suggests that, although there has been some progress over the past five years, financial systems have not come much closer to those desirable features. They are still overly complex, with strong domestic interbank linkages, and concentrated, with the too-important-to-fail issues unresolved. While there has not yet been any serious setback to financial globalization, in the absence of appropriate policies economies are still susceptible to harmful cross-border spillovers. Progress has been limited partly because many regulatory reforms are still in the early stages of implementation and partly because crisis intervention measures are still in use by a number of economies, delaying the "rebooting" of the financial system onto a safer path. Although the reforms currently under way are likely to produce a safer banking system over time, the chapter points to some areas that still require attention: (1) a global discussion of the pros and cons of direct restrictions on business activities to address the too-important-to-fail issue, (2) more attention to segments of the nonbank system that may be posing systemic risks, and (3) further progress on recovery and resolution plans for large institutions, especially those that operate across borders.

Chapter 4 tackles the fundamental question of whether certain aspects of financial structure enhance economic outcomes. Are the forces currently changing financial structures, including regulatory reforms, likely to result in structures that will support higher, less-volatile growth and a more stable financial system? The chapter finds that some structural features are indeed associated with better outcomes and others with less growth and more volatility. In particular, financial buffers (both for capital and liquidity) tend to be associated with better economic performance, whereas some types of nontraditional bank intermediation are linked to less favorable results. The analysis also indicates that certain positive characteristics may sometimes turn negative. For instance, some measures of cross-border connections are beneficial most of the time, but if not managed properly they can act as conduits to transmit destabilizing shocks during a crisis. Overall, the analysis needs to be interpreted carefully, since it is constrained by important gaps in data and a relatively short sample period that included the global financial crisis. As a result, the policy conclusions can only be viewed as tentative. Nonetheless, two of those that emerge are that (1) financial buffers made up of high-quality capital and truly liquid assets generally help economic performance; and (2) banks' global interconnectivity needs to be managed well so as to reap the benefits of cross-border activities, while limiting adverse spillovers during a crisis.

Both Chapters 3 and 4 also stress that the success of steps aimed at producing a safer financial system hinges on effective implementation and strong supervision. Without those elements, regulatory reform may fail to secure greater financial stability.

CHAPTER 1

GLOBAL FINANCIAL STABILITY ASSESSMENT

Risks to financial stability have increased since the April 2012 Global Financial Stability Report *(GFSR), as confidence in the global financial system has become very fragile (Figures 1.1 and 1.2). Despite significant and continuing efforts by European policymakers, which have been essential in addressing investors' biggest fears, the principal risk remains the euro area crisis. Incremental policymaking has been insufficient to fully allay market tensions, despite the recent market rally since end-July. Imbalances in the United States and Japan are amenable to medium-term adjustment, but clarification now of necessary policy actions to be taken over the medium term would sustain confidence and preempt potential future market pressures. Emerging market economies have navigated well through increased global risks, but if spillovers were to intensify, rising domestic vulnerabilities and a reduction in policy space could pose increased challenges.*

Status of Stability Indicators

Since the April 2012 GFSR, markets have been volatile, gyrating between extremes of disappointment and optimism (Figure 1.3). Confidence in policymaking has faltered, despite significant and continuing efforts by European policymakers. In addition, rising political risks elsewhere have postponed medium-term adjustment. These risks have spilled over to broader global economic conditions.

Note: This chapter was written by Peter Dattels and Matthew Jones (team leaders), Sergei Antoshin, Serkan Arslanalp, Eugenio Cerutti, Julian Chow, Nehad Chowdhury, Kay Chung, Sean Craig, Reinout De Bock, Martin Edmonds, Michaela Erbenova, Jeanne Gobat, Mehmet Gorpe, Kristian Hartelius, Sanjay Hazarika, Changchun Hua, Anna Ilyina, Patrick Imam, Marcel Kasumovich, William Kerry, Alexandre Kohlhas, Rebecca McCaughrin, Tommaso Mancini Griffoli, Peter Lindner, André Meier, Paul Mills, Nada Oulidi, Evan Papageorgiou, Jaume Puig, Jochen Schmittmann, Katharine Seal, Stephen Smith, Narayan Suryakumar, Takahiro Tsuda, Constant Verkoren, Chris Walker, Christopher Wilson, Lei Ye, and Jianping Zhou.

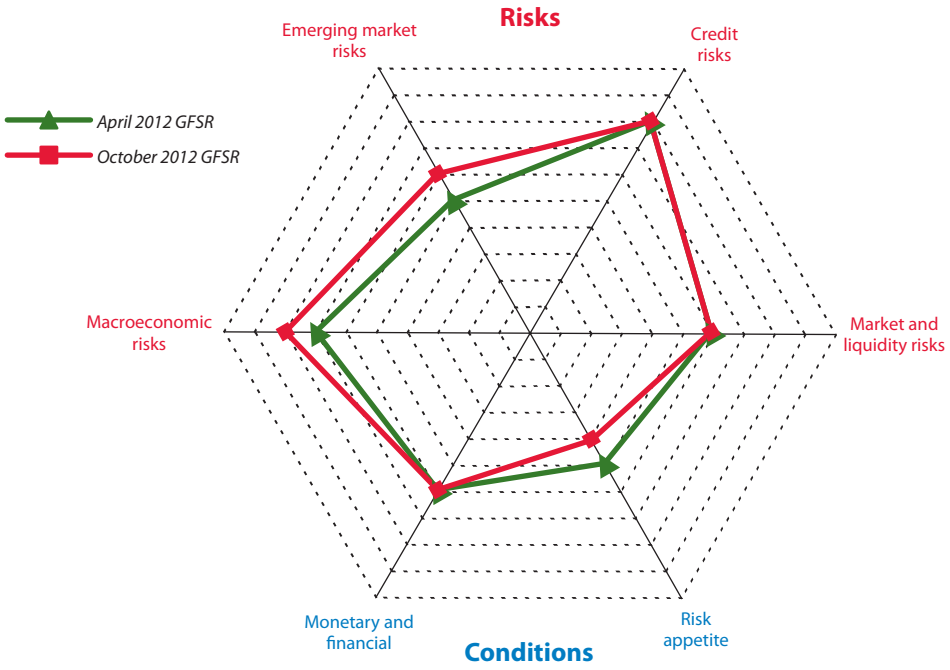
Notwithstanding recent market improvements in response to policy actions described below, conditions remain fragile after a prolonged deterioration in underlying trends. Flows into global bond funds have jumped since the April 2012 GFSR, with investors favoring safe-haven sovereign bonds and investment-grade corporate bonds amid concerns about tail risk outcomes (Figure 1.4).

The combination of lower *risk appetite*, a weakened outlook for growth (see the October 2012 *World Economic Outlook*), and persistently volatile and wide spreads in the euro area periphery has led to an increase in *macroeconomic risks. Emerging market risks* have also risen, as the prospects for these economies appear increasingly linked to the global cycle. In recent years, the resilience of emerging market economies amid the high-risk global environment has been evident in persistent investor flows seeking the relative safety of the sector's fixed-income assets. However, a further escalation of euro area stresses poses risks, especially for the countries in central and eastern Europe. A slowdown in economic activity heightens these risks, as some emerging market economies have only limited policy space to provide countercyclical stimulus and safeguard against external shocks.

Credit risks remain largely unchanged, albeit at high levels, as the renewed deterioration in the banking sector and growing deleveraging and credit pressures in the euro area periphery have been offset by some improvements in corporate and household balance sheets in advanced economies. Within the *euro area,* capital has continued to move out of the periphery, both to the core and to countries outside of the euro area altogether, as official measures to safeguard integration have so far proved insufficient to offset strong private sector forces for fragmentation.

A further deterioration in the euro area crisis is the biggest risk to global financial stability, but rising imbalances elsewhere are also a cause for concern. Safe-haven inflows to *Japan* have compressed govern-

Figure 1.1. Global Financial Stability Map



Source: IMF staff estimates.
Note: Away from center signifies higher risks, easier monetary and financial conditions, or higher risk appetite.

ment bond yields to near-record lows despite a more challenging sovereign debt load and a strengthening sovereign-bank nexus. While these imbalances are mostly a medium-term issue of fiscal adjustment, derivatives markets are pricing in risks of rising interest rates and currency volatility (Box 1.1).

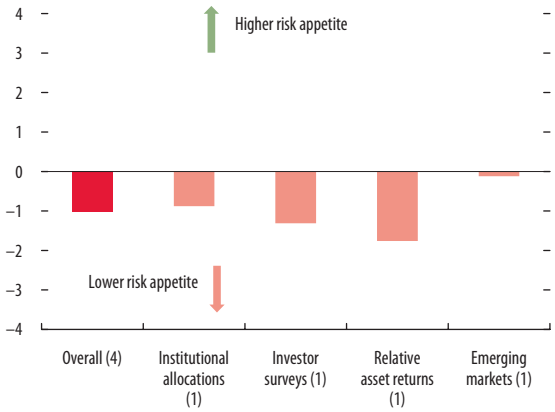
For the *United States*, safe-haven flows, central bank purchases, and balance sheet de-risking have also contributed to an unprecedented compression of credit risk premiums and yields. The looming debt ceiling, fiscal cliff, and related uncertainty are the main immediate risks, while unsustainable debt dynamics remain the key medium-term concern. If compressed credit spreads rise in a disorderly or rapid manner, longer-term fiscal risks could pose increasing stability challenges for the United States and the global financial system. Markets are not pricing in such an outcome (see Box 1.1), suggesting a degree of complacency, as reflected in extended long positions in Treasury bills across broad investor classes, in which interest rate risk, given near-zero policy levels, is essentially all one way. Meanwhile, U.S. banks face structural challenges related to changes in their business models.

Monetary authorities have reacted to the elevated risks of financial instability and tighter credit conditions by maintaining a supportive policy stance, thus keeping overall *monetary and financial conditions* broadly accommodative. The European Central Bank's (ECB's) three-year LTROs (longer-term refinancing operations) eased bank funding strains and slowed the pace of deleveraging in the euro area in the first quarter. Lending conditions stabilized but then began to deteriorate again toward the end of the second quarter as the divergence between the euro area core and periphery continued to grow. However, a broad-based commitment from the ECB, beginning with a statement by ECB President Mario Draghi at the end of July to do "whatever it takes" to preserve the euro, and followed by the introduction in September of a program of Outright Monetary Transactions (OMT) to provide liquidity to sovereign debt markets in the euro area periphery, helped to reduce tensions and boost market recovery.

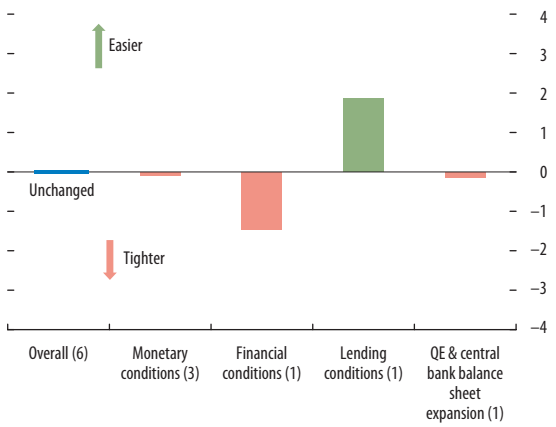
Figure 1.2. Global Financial Stability Map: Assessment of Risks and Conditions

(In notch changes since the April 2012 GFSR)

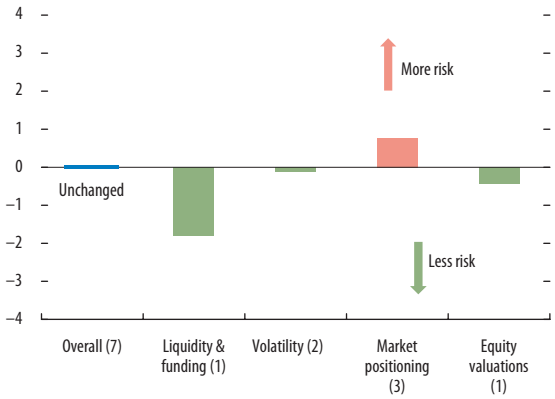
Risk appetite contracted across all measures, reversing the improvement in the beginning of the year.



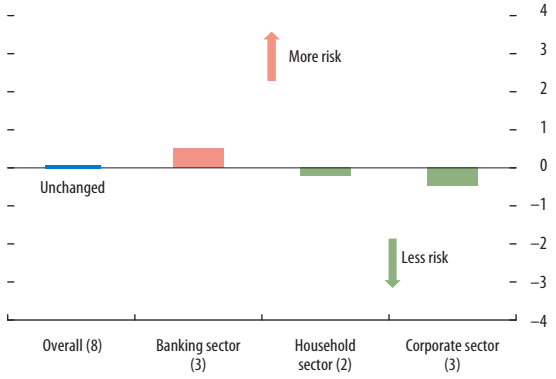
Lending conditions stabilized and financial conditions deteriorated, leaving overall ***monetary and financial conditions*** unchanged.



Easing liquidity strains helped ***market and liquidity risks*** remain steady despite bearish market positioning.

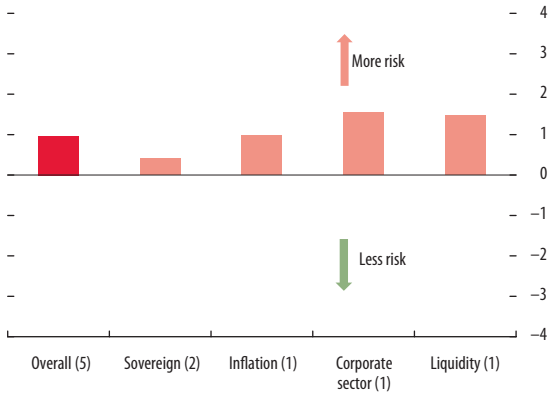


Credit risks remained at elevated levels, as improvements in nonfinancial sectors were offset by banking strains.



Macroeconomic risks increased due to deterioration in economic activity indicators.

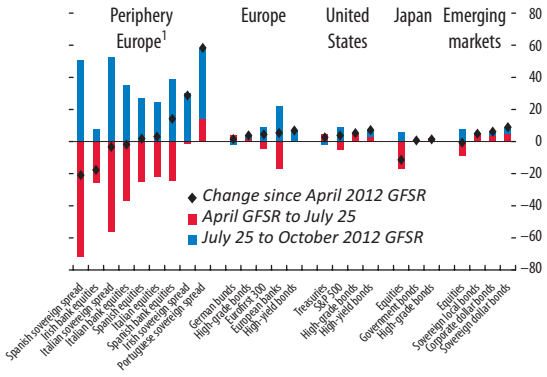
Emerging market risks increased as leading markets were increasingly affected by the global cycle.



Source: IMF staff estimates.

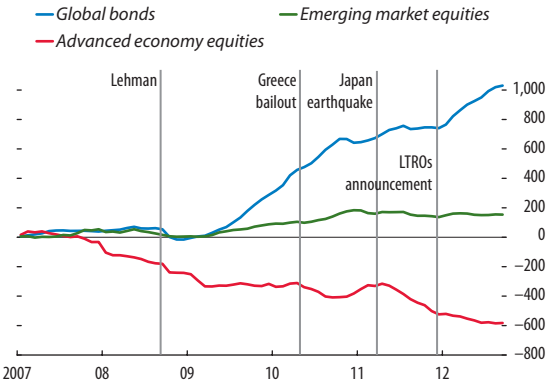
Note: Changes in risk and conditions are based on a range of indicators, complemented with IMF staff judgment; see Annex 1.1. in the April 2010 GFSR and Dattels and others (2010) for a description of the methodology underlying the Global Financial Stability Map. Numbers in parentheses denote the number of individual indicators within each subcategory of risks and conditions. The "overall" notch change in each panel is the simple average of notch changes in individual indicators in that panel. In the panel on monetary and financial conditions, a positive value for lending conditions represents slower pace of tightening or faster easing, and QE = quantitative easing.

Figure 1.3. Asset Price Performance since April 2012 GFSR
(Percent change)



Sources: Bank of America Merrill Lynch; Bloomberg L.P.; and IMF staff estimates.
[1]Spreads are over bunds, inverted.

Figure 1.4. Cumulative Flows to Global Mutual Funds
(In billions of U.S. dollars)



Source: EPFR Global.
Note: LTROs = longer-term refinancing operations.

In response to the weakening outlook in the United States and persistent high unemployment, the Federal Reserve launched a new round of quantitative easing ("QE3") in September. Also in September, the Bank of Japan, responding to weakened external growth prospects and persistent domestic deflation, enhanced monetary easing by increasing the size of its Asset Purchase Program. Together, these central bank actions boosted prices of risk assets and bank equities, while narrowing sovereign peripheral spreads in the recent period.

This GFSR welcomes the important steps taken by the European authorities and encourages strong implementation of announced policies along with further steps outlined in the *complete policies* scenario below that could act as a turning point in the crisis toward durable stability (see Box 1.2).

The rest of this chapter focuses on critical global stability risks and policy challenges. Chapter 2 assesses these financial risks in the sovereign, banking, and corporate sectors across regions of the world.

The Euro Area

The deepening euro area crisis has driven a wedge between the periphery and the core.

The euro area crisis has moved from a sudden stop into a capital-flight phase despite substantial policy interventions, as cross-border private capital is being repatriated from the periphery back to the core of the currency union (Figure 1.5). Since domestic currency depreciation is impossible within the monetary union, higher risks have translated into rising credit spreads on the periphery's sovereign and bank borrowers, particularly in Spain and Italy (Figure 1.6). As financial integration unwinds rapidly in this internal capital account crisis, the private capital leaving the periphery has been mostly replaced by large public sector flows, principally across central bank balance sheets (Figure 1.7).

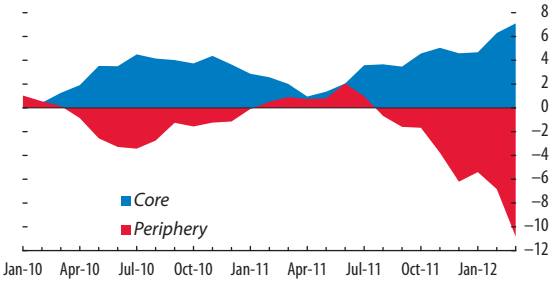
Yet despite the significant public resources being deployed to the periphery, private sector confidence has remained low. Concerns over a possible euro area breakup have led to extreme fragmentation between funding markets in the core and the periphery (Figure 1.8). The announcement of the OMT program in early September has helped address such concerns and reduce sovereign spreads between the periphery and the core. However, periphery bank and corporate spreads have narrowed less, which may act as a brake on recovery. Banks, insurers, and nonfinancial corporations are trying to match assets, liabilities, and collateral in each country of the periphery as protection against redenomination risk. In turn, liquidity in core economy banks is not being recycled to the periphery but is instead being deposited at core central banks or in relatively safe government bonds.

Following a brief pause afforded by the ECB's LTROs, deleveraging pressures on periphery banks

Capital flight from the periphery to the core…

Figure 1.5. Portfolio and Other Investment Capital Flows in the Euro Area, Excluding Central Banks

(Cumulative from December 2009, in percent of GDP in preceding year)



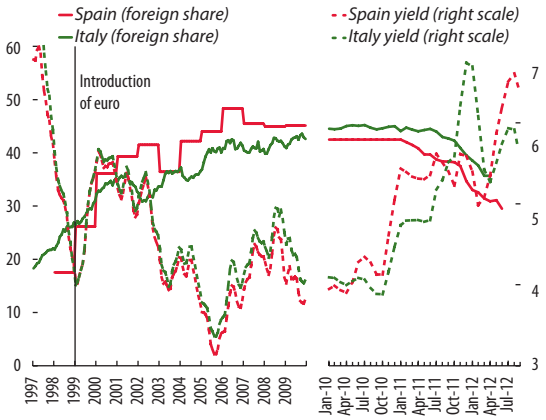
Sources: Haver Analytics; and IMF staff estimates.

Note: To estimate the autonomous, private-sector-driven component of total flows, flows are calculated as the sum of net portfolio and other investment flows, excluding changes in TARGET2 balances at the central bank. Core = Belgium, France, Germany, and the Netherlands; periphery = Greece, Ireland, Italy, Portugal, and Spain.

…is widening sovereign spreads as foreign holdings of periphery debt fall…

Figure 1.6. Spain and Italy: Changes in Foreign Investor Shares and Yields

(In percent)



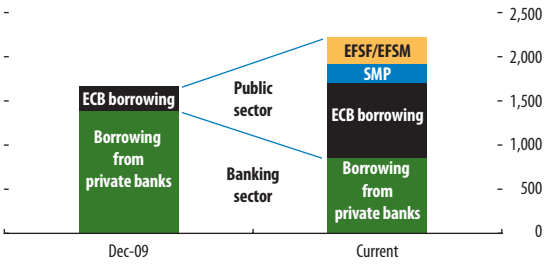
Source: Bloomberg L.P.

Note: Share of nonresident investors in total debt stock, and generic yield of 10-year government bond. Yields are 3-month moving averages.

…and private borrowing is being replaced by public sector flows…

Figure 1.7. Euro Area Exposures to Greece, Ireland, Italy, Portugal, and Spain

(In billions of euros)



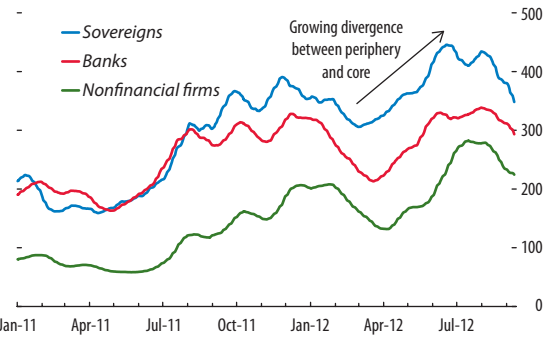
Sources: Bank for International Settlements (BIS); Bloomberg L.P.; European Financial Stability Fund; Haver Analytics; national central banks; and IMF staff estimates.

Note: Current exposures of the rest of the euro area to the periphery (Greece, Ireland, Italy, Portugal, and Spain) amount to €2.2 trillion; including cross-border lending by euro area banks reporting to the BIS on an ultimate risk basis (end-March 2012); periphery banks' borrowing from the Eurosystem, excluding emergency liquidity assistance; ECB purchases of periphery government bonds through its SMP; and EFSF and EFSM contributions to programs with Greece, Ireland, Portugal, and Spain. ECB = European Central Bank; EFSF = European Financial Stability Facility; EFSM = European Financial Stabilisation Mechanism; SMP = Securities Market Programme.

…resulting in a growing divergence in periphery-core funding costs and spreads…

Figure 1.8. Periphery Minus Core Credit Default Swap Spreads

(In basis points)



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

Note: Data for sovereigns are weighted by GDP; for banks, by assets; and for nonfinancial firms, by outstanding bonds. Corporate spreads are calculated via option-adjusted bond spreads. Core = Austria, Belgium, Finland, Germany, and the Netherlands; periphery = Greece, Ireland, Italy, Portugal, and Spain.

have increased amid a sharp economic downturn, worsening funding conditions for both banks and sovereigns, and financial fragmentation within the euro area (see Box 2.3). The corporate sector could quickly become an additional force in this pernicious feedback loop, as downgrades of sovereign ratings threaten to drag investment-grade corporate debt down to the subinvestment-grade level. It is too early to tell whether the ECB's OMT program will relieve deleveraging pressures, as further measures at the national level are likely to be needed, as discussed below.

Restoring stability to reverse financial fragmentation within the monetary union remains the key policy challenge.

Restoring confidence among private investors is paramount for the stabilization of the euro area. Euro area policymakers are laying foundations to support that confidence, but numerous technical, legal, and political challenges remain. The urgency of the task is also increasing, as the fragmentation of funding markets remains intense despite the recent market rally, posing a risk of further damage to the

Box 1.1. Falling Confidence, Rising Risks, and Complacency

Investors are increasingly buying protection against extreme risks, even if investing in the instruments designed to provide the protection can be costly and may prove ineffective. Evaluating extreme risks can inform policymakers on threats to financial stability, by region, timing, and the structure of the protection. In Europe, markets point to some risk of currency redenomination. Reflecting medium-term fiscal challenges, markets are pricing in some upside risk to Japan's low interest rates. In contrast, U.S. markets are sanguine over both near- and medium-term risks from macro imbalances.

Rising Demand for Insurance against Global Tail Risks

The realization of extreme risk in 2008 led to a material alteration in investment strategies: strong demand for insurance against tail outcomes (the risk of low-probability but high-impact events). This demand has been relatively price insensitive in the recent past, indicative of a lasting structural shift in investment strategies. New instruments have emerged to satisfy investor demand, the most notable aimed at exploiting the inverse correlation between equity prices and the expected volatility of equity markets.

The S&P Volatility Index is an indicator of market expectations of future volatility and is widely used as a measure of global risk aversion. In January 2009, in the midst of the steep decline in global equity values, an instrument that tracks market expectations of volatility was introduced—the VXX. The demand for such products has surged, and they now account for a significant share of the equity options market.[1] Demand is also strong despite poor performance (the VXX is down 60 percent on an average annualized basis), indicative of investor focus on extreme risks.

Global tail risks may emanate from one or more sources, such as the euro area crisis or U.S. and Japanese fiscal imbalances. Evaluating the source of specific risks provides policymakers with a guide to areas of potential instability discussed below.

Euro Area Risks: Currency Redenomination Risk

Risks in the euro area are dominated by balance of payments imbalances across member states. Creditor countries are repatriating capital from debtor nations even when the cost of doing so is high, as demonstrated by negative nominal shorter-term interest rates in various countries (Figure 1.1.1). Investors are willing to accept negative interest rates as the cost of guarding against a euro breakup and the introduction of national or subregional currencies (currency redenomination risk). Creditor countries expect to see their currencies appreciate substantially, more than offsetting the negative interest rate.

Redenomination risks can be evaluated against Denmark, a country with a long-standing currency peg to the German mark and now the euro. Figure 1.1.2 estimates the probability of the Danish kroner breaking the strong side of the European Exchange Rate Mechanism (ERM-II) peg to the euro in one year's time

Note: Prepared by Marcel Kasumovich and Narayan Suryakumar.

[1]Instruments such as the VXX and other volatility-based products are roughly 40 percent of listed S&P 500 options.

Box 1.1 *(continued)*

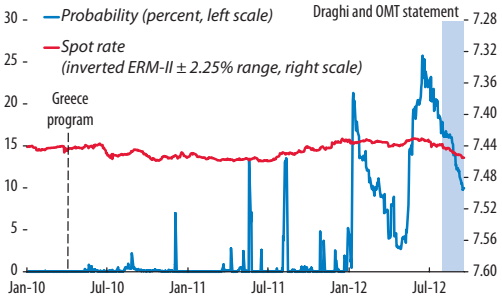
Safe-haven flows have driven rates for creditor countries into negative territory…

Figure 1.1.1. Two-Year Yields of Creditor and Debtor Countries in Europe
(Percent)

Source: Bloomberg L.P.
Note: Yields are weighted by nominal GDP. Creditor countries = Austria, Denmark, Finland, Germany, the Netherlands, and Switzerland. Debtor countries = Ireland, Italy, Portugal, and Spain.

…while currency markets reflect euro redenomination risks.

Figure 1.1.2. Probability of the Danish Kroner Breaking the ERM-II



Sources: Bloomberg L.P.; and IMF staff estimates.
Note: ERM-II = European Exchange Rate Mechanism. The probability of breaking the strong side of the ERM-II boundary is estimated from the one-year euro-Danish kroner forward and volatility from option markets.

from market prices, which has been rising and falling alongside strains in the euro area. This can be viewed as a proxy for the expectation that a stronger, northern euro bloc will emerge from the crisis where the Danish kroner peg is reset to the stronger-currency countries and appreciates against the weak-currency ones.

Longer-Term Risks Emerging in Japan

Japan's imbalances are unique in the context of history: very high government debt yet a very large external creditor position. The resolution of these imbalances could have significant implications for both interest rates and exchange rates. The natural expectation leans to a significant increase in bond yields. Interest rate markets do indeed reflect the potential for higher yields in the medium term.

The implications for foreign exchange markets are more complex. As seen during the March 2011 natural disaster in Japan, rapid currency appreciation may occur given the potential for the repatriation of foreign assets. Alternatively, the threat of an erosion of confidence in domestic policy, or, over the longer run, of a deterioration in the current account, might cause substantial depreciation. The market has resolved these two competing forces by anticipating a very high level of medium-term volatility in the dollar-yen exchange rate (as shown in Figures 1.1.3 and 1.1.4), well above realized volatility and high relative to past crises.

U.S. Risks: Complacency or Confidence?

The United States has a blend of the imbalances seen in the other major countries. U.S. government debt is high, though not as high as in Japan. The United States is an international net debtor, though not to the same extent as Spain and other countries in the euro area periphery. Nevertheless, markets have a benign expectation for the resolution of U.S. imbalances. Evidence of extreme risks in interest rate and currency markets is absent at virtually all horizons.

While the capacity of the U.S. government to repay its debt is not in doubt, continued growth in macro imbalances would raise the likelihood of a misalignment of policy incentives across internal and external creditors. If the expansion of the Federal Reserve balance sheet is the last-resort policy that prevents a large rise in bond yields, the clearest transmission mechanism is currency depreciation. Medium-term expectations have been, instead, leaning toward a U.S. dollar appreciation (Figure 1.1.5).

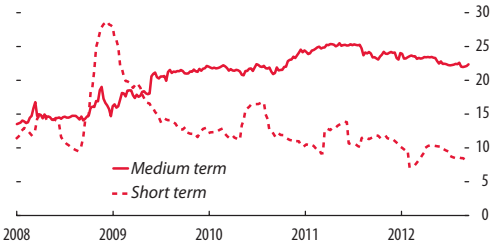
In the near term, the U.S. sovereign credit default swap curve suggests that the debt ceiling, as well as the fiscal cliff, will be resolved without issue (Figure 1.1.6). Uncertainty about a potential technical default as a result of the debt ceiling led to credit risk in short-term default swaps rising above those over longer horizons in July 2011. No such pattern has emerged this time around. In the longer term,

Box 1.1 *(continued)*

Markets are pricing in higher yen exchange rate volatility in the medium term…

Figure 1.1.3. Short- and Medium-Term Expectations of the Yen Exchange Rate Volatility

(Annualized percent)



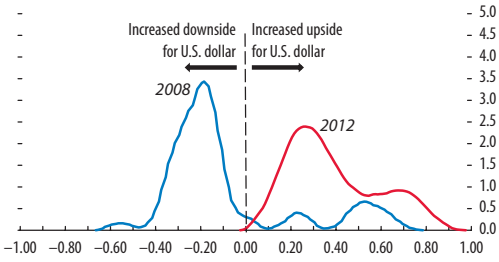
Source: Bloomberg L.P.

Note: The medium term is derived from the difference between the 5-year and 10-year implied volatility in the yen versus the U.S. dollar and the euro. The short term is the historical 3-month volatility.

Medium-term expectations have been biased toward further U.S. dollar appreciation despite macroeconomic imbalances…

Figure 1.1.5. Index Measure of U.S. Dollar Appreciation-Depreciation Bias

(Trade-weighted dollar risk reversal index)



Sources: Bloomberg L.P.; and IMF staff estimates.

Note: Trade-weighted dollar risk reversal index is constructed using 5-year option risk reversals on the euro, yen, and British pound, indexed to a medium-term mean, reflecting investors' bias toward appreciation or depreciation. Data for 2012 are through August 31.

…and risk of higher interest rates in the medium-term in Japan but not in the United States.

Figure 1.1.4. Relative Option Premiums on Long-Term Interest Rates

(In basis points, notional swaption value)

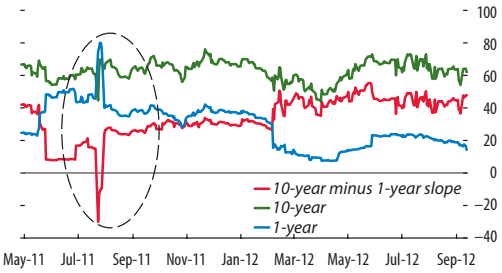
Sources: Bloomberg L.P.; and IMF staff estimates.

Note: A 10-year by 10-year swaption is a 10-year call or put option on a 10-year interest rate swap agreement. The option premium differential depicted here indicates the relative demand for insurance against the possibility that future interest rates will be higher than expected.

…while markets are sanguine about the near-term U.S. fiscal cliff and debt ceiling risks.

Figure 1.1.6. U.S. Credit Default Swap Spreads and Slope

(Basis points)



Sources: Bloomberg L.P.; and IMF staff estimates.

option markets are pricing far less fear of a rise in longer-term interest rates compared with Japan (as shown in Figure 1.1.4).

Financial Stability Implications

Evaluating extreme risks supports financial stability in three important ways. First, policymakers can disagree with the market assessment and provide targeted, logical foundations to the contrary both when there is too much and, importantly, too little concern about future imbalances. Second, understanding strategies that attempt to insure against extreme risks can reveal potential vulnerabilities in the financial system. Seemingly effective hedges, such as long-term euro interest rate swaps, could further concentrate counterparty exposures, exacerbating risks when extreme events occur. Third, changes in investment strategies lead to financial innovation. New products, particularly fast-growing ones where risk diversification is likely to lag innovation, could lead to risks simply being transferred and concentrated, and therefore should be closely monitored.

Box 1.2. Recent Policy Initiatives, Developments, and Challenges in the Euro Area

Since the April 2012 GFSR, European policymakers have announced further important policy measures aimed at reversing the fragmentation of euro area financial markets and strengthening the architecture underpinning the Economic and Monetary Union (EMU). To ensure maximum effectiveness, these measures will need to be followed by implementation at the national level, with further steps taken toward more complete integration.

June 29 European Union Summit

In addition to agreeing on up to €120 billion in European Union (EU) growth-enhancing initiatives, euro area leaders promoted measures to address the sovereign-banking nexus. These included removing the seniority of the European Stability Mechanism (ESM) loan to recapitalize Spanish banks once the European Financial Stability Facility (EFSF) loan rolls over; opening the possibility for the ESM to directly recapitalize Spanish banks once the single supervisory mechanism is in place; and restating the commitment to use EFSF/ESM interventions to stabilize secondary sovereign bond markets. Bond spreads in the euro area periphery narrowed sharply in the aftermath of the summit in the belief that these steps constituted a significant step toward spreading the liability for future bank rescues across the euro area.

German Constitutional Court

In a preliminary ruling on September 12, 2012, the German Constitutional Court stated that the ESM and the Fiscal Pact were consistent with the German Constitution, paving the way for Germany to ratify the ESM Treaty. The Court attached the condition that Germany's commitment to the ESM is capped at the currently planned €190 billion unless the lower house of parliament decides to approve additional funds. The court also ruled that both houses of parliament must be informed about ESM decisions and that granting it a banking license would be incompatible with primary EU law.

ECB's Outright Monetary Transactions

Following its policy meeting on September 6, the European Central Bank (ECB) announced its Outright Monetary Transactions (OMTs) program as a replacement for the Securities Market Programme (SMP).[1] The ECB will consider OMTs for countries under a macroeconomic adjustment or precautionary program with the EFSF/ESM, which should help to ensure that low policy rates transmit to borrowing costs in countries in the periphery with a program. In addition, it relaxed its collateral framework for sovereigns in an OMT program and for foreign currency collateral. OMTs are likely to be more effective than the SMP in slowing and reversing capital flight from the periphery due to:

- *Greater credibility.* By explicitly targeting intervention to address convertibility risk and the broken transmission mechanism, and by tying intervention to conditionality and shorter maturity bonds, the ECB gained near-universal acceptance that it is acting well within its mandate.
- *Operational lessons learned.* OMTs will not dilute existing bondholders by taking a senior position in the sovereign's capital structure, thereby lessening investors' incentive to sell as the ECB buys. Additional transparency will enable investors to assess the ECB's position in, and commitment to, OMT country bonds.
- *Easing of periphery bank liquidity and capital concerns.* An OMT program is likely to encourage domestic banks to continue to participate in sovereign primary bond markets as the ECB will act as a backstop buyer of one- to three-year bonds. The OMT announcement reopened the primary market for unsecured debt of periphery banks—if sustained, this will reduce liquidity concerns for banks.

[1]OMT features include (1) conditionality: the assisted sovereign signs up for an ESM/EFSF program or precautionary credit line; (2) mode of intervention: unlimited, fully sterilized, short-dated (one to three years) ECB bond purchases in the secondary market with no formal yield target; (3) ranking of claim: pari passu ranking with other bondholders for OMT purchases of sovereign bonds; (4) transparency: OMT holdings and their market values to be published weekly and the average duration and country breakdown to be published monthly; and (5) collateral policy: minimum credit rating requirements for sovereign-issued collateral used for ECB liquidity operations are to be suspended for sovereigns eligible for the OMT program.

Box 1.2 *(continued)*

- *Potential reduction in sovereign bond volatility.* A credible OMT program, with potential backup support from the ESM in the primary market, should help anchor sovereign yields at the short end, encourage domestic banks to participate at longer maturities, and reduce volatility, thereby attracting external investors back.

The ECB's actions have eliminated a number of the potential "bad equilibria" arising from fears that a periphery sovereign and its banks will face an extreme liquidity crisis. By addressing many of the operational defects of the SMP and being more clearly within the ECB's mandate, the OMT program has greater credibility and is likely to be deployed with less hesitancy. However, the OMT program still faces significant political and implementation risks. Governments now need to ask for support under the EFSF/ESM, agree on conditionality, and implement reforms. Furthermore, steps need to be taken to put in place the other elements of the *complete policies* scenario—notably, moves toward greater fiscal integration, credible bank recapitalization and resolution, and a banking union. The OMT program does not give categorical assurance that debt sustainability will be restored given the uncertain impact of conditionality.

Banking Union

On September 12, the European Commission published its proposals for banking union within the euro area. These envisage rapid implementation of a Single Supervisory Mechanism (SSM) by January 2013, with the ECB empowered to act from that point on, taking over supervision for systemically important financial institutions in July 2013 and all banks from January 2014. EU countries outside the euro area can opt into "close cooperation" with the ECB, which will then issue guidelines and requests to these authorities and their banks. The European Commission envisaged adoption, by end-2012, of EU legislation harmonizing national prudential regulations, bank resolution, and deposit insurance, and steps toward a single bank recovery and resolution framework. It also proposed that the European Banking Authority's powers of "binding mediation" over national authorities be extended to the ECB.

Numerous issues with this ambitious plan now need to be resolved and agreed upon. These include the boundary of responsibility and delegation between the ECB and national supervisors, the balance between euro area and other EU regulators, the future of macroprudential policymaking across the EU, and the optimum timetable for implementation. Furthermore, these proposals, while important, are only preliminary steps in the creation of a full "banking union" with the aim of weakening the nexus between a sovereign and its banks. This will require, in particular, adequate pan-euro area backstops for deposit insurance and bank resolution, and a bank resolution mechanism. Without these, the cost of banks' capital will still be linked to their home country, while a sovereign's creditworthiness will remain tied to that of its banks.

financial system and the real economy. This report explores these policy challenges by updating and extending the euro area scenarios for *baseline policies, weak policies,* and *complete policies* introduced in the April 2012 GFSR.[1] Developed in detail in Chapter 2, these updated scenarios are briefly summarized below. Owing to mounting pressures on periphery banks since the April 2012 GFSR, the degree of deleveraging stress under all three scenarios is now higher than it was in that report, rising to $2.8 trillion under the *baseline policies* scenario, or as high as $4.5 trillion under the *weak policies* scenario (Figure 1.9).

- The WEO/GFSR *baseline policies* scenario assumes a gradual restoration of confidence based on additional policy actions that demonstrate political commitment to closer integration. Specifically, it assumes that policymakers establish a single supervisory mechanism on

[1]In the April 2012 GFSR, the *baseline policies* scenario was called the *current policies* scenario.

the current timetable and contain pressures on spreads, including potentially through the ECB's OMT program, and policymakers in periphery economies follow through with their adjustment programs. Under this scenario, policy credibility and confidence improves gradually, while capital flight from the periphery to the core slows. Activity would continue to contract in the periphery from still-elevated funding costs, while the core would see only very sluggish growth.

- Unless the policy actions under the baseline are taken, the euro area is likely to slide into a *weak policies* scenario. This scenario envisages current commitments remaining unfulfilled as the periphery's political resistance to reform grows, or support from the core wanes, or both. Strains in the euro area deepen as the forces of fragmentation increase and become entrenched (Box 1.3). Potential financing gaps widen, the degree of fragmentation and financial repression increases, capital holes in banking systems expand, and the increasing intra-euro area capital account crisis spills outward. These developments pose a far-reaching threat to the global financial system and the global economic outlook.
- To avoid rising economic and financial costs seen under the *baseline* scenario, the *complete policies* scenario envisages that euro area policymakers advance timetables for actions assumed in the baseline scenario. In addition, they present a clear roadmap to a banking union and fiscal integration and deliver a major down payment toward those goals. Examples might include putting in place a euro area deposit guarantee scheme and bank resolution mechanism with common backstops, or concrete measures toward fiscal integration, as anticipated in the "Four Presidents" report submitted to the euro area summit (European Council, 2012). Under this scenario, the euro area begins to reintegrate financially as policy credibility is restored and capital flight reverses. Funding costs in the periphery and core normalize by the end of 2013, credit channels reopen as banking strains dissipate, and economic growth returns to the periphery and picks up in the core.

Chapter 2 uses these scenarios to demonstrate that *unless additional policy measures are taken swiftly* to achieve the *complete policies* scenario, confidence will not be sustainably restored, and the result will be higher levels of deleveraging (Figure 1.9), a greater reduction in credit supply (Figure 1.10), leading to a sharp contraction in investment (Figure 1.11), a cut back in employment (Figure 1.12), and a steeper drop in output (Figure 1.13). The longer the crisis continues, the greater will be the public sector costs of its ultimate resolution—because of the transfer of rising credit exposures from the private sector to monetary and fiscal authorities—and the more difficult it will be to reintegrate the periphery with the core. Merely muddling through also imposes increasingly higher costs, as the unchecked forces of fragmentation continue to gather speed and undermine the very foundations of the union—a common monetary policy, and economic and financial integration within the single market. The existing strains in the markets require a leap to better policies if the euro area is to stabilize funding markets and reduce spreads, arrest capital flight, and begin to reintegrate financially (Figure 1.14).

What is needed to achieve the complete policies scenario?

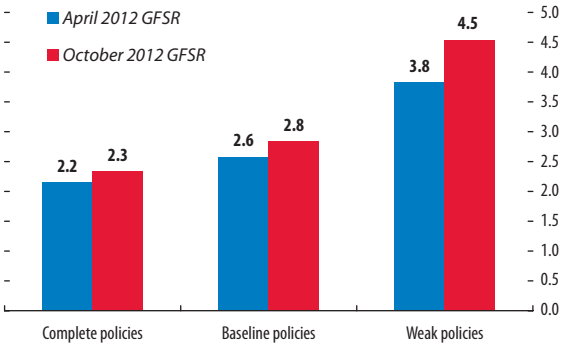
The *complete policies* scenario requires, first, regaining credibility through an unflinching commitment to implement already adopted measures. That credibility supplies the platform on which further actions, taken at both the national and euro area levels, can stabilize the current situation and facilitate a rapid move toward a more integrated union.

At the national level, the first priority is to stabilize fragile balance sheets and address high burdens of legacy debt. Policymakers also need to build political support for the necessary pooling of sovereignty that a more complete currency union entails. Sovereigns and banks need to be made safer:

- For sovereigns, the top priority remains the continued implementation of well-timed medium-term fiscal consolidation strategies. Countries must continue the process of adjusting high debt burdens. To navigate short-term fluctuations,

. . . increasing pressure on banks to reduce assets and credit.

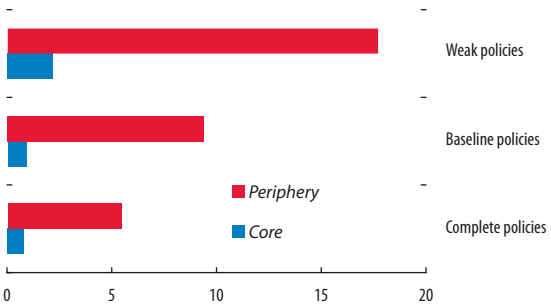
Figure 1.9. Total Deleveraging by Sample Banks
(2011:Q3–2013:Q4; in trillions of U.S. dollars)



Source: IMF staff estimates.

Periphery economies could face a deepening credit crunch . . .

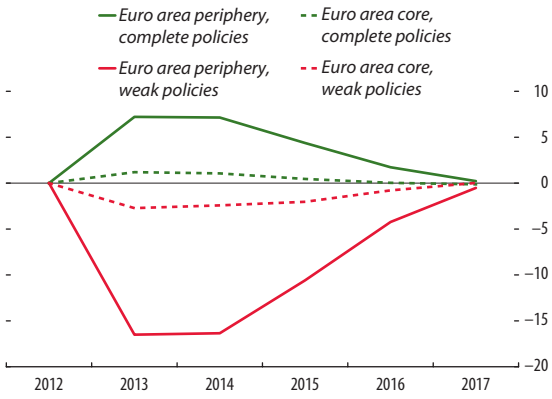
Figure 1.10. Reduction in Euro Area Supply of Credit under Alternative Policy Scenarios
(Cumulative for 2011:Q3–2013:Q4, in percent of total credit)



Source: IMF staff estimates.
Note: Core = Austria, Belgium, Finland, France, Germany, and the Netherlands; periphery = Greece, Ireland, Italy, Portugal, and Spain. Total credit includes domestic and direct cross-border credit supplied by banks.

. . . resulting in diverging investment . . .

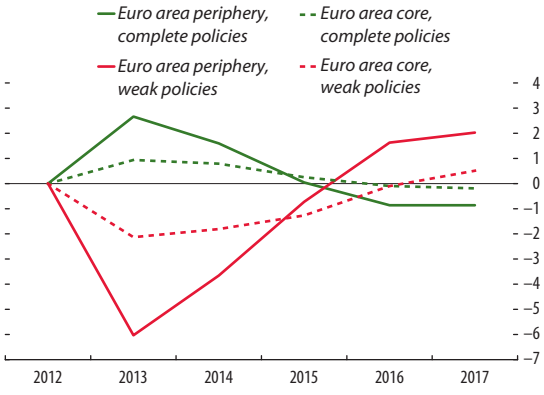
Figure 1.11. Impact on Investment from EU Bank Deleveraging
(Percentage point deviation from WEO baseline)



Source: IMF staff estimates.
Note: Core = Austria, Belgium, Finland, Germany, and the Netherlands; periphery = Greece, Ireland, Italy, Portugal, and Spain.

. . . and employment . . .

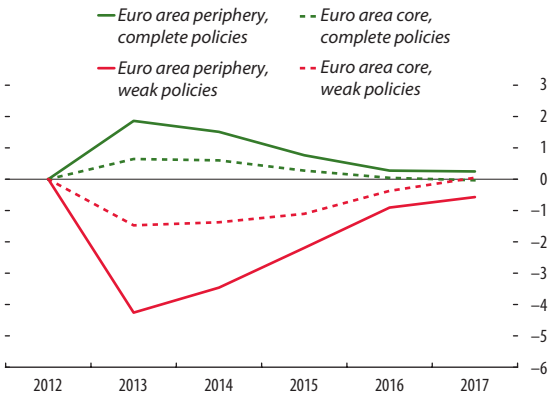
Figure 1.12. Impact on Employment from EU Bank Deleveraging
(Percentage point deviation from WEO baseline)



Source: IMF staff estimates.
Note: Core = Austria, Belgium, Finland, Germany, and the Netherlands; periphery = Greece, Ireland, Italy, Portugal, and Spain.

. . . and growth under the downside scenario.

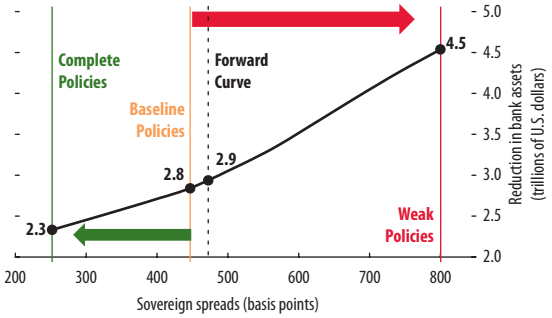
Figure 1.13. Impact on GDP from EU Bank Deleveraging
(Percentage point deviation from WEO baseline)



Source: IMF staff estimates.
Note: Core = Austria, Belgium, Finland, Germany, and the Netherlands; periphery = Greece, Ireland, Italy, Portugal, and Spain.

Reducing sovereign spreads would help relieve deleveraging stress.

Figure 1.14. Reduction in Bank Assets: Sensitivity to Periphery Sovereign Spreads
(2011:Q3–2013:Q4)



Source: IMF staff estimates.
Note: Periphery sovereign spreads are GDP-weighted average spreads of Greece, Ireland, Italy, Portugal, and Spain.

however, countries with fiscal space should let automatic stabilizers operate around a path of sustained fiscal adjustment (see the October 2012 *Fiscal Monitor* for further details).

- For the banking system, important steps must be taken to recapitalize or restructure viable banks where necessary and resolve nonviable banks. Conservation of public resources should require burden sharing by shareholders and by subordinated debt holders in banks that receive significant injections of public capital. Full protection of bank liabilities by impaired sovereigns is likely to do more systemic harm than good by raising the credit risk premium for the whole economy through higher sovereign funding costs. In the case of resolution, other creditors may be subjected to bail-in, respecting the creditor hierarchy.
- Individual countries must address the issues that caused them to lose access to long-term market financing within the currency area. Wide-ranging, growth-enhancing structural and institutional reforms are needed to strengthen competitiveness and economic governance and to narrow external imbalances.

Steps taken at the euro area level to help dissolve the destructive sovereign-banking nexus are also urgently needed to support national efforts at stabilization:

- For the banking system, this should include continuing adequate funding for banks through the ECB's liquidity framework—supplemented with relaxed standards for collateral, as already announced in September. For countries facing a severe feedback loop between banks and sovereigns, banks need direct support from the existing crisis management facilities, namely the European Financial Stability Facility (EFSF) and its successor, the European Stability Mechanism (ESM), following the establishment of a single supervisory mechanism.
- Separating the sovereign debt issue from sovereign liabilities toward domestic banks will require decisive moves toward a banking union. Progress is needed on common regulations and supervision, as well as bank resolution and common safety nets, along with adequate backstops to both a joint deposit insurance fund and a single bank resolution authority. While current plans envisage the creation of the single supervisor, it is also essential to provide a clear timeline and detailed concrete steps toward creation of the resolution authority and joint deposit insurance, which will happen at a later stage. This is essential to guide market expectations and regain confidence.

Box 1.3. Resilience of the Euro, or Fragile Equilibrium?

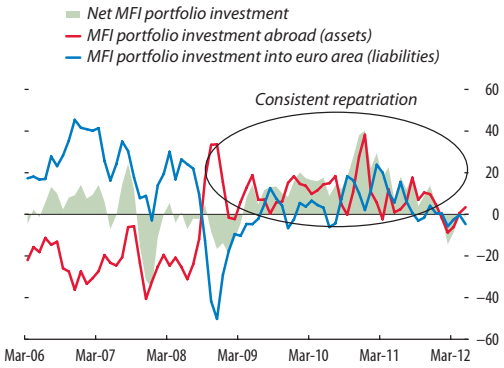
Since the start of the euro area crisis, the resilience of the euro has stood in contrast to the strong depreciation of other free-floating currencies during past periods of banking and sovereign stress (Table 1.3.1). While the euro has been supported by an overall favorable aggregate euro area balance of payments position and relatively favorable debt position, increased stress within the euro area and financial fragmentation could put pressure on the currency.

Balance of payments flows provided support to the euro during the 2008–09 financial crisis leading to the first Greek program, and in the subsequent period of euro area periphery stress (periods I and II in Table 1.3.1). From the beginning of the financial crisis the ongoing shrinkage of assets in the financial account due to portfolio investment repatriation, particularly from European monetary financial institutions (MFIs; red line in Figure 1.3.1), as well as resumption of foreign portfolio inflows by foreign MFIs (blue line in Figure 1.3.1) have reduced some of the pressure on the euro. Moreover, as the euro continues to be a major reserve currency, the increase in general portfolio investment liabilities during the first half of 2012 (foreigners' purchases of European bonds and equities) helped cushion the large drop in fixed-income portfolio investment assets by domestic investors over the same period. From a valuation perspective, the present interest rate configuration suggests that the euro is fairly valued, according to consensus analysts' forecasts and models.

Note: Prepared by Evan Papageorgiou.

Figure 1.3.1. MFI Portfolio Investments Abroad and into the Euro Area

(In billions of euros, three-month moving average)



Source: European Central Bank.

Note: The red line corresponds to European monetary financial institution (MFI) portfolio investment flows outside the euro area; the blue line is the portfolio investment flows into the euro area by foreign (non-euro area) MFIs.

Three broad pillars continue to instill confidence in the euro. First, the euro area as a whole compares favorably with other major economies on fundamental factors (see Table 2.1 in Chapter 2). Countries in the euro area periphery face serious challenges, but the core countries make up the majority of the euro area in output and overall economic standing. Second, the European Central Bank has acted to diffuse tensions in periods of acute risk aversion in the past and has pledged again to do "whatever it takes" to save the euro. Third, commercial bank deposits have stayed within the euro area so far, albeit with some recycling from the periphery to the core.

Table 1.3.1. Foreign Exchange, Equities, Credit and Real Growth Performance during Past Episodes of Stress

		Performance from Peak to Trough			
Country or Area	Period of Stress	Domestic currency versus U.S. dollar (percent)	Growth (percent)	Equities[1] (percent)	Credit spreads[2] (basis points)
Sweden	Jan 1992–Dec 1993	–40	–3.0	–39	. . .
Turkey	Jan 2001–Dec 2001	–60	–6.0	–38	414
United Kingdom	Mar 2008–Mar 2009	–35	–6.3	–46	157
Hungary	Jul 2008–Dec 2009	–43	–7.1	–67	664
Euro area I	Apr 2008–Jun 2010	–25	–4.7	–57	123
Euro area II	Jul 2010–Jul 2012	–19	–0.5	–35	234

Sources: Bloomberg L.P.; and Haver Analytics.

[1]Equity performance in local currency terms. Euro area equities performance is based on the euro Stoxx 50 Blue Chip index.

[2]Increase of five-year credit default swap (CDS) spreads for Hungary and the United Kingdom, 10-year U.S. dollar bond Z-spread for Turkey, and GDP-weighted average of five-year euro area sovereign CDS spreads for the two euro area periods (excluding Greece).

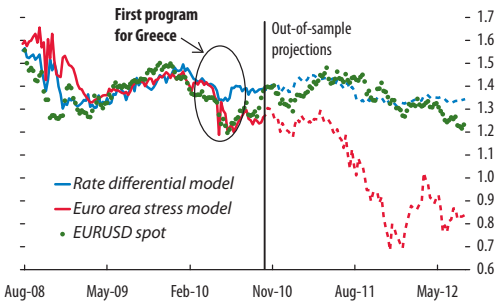
Box 1.3 *(continued)*

However, even though the euro has remained broadly resilient with the ebb and flow of "muddling through" measures, the existing equilibrium is precarious. One may think of the euro as a two-state regime. In periods of decreasing or stable tail risks, the aggregate performance of the euro area in terms of overall balance of payments improvement and the steady deposit base help to keep the euro stable.

In this state, typical interest rate fair value models describe adequately the evolution of the nominal exchange rate of the euro, as shown in Figure 1.3.2 (blue line). During periods of increasing risk aversion, the fragility of equilibrium in the euro area is highlighted by the disparities between core and periphery countries (see Table 2.1 for German, Italian, and Spanish macro variables relative to the euro area). Under such stressed conditions (as in May 2010 around the time of the first Greek program), a model incorporating sovereign and bank funding risks on the nominal euro-U.S. dollar exchange rate (red line in Figure 1.3.2) performs better, as questions arise about the sustainability of current policies and the possibility of a breakup of the currency union.

The resurgence of credit risks during the fourth quarter of 2011 and in May 2012 would be consistent with a much weaker euro under the euro area stress model, in contrast to results from typical interest rate fair value models, which track spot rates closely. A prolonged period of high tail risks may push the currency off its fragile equilibrium toward the state specified in the *weak policies* scenario especially should the strength of the three pillars listed above erode.

Figure 1.3.2. Euro-Dollar Nominal Exchange Rate: Spot Values and Results of Interest Rate Fair Value Model versus Euro Area Stress Model, August 2008–August 2012



Sources: Bloomberg L.P.; and IMF staff estimates.
Note: Fitted values until October 2010 are based on two-year rolling regressions of weekly observations. The rate differential model uses three-month interbank rate spreads, one-, two-, and five-year rate spreads between euro and dollar swaps. The euro area stress model uses GDP-weighted average 10-year bond spreads to Germany for the euro area, and one-year cross-currency euro-dollar basis. After October 2010, the lines correspond to out-of-sample predictions on the latest estimated coefficients.

- Where market dynamics fail to reflect improved policies at the national level, thus compromising sovereign liquidity, some form of temporary support may be necessary. The ESM will be able to provide such support through purchases in sovereign debt markets. In addition, the ECB's recently announced OMT program, which involves purchase of one- to three-year maturities in secondary sovereign bond markets, is aimed at restoring the transmission mechanism of monetary policy throughout the euro area. Encouragingly, the OMT framework incorporates explicit conditionality and greater transparency than the Securities Market Programme, and purchases through the OMT will not have seniority over private market creditors. (The OMT and other recent policy initiatives are summarized in Box 1.2.)

The process of further integrating the euro area as a monetary, fiscal, and financial union must be pushed forcefully ahead. Tangible commitments to the roadmap toward fiscal integration would help anchor expectations about the irreversibility of the euro area project. An immediate step toward greater risk sharing would be to provide a common fiscal backstop for a banking union. Common borrowing, with appropriate fiscal safeguards, could provide such a backstop, ensure market access for sovereigns under stress, and create safe assets for the banking sector.

The United States

Sovereign credit risk is also an important challenge to stability in the United States amid a

weak economy facing slow growth and inadequate demand. Unsustainable debt dynamics remain a medium-term concern, but the looming fiscal cliff, debt ceiling deadline, and related uncertainty also pose near-term risks—to the extent the accompanying unpredictable political process erodes confidence in policymaking and triggers market volatility. Given the very special role that U.S. Treasuries play in global capital markets, keeping them safe is of paramount importance, both for the United States and for the global financial system.

Safe-haven flows, central bank purchases, and balance sheet de-risking have contributed to an unprecedented compression of credit risk premiums and yields in the United States. This makes risk largely asymmetric or "one way," since yields are close to record lows and are more likely to adjust upward. Fiscal imbalances are largely medium-term challenges, but if political discord in managing shorter-term issues or other stresses causes yields to rise in a disorderly or rapid manner, the consequences for global financial stability could be severe, given worldwide exposures to Treasuries. While perceptions could change, markets are currently not pricing in such an outcome (see Box 1.1).

There is little room for complacency in tackling these major policy challenges, even if markets are not yet signaling imminent concerns. The main priorities are to promptly define a gradual consolidation path to avoid the fiscal cliff, restore fiscal sustainability with a balanced approach to medium-term consolidation, and complete financial sector reforms. At its September 13 meeting, the Federal Open Market Committee agreed to extend its low interest rate guidance from late-2014 to mid-2015 and to undertake additional purchases of mortgage-backed securities at a pace of approximately $40 billion per month, conditional on a substantial improvement in the labor market. While these measures have helped to boost prices of risk assets and reduce mortgage rates, additional steps may be needed to unclog the transmission mechanism and accelerate the repair of household balance sheets. Going forward, the focus should be on proactive policies that prevent near-term risks from materializing, that address medium-term sustainability, and that forestall the buildup of vulnerabilities.

Japan

The present difficulties in the euro area provide a cautionary tale for Japan, given the latter's high public debt load and interdependence between banks and the sovereign that is expected to deepen over the medium term. Japan has been a beneficiary of safe-haven inflows as a result of the crisis in Europe; these flows have pushed government bond yields to near record lows, facilitating easy financing of the nation's high public debt. However, safe-haven flows have also driven the yen exchange rate to near historic highs, impacting Japanese exports and domestic production. In turn, this has added headwinds to the economic outlook, leading to continued weakness in credit demand from the private sector. Banks have responded by increasing their holdings of government bonds.

The rising concentration of government bond risk in the domestic banking system is a central financial stability concern in Japan. Since 2008, demand from the traditional investor base for Japan's sovereign debt has waned, and domestic banks have become the dominant buyers. Stress tests of the major banks reveal that, over the near term, they are able to handle moderately large shocks to government bond prices. But a potential sharp rise in government bond yields in the medium term could pose sizable risks to Japan's regional banks (see Chapter 2 and Box 1.1).[2] Measures to induce banks to take greater account of the risks inherent in large holdings of government bonds may help control this risk, particularly in the case of regional and smaller banks.

Emerging Markets and Other Economies

Emerging market economies need to guard against potential further shockwaves from the euro area while managing a slowdown in growth that could raise domestic financial stability risks. Thus far, flows into their bond markets have continued as fears about sovereigns in the euro area have esca-

[2]Chapter 2 projects that domestic regional banks will raise their holdings of government debt from 24 percent of assets in 2011 to 30 percent by 2017. At that point, an increase of 100 basis points in the yield on the debt would reduce the Tier 1 capital of those banks by one-fourth.

lated. However, local markets could come under strain in an adverse scenario of acute global stress that precipitates large-scale capital outflows.

Policy priorities vary significantly, depending on domestic conditions, external vulnerabilities, and available policy space. Overall, countries in central and eastern Europe are the most vulnerable of the emerging market economies, because of their direct exposures to western Europe and some vulnerabilities shared with countries in the euro area's periphery. In broad terms, many economies in central and eastern Europe remain focused on resolving the legacy of past credit and asset price booms that have left them with large external debt burdens and limited space for expansionary macroeconomic policies.

The Achilles' heel of many economies in central and eastern Europe is a banking system struggling with deleveraging pressures, worsening asset quality, and slow growth. At the same time, the region is most exposed to headwinds from the euro area. This challenging constellation argues for continued efforts to reduce vulnerabilities. In particular, authorities should push ahead with coordinated debt resolution policies—such as debt workout plans or loan modification schemes—that allow borrowers a path back to sustainable finances in close coordination with their creditors. Bank regulators simultaneously need to require full loss recognition and adequate capitalization to lay the groundwork for a recovery in credit supply. These domestic efforts must be supported by cooperative approaches from home regulators in the euro area, notably under the Vienna II Initiative.

Emerging market economies in Asia and Latin America generally appear more resilient, but several key economies are prone to late-cycle credit risks following an extended period of rising leverage and property prices. Meanwhile, the scope to provide fresh policy stimulus is limited in several economies, especially where strong recent credit expansions argue against a loosening of financial policies. Policymakers must therefore keep their guard high and deftly navigate their country-specific challenges to avert external and domestic threats to financial stability. The priority for them, therefore, is to build additional buffers in balance sheets—private and public—to withstand possible setbacks, as the cycle may turn downward in the near future.

More broadly, policymakers in emerging market economies are well advised to continue developing local capital markets so as to reduce their vulnerability to reversals of capital flows. The still-limited scale of domestic asset managers in many emerging market economies heightens the risk of disruptive shocks from capital flows. Promoting capital market development is therefore a key priority.

Regulatory Reform

There is a need for a continued strong commitment to the regulatory reform agenda. Implementation of reforms in the current environment, in which banks are facing reduced profitability amid persistent legacy problems, poses considerable challenges. Debates have arisen over the timeliness and difficulty of reforms, and many countries are struggling to implement international agreements in full, as set out in Box 1.4. As documented in Chapters 3 and 4, the reform agenda seeks to improve the resilience of institutions. Without more resilient institutions, recovery will continue to lag. Momentum to carry through with the agenda, in full, should not be lost.

Box 1.4. Regulatory Reform: From Rulemaking to Implementation

The focus of the regulatory reform agenda has shifted from the development of standards to rulemaking and implementation.[1] An April progress report by the Basel Committee on Banking Supervision (BCBS, 2012a) shows that some countries are much further behind than others in the implementation process, raising the possibility that some may miss the January 2013 deadline for the national rules to be in place. Among the G20 countries, according to the report, only India, Japan, and Saudi Arabia had published their final rules for implementation. China subsequently published its final rules for a phased implementation commencing in January 2013. The United States also released its consultative package but did not announce an implementation date.

The liquidity requirements under Basel III—the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR)—are still some time away from implementation, with the LCR and NSFR currently within the observation period. Although the LCR rules will be clarified by early 2013, the final shape of the NFSR is less certain, as the implementation date is further out, in 2018.

Agreement has been reached on the identification of global systemically important banks (G-SIBs) and on the different buckets of capital surcharge applicable to them. Discussions are now focusing on extending the framework to domestic SIBs and to nonbanks, including global systemically important insurers (G-SIIs). In a consultation paper, the International Association of Insurance Supervisors (IAIS, 2012) has proposed a methodology for identifying G-SIIs that places greater emphasis on nontraditional and noninsurance activities and interconnectedness. The BCBS has released draft guidance on a principles-based approach to identifying domestic SIBs and applying related systemic risk charges (BCBS, 2012b). Implementation is targeted for 2016.

The end-2012 deadline for trading all standardized derivatives contracts through exchanges or electronic trading platforms and clearing them where appropriate through central counterparties (CCPs) is likely to be missed because of lagging implementation at the national level. International guidance is largely complete, with some work remaining on capital requirements for banks' exposures to CCPs and margining requirements for non-centrally cleared over-the-counter derivatives.[2]

The various groups examining shadow banking activities and entities within the Financial Stability Board (FSB) are expected to deliver their reports and policy recommendations over the next six months. Recommendations are expected in the near term on money market funds, securities lending and repos, and enhancements to the regulation of banks' interactions with shadow banks. The work on other entities that could be considered shadow banks (ranging from hedge funds to finance companies) is going at a slower pace, in large part because such entities vary across jurisdictions.

The extraterritorial implications of the Dodd-Frank Act and the Foreign Account Tax Compliance Act (FATCA) adopted in the United States are still being evaluated by other jurisdictions and the market. The full implementation of both pieces of legislation continues to evolve. FATCA has potentially far-reaching effects on the compliance obligations of banks, and parts of the Dodd-Frank Act, such as the Volcker rule, would alter the business model of dealer banks.

Implementing effective domestic and cross-border resolution regimes remains a key component of the reform agenda. The FSB published "Key Attributes of Effective Resolution Regimes for Financial Institutions" in November 2011 (FSB, 2011). It also set out an ambitious timetable, including the preparation of recovery and resolution plans by end-2012 for all designated global systemically important financial institutions, conducting their resolvability

Note: Prepared by Christopher Wilson and Michaela Erbenova.

[1]See Chapter 3 for a more complete assessment of the potential effects of regulatory reforms on financial structures.

[2]For example, the Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) in April released the final version of the "Principles for Financial Market Infrastructures," which contains standards for "all systemically important payment systems, central securities depositories, securities settlement systems, central counterparties and trade repositories" (CPSS-IOSCO, 2012).

Box 1.4 *(continued)*

assessments, and concluding institution-specific cross-border cooperation agreements in the first quarter of 2013. A methodology to assess country compliance with the Key Attributes is on track to be completed in 2013. FSB members have begun the first of an iterative series of thematic peer reviews on the implementation of these items. These peer reviews are expected to provide a fuller picture of progress toward implementing the new standard and emerging challenges. Standard setters are also at work on the application of the methodology and resolution tools for G-SIIs (the IAIS) and financial market infrastructures (the CPSS and IOSCO).

Crisis management groups have been established for nearly all the designated G-SIBs. Progress in developing resolution plans is less advanced and uneven as many jurisdictions lack the necessary statutory tools for resolution. Legal reforms to align national resolution regimes with the FSB Key Attributes are under way in many jurisdictions.

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CHAPTER 2

RESTORING CONFIDENCE AND CONTAINING GLOBAL SPILLOVERS

Global Debt Overhang and Stability Challenges

Large debt burdens threaten financial stability across advanced economies.

Since the onset of the global financial crisis more than five years ago, markets have struggled with a sharp repricing of credit risk. From its origins in the U.S. subprime market to its current epicenter of bank and sovereign funding markets in the euro area, the crisis has engulfed a widening number of private and public borrowers. Weaknesses in borrower balance sheets remain at the forefront of investors' concerns, as high debt burdens weigh on economic performance while creating the risk of a confidence-driven deterioration in market dynamics (Table 2.1).

However, not all highly indebted borrowers are facing a credit squeeze. As discussed later in the chapter, the sovereign debt markets in Japan and the United States are the most striking counterexamples, as they continue to rank as prime safe-haven destinations despite daunting fiscal challenges. But the absence of market strains today must not lead to complacency—addressing these challenges over the medium term is critical (see Box 1.1 in Chapter 1).

Note: This chapter was written by Peter Dattels and Matthew Jones (team leaders), Sergei Antoshin, Nicholas Arregui, Serkan Arslanalp, Sophia Avramova, Adolfo Barajas, Ana Carvajal, Eugenio Cerutti, Su Hoong Chang, Ken Chikada, Nehad Chowdhury, Kay Chung, Sean Craig, Era Dabla-Norris, Reinout De Bock, Martin Edmonds, Jennifer Elliott, Michaela Erbenova, Ellen Gaston, Jeanne Gobat, Tom Gole, Kristian Hartelius, Sanjay Hazarika, Changchun Hua, Anna Ilyina, Patrick Imam, Marcel Kasumovich, William Kerry, Oksana Khadarina, John Kiff, Michael Kleeman, Alexandre Kohlhas, Peter Lindner, Tommaso Mancini Griffoli, Rebecca McCaughrin, André Meier, Fabiana Melo, Paul Mills, Srobona Mitra, Gianni de Nicolò, S. Erik Oppers, Nada Oulidi, Evan Papageorgiou, Jaime Puig, Lev Ratnovski, André Santos, Jochen Schmittmann, Katharine Seal, Stephen Smith, Tao Sun, Jay Surti, Narayan Suryakumar, Takahiro Tsuda, Nico Valckx, Constant Verkoren, Chris Walker, Rodolfo Wehrhahn, Christopher Wilson, Xiaoyong Wu, Mamoru Yanase, Lei Ye, Luisa Zanforlin, and Jianping Zhou.

In the euro area, an incomplete architecture for the currency union adds additional vulnerabilities.

Nonetheless, the stability and resilience of government bond markets in Japan and the United States put into sharp relief an important aspect of the euro area crisis, which is the inherent vulnerability of an incomplete architecture for the currency union. Within a common monetary policy setting, inadequate policies at the national level and a lack of bond market discipline allowed large imbalances to emerge during the first 10 years of the euro's existence. The subsequent adjustment, in turn, has been complicated by the fact that euro area members cannot rely on an independent monetary policy or a floating exchange rate as a shock absorber. This constraint concentrates and amplifies the pressure on credit markets, especially since borrowers no longer benefit from a captive domestic investor base in their own currency. Unless there is a safety valve, such pressures can reach systemic proportions, as evidenced by the full-blown crisis now in its third year.

To be sure, by stipulating the principle of individual liability and no bailout, the architects of the euro envisaged default as an implicit safety valve. As recent developments have painfully shown, however, even the perception of sovereign default risk has major adverse consequences for financial stability throughout the currency union. Thus, additional safety valves—notably a deepening of financial and fiscal integration with elements of risk sharing—are essential to restore stability and shore up the single currency (see Chapter 1). Despite many important steps already taken by policymakers, this agenda remains critically incomplete, exposing the euro area to a downward spiral of capital flight, breakup fears, and economic decline.

Indeed, *fragmentation* in financial markets across the euro area has increased as banks, businesses, and even some households increasingly try to limit uncovered exposures to the most vulnerable countries in the euro area periphery. As discussed

Table 2.1. Indebtedness and Leverage in Selected Advanced Economies[1]
(In percent of 2012 GDP, unless noted otherwise)

		General Government			Households		Nonfinancial Firms		Financial Institutions			External Liabilities		
		Gross debt[2]	Net debt[2,3]	Primary balance[2]	Gross debt[4]	Net debt[4,5]	Gross debt[4]	Debt over equity (percent)	Gross debt[4]	Bank leverage[6]	Bank claims on public sector[4]	Gross[4,7]	Net[4,7]	Government debt held abroad[8]
Euro area	Greece	171	n.a.	–1.7	69	–58	73	235	40	n.a.	13	204	96	95
	Ireland	118	103	–4.4	117	–74	289	109	706	8.3	28	1,750	99	71
	Italy	126	103	2.6	51	–174	114	138	105	5.2	38	146	24	46
	Portugal	119	113	–0.7	104	–125	158	154	59	4.5	24	285	108	64
	Spain	91	79	–4.5	87	–74	186	143	115	4.9	35	225	92	25
	Belgium	99	83	0.1	55	–202	186	52	123	n.a.	24	404	–65	57
	France	90	84	–2.2	67	–134	134	68	172	2.5	18	296	16	58
	Germany	83	58	1.4	58	–122	64	96	97	2.2	23	219	–38	51
	Euro area	94	73	–0.5	71	–130	138	107	145	n.a.	n.a.	194	12	26
Rest of the world	United Kingdom	89	84	–5.6	99	–185	116	85	232	4.2	8	692	9	28
	United States	107	84	–6.5	86	–235	89	83	88	7.1	8	161	26	32
	Canada	88	36	–3.2	91	–154	54	44	59	3.3	15	103	12	18
	Japan	237	135	–9.0	76	–241	145	176	188	2.8	83	73	–57	18

Sources: Bank for International Settlements (BIS); Bloomberg L.P.; EU Consolidated Banking Data; Federal Deposit Insurance Corporation; IMF: International Financial Statistics Database, Monetary and Financial Statistics Database, World Economic Outlook Database; BIS-IMF-Organization for Economic Cooperation and Development-World Bank Joint External Debt Hub (JEDH); and IMF staff estimates.

[1]Cells shaded in red indicate a value in the top 25 percent of a pooled sample of all countries shown from 1990 through 2010 (or longest sample available). Green shading indicates values in the bottom 50 percent, yellow in the 50th to 75th percentile. For bank leverage, shading is explained in Table 2.2.

[2]World Economic Outlook (WEO) projections for 2012.

[3]Net general government debt is calculated as gross debt minus financial assets corresponding to debt instruments.

[4]Most recent data divided by annual GDP (projected for 2012). Nonfinancial firms' gross debt figures include intercompany loans and trade credit, and these can differ significantly across countries.

[5]Household net debt is calculated using financial assets and liabilities from a country's flow of funds.

[6]Leverage ratio is tangible common equity/tangible assets in percent.

[7]Calculated from assets and liabilities reported in a country's international investment position; includes data on international financial services centers.

[8]Most recent data for externally held general government debt (from the JEDH) divided by 2012 GDP from the WEO. Debt data from the JEDH are not comparable to WEO debt data when at market value.

in the next section, the resulting financial strains have interacted with weak balance sheets in one or several sectors to generate a dangerous vicious cycle of credit crunch and economic recession. Banks play a key role in propagating stress, as they continue to face very tight funding markets, worsening asset quality, and intense deleveraging pressures (Table 2.2). As European banks have reduced their cross-border exposures, other large banks, notably in Asia, have stepped in to fill in the gap. This, in turn, has increased the reliance of these banks on the dollar funding market and hence their susceptibility to potential strains in that market (see Box 2.1).

In the euro area periphery and Japan, domestic banks continue to function as a major source of demand for sovereign bonds (Table 2.3). With banks holding large lots of sovereign bonds, governments may find it hard to act as a financial sector backstop, as fiscal strains are quickly reflected on bank balance sheets. Relative to European banks, U.S. banks pose less risk to their sovereign, in large measure because of their restructuring following periods of financial crisis. In the case of Japan, there is some concern that regional banks may face unacceptable risks in coming years from the long duration of their sovereign holdings. More broadly, Japanese bank purchases as a share of new issuance have been increasing; this could increase the likelihood that they may need assistance, but it could also restrict their ability to absorb more government bonds.

Stresses in major advanced economies are likely to spill over to emerging markets, in some cases adding to home-grown vulnerabilities.

The euro area crisis raises concerns about possible global spillovers. Earlier IMF studies concluded that as long as the euro area crisis remains contained within the periphery, global spillovers would be

Table 2.2. Banking Financial Stability Indicators[1]

		Capital		Asset Quality	Funding			Earnings	Market Valuation
		Tier 1 capital ratio (percent)[2]	Leverage ratio (percent)[3]	Gross NPL ratio (percent)[4]	Loan-to-deposit ratio (percent)	Short-term funding ratio (percent)[5]	U.S. dollar traded debt as percent of wholesale funding[6]	Return on assets (percent)	Price-to-book ratio
Euro area	Greece	1.5	. . .	20.2	154	42	3.7	–0.4	0.38
	Ireland	16.2	8.3	19.1	155	24	1.1	–0.8	. . .
	Italy	9.5	5.2	10.7	176	25	1.5	0.4	0.32
	Portugal	9.1	4.5	4.1	132	18	2.4	0.3	0.37
	Spain	10.5	4.9	5.6	142	14	5.0	0.2	0.53
	Austria	9.9	4.9	8.5	119	19	0.3	0.4	0.50
	France	11.5	2.5	5.2	116	32	2.4	0.2	0.39
	Germany	11.9	2.2	3.5	98	10	8.7	0.2	0.79
	Netherlands	14.3	4.0	2.7	99	8	4.5	0.4	0.42
Europe (non-euro area)	United Kingdom	12.6	4.2	7.5	100	6	10.5	0.0	0.51
	Denmark	19.7	3.5	5.8	220	16	0.8	0.1	0.74
	Switzerland	17.6	2.9	0.8	77	4	7.1	0.2	0.69
	Sweden	16.7	3.8	1.8	195	9	7.3	0.6	1.22
Western Hemisphere	United States	13.4	7.1	4.8	71	20	. . .	0.8	0.88
	Canada	12.7	3.3	0.9	76	11	. . .	0.8	1.83
Asia	Korea	10.2	7.2	1.7	110	7	7.1	0.8	0.73
	Australia	10.2	4.4	1.3	113	11	12.6	0.9	1.76
	Singapore	13.6	6.8	1.4	90	11	5.8	1.0	1.30
	Japan	12.3	2.8	2.2	73	21	3.0	0.5	0.52
	Hong Kong SAR	10.4	7.6	0.5	69	4	4.0	1.1	1.31

Sources: Bloomberg L.P.; SNL Financial; and company reports.

[1]The ratios reported in the table are unweighted averages computed for a sample of large banks representing 50–85 percent of total assets of banks domiciled in each jurisdiction. These numbers, therefore, may be different from the system-level financial stability indicators (FSIs) presented elsewhere. All ratios are based on the latest available bank balance sheet data (for European and Asian banks, 2012:Q1 or the latest available; for U.S. banks, 2012:Q2 or the latest available). The price-to-book ratios are as of August 10, 2012. Red shading indicates a value in the worst quartile of a pooled sample of all countries shown in the table from 2000 to 2011 (or the longest sample available); values in the next-to-worst quartile are shaded in yellow and the rest in green. In addition, for some indicators, the following benchmarks are used: green shading does not apply to the Tier 1 capital ratios of less than 10 percent, loan-to-deposit ratios of greater than 100 percent, and price-to-book ratios of less than 1.

[2]Tier 1 capital ratio is Tier 1 capital/risk-weighted assets.

[3]Leverage ratio is tangible common equity/tangible assets.

[4]Gross NPL ratio is gross nonperforming loans/total loans.

[5]Short-term funding ratio is short-term borrowing due within one year, including repos, short-term portion of long-term borrowing, and current obligations under capital leases/total liabilities.

[6]U.S. dollar traded debt/wholesale funding is based on bank-level data on U.S. dollar bonds and loans outstanding from Bloomberg (numerator) and bank-level wholesale funding defined as total liabilities net of equity, customer deposits, and derivatives liabilities. The shading for this indicator is based on cross-section only.

limited.[1] The updated bank deleveraging simulations presented in the next section suggest, however, that increasing pressures on euro area periphery banks may have a large impact on some countries outside the euro area, most notably in emerging Europe and possibly in Latin America. Several countries in emerging Europe, moreover, feature certain similarities to the euro area periphery in that they combine high external indebtedness with limited policy space. Although Asia and Latin America are generally more resilient, several regional economies are in the late stages of the credit cycle, and long-running property market booms may have peaked; therefore, because economic activity has started to slow, these economies face the risks that come from worsening credit quality. The final section of the chapter explores these themes in detail.

[1]See, for example, the IMF's 2011 euro area spillover report (IMF, 2011).

Table 2.3. Sovereign Market and Vulnerability Indicators

(Percent of 2012 projected GDP, unless otherwise indicated)

		Fiscal and Debt Fundamentals[1]			Financing Needs[5]		External Funding	Banking System Linkages			Sovereign Credit	Sovereign Credit Default Swaps
					Gross general government debt maturing + budget deficit			Domestic depository institutions' claims on general government[7]				
		Gross general government debt[2] 2012	Net general government debt[3] 2012	Primary balance[4] 2012	2012	2013	General government debt held abroad[6]	(percent of 2012 GDP)	(percent of depository institutions' consolidated assets)	BIS reporting banks' consolidated international claims on public sector[8]	Rating/outlook (notches above speculative grade/ outlook) (as of 06/30/12)[9]	Five-year (basis points) (as of 06/30/12)
Euro area	Greece	171	n.a.	–1.7	29	18	95	13	6	8.1	–8 Stable	17,280
	Ireland	118	103	–4.4	16	14	71	28	4	4.3	2 Negative	514
	Italy	126	103	2.6	30	25	46	38	14	8.7	3 Negative	485
	Portugal	119	113	–0.7	27	22	64	24	7	8.5	–2 Negative	813
	Spain	91	79	–4.5	23	21	25	35	10	4.7	2 Negative	530
	Austria	74	54	–0.7	9	8	62	16	5	12.0	9 Negative	121
	Belgium	99	83	0.1	19	20	57	24	8	12.5	7 Negative	177
	Finland	53	–51	–1.7	9	8	48	6	2	17.1	10 Negative	56
	France	90	84	–2.2	19	19	58	18	4	7.2	9 Negative	159
	Germany	83	58	1.4	8	8	51	23	7	9.5	10 Negative	70
	Netherlands	68	35	–2.4	14	14	38	16	4	11.7	10 Negative	83
Europe (non-euro area)	United Kingdom	89	84	–5.6	15	15	28	8	2	2.5	10 Negative	56
	Denmark	47	4	–3.5	12	10	20	15	3	4.1	10 Stable	87
	Norway	50	–169	11.2	–9	–7	13	n.a.	n.a.	3.6	10 Stable	30
	Sweden	37	–17	–1.2	5	3	17	9	3	3.7	10 Stable	47
Western Hemisphere	United States	107	84	–6.5	26	27	32	8	6	4.1	9 Negative	48
	Canada	88	36	–3.2	16	18	18	15	7	3.1	10 Stable	n.a.
Asia	Australia	27	12	–2.4	5	4	14	2	1	2.8	10 Stable	67
	Japan	237	135	–9.0	59	60	18	83	25	1.6	6 Negative	92
	Korea	33	32	0.9	1	1	5	5	4	3.7	5 Stable	118
	New Zealand	39	12	–4.0	9	13	22	8	4	3.7	8 Stable	82

Sources: Bank for International Settlements (BIS); Bloomberg L.P.; IMF: International Financial Statistics Database, Monetary and Financial Statistics Database, World Economic Outlook (WEO) Database; BIS-IMF-Organization for Economic Cooperation and Development-World Bank Joint External Debt Hub (JEDH); and IMF staff estimates.

Note: Debt data from the JEDH are not comparable to WEO data when they are at market value. Based on projections for 2012 and 2013 from the 2012 *World Economic Outlook* (WEO). See the WEO for a summary of the policy assumptions.

[1]As a percent of GDP projected for 2012. For New Zealand the coverage of fiscal data is for the central government.

[2]Gross general government debt consists of all liabilities that require future payment of interest and/or principal by the debtor to the creditor. This includes debt liabilities in the form of special drawing rights (SDRs), currency and deposits, debt securities, loans, insurance, pensions and standardized guarantee schemes, and other accounts payable.

[3]Net general government debt is calculated as gross debt minus financial assets corresponding to debt instruments. These financial assets are: monetary gold and SDRs, currency and deposits, debt securities, loans, insurance, pensions and standardized guarantee schemes, and other accounts receivable.

[4]Primary balance is general government primary net lending/borrowing balance. Data for Korea are for the central government.

[5]As a proportion of WEO projected GDP for the year.

[6]Most recent data for externally held general government debt from the JEDH divided by projected 2012 GDP. Note that depending on the country, the JEDH reports debt at market or nominal values. Data for New Zealand are from the Reserve Bank of New Zealand.

[7]Includes all claims of depository institutions (excluding the central bank) on general government. Figures for New Zealand are for claims on the central government. Figures for the United Kingdom are for claims on the public sector. Data are for 2012:Q1 or latest available.

[8]BIS reporting banks' international claims on the public sector on an immediate borrower basis as of March 2012, as a percentage of projected 2012 GDP.

[9]Based on the average of long-term foreign currency debt ratings of Fitch, Moody's, and Standard & Poor's agencies, rounded down. Outlook is based on the most negative of the three agencies.

Box 2.1. Systemic Risk in International Dollar Credit

International forms of credit—trade finance, syndicated lending, and project finance, denominated mostly in dollars or euros—are usually provided by the large, global European and U.S. banks. But as many European banks have come under deleveraging pressures, the availability of international credit has become more volatile. Local banks are stepping in; but when they lack a dollar or euro deposit base, they must rely on global wholesale funding markets, which makes them vulnerable to dollar liquidity shocks and raises systemic risk. This shift to local banks is perhaps most advanced in Asia, where a wide range of critical activities—regional supply chains, commodities trade, and mining and power projects—are denominated in dollars. If they coordinate internationally, policymakers can limit the systemic risk by providing dollar liquidity insurance through a variety of mechanisms that require cross-border cooperation.

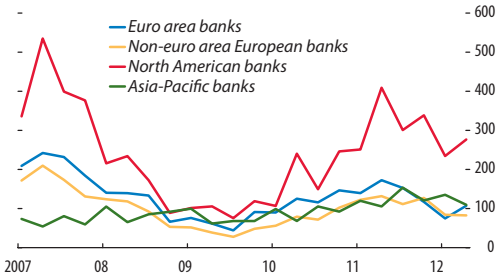
International credit in foreign currency is large and volatile. It peaked at $820 billion in the second quarter of 2011 and then collapsed by one-third over the next three quarters. The role of this credit is often overlooked, as it is not separately identified in national credit and balance of payments statistics and must instead be constructed by aggregating private sector data on individual loan contracts. Large, global, euro area and U.S. banks have traditionally dominated this lending, but in the second half of 2011 the euro area banks came under deleveraging pressure, creating room for local banks to step in (Figure 2.1.1). This shift to local banks is strongest in Asia, particularly in the more specialized, long-term areas of finance (i.e., project, aircraft, and shipping finance) (Figure 2.1.2).

International credit is mostly denominated in dollars (except in Europe), and banks that lack a dollar deposit base must therefore fund this credit largely in global wholesale and derivatives markets. This makes it vulnerable to reductions in dollar liquidity, as demonstrated in the global financial crisis (Figure 2.1.3). For local banks entering this credit market, the increased reliance on external dollar funding creates new risks. This shift was most rapid in Asia, where local banks are relatively strong and thus had good access to dollar liquidity and were able to step in and help finance the expansion in regional supply chains, trade in commodities and mining, and power and infrastructure projects. However, in the second quarter of 2011, dollar funding of Asian banks tightened, and now international credit is turning down (Figure 2.1.4).

The dependence of international credit on dollar liquidity in global wholesale funding markets adds a layer of systemic risk to that posed by excessive growth in domestic credit and asset price bubbles. Policy can limit the effect of shocks to dollar liquidity by providing liquidity insurance, but doing so needs to be coordinated internationally. Coor-

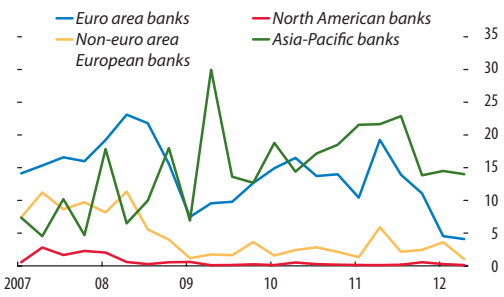
Note: Prepared by Sean Craig and Changchun Hua.

Figure 2.1.1. International Credit: Breakdown by Region of Lending Bank
(In billions of U.S. dollars)



Sources: Dealogic; and IMF staff estimates.
Note: Based on top 50 mandated lead arrangers' reports on trade finance, project finance, and general corporate finance, among others. Loan amounts are distributed equally among participating banks.

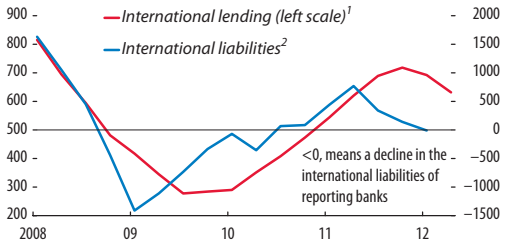
Figure 2.1.2. Global Project Finance
(In billions of U.S. dollars)



Sources: Dealogic; and IMF staff estimates.
Note: Based on top 50 mandated lead arrangers' reports on project, aircraft, and shipping finance. Loan amounts are distributed equally among participating banks.

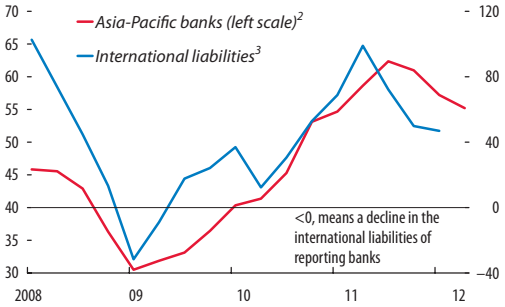
Box 2.1 *(continued)*

Figure 2.1.3. International Credit and External Bank Funding, Global Total
(In billions of U.S. dollars, quarterly flows as a four-quarter moving average)



Sources: Bank for International Settlements (BIS) Locational Banking Statistics; Dealogic; and IMF staff estimates.
[1]Gross credit, based on top 50 mandated lead arrangers' reports in Dealogic. Loan amounts are distributed equally among participating banks.
[2]Change in international liabilities by nationality of ownership of BIS reporting banks, excluding liabilities to related foreign offices.

Figure 2.1.4. International Credit in Asia and External Funding of Asia-Pacific Banks[1]
(In trillions of U.S. dollars, quarterly flows as a four-quarter moving average)



Sources: Bank for International Settlements (BIS) Locational Banking Statistics; Dealogic; and IMF staff estimates.
[1]Excluding Japan.
[2]Gross credit, based on top 50 mandated lead arrangers' reports in Dealogic. Loan amounts are distributed equally among participating banks.
[3]Change in international liabilities by nationality of ownership of BIS reporting banks, excluding liabilities to related foreign offices.

dination would help to ensure that the available resources—foreign exchange reserves, central bank swap facilities, regional reserve pooling arrangements (e.g., the Chiang Mai Initiative), national and international liquidity facilities, and regulatory policy—are deployed in a cooperative fashion. Over the longer run, the dependence of international credit on dollar liquidity should be reduced.

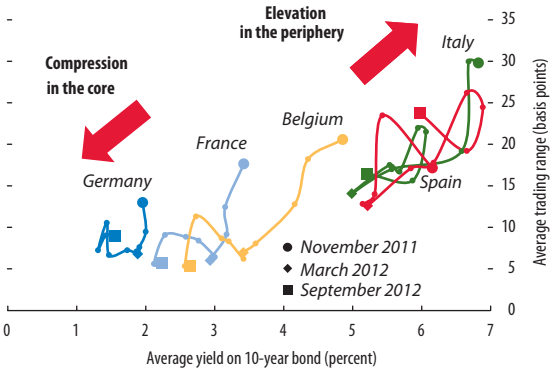
Euro Area Crisis—Reversing Financial Fragmentation

The euro area crisis remains the key threat to global financial stability. European policymakers are taking significant new steps, but confidence has not yet been sufficiently restored, and concerns about financial stability in the euro area remain elevated. The tail risk concerns surrounding currency redenomination continue to fuel both a flight to notionally safe assets and a retrenchment of cross-border capital. The resulting forces of fragmentation undermine the very foundations of the union: integrated markets and an effective common monetary policy. Liquidity-oriented policies can buy time, but they cannot fully resolve the crisis or reverse the ongoing financial fragmentation. What is required is a leap to the "complete policies" scenario to forge a stronger union.

The euro area crisis reintensified after the beneficial effects of the European Central Bank's (ECB's) three-year liquidity operations faded and capital flight accelerated.

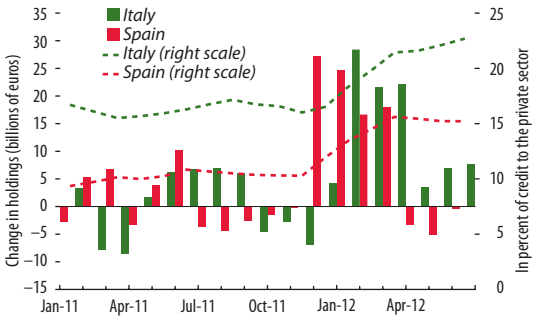
Sovereign debt markets fell into renewed turmoil in the second quarter of 2012 as strains in the euro area periphery spilled over to broader debt markets. The boost from bank purchases of domestic government bonds facilitated by the ECB's three-year LTROs (longer-term refinancing operations) began to fade, causing volatility to rise (Figure 2.1). Spanish and Italian bank purchases of government bonds declined sharply after their exposures had reached new highs (Figure 2.2). Banks' increased holdings of government bonds exposed them to large mark-to-market losses as yields spiked, reinforcing the link between sovereigns and weak banking systems (Figure 2.3). Spanish government bond yields rose particularly sharply to record levels as investors became increasingly concerned about the mounting cost of recapitalizing banks, the risks to fiscal consolidation from subnational budgetary

Figure 2.1. Government Bond Yields and Volatility



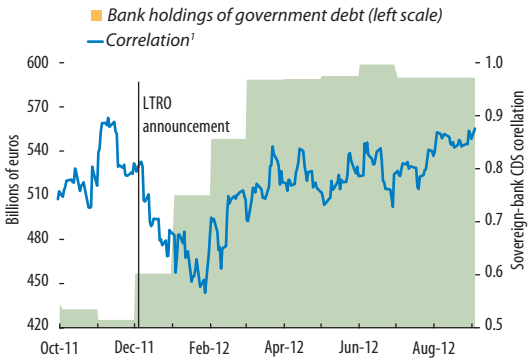
Source: Bloomberg L.P.

Figure 2.2. Bank Holdings of Government Bonds in Spain and Italy



Source: European Central Bank.

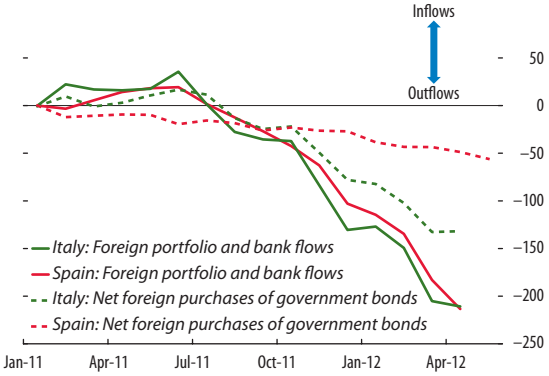
Figure 2.3. Sovereign–Bank Nexus for Italy and Spain



Sources: European Central Bank; Thomson Reuters Datastream; and IMF staff estimates.
Note: LTROs = longer-term refinancing operations.
[1]Thirty day rolling correlations between sovereign bond CDS (credit default swap) spreads and bank CDS spreads.

Figure 2.4. Portfolio Outflows from Italy and Spain

(In billions of euros)



Sources: Haver Analytics; and IMF staff estimates.

performance, and the deepening economic contraction (Box 2.2). Although financial market conditions have improved in recent weeks on policy action from the ECB, bond yields in the euro area periphery remain elevated, while core euro area yields remain close to historic lows, signaling still-elevated concerns about financial stability in the euro area.[2]

Intensification of the crisis has manifested itself in capital outflows from the periphery to the core at a pace typically associated with currency crises or sudden stops. Both Spain and Italy have suffered large-scale capital outflows in the 12 months to June—on the order of €296 billion (27 percent of 2011 GDP) for Spain and €235 billion (15 percent of GDP) for Italy.[3] Foreign investors retreating from periphery bond markets drove a large share of these flows, especially in Italy (Figure 2.4). In Spain, the outflows have been broader-based; a significant part has been in corporate bonds, as sovereign rating actions have been followed by downgrades of Spanish corporations. The erosion of the foreign investor base in the periphery highlights the external financing challenges faced by these countries.

The departure of foreign investors from periphery sovereign debt markets over the past year has also spilled over to banks, which have seen a material

[2]On July 26, ECB President Mario Draghi said that the ECB is prepared to do "whatever it takes" to save the euro; and on September 6 the ECB announced its Outright Monetary Transactions program. Between end-July and mid-September, Spanish and Italian 10-year government bond spreads fell by about 130 basis points, the euro appreciated 7 percent against the U.S. dollar, and periphery equities rose 30–35 percent.

[3]Outflows are calculated by adjusting the financial account for changes in payment system (TARGET2) balances.

Box 2.2. Why Are Euro Area Periphery Sovereign Spreads So High?

Long-run statistical models based on macroeconomic fundamentals are generally unable to explain the dramatic moves in periphery bond spreads over the past two and a half years. However, a high-frequency model using indicators of banking sector stress and euro area market fragmentation as explanatory variables is able to account for much of the recent movement in spreads, signaling the close connection between the sovereign crisis and banking and external strains.

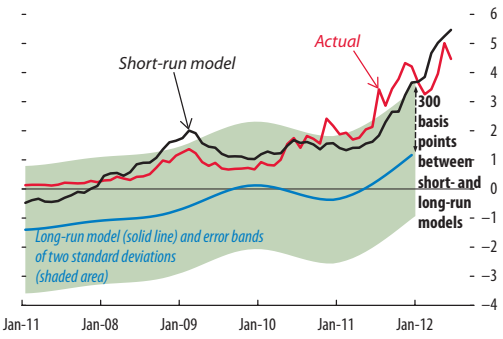
Since the beginning of the European debt crisis, spreads on the debt of sovereigns in the euro area periphery have departed substantially from most calculations of "fair value." This difference shows up clearly in a long-run statistical model that predicts spreads based on determinants such as sovereign credit and solvency. Here, 10-year yields of Spain and Italy are more than 200 basis points, or two standard deviations, above fair value, while yields for the euro area program countries are well beyond this (Figure 2.2.1). Given the persistence of this divergence, it appears that other factors are driving these spreads. In periphery bond markets, the most likely candidates for explaining this gap include loss of confidence in policymakers, tight bank-sovereign linkages, and the retreat of cross-border investors.

To account for the size of the gap and to explore the role of these additional factors, a second, high-frequency, model was estimated, with these and other factors as explanatory variables. The high-frequency model employs a panel regression with country fixed effects, controlling for IMF/EU support programs. Overall, the model provides a reasonably good fit, explaining up to 86 percent of the variation in bond spreads. Results are robust to alternative specifications, including pooled ordinary least squares regressions and variations in the sample size.

As anticipated, the high-frequency model provides considerable insight into the source of the divergence. Model estimates suggest that (1) the health of the banking system, (2) euro area market fragmentation as proxied by the accumulation of cross-border TARGET2 liabilities, and (3) the economic outlook account for much of the gap left unexplained by the model based on macro fundamentals alone (Figure 2.2.2).[1] Accordingly, while it is reasonable to expect spreads to eventually return to the levels forecast by the long-run model, the high-frequency model indicates that it is not likely to happen until the challenges from the banking sector and from one-sided cross-border capital flows are resolved.

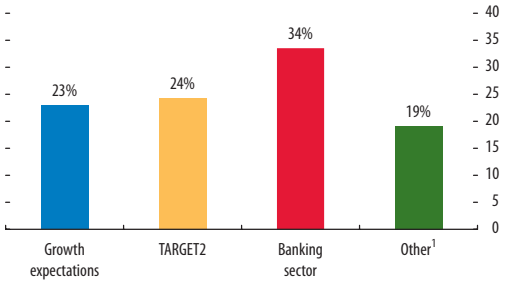
Note: Prepared by Chris Walker and Alexandre Kohlhas.

Figure 2.2.1. Italy and Spain: Actual Spread of 10-Year Sovereign Yield and Fitted Spreads from Long-Run and Short-Run Models
(Percent)



Source: IMF staff estimates.
Note: Arithmetic averages of values for Italy and Spain. Spread is over 10-year German bunds.

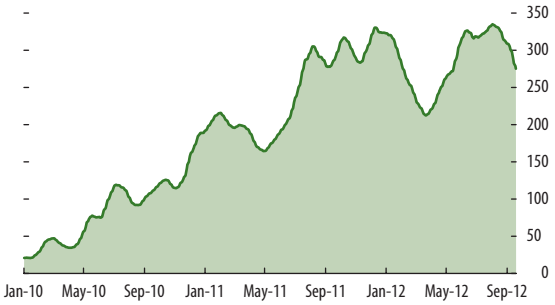
Figure 2.2.2. Factors Contributing to Sovereign Euro Area Spreads
(Percent of total variation)



Source: IMF staff estimates.
Note: Arithmetic averages of values for Ireland, Italy, Portugal, and Spain.
[1]Other: unobserved, time-invariant, country-specific factors.

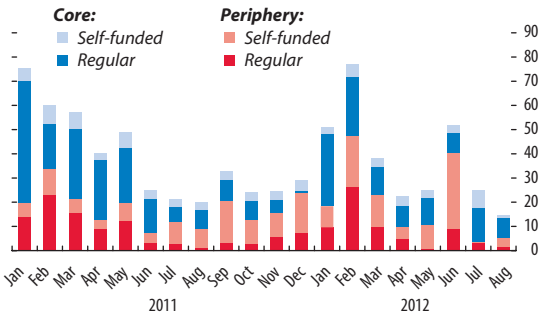
[1]A Gram-Schmidt decomposition was applied to the independent variables to eliminate collinearity. However, endogeneity of the independent variables remains a possibility; thus, care should be taken in drawing causal inferences from the regression.

Figure 2.5. Periphery Minus Core Bank Credit Default Swap Spreads
(In basis points)



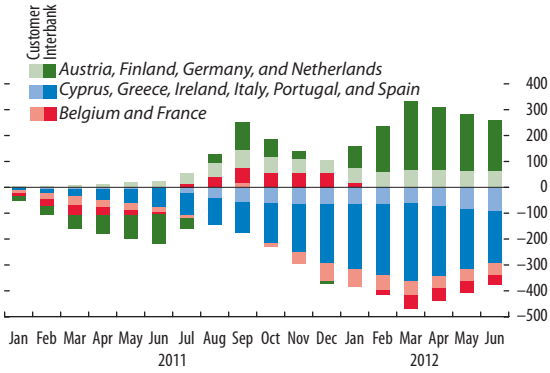
Sources: Bloomberg L.P.; and IMF staff estimates.
Note: The credit default swap data are weighted by bank assets. The figure shows a 20-day moving average.

Figure 2.6. Euro Area Bank Debt Issuance
(In billions of euros)



Source: Dealogic.
Note: In self-funded deals, the issuer is the sole underwriter. Core = Austria, Belgium, France, Finland, Germany, and the Netherlands; periphery = Cyprus, Greece, Ireland, Italy, Portugal, and Spain.

Figure 2.7. Bank Deposit Flows in the Euro Area
(In billions of euros, cumulative change since December 2010)



Sources: Haver Analytics; and IMF staff estimates.
Note: Based on banks located in each country and shows domestic and nonresident deposits, except for the light red and light green bars, which are for nonresident customer deposits only. Monthly figures are interpolated from quarterly data. Customer deposits exclude repos and deposits from other financial intermediaries with a maturity over two years.

decline in the willingness of nonresidents to provide funding. Credit default swap spreads of euro area periphery banks have widened relative to those of core euro area banks; and although this spread has come down recently, following the ECB's Outright Monetary Transactions (OMTs) announcement, it remains at high levels (Figure 2.5). Although many core euro area banks are able to issue debt, and issuance has picked up in recent weeks, broader funding market conditions are still challenging for weaker periphery banks (Figure 2.6). Indeed, the bulk of issuance by periphery banks since mid-2011 has been taken up by the banks themselves (so-called self-funded issues) to be used as collateral.[4]

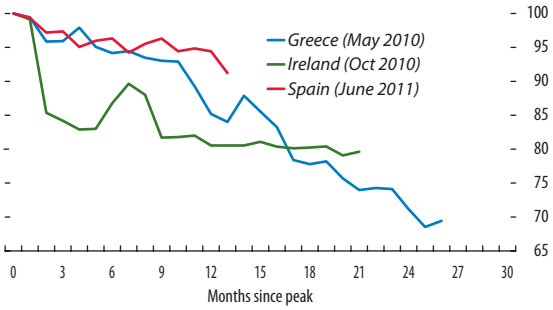
Adding to strains are the continued deposit outflows from periphery banks (Figure 2.7), which reflect a combination of waning confidence and economic contraction. The withdrawals have been most severe in Greece, where deposits are 30 percent below their peak, but there have also been deposit outflows in banks located in other periphery countries, notably Ireland and Spain (Figure 2.8). In addition to the overall decline in deposits, some countries have seen a flight to stronger institutions within their banking systems. Pressures on bank funding have continued to build as rating downgrades have resulted in higher collateral requirements, though the recent ECB decision to ease collateral rules should help banks in any country eligible for OMTs.

European banks have made a significant effort to boost their capital cushions, which has helped to strengthen their balance sheets and prevent a larger reduction in assets.[5] From end-2011:Q3 to end-2012:Q2, total assets (excluding intangibles and

[4]In Dealogic, deals are identified as "self-funded" when the issuer is the sole underwriter. During 2011–12, just over half of the €340 billion of debt issued by periphery banks was self-funded.

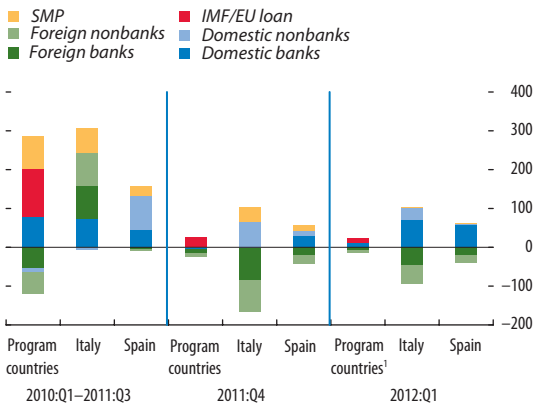
[5]In December 2011, the European Banking Authority (EBA) recommended that 27 large euro area banks increase their capital by €76 billion to reach a 9 percent core Tier 1 target and provide a sovereign buffer by end-June 2012. Bank-by-bank results are not yet available, but the EBA recently reported that banks in aggregate have taken a total of €94.4 billion in measures, exceeding the identified shortfall.

Figure 2.8. Bank Customer Deposit Trends
(Index: Peak = 100)



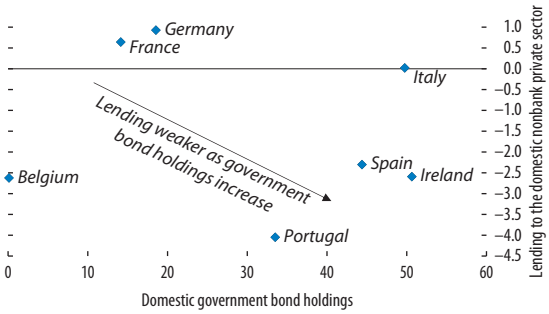
Sources: Haver Analytics; and IMF staff estimates.
Note: The date of the peak is shown in parentheses. The figure is based on banks located in each country and shows customer deposits from residents and nonresidents, excluding repos and deposits of greater than two years in maturity from other financial institutions. The data for Spain are also adjusted for the increase in retail debt from October 2011.

Figure 2.9. Changes in the Sovereign Investor Base
(In billions of euros)



Source: IMF staff estimates.
Note: Program countries are recipients of IMF loans: Greece, Ireland, and Portugal. SMP = Securities Market Programme of the European Central Bank.
[1]Excluding Greece, which had a private sector initiative operation in this period.

Figure 2.10. Bank Credit to Domestic Governments and the Private Sector, Selected Euro Area Countries
(In percent, November 2011 to July 2012)



Sources: Haver Analytics; national central banks; and IMF staff estimates.
Note: Based on banks located in each country. Lending does not include off balance sheet securitized loans. Data through July 2012 or latest available.

derivatives) of the largest EU banks fell by about $600 billion, or 2 percent of total bank assets (see Box 2.3). This compares to the estimated $2.6 trillion decline in total assets from the same start date to end-2013 in the base case (*current policies*) scenario of the April 2012 GFSR. Although the overall pace of deleveraging slowed in the first quarter of 2012 in the wake of the LTROs, increased market fragmentation is now causing renewed pressures, particularly in the euro area periphery. Indeed, Box 2.3 shows that bank credit in the euro area periphery has fallen more sharply than in the base case scenario of the April GFSR.

Foreign investor flight from periphery debt markets exacerbates funding challenges and heightens pressures on domestic banks to increase their holdings of sovereign bonds.

The continued erosion of the foreign investor base since 2010 represents a significant challenge for the euro area periphery (Figure 2.9). If foreign investors continue to reduce their exposures, several governments could face serious funding problems over the period ahead. Domestic banks might be able to step in to a certain extent, but this entails the risk of crowding out lending to the private sector while further tightening the link between sovereigns and banks. Highlighting this risk, the pullback of foreign investors from some periphery sovereign bond markets since end-2011:Q3 has been mirrored by falling credit to the private sector and a simultaneous significant increase in local banks' holdings of local government bonds (Figure 2.10). A further increase in funding pressures on the periphery sovereigns could translate into greater pressures on local banks to buy more sovereign debt, thereby increasing the risk of crowding out private sector credit.

Financial fragmentation is driving a wedge between the core euro area and the periphery.

The currency union is becoming increasingly fragmented between the periphery and the core. Core

Box 2.3. European Bank Deleveraging: An Update

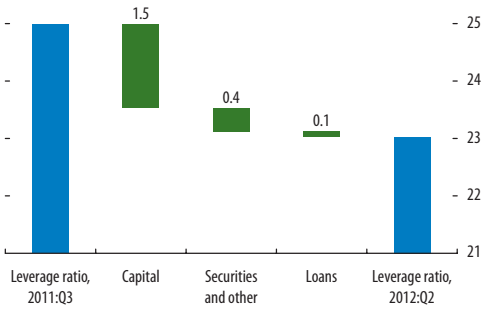
The April 2012 GFSR estimated that a sample of 58 large EU banks would reduce assets (excluding intangibles and derivatives) by $2.2 trillion to $3.8 trillion over the period from 2011:Q3 to 2013:Q4. Assets of these sample banks have fallen by more than $600 billion in the period from 2011:Q3 to 2012:Q2, with much of the decline occurring in 2011:Q4. Since then, following efforts by the European Central Bank (ECB) to relieve funding pressures on euro area banks, the pace of deleveraging has slowed.

Much of the deleveraging is attributable to what was identified in the April 2012 GFSR as being a key driver of asset reductions: banks with plans to scale back the size of their balance sheets by $2.1 trillion overall. U.K. banks have made progress through continued divesting and by cutting back noncore activities. French banks reduced U.S. dollar-denominated assets, including structured products and trading portfolios. Dutch banks sold subsidiaries in the United States and Latin America and remain committed to separating banking from insurance. One medium-sized Austrian bank sold eastern European subsidiaries in early 2012.

To date, the decline in bank leverage has been mainly due to capital measures and asset disposals; cutbacks in bank loans have played a smaller role (Figure 2.3.1). This deleveraging pattern is broadly similar to that estimated in the April 2012 GFSR. Within loans, banks' foreign claims on most borrowers have declined in the two quarters to March 2012 (Figure 2.3.2). Although the impact on emerging Europe seems to have been more muted than expected, there has been a significant impact in the euro area periphery. There is a now a clear divergence within the euro area, with bank credit in the core continuing to rise, while lending in the periphery is falling back sharply (Figure 2.3.3).

Note: Prepared by Sergei Antoshin, Eugenio Cerutti, Anna Ilyina, William Kerry, and Nada Oulidi.

Figure 2.3.1. Contributions to Change in Leverage at European Banks
(In percentage points)

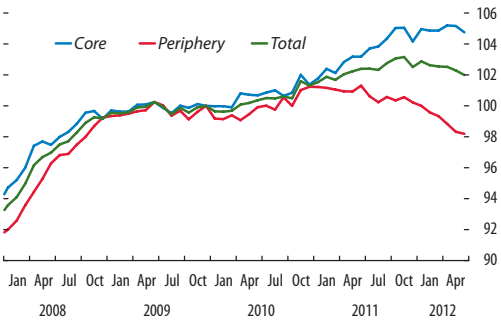


Sources: SNL Financial; and IMF staff estimates.
Note: Leverage is tangible assets less derivatives as a percentage of core Tier 1 capital. Based on a sample of 58 large EU banks.

Figure 2.3.2. Change in Foreign Claims of European Banks
(In percent)

Sources: Bank for International Settlements (BIS); and IMF staff estimates.
Note: Figure shows consolidated exposures of BIS reporting banks in the EU. The data have been adjusted for exchange rate changes and for selected breaks in series.

Figure 2.3.3. Euro Area Bank Credit to the Nonbank Private Sector
(Index, December 2009 = 100)

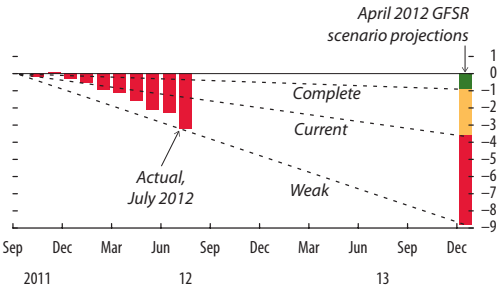


Sources: IMF, International Financial Statistics database; and IMF staff estimates.
Note: Core = Austria, Belgium, Finland, France, Germany, and the Netherlands; periphery = Greece, Ireland, Italy, Portugal, and Spain.

Box 2.3 *(continued)*

Figure 2.3.4. Euro Area Periphery Bank Credit, Actual and under April 2012 GFSR Policy Scenarios

(In percent, cumulative since 2011:Q3)

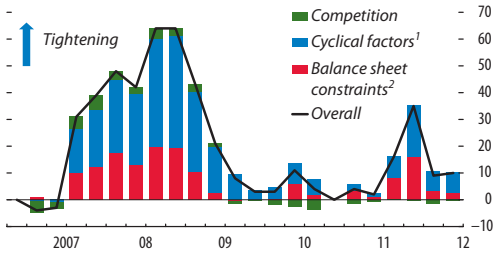


Sources: IMF, International Financial Statistics database; and IMF staff estimates.
Note: Credit is to the nonfinancial private sector. The dotted lines show glide paths for the three April 2012 GFSR scenarios assuming that credit falls at a constant rate over the scenario period. Periphery = Ireland, Italy, Portugal, and Spain.

Indeed, credit in the periphery has fallen more than expected, broadly tracking the pace in the *weak policies* scenario outlined in the April 2012 GFSR (Figure 2.3.4). Although the rapid pace may reflect the uncertainties around the credit estimates, it is also likely due to the rise in new pressures on bank balance sheets, which in turn have increased deleveraging pressures. The fall in credit is also due, in part, to demand conditions. Demand has been weak, but survey data suggest that euro area bank lending standards for corporate loans have also remained tight since the second quarter of 2011 (Figure 2.3.5). Furthermore, rising interest rates on bank loans in the periphery provide evidence that reductions in credit supply may be constraining lending (Figure 2.3.6).

Figure 2.3.5. Contributions to Changes in Euro Area Bank Credit Standards for Loans to Business

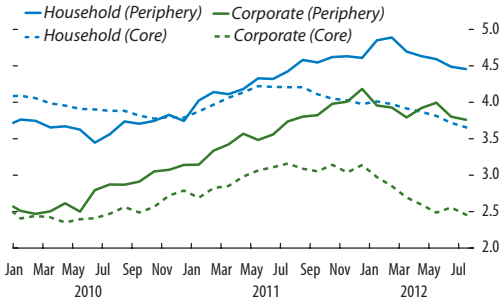
(In percent)



Sources: European Central Bank (ECB); Haver Analytics; and IMF staff estimates.
Note: The overall value is the net percentage of banks responding to the ECB's quarterly *Euro Area Bank Lending Survey* that reported a tightening of credit standards for loans to nonfinancial firms in the preceding quarter. Each bar segment shows the average percentage of respondents citing that factor. The sum of the bars has been adjusted to equal the corresponding overall value.
[1]Cyclical factors include general economic activity, industry outlook, and collateral needs.
[2]Balance sheet constraints include capital, access to financing, and liquidity position.

Figure 2.3.6. Interest Rates on New Bank Loans in the Euro Area Core and Periphery

(In percent)

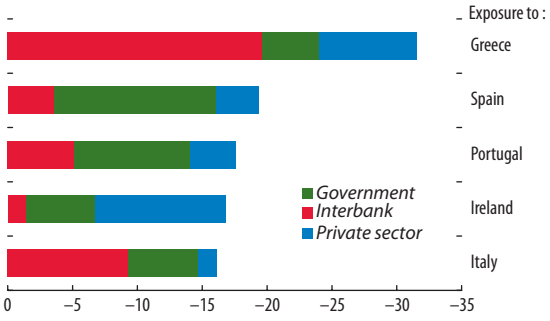


Sources: European Central Bank; and IMF staff estimates.
Note: Data are weighted by the level of loans. Core = Austria, Belgium, Finland, France, Germany, and the Netherlands; periphery = Cyprus, Greece, Ireland, Italy, Portugal, and Spain.

euro area banks have already significantly scaled back their exposures to periphery countries (Figure 2.11). At the same time, the interest rates charged by periphery banks on new corporate and household loans have increased—by about 65 basis points on average since December 2010—compared with a 20 basis point decline in average interest rates charged by banks in the core countries (Figure 2.12). Thus, pressure on periphery economies continues to mount.

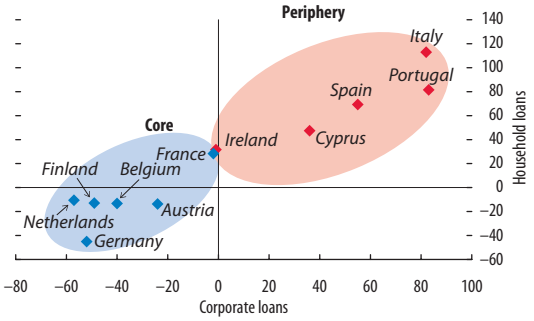
Redenomination risk—the possibility that a euro area country will revert to using local currency—has become a driving force behind fragmentation. The ECB's OMT has helped to ease some of these concerns, as reflected in market prices. But it is too early

Figure 2.11. Change in Euro Area Bank Cross-Border Exposures
(In percent, since December 2010)



Sources: Bank for International Settlements; and IMF staff estimates.
Note: The data have been adjusted for changes in the U.S. dollar-euro exchange rate and the private sector initiative in Greece.

Figure 2.12. Change in Interest Rate on New Bank Loans
(In basis points, December 2010 to July 2012)



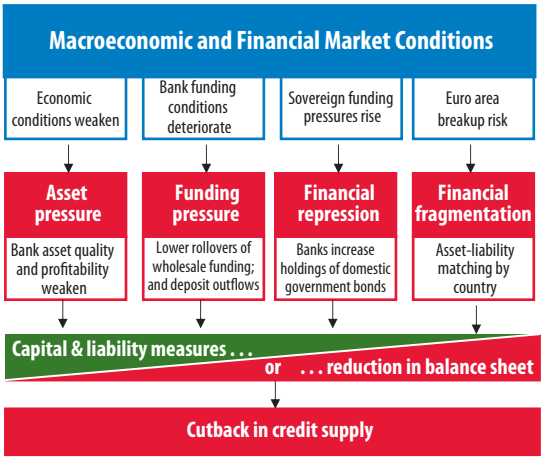
Sources: European Central Bank; and IMF staff estimates.
Note: Household data are a weighted average of interest rates on consumer, housing, and other loans.

to tell whether this will eliminate all redenomination risks. To hedge against the low-probability but high-impact risk of redenomination in a euro area country, some European cross-border banking groups have been matching their assets and liabilities on a country-by-country basis, at least in the periphery.[6] Several large EU banks have already used subsidiaries in the euro area periphery to obtain LTRO funding, and some cross-border banks with operations in the periphery are using periphery sovereign bonds to obtain liquidity from local central banks via their local affiliates.[7] This

[6]For example, French banks recently announced their policy to match assets and liabilities by geographic location and make their subsidiaries' operations in the euro area periphery less reliant on funding from parent banks.

[7]Data (available on Bloomberg) reveal that French, German, and Spanish banks have used subsidiaries in periphery countries to obtain LTRO funding.

Figure 2.13. Pressure on Euro Area Banks



behavior may also be driven by regulatory ring-fencing aimed at protecting local depositors or limiting potential deposit insurance liabilities. For example, some host country regulators are reportedly preventing periphery banks from using their affiliates to raise funding in other countries. In combination, all of these developments are likely to further reduce the flow of funds from the core euro area to the periphery.

The protracted nature of the crisis has thus given momentum to several destructive forces, including financial fragmentation and a potential financial repression (see definition in Table 2.4), that may increase deleveraging pressures on banks, with adverse implications for the economy (Figure 2.13). Building on earlier work presented in the April 2012 GFSR, we assess the impact of these forces under three scenarios—*baseline policies*, *weak policies,* and *complete policies*—detailed in Chapter 1.[8] To illustrate the implications of these strains, it is assumed that liquidity support is not used beyond current levels. The key features of the exercise are described in Table 2.4 (detailed assumptions are in Annex 2.1).

Unless confidence in the euro area is restored, fragmentation forces are likely to intensify bank deleveraging, restrict lending, add to the economic woes of the periphery, and spill over to the core.

[8]In the April 2012 GFSR, the central scenario (here called *baseline policies*) was called *current policies*.

Table 2.4. Key Features of Sovereign Funding and Bank Deleveraging Scenarios

Factors	Description
Sovereign funding pressures	Under *baseline policies*, foreign investors' share of the total debt stock is assumed to continue to decline at the same pace as seen during 2009–11. For periphery countries, the share of foreign debt holdings is assumed to move halfway toward pre-euro era levels. The assumptions on sovereign spreads reflect positive market developments following the announcements by the European Central Bank on July 26 and September 6 launching the Outright Monetary Transactions program. Periphery sovereign spreads are assumed to stabilize and/or gradually decline by end-2013 (see Annex 2.1). Under *weak policies,* the withdrawal of foreign investors accelerates to twice the pace seen since 2009. Periphery spreads widen by about one standard deviation above the baseline. Under *complete policies,* by contrast, confidence returns and foreign investors increase their share of the total debt stock as funds flow back to the periphery. Periphery spreads tighten by one to two standard deviations below the baseline.
Financial repression	"Financial repression" refers to the assumption that local banks are required or encouraged to purchase part of their domestic government's bonds that are sold or not rolled over by foreign investors and, as a result, have to reduce other assets in order to meet their deleveraging targets. The amount of bonds purchased by local banks is determined by the scenario assumptions in Table 2.11 in Annex 2.1. Local banks are assumed to purchase bonds in proportion to their current holdings of bonds along with other local investors (e.g. pension funds and asset managers), taking into account the coverage of the sample relative to the financial system.
Bank funding pressures/funding gaps	Under *baseline policies,* bank wholesale funding is assumed to roll over at current rates, with periphery deposits falling at their current pace in 2012 and stabilizing in 2013. Under the *weak policies* scenario, wholesale funding conditions deteriorate further, while in the periphery deposits continue to fall at their current pace throughout 2012–13. In the *complete policies* scenario, current funding pressures gradually ease to enable banks to roll over liabilities in markets going forward; deposits remain at their current level, taking into account the outflows that have been experienced to date.
Financial fragmentation	"Financial fragmentation" is modeled as a behavioral assumption for banks, whereby banks aim to match loans and deposits of their subsidiaries in selected countries (depending on the scenarios) and give priority to reducing other periphery exposures that are not funded locally. Under *baseline policies*, loan-to-deposit ratios of foreign banks' subsidiaries in the periphery are reduced to 110 percent. Under *weak policies*, loan-to-deposit ratios of foreign banks' subsidiaries in the entire euro area are reduced to 100 percent. There is no financial fragmentation under the *complete policies* scenario.
Weak economic growth and pressures on bank capital	Under baseline and weak policies, weaker earnings and higher asset impairments result in a capital shortfall for some banks relative to the 9 percent core Tier 1 hurdle ratio at end-2013, due to weaker growth and higher risk premiums. Under *complete policies*, banks are assumed to have no capital shortfall, as they are able to raise private equity or receive official support.

Source: IMF staff.

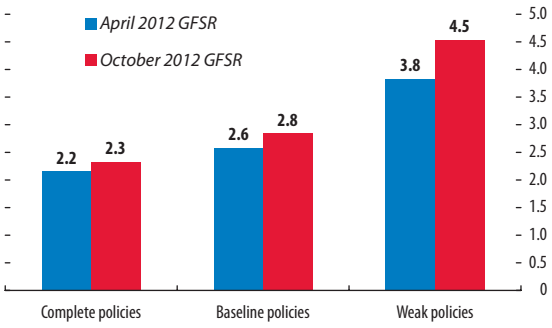
Note: See Annex 2.1 for more details on deleveraging targets and assumptions. The bank sample (58 large EU banks) and time horizon (end-2011:Q3 to end-2013) are the same as in the April 2012 GFSR deleveraging exercise.

For each of the three scenarios, we present simulation results for the potential decline of aggregate assets of large EU banks as well as the implications for credit supply and growth of the euro area countries.[9] The results underscore the fact that the slow progress in addressing the euro area's structural weaknesses has already pushed up the economic and financial costs of the crisis:

- *The expected amount of bank deleveraging is now higher* than it was in the April 2012 GFSR under all three scenarios because of lower expected earnings, higher losses linked to worsened economic conditions, and greater funding pressures on banks. The expected amount of asset reduction by all sample banks is $2.8 trillion (7.3 percent of bank assets) in the *baseline policies* scenario (versus $2.6 trillion in the April 2012 GFSR) and $4.5 trillion (12 percent of bank assets) in the *weak policies* scenario (versus $3.8 trillion in the April 2012 GFSR) (Figure 2.14). Recent ECB action has helped to improve confidence. If this momentum is maintained through further policy measures, as in the *complete policies* scenario, bank asset reductions would amount to about $2.3 trillion (6 percent of bank assets).

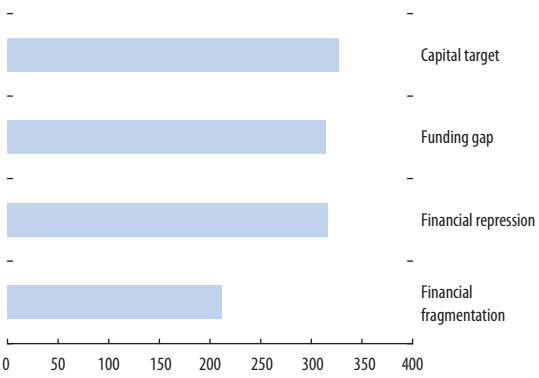
[9]The analysis focuses on the same sample of banks (58 large EU banks) and the same time frame (between end-2011:Q3 and end-2013:Q4) as in the April 2012 GFSR.

Figure 2.14. Total Deleveraging by Sample Banks
(2011:Q3–2013:Q4, in trillions of U.S. dollars)



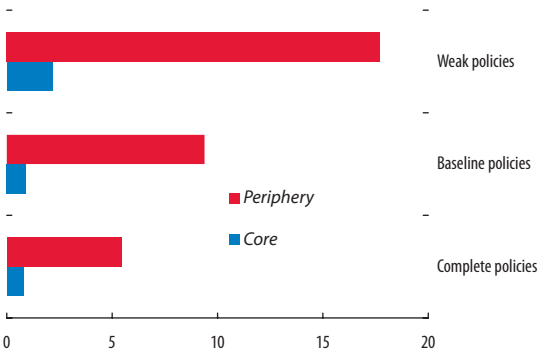
Source: IMF staff estimates.
Note: Total deleveraging is obtained by aggregating projected asset reduction of all sample banks. For each bank, the required amount of asset reduction is such that it allows a bank to meet all deleveraging targets, after taking into account capital measures (the same approach as used in the April 2012 GFSR).

Figure 2.15. Total Deleveraging Due to Selected Stand-Alone Factors
(2011:Q3–2013:Q4, in billions of U.S. dollars)



Source: IMF staff estimates.
Note: Figure shows total deleveraging due to each of the factors when all other factors/deleveraging targets are set to zero.

Figure 2.16. Reduction in Supply of Credit to Euro Area: Core versus Periphery
(Cumulative for 2011:Q3–2013:Q4, in percent of total credit)



Source: IMF staff estimates.
Note: Total credit includes cross-border lending. Core = Austria, Belgium, Finland, France, Germany, and the Netherlands; periphery = Greece, Ireland, Italy, Portugal, and Spain.

- *The deterioration in financial and economic conditions entails greater pressure on bank asset quality and capital.* The scarcity and higher costs of bank funding, sovereign stress, and a weaker economy are adding to the pressure on bank profits, while weakening economic conditions have led to a deterioration in the quality of bank loans, as indicated by a rise in nonperforming loan (NPL) ratios.[10] Among the four factors analyzed here—capital, funding, financial repression, and financial fragmentation—capital emerges as one of the key factors, particularly for weaker periphery banks (Figure 2.15). This means, for example, that even if funding gaps are closed, bank deleveraging pressures will remain.
- *The periphery bears the brunt of shrinking credit supply*. The cutbacks in the supply of credit to the periphery countries are much larger than in the core euro area (Figure 2.16). The supply of total credit in the periphery (including cross-border lending) is expected to decline 9 percent under the *baseline policies* scenario and almost 18 percent under the *weak policies* scenario.
- *EU banks cut back the supply of credit outside the euro area as well*, notably in emerging Europe, Latin America, and the United States. In some cases, however, domestic banks and foreign banks operating in these three regions are expected to step in and offset the impact that the EU banks' pullback will have on credit supply (Figure 2.17). For example, recent European asset sales in the United States and Latin America have so far been orderly.
- *A rapid move to the* complete policies *scenario would avoid additional economic damage to periphery economies due to the credit supply shock* (Figures 2.18 and 2.19). The estimated impact on euro area credit supply under the *baseline policies*

[10]Increasing loan loss provisions and other asset impairments have led several banks to report large losses in 2011. To date, the quality of commercial real estate exposures has been the key concern, but the weakness now affecting periphery firms could become more widespread (see Box 2.4).

Box 2.4. Corporate Sector Fundamentals, Funding Conditions, and Credit Risks

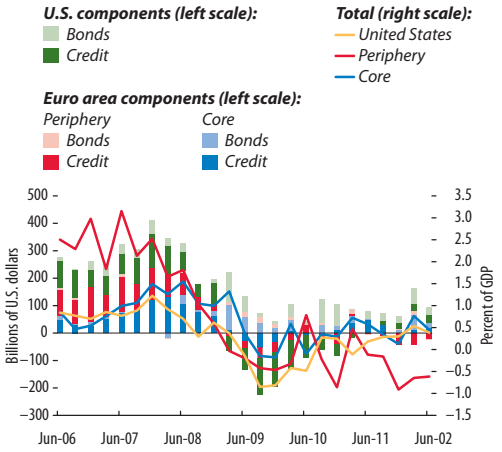
Corporate fundamentals and funding conditions remain strong in advanced economies outside the euro area periphery. Although earnings growth is slowing sharply in all countries amid a generalized economic slowdown, funding conditions and the debt servicing capacity of businesses in most countries remain strong. This financial strength is a reflection mainly of the moderate nature of the last credit cycle in the corporate sector; it also reflects the benefits of accommodative monetary policies to support deleveraging in other sectors more affected by the crisis. In contrast, corporations in the euro area periphery have made only limited progress in reducing the large leverage built up in the run-up to the crisis. Those firms now pose severe credit risks to their banks as the effects of the recession and difficult funding conditions continue to play out.

The analysis of corporate fundamentals of investment-grade companies shows a significant divergence between, on the one hand, U.K., U.S., and core euro area firms and, on the other, firms in the euro area periphery (Table 2.4.1). Debt servicing capacity (interest coverage) remains favorable for the former group of countries despite the recent decline in profit growth (as measured by EBITDA)[1] in a slowing economy. These readings reflect relatively low corporate leverage throughout the latest credit cycle (net leverage) as well as easy monetary policies that have succeeded in keeping corporate financing costs low.

Given their relative balance sheet strength and the contrasting record low yields on high-quality government debt, firms in these core euro area countries continue to benefit from strong investor demand for their bonds, which are perceived to provide better risk-adjusted returns than sovereigns. Corporate bond issuance was close to record highs in recent quarters, especially in the aftermath of the European Central Bank's (ECB's) two longer-term refinancing operations, which allowed renewed corporate balance sheet expansion in the core euro area despite the modest growth in bank credit (Figure 2.4.1).

In contrast, corporate leverage remains high in Italy and Spain, where a large proportion of firms are in the real estate and utility industries. The debt servicing capacity of Italian and Spanish businesses

Figure 2.4.1. Change in Euro Area and U.S. Corporate Bank Credit and Outstanding Corporate Bonds



Sources: Dealogic; Haver Analytics; and IMF staff estimates.
Note: Core = Austria, Belgium, Finland, France, Germany, and the Netherlands; periphery = Greece, Ireland, Italy, Portugal, and Spain.

Note: Prepared by Nada Oulidi and Jaume Puig.
[1]Earnings before interest, taxes, depreciation, and amortization.

Table 2.4.1. Investment-Grade Corporate Sector Fundamentals

	Spain	Italy	France	United States	United Kingdom	Germany
Interest coverage	–1.4	–0.5	1.7	1.9	0.8	1.2
EBITDA year-over-year	–1.1	–0.9	–0.5	0.0	–0.4	–1.1
Net leverage	1.6	1.5	–0.8	0.1	–1.0	–0.9
Free cash flow/debt	–1.5	–0.9	–0.4	1.1	1.0	0.7
Dividends to debt	–0.1	–0.4	0.4	–1.4	2.0	2.3
Capital expenditure year-over-year	–1.2	–0.1	0.1	0.9	0.2	0.8

Sources: Morgan Stanley; and IMF staff estimates.

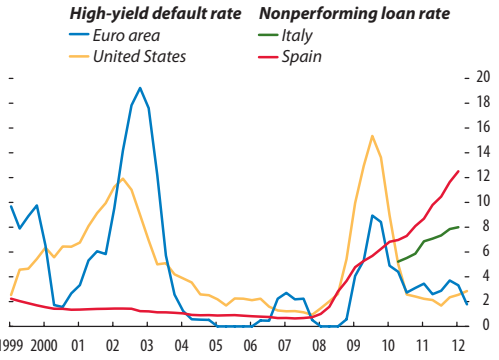
Note: Figures in the table are based on March 2012 values for each of the metrics listed, measured in number of standard deviations from average values of each metric for all countries in the table from 1999:Q4. Red cells indicate the most recent, highest stress levels of each indicator relative to the sample, and dark green indicates countries with the healthiest readings for each indicator. Countries are ordered in columns according to the average of all metrics used, from the most stressed average readings to the least stressed. EBITDA = earnings before interest, taxes, depreciation, and amortization.

Box 2.4 *(continued)*

has benefited to some extent from injections of central bank liquidity, given the adverse developments in the normal credit transmission channel. While the recent announcement of the ECB's Outright Monetary Transactions (OMT) program has allowed some large periphery firms to reenter the capital markets, spreads remain very elevated relative to those in the core. Furthermore, indicators of financial flexibility (Table 2.4.1) suggest that firms in the periphery would face great challenges in raising liquidity internally, as illustrated by their lower levels of free cash flow and dividends. In this context, the risk remains that cuts in capital expenditures continue to add to the downward pressures on growth from deleveraging by the sovereigns and the banks.

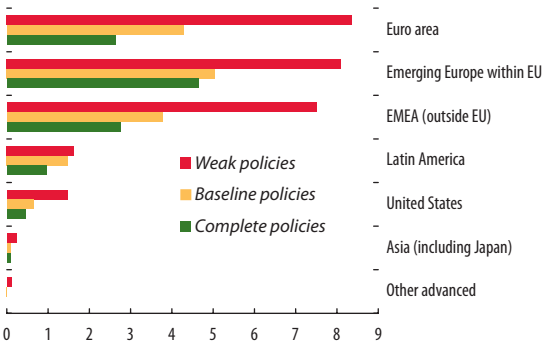
The sharp rise in nonperforming corporate loans in Italy and Spain (much of which is in the real estate sector) demonstrates the effects of weaker corporate fundamentals amid challenging funding and economic conditions. The deterioration in those countries contrasts starkly with much more favorable trends in the United States, even at the weaker end of the credit spectrum, and in broader euro area bond markets (Figure 2.4.2). Market-based forward-looking indicators of credit risk—such as Moody's KMV expected default frequencies, which have spiked recently—also suggest a significant additional buildup of stresses on bank balance sheets from their corporate exposures in Italy and Spain.

Figure 2.4.2. Corporate Sector Credit Risk in the Euro Area and United States
(In percent)



Sources: Bank of America Merrill Lynch; national central banks; and IMF staff estimates.

Figure 2.17. Reduction in Credit Supply: Global Spillovers
(Cumulative for 2011:Q3–2013:Q4, in percent of total credit)



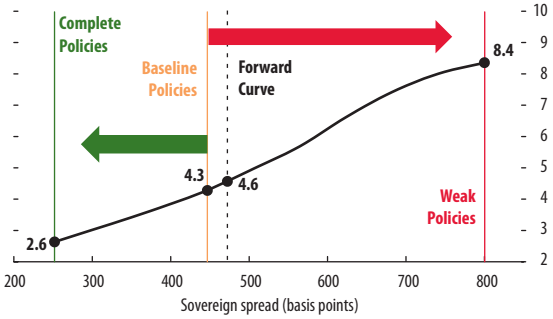
Source: IMF staff estimates.
Note: EMEA = Europe, the Middle East, and Africa. Total credit includes cross-border lending.

Figure 2.18. Impact of EU Bank Deleveraging on GDP, 2013 Projection
(Percentage point deviation from WEO baseline)

Source: IMF staff estimates.

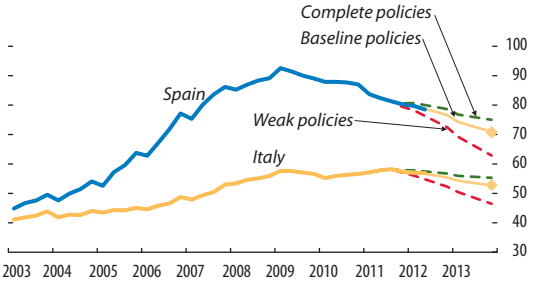
scenario is broadly in line with the WEO baseline. Under the *weak policies* scenario, the credit supply shock from the EU bank deleveraging would lower periphery euro area GDP by more than 4 percentage points relative to the WEO baseline in 2013. In the core euro area, GDP would contract much less, in line with the relatively moderate impact on credit, but still significantly—by 1.5 percentage points relative to the WEO baseline. In the *complete policies* scenario, GDP at

Figure 2.19. Reduction in Credit Supply to Euro Area: Sensitivity to Periphery Sovereign Spreads under Alternative Policy Scenarios
(In percent of total credit)



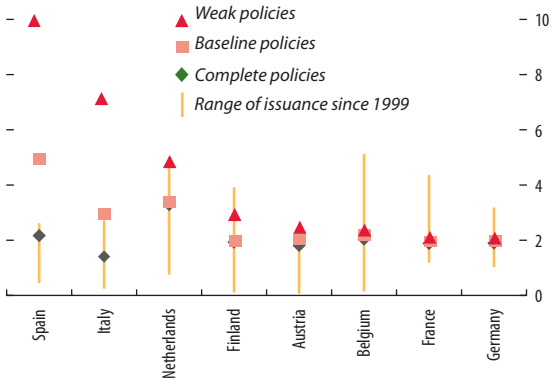
Source: IMF staff estimates.
Note: Total credit includes cross-border lending. Periphery sovereign spreads are GDP-weighted average spreads of Greece, Ireland, Italy, Portugal, and Spain.

Figure 2.20. Bank Credit to Nonfinancial Firms in Italy and Spain
(In percent of GDP)



Sources: Haver Analytics; and IMF staff estimates.
Note: Thick solid lines show actual credit paths up to June 2012. Thin solid lines show the predicted credit paths under a baseline scenario with baseline policies; dashed lines show the predicted paths under the upside and downside scenarios, with complete and weaker policies, respectively; diamonds show the end-2013 credit levels consistent with a path of deleveraging that would bring credit-to-GDP ratios back to 2003–04 levels by end-2017.

Figure 2.21. Corporate Bond Issuance Needs through End-2013 under Alternative Deleveraging Scenarios
(In percent of GDP, annualized)



Sources: Dealogic; Haver Analytics; and IMF staff estimates.
Note: The deleveraging sample is 58 large EU banks, and the deleveraging period is end-2011:Q3 to end-2013.

end-2013 relative to the *baseline policies* scenario would be two-thirds of a percentage point higher in the core, and almost 2 percentage points higher in the periphery.

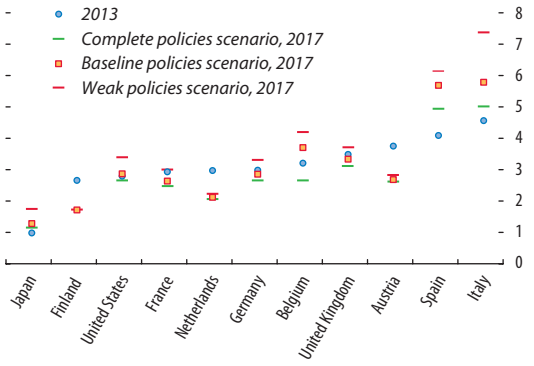
Spillovers of sovereign stress and bank deleveraging will have a systemic impact on the corporate sector, potentially triggering a downward spiral of downgrades.

Firms in the euro area periphery are likely to undergo a protracted period of deleveraging, as capital markets that have traditionally played a limited role in these countries cannot fill the gap left by banks. Figure 2.20 shows that the recent fall in bank credit to nonfinancial firms in Italy and Spain is broadly consistent with a path of deleveraging that would bring credit-to-GDP ratios back to 2003–04 levels by 2017. Bank credit in all these economies could fall much faster under the *weak policies* scenario. Figure 2.21 shows that the volume of bond issuance by periphery firms needed to meet their refinancing needs under the *weak policies* scenario would have to be three to four times larger than their historical maximum annual bond issuance since 1999. Record high bond issuance by some large Spanish and Italian firms immediately following the announcement of the ECB's new OMT program suggests that some firms could substitute bank financing for capital market financing if the benefits from the OMT program are sustained, but the majority of firms traditionally reliant on bank financing are unlikely to benefit to a similar extent.

Higher spreads and deteriorating ratios of interest cost to revenue could lead to further sovereign downgrades. Rating agencies have cited challenging funding conditions as justification for earlier sovereign downgrades and are maintaining a negative outlook or negative watch on most euro area sovereign ratings. Even if spreads were to remain at current

Figure 2.22. Projected Average Interest Rates on Outstanding Sovereign Debt

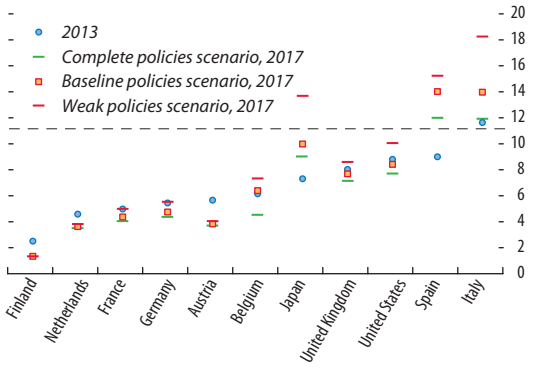
(In percent)



Sources: IMF, World Economic Outlook database; and IMF staff estimates.

Figure 2.23. Projected Sovereign Interest Expense as a Proportion of Revenue

(In percent)

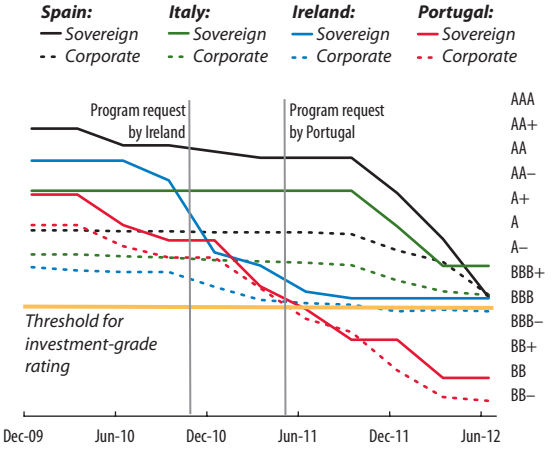


Sources: IMF, World Economic Outlook database; and IMF staff estimates.

levels, sovereigns are facing a rising burden of interest payments on their national debt (Figures 2.22 and 2.23).[11] The *baseline policies* scenario implies that in Italy and Spain, the government interest bill rises to about 14 percent of revenue by 2017. The *weak policies* scenario presents an even more challenging prospect, as an assumed further increase in spreads for Italy (of 300 basis points) and Spain (of 330 basis points) would push up their interest-to-revenue ratios to 18 percent and 15 percent, respectively. Historically, a ratio of 10 percent has been viewed as a threshold for AAA-rated sovereigns, and ratios of 20 percent and higher might raise serious concerns about sustainability.

[11]Projections are based on (1) current market forward rates for the sovereign German, Japanese, U.K., and U.S. yield curves; (2) IMF forecasts of spreads for Austria, Belgium, Finland, France, Italy, the Netherlands, and Spain; and (3) WEO fiscal and GDP forecasts. For a description of the methodology, see the April 2011 GFSR.

Figure 2.24. Sovereign and Corporate Credit Ratings in the Euro Area Periphery



Source: Citigroup.
Note: Ratings are the average of ratings by Moody's Investor Services, Standard & Poor's, and Fitch.

Notwithstanding the recovery of market access for businesses in the periphery following the ECB's OMTs announcement, the risk of additional downgrades of sovereign credit ratings continues to weigh on the corporate sector. Since sovereign ratings typically act as a ceiling on corporate ratings, such downgrades could trigger the migration of ratings for periphery firms to below investment grade. For instance, the gap between the average rating of the Spanish corporate sector and the Spanish sovereign has already disappeared after successive sovereign downgrades, implying that the sovereign credit ceiling is becoming increasingly binding (Figure 2.24). Since funding costs remain elevated, corporate fundamentals could deteriorate further (see Box 2.4) and add to the negative ratings outlook, especially in Spain. In turn, losses on corporate loans and security purchases could spark further negative repercussions for banks.

A massive downgrade of Spanish and Italian corporate bonds to below investment grade would overwhelm the capacity of investors in the euro area high-yield market to absorb the resulting supply.

At 20 percent of the euro area's investment-grade market, the combined outstandings of Spanish and Italian investment-grade corporate bonds exceed the size of the entire euro area high-yield bond market. As a result, refinancing risk would rise for the entire euro area high-yield corporate sector.

The "firewall" and supporting policies should be deployed to assist in capping financial stress, but their effectiveness can be assured only by more convincing progress toward integration.

The bank deleveraging simulations could provide a barometer for the types of pressure that emerge and for the extent and effectiveness of the euro area firewall facilities—the European Financial Stability Facility and European Stability Mechanism (EFSF/ESM) and OMTs. As an illustration, under the *baseline policies* scenario (Figure 2.19), various strains can be mapped into policy instruments that could be used to mitigate their impact. For instance, the sovereign funding gap could be met by using the firewall to support sovereign financing. Bank deleveraging as a result of capital strains could be reduced or averted through national and ESM capital injections to viable banks. A banking union with a deposit guarantee scheme could avoid deposit flight. ECB lending could close bank funding gaps.

Euro area periphery banks have already substantially increased their reliance on funding from the Eurosystem. While the ECB's LTROs have allowed many banks to prefund some of their maturing term debt, there is a risk that these funds may be insufficient to cope with the subsequent loss of short-term wholesale and deposit funding. At the same time, some periphery banks are reportedly experiencing collateral shortages and therefore may be at risk of not being able to use central bank liquidity facilities to cover lost private funding. While the recent ECB move to ease collateral requirements on asset-backed securities could provide some relief to these institutions, it may prove to be temporary, particularly if banks are downgraded further.

Figure 2.19 shows that more proactive policies can significantly mitigate some of the deleveraging pressures. For example, under the assumption that periphery sovereign spreads throughout 2012–13 remain at the levels observed in mid-July (before the ECB president's statement), the estimated cutback of total euro area credit would be more than 2 percentage points larger than under the *baseline policies* scenario. Figure 2.19 also highlights the nonlinearity of the impact of sovereign and other stresses on bank deleveraging and credit cutbacks.

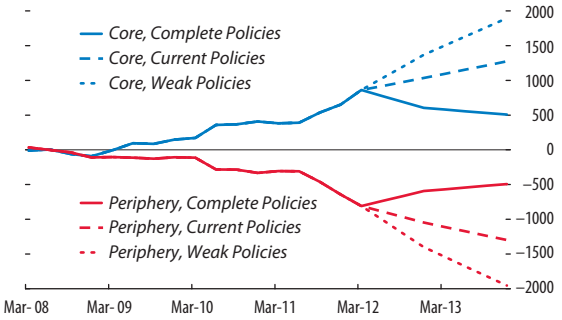
A leap to the complete policies scenario is needed to restore confidence, reverse capital flight, and reintegrate the euro area.

The analysis in this GFSR underscores the shortcoming of any strategy that would rely solely on liquidity measures to resolve the euro area crisis. While the ECB's liquidity support is essential, it is not sufficient to stem the forces of fragmentation that threaten to undermine the integrated markets and effective common monetary policy that are the foundation of the union.[12] A continuation of incremental and reactive policymaking will not restore confidence and carries negative consequences for the euro area and the global financial system. What is needed is a leap to the *complete policies* scenario to stabilize funding markets, arrest capital flight, and begin the process of reintegrating the euro area.

The ongoing financial fragmentation of the euro area can be reversed only through far-reaching action by euro area policymakers along the lines proposed in Chapter 1. Stressed balance sheets need to be repaired and placed on a more sustainable footing; emergency financing can provide only a temporary bridge across the current turbulence as the foundations of a durable union are laid. The main elements are (1) addressing high legacy debt burdens; (2) severing the sovereign-bank linkage, including through bank resolution and recapitalization; and (3) making credible down payments on fiscal and banking union. Unless policymakers deliver credible and comprehensive measures to resolve the crisis, the recent improvement in market sentiment is unlikely to last.

[12]As discussed in the IMF's Staff Report on euro area policies (IMF, 2012a).

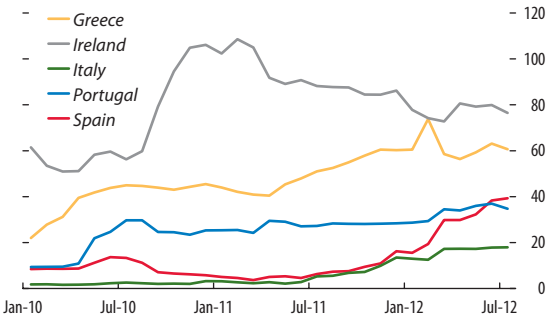
Figure 2.25. TARGET2 Projections
(In billions of euros)



Source: IMF staff estimates.

Note: Figures through March 2012 represent accumulated balances in the TARGET2 payment system within the European Monetary Union. The scenario-dependent projections for TARGET2 balances reflect the bank deleveraging and sovereign bond net sales projected in each of the three scenarios. Projections for the other components of capital flows within the European Monetary Union that affect TARGET2 balances are based on recent trends. Core = Austria, Belgium, Finland, France, Germany, and the Netherlands; periphery = Greece, Ireland, Italy, Portugal, and Spain.

Figure 2.26. Borrowing from Central Banks
(In percent of 2011 GDP)



Sources: Haver Analytics; IMF, World Economic Outlook database; and IMF staff estimates.

Note: The figure includes estimates of Emergency Liquidity Assistance in Greece and Ireland.

Contingent liabilities are rising as incremental policymaking pushes up the ultimate cost of resolving the crisis.

The slow pace of crisis resolution has pushed up the size of contingent liabilities for economies in the core of the euro area. Contingent liabilities reflect the size of potential ultimate fiscal transfers, or the costs of potential defaults in the periphery under a breakup scenario, should the crisis deepen. Under the assumption that the ECB provides unlimited support to fill in the funding gap left by capital flight from the periphery, one measure of the size of contingent liabilities is given by the estimated size of payment system (TARGET2) balances, the commitments on bilateral loans, and support for domestic banks with exposure to the periphery.

Under the assumption of unlimited support from the Eurosystem, TARGET2 liabilities could be expected to continue to rise for the periphery (Figures 2.25 and 2.26).[13] In the *baseline policies* scenario, capital flows from the periphery to the core would continue, marked by further financial fragmentation and consolidation of bank balance sheets within national borders. The *weak policies* scenario would result in stronger outflows from the periphery and net outflows from the euro area as investors seek to evade the impact of a potential breakup of the euro area. Roll-offs by foreign investors would climb, the pace of overall outflows would rise further still, and the euro would likely come under substantial depreciation pressure. Under the *complete policies* scenario, confidence returns and foreign investors increase their share of outstanding debt.

Even though the yields on German bunds have declined as bond investors demand liquidity and safety, credit default spreads remain non-negligible in part because of concerns about contingent liabilities. In an environment of great sovereign stress, political risks come into play. For market participants, concerns about the political hurdles to financial and fiscal adjustments are the background against which indications of discord or policy confusion could lead to another round of spread widening.

In contrast, with confidence restored under the *complete policies* scenario, capital flight stops and

[13]TARGET2, the main payment system within the European Monetary Union (EMU), works through the individual national central banks (NCBs) of each of the euro area countries. The settlement of cross-border payment flows between euro area countries in TARGET2 results in claims and liabilities for each NCB. For example, when a Spanish importer pays for goods bought from a German exporter, the transaction normally results in a debit from the reserves of a Spanish commercial bank with the Bank of Spain, and a credit to the reserves of a German commercial bank with the Bundesbank. Correspondingly, the Bank of Spain's TARGET2 account is debited, resulting in a liability to the ECB, and the Bundesbank's account is credited, producing a claim against the ECB. TARGET2 is a closed system in which balances are generally equivalent to the transfer of foreign reserves in a fixed exchange rate system—except in this case the "reserves" transferred are euros created by the NCBs.

reverses, and the euro area reintegrates as the interest rate spread between the periphery and the core normalizes and growth prospects strengthen.

The United States: Stability or Complacency?

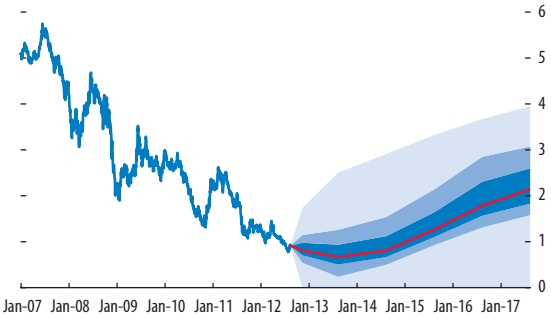
Safe-haven flows, central bank bond purchases, and balance sheet de-risking have contributed to a substantial compression of credit risk premiums and longer-term bond yields. Fiscal imbalances are largely medium-term challenges, but the suppression of credit risks is unlikely to persist. A disorderly or rapid rise of credit risks could present financial stability risks to the United States and the global financial system. These risks are largely asymmetric, or "one way," because yields near record lows are likely to adjust only upward in the years ahead. This suggests that there is little room for policy complacency: The key lesson of the euro area and U.S. subprime crises is that waiting for market signals will lead to harsher economic outcomes with unintended financial risks.

Near- and medium-term policy challenges are generally well acknowledged.

The uncertain path of fiscal adjustment is both a near- and medium-term risk—an excessively sharp fiscal contraction owing to "fiscal cliff" effects, and financial risk from the breach of the debt ceiling, looms in the near term, and insufficient fiscal adjustment remains a medium-term risk. Simply put, fiscal adjustment may go too far in the near term and not far enough in the medium term. The required balancing act is a difficult one: A measured pace of deficit reduction is needed, given the persistent weakness in economic activity; yet the near-term adoption of a credible fiscal consolidation framework is crucial for stable medium-term growth.

At the same time, the U.S. authorities are implementing a financial reform program in line with the Dodd-Frank Act and the international regulatory agenda. The aim is to ensure the benefits of deep and liquid capital markets while increasing the system's resilience. The challenge is to transition in an orderly manner as financial markets undergo reform, market structures change (including over-the-counter markets), and financial intermediaries adjust business models to account for the decline in leverage and potential trading revenues (Box 2.5).

Figure 2.27. U.S. Five-Year Swap Rate and Implied Probability Distribution
(In percent)



Sources: Bloomberg L.P.; and IMF staff estimates.
Note: Dark, medium, and light blue shaded areas correspond to the 50, 75, and 100 percent confidence intervals, respectively, as defined by risk-neutral option-implied probabilities.

There is little room for complacency in tackling these policy issues, even if markets do not signal concern. The focus should be on proactive policies to avoid near-term risks, address medium-term sustainability, and forestall the buildup of vulnerabilities. A key lesson of the euro area crisis, or indeed the U.S. subprime crisis, is that waiting for market signals will lead to harsher economic outcomes, with unintended financial risks.

Yields are at historic lows while liquidity and risk premiums appear to be suppressed.

By all accounts, U.S. interest rates are low. Long-term nominal interest rates are the lowest since the 1950s and real yields on inflation-indexed government securities are negative over staggeringly long horizons. The five-year swap rate starting five years from now—a proxy for medium-term interest-rate expectations void of shorter-term cyclical factors—is only 2.8 percent. Markets also see little chance of a substantive increase in future interest rates (Figure 2.27). To put this in perspective, it took Japan 10 years after the peak of its asset boom to see a similar level of medium-term rate expectations.

As was the case in Japan, various metrics suggest that U.S. bond yields are too low. For instance,

Box 2.5. Key Challenges for the Dealer Operations of U.S. Banks

The global financial crisis produced a radical transformation of the trading and investment banking operations of financial institutions in the United States. The significant industry consolidation that followed has resulted in the five largest players now being part of bank holding companies (BHCs), which are part of the regulated banking system. Although the difficulties related to high leverage and wholesale funding have abated somewhat for the dealer banking operations of these five BHCs, they face many other challenges, including reduced profitability because of regulatory changes. These factors raise fundamental questions about the future direction of the industry.

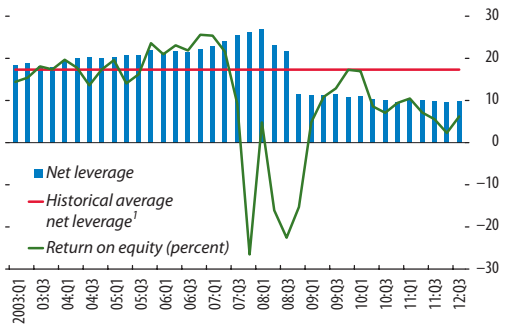
The dealer operations of five major U.S. BHCs dominate both the U.S. and global capital markets.[1] Their combined assets account for 64 percent of all commercial banking assets in the United States; they command more than 50 percent of global revenue in fixed income and equity trading; and they account for 48 percent of the global revenue in investment banking. The dealer banking operations of these five BHCs are particularly important in the U.S. derivatives markets, where they hold 96 percent of outstanding derivatives contracts.

Leverage levels have declined markedly, and dealer operations remain in a state of transition, as firms continue to try to improve their returns by reshaping their business models. Net leverage ratios for the two BHCs with a higher share of earnings derived from dealer activities (Goldman Sachs and Morgan Stanley) continue to remain well below the historical average of 18, meaning that they are no longer able to use high leverage to drive returns. Overall, the drop in leverage reduced the average return on equity of the five BHCs to 6 percent in 2011—below their cost of equity—from more than 20 percent in years preceding the crisis (Figure 2.5.1).

Note: Prepared by Stephen Smith.

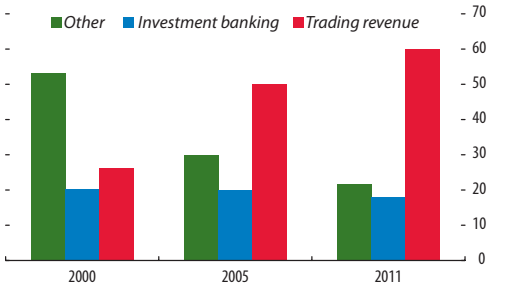
[1]The five (in order of BHC asset size as of June 30) are JPMorgan Chase, Bank of America, Citigroup, Goldman Sachs, and Morgan Stanley. The Federal Reserve (which regulates and supervises BHCs) defines a BHC as "a company that owns and/or controls one or more U.S. banks or one that owns, or has controlling interest in, one or more banks" (Federal Reserve System, National Information Center, www.ffiec.gov/nicpubweb/Content/HELP/Institution%20Type%20Description.htm).

Figure 2.5.1. Leverage Levels of U.S. Dealer-Banks



Source: Company reports.
[1]For the period shown.

Figure 2.5.2. Growth in Trading Revenue at U.S. Dealer-Banks
(In percent)



Source: Company reports.

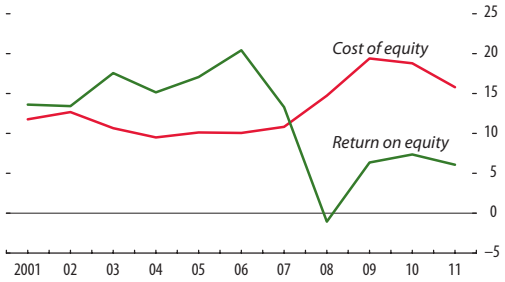
Business models for the five BHCs with the largest dealer operations have evolved significantly over the past several years, with trading operations now the greatest factor in revenues. The share of trading revenues grew from about 26 percent of total capital market revenue in 2000 to more than 60 percent at the end of 2011. The components of trading income have also shifted dramatically (Figure 2.5.2).[2]

Regulatory changes are expected to reduce operating margins, financial leverage, and asset turnover,

[2]This includes the growing weight of fixed income, currencies, and commodities trading as a component of revenue, especially the higher-margin derivatives activities. The structure of equity trading revenue has also changed, away from commissions toward higher-risk client execution and equity derivatives trading.

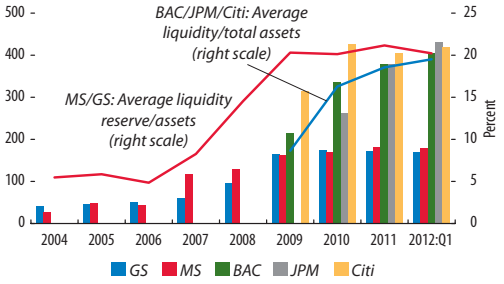
Box 2.5 *(continued)*

Figure 2.5.3. Return on Equity versus Cost of Equity for All U.S. Dealer-Banks
(In percent)



Sources: Bloomberg L.P.; and SNL Financial.

Figure 2.5.4. Excess Liquidity Levels at the Largest U.S. Dealer-Banks
(In billions of U.S. dollars)



Source: Company reports.
Note: BAC = Bank of America; Citi = Citigroup; GS = Goldman Sachs; JPM = JPMorgan Chase; MS = Morgan Stanley.

all of which will mean lower profitability. The wide-ranging remit of the Dodd-Frank Act is expected to reduce margins on over-the-counter derivatives as these products move onto central counterparty clearing platforms, thereby increasing transparency; and the part of the act called the Volcker rule (still to be finalized) would eliminate proprietary trading. The enhanced liquidity and capital requirements of Basel III will also be a drag on earnings by reducing leverage and asset turnover. Taken together, these factors spell an end to the era in which U.S. dealer banks earned in excess of 20 percent on equity. Figure 2.5.3 illustrates the significant challenges faced by the dealer bank business model, as BHCs on average continue to generate returns significantly below the cost of equity.

Despite structural improvements in liquidity and funding profiles, the dealer bank funding model remains a concern, especially given recent market stresses. Since the crisis, the major dealer BHCs have significantly reduced their reliance on short-term wholesale funding and have virtually eliminated their reliance on commercial paper. Goldman Sachs and Morgan Stanley have also made deposits a more meaningful part of their funding mix and have worked to build liquidity reserves.[3] Figure 2.5.4 shows that in the two BHCs that focus on dealer activities, average excess liquidity as a share of assets has increased from less than 5 percent in 2004 to 20 percent as of the first quarter of 2012. Although these measures have helped to reduce the potential impact of a liquidity and funding shock, the cost of carrying this portfolio of liquid assets is a significant drag on earnings.

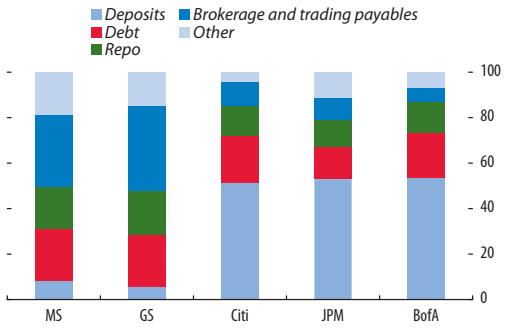
At the end of fiscal year 2011, deposits accounted for an average of 53 percent of balance sheet liabilities for the three BHCs that are universal banks with large retail and commercial banking operations (JPMorgan Chase, Bank of America, and Citigroup) but averaged only 8 percent for the more narrowly focused dealers Goldman Sachs and Morgan Stanley (Figure 2.5.5). With their lower level of deposits, Goldman Sachs and Morgan Stanley relied more on collateralized funding, mainly through reverse repo transactions (about 17 percent of liabilities), than did the other three BHCs, where such funding was at 11 percent of liabilities. A lower share of deposits in total funding tends to increase funding risks during periods of market instability, given the higher reliance on confidence-sensitive wholesale funding.

What do all these structural changes mean for the industry and what will the future landscape look like? Although BHCs have improved their leverage, liquidity, and capital levels, the dealer operations of large BHCs remain vulnerable to the confidence-sensitive nature of customers, continue to rely on

[3]Liquidity reserves carry different titles depending on the entity; however, they generally consist of pools of unencumbered, highly liquid securities and cash designed to meet cash outflows and collateral requirements in the event that the firm loses access to funding markets.

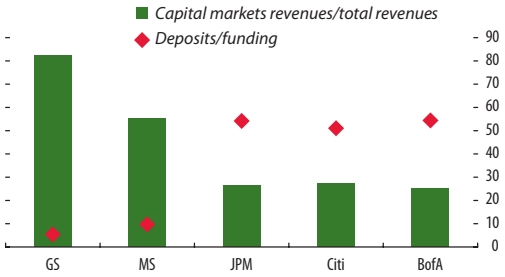
Box 2.5 *(continued)*

Figure 2.5.5. U.S. Bank Holding Companies' Balance Sheet Liabilities at End-2011
(In percent)



Source: SNL Financial.
Note: BHCs = bank holding companies. BofA = Bank of America; Citi = Citigroup; GS = Goldman Sachs; JPM = JPMorgan Chase; MS = Morgan Stanley.

Figure 2.5.6. Reliance of U.S. Dealer-Banks on Capital Markets Revenue and Wholesale Funding
(In percent)



Sources: Company reports; and IMF staff estimates.
Note: BHCs = bank holding companies. BofA = Bank of America; Citi = Citigroup; GS = Goldman Sachs; JPM = JPMorgan Chase; MS = Morgan Stanley.

wholesale funding, and face an earnings outlook weakened by regulatory changes (Figure 2.5.6). All of these factors combined raise existential questions about future business models, especially for the BHCs that rely more on earnings from dealer activities and lack the earnings or funding diversification of the universal banks.

This could potentially lead to the breakup of BHCs as they seek to escape aspects of regulatory oversight. Although recent regulatory changes are designed to improve the stability and oversight of capital markets, regulators must remain cognizant of potential unintended consequences of rule making, especially as the BHCs may push their dealer operations toward heightened risk taking to improve returns.

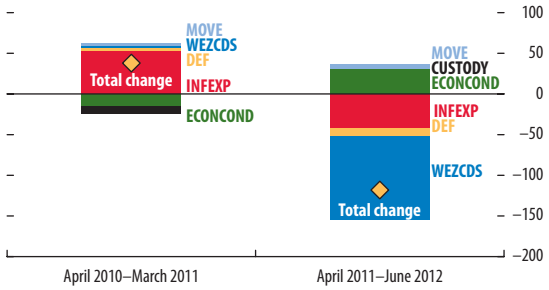
econometric models show that 10-year Treasury yields are well below where they should be based on medium-term fundamentals.[14] Why?

- *Global safe-haven flows.* The market for U.S. Treasury securities—one of the deepest, most liquid global debt markets—has benefited from safe-haven inflows. Some of the deviation between fair value and actual yields is the result of these flight-to-safety flows. To measure that influence, we incorporated euro area spreads on credit default swaps (CDS) into our core fair value model as a proxy for recent risk aversion and found that global strains account for a substantial amount of yield compression (Figure 2.28). There have also been spillovers to corporate credit markets. Corporate borrowing costs have declined alongside portfolio shifts favoring debt over equities, which has been accommodated by a surge in corporate issuance (see Chapter 1).
- *Domestic balance sheet repair and deleveraging is raising demand for Treasuries.* Internal deleveraging pressures, as households de-risk and repair their balance sheets, have boosted the demand for Treasury bonds, contributing to downward pressure on longer-term interest rates. The U.S. private sector is running a large financial surplus, and the experience of past boom-bust asset cycles suggests this will be lasting (Figure 2.29). The free-cash flow is being allocated to

[14]Our fair value model uses monthly data to assess the current level of 10-year U.S. Treasury yields according to the following specification: $ust10yr_t = \beta_1 + \beta_2 E_t[y_{t+h}] + \beta_3 E_t[\pi_{t+h}] + \beta_4 b_t + \beta_5 cus_t + \beta_6 ez_t + \beta_7 unc_t + e_t$, where $ust10yr_t$ is the 10-year U.S. Treasury yield; $E_t[y_{t+h}]$ expected growth h periods ahead; $E_t[\pi_{t+h}]$ expected inflation h periods ahead; b_t the overall government balance; cus_t foreign central bank custody holdings; ez_t a proxy for euro area stress; and unc_t general economic uncertainty.

Figure 2.28. Contributions to Change in Fitted 10-Year Nominal Treasury Yield

(In basis points)

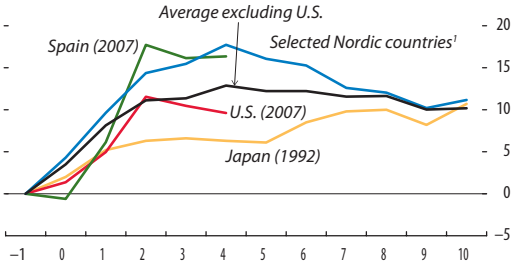


Sources: Bloomberg L.P.; Haver Analytics; national government sources; and IMF staff estimates.

Note: Contributions to the fitted yield from changes in: a GDP-weighted euro area sovereign credit default swap index (WEZCDS); custody holdings of U.S. Treasuries (CUSTODY); inflation expectations (INFEXP); budget deficit (DEF); expected business conditions (ECONCOND); and implied volatility on U.S. Treasuries (MOVE).

Figure 2.29. Private Sector Financial Balance Relative to Year before Outbreak of Financial Crisis, Selected Advanced Economies

(In percent of GDP)



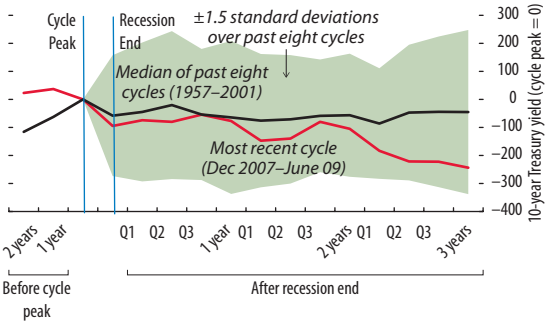
Sources: IMF, International Financial Statistics database; and IMF staff estimates.

Note: Financial balance is net saving for the business and household sectors. Year in parentheses is the first year of the selected financial crisis (year 0).

[1]Finland (1991), Norway (1987), and Sweden (1991).

Figure 2.30. Change in 10-Year U.S. Treasury Yield in Recent Business Cycles

(In basis points relative to cycle peak)



Sources: Haver Analytics; and IMF staff estimates.

lower-risk securities, like government bonds. Table 2.5 shows that the combination of flows and portfolio adjustments has resulted in a major reallocation of funds to government bonds by all major sectors, especially households, over the past three years.

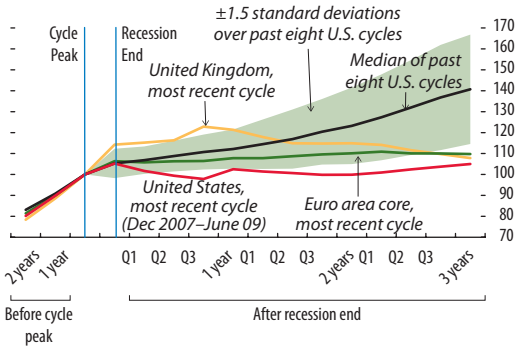
- *Monetary policy easing has sought to counter a tepid recovery.* One of the objectives of monetary policy has been to reduce risk-free rates in order to indirectly generate a rebalancing of portfolios toward risk assets. These actions have largely been effective in reducing the term premium on Treasury yields. Indeed, despite a lower starting point, the decline in longer-term bond yields has been even greater than in prior business cycles (Figure 2.30). However, the credit transmission mechanism has been weaker than the norms for the past eight cycles (Figure 2.31), as more tentative lending

Table 2.5. Holdings of Treasury Securities, by Sector

	2008:Q4 (billions of U.S. dollars)	2012:Q1 (billions of U.S. dollars)	Change (percent)	Current Holdings to Assets (percent)
Households	257	1,308	410	2
Mutual funds	796	916	15	8
Foreign institutions	3,253	4,761	46	26
Commercial banks and brokerages	257	410	60	3
Private pension funds	185	448	142	7
Insurance companies	171	254	48	4
Federal Reserve	476	1,661	249	58
Total stock of Treasuries	6,338	10,827	71	
Global foreign exchange reserves	7,414	10,889	47	

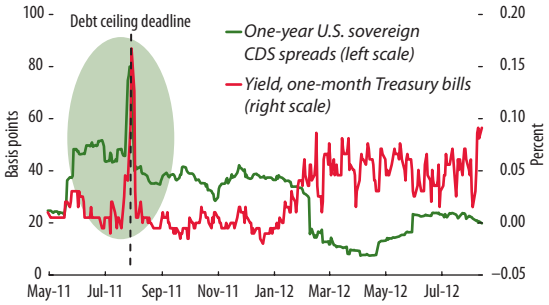
Sources: Federal Reserve; and IMF staff estimates.

Figure 2.31. Bank Credit in Past and Current Credit Cycles
(Cycle peak = 100)



Sources: Haver Analytics; and IMF staff estimates.
Note: Core = Austria, Belgium, Finland, France, Germany, and the Netherlands.

Figure 2.32. Market Reaction: Heightened Uncertainty and Policy



Sources: Bloomberg L.P.; and IMF staff estimates.
Note: CDS = credit default swap.

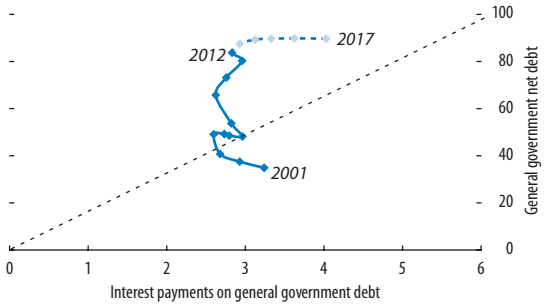
conditions and rigidities in the mortgage market have stymied credit growth.[15]

Low rates and suppressed risk premiums could lull markets and policymakers into complacency, leading to a buildup of stability risks.

Although perceptions could change, market pricing currently suggests that the U.S. government will overcome political differences and implement convincing policies on a timely basis. The risk is that the political process will become drawn out into a costly delay of policy action. As noted in Box

[15]Compared to a smaller sample, domestic credit in the United States has held up better relative to the credit contraction during the early1990s recession. See the October 2012 *World Economic Outlook*.

Figure 2.33. U.S. Government Debt and Interest Payments
(Percent of fiscal year GDP)



Source: IMF, *World Economic Outlook*, October 2012.
Note: Dashed line represents projections for 2012–17.

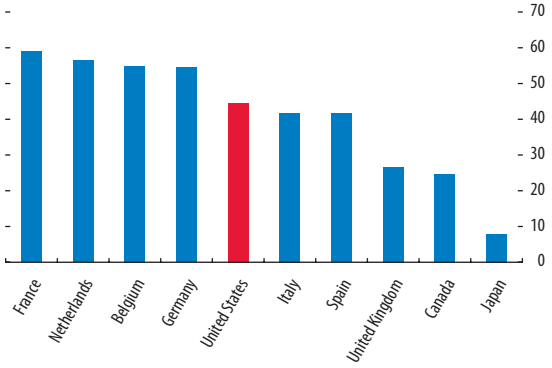
1.1 and Figure 2.32, short-term credit default swap spreads, volatility markets, and other sovereign-risk implied market indicators are not signaling much concern about fiscal cliff or debt ceiling risks. This could give rise to a repeat of market instability, such as that seen during the political brinksmanship over raising the U.S. debt ceiling in August 2011.

Low rates can also delay action on needed medium-term debt consolidation plans. Figure 2.33 shows that despite the sharp run-up in U.S. public debt in 2009–12 (solid line) with the crisis, debt servicing costs have not risen as a share of expenditures. But as interest rates normalize over the medium term (dashed line), debt servicing costs should begin to rise appreciably along with the burden of servicing a much higher stock of debt. The message is clear: Policymakers cannot rely on low rates indefinitely.

Lack of progress on a credible fiscal consolidation plan risks triggering additional sovereign credit rating downgrades. Multinotch downgrades or downgrades by more than one agency could, in turn, prompt changes in asset manager benchmarks and lead to reduced demand for dollar assets, increased term premiums, lower liquidity, impaired markets for repurchase agreements, and potentially some erosion of the dollar's reserve currency status.

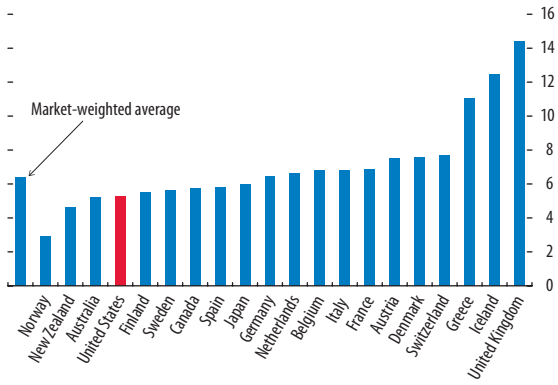
To gauge the impact of an erosion in reserve currency status, we simulated a portfolio rebalancing in which central bank reserve managers reduce their current holdings of U.S. Treasuries by 5 percentage points, from 62 percent of global (allocated) foreign exchange reserves to 57 percent. This would push 10-year Treasury yields nearly 50 basis points higher.

Figure 2.34. Foreign Investors' Share of Outstanding Sovereign Debt, as of End-2011
(Percent)



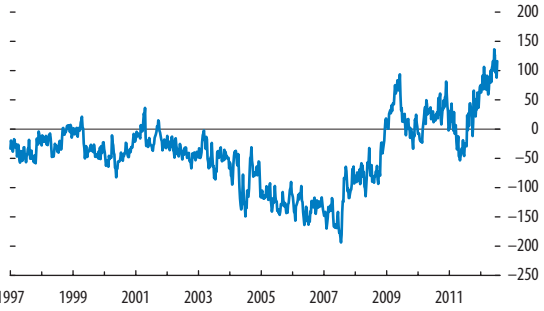
Sources: National government sources; and IMF staff estimates.
Note: U.S. data exclude municipal bonds.

Figure 2.35. Rollover Risk: Weighted Average Maturity of Sovereign Bonds
(In years)



Sources: Bloomberg L.P.; and IMF staff estimates.

Figure 2.36. Primary Dealers' Positioning in U.S. Treasury Securities
(In billions of U.S. dollars)



Sources: Bloomberg L.P.; Federal Reserve; and IMF staff estimates.

More generally, high public debt, large external exposure, a short debt maturity profile, and extended investor positioning would combine to increase the vulnerability to, and transmission of, a rise in rates (Figures 2.34, 2.35, and 2.36).

If the demand for U.S. corporate bonds dries up, the market's capacity for adjustment could be tested. Box 2.6 highlights the underlying liquidity conditions in U.S. corporate bond markets, which have weakened owing to changes in market structure and reduced warehousing by dealer banks. In an adverse credit cycle, illiquidity would likely compound the effects of higher funding costs, reducing credit intermediation and tightening financial conditions more than would otherwise be the case.

Low rates may be masking the vulnerabilities being built up by excessive risk taking in the more lightly regulated nonbanking financial sectors. While activity in the overall shadow banking system remains depressed, that is not the case in all segments. An example is the rapid expansion in specialized vehicles for secondary mortgage securities—real estate investment trusts (REITs). REITs have nearly doubled their assets (to nearly $500 billion) since 2010, in part because of the extended decline in bond yields, slower mortgage prepayment speeds, and reduced competition from banks and the government-sponsored enterprises Fannie Mae and Freddie Mac. An increase in bond yields or volatility poses a threat to the thin layer of equity capital supporting the assets of these specialized vehicles, given their substantial deployment of leverage.

Policymakers need to avoid the pitfalls of complacency and tackle the challenges ahead to preserve growth and financial resiliency.

Vulnerabilities are unlikely to be realized in the near term. Policymakers have the opportunity to evaluate strategic policy options that preempt negative market developments, rather than just reacting to them. The three key lines of policy action are correcting macro-fiscal imbalances, accelerating private sector deleveraging, and monitoring nonbank institutions as banks adjust business models to a lower risk profile.

Box 2.6. How Impaired Is Liquidity in the U.S. Corporate Bond Trading Market?

Liquidity in the secondary market for U.S. corporate bonds fell sharply at the start of the global financial crisis and never fully recovered. This box discusses the main factors for the decline and their implications. A shortage of liquidity may limit market participation while imposing higher funding costs on issuers, which could constrain still-weak credit channels.

Market liquidity—the ability to trade an asset without causing a large movement in its price—is critical. Without sufficient market liquidity, market participants face "gapping risk" (the possibility of a large drop in price from one trade to the next), reduced price discovery, information asymmetry, and market fragmentation, while issuers face higher funding costs.

Most measures show that liquidity in the U.S. corporate bond market has declined since the start of the global financial crisis and has not returned to precrisis levels (Table 2.6.1). For instance, the ratio of trading volume ($17 billion) to the value of outstanding corporate bonds ($5 trillion) is just 0.33 percent, one of the lowest ratios among key U.S. assets, and lower than it was before the crisis. Other liquidity measures have also deteriorated relative to precrisis levels: Market turnover ratios have declined and bid-ask spreads are generally wider, especially on larger-size trades and off-the-run issues. The distribution of liquidity has also grown more top-heavy, with trading activity more concentrated in a smaller number of issuers.[1]

Thus far, however, there is no evidence that reduced liquidity has increased corporate borrowing costs or hindered the ability to issue. On the contrary, investor inflows to corporate bond mutual funds have accelerated, costs have fallen, and corporate issuance has risen (Figures 2.6.1, 2.6.2, and 2.6.3). In part, this reflects currently favorable dynamics—excess liquidity, lack of alternative risk assets, and strong corporate fundamentals. However, an adverse credit cycle would likely intensify liquidity pressures and compound the negative effects on corporate borrowing costs and credit growth.

The market structure is prone to liquidity shocks owing to certain characteristics. The corporate bond

Note: Prepared by Martin Edmonds, Sanjay Hazarika, and Rebecca McCaughrin.

[1]About 40 issuers account for roughly half of trading volumes on investment-grade corporate bonds.

Table 2.6.1. Corporate Bond Market Liquidity Measures

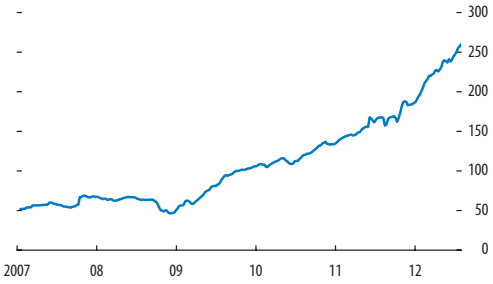
	Precrisis	Crisis Period	Latest Month	Percent Change: Latest Month vs. Precrisis	
	(Daily/monthly averages over period)				
Investment grade					
Number of trades	2,879	2,765	4,100	42%	↑
Daily trading volume (billions of U.S. dollars)	8.8	9.3	11.8	34%	↑
Trading volumes (percent of market)	0.9	0.2	0.3	–67%	↓
Turnover	3.5	0.5	2.7	–24%	↓
Bid-ask spreads (basis points)	5.5	23.5	12.0	118%	↓
LCS (percent)	0.8	2.4	1.2	58%	↓
Financials - LCS (percent)	0.8	2.9	1.1	37%	↓
Nonfinancials - LCS (percent)	0.8	2.4	1.3	61%	↓
High yield					
Number of trades	1,421	1,012	1,292	–9%	↓
Daily trading volume (billions of U.S. dollars)	4.8	4.3	5.2	8%	↑
Trading volumes (percent of market)	0.9	0.4	0.6	–33%	↓
LCS (percent)	1.6	6.3	1.8	8%	↓
Miscellaneous					
Investment-grade Sharpe ratio	2.0	0.1	8.1	314%	↑
High-yield Sharpe ratio	4.3	(0.3)	15.5	257%	↑
Primary dealer corporate bond inventory (billions of U.S. dollars)	278.0	100.0	66.0	–76%	↓
Primary dealer corporate bond inventory (percent of market)	6.0	2.7	0.9	–84%	↓

Sources: Barclays; Bloomberg L.P.; Federal Reserve; JPMorgan Chase; Securities Industry and Financial Markets Association; and IMF staff estimates.

Note: LCS = liquidity cost score, which is akin to a bid-ask spread, and effectively represents the roundtrip cost of trading a bond divided by the bond's duration. The precrisis period covers January 1, 2005 to September 14, 2008; the crisis period covers September 15, 2008 to May 31, 2009; latest month reflects July or August. Red downward arrows indicate weaker liquidity compared to the precrisis period; green upward arrows connote stronger liquidity.

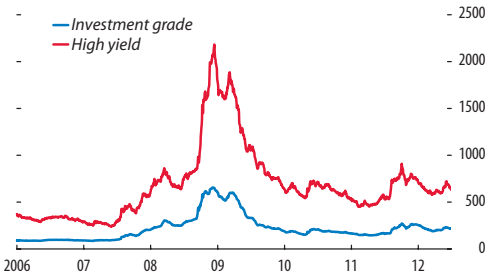
Box 2.6 *(continued)*

Figure 2.6.1. Assets under Management of U.S. Corporate Bond Funds
(In billions of U.S. dollars)



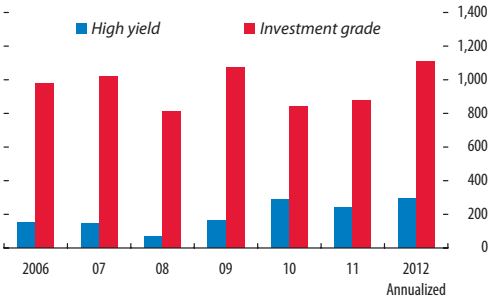
Sources: EPFR Global; and IMF staff estimates.

Figure 2.6.2. U.S. Corporate Bond Spreads
(In basis points)



Source: Bank of America Merrill Lynch.
Note: Spread of yield over U.S. government securities of comparable maturity.

Figure 2.6.3. U.S. Gross Corporate Bond Issuance
(In billions of U.S. dollars)



Sources: Bloomberg L.P.; and IMF staff estimates.

market has traditionally suffered from lower liquidity relative to other asset markets (Table 2.6.2), making it more prone to liquidity shocks. This weakness is due in part to a relatively archaic market microstructure: Because of the large number of outstanding corporate bond issues (as of end-2011 there were more than 40,000 issues versus just 300 in the U.S. Treasury market), corporate bond trading is a quote-driven market, with prices on platforms such as Bloomberg functioning as indicative—rather than executable—prices. Most large transactions are still conducted by phone to preserve anonymity for both dealer and investor and improve execution by the dealer.

The decline in liquidity in the secondary corporate bond market is due to a combination of cyclical and secular forces. Three are most notable:

1. *Changes in dealer-banks' business models and greater global uncertainty*. Structural changes affecting dealer-banks' business models (see Box 2.5) and a compression in balance sheets have reduced the willingness of dealer banks to undertake the risk of warehousing a large amount of bonds. As such, balances at primary dealers (original issues bought for resale) have not kept pace with growth in the corporate bond market (Figure 2.6.4). Preventive actions on the part of market-makers in anticipation of regulatory developments may have reinforced the trend, though such changes do not appear to have been the main driver.[2] The decline in dealer inventories started well before the Dodd-Frank Act and Basel III were fully fleshed out.
2. *Trading has shifted to exchange-traded funds (ETFs), corporate derivatives, and other alternatives to trading corporate bonds directly (the cash market)*. Both bond ETFs and corporate credit default swap products have grown in importance, with market capitalizations rising steadily and the

[2]The Volcker rule in the Dodd-Frank Act bans proprietary trading in corporate bonds, equities, and derivative securities tied to interest rates, credit, foreign exchange, equities, and commodities; and it prevents traders from "engaging as principal for the trading account of the covered banking entity in any purchase or sale of one or more covered financial positions" unless such trades involve genuine market-making, risk mitigation, or hedging. Basel III will potentially increase some risk-weights on risk assets used to determine how much capital banks need to set aside to backstop their asset portfolios.

Box 2.6 *(continued)*

Table 2.6.2. U.S. Asset Class Liquidity Comparators

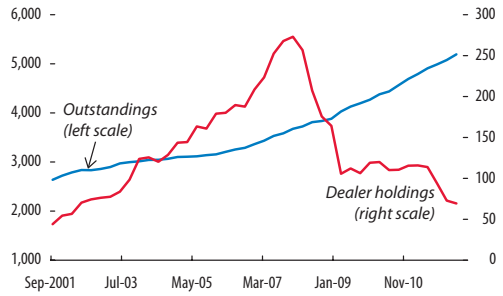
	Number of CUSIPs	Total Outstanding (trillions of U.S. dollars)	Average Daily Trading Volume (billions of U.S. dollars)	Ratio of Trading Volume to Outstanding (percent)	Annual Turnover Ratio (times)
Agency debt	12,000	2.7	72	2.67	6.6
Agency MBS	50,000	6.9	321	4.65	11.8
Firms	40,000	4.7	17	0.33	0.5
Equities	5,000	23.3	114	0.49	1.2
Municipalities	15,000	3.8	13	0.34	0.9
Treasuries	300	9.4	528	5.62	14.2

Sources: Barclays; Bloomberg L.P.; Federal Reserve; Oliver Wyman; and Securities Industry and Financial Markets Association.

Note: MBS = mortgage-backed securities.

Figure 2.6.4. Primary Dealer Balances and Outstanding Stock of Corporate Bonds

(In billions of U.S. dollars)



Source: Federal Reserve; and IMF staff estimates.

investor base broadening, especially relative to the high-yield corporate cash bond market.

3. *Changes in the investor base are also affecting trading conditions.* Traditional buy-side institutions, including pension funds, insurance companies, and asset managers, have not only expanded their market share, they have also increased the holding time of risk assets, owing to the lack of yield and the dearth of alternative credit instruments.

In response to reduced liquidity, a new model is beginning to emerge—one that emphasizes an agent-dominant system and direct matching of buy orders to sell orders. Some dealer banks are seeking to reinvent themselves as agents in such a system, that is, acting as brokers instead of taking positions. In addition, specialized credit-focused broker-dealers have increased their market share. Some investors have also emerged as agents using their own portfolios to match buyers and sellers.

Trading volumes on these alternative platforms have risen, but overall amounts that can be executed are still minute. Some of these platforms cannot accommodate large trades, and some investors are reluctant to trade in large volume, given the lack of anonymity in such trades.[3] Moreover, most alternative trading platforms are active only in trading investment-grade bonds, so they would do little to alleviate illiquidity in the high-yield market. Another constraining factor is the lack of so-called bundling opportunities sometimes offered by dealer banks (wherein trade executions are made contingent on inclusion of other core banking products). The inability to bundle could reduce participation in the market.

A return to the prior structure seems unlikely given changes in bank business incentives. Nor is sustaining the conventional trading structure necessarily desirable, as it suffers from fragmented liquidity and an inefficient network of dealer-banks and interdealer brokers. As the agent-dominated market becomes more standardized and electronic trading evolves, liquidity pools may consolidate, and the cost of liquidity and market risk should shift further to sectors in which failures have more limited implications for taxpayers. However, in the interim, funding rates may rise for high-yield or smaller issuers, as market makers will likely be willing to provide liquidity to only the largest, most liquid issuers. Higher funding costs, in turn, would reduce the supply of lending and tighten credit conditions.

[3]Average daily trade volumes executed on the electronic trading platform, MarketAxess, are around $2.5 billion, whereas the average for individual broker-dealer and buy-side electronic platforms—most of which are in trial phase—are no larger than about $200 million. In contrast, the average daily trading volume for the corporate cash bond market as a whole is $17 billion.

First, while fiscal policy can still counter a slowdown in economic growth, debt levels are elevated and the monetary policy transmission mechanism remains clogged. The main challenge is to use the limited policy space available effectively to support the recovery in the near term, taking a balanced approach to medium-term fiscal consolidation and completing financial sector reforms. As highlighted in the October 2012 *Fiscal Monitor*, fiscal authorities need to clarify future objectives and actions and obtain requisite political backing for medium-term adjustment.

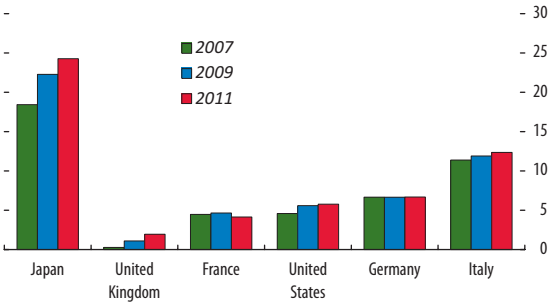
Second, the efficacy of monetary and financial policies can be improved. The Federal Reserve's latest monetary policy decision—to extend its forward rate guidance and commit to purchase agency mortgage-backed securities (MBS) until it sees a substantial improvement in the labor market—reinforces its intention to provide highly accommodative monetary policy for a considerable period. However, additional measures may be needed to unclog the transmission mechanism and accelerate balance sheet repair, particularly in the mortgage market. Aiming policy action at the cohort in which deleveraging is progressing most slowly could speed the cycle. The effectiveness of purchasing MBS and of other forms of credit easing would be enhanced if policymakers were successful in facilitating housing market adjustment, including expanding access to mortgage refinancing and encouraging mortgage write-downs.

Third, market surveillance is all the more important, given the plethora of regulations being implemented. The direct effects of changes in the business models of dealer-banks are risk reducing. But the indirect effects could be quite relevant for future risks in the nonbank financial sector, where regulations are less onerous. The effects on financial market liquidity and the transfer of risk to nonbank entities deserve careful consideration (see Chapters 3 and 4).

Japan: How Safe a Safe Haven?

Japan has been a beneficiary of safe-haven inflows from Europe and elsewhere, with yields on Japanese government bonds (JGBs) reaching record lows. However, the problems of high sovereign debt and a concentration of government bond risk in the banking system are as characteristic of Japan as they are of euro area sovereigns currently under market pressure. Moreover,

Figure 2.37. Bank Holdings of Government Debt in Selected Advanced Economies
(In percent of bank assets)



Source: IMF, International Financial Statistics database.
Note: Includes all claims of domestic institutions (excluding the central bank) on general government. U.K. figures are for claims on the public sector.

the concentration of bond risk within the banking system is expected to increase over the medium term, particularly for smaller, regional banks. To address these concerns, Japan needs a comprehensive strategy to rein in fiscal imbalances and reduce the risk that the bond market will destabilize the domestic banking system.

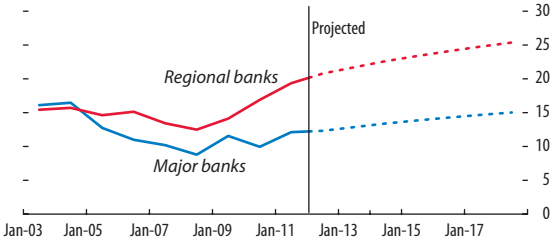
The sovereign-banking nexus has been a reality in Japan for some time.

In Japan, medium-term fiscal risks are evident, but the sovereign continues to enjoy market confidence, as reflected in low sovereign CDS spreads and low yields on JGBs. Bond investors note that Japan enjoys several advantages generally not available to euro area sovereigns under stress. It has room to raise taxes,[16] it has a stable domestic investor base that effectively channels private savings to the sovereign, and it issues all of its debt in a currency that it controls. JGB yields are now about 100 basis points below fair value estimates—largely because of strong support from domestic banks, which, in part because of weak loan demand, have shifted their portfolios away from loans and toward government bonds. Government debt holdings now make up 24 percent of the assets of Japanese depository institutions, a very high level for a major advanced economy (Figure 2.37).

Recently conducted stress tests indicate that, at current levels of exposure, Japan's financial system would

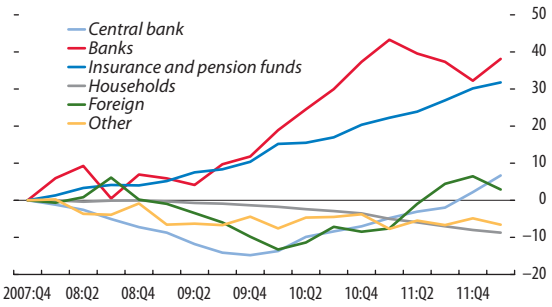
[16]In August the Diet passed a bill to double the effective consumption tax rate, from 5 to 10 percent, by 2015.

Figure 2.38. Sensitivity of Japanese Banks to a 100 Basis Point Interest Rate Shock
(Losses as a percent of Tier 1 capital)



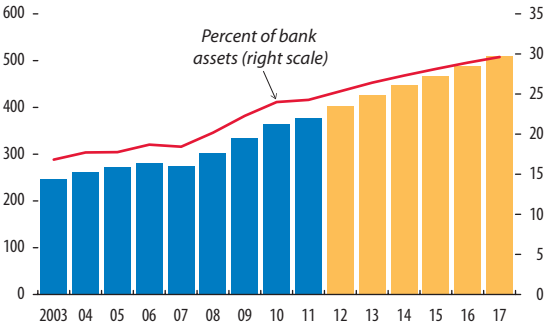
Sources: Bank of Japan; and IMF staff estimates.
Note: Mark-to-market losses in bond holdings due to a 100 basis point parallel rise in material yields. Projections for 2012–17 assume that banks cover the same share of government funding as in 2008–11, keep the duration of their bond holdings constant, and bank assets and Tier I capital grow in line with nominal GDP.

Figure 2.39. Cumulative Purchases of Japanese Government Bonds since 2007
(In trillions of yen)



Source: Bank of Japan, flow of funds accounts.

Figure 2.40. Japanese Bank Holdings of Government Debt to 2017 under Current Trend
(In trillions of yen, left scale)



Sources: IMF, International Financial Statistics and World Economic Outlook databases; and IMF staff estimates.
Note: Calculation of projected holdings (yellow bars) assumes that banks cover the same share of government funding as in 2008–11 and that bank assets grow with nominal GDP.

be resilient to severe economic distress and moderate market shocks.[17] According to estimates by the Bank of Japan (BOJ), a 100 basis point increase in interest rates across the yield curve would lead to mark-to-market losses of 20 percent of Tier 1 capital for regional banks, and of 10 percent for the major banks (Figure 2.38). Several regional banks are afflicted by low core profitability, relatively thin capital positions, and large duration gaps, making them particularly vulnerable to slow growth and market yield shocks. The vulnerability is especially pronounced in the case of small regional banks, which make up 6 percent of the Japanese banking sector, while large regional banks account for 23 percent of the sector.

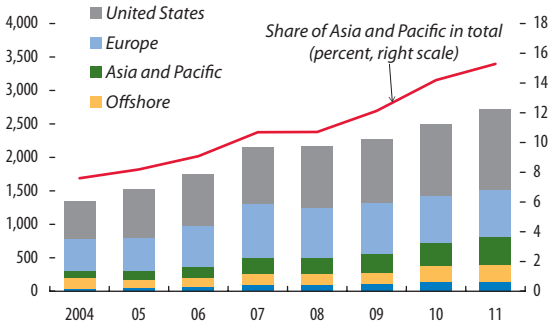
Risks to financial stability from bank holdings of sovereign bonds are expected to rise.

In the postcrisis period, domestic banks have become the dominant buyers of Japanese government debt, as some traditional investors have begun to divest JGB holdings (Figure 2.39). With this trend expected to continue, the IMF staff estimates that domestic banks will raise their holdings of government debt from 24 percent of assets in 2011 to 30 percent by 2017 (Figure 2.40).[18] The increase in exposure to government bonds would make bank capital even more susceptible to a major interest rate shock in the future, particularly in the case of regional banks. A 100 basis point shock in 2017 would result in mark-to-market losses of 26 percent of regional banks' Tier 1 capital if bank balance sheets evolve as projected (Figure 2.41). In addition, should there be some other shock to the banking system, the government would find it hard to act as a backstop owing to the effects of its own fiscal position on bank balance sheets.

[17]See the IMF's 2012 Financial Sector Assessment Program (FSAP) report for Japan (IMF, 2012b).

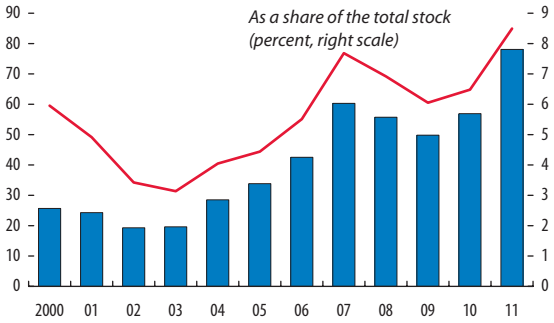
[18]The estimate is based on the IMF staff's fiscal forecasts for net new government debt issuance over 2012–17; absorption of this issuance by domestic banks is estimated on the basis of the banks' purchase of new debt issuance over the most recent three-year period (2008–11).

Figure 2.41. Foreign Claims of Japanese Banks
(In billions of U.S. dollars, left scale)



Source: Bank of Japan, Consolidated International Banking Statistics.

Figure 2.42. Foreign Holdings of Japanese Government Securities
(In trillions of yen, left scale)



Source: Bank of Japan, flow of funds accounts.
Note: Japanese government bonds and Treasury discount bills.

At the same time, overexposure of banks to the sovereign may hurt growth, as banks move away from their traditional role of credit intermediation to the private sector. These considerations illustrate the risk of maintaining too close a tie between the sovereign and the domestic banking system. The case of the euro area periphery underscores how large bank holdings of domestic sovereign debt can lead to a very problematic interdependence between the sovereign and domestic banks.

In an alternative to our projections, foreigners' appetite for JGBs—currently still limited—may grow. But for this to take place, domestic interest rates would likely need to rise to attract overseas buyers. This, in turn, would stress the balance sheets of weaker banks, jeopardizing financial stability.

Japan has thus far been a beneficiary of safe-haven flows prompted by the euro area debt crisis, but an escalation of that crisis could eventually undermine financial stability.

With the supply of global sovereign safe assets rapidly dwindling, international investors who had avoided JGBs in the past have increasingly been drawn to this asset class, particularly at the short end (Figure 2.42), even as Japanese investors have brought some capital home.[19] Japanese financial institutions have also been boosting their overseas exposure, especially in Asia (e.g., in syndicated loans), where European banks have retrenched. Overall, this is a welcome development, as overseas exposures of Japanese banks are still relatively low compared with other G7 countries. Given the low profitability environment at home, Japanese banks could benefit from more internationalization while playing a stabilizing role in global financial markets as European banks divest assets.

At the same time, an escalation in the European crisis could affect Japan through various channels. The indirect impact of a shock from Europe may be substantial, if U.S. and U.K. banks are hit, or if claims on the nonfinancial sector in core Europe are affected.[20] European troubles could also influence Japan through mutual trading partners in emerging markets, compounding the direct effect from Europe on Japanese corporations (see the October 2012 *World Economic Outlook*). Finally, a general rise in global risk premiums could have significant consequences for the Japanese economy through higher JGB yields (see IMF, 2012b), particularly if investors come to focus more on similarities between Japan's circumstances and those of stressed European sovereigns. If severe enough, such a shock could derail the sustainability of Japan's public debt and create sizable losses for banks, especially regional banks.

[19]Safe-haven flows have also subjected the yen to strong appreciation pressures, dampening demand for domestic output and compressing domestic credit demand.

[20]In a network analysis, the Japan FSAP (IMF, 2012b) illustrated that Tier 1 capital of Japanese banks would be substantially impaired by a sizable credit and funding shock of 100 percent of loss given default and a 50 percent discount on liquidation of assets—an admittedly tail risk scenario.

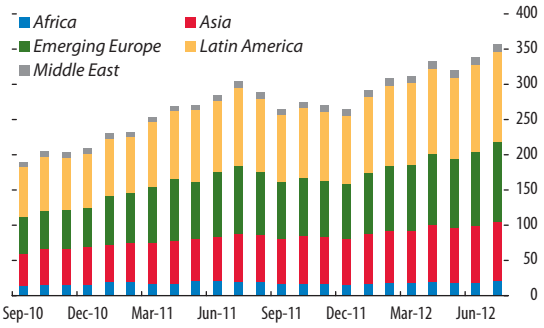
How can Japan manage its sovereign-banking nexus?

The rising concentration of government bond risk in the domestic banking system is a central financial stability concern in Japan. Measures to induce banks to take greater account of the risks inherent in large JGB holdings may be of great use in controlling this risk, particularly in the case of regional or smaller banks. Mechanisms for systemic and macroprudential oversight could be enhanced by conducting regular thematic risk assessments and bottom-up stress tests for macroprudential purposes. To provide larger risk buffers, minimum capital ratios for domestically active banks can be raised closer to those required of internationally active banks, and capital requirements can be more aligned with the materiality of risks. Moreover, systemic risks may be mitigated through a strategy to establish a stronger regional and cooperative bank sector, including through private-sector-led consolidation. Complementing such measures should be efforts to encourage banks to find ways to cushion the impact of sharp interest rate increases, including through the use of market instruments to manage interest rate risk.

Emerging Markets and Other Economies: Navigating Domestic and Global Risks

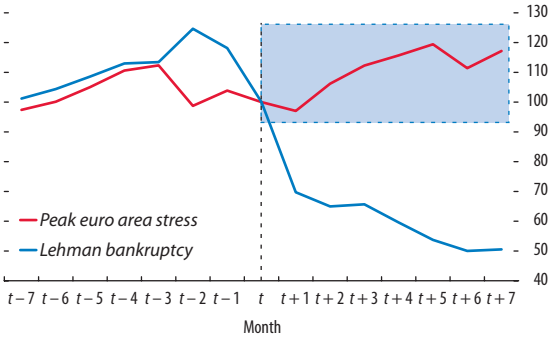
Emerging markets need to guard against potential further shockwaves from the euro area while managing a slowdown in growth that could expose home-grown financial stability risks. So far, inflows to local bond markets have continued even as sovereign fears in the euro area have escalated. However, markets could come under strain if a bout of acute global stress precipitated large-scale capital outflows. Overall, vulnerabilities are most pronounced in many central and eastern European economies because of their high direct exposures to the euro area and some similarities with the euro area periphery. Asia and Latin America generally appear more resilient, but several key economies in those regions are prone to late-cycle credit risks in the wake of an extended period of rising debt and property prices. Meanwhile, the scope to provide fresh policy stimulus is somewhat constrained in several economies. Policymakers therefore need to deftly navigate country-specific challenges to safeguard financial stability.

Figure 2.43. Emerging Market Bond Fund Assets under Management, by Geographic Location
(In billions of U.S. dollars)



Source: EPFR Global.

Figure 2.44. Resilience of Inflows into Emerging Market Local-Currency Bond Funds Despite Euro Area Stress
(Assets under management, t = 100)



Sources: EPFR Global; and IMF staff estimates.
Note: Peak of stress (month = *t*) for euro area stress is November 2011; for Lehman bankruptcy it is September 2008.

Continued portfolio inflows underscore investors' perceptions of selected emerging market economies as relatively safe havens.

Investor flows into emerging market fixed-income assets, including local currency instruments, have accumulated rapidly during the euro area crisis (Figure 2.43), with reversals proving to be short-lived, in sharp contrast to behavior at the height of the Lehman crisis (Figure 2.44). Inflows in many emerging market economies have been supported by favorable macroeconomic and credit fundamentals. Indeed,

investors' quest to diversify out of troubled advanced economy markets has prompted structurally higher allocations toward emerging market funds. Other supportive factors include accommodative global liquidity conditions and the resulting search for yield.

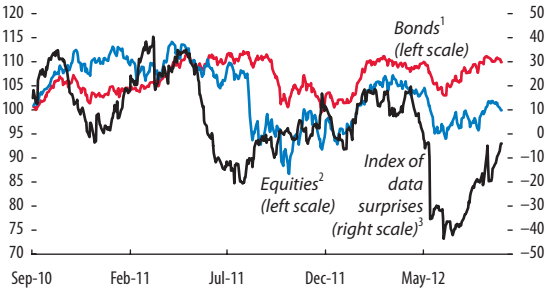
The environment in emerging markets has turned more challenging, as the euro area crisis sends renewed ripples through a fragile global economy.

Headwinds have stiffened since the April 2012 GFSR amid persistent tensions in euro area financial markets. The deterioration of economic conditions in Europe, along with specific local factors, has also reinforced a slowdown in activity across emerging market economies, including Brazil, China, and India. Weaker growth prospects have weighed on emerging market equities and currencies, even as bond markets have performed well (Figure 2.45).

Credit risk premiums in emerging market economies have also been affected to varying degrees by volatile sovereign spreads in the euro area. The effect has been especially pronounced in central and eastern Europe, which remains the most vulnerable of emerging market regions (Figure 2.46).[21] In comparison, most sovereigns in Latin America and especially in emerging Asia exhibit a fairly low sensitivity to euro area stress, which points to their better fundamentals and their perceived role as (relatively) safe havens.

[21]Market liquidity conditions may also affect the correlation between credit default swap spreads across countries.

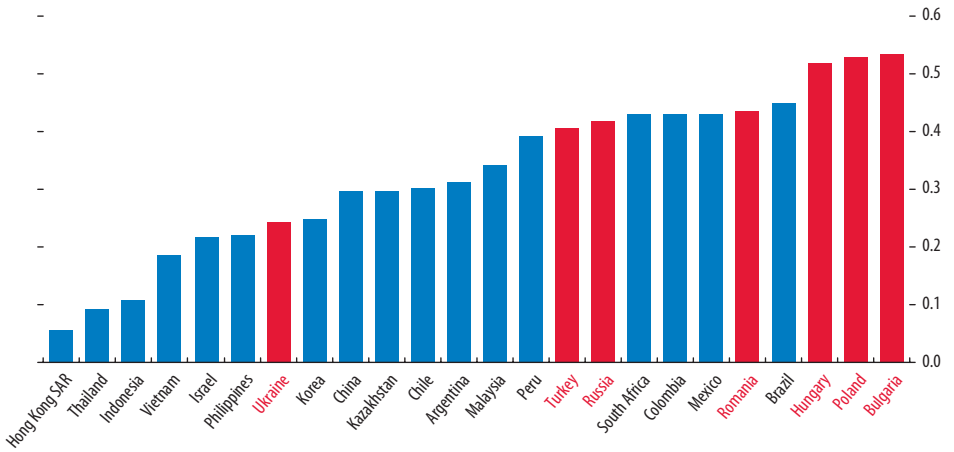
Figure 2.45. Performance of Emerging Market Equities and Bonds vs. Economic Surprise Index
(Price index, September 2010 = 100, left scale)



Sources: Bloomberg L.P.; and IMF staff calculations.
[1]Markit iBoxx Global Emerging Markets Local Currency Bond Index.
[2]MSCI Emerging Markets Local Currency Equity Index.
[3]Citigroup Emerging Market Surprise Index. Values less than zero indicate negative data surprises.

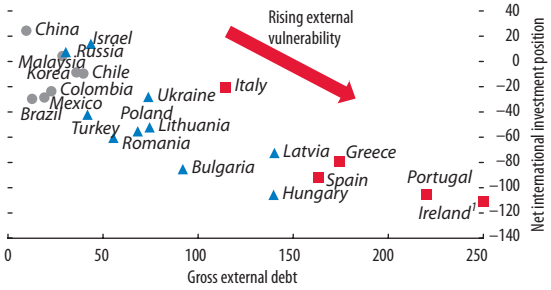
Central and eastern Europe stands out as the most vulnerable of emerging market regions, as it has the greatest direct exposures to the euro area as well as certain similarities to the troubled euro area periphery.

Figure 2.46. Sensitivity of Selected Sovereign CDS to CDS of Euro Area Periphery, 2011–12



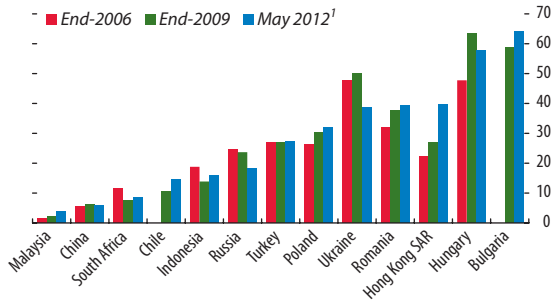
Sources: Bloomberg L.P.; and IMF staff estimates.
Note: For economies shown, the data show the percentage change in their credit default swap (CDS) spread associated with a 1 percent change in the average CDS spread of Ireland, Italy, Portugal, and Spain; computed from weekly observations beginning in January 2011. Data in red are for countries in central and eastern Europe.

Figure 2.47. Net International Investment Position versus Gross External Debt, Selected Economies, 2011
(In percent of GDP)



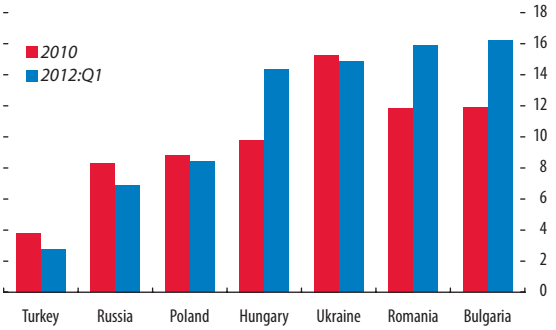
Sources: Haver Analytics; and IMF staff calculations.
[1]For Ireland, gross external debt was 1,063 percent of GDP at end-2011 (truncated in the figure); net international investment position excludes its International Financial Center.

Figure 2.48. Share of Foreign-Currency-Denominated Bank Loans in Total Loans
(In percent)



Sources: CEIC; Haver Analytics; national authorities; and IMF staff estimates.
[1]Except for Russia and South Africa (March 2012) and Bulgaria and Ukraine (April 2012).

Figure 2.49. Ratio of Nonperforming Loans to Total Loans
(In percent)



Sources: National authorities; and IMF staff estimates.

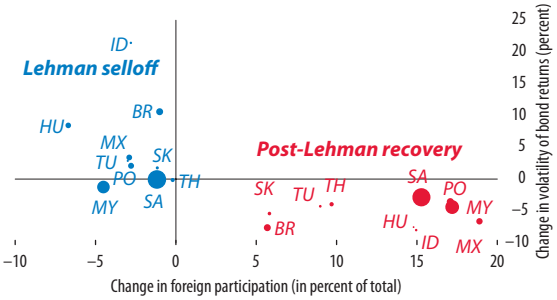
Several countries in central and eastern Europe exhibit some of the same financial vulnerabilities that have come to the fore in the euro area crisis. Fueled by rampant credit and asset price booms, their external indebtedness surged during the early 2000s at a rate that was second only to that in the euro area periphery (Figure 2.47). To be sure, many countries in central and eastern Europe have flexible exchange rates, which facilitates the necessary adjustment of their economies. In some cases, however, this function is constrained by the high share of bank loans denominated in foreign currency (Figure 2.48). Comparatively modest official reserve holdings further limit the capacity in central and eastern Europe to deal with external shocks.[22] Compounding these challenges are direct exposures to the euro area via trade and banking channels that significantly exceed the exposures of other emerging market regions.

As outlined in Box 2.3, the gradual retreat of euro area banks from central and eastern Europe will likely generate headwinds for some time. Although the significant measures taken by the ECB have provided some much-needed respite, parent banks are still targeting lower loan-to-deposit ratios and less cross-border funding, which keep up the pressure to trim loan books. As a result, near-term credit growth is likely to remain flat or negative in many central and eastern European countries, notably Bulgaria, Hungary, and Romania.

In this environment, bank asset quality has continued to worsen in many countries in the region, reflecting a deterioration in the repayment capacity of borrowers, and increased recognition of NPLs from the 2008–09 crisis that were initially "evergreened." Thus, NPL ratios have risen from already high levels in several countries in the region (Figure 2.49). There is now a clear risk that asset quality problems will increase: Bank deleveraging continues, economic activity remains sluggish, and currency depreciation could hurt households and businesses that have debts denominated in foreign currencies. Any further intensification of the euro area crisis would exacerbate these dynamics.

[22]Unlike in Asia and Latin America, the level of official reserves in many countries in central and eastern Europe is well below 100 percent of short-term external debt.

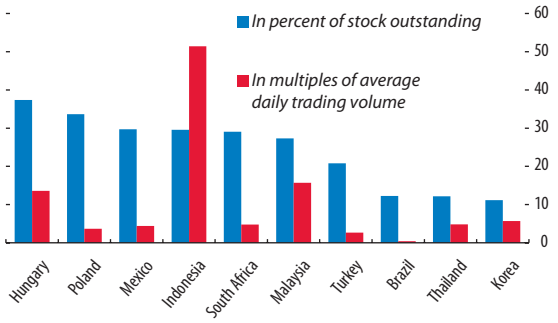
Figure 2.50. Change in Volatility of Local Bond Returns Relative to Foreign Participation and Domestic Investor Base



Sources: Bloomberg L.P.; national authorities; Organization for Economic Cooperation and Development; and IMF staff calculations.

Note: Data as of May 2012. Lehman selloff refers to September-October 2008, and post-Lehman recovery refers to the period since the post-Lehman trough (see Table 2.6 for details). Size of bubbles is proportional to the size of domestic pension fund assets under management relative to GDP. BR = Brazil; ID = Indonesia; MY = Malaysia; PL = Poland; SK = Republic of Korea; TH = Thailand; TR = Turkey.

Figure 2.51. Nonresident Holdings of Government Debt and Market Liquidity



Sources: Asian Bonds Online; CEIC; national authorities; and IMF staff calculations.

Note: Data are as of end-March 2012, except for Brazil and Mexico (May 2012), Hungary and Poland (July 2012), and Turkey (August 2012).

Global shocks and foreign flows in recent years have been a key influence on local bond market volatility of emerging market economies.

The period around the collapse of Lehman Brothers substantially boosted the volatility of emerging market local bonds as foreign investors reduced their exposures to risky assets (Figure 2.50). Brazilian, Hungarian, and Indonesian bonds sold off substantially, increasing the volatility of total returns by up to 22 percent. Since that episode, local bond markets have received sustained new inflows of foreign funds; in several emerging market economies the inflows have pushed nonresident holdings of local debt to historically high levels (Figure 2.51). This trend has been accompanied by a reduction in the volatility of bond returns (Figure 2.50). Nonetheless, a new sudden reversal of capital flows cannot be ruled out.

The size of the domestic investor base affects the ability of local markets to cope with sudden, large outflows.

Markets with high foreign bond holdings, relatively small local long-term investors, and low trading liquidity are likely to be most disrupted by outflows.[23]

Indeed, earlier periods of large capital inflows and outflows suggest that markets with sizable domestic pension fund assets, such as Malaysia, Poland, and South Africa, tend to suffer smaller swings in bond prices and better withstand external shocks (Figure 2.50). By contrast, the absence of a significant local investor base in Hungary and Indonesia has meant that the substantial ebb and flow of nonresident investments has contributed to larger changes in market volatility. Low average market turnover, as observed especially in Indonesia, may exacerbate bond price action in periods of large outflows.[24]

A sudden reversal of flows could be disruptive, especially where local asset managers have a limited capacity to absorb the resulting supply, forcing banks to further expand their holdings of government bonds.

To illustrate the potential ramifications of a severe new shock, we consider a hypothetical reversal of all cumulative net foreign inflows into local currency bonds since the post-Lehman trough for a set of nine economies (Table 2.6). The size of outflows as a share of total debt outstanding ranges from 7 percent (for Korea) to 23 percent (for Mexico). The resulting bond sales are assumed to be partly absorbed by domestic pension funds and other asset managers. In particular, the amount bought by pension funds is

[23]In addition to these characteristics, foreign exchange flexibility has been found to influence the effect of capital flow shocks.

[24]Reflecting such concerns, the Indonesian authorities launched a bond stabilization fund last year, following the example of Korea.

Table 2.6. Impact on Domestic Bank Balance Sheets from a Hypothetical Reversal of Foreign Inflows into Local Bond Markets[1]
(Billions of U.S. dollars, unless otherwise noted)

	Brazil	Hungary	Indonesia	Korea	Malaysia	Mexico	Poland	South Africa	Turkey
Potential selling by foreign investors									
Size of local bond market	858	46	94	531	179	323	157	99	221
Share of foreign holdings (percent of total)	11.9	35.6	29.6	11.2	27.3	29.7	30.5	29.4	17.5
Foreign holdings	102	16	28	59	49	96	48	29	39
Potential sales by foreigners (= cumulative net foreign purchases since country-specific post-Lehman trough)	62	8	15	36	26	76	32	21	24
As a share of local bond market (percent)	7.2	17.6	16.5	6.8	14.6	23.4	20.1	21.7	10.8
In percent of official foreign exchange reserves	17.0	20.8	15.5	11.9	21.7	48.1	36.8	50.0	28.7
Capacity for absorption by local investors									
Assets under management of local private pension funds and other asset managers	321	21	14	351	148	130	71	368	17
Estimated potential absorption by local private pension funds and other asset managers[2]	16.1	1.0	0.7	17.6	7.4	30.0	3.5	18.4	0.8
Potential required absorption by local banks	46.1	7.1	14.8	18.7	18.9	45.7	28.1	3.0	23.0
Impact on domestic banks' balance sheets									
Current holdings of government securities (percent of total assets)	12.4	12.1	4.8	6.0	10.1	2.4	10.3	8.9	18.4
Implied holdings of government securities (percent of total assets)[3]	14.7	16.8	7.1	7.2	13.6	7.3	17.0	9.6	21.7
Increase (percent)[3]	18.0	38.9	47.2	20.1	34.3	199.6	65.8	8.6	17.8

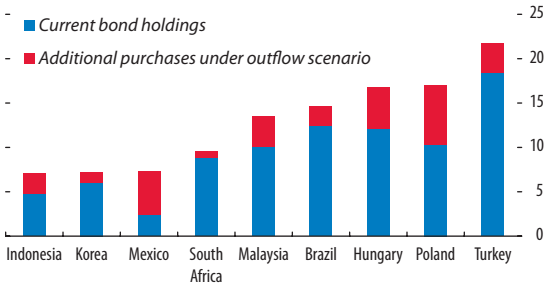
Sources: Asian Development Bank; Bloomberg L.P.; CEIC; national authorities; Organization for Economic Cooperation and Development; and IMF staff estimates.

[1]Data are as of December 2011 for South Africa; January 2012 for Brazil; March 2012 for Malaysia, Indonesia, Korea, and Poland; April 2012 for Hungary and Turkey; and May 2012 for Mexico.

[2]Assumes that pension funds can increase bond holdings by 5 percent of assets under management. For Mexico, absorptive capacity is estimated at US$30 billion, based on IMF staff estimates.

[3]Assumes no increase in overall bank assets, i.e., higher government bond holdings substitute for other assets currently on balance sheet.

Figure 2.52. Bank Holdings of Local Currency Government Debt and Additional Purchases under Outflow Scenario
(In percent of total banking system assets)



Sources: Asian Development Bank; Bloomberg L.P.; CEIC; national authorities; Organization for Economic Cooperation and Development; and IMF staff estimates.
Note: See Table 2.6 for details.

assumed to equal as much as 5 percent of their latest assets under management, consistent with a partial reallocation of assets, including cash.

In the above scenario of flow reversal, domestic banks would likely buy the remaining bonds sold by foreigners, as exemplified by the experience of Turkey in 2008–09 (Table 2.6 and Figure 2.52).[25] Thus, bank holdings of government debt could rise sharply in many economies. The largest increases would occur in Hungary and Poland, reflecting the large foreign holdings of local bonds together with the limited absorptive capacity of private pension funds, although Polish banks maintain high capital adequacy levels overall.[26] The scenario also suggests a marked increase in bond holdings for Mexican banks, albeit from a relatively low initial base. Turkish banks already allocate an unusually high share of their balance sheets to local government paper. Nevertheless, they could arguably acquire more local bonds: Historical holdings have been even higher, bank balance sheets remain fairly liquid, and the outstanding stock of government debt is of short average maturity.

[25]There is significant uncertainty around domestic asset managers' ability to absorb bonds during a disorderly exit by nonresidents. In some countries, for instance, there might be scope for retail investors to step into the market if yields become sufficiently attractive. Therefore, the calculations provided here should be viewed as illustrative only.

[26]Hungary is also vulnerable given the large role of foreign banks, which may be reluctant to increase exposures to the local sovereign. This concern also applies, to a lesser extent, to several other countries in central and eastern Europe.

In some countries (Mexico and South Africa in particular), the size of the simulated outflows is also significant relative to the stock of official foreign exchange reserves. This underscores the risk of adverse effects on currency markets. Moreover, an exodus of foreign investors could reinforce negative sovereign-bank feedback loops, leading to an overall weakening of financial sector resilience and potentially crowding out the private sector. Countries with stronger fiscal positions are better placed to cushion such a shock.

Asia and Latin America generally appear more resilient, but several key regional economies are facing home-grown risks related to long-running credit expansions.

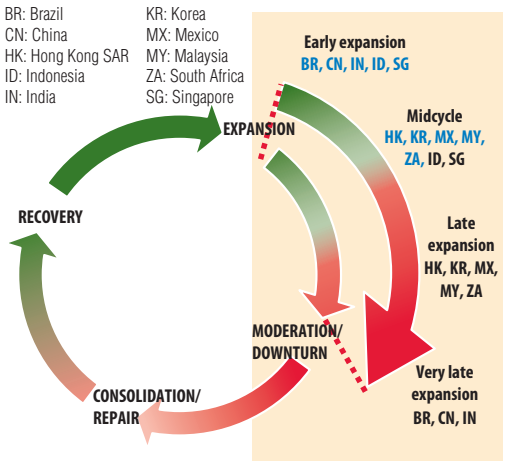
Economies in Asia and Latin America generally compare favorably with their central and eastern European peers in all dimensions of external vulnerability (Figure 2.47). However, they clearly are not immune to the effects of a broad-based global slowdown, let alone a possible systemic shock. In particular, further significant disruptions of euro area banks could have large negative effects on those banks' overseas operations, notably in Latin America, even though local subsidiaries appear somewhat shielded under the *baseline policies* scenario. Latin America is also significantly exposed to the risk of sustained pressure on commodity prices in the event of a protracted global downturn. In addition, a large systemic shock could revive acute tensions in global dollar funding markets.

Aside from such spillover risk, several large economies are vulnerable to late-credit-cycle risks following several years of strong growth in credit and in property prices.[27] The October 2011 GFSR pointed out that most emerging market economies (with the notable exception of those in central and eastern Europe) were in the expansionary phase at that time and thus well advanced along the credit cycle.[28]

[27]Credit growth in excess of nominal income growth may be a reflection of healthy financial deepening. Nonetheless, international experience shows that excessively rapid credit growth, coupled with lax regulation, can precipitate financial crises even when credit is starting from a low base.

[28]As discussed in the October 2011 GFSR, the stylized credit cycle graphic progresses through four distinct phases (see also Figure 2.53): consolidation/repair, recovery, expansion, and mod-

Figure 2.53. Credit Cycle Position of Selected Economies: 2006 and 2011



Sources: Bank for International Settlements; banks' annual reports; Bloomberg L.P.; IMF databases; national authorities; and IMF staff estimates.

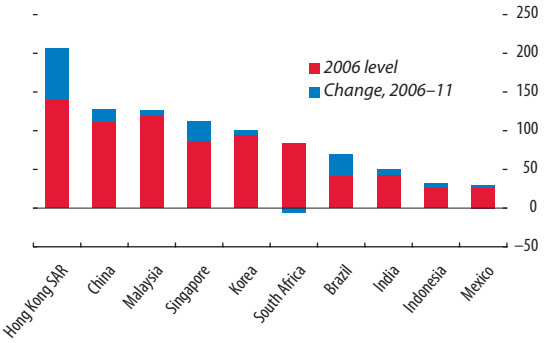
Note: Countries in black = 2011; in blue = 2006. Countries' positions along the stylized credit cycle are estimated from a composite of indicators, including the ratio of credit to GDP, real house price changes, the price-to-book value of the equity market, banking sector gross nonperforming loan ratio and return on assets, and corporate sector debt-to-equity ratio and return on equity. The cyclical position is initially evaluated for each indicator and then aggregated across indicators, using a simple average of scores. Trends in some indicators and the resulting assessment also reflect policy actions.

Figure 2.53 illustrates the credit cycle and shows the position of economies in the cycle at end-2006 and end-2011; the positions are assessed on the basis of several key indicators, including credit growth, asset prices, bank earnings and asset quality, and corporate leverage and profitability.

Some key economies have progressed into the later stages of the credit cycle, as shown by elevated debt levels, peaking asset prices, and early indications of worsening loan quality.

As Figure 2.53 makes clear, Brazil, China, and India have moved decisively into the late stage of a cyclical upswing in credit and asset markets, and the

Figure 2.54. Change in Private Sector Credit, 2006–11
(In percent of GDP)



Source: IMF, International Financial Statistics database.
Note: Data are as of year-end.

trend extends to almost all Asian and Latin American countries examined here.[29]

Bank credit has expanded at an average annual rate of more than 15 percent over the past five years across Asia and Latin America, with particularly rapid growth in Brazil, China, Hong Kong SAR, Singapore, and Vietnam (Figure 2.54).[30] Sustained increases in real house prices have been a key factor supporting strong loan demand. For example, in the four years since end-2007, inflation-adjusted property prices climbed by nearly 100 percent in Brazil's largest cities (Figure 2.55). Increases in real house prices also reached high double digits in China, Hong Kong SAR, and Singapore.[31]

Although credit quality generally remains solid, it is likely to deteriorate in a few countries (Figure 2.56)

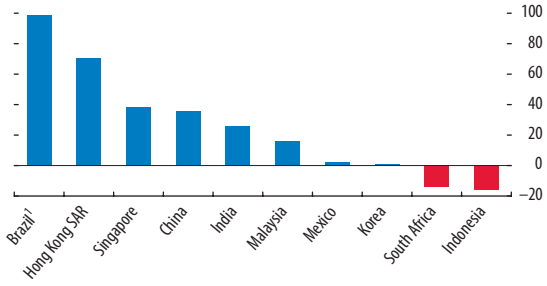
eration/downturn. As economies advance through the credit cycle, leverage builds up and asset prices reach lofty levels. Strong capital inflows tend to reinforce these dynamics. Over time, the quality of assets in the banking system deteriorates. Eventually, these pressure points may culminate in a downturn, the severity of which depends on a series of factors, including the quality of financial regulation and supervision, external shocks, and the scope for countercyclical policies.

[29]Data constraints limit the credit cycle analysis to the 10 African, Asian, and Latin American emerging market and other economies shown in Figure 2.53.

[30]While China's credit expansion harks back to a deliberate policy of bank-financed stimulus spending during 2009/10, credit growth elsewhere has typically been driven by household borrowing. Brazil's mortgage and consumer loan boom is a prominent example. China stands out as having a very high stock of credit outstanding, measured against GDP, even before nonbank sources of credit that have also grown strongly are taken into account. By contrast, Latin America's credit expansions generally started from low initial levels.

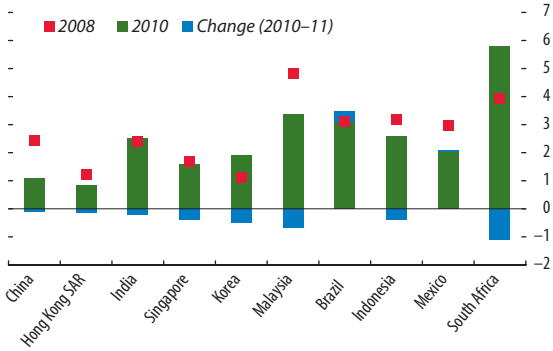
[31]More recently, prices have eased somewhat (China and Singapore) or at least decelerated (Brazil and India), often amid official efforts to avert bubble risks, but valuations remain elevated in a few economies. One important challenge in gauging these vulnerabilities is the lack of consistently defined and comprehensive data. Further efforts are therefore needed to track developments in the real estate sector across many countries.

Figure 2.55. Change in Real House Prices, 2006–11
(In percent)



Sources: Bank for International Settlements; CEIC; FIPE ZAP (Rio de Janeiro and São Paolo); Haver; IMF, International Financial Statistics; Knight Frank; National Housing Bank; and IMF staff estimates.
Notes: Prices are country-specific measures of nominal house prices deflated by country-specific consumer price indexes.
[1]For São Paulo and Rio de Janeiro only, beginning with 2007.

Figure 2.56. Nonperforming Loans in Selected Economies, 2008, 2010, and 2011
(In percent of total loans outstanding)

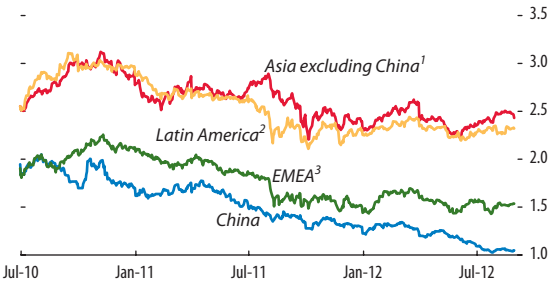


Source: IMF, Financial Soundness Indicators.
Note: Data are as of year-end except in 2011 for India (March) and Korea and Singapore (September).

as economic growth slows and asset prices peak. One notable trend is the relatively rapid increase in the NPL ratio for household loans in Brazil, which reached 7.8 percent in June. Banks in India have also had to take higher write-downs, as the growth of NPLs among the three largest commercial banks has recently outpaced loan growth by a factor of 2.5, and loan restructurings reached 2.6 percent of total gross loans in the first quarter of 2012 alone.[32] Chinese banks have continued to report very low NPL ratios, but there are signs of weakening credit quality in certain segments

[32]These three banks account for more than 50 percent of total assets of domestic commercial banks.

Figure 2.57. Ratio of Price to Book Value of Banks in Selected Economies, 2010–12



Sources: Bloomberg L.P.; and IMF staff estimates.
Note: Regional values are simple averages of banks from the countries indicated. EMEA = Europe, Middle East, and Africa.
[1]India, Indonesia, Malaysia, and Thailand.
[2]Brazil, Chile, Colombia, and Mexico.
[3]Poland, Russia, South Africa, and Turkey.

(notably loans to smaller firms) that may have a disproportionate impact on nonbank lenders (see Box 2.7).

Matching the late-cycle pattern, bank equities have performed poorly, with price-to-book ratios down from 2010 levels in almost all countries (Figure 2.57). Valuations have fallen to particularly low levels in China, as investors worry about the risk of worsening asset quality. Moreover, China's banks are likely to face sustained earnings pressure now that the authorities have begun to liberalize interest rates. Meanwhile, several countries have seen marked increases in corporate leverage. Debt-to-equity ratios now exceed 100 percent in Brazil, India, and Korea.[33] Past episodes of financial crisis clearly indicate that high leverage and declining profitability raise the probability of corporate defaults in a downturn.

Policymakers in emerging market economies have taken steps to alleviate the rising risks to financial stability, but continued vigilance is critical.

Concerns about overheating and financial stability risks caused policymakers in many countries to tighten policies after the initial expansionary response to the global financial crisis. More recently, policy stances have shifted again, as several central banks—including in Brazil, China, Korea, and

[33]Based on capital-weighted mean of corporate debt-to-equity ratio (all sectors) from the IMF Research Department's Corporate Vulnerability Utility database.

Box 2.7. Avoiding the Pitfalls of Financial Liberalization in China—Credit Risk, Liquidity Mismatches, and Moral Hazard in Nonbank Intermediation

Financial intermediation outside of the regulated banking system has grown rapidly in China over the past few years, especially since the authorities tightened bank lending conditions in the aftermath of the 2009–10 credit boom. Even during the recent economic slowdown, which has dampened overall loan demand, the importance of nonbank credit has continued to rise (Figure 2.7.1). These developments provide the private sector with a broader range of financial services, but they also pose new challenges to financial stability.

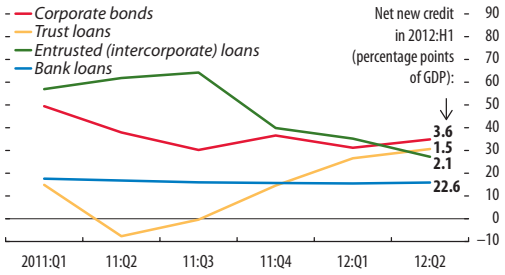
Informal lenders are the least transparent of the actors in China's shadow banking system. Roughly estimated at 6–8 percent of national GDP, informal loan markets are concentrated in a few provinces. Regulated banks mostly serve large, often state-owned companies; in contrast, informal lenders typically cater to small enterprises and so face much higher credit risk, reflected in loan rates of 20 percent or higher. Indeed, as small private companies have been hard hit by the current economic downturn, there is mounting evidence that some lending networks, notably in the industrial hub of Wenzhou, have suffered a sharp rise in nonperforming loans. The effect of individual insolvencies is compounded by the frequent use of loan guarantee structures that are sending ripples through the wider local economy. In this context, the authorities have announced plans to regularize the informal lending industry, starting with a pilot program in Wenzhou.

A far more transparent yet still very fast-growing segment is the trust company sector, whose total assets under management reached CNY 5.3 trillion (or 11 percent of GDP) at end-June, up 90 percent in just two years and on course to exceed the size of China's insurance industry. Although trusts engage in a wide range of financial activities, a large part of the sector's aggregate balance sheet represents loans and loan-like claims, typically to higher-risk entities that do not have access to bank credit, such as property developers or local government investment vehicles (Figure 2.7.2).

Elevated credit risk might seem unproblematic insofar as it represents the flip side of the double-digit returns typically earned by trust investors. Moreover, trust products require minimum investments of CNY 1–3 million, confining exposures to well-off investors. Yet this seemingly benign view ignores the effect of selling practices often described as aggressive, which may lead investors to underestimate risk, especially after many years of strong returns. Heightening such concerns are some signs that the financial risks associated with trust products may be artificially suppressed. In several recent cases, funds reportedly facing potential losses were rescued or restructured by a stakeholder via various meth-

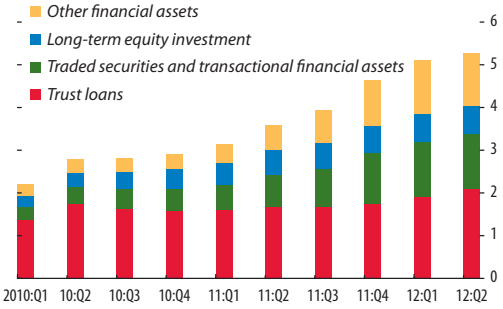
Note: Prepared by André Meier and Sean Craig.

Figure 2.7.1. Growth Rate of Credit in China, by Selected Type
(In percent, year-over-year, except as noted)



Sources: CEIC; Haver Analytics; and IMF staff estimates.
Note: Official data on trust loans and entrusted loans cover only flows, i.e., net new credit. Stocks are computed by cumulating historical flows from 2002 onward, using end-2001 = 0 as a starting point.

Figure 2.7.2. Trust Companies in China: Assets under Management
(In trillions of yuan)



Sources: CEIC; and IMF staff estimates.

Box 2.7 *(continued)*

ods, ranging from a rollover into new trust products to buyouts by asset management companies. Such steps may allow stakeholders to avert reputational damage or the loss of a license, but they also create a false sense of safety that induces overinvestment in high-risk financial activities.

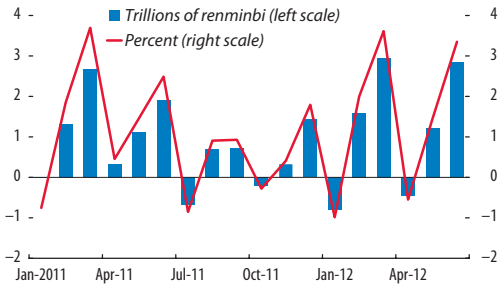
Analysts worry that in the event of more severe credit problems in the trust sector, some financial losses might even spill over to banks, which often act as a marketing channel for trust products. A pure marketing function does not give rise to formal liability, but banks may still feel the need to make investors whole for fear of losing long-standing, well-off clients.

A more direct risk for banks relates to wealth management products (WMPs) sold under their own name. Although authoritative figures are not available, the stock of such products is now estimated at CNY 8–9 trillion, or up to 10 percent of deposits. Bank WMPs typically have short maturities and offer returns somewhat above regulated deposit rates. Indeed, their main purpose is to retain bank clients put off by the low yield on those deposits. In a striking pattern apparently intended to window-dress balance sheets, banks typically structure WMPs so that they expire just before the end-quarter reporting date, allowing them to record the customer funds as deposits for that quarter, only to switch them back into higher-yielding WMPs at the beginning of the following month (Figure 2.7.3). Thus, balance sheet data overstate somewhat banks' true deposit base, concealing a secular shift into less transparent funding and investment structures.

Funds raised via WMPs are used to finance off-balance-sheet assets, including corporate bonds. As detailed information on those assets is not disclosed, it is difficult to gauge the underlying credit risk, which is formally borne by WMP buyers. Even if credit risk is lower than for trust products, a sudden realization of such risk could have significant adverse consequences. In particular, a run on WMPs by anxious bank clients could crystallize liquidity risk arising from asset pooling, whereby banks channel some short-term customer funds into longer-term assets. As in the case of trusts, banks may be reluctant to inflict losses on their customers. Consistent with this notion, customer losses on WMPs have been very rare. Proper accounting for banks' contingencies, sufficient capital backing, and strict limits on off-balance-sheet maturity transformation are therefore crucial. More broadly, recent steps toward liberalizing deposit rates should help reduce regulatory arbitrage via WMPs.

The apparent pattern of "higher returns and suppressed default risk" extends, finally, to another fast-growing segment of China's financial system, the corporate bond market. Spurred by regulatory reform, issuance has taken off in recent years (Figure 2.7.4). Underpinning demand is a record of zero bond defaults matched by remarkably high credit

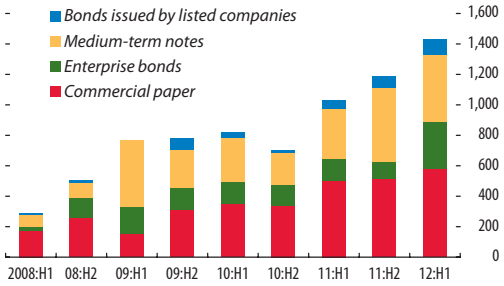
Figure 2.7.3. Monthly Change in System-Wide Renminbi Deposits in China



Sources: CEIC; and IMF staff estimates.

Figure 2.7.4. Gross Issuance of Nonfinancial Corporate Debt in China

(Billions of yuan)



Sources: Wind Information Co., Ltd.; and IMF staff estimates.

Box 2.7 *(continued)*

ratings—more than 98 percent of rated bonds are AA or higher.[1]

The perception that corporate bonds are risk free may have been reinforced by recent experience, as impending defaults were averted in at least two cases through last-ditch financial operations by interested parties, such as a sponsoring bank or a local government. While beneficial to investors in the short term, wider application of this practice would generate significant moral hazard.

A continued upgrading of prudential oversight and effective market discipline are therefore crucial to avoid an excessive buildup of risk as China's financial system continues to grow and diversify.

[1]In contrast, since 2009 Chinese businesses selling bonds in the offshore market have defaulted at least 10 times on bonds totaling $8 billion.

South Africa—have cut policy rates to mitigate the downturn in economic activity.

Policymakers are aware that such policy loosening must not undermine earlier efforts to curb exuberant asset and credit markets. Indeed, several Asian and Latin American economies have used macroprudential policies and capital flow management to strengthen banking systems, slow down the pace of capital inflows, or rein in soaring property prices (Table 2.7). Although a conclusive overall judgment is difficult to make, and important risks remain, some of these measures have clearly been effective.[34]

Continued supervisory vigilance and a preemptive countercyclical stance remain important to preserve the resilience of the financial system. At the current juncture, appropriate steps would include promoting earnings retention to bolster banks' capital base, ensuring sufficient provisioning and swift recognition of loan quality problems, and extending macroprudential tools where exuberance persists.[35] These efforts must be underpinned by prudent monetary and fiscal policies, which should provide buffers for more difficult times.

[34]For instance, the sharp tightening of loan-to-value limits on mortgages in Hong Kong SAR has protected households from overborrowing and contained risks to banks. In China, the broad-based restrictions on housing market activity have dampened demand and caused prices to edge down, although the market has recently shown signs of picking up again. And in Korea, authorities have been successful in reducing external vulnerabilities, notably by discouraging banks' use of short-term debt denominated in foreign currencies. Brazil, in turn, has started to reverse some of its earlier efforts at macroprudential measures and capital flow management as overheating concerns have subsided.

[35]Some specific advice on how to tackle NPL problems in emerging Europe is available at http://blog-imfdirect.imf.org/2012/03/29/debt-hangover-nonperforming-loans-in-europes-emerging-economies/.

In some countries, the policy space to respond to new adverse shocks has become somewhat limited.

Given the heightened risks in the global economic environment, flexibility to deploy different policy tools is particularly valuable. Yet, as Table 2.8 indicates, most emerging market and other economies are judged to be constrained in at least one policy area—fiscal, monetary, or financial. This situation reflects different country-specific concerns, including strained public finances in Hungary, limited monetary policy space in India, and potentially large hidden costs from renewed credit-based stimulus in China. Overall, many countries in central and eastern Europe stand out as having very limited macroeconomic policy space; Chile, Colombia, and Peru have relatively broad room for maneuver, and other economies are somewhere in between.

Especially where policy space is limited, authorities should redouble their *structural* reform efforts to reduce vulnerabilities. Many countries, including India, have scope to improve the environment for private investment, which would boost confidence and reduce funding constraints.[36] In several central and eastern European countries, shoring up the financial system remains the priority. One promising element is coordinated loan modification schemes that would help restore sustainable finances

[36]In India's case, such efforts, together with appropriate fiscal reform, could also counter warnings from rating agencies of a possible sovereign rating downgrade to below investment-grade level. It is therefore encouraging that the government has recently announced a number of significant measures, including a reduction in diesel subsidies and steps to liberalize foreign investment in key sectors of the economy.

Table 2.7. Overview of Recent Macroprudential and Capital Flow Measures in Selected Emerging Market and Other Economies

Area of Macrofinancial Concern	Examples of Recent Measures Adopted by Authorities in Emerging Market and Other Economies
Credit growth and banking sector health	• Several Asian economies, including Hong Kong SAR, Korea, and Singapore, have been implementing a policy of periodic variation in loan-to-value (LTV) and/or debt-to-income (DTI) limits on bank mortgages to curb excessive borrowing by households and limit risks to the banking system. In a recent move, Korea lowered the LTV limit in May 2012. • In March 2011, Brazil increased the financial tax on consumer credit card purchases abroad to 6.38 percent from 2.38 percent. Brazil also introduced a 1 percent financial transaction tax on increases of short positions in foreign exchange derivatives. • China's authorities have taken several steps over the past two years to mitigate risks from lending to local government financing vehicles (LGFVs). Measures have included a tightening of lending restrictions, as well as higher bank provisioning requirements and capital risk weightings for existing LGFV exposures. • Korea introduced a maximum loan-to-deposit (LTD) ratio of 100 percent in August 2010, with an initial grace period until end-2013 (recently shortened to mid-2012). The authorities also took a series of steps to discourage banks from accumulating excessive external foreign-exchange-denominated debt, via tighter restrictions on foreign exchange forward positions, a macroprudential levy on nondeposit liabilities (with higher rates for short-term funding sources), and regulatory guidance to lengthen the maturity of funding structures and increase foreign exchange liquidity buffers. • Malaysia has tightened restrictions on bank lending to consumers via hire purchase, personal loans, and credit cards. Measures have included stricter income eligibility standards for credit cards as well as higher risk weights for high-LTV housing loans and long-term personal loans. • Indonesia imposed a limit on banks' overseas borrowing at 30 percent of bank capital in 2011. The authorities also introduced an unremunerated 8 percent reserve requirement on banks' total foreign exchange holdings to minimize foreign exchange volatility.
Corporate health	• India has instituted an External Commercial Borrowing (ECB) framework to regulate access to foreign funding by corporations and public sector undertakings through specific limits set on overseas borrowings. Up to 50 percent of infrastructure, telecommunications, and greenfield projects can be funded through the ECB. • In April 2011, Brazil extended the 6 percent financial tax on foreign-exchange-denominated loans obtained by domestic corporations abroad with maturities up to 720 days. Previously, this tax was applied to foreign-exchange-denominated loans with maturities up to 360 days.
Asset prices and capital inflow pressures	• To mitigate risks associated with foreign capital flows, Korea reintroduced a withholding tax of 14 percent on interest income on foreign holdings of treasuries/monetary stabilization bonds. Similarly, in late 2010 Thailand removed a tax exemption for foreigners on income from domestic bonds. • Since April 2010, China has imposed a series of measures to counter the risk of a bubble in the housing market, including higher down payment requirements, limits on the number of properties that individuals can buy, restrictions on property developer funding, introduction of property taxes in some cities, and stepped-up construction of apartments for low-income earners. • In July 2012, the existing limit for investment in government securities (G-Secs) by foreign institutional investors (FIIs) registered with the Securities and Exchange Board of India (SEBI) was increased by US$5 billion to US$20 billion. To broaden the nonresident investor base for G-Secs, long-term investors such as sovereign wealth funds, multilateral agencies, endowment funds, insurance funds, pension funds, and foreign central banks are now allowed to be registered with SEBI as FIIs.

Source: IMF staff.

for overly indebted borrowers. Critically, domestic efforts to protect credit supply must be supported by enhanced cross-border cooperation between host and home regulators, notably under the Vienna II Initiative, to limit the adverse consequences of home bias. A more detailed discussion is provided in Chapter 1.

Table 2.8. Indicators of Vulnerability and Policy Space For Emerging Market and Other Economies

	External Financing and Capital Flows Vulnerabilities (percent of 2012 reserves)			Banking System Cross-Border Financing Vulnerability	Contagion from Euro Area Periphery	Fiscal Vulnerability	Monetary Policy Room[6]			Room for Credit Expansion[7]		
	External refinancing needs in 2012[1]	Debt portfolio liabilities (IIP)[2]	Equity portfolio liabilities (IIP)[2]	Liabilities to BIS reporting banks (percent of total credit)[3]	Sensitivity of sovereign CDS to CDS of the euro area periphery[4]	Index[5]	Nominal policy rate (percent)	2012 projected CPI inflation (percent)	Difference of inflation target (upper bound) and 2012 projected inflation (percentage points)	Position in credit cycle: change in credit-to-GDP ratio, 2006–11 (percentage points)[8]	Banking sector: change in gross NPL ratios, 2010–11 (percentage points)[9]	Banking sector: change in capital/ total assets, 2010–11 (percentage points)[10]
Europe												
Bulgaria	104	8	2	. . .	53		3.50	2.1	. . .	27.2	1.2	–0.2
Hungary	105	96	22	56	52		6.75	5.4	–1.4	9.6	3.5	0.2
Poland	110	105	27	30	53		4.75	3.2	0.3	21.7	–0.6	–0.2
Romania	112	14	4	63	44		5.25	3.6	0.4	12.9	2.2	–0.3
Russia	32	10	50	15	42		8.25	6.7	–0.7	15.2	–1.6	–1.4
Turkey	146	68	73	23	41		5.75	6.5	0.5	25.1	–0.8	
Ukraine	213	66	13	15	24		7.50	6.0	. . .	15.5	–0.5	0.1
Africa/Middle East												
Egypt	40	95	29	. . .	. . .		9.25	7.3	. . .	–20.2	–2.6	0.0
Israel	. . .	42	77	5	22		2.25	2.0	1.0	8.9	–0.6	–0.3
South Africa	71	94	312	9	43		5.00	5.3	0.7	–5.4	–1.1	0.2
Asia/Pacific												
China	17	1	6	5	30		6.00	2.8	. . .	16.6	–0.1	0.3
India	37	. . .	. . .	10	. . .		8.00	13.0	. . .	7.4	–0.2	0.0
Indonesia	43	54	82	19	11		5.75	5.0	0.5	5.9	–0.4	–0.2
Korea	. . .	63	92	15	25		3.00	2.2	1.8	5.5	–0.5	0.3
Malaysia	39	47	50	14	34		3.00	2.0	. . .	3.4	–0.7	–0.2
Philippines	24	41	14	17	22		3.75	4.6	0.4	3.9	–0.6	0.3
Thailand	27	9	42	7	9		3.00	4.7	–1.7	11.4	–1.0	–0.8
Vietnam	. . .	. . .	. . .	. . .	19		9.00	4.5	. . .	40.4		0.0
Latin America												
Brazil	21	64	94	7	45		7.50	5.0	1.5	27.4	0.4	–0.7
Chile	100	. . .	. . .	27	30		5.00	2.5	1.5	13.6	–0.3	–0.5
Colombia	61	84	15	8	43		4.75	2.7	1.3	8.2	–0.4	0.1
Mexico	48	92	103	16	43		4.50	4.0	0.0	3.3	0.1	–0.5
Peru	16	. . .	. . .	37	39		4.25	3.0	0.0	9.5	–0.1	0.6
Venezuela	293	451	6	5	. . .		. . .	22.0	. . .	4.0	–2.0	0.6

Sources: Bloomberg L.P.; Haver Analytics; IMF: Direction of Trade database, Financial Soundness Indicators (FSI) database, International Financial Statistics (IFS) database, World Economic Outlook (WEO) database; Bank for International Settlements-IMF-Organization for Economic Cooperation and Development-World Bank Joint External Debt Hub (JEDH); and IMF staff estimates.

Note: BIS = Bank for International Settlements; CDS = credit default swaps; CPI = consumer price index; IIP = international investment position; NPL = nonperforming loan.

[1]External refinancing need is the sum of short-term debt at initial maturity at end-2011 plus amortization of medium- and long-term government debt during 2012, estimated by IMF staff and scaled by most recent reserves from IFS.

[2]Calculated from a country's IIP.

[3]Liabilities to BIS banks are consolidated. Total credit is the sum of credit to the private sector and total public debt.

[4]Calculated using percentage changes in CDS levels; periphery euro area sovereign CDS is the average of Ireland, Italy, Portugal, and Spain CDS; 50 means that the country's CDS tends to widen by 50 percent for a 100 percent widening of periphery CDS.

[5]Fiscal vulnerability index is calculated from fiscal vulnerability indicators presented in Table 7 of the October 2012 *Fiscal Monitor*; red (yellow, green) denotes high (medium, moderate) levels of fiscal vulnerability. For more detail refer to the *Fiscal Monitor*.

[6]For inflation targeters, green if the policy rate is at least 4 percent and projected 2012 CPI inflation is at least 1 percentage point lower than the (upper bound of the) inflation target (range), red if the policy rate is lower than 2 percent or projected 2012 inflation is above the (upper end of the) inflation target (range), and yellow otherwise; for noninflation targeters (denoted by ".."), green if the policy rate is at least 4 percent and projected 2012 inflation is 3 percent or lower, red if the policy rate is lower than 2 percent or projected 2012 inflation is above 6 percent, and yellow otherwise. Countries operating under currency board regimes are coded as red.

[7]Green indicates modest credit growth over the past five years (increase in credit-to-GDP ratio less than 10 percentage points during 2006–11) along with improving asset quality and capital base in 2011 (proxied by a combination of decline in banking sector gross NPL ratio and increase in capital/asset ratio). Red indicates the least flexibility for banks to expand credit due to high past credit growth (increase in credit-to-GDP ratio above 15 percentage points during 2006–11) or deterioration in asset quality and capital base during 2011. Yellow for all other cases. This measure of credit policy space does not imply a judgment on the stability of the banking system or the scope for medium-term financial deepening.

[8]Credit corresponds to data from IFS on credit to the private sector.

[9]NPL ratio is the ratio of nonperforming loans to total loans from the FSI database.

[10]Change in bank capital to assets as calculated in Table 2 in FSI database.

Annex 2.1. Update to the EU Bank Deleveraging Exercise

This annex provides more information on the updated estimates for EU bank deleveraging—defined in this exercise as a reduction in bank assets—presented in the text. In this GFSR, the time frame (end-2011:Q3 to end-2013:Q4) and sample (58 large EU banks) are the same as in the deleveraging exercise in the April 2012 GFSR,[37] but the exercise is updated in this report to reflect the key factors affecting European banks: economic downturn, capital flight, financial repression, and growing financial fragmentation of the euro area. In addition to the four targets in the previous exercise, this update includes two new ones (purchases of local government bonds, and asset-liability matching on a country-by-country basis). The exercise in this report also includes new methodological assumptions and updated information. The changes are summarized in Table 2.9 and discussed below.

The scale of deleveraging is assessed under the three scenarios outlined in Chapter 1: *baseline policies*, *weak policies*, and *complete policies*.

Economic Downturn

The impact of the economic downturn on bank deleveraging is modeled through a capital target. In the scenarios, banks target a core Tier 1 capital ratio of 9 percent at end-2013.[38] If bank capital is insufficient to meet the target, banks are assumed to reduce assets. In the scenarios, the amount of bank capital changes for two reasons: capital measures and retained earnings.

- For *capital measures* we use the information provided by the European Banking Authority on capital raising, issuance of contingent capital, liability management, risk-weight optimization, and other capital measures.[39] This includes a total of €9.5 billion in government backstops. We also account for the announced support of up to €100 billion for Spanish banks.
- *Retained earnings* are based on the net income projections and assume full retention of dividends. Net income is modeled using a combination of macro-financial models linking the main net income components—net interest income, commission and fee income, trading income, other income, operating expense, and loan loss provisions and other asset impairments—with macroeconomic and financial variables. The key variables that underpin the projections are real GDP growth rates, other macroeconomic factors, and sovereign bond spreads (see Table 2.10). Sovereign bond spreads affect asset impairments both directly and through their impact on corporate risk premiums.

GDP growth varies across the scenarios and is based on the WEO baseline. GDP growth improves (under the *complete policies* scenario) or deteriorates (under the *weak policies* scenario) in line with the deviations of sovereign spreads from the baseline. In addition, under the *weak policies* scenario, fiscal contraction of 2 percent is assumed for the countries in the euro area periphery, which also affects GDP growth. The effects of sovereign spreads and fiscal contraction on GDP growth are estimated on the basis of elasticities from the IMF Global Integrated Monetary and Fiscal Model.

Capital Flight

As in the April 2012 GFSR, capital flight is modeled through assumptions about the rollover of wholesale funding and outflows of deposits. In this update, however, the assumptions on rollovers differ to reflect current funding pressures on periphery banks and the new scenarios:

- In the *baseline policies* scenario, banks are able to roll over wholesale funding only at current rates;

Note: Prepared by Sergei Antoshin, Anna Ilyina, William Kerry, Nada Oulidi, and Chris Walker.

[37]Annex 2.1 in the April 2012 GFSR explains the methodology behind that deleveraging exercise.

[38]In the April 2012 GFSR exercise, banks had to meet a capital target comprising a 9 percent core Tier 1 ratio plus a sovereign buffer by June 2012, as recommended by the European Banking Authority.

[39]See the announcement by the European Banking Authority on July 11, 2012, available at www.eba.europa.eu/cebs/media/aboutus/News%20and%20Communications/EBA-BS-2012-149--recap-report-to-be-published-11-July--FINAL.pdf.

Table 2.9. Summary of Updates to the Deleveraging Exercise

Macro/Financial/Structural Forces	Deleveraging Targets	Changes to Methodology
Economic downturn	Capital	Same target as in the April 2012 GFSR. Nine percent core Tier 1 ratio (in line with the European Banking Authority recommendation). To be met by end-2013. Includes revised projections of banks' retained earnings and updated information on capital measures.
Capital flight	Funding	Same target as in the April 2012 GFSR. Includes new assumptions on the rollover of wholesale funding and deposit outflows (see Table 2.11). Incorporates actual increases in central bank liquidity support.
Financial repression	Purchases of local government bonds	New target. Banks assumed to substitute, along with other domestic investors, for foreign investor flight from sovereigns (see Table 2.12).
Fragmentation of euro area	Asset-liability matching by country	New target. Banks reduce the loan-to-deposit ratios of their subsidiaries in selected countries to 110 or 100 percent, depending on scenarios. Priority is also given to scaling back other exposures (in selected countries).
Longer-term structural	Wholesale funding reliance	Same target as in the April 2012 GFSR. Proxied by a net stable funding ratio of 100 percent.
	Business model	Same target as in the April 2012 GFSR. Proxied by restructuring plans announced by the banks. Updated to reflect new information that became available after April 2012.

Source: IMF staff estimates.

Table 2.10. Assumptions on Key Macro-Financial Variables

	Complete Policies		Baseline Policies		Weak Policies	
Sovereign spreads, 10-year, basis points, relative to Germany						
	2011:Q3	2013		2013		2013
Euro area	198	97		176		328
Italy	365	250		375		700
Spain	325	250		380		750
GDP growth, in percentage points, deviations from WEO/GFSR baseline						
	2012	2013	2012	2013	2012	2013
Euro area	0.0	0.3	–	–	0.0	–1.2
Italy	0.0	0.5	–	–	0.0	–1.6
Spain	0.0	0.6	–	–	0.0	–1.9

Source: IMF staff estimates.

customer and interbank deposits at banks in the periphery continue to fall at their current pace through 2012 and then remain at that level.

- In the *weak policies* scenario, conditions worsen, and banks—including some in core countries—are able to roll over less of their wholesale funding. Deposits continue to flow out of periphery banks at their current pace until the end of 2013; deposit levels also fall at other euro area banks, albeit to a lesser extent, as the crisis spreads to other economies.
- In the *complete policies* scenario, current funding pressures gradually ease to enable banks to roll over liabilities in markets.

In the *baseline policies* and *weak policies* scenarios, the loss of deposits and wholesale funding is assumed to be partially offset by an increase in

Table 2.11. Average Funding Rollover Rates
(Percent)

	Customer Deposits	Interbank Deposits and Repo	Short-Term U.S. Dollar Funding	Other Short-Term Funding	Unsecured Term Funding (due 2012–13)	Covered Bonds (due 2012–13)
Complete policies scenario	100	100	100	100	100	100
Baseline policies scenario	99	100	55	100	85	90
Weak policies scenario	95	95	40	95	65	80

Source: IMF staff estimates.

central bank liquidity support. Looking ahead, it is assumed that the level of central bank support is maintained at its current level, accounting for the fact that the LTRO funding has to be paid back three years after it was granted.

Table 2.11 shows the weighted average rollover rates used in the scenarios. Note that the actual rollover rates used for banks vary, with those institutions under the most pressure facing lower rollover rates and higher deposit outflows than the average.

Financial Repression

Financial repression is modeled in the *baseline policies* and *weak policies* scenarios by assuming local banks need to buy more local government bonds. This assumption then interacts with the funding and the net stable funding ratio (NSFR) targets,[40] as banks need to shrink assets by more than they would prior to purchasing the bonds. Financial repression does not interact with the capital target, as it is assumed that local banks have a zero risk weight on the holdings of their own government bonds. Similarly, financial repression does not interact with banks' business plans or with the fragmentation target.

The amount of bonds purchased by local banks is determined by the scenario assumptions in Table 2.12. Local banks, along with other local investors (such as pension funds and asset managers), are assumed to purchase bonds in proportion to their current holdings of bonds, taking into account the coverage of the sample relative to the whole banking system.

[40]The scenarios assume that government bonds purchased under financial repression will be held to maturity, attracting an NSFR weight of 1.00 under Required Stable Funding.

Financial Fragmentation

Financial fragmentation of the euro area is incorporated in the *baseline policies* and *weak policies* scenarios; it does not occur in the *complete policies* scenario. In the *baseline policies* scenario, EU banks target loan-to-deposit ratios of 110 percent in their euro area periphery subsidiaries[41] and give priority to scaling back other exposures to periphery countries that are not locally funded.[42] In the *weak policies* scenario, banks target loan-to-deposit ratios of 100 percent in their foreign subsidiaries in all euro area countries as well as give priority to scaling back other periphery exposures that are not locally funded.

Long-Term Structural Forces

The two longer-term structural targets—reduction in wholesale funding and business plans—are modeled largely as they were in the April 2012 GFSR. The reduction in wholesale funding is proxied by an estimated NSFR, which incorporates the updated data on capital measures and the updated estimates for retained earnings. Business plans are again based on information made available by the banks in the

[41]The threshold of 110 percent is chosen as a less stringent target that has recently been recommended by some regulators. For example, the Austrian supervisor introduced the Loan-to-Local-Stable-Funding Ratio as a new monitoring tool in March 2012 and applies a threshold of 110 percent on the stock ratio among other indicators to determine unsustainable lending practices.

[42]This is motivated by the assumption that banks would like to match assets and liabilities in branches as well. However, available data do not allow us to distinguish between direct cross-border exposures and lending through local branches at the bank level. At the aggregate level, total assets of branches are sizable. Hence, any estimates based only on the subsidiaries data would likely understate the overall impact of financial fragmentation. For example, as of end-2010, the percentage split between total assets of subsidiaries and branches of credit institutions from EU countries was 36/64 for Spain and 47/53 for Italy.

Table 2.12. Amount of Additional Funding Required from Domestic Investors

	Additional Domestic Financing in 2012–13 (billions of euros)			Foreign Investor Share of Total Debt Stock[1] (percent of total stock)				
	Complete policies	Baseline policies	Weak policies	End-2009	End-2011	Complete policies[2]	Baseline policies[3]	Weak policies[4]
Austria	1	9	13	76.2	74.2	75.3	72.2	70.2
Belgium[5]	–9	31	55	63.1	50.8	55.3	44.6	38.5
Finland	1	–3	–6	82.9	86.0	85.7	89.2	92.3
France	46	93	112	58.8	57.8	59.3	56.8	55.8
Germany	119	–93	–229	49.8	56.1	52.6	62.3	68.6
Greece[6]	21	43	75	74.8	43.9	41.2	35.3	26.7
Ireland[6]	5	22	25	71.9	29.1	35.8	27.3	25.5
Italy[6]	–139	166	290	42.6	34.6	43.9	28.3	22.0
Netherlands[5]	10	56	85	68.1	55.4	59.2	49.1	42.7
Portugal[6]	–9	10	12	68.1	31.8	40.6	31.0	30.2
Spain[6]	12	121	164	50.5	32.9	40.8	28.0	23.0

Source: IMF staff estimates.

Note: Calculated as the share of the overall deficit funded by domestic investors, plus net change in the foreign share of the existing stock. It is possible for a euro area member country to have net outflows from domestic sovereign bonds, while simultaneously being a net overall recipient of capital inflows.

[1]Foreign investors exclude holdings in the Securities Market Programme and EU/IMF loans.

[2]Shares return to June 2011 levels by the end of 2013.

[3]Share declines over 2012–13 by the same amount as the decrease from end-2009 to end-2011.

[4]Share declines over 2012–13 by twice the amount of the decrease from end-2009 to end-2011.

[5]For Belgium and the Netherlands, the decline in the foreign share in the baseline policies scenario is half the decline from end-2009 to end-2011. In the weak policies scenario it is the same as the decline from end-2009 to end-2011.

[6]For periphery euro area countries, under the weak policies scenario shares decline during 2012–13 to levels existing prior to the formation of the European Monetary Union (as of end-1997). Under baseline policies, the decline occurs at half the rate.

sample. Updated plans are available for 12 banks, with our latest estimate of planned balance sheet reductions from end-2011:Q3 to end-2012:Q4 standing at $2.1 trillion (from $2.0 trillion in the April 2012 GFSR).

According to their original business plans, banks have strived to reduce (1) overreliance on short-term wholesale foreign exchange funding, (2) activities related to trading and corporate and investment banking (they attract higher risk weights under Basel 2.5 and Basel III), and (3) noncore assets and activities. Table 2.13 updates on progress in the implementation of these plans. Some examples are:

- *Trading portfolio*—most banks have reduced their securities holdings in derivatives and structured products (including collateralized debt obligations and residential mortgage-backed securities).
- *Corporate and investment banking activities (including legacy assets)*—several banks, notably French banks, are scaling back these activities significantly.
- *Noncore subsidiaries*—banks have made significant progress on several strategic sales of subsidiaries, including the sale of the U.S. subsidiary ING Direct by ING Group; Dexia's large ongoing and planned divestments of several subsidiaries in Canada, France, Luxembourg, and Turkey for an expected total of €113 billion; and KBC's sales of branches in Ireland, Poland, Romania, and the United Kingdom for a total post-tax income of €868 million, thereby relieving €1.4 billion of capital. The Royal Bank of Scotland has made significant strides in its divestment program by selling subsidiaries in the Netherlands as well as in the United Kingdom, which reduced its noncore assets by £11 billion and its risk-weighted assets by £7 billion in the second quarter of 2012.
- *De-risking the loan portfolio*—the basic strategy followed by banks is loan runoffs for risky segments and clients to reduce credit risk and capital requirements. Some banks, including Unicredit and ING, are planning to reduce their geographic asset-liability asymmetries as well. German banks are significantly reducing exposures to the commercial real estate and public sectors.

Table 2.13. Progress on the Implementation of Business Plans by Selected EU Banks

	Decrease in Assets				Decrease in Funding Gap		Regional Reach				
Country/Bank	Trading portfolio	Corporate and investment banking	Other loans (including CRE and run-offs)	Sale of subsidiaries	Increase deposits	Increase maturities of wholesale funding	Eastern Europe	Asia	Latin America	EU	North America
Austria											
Erste											
Belgium											
Dexia											
KBC Bank											
France											
BNP Paribas											
Crédit Agricole											
BPCE											
Sociéte Genérale											
Germany											
DB											
Commerzbank											
Landesbank BW											
Bayern LB											
Ireland											
AIB											
Bank of Ireland											
Italy											
Unicredit											
Netherlands											
ING											
ABN AMRO BANK											
Spain											
Santander											
United Kingdom											
HSBC											
RBS											

Sources: Bank websites; and IMF staff estimates

Note: Total number of banks: 58; number of banks with a plan: 24; number of banks with plans relating to the European Banking Authority: 3; number of banks with an update: 12. CRE = commercial real estate.

Significant progress in restructuring plans

Some progress in restructuring plans

Information on progress not available

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CHAPTER 3

THE REFORM AGENDA: AN INTERIM REPORT ON PROGRESS TOWARD A SAFER FINANCIAL SYSTEM

Summary

A host of regulatory reforms are under way to make the financial system safer, and the reforms are aimed in the right direction: to make markets and institutions more transparent, less complex, and less leveraged. The chapter uses these qualities, among others, as normative benchmarks and adds value by providing new measures of financial intermediation structures and an early assessment of whether the financial system is headed in a safer direction. The same framework can be used for further evaluation when the crisis subsides. The chapter also takes stock of the host of regulatory reforms and their status with regard to implementation, and indicates where further effort is still needed.

Most reforms are in the banking sector and impose higher costs to encourage banks to internalize the costs of certain risky activities. Basel III requirements for more and better-quality capital and liquidity buffers should enable institutions to better withstand distress. Banks will likely adjust to the new costs in various ways, some of which may not have been intended. The new banking standards may encourage certain activities to move to the nonbank sector, where those standards do not apply. Alternatively, big banking groups with advantages of scale may be better able to absorb the costs of the regulations; as a result, they may become even more prominent in certain markets, making these markets more concentrated.

Although the intentions of policymakers are clear and positive, the reforms have yet to effect a safer set of financial structures, in part because, in some economies and regions, the intervention measures needed to deal with the prolonged crisis are delaying a "reboot" of the system onto a safer path. These intervention measures are rightly aimed at preventing a collapse of the financial system and supporting the real economy, but they can also provide time to allow damaged financial systems to recover. The findings suggest, however, that despite improvements along some dimensions and in some economies, the structure of intermediation remains largely unchanged. The data suggest that financial systems are still overly complex, banking assets are concentrated, with strong domestic interbank linkages, and the too-important-to-fail issues are unresolved. Innovative products are already being developed to circumvent some new regulations. These same traits have been linked to the crisis, suggesting financial systems remain vulnerable. The good news is that there do not appear to have been serious setbacks to financial globalization (despite reversals from some crisis-hit economies); however, this also means that in the absence of appropriate policies, highly integrated economies are still susceptible to harmful cross-border spillovers.

Despite much progress on the reform agenda, reforms in some areas still need to be further refined by policymakers. These areas include a global-level discussion on the pros and cons for direct restrictions on business models; monitoring, and a set of prudential standards if needed, for nonbank financial institutions posing systemic risks within the so-called shadow banking sector; careful thought on how to encourage the use of simpler products and simpler organizational structures; and further progress on recovery and resolution planning for large institutions, including cross-border resolution to help secure the benefits of financial globalization. Finally, the success of the current and prospective reforms depends on enhanced supervision, incentives for the private sector to adhere to the reforms, the political will to implement regulations, and the resources necessary for the task of making the financial system simpler and safer.

The global regulatory reform agenda aims for a safer financial system so that financial intermediation can help produce stable and sustainable economic growth—a system that avoids taxpayer-paid bailouts and large disruptions to economic activity. Many of the current reforms attempt to ensure that financial institutions internalize the risks and explicit or implicit costs of their business activities, mainly through the imposition of additional costs on activities that, in the crisis, were shown to be riskier than originally envisaged or had broader systemic effects. This chapter takes the first step toward assessing the extent to which these reforms are producing a safer system and identifies some remaining gaps in the reform agenda.

This task should be viewed as a normative one: Have interim lessons from the crisis shaped the reforms appropriately? Or have some lessons not yet been adequately incorporated? Despite the dearth of up-to-date cross-country data on which to make quantitative assessments, some changes in financial systems are beginning to be noticeable, especially in economies in which the crisis has subsided and reforms are being implemented. Hence, the chapter should be viewed as an interim report on whether structural changes are starting to move us closer to a safer financial system, along with suggestions about how to reap the full benefits of the reform agenda.

It is helpful at the outset to describe what a safer financial system would look like. Most would envisage a system that is less complex and more transparent, a system in which institutions are less dependent on leverage, are better capitalized and better able to absorb loss, and can better manage liquidity risk through a more sustainable level of maturity mismatch. This safer system would discourage individual institutions from taking advantage of an implicit government guarantee and would encourage all risks (including systemic risks) to be properly priced. It would apply similar prudential standards to similar risks to avoid regulatory arbitrage that would allow risks to migrate and potentially threaten stability.

Although structural changes are not always apparent, we believe that the thrust of the reforms is pushing in the right direction and will, over time, deliver a system less prone to instability. That said, the chapter finds that, since 2007, overall, financial buffers are being strengthened but vulnerabilities remain and implementation of the reforms is uneven. Progress is lacking in part because (1) in many economies the reforms have only begun to take root, and (2) in some economies and regions, the continued need for official support of the financial system to prevent a collapse is not accompanied by resolute measures to deeply restructure the financial sector, which is affecting incentives and hampering normalization. The long transition period for implementation of reforms has been designed to minimize any potential disruption of the nascent economic recovery (as opposed to eventual steady-state impact). Hence, only a preliminary assessment of the effects of the proposed reforms is possible. As reforms and implementation advance and crisis management effects unwind, however, it will be important to again evaluate progress in addressing the key structural components and, if needed, consider further improvements.

The analysis in this chapter suggests some areas for further attention, including the too-important-to-fail problem, risks posed by systemically important nonbank institutions, and methods to ensure that globalization does not reverse. Regulations imply that costs will rise for certain riskier activities, and some of the largest institutions will pursue their scale economies in certain business lines to absorb the higher costs. Consequently there is a risk that in some markets large institutions will become larger still, and more concentrated, and that these few global institutions will become even more influential—thereby further entrenching the too-important-to-fail problem.

The risks inherent in a growing too-important-to-fail problem make regulatory initiatives to tackle the problem a high priority—initiatives such as enhancing the resolvability of such global institutions and directly changing permissible business models.

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However, in some cases, these initiatives may be very difficult to implement effectively or may not have the intended outcomes (either domestically or globally). Tighter bank regulation and more intense supervision may also push bank-like activities into some less-regulated nonbank financial institutions (the shadow banking system). If these are deemed to raise systemic risks, a wider regulatory perimeter is advisable.

Concerns about deglobalization are rising, especially with the fragmentation in the euro area, though solid evidence is currently lacking at the global level to substantiate a decline in cross-border activity. Although a pull-back from globalization may not yet be evident, further measures will be needed to make sure that the benefits of risk-sharing and diversification that come from an integrated global financial system are not lost.

The chapter will progress by addressing the following questions in turn:

- What structural features of the financial system were associated with the crisis? The answers to this question will lay out the elements of a safe financial structure that regulations should address.
- What are the goals of the new regulatory initiatives, and what is the current best guess regarding their implications—both intended and unintended—for the structure of intermediation?
- What are the potential long-term effects of the crisis intervention measures? The key risks of the much-needed policies to manage the prolonged crisis will be highlighted.
- Has the structure of the financial system become safer in the past five years? Evidence of changes in trends of three structural features will be documented. Quantitative analysis on whether progress on key regulatory reforms is driving these changes will be provided.
- What are the implications of the reform agenda for the attainment of a safer structure? The chapter will identify key reform areas in which further discussions are needed.

Structural Features Associated with the Crisis

The structure of financial intermediation can be characterized in various ways, each with different implications for systemic risk and economic growth.[1] Financial intermediation that is more *market based* (and less *traditional*) can be characterized by three features: banks playing more of a *nontraditional role* by relying on fee-based income sources, trading activities, and nondeposit liabilities; a relatively large role for *nonbank* financial institutions in the intermediation process; and greater use of *new financial products* such as securitizations and derivatives (IMF, 2006, Box 3.1).[2] On the other hand, the financial system is one with more *traditional bank-based intermediation* if banks primarily take deposits and make loans and are the main institutions in the economy that intermediate between savers and investors. With traditional intermediation, banks tend to depend on net interest income as their main source of profitability. These two basic intermediation structures, market based and traditional, give rise to financial institutions with different features of scale and scope (Box 3.1). In particular, certain market-based forms of intermediation could be related to larger, more interconnected (both domestically and globally), and more complex financial structures and instruments. Complexity can be detrimental to financial stability if the associated financial products are opaque and cannot be easily priced.

A surge of market-based financial intermediation and new financial products led to structural features that were associated with the recent financial crisis.[3] Before the crisis, advanced financial systems conducted more market-based business rather than the traditional bank-based intermediation. Because the regulatory framework had not been adequately upgraded to preserve financial safety, new vulnerabilities emerged (Viñals and others, 2010). Box 3.1 examines the theoretical and empirical literature to demonstrate how these developments are linked to

[1]The implications for systemic risk are derived in this chapter; Chapter 4 explores a more formal cross-country examination of the effects on economic growth, on its volatility, and on financial stability.

[2]See Annex 3.1 for the indicators used to characterize the various structures of intermediation. The terms in italics represent the measures used to examine the structures.

[3]There were other contributing factors as well—poor lending standards, a "search for yield" driven by relatively loose monetary policy, weak supervision, and compensation policies encouraging risk taking, to name a few.

Box 3.1. Risks Associated with New Forms of Financial Intermediation

Changes in structures of financial intermediation over the decade have considerably expanded access to finance and contributed to social welfare. The changes led to new forms of bank intermediation, including the rise of the shadow banking system and innovative products. Yet, some of the changes—associated with the attributes of concentration, interconnectedness, complexity, and opacity—have come with risks.

The greatest change to intermediation in the history of finance has been spurred by advances in information technology (IT) that have enabled, among other things, better and faster processing of information and trading in a wider range of financial instruments. Over the past 10 years, these changes have allowed more financial intermediation to take place in markets instead of through bilateral negotiations. The more market-based system has in turn generated new or expanded forms of financial intermediation: banks deriving income from nontraditional sources and lending to and borrowing from nonbank financial institutions, expanded intermediation by nonbanks, and new financial products like private-label asset-backed securities and customized derivatives.

Nontraditional Banking and Associated Risks

Bank business models have traditionally been built on information obtained from repeated interactions with customers, or "soft" information. Technology and transparency have shifted banks toward the use of hard information (e.g., credit registries or standardized scoring) and "arm's length" transactions (IMF, 2006) for their traditional deposit and lending business, and toward more fee-based business (Boot and Thakor, 2000). Thus, transactions that were based on customer relationships lost their natural advantage, and banks came to face greater competition. The tilt in intermediation toward nontraditional banking has entailed rising systemic risks:

- *Size and complexity*. Soft information benefits smaller, simpler banks. Hard information enables banks to become larger and more complex (Stein, 2002). Theoretically, large banks could benefit from economies of scale and scope. Yet the evidence on such economies is mixed (De Nicolò, Boyd, and Jalal, 2009; Demsetz and Strahan, 1997; Saunders, 2000). Large and complex banks are hard to resolve, which increases the impact of crises (Hoenig and Morris, 2011; Ueda and Weder di Mauro, 2012). Also, when bank assets are tradable, banks can change risk profiles rapidly or structure their assets in a way that conceals risks from outside parties (Myers and Rajan, 1998). These factors challenge the ability of market discipline, corporate governance, and supervision to reduce potential systemic risks.
- *Concentration*. As banks grow, in part through mergers and acquisitions, the banking industry could become more concentrated, which tends to increase profits and could reduce the incentives to take risk. However, higher concentration could also induce banks to charge higher loan rates, which in turn could lead to higher risk taking by banks' borrowers, thus increasing systemic risk (Allen and Gale, 2004; Boyd and De Nicolò, 2005). Concentration can also make institutions too important to fail if resolution regimes are inadequate, with detrimental effects on financial stability.
- *Interconnectedness.* With a wider universe of tradable claims, banks become more connected with other banks and with nonbanks. Interconnectedness improves opportunities for diversifying risks, allows a wider range of transactions, and facilitates a more globally integrated financial system (Wagner, 2011; Freixas and Holthausen, 2005). Yet increased interconnectedness can also lead to higher systemic risk. Interconnected systems spread small and idiosyncratic shocks but can be fragile when subjected to large, systemic shocks, particularly when banks underestimate their likelihood (Allen and Gale, 2000; Acemoğlu, Ozdaglar, and Tahbaz-Salehi, 2012; Gennaioli, Shleifer, and Vishny, forthcoming).
- *Procyclicality*. When bank assets are tradable, it is easier for a bank to alter the size of its balance sheet and leverage. This exposes the bank to boom-bust financial cycles, which can be amplified by mark-to-market rules (Shleifer and Vishny, 2010; Plantin, Sapra, and Shin, 2008; IMF, 2009). The shedding of assets may trigger fire sales and

Note: Prepared by Lev Ratnovski.

Box 3.1 *(continued)*

credit freezes, with significant negative implications for macroeconomic outcomes and financial stability. Depressed asset values through fire sales pose a contagion risk in that they may lead to additional margin calls and losses for other institutions, including previously unaffected firms.

- *Tail risk*. With more tradable assets and less traditional banking business, banks can accumulate large, skewed exposures to various risks. In a common pattern before and, in some cases, during the global crisis, banks used structured investments and proprietary trading to generate additional return ("alpha") at the cost of a rise in "tail risk"—the risk of a rare but catastrophic event (Acharya and others, 2010; Boot and Ratnovski, forthcoming). A realization of such risk is likely to bring about long-lasting bank distress (Brunnermeier, Dong, and Palia, forthcoming).
- *Wholesale funding and market discipline*. The providers of wholesale funding are often senior creditors to a bank who can maintain lending to prop up a troubled bank, but they can also rapidly cut it off if the riskiness of the bank becomes excessive or its value falls below a certain threshold (Gorton and Metrick, 2012; Huang and Ratnovski, 2011). An abrupt funding freeze may complicate a policy response, particularly if such an event affects multiple banks—that is, a systemic liquidity event. Lack of disclosure and transparency (particularly with respect to exposures taken by the bank) can undermine the market discipline that should be applied by those providing wholesale funding and by equity investors. Market discipline can be further compromised if the losses of most creditors of distressed banks are cushioned by government interventions.

Nonbanks and New Financial Products

Another change in the financial sector structure has been the reemergence of a variety of nonbank intermediaries, including money market funds, major broker-dealers, and various off-balance-sheet vehicles sponsored by banks (Claessens and others, forthcoming). Collectively, credit intermediation involving entities or activities by nonbanks (whether by maturity or liquidity transformation or leverage) has become known as the shadow banking system.[1]

The breakdown in credit markets in 2008 revealed how this type of financial intermediation can contribute to systemic risks. The interconnection of nonbanks and banks led to contagion across both sets of entities as uncertainty caused funding markets to seize up. Reliance on very-short-term funding resulted in the private creation of money-like financial instruments that were subject to runs once market participants started seeing the instruments as risky instead of safe. The resilience of nonbanks—notably U.S. investment banks—was hampered by insufficient capital and there were no appropriate procedures for access to liquidity support or a set of rules for resolution (Duffie, 2010; Covitz, Liang, and Suarez, forthcoming). Banks had used nonbanks to move their own risks off the balance sheet—for instance by establishing separate special-purpose vehicles (SPVs) and providing them with insurance facilities to cover credit and liquidity risk—but had to take back those risks for reputational reasons during the crisis. Banks retained the residual risks that their customers eschewed (for instance, the risky tranches of structured instruments), while they sold off the safer tranches (Pozsar, 2011). As a result, banks had assumed too much residual risk (Gennaioli, Shleifer, and Vishny, forthcoming).

New insurance and investment products (like exchange traded products, customized derivatives, and synthetic debt obligations) have become easy to construct with greater availability of data and better information technology. Some of these new products can be complex and opaque; therefore, counterparties may not understand the risks that they are assuming (Gabaix and Laibson, 2006; Carlin, 2009; Lo, 2011), causing financial instability when their risks are revealed.

[1]The FSB (2012a) describes the shadow banking system as "credit intermediation involving entities and activities outside the regular banking system."

financial structures that may give rise to systemic risk.

It is now well accepted that financial systems became highly complex and the location of risks was opaque, making it difficult for both authorities and investors to track risks and assess potential spillovers. The inability of investors and supervisors to understand the underlying elements of new financial

instruments, in turn, allowed institutions to take on too much leverage. Technological advances also permitted financial institutions to become more highly interconnected through interbank, repo, and other wholesale markets, both domestically and globally. Both features enabled rapid transmission and amplification of shocks during the crisis. Furthermore, large complex institutions became too important to fail and were bailed out by taxpayers during the crisis. In addition, the shadow banking system gained importance as it avoided the more stringent regulatory requirements imposed on banks.

As motivation for examining structural characteristics, it is useful to note that economies that contained some of these features before the crisis appear to have been associated with a higher incidence of financial stress. Simple correlations between the pre-crisis structures and the financial stress index (IMF, 2009; Cardarelli, Elekdag, and Lall, 2011) during 2008–10 suggest that certain structures were associated with greater instability during the crisis.[4] In particular, bigger financial systems, higher cross-border interconnectedness (which is also closely associated with greater reliance on wholesale funding), and systems with lower net interest margins (also associated with less profitable traditional banking systems) were associated with a higher degree of financial stress (Table 3.1).[5] Financial systems that have relied on derivatives and securitization were also associated with higher financial stress, although in some cases the number of observations is small.[6] The association of the crisis with higher banking concentration is ambiguous—what seem more important are domestic interconnectedness and globalization and the use of some types of derivatives that could add to complexity and interconnectedness.[7]

The Goal of Reforms—Desirable Structures of Financial Intermediation

The new regulatory agenda should aim to reduce the burden of financial distress on the public sector (and ultimately taxpayers), lessen the severity of boom-bust cycles, and sustain growth—that is, make the system "safer" (Viñals and others, 2010; Kodres and Narain, 2010; and Chapter 4). The agenda involves making financial institutions less complex and more transparent and lowering the incentives for them to take excessive risk. Hence, financial policies should aim to move the financial system to more desirable structures along the following dimensions:

- A more transparent financial system with better governance—one in which both regulatory authorities and investors understand the location of risks and the way in which institutions are interconnected. Corporate structures, instruments, and markets should be less opaque and simple enough so that the risks can be properly priced by investors.
- A system with less leverage and hence less prone to boom and bust cycles; and one that reaps the positive aspects of interconnectedness and global-

[4]The financial stress index (FSI) is a monthly indicator of strain in national financial systems. An increase in the FSI denotes higher stress. See Cardarelli, Elekdag, and Lall (2011) for advanced economies, and Balakrishnan and others (2009) for emerging economies. The FSI for advanced economies is a combination of several variables: banking sector beta, the TED spread, term spreads, stock market returns, stock market volatility, sovereign debt spreads, and exchange market volatility. For emerging economies, the FSI has five variables—it excludes the TED and term spreads and replaces exchange market volatility with an exchange market pressure index.

[5]The monthly financial stress index is averaged for the years 2008–11, the structure variables are averaged over their annual observations for 2003–07, and then the correlation is calculated between the two variables across economies. Some high correlations in Table 3.1 are not statistically significant because of a low number of observations.

[6]Although there is no direct measure of complexity, use of derivatives and structured products in collateral chains could be weak links during a crisis. Bhatia and Bayoumi (2012) show that nongovernmental securities, such as top-rated asset-backed securities (ABS) and mortgage-backed securities (MBS), were used as collateral for funding with a low or zero haircut in U.S. tri-party repo markets. The presence of these securities in the collateral pools triggered mass withdrawals of secured funding to interconnected market-making firms during the crisis. A good portion of the 2006–07 spike in securitization consisted of ABS, MBS, collateralized debt obligations (CDO), and resecuritizations. Also, much of the $1.4 trillion asset-backed commercial paper (ABCP) outstanding at the end of 2006 in Europe and the United States was backed by securitization products, including resecuritizations. Most of these highly leveraged products were part of the trend to generate fee income and move loans off of banks' balance sheets.

[7]These observations are in line with existing evidence (Ötker-Robe and others, 2011) that large and complex financial institutions that were interconnected had a higher likelihood of distress during the recent crisis; the distress was notably higher for banks with investment and universal banking activities than for commercial banks. Also, see Chapter 4 on evidence that higher domestic interconnectedness increases the probability of crisis.

Table 3.1. Financial Structure before the Crisis and Financial Stress during the Crisis

Structural Indicator, 2003–07	Correlation with Financial Stress Index, 2008–11[1]	Number of Countries
Market-based intermediation	0.34	7
Nontraditional bank intermediation	0.23	29
Noninterest income to total income	0.12	44
Other earning assets to total assets	–0.05	40
Other interest-bearing liabilities to total liabilities	0.24	40
Nonbank intermediation		
Loans and bonds held by nonbanks over loans and bonds held by financial sector	0.04	22
Use of new financial products	0.35	11
Derivatives turnover to GDP	0.28	22
Securitization to GDP	0.40	11
Traditional bank-based intermediation	–0.41	15
Loans and bonds held by banks relative to the overall financial sector	–0.04	22
Net interest margin	–0.44**	43
Scale and scope	0.21	20
Size	0.40**	35
Domestic interconnectedness	0.02	20
Wholesale funding ratio	0.16	23
Interbank assets to total assets	0.00	32
Interbank liabilities to total liabilities	–0.10	32
Concentration (share of top three banks)	0.16	42
Financial globalization	0.35*	25
Share of foreign banks (number of banks)	0.03	44
Total bank foreign assets (in percent of GDP)	0.45**	33
Global interconnectedness[2]	0.48**	42
Global interconnectedness on assets	0.47**	42
Global interconnectedness on liabilities	0.49**	42
Financial buffers	–0.42**	44
Liquid assets to deposits and short-term funding	–0.12	44
Equity to total assets	–0.50**	44

Source: IMF staff estimates.

Note: See Annex 3.1 for the description of data and indices. The financial stress index (FSI) is a monthly indicator of national financial system strain. See Cardarelli, Elekdag, and Lall (2011) for advanced economies, and Balakrishnan and others (2009) for emerging economies. For advanced economies, the FSI is an aggregate of several standardized indicators: banking sector beta, the TED spread, term spreads, stock market returns, stock market volatility, sovereign debt spreads, and exchange market volatility. For emerging economies, the FSI consists of only five indicators (the TED and term spreads are excluded, and exchange market volatility is replaced with exchange market pressure index). An increase in the FSI denotes higher stress.

[1]** and * denote statistical significance at the 5 percent and 10 percent levels of confidence.

[2]See Čihák, Muñoz, and Scuzzarella (2012).

ization (risk diversification and access to finance) while limiting contagion risk and rapid retrenchment of cross-border flows during crisis.

- Higher and better-quality capital and liquidity buffers that enable institutions to withstand distress and that appropriately reflect the systemic risk of their activities.
- A better understanding and oversight of risks in the nonbank financial sector, which has been placed within a perimeter for monitoring and, as needed, regulation. The purpose is to ensure that contagion is limited between banks and nonbanks during a crisis and that the transactions by shadow banks are transparent and allow pricing to reflect risks.
- Systemically important financial institutions that can be resolved in an effective and timely way and with minimum cost to their customers, and, ideally no costs to the taxpayer.

In the process of limiting high-risk activities, the positive aspects of the recent financial developments

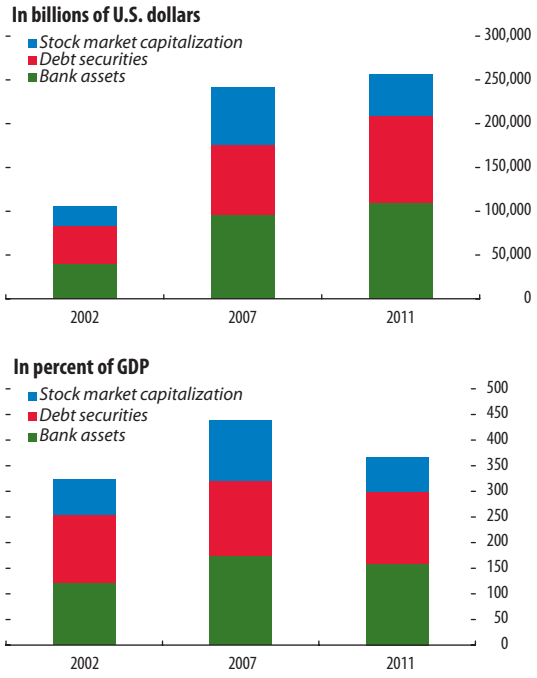
should not be lost, as there are clear trade-offs. Nontraditional banking and nonbank financial intermediation can benefit market depth and broaden access to finance. Diversifying financial intermediation beyond the traditional form of deposit taking and lending has expanded credit and can additionally benefit the economy through a wider dispersion of risks. New, well-conceived products can open up opportunities to price risks, share them among those best able to bear them, and enhance economic activity. However, where risks in market-based finance are not well understood or not transparent—in particular, risks arising from (and underestimating the degree of) interconnectedness, poor disclosure, undercapitalization, and complexity of financial intermediaries—the result is often costly for the financial system and the wider economy. A desirable financial system would limit these externalities, and policies should be clearly aimed at doing so.

Even though the reforms are aimed at obtaining a safer system, evaluating their implementation status and their impact now is challenging because the reforms are in process, the crisis is still not over, and crisis management policies are ongoing in some regions. In addition, the financial system continues to grow in nominal terms, but it has shrunk relative to the world economy (Figure 3.1). Also, policies (and events) have altered the relative size of the components that make up the global financial system—the growth of debt securities (including government debt, some of which has been directly related to crisis management and fiscal support) has outpaced that of equity and bank assets. While thus recognizing the great difficulties involved, the chapter attempts to identify structural alterations that can reasonably be ascribed to regulation.

Objectives and Implications of the New Regulatory Initiatives

Since the crisis began, the regulatory reform agenda has been both ambitious and global. Setting aside some specific attempts to alter business models (the Vickers commission report in the United Kingdom and the Volcker rule under the Dodd-Frank Act in the United States) at the national level, the global regulatory reform agenda has not been driven

Figure 3.1. Size of the Global Financial System



Sources: Bank for International Settlements; Bankscope; Bloomberg L.P.; and World Federation of Exchanges.

toward directly altering financial sector structures per se, but rather toward promoting safer behavior (G20, 2008, 2009).[8] However, the emphasis in the reforms on raising the costs of riskier activities means one can expect changes by the private sector to lower overall costs and move to more profitable activities. Hence, the response of institutions and investors to new requirements is likely to produce new and altered structures and could change the larger financial system structure. The enhanced capital and liquidity requirements under Basel III, for example, are aimed at improving banks' resilience and ability to absorb losses.[9] In responding to these

[8]Section 619 of the Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111–203, 24 Stat. 1376 (2010) (Dodd-Frank Act), also known as the "Volcker Rule," and Independent Commission on Banking: Final Report and Recommendations, September 12, 2011, http://bankingcommission.independent.gov.uk/, also known as the "Vickers report."

[9]Basel Committee on Banking Supervision (BCBS; 2011a, 2011b). See also a current BCBS (2012b) proposal to extend the surcharge on global systemically important financial institutions (G-SIFIs) to domestic systemically important banks (D-SIBs).

enhanced requirements as well as to changing business conditions, banks must decide which activities to keep and how to structure their funding and capital profiles. Investors will in turn decide how they will participate and on what terms. These decisions will produce change, much of which is as yet unpredictable.

At this stage, as noted, an analysis is complicated: Some crucial elements of the reform are yet to be finalized, and many have not yet been implemented. This leaves open the possibility of differences in their implementation or application, particularly as they trickle down from the international to the national level. Nevertheless, assessments of the economic costs and benefits, both transitional and long term, of the Basel III capital and liquidity standards have shown that the long-term benefits vastly exceed the transitional costs (BCBS, 2010a; MAG, 2010). In addition, BCBS (2012a) and the European Banking Authority (EBA; 2012) report the impact of the Basel III capital and liquidity measures on the soundness (capital ratios) and liquidity of a sample of global and regional banks from advanced and emerging economies. This chapter adds to these studies by attempting to directly assess the impact of the reforms on financial intermediation structures.[10] Table 3.2 provides a snapshot of the new regulatory initiatives, and Annex 3.2 summarizes the regulatory proposals whose goals and implications are discussed here.[11]

Acknowledging that these are early days in the reform agenda, we set out below the key regulatory goals and their potential impact on financial structure. Table 3.2 provides a snapshot of the new regulatory initiatives (which are set out in more detail in Annex 3.2); Table 3.3 summarizes our conclusions about the potential outcomes.

Banks

Capital

The new capital rules are designed to improve the "loss absorbency" of capital—creating additional buffers that allow an institution to incur losses without being forced into insolvency or without liability holders becoming concerned about solvency. The new rules tighten the definition of capital, alter the risk weights assigned to various assets to better align them with the risk incurred, and raise the capital ratios themselves. A leverage ratio is being added as a separate backstop to risk-weighted capital. Global systemically important banks (G-SIBs) will be subject to additional capital requirements, usually referred to as a surcharge (BCBS, 2011c).

Banks can adjust to higher capital standards through a range of means. These would include reducing the payout of dividends and retaining more profits, raising equity, reducing balance sheet size, including by shedding assets, and changing asset composition. Through these changes, and depending upon the ability to raise capital, the broader outcomes could include restructuring business lines, tightening credit availability, and increasing the cost of credit (Santos and Elliott, 2012).

Balance sheet optimization, in the face of higher capital charges, may drive change. The higher capital charges encourage banks to deemphasize activities that "consume" higher risk-weighted assets (RWAs), such as direct exposures, and increase activities that are more efficient from an RWA perspective, such as fee-generating business (especially relevant for banks accredited under the advanced Basel II approaches). Higher capital charges against positions in the trading book and for over-the-counter (OTC) derivatives counterparty risk have increased the amounts needed for these riskier activities and could lead to a change in the asset composition from higher RWAs to lower ones.[12]

Early evidence suggests banks may be adjusting to capital requirements through "derisking" rather than "deleveraging." Banks have been able to build regulatory capital by substituting assets (taking on assets that need less required capital) or retaining earnings. The outcome of the recent exercise by the EBA to create additional capital buffers in the face of market stress is illustrative. So far, the EBA exercise has revealed that most banks have been able to raise the

[10]Chapter 4 takes the additional step and attempts to link the structures to economic outcomes.

[11]See Table 3.8 on the status of implementation in 12 economies and the European Union.

[12]Exceptions are made for nonfinancial corporations as counterparties; these exceptions differ by jurisdiction.

Table 3.2. A Snapshot of the New Regulatory Initiatives

Key reforms	Elements	Timeline
	Banks	
Global reforms		
Basel III capital standards	Changes to the definition of capital.	Completion 2019
Basel III capital charges	Better valuation of risk.	Completion 2019
	Incremental risk charge for trading-book activity.	Completion 2019
	Higher capital charges for counterparty exposures in derivatives, repo trading.	Completion 2019
	Additional capital conservation and countercyclical buffers.	Completion 2019
	Additional capital surcharge for G-SIFIs.	Completion 2019
	Capital charge assessed on (clearing member) banks' central counterparty default fund exposures.	Completion 2019
G-SIB surcharge	Additional amount of common equity for systemically important banks.	Completion 2019
Basel III liquidity requirements	Liquidity coverage ratio: requires high-quality liquid assets sufficient to meet 30 days' outflows	Completion 2015
	Net stable funding ratio: requires better maturity matching of assets and liabilities.	Completion 2018
Basel III leverage ratio	Sets a ceiling on the measure of exposures (regardless of risk weighting) against capital (3 percent Tier 1 capital over total exposures).	Completion 2019
FSB compensation guidelines	Responsibility of boards for compensation policies. Compensation should be aligned with risks and time horizons. Supervisors should monitor compensation policies.	Implemented
Corporate governance	Emphasis on robust corporate governance, including the role of banks' boards.	
Resolution of G-SIFIs	Reduce the likelihood that institutions will need to use public funds when they fail.	
National reforms		
Volcker rule (Dodd-Frank Act)	Deposit-taking institutions restricted from trading activities, ownership of private equity and hedge funds.	Law passed, implementation pending
Vickers report	Ring-fencing of U.K. retail banks from investment banking activities; additional capital for ring-fenced entity.	Completion 2019
	Markets	
Global reforms		
OTC derivatives	Standardization of derivatives contracts. Clearing of standardized derivatives contracts through central counterparties (CCPs). Trading of standardized derivatives contracts on exchanges or electronic trading platforms where appropriate. Reporting of contracts to trade repositories. Higher capital and margin requirements for derivatives that are not centrally cleared.	Varied
	Nonbanks	
Global reforms		
Shadow banking	Monitoring of shadow banking and evaluation of risks. Registration of hedge funds; improved standards for securitization. Future regulatory reforms include enhancements to indirect regulation (regulation of shadow banks through their interaction with banks); increased liquidity and valuation rules for money market funds; rules governing repos and securities lending.	
	Other initiatives	
Credit ratings	Registration and regulation of credit rating agencies; regulation includes further transparency on rating methodologies, on the performance of ratings, and raw data.	Implementation ongoing
	Reduction of regulatory reliance on ratings. In the United States, this has triggered removal of references to credit ratings in laws and regulations.	Implementation ongoing

Source: IMF staff.

Note: No entry for timeline means that the reforms are still being developed. FSB = Financial Stability Board; G-SIB = global systemically important bank; G-SIFIs = global systemically important financial institutions.

Table 3.3. Possible Effects of Regulatory Reforms on Financial Structure

		Basel III Capital Rules	Basel III Leverage Rules	Basel III Liquidity Rules	Compensation Reform	Volcker Rule and Vickers Commission	Resolution	OTC Derivatives Reforms
Form of financial intermediation	Traditional bank-based intermediation (deposit taking and lending)	↓	↓	↓				
	Nontraditional banking (investment banking)[1]	↑↓[2]	↓↑[3]	↓	↓	↓	↓	↓
	Nonbanks	↑	↑	↑	↑			↑[4]
Scale and scope of the financial sector	Size (measured by total financial assets)	↓	↓	↓		↓		↓
	Complexity	↓		↓	↓	↓	↓	↓
	Domestic interconnectedness	↓		↓		↓		↓[5]
Competition within the financial sector	Efficiency (transparency, price formation)	↑↓[6]		↑↓[7]	↑			↑↓[8]
	Concentration (number of institutions)	↑	↓				↓	↑

Source: IMF staff.

Note: ↑ indicates an increase in the financial structure indicator; ↓ indicates a decrease. Entries with no arrows indicate either the impact is neutral or it is too soon to assess the impact of regulatory reforms.

[1]Includes the former U.S. investment banks Goldman Sachs and Morgan Stanley, which are currently incorporated as bank holding companies.

[2]Basel III capital standards will discourage trading activities using banks' balance sheets and certain business structures based on minority shareholders, bank sales of insurance, and goodwill. However, it may increase fee-based businesses as they are not subject to capital charges.

[3]The leverage ratio will also limit balance sheet expansion both in the traditional and nontraditional banking businesses. On the other hand, the leverage ratio is insensitive to risk and may encourage the increase of investment-banking activities.

[4]Arising from niche opportunities for nonbank competitors, although market share may remain modest.

[5]Use of central counterparties (CCPs) will reduce interconnections arising from bilateral trading. However, CCPs themselves will concentrate risk.

[6]The Basel III rules place more emphasis on a commonly accepted definition of capital, common equity Tier 1 (CET1), which basically consists of common shares. The harmonized definition of capital will make comparing the capital base of internationally active banks easier and more effective, enhancing transparency and hence price formation. However, the rules related to the larger risk coverage may require banks to post more collateral or hedge, which might be difficult, reducing transparency and efficiency in price formation. In addition, greater capital requirements might act as a barrier to entry and reduce competition, rendering the banking system less transparent and decreasing efficiency in price formation.

[7]The Basel III liquidity standards will apply uniformly to banks in different jurisdictions. They will make comparison of banks' liquidity situation easier and more effective, enhancing transparency and hence price information. However, greater liquidity requirements might act as a barrier to entry and reduce competition, decreasing efficiency in price formation.

[8]CCPs would bring efficiencies through netting. However, proliferation of CCPs without interoperability would reduce such efficiencies (↓). Trading on public venues may result in compression of bid-ask spreads, and trade reporting could increase transparency.

necessary capital and have made little use of restructuring or divestment of business lines, but their ability to continue doing so may be difficult given deteriorating market conditions (see Chapter 1).

Banks may be encouraged to consolidate business lines and focus on identified "core" activities. In particular, the fixed income, currencies, and commodities (FICC) business lines are affected by new capital requirements, potentially reducing profitability for banks that do not have sufficient market share of the business. At least two large global banks have already announced that they will divest FICC business lines as they adapt to new capital requirements because they are not sufficiently competitive in the area. An unintended outcome of regulatory reform may be to concentrate FICC activities in banks with an already larger share of the business or into investment funds and smaller investment firms. It is likely that small banks will experience less impact than large, more complex ones, and this is borne out by BCBS impact studies.[13]

Nonbank activity could increase, especially as the banking regulations begin to bite. Since nonbanks will not face higher capital requirements, their competitive position may be improved for activities in which they compete with banks, potentially changing financial structure. Working against such an outcome would be the funding advantage banks have over nonbanks (a regulatory premium), particularly banks that are seen by investors as too important to fail, as well as their access to central bank liquidity support. Investor decisions will also weigh heavily on the eventual outcome.

[13]Basel Committee on Banking Supervision, www.bis.org/bcbs/qis/overview.htm.

The more restrictive definition of what constitutes capital will also have an impact, mostly in advanced economies. For example, "carve outs" from capital (partial spin-offs), such as equity ownership of insurance companies, will have a direct impact on group structures and exposures and should work to make groups more transparent and less complex. These structural changes are already under way (Box 3.2). Reducing the use of goodwill and deferred tax assets and other intangibles will increase costs for banks and could also be expected to affect size and activity, but it may also have a positive impact on efficiency as a result of simpler organizational structures. The restriction on the eligibility of hybrid instruments is also having an effect on U.S. banks (Box 3.3). For instance, large U.S. banks have a large proportion of trust-preferred securities (TRuPs) that counted as Tier 1 capital under existing rules but will be phased out under Basel III.

For emerging economies, the definition of capital will not represent significant change in practice. In these economies, there are few alternatives to equity; common equity has always been the major component of capital. The reaction of parent banks to new requirements, particularly the Basel III and G-SIB surcharges (see below) may, however, be a source of change. If parent banks react by reducing their exposure to emerging and developing economies as a means of deleveraging, this will change local structures, although to date these effects have not been detected (see Box 3.2; and G20, 2012).

Liquidity

Basel III also aims to ensure that an institution can withstand a short-term severe liquidity freeze and to create a more sustainable maturity matching of assets to liabilities. The new liquidity ratios will require many banks to hold more short-term, high-quality assets or pay higher rates by tapping long-term funding sources. The liquidity coverage ratio (LCR) creates a strong demand for short-term, liquid government securities, while the net stable funding ratio (NSFR) promotes the growth of stable deposits and the issuance of long-term liabilities.[14]

Banks that focus on commercial banking with a stable retail deposit base, particularly smaller banks, would be considerably less affected than those that focus on investment banking, with universal banks falling in between.[15] Banks will consider how to construct the most efficient liquidity profiles under these requirements—with a drive toward lengthening deposit offerings and possibly competing more strongly for those deposits. As with capital, nonbank financial institutions are largely unaffected by these changes and therefore could benefit from a movement of business in their direction provided investors are willing to fund nonbanks in these activities. Liquidity requirements may increase the cost of operating in some jurisdictions and may therefore reduce cross-border activity or prompt changes to banking group structures.

Business Model Restrictions

The purpose of restricting business activities is to reduce systemic risk by prohibiting deposit-funded banks from engaging in certain investment banking businesses that are deemed to be too risky. So far, these restrictions have been addressed at the national level: They have already been adopted in the United States (regulations pending) and envisaged in the United Kingdom. Broader discussions on their design and effectiveness have not taken place.

The Volcker rule, in the United States, is intended to force banks to divest trading businesses—reducing their nontraditional revenues as a consequence—which would be picked up primarily by the nonbank sector and also by stand-alone investment banks, should the latter reenter the U.S. financial landscape in the longer run (see Chapter 1, Box 1.3). The result would be less connected, less complex, and smaller banks. The rule is now law but implementation through regulation is pending. Implementation of the rule will be a challenge to prudential authorities; and an inability to clearly distinguish permissible activities (market making and underwriting) from prohibited ones (proprietary trading) may mitigate the impact of the rule.

[14]BCBS (2010b). The demand for "safe" assets from this source (and others) and its implications for financial stability are discussed in IMF (2012b).

[15]See IMF (2011b) for a discussion of the effect of the NSFR on different types of banks.

Box 3.2. Global Deleveraging Landscape: Economy- and Bank-Level View

Global banks have been proactively adjusting their business models to meet forthcoming regulatory requirements. Major divestitures by some banks have presented others with lucrative investment opportunities. As a result, international claims of domestic banks have been increasing overall, although their geographic distribution has changed, with some regions witnessing a withdrawal of foreign claims.

Global banks have made significant changes in their business strategies in recent years following the financial crisis. The need to replace depleted capital buffers, reduce risky exposures, and adapt to changing market conditions has driven some banks to shed assets from global portfolios. The divestiture trends among the largest global banks are part of this strategy. Table 3.2.1 shows that since January 2009 those banks have shed about $72 billion in total assets, or an average of about 7.5 percent of equity. Within this sample, divestitures of domestic (53 percent) and foreign (47 percent) entities were about evenly split. Asset sales in investment management and advisory services, commercial banks, and multiline insurance in total accounted for 52 percent of divestitures (Table 3.2.2). Internationally active banks are likely to refocus their activities to prepare for new, stricter capital and liquidity requirements.

In the EU, very stringent restructuring requirements have been applied to a number of large banks that had received public support in 2008, including RBS and Lloyds in the United Kingdom, WestLB and Nordbanken in Germany, Dexia in Belgium, ING in the Netherlands, and all banks in Ireland. Asset sales, rapidly executed in a small number of cases, are still pending in others.

With many divestiture plans yet to be concluded, the question arises as to whether such trends will significantly change the structure of global banking toward a more domestic orientation. The evidence seems to indicate a geographic shift but not a pullback. Total cross-border claims of large global banks to emerging and developing economies have grown since 2006 (Figure 3.2.1). Cross-border activity has entailed both acquisitions and divestitures, suggesting that banks are shifting business strategies to accommodate required changes in risk management practices as well as rebalancing to better reflect their competitive advantages in international markets rather than retreating from them. Indeed, to date,

Note: Prepared by Sofiya Avramova and Luisa Zanforlin.

Table 3.2.1. Assets of Selected Global Banks: Growth Rate, 2006–11, and Ratio of Sales to Total Equity
(In percent except as noted)

	Growth Rate	Ratio of Sales to Total Equity	Sales (millions of U.S. dollars)
Barclays	56.9	17.3	17,530
BBVA	45.8	4.2	2,190
BNP	36.4	0.1	116
Citigroup	2.1	5.4	9,730
Deutsche Bank	36.6	4.0	2,800
Dexia	–27.2	38.1	5,460
HSBC	40.2	7.7	12,830
ING	4.3	14.6	9,540
Lloyds	182.5	2.4	1,750
Raiffeisen	166.3	. . .	. . .
RBS	31.5	6.1	7,240
Santander	53.9	2.2	2,390
UBS	68.9	0.4	261
Unicredit	12.6	0.3	203
West LB (Portigon)	–35.0	2.6	143

Source: Bloomberg L.P.

Note: Data for asset sales are from January 2009 to July 2012. Data for equity are as of December 2011.

Table 3.2.2. Divestitures of Major Global Banks, by Industry
(In percent of total divestitures)

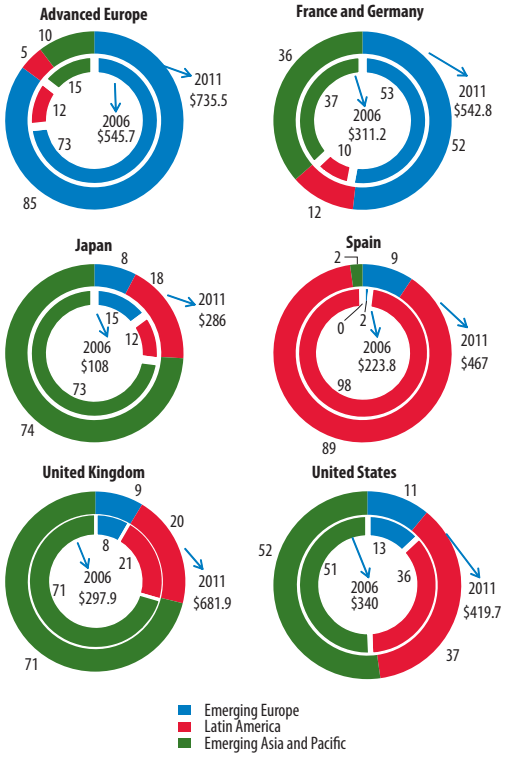
Investment management and advisory services	26.27
Commercial banks	15.91
Multiline insurance	10.26
Finance: consumer loans	8.00
Building: residential/commercial	7.44
Finance: other service	6.37
Finance: credit cards	5.22
Diversified banking institutions	4.81
Real estate management/services	3.94
Derivatives	2.48
Real estate operation/development	2.34
REITS: diversified	2.15
REITS: shopping centers	2.05
Hotels and motels	1.21
REITS: mortgage	0.87
REITS: office property	0.25
Retail: hypermarkets	0.19
Property trust	0.14
Finance: investment banker/broker	0.07
Diversified financial service	0.05

Source: Bloomberg L.P.

Note: Data are for January 2009 to July 2012.

Box 3.2 *(continued)*

Figure 3.2.1. Growth in Total Foreign Claims from 2006 to 2011
(In percent; 2006 and 2011 totals in billions of U.S. dollars)



Source: Bank for International Settlements.

there is little sign that international activities (of the financial institutions in BIS reporting countries) are declining, even though there was a pullback in 2008.

Gross international claims of domestic banks on their foreign offices are significantly higher than at the end of 2006, before the onset of the global financial crisis. Even for those few economies where gross claims appear to have fallen (such as Austria), net international exposures have remained constant, suggesting that subsidiaries are funding themselves locally. But on average, financial institutions have maintained the same level of exposure to international activities that they had before the crisis. These observations are in line with the data in BIS (2012a).

For individual financial institutions, the amount of total international claims on a consolidated basis suggests that international activity continues to be significantly above its 2006 level. Significant deleveraging activity persists for some banks, especially those in Spain and the United Kingdom with respect to their activities in developed economies and those in Belgium and Sweden with respect to emerging Europe. However, overall, claims to developing economies continue to be quite robust. Banks in some economies are changing the composition of their exposures in regions where they are already prominent (e.g., Spain from Latin America) while other economies are picking up the slack (France, Germany, and the United Kingdom). One explanation may be that relatively healthy, internationally active banks have taken advantage of favorable market conditions to restructure their business toward different areas. This has shifted international exposures across banking sectors but has not lessened global financial interlinkages. In line with these trends, new acquirers from some large emerging economies have entered western European and Latin American banking markets.

In the United Kingdom, the retail ring-fence proposed by the Vickers commission (ICB, 2011) would allow a group to maintain all business lines but seeks to make U.K. retail banking businesses more resilient and insulated from trading risk by requiring more capital. The Vickers recommendations are to be included in forthcoming legislation and implemented through 2019. As retail ring-fencing is limited to the United Kingdom, it may have little, if any, effect on the cross-border activity of internationally active U.K. banks. One outcome could be that some U.K. banks divest trading activities—with an impact on nontraditional banking revenues, bank size, complexity, and interconnectedness—given the increased capital and liquidity costs. To the extent that ring-fencing is seen as removing or reducing an implicit government guarantee, activities that were only sustainable with the benefit of such a guarantee would also be wound down. However, these effects could be mitigated by large

Box 3.3. TRuPs and the Impact of Basel III on U.S. Banks

Changes to the Basel definition and measurement of capital under Basel III are expected to have a material impact on banks' capital structure. Some of these changes are already visible in the United States.

U.S. banks are adjusting their issuance programs to meet the Basel III definition of higher-quality capital, including greater restrictions on the Tier 1 eligibility of hybrid instruments, which have characteristics of debt and equity. In the United States, a meaningful proportion of the capital base of larger banks consists of trust-preferred securities (TRuPs) a type of hybrid instrument counted as Tier 1 capital under the existing rules (Table 3.3.1). The draft proposals issued by the Federal Reserve Board align largely with Basel III, which will mean that TRuPs will be phased out of Tier 1 regulatory capital over time. For U.S. bank holding companies with a balance sheet of more than $15 billion, TRuPs will be completely phased out by 2016, ahead of the Basel III schedule, whereas for all other banking organizations the phase-out period is aligned with the Basel schedule of 2022. The phase-out period for nonqualifying capital instruments such as TRuPs is planned (under the Federal Reserve's first notice of proposed rulemaking) to commence in 2013.

In anticipation of the new capital requirements, some banks have been actively redeeming the instruments as they become callable. Publicly available data suggest that approximately $73 billion of TRuPs would need to be redeemed and replaced by higher-quality instruments to meet the requirements in the Federal Reserve's proposals.

Besides regulatory compliance, an aspect of the recent increase in TRuPs redemptions is price. Some analysts have suggested that about $30 billion of TruPs have a coupon above 6.25 percent, so upgrading to higher-quality instruments (that will be counted as Tier 1 capital under the new rules) at similar or potentially lower rates is good capital management.

Note: Prepared by Christopher Wilson.

Table 3.3.1. Trust Preferred Securities Outstanding, Selected Banks
(In millions of U.S. dollars except as noted)

	Total Trust Preferred Securities	Total Equity	Ratio of Trust Preferred Securities to Equity (In percent)
BB&T	3,308	18,926	17.5
Fifth Third Bancorp	2,248	13,824	16.3
JPMorgan Chase	19,600	191,572	10.2
Citigroup	17,656	185,839	9.5
SunTrust Bank	1,825	20,568	8.9
Capital One Financial	3,250	37,192	8.7
Bank of America	14,575	235,975	6.2
U.S. Bancorp	1,800	38,874	4.6
Goldman Sachs	2,750	73,033	3.8
PNC Financial Services Group	1,496	40,214	3.7
Wells Fargo	4,825	149,437	3.2

Sources: Bloomberg L.P.; JPMorgan Chase research; and IMF staff estimates.

Note: Data are as of March 31, 2012.

banks' funding advantage, economies of scale, and the tendency to concentration.

Compensation and Governance

Compensation reforms aim to better align the incentives of key employees and managers with the longer-term stability of institutions and markets. These reforms could improve risk measurement, monitoring, and management of financial institutions. Compensating employees on the basis of both risk and return will require more information about risk. In the long term, the reforms could also make business operations less risky, smaller in scale, and less complex as a result of more active and appropriate governance and the alignment of employee compensation with risks. The "Principles for Sound

Compensation Practices," developed in 2009 by the Financial Stability Forum and its successor, the Financial Stability Board (FSB), are expected to be implemented by all significant financial institutions in the world.[16] In practice, however, a number of jurisdictions limit their application to banks or other regulated financial institutions, and some limit their application to institutions of a particular size.

Bank Resolution

The global regulatory reform agenda has included an emphasis on the recovery and resolution of banks. In particular, the FSB has articulated the "Key Attributes of Effective Resolution Regimes for Financial Institutions," which contain a number of recommendations to strengthen economies' resolution regimes and to make large complex financial institutions more resolvable (FSB, 2011a). The introduction of crisis management groups and recovery and resolution planning under these reforms increases the transparency of financial groups and may reduce complexity depending on the responses of both institutions and supervisors to what emerges in these processes.

Key resolution issues that may affect financial sector structure are the efforts to impose burden sharing on unsecured debt holders who may have their holdings converted to equity at particular trigger points, including "bail in" at the point of unviability. These features may have an impact on the funding profile of banks, cost of funding, and the development of funding instruments. This will depend on both the implementation of this reform and investor reaction to it.

OTC Derivatives Reforms

Much of the OTC derivatives reform agenda is meant to increase transparency, mitigate systemic risk, and protect customers against market abuse (FSB, 2012b). The most far-reaching aspect of the agenda is the movement of some types of OTC contracts to clearing through central counterparties (CCPs) for non-cleared trades. Although this reduces bilateral exposures, it increases the importance of CCPs to the structure of the financial sector and will have a direct impact on whether and how institutions participate in these markets. Banks and nonbanks active as dealers in OTC derivatives trading may find their costs higher and some of their revenues lower as the tailored derivatives business increasingly moves to low-margin standardized forms. The actual impact on structures will depend, however, on the extent and speed of the change, how clearing infrastructures are set up, and decisions by authorities on which types of OTC derivatives contracts will be subject to mandatory central clearing. In addition, increased use of trade repositories could open the door for enhanced transparency.

From a system-wide perspective, the main effect of these reforms will be to shift some types of risks to CCPs with the aim of improving the resiliency of the financial system.[17] Concentration of counterparty risk in CCPs can make these entities systemically important (in the United States, for example, some have already been designated as such). This necessitates careful regulation and oversight as well as establishment of credible liquidity backstops for potential clearing member defaults.[18] If risks become concentrated in a very few CCPs—or a single CCP—(without appropriate risk-management systems and well-designed default funds) these entities could become too important to fail. Use of multiple CCPs reduces the multilateral netting benefits and puts additional pressure on safe assets, because the inability to net transactions across CCPs will necessitate posting more collateral. If not appropriately managed and backstopped, CCPs in distress could reintroduce systemic risks to the financial system. Work is under way to address such issues; the FSB and the International Organization of Securities Commissions and the Committee on Payment and

[16]The original statement of the standards (FSF, 2009) is at www.financialstabilityboard.org/list/fsb_publications/tid_123/index.htm along with subsequent FSB publications on the standards.

[17]See IMF (2010) for an in-depth treatment of OTC derivatives and use of CCPs.

[18]The safeguard on liquidity provision developed by the FSB envisages a regime that ensures there are no technical obstacles for the timely provision of emergency liquidity assistance by central banks to solvent and viable CCPs (without precommitting to the provision of this liquidity). See Conclusions by the Economic Consultative Committee (ECC) of the Bank for International Settlements (FSB, 2012b).

Settlement Systems (IOSCO-CPSS) have issued guidance, "four safeguards," to mitigate these systemic concerns (FSB, 2012b).

Although CCPs can broaden the use of derivatives by end users, the rules governing clearing membership could alter financial structures by further concentrating the benefits of these financial transactions in a small number of firms. In some CCPs, the clearing members are the same large financial institutions in which trading of OTC derivatives is concentrated, potentially reinforcing a lack of competition in the OTC market if not governed and regulated properly. That said, clearing membership in CCPs typically requires all remaining members to assume the losses imposed by a defaulting member, thereby mutualizing the risks. Even with this mechanism in place, adequately regulating CCPs is very important from the systemic point of view.

Nonbanks: Shadow Banking

Efforts to address shadow banking—credit intermediation activities in the nonbanking sector—are meant to ensure that these activities are monitored and, if they are found to pose systemic risk, that robust prudential regulation and supervision are considered. Reforms, led by the FSB, are at a very early stage (both at the international and domestic levels), and a firm consensus has yet to emerge on what, if any, regulatory action is needed.[19] Bank and nonbank regulators have given increased attention to interconnectedness and systemic risk beyond the banking sector. Data limitations are a key impediment to progress on these issues and might curtail the ability of regulators to identify shadow banking entities.[20]

In jurisdictions where shadow banking is more readily identified, policymakers have taken some initial steps to address risks. For example, rules shortening the maturity of U.S. money market fund assets have been effective. However, the recent inability to enact reforms to U.S. money market funds proposed by staff of the Securities and Exchange Commission was a setback to a possible reduction of systemic risk from this source. However, if new rules reduce the size of the money market funds (by making them less attractive to investors as their returns fall), they would likewise provide less funding for banks.

Other Initiatives

Some other important initiatives that may affect the financial structure are taking place in the insurance sector as well as in credit ratings agencies and accounting. Initiatives on group-wide supervision in the insurance sector seek to minimize regulatory arbitrage, reduce contagion risks, and address complex group structures that hinder effective supervision. Credit rating reforms aim at achieving better understanding of risks embedded in different products and securities. Even though authorities have missed the end-2011 target set by the FSB and the G20 for completing the convergence between the IFRS (International Financial Reporting Standards) and U.S. GAAP (generally accepted accounting principles), it is expected that convergence and enhancement of U.S. and international accounting standards will foster greater comparability of data. Annex 3.2 provides further details on these initiatives.

Summary

The regulatory reform agenda seeks to improve financial sector safety by reducing risks to institutions and improving their resilience when risks are realized. It is likely that the impact of the new capital and liquidity requirements will be to favor stable, traditional banking rather than nontraditional banking activities. As a result, some institutions

[19]See the FSB reports, "Shadow Banking: Scoping the Issues" (2011b) and "Strengthening the Oversight and Regulation of Shadow Banking" (2012a).

[20]The Data Gaps Initiative, endorsed by the G20 and the IMF's International Monetary and Financial Committee (see www.imf.org/external/np/g20/pdf/102909.pdf) aims to fill data gaps revealed by the global crisis. Its 20 recommendations include monitoring systemic risks arising from shadow banks and G-SIFIs. In cooperation with the members of the Interagency Group on Economic and Financial Statistics, a great deal of work is in progress, including improving data collecting and sharing information on G-SIFIs as well as monitoring the cross-border activities of nonbank financial institutions (see www.principalglobalindicators.org/default.aspx). The preparation of templates for a minimum and encouraged set of internationally comparable sectoral accounts and balance sheets is an important step for the collection of data relevant for the analysis of shadow banking.

may become smaller and there may be a migration of nontraditional activities to the nonbanking sector. However, there is also potential for a greater concentration in some nontraditional business lines (for example, FICC) in banks where increased costs can be offset by economies of scale. Reform of OTC derivatives trading should help lower counterparty credit risks and hence potentially lessen some of the disruptive effects of interconnectedness.

Looking ahead, a great deal will depend on whether the higher-risk activity—investment banking and trading—shrinks in size (contrary to current trends) and whether it remains in the banking sector or shifts to nonbank institutions. If activities move out of the banking sector, greater attention to regulation and supervision standards in the nonbank sector will be required to ensure that risks are properly addressed. If risks remain within the banking sector, the effects of increased concentration or the entrenchment of too-important-to-fail institutions will need to be considered.

The major reform proposals, especially capital and liquidity rules, may not have a significant direct effect on emerging economies. For instance, with regard to the capital rules, common equity has always been the major component of capital in these economies, so a tightening of the definition of capital will therefore have less impact. There may, however, be some other effects on structure: Parent banks in advanced economies may reduce their exposures to emerging and developing economies as a means of deleveraging in reaction to Basel III and G-SIB surcharges and business model restrictions. Some emerging economies fear that global banks may no longer make markets in their sovereign or corporate debt, which would lower liquidity and raise their costs of issuance. There is also a concern that a lack of eligible instruments for collateral will impede the effectiveness of the liquidity coverage ratio and also the ability to post collateral at CCPs.

Structural Implications of Crisis Intervention Measures

Recent regulatory reforms are not the only influences on the future financial structure. At the height of the global financial crisis, both governments and central banks in advanced and emerging economies took various measures to support bank funding, financial intermediation, creditor confidence, and, ultimately, financial stability (Table 3.4).[21]

- Fiscal measures included guarantees of bank liabilities (retail and wholesale), capital injections, and direct and indirect financial intermediation by governments (through asset purchases or guarantees).
- Central bank measures included cutting policy interest rates to historical lows, broadening lender of last resort facilities,[22] strengthening open market operation frameworks to provide more liquidity, asset purchases of private and public securities, and enhancement of multilateral and bilateral foreign exchange swaps between central banks to ensure cross-border intermediation.[23]

Many measures—particularly those designed to support market functioning and bank funding conditions—were designed to be temporary in principle and, indeed, various programs were terminated or scaled down as market conditions improved, although the pace and extent of the exits has differed by economy and region.[24]

However, the policy responses have been complicated by sluggish economic growth and by the intensification of sovereign and bank problems in some euro area economies. The slow recovery and new shocks to financial stability in some regions have called for further and more drastic policy actions by the major central banks. These new policies include the ECB's launch of its Securities Markets Programme (SMP) to ease sovereign bond stress and its

[21]For more detailed discussions, see for example Schich and Kim (2011), IMF (2009, 2012b), Borio and Disyatat (2009), and Laeven and Valencia (forthcoming).

[22]The cuts in policy interest rates were primarily aimed to counter deflation risks and support economic growth. However they also helped lower banks' funding costs (because a large portion of their liabilities are short term), thus supporting banks' profitability and rebuilding of capital bases (see Box 3.4 and BIS, 2012a).

[23]In some emerging economies, reserve requirements were also relaxed.

[24]For example, blanket guarantees of deposits were largely terminated by end-2011. Similarly, European arrangements for guarantees for unsecured bank bonds expired by end-2011 (but were replaced with new schemes in 2012).

Table 3.4. Government and Central Bank Crisis Measures, 2007–10

(1 = measure announced)

	Government Support						Central Bank Support[1]				Total of Government and Central Bank Support
	Deposit Insurance		Bank Debt Guarantee (other than deposits)	Capital Injection or Bank Liquidation[2]	Government Asset Purchase or Guarantee[3]	Total	Reduction of Policy Rates	Liquidity Support Measure[4]	Private Securities Purchase	Total	
	Temporary Blanket Guarantee	Establishment or Enhancement									
Selected advanced economies						**3**				**2**	**5**
Australia		1	1		1	3	1	1		2	5
Canada			1		1	2	1	1		2	4
Denmark	1	1	1	1		4	1	1		2	6
Japan				1	1	2	1	1	1	3	5
New Zealand		1	1			2	1	1		2	4
Norway				1		1	1	1		2	3
Sweden		1	1	1		3	1	1		2	5
Switzerland		1		1	1	3	1	1	1	3	6
United Kingdom		1	1	1	1	4	1	1	1	3	7
United States		1	1	1	1	4	1	1	1	3	7
Euro area						**4**				**3**	**7**
Austria	1	1	1	1	1	5	1	1	1	3	8
Belgium		1	1	1	1	4	1	1	1	3	7
Cyprus				1		1	1	1	1	3	4
Finland		1	1	1	1	4	1	1	1	3	7
France		1	1	1	1	4	1	1	1	3	7
Germany		1	1	1	1	4	1	1	1	3	7
Greece		1	1	1		3	1	1	1	3	6
Ireland	1	1	1	1	1	5	1	1	1	3	8
Italy		1	1	1		3	1	1	1	3	6
Netherlands		1	1	1	1	4	1	1	1	3	7
Portugal		1	1	1		3	1	1	1	3	6
Slovenia	1	1	1	1	1	5	1	1	1	3	8
Spain		1	1	1	1	4	1	1	1	3	7
Central and eastern Europe						**2**				**2**	**4**
Croatia		1				1		1		1	2
Czech Republic		1				1	1	1		2	3
Hungary	1	1	1	1		4	1	1	1	3	7
Latvia		1	1	1		3	1	1		2	5
Lithuania		1		1	1	3	1	1		2	5
Poland			1	1		2	1	1		2	4
Romania		1			1	2	1	1		2	4
Russia		1		1		2	1	1		2	4
Ukraine				1		1	1	1		2	3
Asia						**1**				**2**	**3**
China						0	1	1		2	2
Hong Kong SAR	1			1		2		1		1	3
India						0	1	1		2	2
Indonesia		1		1		2	1	1		2	4
Korea					1	1	1	1		2	3
Malaysia	1					1	1	1		2	3
Singapore	1				1	2	1	1		2	4
Thailand	1					1	1	1		2	3
Latin America						**2**				**2**	**4**
Brazil		1		1		2	1	1		2	4
Mexico					1	1	1	1		2	3

Sources: Bank for International Settlements (2010); Borio and Disyatat (2009); Schich and Kim (2011); national sources; and IMF staff.

Note: The above values do not necessarily indicate that the schemes or facilities were actually used. Regional averages are in bold.

[1]For the euro area, each member country is assigned 1 point for any support measure taken by the European Central Bank.

[2]May consist of establishing a capital injection program as well as actual capital injections or liquidations of specific banks.

[3]Includes purchases of bank assets, loan guarantees, and loss protection for certain loans (e.g., to small and medium-sized enterprises) and certain securities (e.g., mortgage-backed securities).

[4]Includes changes in reserve requirements, longer-term or more frequent funding terms, expansion of eligible counterparties, expansion of collateral eligibility, and establishment or enhancement of multilateral or bilateral foreign exchange swaps between central banks.

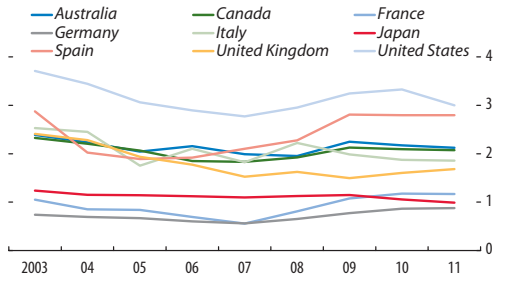
Box 3.4. Side Effects of Low Policy Interest Rates

Low policy interest rates keep credit flowing and stem downside risk during a crisis. Nevertheless, persistently low interest rates also may have side effects, such as moving more intermediation activity to nontraditional banking businesses or out of the banking sector. We briefly describe these possible effects of low policy interest rates on financial intermediation, focusing on the recent period.

Monetary policies play an important role in smoothing economic activity. Additionally, they influence the functioning of financial intermediation and financial structure. However, widespread evidence suggests that a prolonged period of low short-term interest rates encourages excessive risk taking, by financial institutions. There are various channels of influence in financial institutions' risk taking, including (1) increasing asset and collateral valuations, (2) providing the incentive to "search for yield," and (3) decreasing the degree of investors' risk aversion.[1] In contrast, low interest rates during a crisis prevent economic meltdowns and help limit a crippling rise in nonperforming loans.

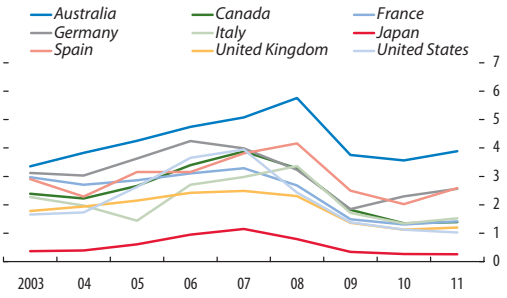
However, in the run-up to the most recent financial crisis, what may be particularly noteworthy from a banks' profitability perspective was the decrease in net interest margins (NIMs) (Figure 3.4.1).[2] The decreases were mainly caused by increases in interest expenses, which reflected (low but) gradually rising policy interest rates in major economies (Figures 3.4.2 and 3.4.3) as well as volume growth in lending (that increased the denominator of NIMs). Besides the regulatory incentives for holding more assets in trading books and off of balance sheets, the declines in NIMs presumably provided an additional incentive for banks to seek more income from trading, commissions, and fees (including those generated from securitization origination businesses).

Figure 3.4.1. Net Interest Margin
(In percent)



Sources: Bloomberg L.P.; and IMF staff estimates.

Figure 3.4.2. Interest Expenses
(In percent, relative to earning assets)



Sources: Bloomberg L.P.; and IMF staff estimates.

Successive cuts in policy rates in 2008 and 2009 by major central banks to support their lagging economies have helped prop up NIMs. Since the crisis began, improvements in NIMs have been due to declines in interest expenses, which exceeded declines in interest income in general (Figure 3.4.3). A separate analysis indicates that reductions in the European Central Bank policy rate and its larger liquidity provision have underpinned banks' lending in the stressed market environment.[3]

However, there seems to be only limited room for further declines in funding costs. Likewise, increases in interest income could also be limited given sluggish economic prospects in advanced economies in general as well as banks' likely increase in their allocation to safer but low-yielding assets to accom-

Note: Prepared by Ken Chikada and Nico Valckx.

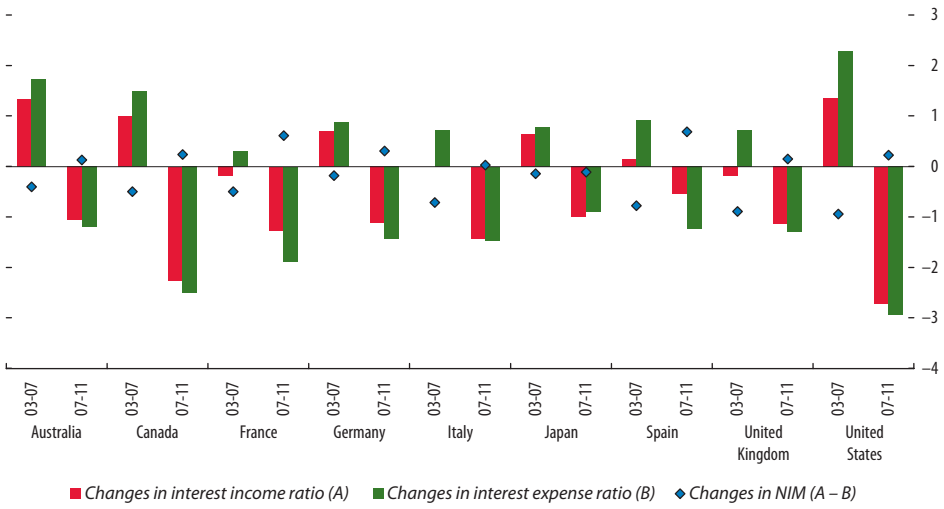
[1]For more discussions, see for example Rajan (2005), Allen and Gale (2007), Adrian and Shin (2009, 2010).

[2]The figures here are based on a sample of large commercial bank groups in each economy; thus, they should be considered as a rough guide rather than as macro statistics representing the entire banking sector of the sample economies.

[3]See Valckx (forthcoming).

Box 3.4 *(continued)*

Figure 3.4.3. Decomposition of Changes in Net Interest Margin
(In percent)



Sources: Bloomberg L.P.; and IMF staff estimates.
Note: Estimates are based on a sample of large commercial bank groups in each country.
Net interest margin (NIM) = (interest income – interest expenses)/earning assets.
Interest income ratio = (interest income)/earning assets. Interest income includes dividend income.

modate regulatory requirements. This may imply that banks' profitability from traditional sources will remain low for an extended period, especially taking into account effects of various regulatory initiatives which may limit the scope for banks to generate profits through noninterest income. Where permitted, this in turn may encourage some banks to find ways to enter nontraditional banking businesses where profitability could be higher or for more activity to flow into the nonbank sector.

enhanced provision of bank liquidity through two extraordinary (three-year maturity) longer-term refinancing operations; and significant increases in the purchase of government bonds in Japan, the United Kingdom, and the United States.[25]

As a consequence of these measures, central banks have taken a more prominent role in the financial sector as evident in their significantly larger balance sheet sizes. To a large extent, their operations have substituted for interbank lending (especially in the euro area economies and Japan); they have become pivotal holders of government securities (as part of the increasing nominal value of such securities shown in Figure 3.1); and, in the euro area, they have partly substituted for cross-border intermediation. Under current conditions, such monetary policy initiatives are necessary, but they remove some of the pressures to alter funding structures. Hence, if the central bank initiatives are not accompanied by resolute actions to thoroughly restructure the impaired segments of the financial system and solve deep-seated remaining problems in financial institutions, they may inhibit adjustments in the structure of banking systems. The central bank initiatives also may be problematic in light of banks' increased holdings of sovereign assets, a trend that could com-

[25]The Federal Reserve also purchased agency securities and agency mortgage-backed securities to support housing markets. In regard to government holdings, the total amount stopped increasing after the introduction of the Maturity Extension Program, known as "Operation Twist," under which the Federal Reserve replaces its short-term securities with long-term securities.

pete with their acquisitions of highly liquid assets to meet the Basel III requirement for the liquidity coverage ratio.

Exceptionally low interest rates have been helpful and necessary during the crisis and remain so at this juncture. However, their persistence could have the side effect of prompting banks to conduct more nontraditional banking business, which in turn would require heightened vigilance on the part of supervisors to avoid future problems. The policy rate cuts by major central banks supported economies during the critical times of the global financial crisis and helped prop up net interest margins (Box 3.4). However, as sluggish economic prospects in advanced economies persist, the returns the banks earn on some of their assets are under downward pressure. Moreover, with central banks also attempting to hold down long-term rates and keep yield curves flat, the natural pick-up banks receive from funding cheaply at short-term rates while lending at higher, long-term rates is generating fewer profits. The result could potentially encourage banks to engage in more nontraditional business where permitted.[26] Also, the protracted low interest rates could adversely affect the solvency of long-term institutional investors, thus potentially inducing them to take more investment risk (IMF, 2011a, 2012c).

However, the fiscal support provided to some banks at the height of the crisis could encourage traditional banking intermediation. The fiscal measures underscored the special importance of banks in preserving financial stability and economic growth. This could in turn tilt the asset allocation of households and firms toward bank deposits and bonds, thus potentially affecting the financial structure in favor of more traditional banking.[27]

[26] Other possible adverse effects of protracted low interest rates could be that the low rates and consequent thin trading spreads reduce incentives for financial institutions to trade in money markets, which could lead to the downsizing of money market desks. Although, in principle, trading volumes could gradually increase as the market rate rises, the loss of skills and market infrastructure could require some time to recover (see BIS, 2010).

[27] This may not necessarily hold for economies with an extensive capital market, most notably the United States, which provided various supporting measures to nonbanking sectors and capital market instruments (such as guarantees on investments held in money market mutual funds).

Importantly, the impetus for the deep restructuring needed for normalization is lacking in some economies, given the current set of crisis response policies (Claessens and others, 2011). The interventions during crises prior to 2008 went through three phases: (1) containment of liquidity stress, (2) resolution and balance sheet restructuring (removing insolvent financial institutions and recapitalizing viable ones), and (3) operational restructuring to restore the profitability of viable institutions and remove and deal with nonperforming loans through various asset management techniques. The policies during the crisis starting in 2008 dealt with the first phase but stopped short of completing the second stage—balance sheet restructuring in many economies has not occurred, while recapitalizations have occurred but in some cases insufficiently. The targeted, diagnosis-based resolution and asset restructuring that should have preceded recapitalization could be delayed further by the current set of intervention policies.

In short, as the necessary and critical crisis intervention policies persist, their lingering presence may impede the movement of the structure in a suitable direction. Financial authorities must address this side effect by exerting strong vigilance and pushing forward with the necessary restructuring efforts. Low interest rates are still needed to support the real economy, and without them the financial sector would be even worse off. Yet, care should be taken that there are no delays that would impede the move to a structure that is less reliant on wholesale funding and is less complex.

Change over the Past Five Years: Are Financial Systems Structurally Safer?

Having provided some indication of how regulation and crisis interventions are expected to alter the structure of financial intermediation, we look now for evidence of change toward safer financial structures. Since 1998, three major trends have been observed:[28]

[28] Three five-year periods are considered for this section: 1998–2002, 2003–07, and 2008–11 (but 2008–10 for a few indicators with less-recent data). The variations in availability of data across a wide range of economies dictated the starting point. Also, it should be noted that many of the regulatory reforms referred to have yet to be fully implemented.

- The role of traditional banks—borrowing from depositors and lending to the household and corporate sectors—has diminished for some advanced economies and given way to innovative and nontraditional means in which banks rely more on financial markets for both funding and revenues (Box 3.1 and IMF, 2006).
- At the same time, greater consolidation among small (and sometimes large) financial institutions has resulted in more concentrated financial structures.
- Globalization has occurred through strategic foreign ownerships in emerging economies, especially in Europe and Latin America by European and U.S. banks.

While these three trends potentially make intermediation more efficient and accessible, they also give rise to concerns about the large size of individual institutions and their contribution to systemic risk (too important to fail) through greater interconnectedness of the system (Ötker-Robe and Pazarbasioglu, 2010).

The next section provides some broad tendencies in the data for the period 1998–2011 (see Annex 3.1 for details on the various concepts of intermediation structures).[29] Regional differences in the levels of these indicators are particularly noteworthy.

Market-Based Intermediation: Dented but Not Reversed

Because the financial crisis originated in the United States, it was believed that the crisis would do serious damage to market-based (or "arm's length") intermediation—a hallmark of the U.S. financial system (IMF, 2006).[30] Excessive bank reliance on market funding (rather than deposits) and on trading and investment income and commission and fee income can be traced to the crisis in many of the hardest hit economies (Viñals and others, 2010). This nontraditional role in banks was accompanied by the rise of "shadow banks" and new financial products (Box 3.1). Evidence indicates that the precrisis upward trend in market-based intermediation activities has not wholly reversed, although some of the components of this indicator have done so (Figures 3.2 and 3.3). It is worth acknowledging that some market-based intermediation, for instance, the issuance of corporate bonds and equity, was not a proximate cause of this crisis and should not be viewed as contributing to financial instability.

The share of nontraditional bank-based intermediation in total activities, which is one of the components of market-based intermediation, has fallen in only a few advanced economies (Figure 3.2).[31] Where this share was very high in 2003–07, in France for instance, the reversal may be due to a deleveraging process in which banks started shedding noncore activities (IMF, 2012a). In other cases, as in Switzerland and the United Kingdom, the share continues to grow, although for different reasons. The Swiss banks continue to rely on wholesale funding that shows up in nontraditional liabilities, whereas the U.K. banks rely on wholesale funding and hold more government securities.

The levels of market-based intermediation in emerging economies were far below those in advanced economies in the precrisis period and have remained so. It was only in Latin America that a sharp upward trend in nontraditional banking emerged, and it leveled off during the crisis. Of note is the continuous decline in the share of nontraditional banking in emerging Europe.

On the other hand, the role of intermediation by nonbanks, as a share of total loans and bonds held by the financial sector, has changed little over all three periods in most countries (Figure 3.2).[32] For advanced

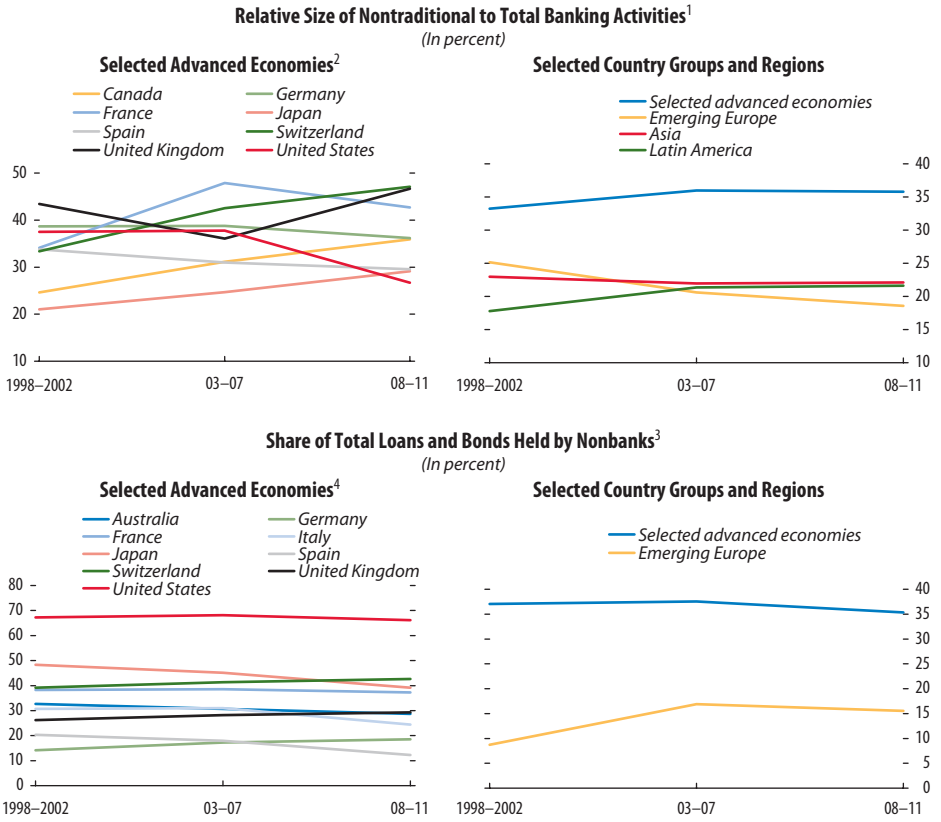
[29]Where indices are used to characterize financial structures, all intermediation data are standardized, using the data across both economies and years together to calculate the mean and standard deviation, then averaged across variables to form an index with zero mean and one standard deviation. Different subindices are averaged to arrive at the "conceptual" index. The five-year averages are taken to show the underlying structure and its trends. The units of the indices are in terms of standard deviations. Details are presented in Annex 3.1.

[30]Financial system intermediation is at arm's length if intermediation is done by transactions between two unaffiliated parties or between two parties with no relationship between them.

[31]The share of nontraditional banking in total banking activities consists of two ratios: banks' other earning assets over total assets, and banks' other interest-bearing liabilities over total liabilities. If the share of income derived from non-interest-earning sources is included in this average, then the trend in the nontraditional banking share in advanced economies shows a sharper reversal overall, but data for this variable exist only up to 2010.

[32]Nonbanks include all institutions, regulated and unregulated, that are not classified as commercial banks.

Figure 3.2. Market-Based Intermediation



Source: IMF staff estimates based on the data sources in Annex 3.1.

Note: Data for individual countries (left panels) and cross-country averages (right panels) are shown. The selected advanced economies in the panels on the right refer to the average of those in the panels on the left.

[1]The relative size of nontraditional to total banking activities is constructed as the average of the following two ratios: banks' other earning assets over total assets, and banks' other interest-bearing liabilities over total liabilities.

[2]Data for Canada, Spain, and Switzerland are available until 2010.

[3]This variable represents loans and bonds held by nonbanks over loans and bonds held by the overall financial sector.

[4]Data for Switzerland until 2009.

economies as a whole, this share has fallen only slightly. One of the reasons that this score remains high is the substitution of ("high quality") corporate bond issuance that took the place of issuance of securitization.[33]

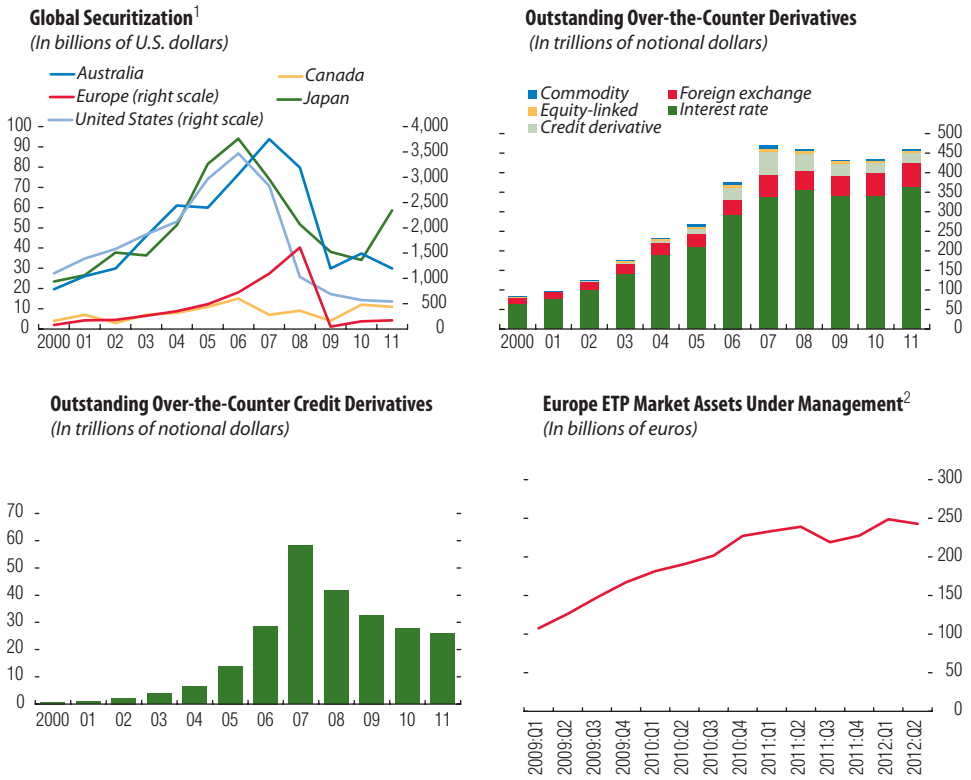
Certain types of new financial products have been seriously affected by the crisis (Figure 3.3). The disappearance of the U.S. market for private-label residential and commercial mortgage-backed securities (MBS, the underlying securities for resecuritizations) and collateralized debt obligations (both CDOs and CDO-squared) is symptomatic of the pullback from new products that were found to be more risky than they first appeared.

Outstanding OTC derivatives have leveled off since the start of the crisis, and credit derivatives, some forms of which have been implicated in the crisis, have dropped below precrisis levels, from a peak of about $56 trillion at end-2007 to $29 trillion at end-2011, according to the Bank for International Settlements (BIS). However, much of the decline is due to "tear-up" and "compression" operations that lower counterparty exposures (see Figure 3.4).[34] The use of other types of derivatives,

[33]Even as the banking system has shrunk in scale, the global shadow banking system had recovered to its 2006 level by end-2010 (BIS, 2012a). By some measures, U.S. nonbank intermediation has ebbed (FSOC, 2012).

[34]Data from DTCC (the depository for data on credit derivatives trading), which begin with 2008, show that gross notionals went from $29.158 trillion at end-2008 to $25.880 trillion at

Figure 3.3. Market-Based Intermediation: New Financial Products



Sources: Bank for International Settlements; International Swaps and Derivatives Association; *Risk* Magazine; World Federation of Exchanges; and IMF staff estimates.

Note: Global securitization data are IMF staff estimates based on data from JPMorgan Chase, the Association for Financial Markets in Europe, Bank of America Merrill Lynch, Bank of Canada, Board of Governors of the Federal Reserve System, the Commercial Real Estate Finance Council, Dominion Bond Rating Service, Fitch Ratings, Inside Mortgage Finance, Reserve Bank of Australia, and Standard & Poor's.

[1]Securitization issuance volumes except for asset-backed commercial paper, which is expressed in year-end outstanding terms.

[2]Exchange-traded products (ETPs) are defined as the universe of exchange-traded funds (ETFs) and exchange-traded commodities (ETCs) only.

such as interest rate and cross-currency swaps, has continued to grow, largely because they continue to play useful hedging and risk management roles.

Developments in newer types of financial products need careful monitoring even as use of some complex products is unwinding. The market for exchange traded products (ETPs) continues to grow in size. The use of nontraditional collateral in tri-party repo markets and issuance of commercial MBS have come down significantly in the United States (FSOC, 2012). This latter development reduces the complexity of intermediation.

Overall, nontraditional banking has been adversely affected by the crisis, but the other parts of market-based intermediation—nonbank intermediation and the use of complex products—have remained important over the past five years, albeit to a lesser extent. Moreover, some parts of market-based intermediation did not contribute to the recent crisis, which indicates that it is not a financial system's market-based structures per se that raise stability concerns, but only some elements of them.

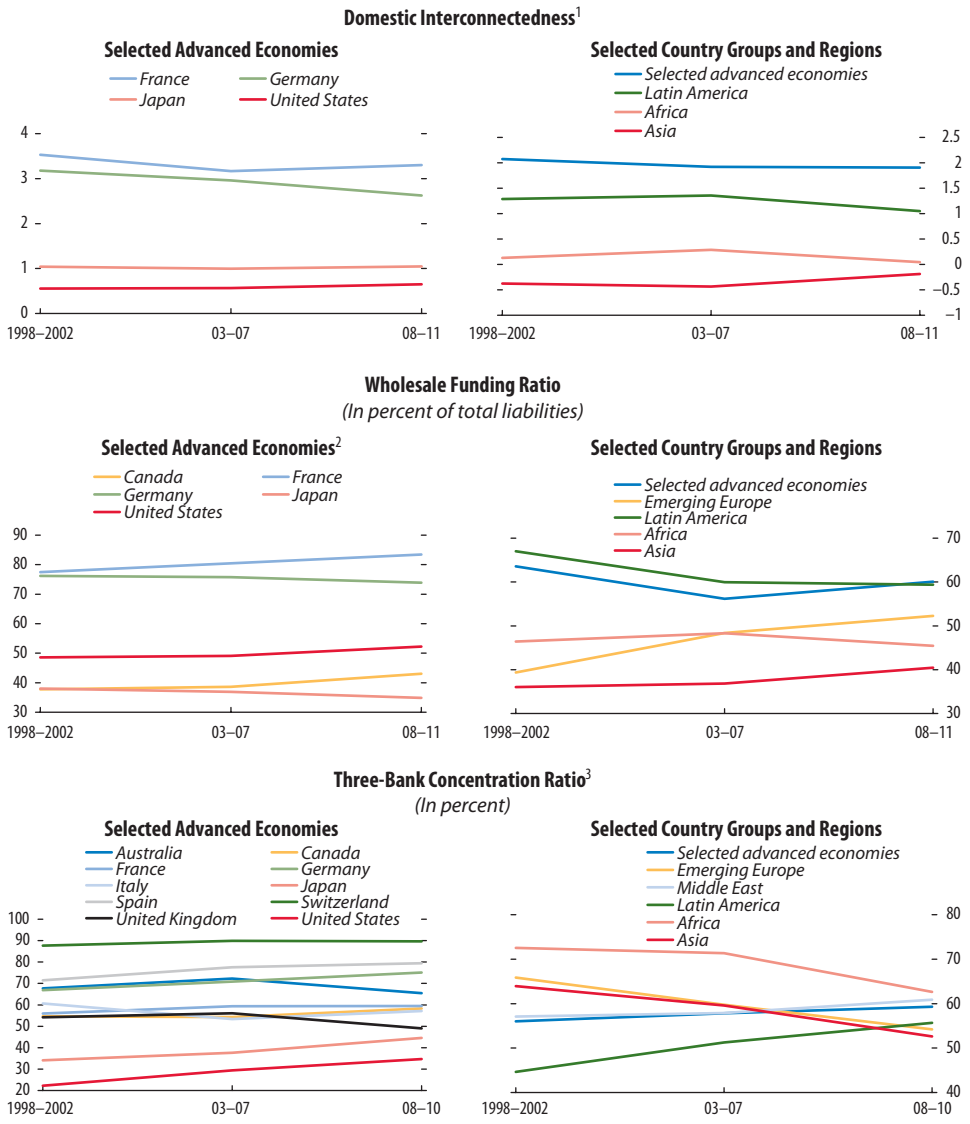
Financial Systems Are Still Concentrated, with Strong Domestic Interbank Linkages

In some economies, the crisis has resulted in even bigger banking groups and other financial institutions.[35] This is in part related to the crisis mea-

end-2011, while net notionals hardly changed ($2.754 trillion to $2.675 trillion).

[35]Data fron Bankscope show that major banking groups in Australia, Canada, France, Japan, the United Kingdom, and the United States were larger in 2011 than they were in 2007.

Figure 3.4. Scope and Scale: Interconnectedness, Funding, Concentration



Source: IMF staff estimates based on the data sources in Annex 3.1.

Note: Data for individual countries (left panels) and cross-country averages (right panels) are shown. The selected advanced economies in the panels on the right refer to the average of those in the panels on the left.

[1]The index aggregates information on three indicators: wholesale funding to total funding, interbank assets to total assets, and interbank liabilities to total liabilities. Units represent deviations from the pooled mean over all sample countries in standard deviations.

[2]Data for Canada until 2008.

[3]Assets of three largest banks as a share of assets of all commercial banks. The measure may overestimate concentration ratios for countries in which other types of banks are prominent players, such as savings banks in Spain.

sures—mergers of smaller distressed institutions with larger ones and mergers of a number of distressed institutions followed by nationalization. In addition, relatively healthy institutions were able to acquire assets from those institutions looking to deleverage to meet higher capital ratios. Is the financial sector becoming bigger and more concentrated? That is, could the risks of too-important-to-fail institutions be even larger now (Figure 3.4)?

Even though it is larger in nominal terms, the overall size of the financial sector—the sum of bank assets, bonds, and stock market capitalization—has

shrunk relative to the economy (Figure 3.1). The shrinking relative to GDP could partly be the result of banks' shedding noncore activities, as was seen in the reversal of trend in nontraditional banking.

But financial systems remain concentrated, with tight domestic interbank linkages. The domestic interconnectedness among financial institutions within an economy—as represented by interbank assets, interbank liabilities, and the wholesale funding ratio—has not fallen in general for advanced economies (Figure 3.4).[36] Mitigating this conclusion somewhat is the fact that the wholesale funding data could reflect the increased role of central banks as they substitute for normal intermediation in private funding markets. Not captured in these measures is the interconnectedness in derivatives markets, where counterparty risks are still considerable. Latin America and African economies, though, are clearly seeing a reversal in their precrisis upward trends. And concentration is increasing in the major advanced economies (Figure 3.4). The ratio of assets at the three largest banks to total bank assets (the three-bank asset concentration ratio) shows that the too-important-to-fail problem remains.[37]

At the same time, traditional banking is becoming a less profitable business in some advanced economies. Before the crisis, there was a downward trend in the net interest margin (NIM, interest earned, less interest paid out, divided by the amount of interest-earning assets—the form of profit from traditional bank intermediation): Retail lending rates were falling, slowly rising policy interest rates were pushing up interest expense, and higher volumes in loans were enlarging the NIM denominator. Currently, low policy interest rates and the crisis intervention policies that are enabling banks to continue lending prevented an even further drop in the NIM (see Box 3.4 and BIS, 2012a). In a few economies, such as the United States, banks' traditional source of profits has recovered. A lower NIM is normally considered to be an indicator of higher competition in the loan market. However, taken in combination with the higher concentration in the banking sector, it is unlikely that the falling NIM can still be interpreted as a sign of healthy competition in the five years since the crisis started.[38]

Overall, banking systems are generally more concentrated and as reliant on wholesale funding today as they were before the crisis. Although some countries, notably the United States, have reduced their dependence on short-term funding, the bulk of the evidence suggests that the structure of the system has not changed in healthier directions and could reflect the lack of deep restructuring that should have occurred.

Financial Globalization: Not Severely Affected as Yet

During the past decade, financial institutions dramatically extended their global reach. Cross-border integration diversified risks in the home country and brought technologies and enhanced competition to the host country, but it also paved the path for negative spillovers. The crisis has raised the concern that, to meet more expensive funding needs and new regulatory requirements (IMF, 2012a), banks would retrench from their foreign operations, setting in train a deglobalization trend.

Globalization can be characterized in various ways: the investment of financial institutions in another economy, funding financial institutions from another economy, the branching of banks across borders, and network measures of interconnectedness of global financial centers. Have banks reduced their investments in other economies?[39] For the advanced economies, on average, there is a slowdown in the upward trend of gross foreign asset holdings as a percent of GDP (Figure 3.5). For Swiss banks, there is an outright decline in holdings (that primarily reflects a sharp decline in deposits of Swiss parent banks in their cross-border subsidiaries). However,

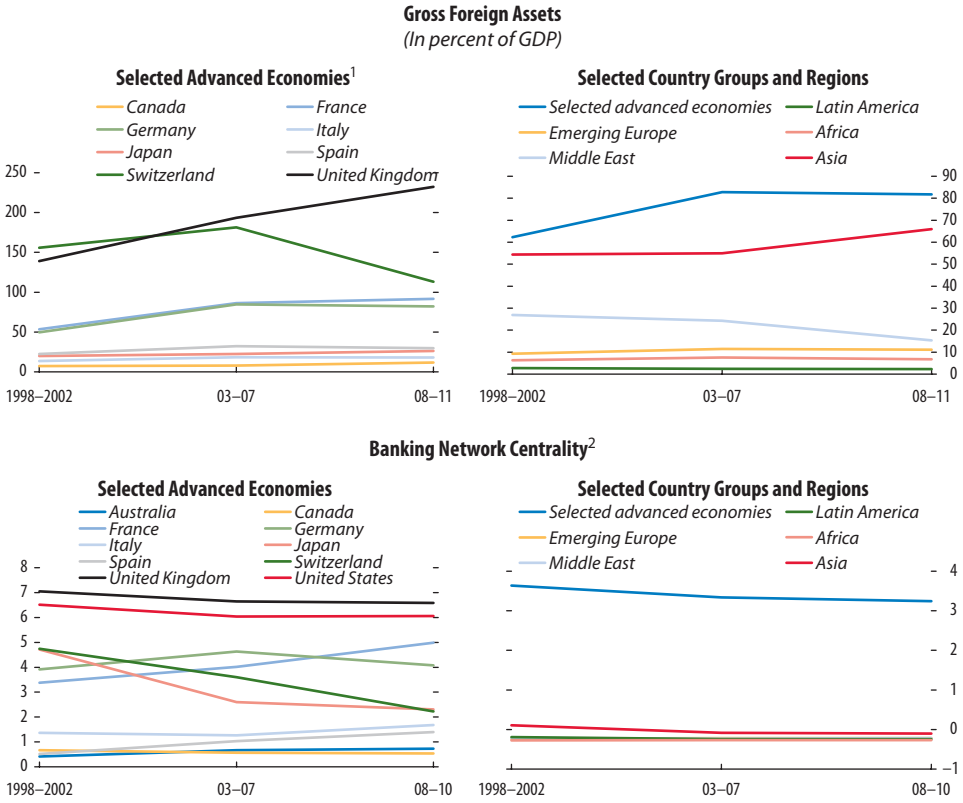
[36]The wholesale funding ratio is the share of liabilities other than customer deposits, in percent of total liabilities. For the euro area economies, "domestic" refers to the interbank market within each member country's borders.

[37]Concentration has increased in other markets as well. For instance, Fitch Ratings (2012) reports that five banks account for 97 percent of the $300 trillion of notional amounts of derivatives on the books of 100 surveyed U.S. companies.

[38]Indeed, the NIM can drop with higher legacy assets and nonperforming loans. Distressed banking systems are often accompanied by a low NIM.

[39]As measured by cross-border portfolio holdings of bonds, money market funds, and equities, and through outright loans and currencies and deposits.

Figure 3.5. Globalization



Source: IMF staff estimates based on the data sources in Annex 3.1.

Note: Data for individual countries (left panels) and cross-country averages (right panels) are shown. The selected advanced economies in the panels on the right refer to the average of those in the panels on the left.

[1]Data for France until 2010.

[2]The index aggregates information on the global interconnectedness of banking systems in terms of banking assets and liabilities according to a network analysis based on data from the Bank for International Settlements. Units represent deviations from the pooled mean over all sample countries in standard deviations. See Čihák, Muñoz, and Scuzzarella (2012).

at least through 2011, banking sector investment in other economies does not seem to have been severely affected during the crisis. This restraint could, in part, be related to crisis-intervention policies, such as the Vienna Initiative in Europe.[40]

In addition, analysis of cross-border banking flows through end-2011 and flows from G-SIBs show that these institutions have shifted their global portfolios but have not necessarily withdrawn significantly from foreign asset holdings (Box 3.2). BIS data for 2011 reveal little sign of a decline in the international activity of financial institutions on a country-by-country basis; a few exceptions are within the euro area, where fragmentation is quite evident, even more so since the end of 2011 (see Chapter 1). Gross international claims of domestic banks on their foreign offices are higher than the 2006 level for the EU member countries as a whole, even though there was a noticeable retrenchment in 2008–09.

Network analyses that measure the importance, or centrality, of economies in banking flows do not show a reversal in trend (Figure 3.5).[41] The central

[40]Formally, the European Bank Coordination Initiative; see, for example, www.imf.org/external/pubs/ft/survey/so/2009/INT102809A.htm.

[41]Centrality measures attempt to gauge the proportion of claims from one country in the total claims across all economies. The measure of centrality used in Figure 3.5 takes the average of an indicator for asset exposures of one country vis-à-vis those of other economies ("downstream" centrality) and an indicator for liabilities of one country vis-à-vis those of other economies ("upstream" centrality).

importance of advanced economies' cross-border banking flows continues. The dependence of France and some other euro area economies on wholesale funding has continued to grow. However, other evidence from a network analysis of BIS data on the number of links between economies (Minoiu and Reyes, 2011) reveals a drop in global connectivity during the current crisis. For instance, the connections or links between the "core" economies (as measured by various network centrality measures of the importance of economies in the global financial network) dropped by half in 2008.

In general, up until 2011, the crisis had not reversed the long-term trend of globalization even though some selected areas have suffered. There is currently no evidence of a generalized move toward deglobalization. But the overall picture could hide region-specific bilateral withdrawals in funding relationships, especially between the euro area and banking sectors in emerging Europe, where there has been some evidence of a diminution of cross-border banking claims in the first half of 2012. Also, deglobalization could yet emerge if the global regulatory reforms fail to deliver a level playing field and good cross-border resolution frameworks.

Has the Structure of Financial Systems Become Safer?

A number of financial structure indicators reviewed in this section suggest that financial systems are not safer than before the crisis. Although trends through to 2012 are not observable, given that much of the data end in 2011, the main observations are that (1) market-based financial intermediation continues to be important in most financial systems, even though certain components have declined; (2) financial systems remain dependent on wholesale funding and, for the most part, highly concentrated; and (3) globalization has not been severely affected, though pull-backs for some economies are evident (see Chapter 2).[42] Of course, the suggestion is not that these are all necessarily undesirable outcomes. Rather, the efficiency benefits of some of these features—such as globalization—need to be preserved while reducing the adverse effects of disruptive spillovers during crisis.

Financial systems in advanced economies have become more concentrated; and with their reliance on wholesale funding, they are still highly linked domestically—all these are indicators that have a positive correlation with financial stress (see Table 3.1). Some of these characteristics are also found to hinder economic activity (see Chapter 4). Moreover, the lingering presence of needed intervention measures could stall progress on the positive effects of regulatory reforms if not accompanied by strong pressure from supervisors on banks to make the necessary adjustments. The officially inspired mergers, the nationalization of banks, and the extension of government underwritten guarantees that have been part of crisis management strategies all further instill the notion that some banks are too important to fail, potentially undermining the credibility of bail-ins.[43] These interventions could result in more concentration, rather than less. Such interventions also obscure market discipline and often detract from transparency.

Although the use of some new, complex products, such as resecuritization, has waned, others are being developed and deserve careful attention. For instance, there is some anecdotal evidence that a number of banks have been securitizing derivative counterparty risk to offset the new Basel III credit value adjustment (CVA) capital charge (Cameron, 2011). Most importantly, Basel capital and liquidity rules could be prompting a greater intermediation of new financial products as financial institutions use other avenues to make up for the higher expenses imposed by the Basel rules. These developments need to be monitored because a high degree of complexity in financial products can hinder the ability of potential investors to calculate an accurately risk-adjusted price for them.[44]

[42]Simple correlations suggest that, before the crisis, larger size, greater domestic interconnectedness, and financial globalization were associated more with nontraditional and less with traditional banking. Copeland (2012) shows that, in the United States, the largest bank holding companies had aggressively built up new sources of income from capital market activities like trading and investment (nonsecuritization) incomes and relied much more on income from their noncommercial bank subsidiaries.

[43]Bail-in refers to a statutory power of a resolution authority to restructure the liabilities of a distressed financial institution by writing down its unsecured debt and/or converting it to equity.

[44]Banks are reacting to Basel III regulations by selling the underlying constituents of a CDO (Alloway, 2012) and CDOs backed by trade receivables (Jenkins and Masters, 2012).

The long-term trends in globalization have not been significantly affected by the crisis, which means that globalization still presents potential channels for the transmission of shocks during crises. In good times, strong global links can aid intermediation by ensuring that investors can find funds even when local savers are absent. However, economies with more financial interconnections—domestically and abroad—run the risk of becoming the recipient of a shock from another economy during a crisis. There is some evidence that closed financial systems have weathered the crisis better, albeit at the cost of missing some of the structural benefits of cross-border financial interconnections. The resilience of some systems can also be attributed to good operational profiles of banks, for instance relying on stable host-country deposits rather than on cross-border funding sources (Box 3.5). Overall, however, in the absence of good cross-border resolution frameworks, the risk of spillovers related to globalization is still present.

Overall, risks in the financial system remain. Of particular concern are the larger size of financial institutions, the greater concentration and domestic interconnectedness of financial systems, and the continued importance of nonbanks in overall intermediation. The potential future use of structured and some new derivative products could add to complexity and a mispricing of risk.

Analyzing the Effect of Reforms on Structures—An Early Look

Any change in the financial structure observed since the crisis could be due to a combination of factors, including changes in regulatory policy, the anticipation of policy changes, continuing crisis management, and private sector responses to changing business conditions. Disentangling the effects of such factors on financial structures across economies with precision is extremely difficult because of data limitations and the number of other forces at work. Nonetheless, we explore an econometric analysis that tries to extract the influence of postcrisis policies on different aspects of financial structure across economies. Presented here are results regarding the influence on intermediation structures arising from progress in implementing Basel capital rules. The results for progress on Basel liquidity rules and on crisis intervention policies are only summarized here, with further details presented in Annex 3.3.

With progress on Basel III everywhere at an early stage, the regulatory policy area explored here is a country's progress on Basel II and Basel 2.5 capital rules.[45] We describe implementation progress through an index ranging in value from 0 to 1—a sort of distance to perfect implementation (see Annex 3.4 and Table 3.11), with 1 representing perfect progress. This index, which varies from 0.19 to 1.0 across the sample economies, is then used to analyze its effect on structural characteristics with the help of the so-called difference-in-differences estimation in econometrics.[46]

The difference-in-differences method estimates the impact of a policy by comparing the policy-induced outcome with what would have been observed in the absence of the policy. More specifically, for the present exercise, it decomposes the observed differences in financial structures across economies and over time into three parts:

1. A common time trend shared by all economies [column (1) of Table 3.5], which reflects what happened to structure over time without considering anything else. This controls for changes in business conditions and other common elements related to the passage of time.
2. The differences in structures characterizing economies at different stages of progress on Basel rules [column

[45]The variation in implementation across economies comes from variation in implementation of Basel 2.5 as of March 2012. The results do not qualitatively change when Basel III implementation is used instead of Basel II and 2.5. As of 2012, the variation across economies is quite large regarding progress toward implementation of Basel II (which is eight years old) and Basel 2.5 (which came into effect at end-2011). We assume that this same variation between economies existed in 2011, which is the last year in our sample.

[46]See Annex 3.3 for details and interpretations. The difference-in-differences method is employed to extract the influence of policies. To account for the possibility that the country-specific trend could differ by the intensity of the crisis, the average values of the financial stress index (FSI, the same indicator used in Table 3.1) in the precrisis and postcrisis periods are added as controls in the regressions. The coefficient on the FSI for the 2008–11 period would also capture country-specific responses to changing market conditions during that period.

Table 3.5. Effect of Progress in Basel Capital Rules on Intermediation Structures
(Effect on levels; in percent except as noted)

	(1)	(2)	(3)	(4)	(5)	(6)
Structural Indicators	Change in Structure during 2008–11 (β_1)	Association between Progress on Basel Capital Rules and Structure (β_2)[1]	Effect of Progress in Basel Capital Rules on Structure during 2008–11 (β_3)[2]	Number of Observations[3]	R^2	Year of Latest Available Data[4]
Market-based intermediation						
Nontraditional bank intermediation	0.28	1.47	–0.09	30	0.09	2010
Noninterest income to total income	3.67	0.15	–9.12	46	0.01	2010
Other earning assets to total assets	–6.89	2.72	0.66	46	0.07	2011
Other interest-bearing liabilities to total liabilities	–2.16	4.27	**11.34***	46	0.06	2011
Nonbank intermediation						
Loans and bonds held by nonbanks relative to the overall financial sector	13.28	**–75.18****	–4.73	26	0.43	2011
Ratio of private bond market capitalization to GDP (percentage points)	6.02	13.10	–2.14	43	0.06	2010
Use of new financial products						
Derivatives turnover to GDP	–0.60	0.58	0.35	32	0.07	2010
Securitization to GDP	**–26.93*****	**–15.18*****	**25.17*****	22	0.15	2011
Traditional bank-based intermediation						
Loans and bonds held by banks relative to the overall financial sector	–13.28	**75.18****	4.73	26	0.43	2011
Net interest margin	1.71**	**–2.63*****	–0.32	46	0.24	2010
Bank credit versus stocks and bonds[5]	–0.28	**0.70****	1.02	43	0.27	2010
Scale and scope						
Size (index)	–39.18	**281.49*****	–16.08	42	0.48	2010
Domestic interconnectedness (index)	0.62	**2.02***	0.22	20	0.37	2011
Wholesale funding ratio	2.93	**29.18****	6.46	24	0.30	2011
Interbank assets to total assets	3.43	**10.66***	1.82	30	0.23	2011
Interbank liabilities to total liabilities	3.02	7.34	2.22	30	0.26	2011
Concentration (asset share of top three banks)	–6.92	**29.97****	9.41	46	0.25	2010
Financial globalization	0.44	0.69	**–1.52****	26	0.22	2010
Share of foreign banks (number of banks)	7.29	–5.60	**–20.59***	46	0.15	2010
Gross foreign assets (percentage points of GDP)	3.64	**93.91****	–39.32	35	0.16	2011
Global interconnectedness (index)[6]	–0.18	1.73	–1.25	46	0.11	2010

Source: IMF staff estimates.

Note: For each structural indicator, the following regression is estimated by the difference-in-differences (DiD) method; see Annex 3.3.

$$s_i^t = \beta_0 + \beta_1 D_t^{Crisis} + \beta_2 Basel\ Capital\ Progress\ Index_i + \beta_3 D_t^{Crisis} * Basel\ Capital\ Progress\ Index_i + \beta_4 Financial\ Stress\ Index_{i,t} + \varepsilon_{i,t},$$

where, s_i^t denotes the structural indicator, D_t^{crisis} is a crisis dummy taking the value of 1 in the period 2008–10 and zero in 2003–07, and *Basel Capital Progress Index*$_i$ is taken from Table 3.11; Financial Stress Index$_{i,t}$ is described in Table 3.1. Results for the constant β_0 and the control β_4 are not reported. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels of confidence. Standard errors are clustered by country. See Annex 3.1 for an overview of the structural indicators and the underlying data.

[1]The parameter refers to the structural difference observed between countries for which the Basel Capital Progress Index differs by 1.

[2]The parameter refers to the causal effect of an increase in Basel Capital Progress Index by 1 on the corresponding structural indicator. However, a causal interpretation requires strong assumptions, especially, equal trends in the structural indicators among countries in the absence of the implementation of Basel regulations, which are not testable.

[3]The difference-in-differences approach is based on a pooled panel. Accordingly, the number of observations is two times the number of countries in the corresponding sample.

[4]For structural indicators with data through 2011, a few countries in some cases are included that have data through 2010 only. The signs and levels of significance do not change if data only through 2010 are used instead.

[5]This variable is used to represent the share of traditional versus nontraditional intermediation.

[6]This variable is based on the work of Čihák, Muñoz, and Scuzzarella (2012). See Annex 3.1 and Table 3.6 for further details.

Box 3.5. Did Some Banking Systems Withstand International Contagion Because They Are Less Globally Integrated?

The recent episode of global financial turmoil highlights the risk of international contagion and the potential resiliency of less integrated banking systems. This box explore the banking system "openness" and regulatory frameworks of four jurisdictions generally regarded as less globally integrated, all of which fared relatively well in the financial crisis. It concludes that the funding structure of banks could be more important than a lack of foreign bank ownership for financial stability.

Australia, Canada, India, and Malaysia have a relatively low degree of exposure to international banking and also avoided the worst of the effects of the global financial crisis. Is there a connection?

We use three measures to gauge the extent of globalization of a banking system: the extent of foreign banks' presence in the banking system, by taking the ratio of *foreign bank assets* to total bank assets and *banks' foreign assets* as a percent of total assets or GDP; and the direction of global interconnectedness, by taking *international financial claims and liabilities*, both in percent of total assets. We use these three indicators to compare Australia, Canada, India, and Malaysia with peer groups.

Note: Prepared by Mamoru Yanase and Sofiya Avramova.

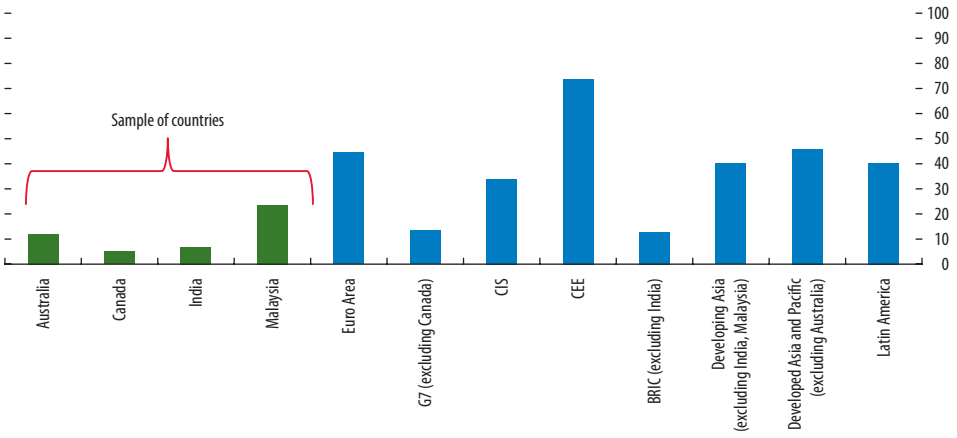
Australia and Canada have limited foreign bank presence and low foreign claims when compared with the euro area and advanced Asia (Figures 3.5.1 and 3.5.2).[1] But when the international positions of their banks are used, international integration becomes more evident. Even so, Australia and Canada relied far less on foreign liabilities than most peer groups before the crisis (Figure 3.5.3).

India and Malaysia appear insulated from foreign banks by almost all indicators when compared with all peer groups except developing Asia and the economies (besides India) that make up the BRIC group (Brazil, Russia, and China). Both India and Malaysia have low foreign bank presence, and banks there have a very low level of foreign assets in their balance sheet. Malaysia had relatively low reliance on foreign liabilities compared with other peers, whereas in 2007 India was close to the BRIC average (Figures 3.5.1–3.5.3).

Regulatory policies in Australia and Canada share some features that might have resulted in less

[1]Internationally comparable data from the Bank for International Settlements show thatafter the crisis, foreign liabilities (in percent of total bank assets) for Australia, Canada, the euro area, and the G7 (excluding Canada) declined to various degrees.

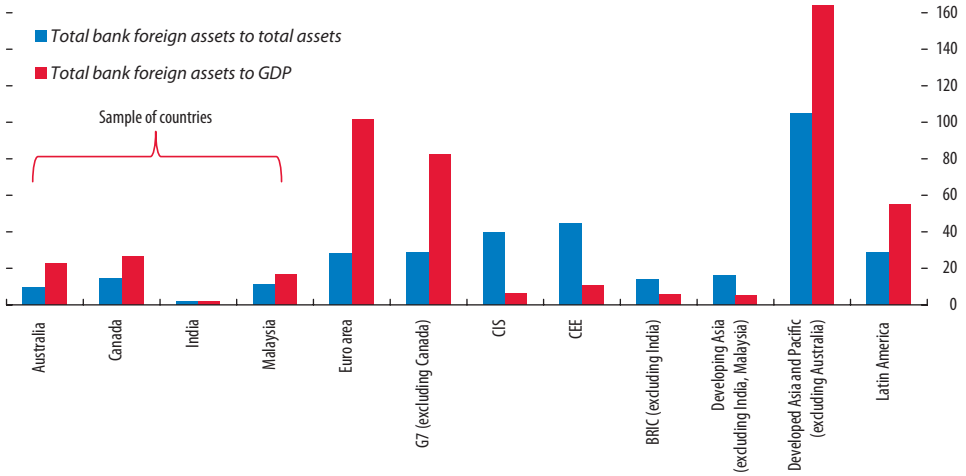
Figure 3.5.1. Degrees of Globalization in Banking Systems—Foreign Bank Presence
(In percent, ratio of foreign bank subsidiary and branch assets to total banking assets)



Sources: Bank for International Settlements; European Central Bank; World Bank; and IMF staff estimates.
Note: Data are as of December 2011. BRIC = Brazil, Russia, India, and China; CIS = Commonwealth of Independent States; CEE = Central and Eastern Europe.

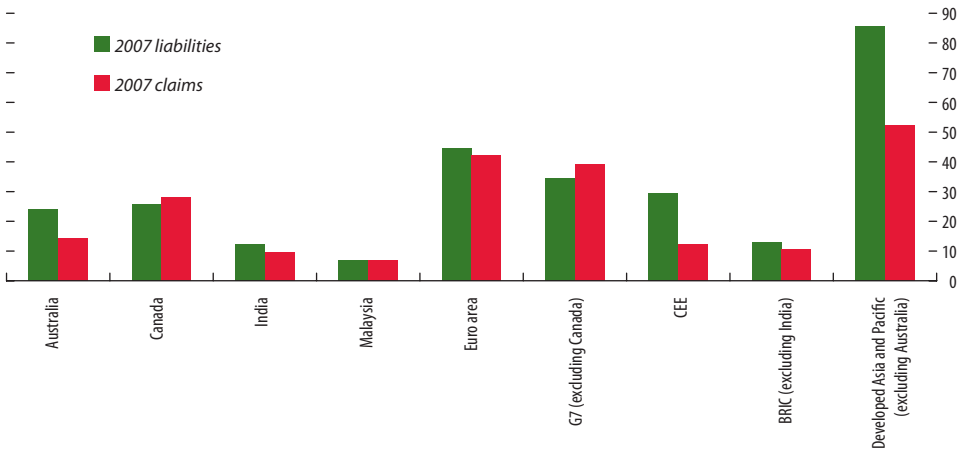
Box 3.5 *(continued)*

Figure 3.5.2. Degrees of Globalization in Banking Systems—International Positions
(In percent)



Sources: Bank for International Settlements; European Central Bank; World Bank; and IMF staff estimates.
Note: Data are as of December 2011 and 2010 selectively. BRIC = Brazil, Russia, India, and China; CIS = Commonwealth of Independent States; CEE = Central and Eastern Europe.

Figure 3.5.3. Direction of Interconnectedness—International Claims versus Liabilities, 2007
(In percent of bank assets)



Sources: Bank for International Settlements; European Central Bank; World Bank; and IMF staff estimates.
Note: BRIC = Brazil, Russia, India, and China; CEE = Central and Eastern Europe.

globally integrated banking systems. One important policy they have in common is the de facto prohibition of mergers among the major domestic banks. While its primary objective is to retain competition, the prohibition has prevented an increase in the size of these banks and the creation of national "champions" that could compete with major global financial institutions. This may have been a factor limiting their banks' international activities. The two economies also impose restrictions on shareholder

Box 3.5 *(concluded)*

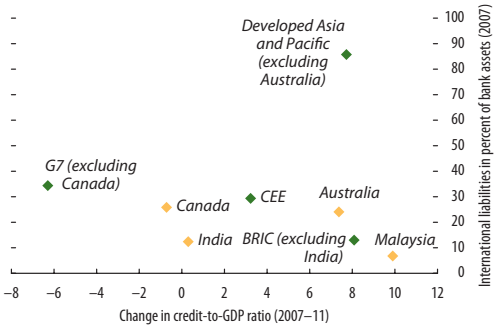
ownership, which limits acquisition of domestic banks by either other domestic banks or foreign ones, although establishment of subsidiaries and branches of foreign banks are not restricted, except on prudential grounds. In Canada, a "widely held rule" prohibits a single shareholder, domestic or foreign, from owning more than 20 percent of voting rights in a big bank. In Australia, share purchases of a bank, domestic or foreign, exceeding 15 percent of its voting rights require special approval under a process in which the authorities consider their ability to meet prudential requirements, the implications of foreign ownership, and the impact on competition.

India and Malaysia explicitly restrict entry by foreign banks, although both economies have relaxed the policy somewhat. Such restrictions are common among emerging economies in the region. In Malaysia, branches of foreign banks are prohibited, and approvals for establishing banking subsidiaries are rare—no new entry had been approved until very recently. The number of branches a subsidiary can set up had also been restricted.[2] The maximum foreign ownership stake in a domestic bank is 30 percent.[3] In India, foreign bank entry has been through branches, and the number of approvals (including expansion of branch networks) is strictly controlled. Foreign banks that already have operations in India are not permitted to own more than 5 percent of shares in domestic banks. Other foreign banks must seek approval to own more than 10 percent of shares in an Indian bank. The authorities are currently considering encouraging the use of subsidiaries. The share of foreign-owned bank assets in total assets is subject to a ceiling.[4]

[2]However, a number of foreign banks that had entered before the respective policies were established have significant operations in Malaysia, resulting in a relatively high foreign bank share.

[3]In 2009, Malaysia increased to 70 percent the foreign equity limits in domestic Islamic and investment banks.

Figure 3.5.4. Credit Growth and Precrisis Funding Structure



Sources: Bank for International Settlements; Economist Intelligence Unit; European Central Bank; and IMF staff estimates.
Note: BRIC = Brazil, Russia, India, and China. CEE = Central and Eastern Europe.

The data suggest, however, that prudential regulatory requirements placed on entry of foreign banks may be less important for financial stability than the funding structure of domestic banks. Analysis shows that banking systems less reliant on foreign funding—economies whose bank assets were relatively less funded with international liabilities in 2007—had higher credit growth in the five years since the crisis (Figure 3.5.4).[5] All four economies reviewed here follow the pattern of other peer groups on average, especially Australia and Malaysia. Other evidence suggests that having a strong domestic deposit base is important for supporting local lending by foreign banks (Claessens and Van Horen, 2012). Hence, the positive experience of these four economies could be attributable not only to their regulatory approaches but also to the funding structure of the banks.

[4]Currently, the share of foreign bank branches' assets in the total banking assets in India is limited to 15 percent. If the limit is exceeded, licenses may be denied to new foreign banks.

[5]Nondeposit funding could also be a signal of investments in new and more risky products, some of which were not sufficiently discouraged by local supervisors before the crisis. Also, the funding structure could be related to regulatory policies on foreign bank presence.

(2) in Table 3.5]. This element can be viewed as a conditional correlation, not a causal relationship.

3. A remaining difference in trends between economies [column (3) of Table 3.5]. This can be attributed to differences in implementation, that is, the causal effect of policies, because it measures the additional effect of the progress in capital rules on the structure during 2008–11.

This interpretation assumes that equal trends in the structural variables are captured by the common time trend and other controls.

The quantitative impact of regulatory policy measures on structural characteristics is likely to be small and confounded by other influences that would make it hard to find statistical relationships. This is especially so because many regulatory policies in addition to the Basel initiatives are still at the rule-making stage, and only a handful have been implemented so far (see the section above on "Objectives and Implications of the New Regulatory Initiatives" and Annexes 3.2 and 3.4). Furthermore, the ongoing crisis and the various intervention measures are obscuring change. Nevertheless, the variation across economies is large enough to warrant conducting this exercise in relation to Basel capital rules implementation. The econometric exercise could illustrate the direction of the changes, even if these effects are currently weak. Importantly, this exercise sets out a framework that can be repeated from time to time, especially once the crisis is past, to understand the effect of policies on structure. Despite the strength of the technique in isolating various relationships, care should be exercised in interpreting the results. The structural variables themselves are only stand-ins for characteristics of financial systems, and thus their relationship to implementation progress could be capturing other regulatory initiatives common to both that are not picked up by the other controls.

Progress on Basel Capital Rules

Before turning to the empirical results, we recall the likely effects of the new Basel rules on capital and liquidity (Basel III) as presented in Table 3.3. The new rules are expected to reduce the scale and scope of operations of banks but could provide incentives for intermediation to move away from traditional banking to nontraditional banking and nonbank institutions. Shifting from assets with higher risk weights to those with lower risk weights, to conserve capital, could further lower the investment and interest income of banks. At the same time, the banking system could become more concentrated as banks try to benefit from consolidating business lines in areas where they have advantages.

We find that in economies farthest along in implementing the Basel rules, the financial sector is relatively larger, has more traditional bank-based intermediation, is more domestically interconnected, and is more concentrated and globalized [see column (2) of Table 3.5].[47] Most of the progress overall has been made on Basel II and 2.5 (as shown in Table 3.11 in Annex 3.4), so this result likely represents the structural characteristics of the economies that had instituted these elements (e.g., European economies).

Furthermore, there is some evidence that the Basel capital rules are prompting more nontraditional banking, creeping up home bias, and moderating the fall in securitization.[48] Progress on capital rules is leading to changes in structural characteristics [column (3) of Table 3.5] that confirm some of the expectations summarized in Table 3.3, as recalled above. Banking systems are increasingly using non-interest-bearing liabilities (a subindex for nontraditional banking). Also, progress on the capital rules may be encouraging banking systems to use more of some forms of securitization (cushioning the overall fall in securitization). Despite the gradual implementation of Basel capital rules, investor pressure may encourage banks to move rapidly to adopt the rules before the final implementation dates and, thus, could already have prompted banks to shed noncore activities like nonloan assets (IMF, 2012a). Banks' greater reliance on nondeposit liabilities could be due to their attempts to cut expenses on funding by moving to a

[47]The coefficients in Table 3.5 are interpreted as follows. Taking the example of "Securitization" (the last entry in the category "Market-based intermediation"), column (1) shows that the mean level across all economies decreased by 26.93 percentage points of GDP between 2003–07 and 2008–11 (and can be compared to the average decline shown in Figure 3.3), and economies that had made the most progress in Basel capital rules had relatively low securitization levels [the negative coefficient in column (2)]. Moreover, progress in capital rules had the effect of pushing up securitization by 25.17 percentage points of GDP in 2008–11 for those economies that made 0.1 unit higher progress on the capital rules [column (3)]. Thus, on average, securitization changed by –1.76 percentage points of GDP (–26.93 + 25.17) in 2008–11 for economies with perfect progress.

[48]Even after removing the estimated amount of securitization potentially for use as collateral against ECB loans in Europe, the results still hold.

different liabilities structure.[49] The negative relationship between globalization and progress on Basel capital rules implementation is suggestive of increasing home bias, especially for economies further along in implementation.

Basel Liquidity Rules and Crisis Intervention Measures

Applying the analysis to proposed liquidity standards, we find that market participants' anticipation that jurisdictions will be implementing them could already be prompting changes in structures.[50] In particular, progress on implementing the Basel III liquidity rules in a domestic context is prompting more nontraditional activities, especially larger holdings in other earning assets (see Table 3.9 in Annex 3.3). Most of the direct connections between implementation and structure are not statistically significant [Table 3.9, column (3)]. However, the significant relationship between implementation progress and lowered bank credit relative to other forms of intermediation supports the notion of intermediation moving out of banking systems as implementation of the liquidity standards proceeds.

Applying the model to crisis intervention measures, we found that greater intervention was associated with potentially more fragile structures.[51] In general, economies with a greater degree of nontraditional banking, higher domestic interconnectedness (especially reliance on wholesale funding), more concentration, lower net interest margins, and stronger global interconnectedness were associated with a greater degree of intervention during the crisis [see Table 3.10, column (2), in Annex 3.3]. This observation could be an artifact of the large-scale interventions in the advanced economies, especially in Europe, and is additional evidence that these structural characteristics were associated with crisis outcomes (see also Table 3.1). As such, it provides more comfort regarding regulatory reforms that seek to address the safety concerns related to some of these structural elements.

[49]The EBA exercise in July 2012 showed that the banks that were subject to EBA's stress tests are cutting expenses and changing the structure of liabilities to cheaper ones, to mitigate the costs arising from the capital regulatory measures.

[50]The progress in adopting and implementing legislation based on proposed Basel III liquidity standards (continuous indices ranging from 0 to 1) are shown in Table 3.11, although the progress is judged on the basis of planning and preparation by domestic institutions for such implementation. The crisis intervention measures and the progress indices are country-specific variables and do not vary over time.

[51]The number of interventions during the crisis (an index ranging from 2 to 8) is taken from the last column in Table 3.4.

Implications for the Reform Agenda

The impact of the regulatory reform agenda on the financial sector cannot yet be observed—these are still early days in the unfolding of the agenda, and the ongoing global financial crisis obscures, and to some extent delays, change. Nonetheless, the chapter provides some partial answers to the questions posed in the introduction.

The crisis has provided some guidance about where financial systems need fixing. As noted above, a host of papers show that some specific structural features of financial systems were associated with the crisis. These include size of the financial system; overuse of leverage; reliance on wholesale funding, including repo market financing; the role of nonbank institutions; and (a largely underestimated) degree of interconnectedness across institutions and economies. This earlier analysis provides the starting point for evaluating the reform agenda.

Learning from the crisis, the global reform agenda has focused on areas that are likely to bring about the fastest improvement—mostly in the banking system. Within banking regulations, the rules mostly impose higher costs on activities whose risks were found to have been underpriced. These higher costs should move the banking sector in a safer direction. The ultimate goal is broader, however: designing regulatory reforms to effect a safer financial system, one less complex, more transparent, and with larger financial buffers. In this chapter we have used these normative qualities as a benchmark and provided an early assessment (using raw data, analysis, and judgment) about whether the reforms are moving financial intermediation in a safer direction.

Unfortunately, much of the intended change cannot yet be observed, in part because the implementation phases of the regulatory reforms have long timelines to avoid dampening the recovery, and in part because crisis intervention measures are still actively employed in some places. Crisis interven-

tions have sometimes brought abrupt changes to structure that often worked against the direction of safety—for example, even larger institutions were created as strong institutions bought weaker ones. The low interest rate environment and unprecedented levels of quantitative easing have been necessary to support credit growth and have kept the crisis from deepening, but they have also weakened the functioning of some markets, potentially with longer-term consequences. Moreover, the protracted crisis intervention measures, mostly in Europe, could be slowing the needed restructuring of their financial sectors. Uncertainty about the economic and regulatory environment has also inhibited institutions from making strategic decisions about their activities.

Despite improvement in most financial systems along some dimensions, the structure of intermediation remains largely unchanged overall and is still vulnerable in the following ways:

- The data suggest that systemic risks arising from the size and scope of intermediation remain much as before, with linkages across institutions in domestic financial systems still high and financial innovation and complex products taking on new forms.
- More importantly, some advanced economy financial institutions continue to rely heavily on wholesale funding, though in some cases this takes the form of relying on central bank liquidity support. In either case, it suggests that funding vulnerabilities remain.
- Since 2006, trend growth in cross-border bank linkages has continued after its dip in 2008–09, implying that ongoing retrenchment from some economies has coincided with flows moving to others. This is promising; such linkages will continue to permit better diversification of risks provided these movements are accompanied by appropriate risk management and good governance within institutions. Nonetheless, without good risk management techniques and effective cross-border resolution schemes, the potential for disruptive withdrawals remains.
- The Basel capital rules are resulting in higher capital ratios and better-quality capital for many banks, but our findings suggest that these could also be raising the incentives to develop new financial products. Banks are securitizing counterparty credit risk and attempting to raise profitability with more emphasis on non-interest-related activities.
- There is also a high chance that regulatory initiatives could be moving intermediation to nonbank financial institutions. With nonbanks' less regulated status and less intrusive supervision, new systemic risks may emerge.

One of the overarching intentions of the reform agenda is to render systemically important institutions less prone to failure and to prevent the use of taxpayer funds to avoid a collapse. The primary means of achieving this has been to increase capital and liquidity and other measures that increase explicit and implicit costs and reduce profitability. One of the key elements determining the future of the financial structure is how the pressure on profitability will play out. If investors in financial institutions continue to demand precrisis levels of return on equity, will the institutions achieve that by restructuring existing business lines, or will they be tempted to engage in new, risky activities in the search for return? There is a clear risk of further concentration of trading activities in even fewer global institutions as they attempt to combine their funding advantages with economies of scale to continue achieving an acceptable return. These institutions would become even more important.

At the same time, movements of some activities off of supervisors' radar screens and into the shadow banking system may raise new concerns about transparency and the connection of those activities to the regulated banking system. Policymakers must vigilantly monitor the evolution of shadow banking, as is currently being done under the auspices of the FSB. For those jurisdictions with already substantial evidence of shadow banking, more needs to be done to ensure that potential risks are identified in a timely fashion and adequately addressed where needed.

Crisis management policies should act as a bridge, encouraging restructuring and disposal of bad assets, so the system can "reboot" on a safer path. It needs to be recognized that current crisis management policies are not designed to fix longstanding structural issues, nor should they be. That said, crisis manage-

ment policies provide the needed breathing room to take actions to restructure banking operations and to deal with nonperforming assets or, if needed, to close nonviable institutions. Some economies, like the United States, have made good strides in this direction, while others, including some economies in the euro area, have not. Unlike in previous crises, the much needed deep restructuring has not yet occurred for the hardest-hit region.

Authorities have made much progress on the reform agenda, but several issues still need the attention of policymakers. While being cognizant of a tendency by government to over-regulate during periods of distress (potentially stifling economic benefits), we suggest that there are still some regulatory areas that remain unfinished or that may develop and require action because of unintended side effects of reform. The following is a list of those areas and a suggested agenda for further work.

Too Important to Fail

- *A global-level discussion on the pros and cons of direct business activity restrictions*, because the effects of such national initiatives will not stop at the borders. This discussion should address the question of whether imposing higher costs can be expected to lower systemic risks. If not, the questions become, will restraints on activities be more effective? And what might their cross-border implications be?
- *Recovery and resolution planning for large institutions*. Progress so far is uneven across economies and, especially for systemically important institutions, faster progress is needed. While a so-called living will is not a panacea for reducing risk at a financial institution, the discipline of constructing such a plan for its own demise can help it sort out its internal structures and enhance its governance mechanisms to control excessive risk taking. If properly implemented, implicit guarantees would be curtailed, lowering the potential use of taxpayer funds.

Financial Globalization

- *Further progress on cross-border resolution*. Globalization works best when the flows are calm and consistent and disruptions can be handled in a fair and transparent manner. Good management by financial institutions with cross-border activities, well-coordinated supervision of cross-border institutions, and transparent methods of dealing with distress are all components of healthy financial globalization. Cross-border resolution remains the most difficult component of any plan to ensure a smooth unwinding of large global institutions—burden sharing and legal commitments are areas for further clarity (Leckow and Pazarbasioglu, 2012). The framework for coping with cross-border resolution needs to encourage operating behaviors, both by institutions themselves and by their supervisors, that reduce the likelihood of having to resort to resolution.

Shadow Banking

- *Enhanced monitoring of systemic risks posed by nonbanks*. To the extent that nonbanks act like banks, a common set of prudential standards must be applied to both types of institution. Further monitoring to see where bank-like activities pose systemic concerns needs to continue and be enhanced, since some of the cost pressures on banks mean some activities will undoubtedly move into the nonbank sector.

Complexity and Transparency

- *Further thought on how to encourage the development of simpler products*. While not inhibiting innovation, we need to have ways to encourage products that can be priced more accurately to reflect risks. Both the producers of such products and their customers should be able to see clearly where risks reside. For example, the new products to securitize counterparty risks warrant close monitoring to ensure that they are transparent to investors and shareholders so they can appropriately price their exposures and to ensure that the products are not offsetting some of the goals of the new banking standards.
- *More information to reveal interconnections and the buildup and spillover of risk*. Lack of transparency on counterparty relationships, corporate governance structures, and other potentially risk-laden

conditions blocks investors and counterparties from imposing market discipline and prevents regulators and supervisors from taking early corrective actions.

Over-the-Counter Derivatives

- *More consideration of risks in moving OTC derivatives contracts to central counterparties (CCPs)*. Current efforts to reduce counterparty exposures through such moves come with some danger that the CCPs themselves will become too important to fail and that the "location" requirements enforced in multiple jurisdictions may create too many CCPs. These institutions could have diverse requirements and levels of oversight that would hinder the benefits of netting, increase the demands for collateral, and unnecessarily increase costs. In general, the international effort to harmonize approaches to reforms in OTC derivatives markets should be reenergized.

Other Conditions

Though they are not part of the regulatory reforms effort, two conditions are essential if the reforms are to bring about a safer financial system: (1) strong supervision in implementing the reforms and (2) a private sector with the incentives to follow them. Without these elements, the reforms will wither and die.

Hence, we cannot overemphasize the importance of the role played by implementation of regulations—both in terms of the final version of rules at the national level and in terms of how those rules are interpreted and enforced within and across institutions. National and regional approaches will vary considerably, and these have the potential to alter the effectiveness of the reforms, not only for themselves but globally as well. Hence, supervision must have a global focus. But with the system remaining complex, and with the set of new (detailed and complex) regulatory initiatives being added, a political and social consensus is needed to give supervisors the will to act and to be intrusive, skeptical, proactive, comprehensive, adaptive, and conclusive (Viñals and Fiechter, 2010).

In addition, the private sector needs to take its share of the responsibility for making financial systems safe for savers and investors—the ultimate beneficiaries. Compensation within institutions should seek to apportion rewards based on both risk and return. Governance structures should be set to support those responsible for ensuring the firm's integrity and soundness. Product development should seek to satisfy customer's bona fide needs in a manner that enables risk-adjusted pricing.

In summary, we must look beyond the crisis to ensure that the quick and urgent responses to problems arising during the crisis do not lead to new structural problems and do not fuel systemic risk down the road. To do this effectively, many of the key areas for further reform will require a strong global dialogue and commitment. Such action will help keep the benefits of global markets and institutions, mitigate their downside risks, and avoid the pitfalls that accompany protective national tendencies.

Annex 3.1. Financial Structure Indices

To map the various aspects of financial structure from the available economic indicators, the analysis in the chapter relies on indices as a way to aggregate information. All incorporated information is weighted equally in the associated index if not indicated otherwise. In addition, all indicators have been demeaned and divided by their standard deviation to equalize scaling patterns and to prevent more volatile indicators from determining the behavior of the aggregate index; and the corresponding means and standard deviations are calculated on the pooled country sample (across both time and economies) to enable cross-country comparisons while maintaining the time series structure of the underlying indicators. Finally, the frequency of the resulting indices is transformed from annual to five-year averages to filter business cycle patterns that are likely to interfere with the more persistent structural trends in the data.

Indices have been divided into various concepts. The concepts are partly borrowed from IMF (2006), which laid out the influence of different types of intermediation structures on economic cycles. Financial systems in which intermediation is done at arm's length—transactions between two unaffiliated parties or between two parties with no relationship to each other—have been found to facilitate consumption smoothing more effectively than systems that rely on relationships. At the same time, arm's length systems make households sensitive to asset price changes through leverage and wealth effects, exposing economies to systemic risk.

In this chapter, the focus is on the difference between market-based systems (where there is a large role for banks doing nontraditional business, for nonbank intermediaries, and for the use of new financial products) and traditional bank-based intermediation structures (also see Box 3.1 for implications of market-based systems for systemic risk). In addition, the chapter considers a different concept of structure that could result from the distinction between market-based and traditional relationship-based intermediation: scale and scope. This concept would involve size (credit, deposits, market capitalization, securities holdings); domestic interconnectedness (interbank assets/total assets, interbank liabilities/total liabilities, and wholesale funding as a share of total liabilities); concentration (the asset share of the top three banks); and global interconnectedness (see Table 3.6 for the various indices).[52]

Not all indices were used in the chapter. However, those excluded are still presented here—some because they are used in Chapter 4 (at annual frequency) and some so that other users of such data can observe the types of data available for future studies. The correlations table (Table 3.1), the stylized facts (Figures 3.2, 3.4, and 3.5), and the tables showing econometric results (Tables 3.5, 3.9, and 3.10) are organized around these concepts of intermediation structures. See Table 3.6 for details on the components of the indices that represent these concepts.

Note: Prepared by Michael Kleemann and Oksana Khadarina.

[52]These concepts are partly based on the report to the G20 on identifying SIFIs (IMF-BIS-FSB, 2009) and the G-SIB identification methodology in BCBS (2011c).

Table 3.6. Indices, Subindices, and Data Sources

Index/Subindex	Data Source	Figure (F)/ Table (T)
Market-based intermediation index		
Nontraditional banking ratios (subindex)		F3.2, T3.5, T3.9, T3.10
Noninterest income to total income	The World Bank, Global Financial Development Database	T3.5, T3.9, T3.10
Other earning assets to total assets	IMF staff calculations based on Bankscope data	T3.5, T3.9, T3.10, T4.3, T4.5, T4.6
Other interest-bearing liabilities to total liabilities	IMF staff calculations based on Bankscope data	T3.5, T3.9, T3.10, T4.3, T4.5, T4.6
Nonbank Intermediation (subindex)		
Loans and bonds held by nonbanks over loans and bonds held by financial sector	Flow of Funds statistics (national statistical offices)	F3.2, T3.5, T3.9, T3.10
Ratio of private bond market capitalization to total credit	The World Bank, GFDD; IMF, IFS; and WEO	T3.5, T3.9, T3.10
Use of new financial products (subindex)		
Derivatives turnover (sub-subindex)		
Foreign exchange derivatives turnover (daily average in April)	BIS Triennial Central Bank Survey	
Interest rate derivatives turnover (daily average in April)	BIS Triennial Central Bank Survey	
Securitization relative to gross domestic product	SIFMA; IMF, WEO; and IMF staff calculations	
Traditional bank-based intermediation index		
Volume of funds intermediated by banks (subindex)		
Loans and bonds held by banks over loans and bonds held by financial sector	Flow of Funds statistics (national statistical offices)	T3.5, T3.9, T3.10
Competition in banking (subindex)		
Net interest margin (percent)	The World Bank, Global Financial Development Database	T3.5, T3.9, T3.10
Asset concentration of top three banks (percent)	The World Bank, Global Financial Development Database	F3.4, T3.5, T3.9, T3.10, T4.3, T4.5, T4.6
Share of foreign banks in total number of banks	The World Bank, Global Financial Development Database	T3.5, T3.9, T3.10
Disclosure of financial information (subindex)		
Accounting standards[1]	IMF Corporate Vulnerability Utility[1]	
Stock price co-movement	IMF Corporate Vulnerability Utility	
Bank credit versus stocks and bonds	IMF staff calculations[2]	
Scale and scope index		T3.5, T3.9, T3.10
Size		T3.5, T3.9, T3.10
Domestic bank deposits to GDP	The World Bank, Global Financial Development Database	
Credit to GDP	IMF, IFS; and WEO	
Stock market capitalization to GDP	The World Bank, Global Financial Development Database	
Outstanding public debt securities to GDP	The World Bank, Global Financial Development Database	
Outstanding private debt securities to GDP	The World Bank, Global Financial Development Database	
Domestic interconnectedness		F3.4, T3.5, T3.9, T3.10
Wholesale funding to total liabilities	IMF, IFS (monetary statistics)	F3.4, T3.5, T3.9, T3.10
Interbank assets to total assets	IMF, IFS (monetary statistics)	T3.5, T3.9, T3.10
Interbank liabilities to total liabilities	IMF, IFS (monetary statistics)	T3.5, T3.9, T3.10
Financial buffers ratios		F4.2
Liquid assets to deposits and short-term funding	The World Bank, Global Financial Development Database	T4.3, T4.5, T4.6
Equity to total assets	The World Bank, Global Financial Development Database	T4.3, T4.5, T4.6
Competition index		F4.3
Efficiency (subindex)		
Net interest margin (percent))	The World Bank, Global Financial Development Database	
Subindex cost ratios (sub-subindex)		
Overhead costs to total assets	The World Bank, Global Financial Development Database	
Cost to income	The World Bank, Global Financial Development Database	
Concentration (subindex)		
Asset concentration of top three banks (percent)	The World Bank, Global Financial Development Database	F3.4, T3.5, T3.9, T3.10, T4.3, T4.5, T4.6
Share of foreign banks in total number of banks	The World Bank, Global Financial Development Database	T3.5, T3.9, T3.10
Financial globalization index		T3.5, T3.9, T3.10, F4.1
Share of foreign banks in total number of banks	The World Bank, Global Financial Development Database	T3.5, T3.9, T3.10, T4.3, T4.5, T4.6
Ratio of total bank foreign assets to gross domestic product	IMF, Balance of Payments Statistics; and WEO	F3.5, T3.5, T3.9, T3.10, T4.3, T4.5, T4.6
Global interconnectedness[3]		F3.5, T3.5, T3.9, T3.10
Global interconnectedness (asset centrality)[3]	BIS	
Global interconnectedness (liability centrality)[3]	BIS	

Source: IMF staff.

Note: BIS = Bank for International Settlements; IFS = *International Financial Statistics*; SIFMA = Securities Industry and Financial Markets Association; WEO = *World Economic Outlook*.

[1]The indicator is given by the number of accounting items reported as a fraction of 40 key items selected from the Center for International Financial Analysis and Research's 90 items, available in the Worldscope database; see De Nicolò, Laeven, and Ueda (2008).

[2]The indicator is calculated as the ratio of credit over the sum of stock market capitalization and outstanding private and public debt securities.

[3]The indicator takes the average of the downstream interconnectedness (or "asset centrality") and upstream interconnectedness (or "liability centrality") and uses data from the BIS. Downstream interconnectedness is the recursive centrality measure of interconnectedness based on asset exposures for each banking system. The motivation for this comes from calling the asset (credit) exposure of creditor countries vis-à-vis borrowing countries a "downstream" exposure. Upstream interconnectedness is the recursive centrality measure of interconnectedness based on liability exposures for each banking system. The motivation for this comes from calling the funding exposure of borrowing countries vis-à-vis credit countries an "upstream" exposure. See Čihák, Muñoz, and Scuzzarella (2012).

Annex 3.2. Regulatory Initiatives: Proposals and Implementation Status

This annex details the status of selected regulatory reform proposals as of end-July 2012. It also provides a summary of implementation by 12 selected economies and the European Union (shown in Table 3.8 at the end of this annex).

Banks

Capital

The Basel III standards established by the Basel Committee on Banking Supervision (BCBS) increase the amount of capital required, both through changes to the capital calculation and through changes to the definition of capital (Table 3.2). Basel III keeps the total capital ratio at the level specified in Basel I and Basel II, 8 percent of risk-weighted assets, but because it introduces major changes in the composition of capital and in the definition of eligible capital, many banks will nonetheless have to raise capital to meet the new standards. These new capital standards will be applicable to all major banks in most economies by 2019.

The new rules will require more common equity (as opposed to forms of capital such as hybrid and subordinated debt that proved to be less loss absorbing in the crisis). The definition of capital will be further tightened, as banks will have a reduced ability to include intangibles such as good will and deferred tax assets as capital. They will not be allowed to include holdings in nonconsolidated financial companies as capital. In jurisdictions or institutions in which deferred tax assets have been a significant portion of capital, institutions will have to raise additional common equity.

Two capital buffers have been added: the so-called capital conservation buffer and countercyclical buffer. The capital conservation buffer is a layer of common equity that if encroached on will attract prompt supervisory corrective actions such as the suspension of dividends and bonus payments to management. The countercyclical buffer will be applied by national authorities when there is excessive aggregate credit growth leading to the buildup of system-wide risk. In addition to capital buffers, global systemically important banks (G-SIBs) will be subject to additional capital requirements, usually referred to as a surcharge.

The new rules also increase capital that needs to be held against riskier activities by imposing specific capital charges for certain exposures, including the trading book and derivatives activities. The regulatory capital calculation for market risk will include stressed inputs into the calculation and a charge for counterparty credit risk.

Liquidity

The Basel III rules will require banks to hold more highly liquid assets and better match the maturity of assets and liabilities. The BCBS has adopted these proposals, but final details are still subject to adjustment. The current international discussion focuses on the liquidity coverage ratio (LCR), which will be introduced before the net stable funding ratio (NSFR). Concerns have been raised regarding the challenges in implementing the LCR in some jurisdictions and unintended effects. The implementation dates are 2015 for the LCR and 2018 for the NSFR. The BCBS has clarified that the LCR must be fully met in normal times but that banks should be allowed to use their pool of liquid assets in times of stress.

Leverage Ratio

The Basel reforms introduce a leverage ratio that will help authorities monitor the buildup of excessive leverage in the banking system. The leverage ratio limits the (unweighted) ratio of capital to total assets (including some off balance sheet items) to 3 percent and will act in tandem with the existing suite of risk-based capital ratios. The assignment of too-low risk weights was a weakness in the overall resilience of bank balance sheets, and the underweighting of what turned out to be riskier assets caused undercapitalization. Before the adoption of Basel I, several jurisdictions relied solely on the leverage ratio, which created incentives for banks to allocate resources to higher-risk assets because the returns on those assets were not offset by a requirement to hold larger

Note: Prepared by Ana Carvajal, Su Hoong Chang, Ellen Gaston, Fabiana Melo, André Santos, Katharine Seal, Jay Surti, Rodolfo Wehrhahn, and Mamoru Yanase.

amounts of capital against them. By including some off balance sheet items, the leverage ratio will also, to some extent, address that area of risk.

Compensation and Governance

Various jurisdictions are putting rules in place to address the lack of effective alignment of compensation with risk taking and the lack of governance of compensation by the boards of financial institutions. The FSB's "Principles for Sound Compensation Practices" are general in nature and implementation varies.[53] Financial institutions' practices have so far been widely divergent, and best practices are difficult to identify. The ultimate goal of changing major financial institutions' culture and behavior is a long-term challenge. The BCBS included the FSB's Principles as part of its Basel 2.5 framework. Compensation regulation for nonbanks is also an active issue—for example, the European Union has included compensation restrictions in its investment funds legislation.[54]

Banks' corporate governance policies and practices have also come under renewed scrutiny, particularly in the context of systemically important financial institution (SIFI) supervision. Supervisory efforts are ongoing to address these issues, including the role of banks' boards, with particular emphasis on risk management. The Basel Committee's proposed revision of its *Core Principles for Effective Banking Supervision* includes a principle dedicated to corporate governance.[55]

Business Model Restrictions

A number of jurisdictions are considering direct regulation of banks' business models, most notably the United Kingdom with the Vickers proposals and the United States through the so-called Volcker rule in the Dodd-Frank Act (Table 3.2). These initiatives seek to reduce systemic risk in the financial system and the wider economy by prohibiting deposit-funded banks from engaging in certain investment banking businesses that are deemed to be too risky (such as proprietary trading, and the ownership or control of hedge funds and private equity arms). The aim is to improve resolvability and reduce the extent of too-important-to-fail issues.[56]

Resolution of Cross-Border Institutions and SIFIs

Reforms aimed at ensuring the smooth resolution of large failed institutions (especially global ones) could also have implications for the ex ante structure of the financial system. Recent initiatives are shown in Table 3.7.

Improving resolution frameworks, particularly for cross-border institutions and institutions deemed to be too important to fail has been a key focus of the overall regulatory reform agenda. Enhanced resolution frameworks and living wills are aimed at improving the ability of policymakers to resolve institutions, thus reducing moral hazard and reintroducing market discipline that might curb excessive risk taking. The ability to resolve institutions provides greater certainty and curbs contagion in times of distress.

The FSB has been instrumental in providing the cross-border element of the discussions, providing the basic principles that should underlie resolution frameworks to make them consistent across economies. Its October 2011 "Key Attributes of Effective Resolution Regimes for Financial Institutions" (FSB, 2011a) seeks to ensure that national frameworks are designed in a manner that enables and encourages the relevant authorities to cooperate with their counterparts in other jurisdictions in the resolution of a cross-border financial institution or group. In June, the EU proposed a Directive establishing a framework for recovery and resolution of credit institutions and investment firms.[57] A few key issues that may affect financial sector structure

[53]See www.financialstabilityboard.org/list/fsb_publications/tid_123/index.htm.

[54]See for example, the European Union Directive on Alternative Investment Fund Managers (2011/61/EU, http://ec.europa.eu/internal_market/investment/alternative_investments_en.htm), which applies remuneration rules to hedge fund managers; and the draft proposed European Union Directive on Undertakings in Collective Investments in Transferable Securities (UCITS V, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52008PC0458:EN:HTML), which will apply to mutual fund managers.

[55]See www.bis.org/publ/bcbs213.htm.

[56]Also see Chow and Surti (2011).

[57] The proposed EU Directive was published June 6, 2012, and is subject to the approval of the European Parliament Council (http://ec.europa.eu/internal_market/bank/docs/crisis-management/2012_eu_framework/COM_2012_280_en.pdf).

Table 3.7. Snapshot of the New Global Regulatory Initiatives: Resolution of G-SIFIs

Key initiative	Elements
	Global reforms
FSB "Key Attributes"[1]	• Sets out core elements of a resolution framework and improved capacity for cross-border resolution, including designation of a resolution authority with appropriate powers; provisions for netting, offsetting, and segregation of client assets; provisions for funding of resolution; introduction of cross-border crisis management groups; and requirements for recovery and resolution plans for large institutions.
Statutory "bail in" powers	• The FSB Key Attributes include statutory powers to convert unsecured and uninsured creditor claims into equity at a certain threshold of financial distress of the institution (when it is no longer viable, etc.).
Recovery and resolution plans (RRPs)[2]	• Major international institutions (G-SIFIs) and their host authorities are to draft RRPs setting out specific actions that the firm could take to facilitate a recovery in response to stress and how they could be resolved if necessary.
Crisis management groups	• Supervisors to review and crisis management groups to assess these for G-SIFIs. • Authorities from home and key host jurisdictions form groups to assess recovery and resolution plans of G-SIFIs and enhance preparedness for the management and resolution of a cross-border crisis.

Source: IMF staff.

Note: FSB = Financial Stability Board; G-SIFIs = global systemically important financial institutions.

[1]The FSB "Key Attributes of Effective Resolution Regimes for Financial Instructions," October 2011.

[2]Also known as "living wills."

include "bail in"—whereby unsecured debt holders may have their holdings converted to equity at particular trigger points—and measures to simplify the operational complexity and structure of banks (e.g., "living wills"). Implementation of many of these changes, including bail-in, has not yet taken place. As discussed in earlier IMF staff work, however, the bail-in remains untested in a systemic crisis, and its effectiveness may be hampered by the lack of unencumbered collateral (Zhou and others, 2012).

Markets: Over-the-Counter Derivatives Reforms

A series of reforms under way for OTC derivatives are affecting the way derivatives are traded, reported, and cleared, as well as the capital required for bilateral trading. Articulation and implementation of these rules are not fully complete. The basic thrust of the reforms is to move more OTC bilateral derivatives contracts to central counterparties (CCPs) and, where possible, to organized exchange trading platforms, while potentially increasing the transparency of the market via reporting of transactions to trade repositories (TRs). The high-level principles for the design of CCPs and TRs have been prepared by the international standard setters, but the practical implementation in different jurisdictions remains a work in progress, with efforts in Japan, the United States, and the European Union being the most advanced.

OTC derivatives reforms are aimed at increasing transparency, mitigating systemic risk, and protecting against market abuse. Organized trading platforms contribute to price formation and increase the transparency of trades, assisting regulators in detecting market abuse. A CCP replaces bilateral counterparty risk with a single exposure to the CCP and further reduces exposures through multilateral netting and posted collateral. The exposures are reduced by collateral that is calculated and collected at least daily. In case of default by one of its participants the CCP can transfer customer positions and collateral to solvent CCP members and coordinate the orderly replacement of defaulted trades through auctions and hedging. Data provided by TRs to regulators and other relevant authorities will help them discharge their responsibilities in relation to OTC derivatives markets. For example, prudential regulators will have access to data on bank and securities firm positions (counterparties and underlyings), market authorities can use the data to monitor and address market abuse, and macroprudential authorities can assess system-wide risks. Margin requirements for non-centrally cleared contracts (and higher capital requirements for banks when margins are not posted) promote the movement of contracts to CCPs and thereby help reduce counterparty risks, systemic risks, and interconnectedness.

Nonbanks: Shadow Banking

Regulatory change focused on shadow banking has varied depending on the type of institution or activity viewed as problematic. The role played in credit intermediation by nonbank entities such as special-purpose vehicles and money market funds came to the fore during the crisis; weaknesses in prudential regulation and oversight of these entities are seen as a key failing. More stringent regulation of the banking sector may drive risks to other financial entities that may not be adequately regulated or supervised. Authorities are now placing increased emphasis on the monitoring of risks arising from credit intermediation-like activities in the nonbanking sector—those of shadow banks—with the application of robust prudential regulation and supervision where such activities pose a risk to financial stability.

The focus on shadow banking has triggered enhancements in the regulation of certain activities (including securitization) and has brought renewed attention to entities that had not yet been regulated (e.g., requiring the registration of hedge funds). At the international level, the FSB is considering a number of changes, including regulating the interaction of banks with shadow banks, banks' reliance on short-term funding (including through money market funds), and securities lending and repurchase agreements (repos).

Progress in advancing the regulation of other financial institutions that could pose systemic risk (for example, securities intermediaries and finance companies) is slower because the legal forms of those entities vary across jurisdictions, making it difficult to develop globally applicable recommendations. The development of a methodology to identify nonbank SIFIs is also at an early stage. At the domestic level, some regulators have addressed the potential systemic implications of entities and/or activities that in their jurisdictions fall under the definition of shadow banking. That is the case with money market funds in the United States, where certain reforms have already been implemented and additional measures to address potential runs are being considered.[58] The authorities in India also strengthened the framework for money market funds in light of stress pressures observed during the current crisis.

Other Initiatives

Insurance

The forum for authorities to discuss global insurance regulation is the International Association of Insurance Supervisors (IAIS), whose current proposals for group-wide supervision are summarized in Table 3.2.

Group-wide supervision—The bailout of AIG Group is expected to lead to a more intensive level of supervision for insurance groups. In October 2011, the IAIS significantly strengthened the supervisory standards relating to group supervision.[59] The key objectives are to minimize regulatory arbitrage, reduce contagion risks, and address complex group structures that hinder effective supervision. Nonregulated entities within an insurance group are now brought within the regulatory perimeter to allow for a holistic supervisory assessment. Enhanced supervision of internationally active insurance groups (IAIGs) is targeted at reducing the impact of their failure on the financial system.[60]

[58]Since the September 16, 2008, episode of a money market fund "breaking the buck" (in which the net asset value of a share falls below $1), the U.S. Securities and Exchange Commission has implemented several reforms for money market funds, including the establishment of a liquidity ratio, additional restrictions in connection with eligible assets (aimed at enhancing the "quality" of the assets), and the shortening of portfolio duration. Although these reforms have strengthened investor protections, they do not seem to have fully addressed systemic risk concerns associated with a run on money market funds. Two main proposals are being considered in that regard: (1) moving from a constant ($1) to a variable net asset value of shares (thus making investors bear the risks of the portfolio) and (2) keeping a constant net asset value but with a capital buffer, possibly combined with restrictions on withdrawals.

[59]*Insurance Core Principles, Standards, Guidance and Assessment Methodology,* issued by the IAIS on October 1, 2011, applies explicitly to insurance groups (www.iaisweb.org/Insurance-Core-Principles-material-adopted-in-2011-795).

[60] Two criteria are proposed for identifying IAIGs: *international activity*—premiums are written in not less than three jurisdictions, and the percentage of gross premiums outside the home jurisdiction is not less than 10 percent of the group's total gross written premium; and *size*—total assets of not less than $50 billion or gross written premiums of not less than $10 billion.

A multilateral supervisory framework, ComFrame,[61] is intended to provide a better structure for home and host supervisor cooperation and information sharing, leading to more effective supervision of IAIGs while reducing duplicative supervisory efforts. In the absence of a global solvency regime for insurers, ComFrame seeks to establish a set of "partly harmonized" standards and parameters, including a common definition of capital resources, to facilitate capital assessment at the group level.[62] Regulatory requirements on intragroup exposures and risk concentrations, aggregate group exposures, and transferability of financial resources are intended to motivate more effective management of contagion risks.

Systemically important insurers—The IAIS is currently formulating policy measures applicable to global systemically important insurers (G-SIIs), in line with the FSB's regulatory reform agenda.[63] The objective is to limit the impact of G-SIIs on financial stability and improve the resilience of G-SIIs that remain large and complex. The methodology proposed by the IAIS for identifying G-SIIs gives the highest weight to the indicator for NTNIA (nontraditional insurance and noninsurance activities) and the second highest to interconnectedness.[64] It is envisaged that G-SIIs may be subject to additional policy measures designed to provide regulatory incentives for them to reduce their potential systemic impact. These may include enhanced supervision, improved resolvability, structural measures (e.g., separation of, or restrictions on, NTNIA), and higher loss absorbency.

Solvency II—With about 30 of the largest global insurance groups domiciled in the European Union, engagement with them by the EU authorities and the timely evaluation of their prudential conditions will be essential for global financial stability. Under current plans, Solvency II will replace the current regulatory framework (Solvency I) in the European Union in January 2014.[65] Solvency II is a risk-sensitive solvency regime, similar in approach to Basel II, that takes into account all key risks of insurers, recognizing the interdependence between assets, liabilities, regulatory capital requirements, and capital resources. It is based on three pillars: quantitative requirements, qualitative requirements such as risk management, and supervisory reporting. The use of internal models for capital calculations is encouraged for larger complex groups.

The reform of regulation pertaining to credit ratings aims to force both the credit ratings agencies (CRAs) and financial institutions to move toward a better understanding of the risks embedded in products and securities. The crisis revealed limitations in the way CRAs assess risks, in particular in connection with structured products. At the same time, market participants rely mechanistically on such ratings. In this context, unexpected negative outlooks and downgrades of rated securities below established thresholds have led to forced sales and negative price dynamics. Reduced reliance on ratings should improve the conduct of due diligence by market participants and help avoid forced sales and other such "cliff effects." Because ratings will continue to be used, it is critical that CRAs strengthen the quality of their rating processes, which have generally been conducted under an "issuer pay" model, in which the issuer of the rated instrument pays the CRA for the rating. Registration regimes can play a role in this regard by ensuring that CRA governance policies are in place to mitigate the inherent conflicts of interest in the issuer-pay model.

[61]The IAIS issued *Common Framework for the Supervision of Internationally Active Insurance Groups* as a public consultation document in July 2012, with comments due on August 31 (www.iaisweb.org/ComFrame-938).

[62]ComFrame proposes to establish group regulatory capital at a level sufficient in times of adversity to allow an IAIG to meet its obligations to policyholders as they fall due; and it proposes that the calculation of capital be based on risk measurement criteria. A partly harmonized approach to these risk management criteria is currently a work in progress.

[63]The IAIS issued *Global Systematically Important Insurers: Proposed Assessment Methodology* as a public consultation document in May 2012, with comments due on July 31 (www.iaisweb.org/G-SIIs--918).

[64]Five key indicators were used: NTNIA (40 to 50 percent weighting), interconnectedness (30 to 40), size (5 to 10), global activities (5 to 10), and substitutability (5 to 10). Examples of NTNIA include financial guarantee insurance, finite reinsurance, purely synthetic investment portfolios, cascade of repos and securities lending, CDS/CDO underwriting, and third party asset management.

[65]Solvency II Directive (2009/138/EC, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:335:0001:01:EN:HTML).

Accounting Rules

Understanding the condition of both financial and nonfinancial firms (and hence counterparty and credit risk) depends on good-quality financial accounts that are comparable across institutions. The evolution of global accounting standards and the focus on improving their quality has been a key feature of accounting policymaking for some years, but differences in approach across jurisdictions remain. Global convergence has also been the theme. Over 120 jurisdictions have adopted the International Financial Reporting Standards (IFRS) system, albeit in many cases under different mechanisms, while GAAP (generally accepted accounting principles) remains the standard in the United States. Convergence and enhancement of U.S. and international accounting standards will foster greater comparability of data and therefore improve transparency in markets and institutions. Even though convergence has been agreed on in principle by the two major accounting bodies—the International Accounting Standards Board (IASB) and, in the United States, the Financial Accounting Standards Board (FASB)—in reality the United States has been slow in setting a timetable for IFRS adoption.[66] The two boards have achieved convergence of IFRS and GAAP in some key areas, but they have missed the end-2011 target date set by the FSB and the G20. The FSB and G20 subsequently encouraged the IASB and FASB to achieve convergence regarding their most important projects by their expected timeframe of mid-2013.

[66]The *Work Plan for the Consideration of Incorporating International Financial Reporting Standards into the Financial Reporting System for U.S. Issuers: Final Staff Report,* issued in July 2012 by the staff of the U.S. Securities and Exchange Commission, did not make a recommendation on whether IFRS "should be incorporated into the financial reporting system for U.S. issuers" ("Introductory Note" to the report), www.sec.gov/spotlight/globalaccountingstandards/ifrs-work-plan-final-report.pdf.

Table 3.8. Status of Initiatives, by Selected Economy

		Brazil	Canada	China	European Union	Hong Kong SAR
Capital requirements	Higher overall capital—Basel III or other	Currently above Basel III. Draft regulation implementing Basel III. New CET1 to be fully met by Jan. 2013.	Draft regulation issued in Aug. 2012. Implementation will follow Basel III schedule.	Basel III regulation finalized and released in June 2012, will be implemented from Jan. 1, 2013, to 2018. The minimum CARs are set at 5% for core Tier 1 capital, 6% for Tier 1 capital, and 8% for total capital.	Draft rules implementing Basel III. Countries will be limited in their capacity to require more capital than the Basel III minimum. Current draft allows for a 3% systemic buffer.	HKMA Banking Amendment bill introduced to legislative council in Dec. 2011. The bill was passed by the Legislative Council in Feb. 2012 and became the Banking (Amendment) Ordinance 2012.
	Higher quality capital	Currently above Basel II. Draft regulation implementing Basel III.	Draft regulation issued in Aug. 2012. Implementation will follow Basel III schedule.	Basel III regulation finalized and released in June 2012, will be implemented from Jan. 1, 2013, to 2018.	Draft rules implementing Basel III. Deductions not aligned with Basel III.	New law to implement Basel III was approved in Feb. 2012.
	G-SIFI buffer	n.a.	n.a.	Basel III regulation finalized and released in June 2012; will be implemented from Jan. 1, 2013, to 2018. Additional capital requirements for D-SIBs are 1%. If the D-SIB is a G-SIB, the additional capital requirement cannot be lower than the Basel minimum level.	Draft rules implementing Basel III. Countries will be limited in their capacity to require more capital than the Basel III minimum. Current draft allows for a 3% systemic buffer; unclear whether the same provision will be used for countries that are home supervisors of G-SIBs. The systemic risk buffers can apply to all banks in the system.	n.a.
	Capital conservation buffer	Draft regulation implementing Basel III includes the buffer according to the Basel schedule.	To be phased in starting in 2016.	Basel III regulation finalized and released in June 2012, will be implemented from Jan. 1, 2013, to 2018.	Draft rules implementing Basel III.	HKMA Banking Amendment bill introduced to legislative council in Dec. 2011. The bill was passed by the Legislative Council in Feb. 2012 and became the Banking (Amendment) Ordinance 2012.

India	Japan	Russia	Singapore	South Africa	Switzerland	United Kingdom	United States
Final Basel III regulations issued. Implementation as scheduled.	Final regulations for Basel III published. Implementation as scheduled.	No draft regulation has yet been published. Legal powers to implement Basel III pending legislative amendment.	Draft Basel III regulation published. Requires Singapore-incorporated banks to meet minimum CARs of 6.5% for CET1, 8% for Tier 1, and 10% for total capital as of Jan. 1, 2015.	Draft legislation published.	Draft regulation implementing Basel III published.	Draft rules, plus draft legislation requiring above Basel III.	Draft regulation implementing Basel III, applies only to bank holding companies with more than $500 million in total consolidated assets.
Final Basel III regulations issued. Implementation as scheduled.	Final regulations for Basel III published. Implementation as scheduled.	No draft regulation has yet been published. Legal powers to implement Basel III pending legislative amendment.	Draft Basel III regulation published. Requires Singapore-incorporated banks to meet minimum CARs of 6.5% for CET1, 8% for Tier 1, and 10% for total capital as of Jan. 1, 2015.	Draft legislation published.	Draft regulation implementing Basel III published.	Draft rules, plus draft legislation requiring higher than Basel III capital, composed of common equity.	Draft regulation implementing Basel III, applies only to bank holding companies with more than $500 million in total consolidated assets.
n.a.	n.a.	n.a.	n.a.	n.a.	Legislation adopted Sept. 2011, draft regulation published Dec. 2011. On top of CET1, SIBs must have a capital conservation buffer of 8.5% (5.5% conservation buffer and additional 3% in "recovery CoCos") and a systemic surcharge of up to 6% (depending on market share and balance sheet size), bringing total capital requirements to 19%.	Draft legislation requiring buffers above Basel III capital, composed of common equity.	G-SIBs not yet covered, as BCBS has not finalized its framework. There are references to systemic institutions in Dodd Frank (sections 165 and 166) as passed in Dec. 2011
Final Basel III regulations issued. Implementation as scheduled.	Not published yet.	No draft regulation published yet. Legal powers to implement Basel III pending legislative amendment.	Draft Basel III regulation published. Capital conservation buffer will be phased in according to the Basel III schedule.	Draft legislation implementing Basel III published May 2012. The minimum required capital, including a conservation buffer, would increase from 9.5% in 2013 to 12.5% in 2019.	Draft regulation implementing Basel III published.	Draft rules.	Draft regulation, limited scope of application. Includes capital conservation buffer of 2.5%.

(continued)

Table 3.8. Status of Initiatives, by Selected Economy *(continued)*

		Brazil	Canada	China	European Union	Hong Kong SAR
Capital requirements	Countercyclical capital requirements	Draft regulation implementing Basel III includes the buffer according to the Basel schedule.	To be phased in starting in 2016.	Basel III regulation finalized and released in June 2012, will be implemented from Jan. 1, 2013, to 2018.	Draft rules implementing Basel III.	HKMA is analyzing the technical aspects of the countercyclical capital buffer.
	Basel 2.5	Implemented.	Implemented.	Implemented.	Implemented.	Implemented.
Higher liquidity requirements	Quantitative liquidity requirements[1]	For supervisory monitoring only.	Quantitative metric for monitoring.	Draft for consultation.	Draft rules.	n.a.
	Liquidity risk management requirements	Implemented.	Implemented, review underway.	Draft for consultation.	Implemented via CRD II.	Implemented.
	Monitoring and management of foreign exchange liquidity	Implemented.	Implemented guidelines on liquidity Feb. 2012.	n.a.	European Systemic Risk Board recommendations issued in 2011.	Implemented.
	Other local restrictions	Reserve requirements used as macroprudential liquidity buffer.	n.a.	n.a.	n.a.	n.a.
Tightening of OTC derivatives regulation	Mandatory clearing of standardized trades by central counterparties	Mandatory clearing applies only to exchange traded derivatives.	Legislation is in place in provinces where the majority of OTC derivatives are booked, but further work is required to harmonize across provinces. Provincial legislation expected by end-2012.	Legislation not yet proposed. People's Bank of China is encouraging Shanghai Clearing House to establish detailed schemes for central clearing of OTC derivatives. Central clearing operation for interest rate swaps under discussion.	EMIR adopted by the Council and Parliament in July 2012. ESMA is developing technical standards, which are expected to be finalized by Sept. 2012 and approved by the Council by end-2012.	Legislative drafting has started, with approval target at end-2012.
	Trading of standardized trades through public venues	Not required.	Under review. Consultation paper to be published in 2012.	Under review. Electronic trading platform operated by CFETS has been developed. All standardized OTC interest rate and credit derivatives can be, and certain types are required to be, traded on CFETS platform.	Final rules on Markets in Financial Instruments Directive and Regulation expected to be in effect by mid-2014.	Regulators have issued a consultation paper.

India	Japan	Russia	Singapore	South Africa	Switzerland	United Kingdom	United States
Final Basel III regulations issued. Implementation as scheduled.	Not published yet.	No draft regulation has yet been published. Legal powers to implement Basel III pending legislative amendment.	MAS should have in place a countercyclical capital framework by Jan. 1, 2016. MAS will have discretion to make decisions on the triggers for, and size of, the countercyclical capital buffer.	Countercyclical buffer of up to 2.5% is still to be finalized.	Draft regulation implementing Basel III published.	Draft rules.	Proposed legislation applies countercyclical buffer only to banks using advanced IRB approach. Initially buffer set to zero and may increase in times of high credit growth. Banks will have 12-month transition time to comply after an announcement.
Implemented.	Implemented.	Draft regulation.	Implemented.	Implemented.	Implemented.	Implemented.	Draft regulation.
n.a.	Basel III schedule.	Since 2004; reviewed in 2011.	Not required.	Basel III timetable.	For G-SIBs only.	Implemented 2010.	n.a.
Draft regulation.	Implemented.	Since 2004; reviewed in 2011.	Revised guidance.	Required since 2009.	For G-SIBs only.	Implemented 2010.	Introduced in 2010.
Implemented.	n.a.	n.a.	Through on-site supervision.	Limits on regulated and net open positions.	n.a.	ESRB recommendations issued 2011.	n.a.
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Legislation not yet proposed. CCIL to transition soon to guaranteed settlement of interest rate swaps; no immediate timeframe for guaranteed settlement of CDS.	Legislation adopted via reform to the Financial Instruments and Exchange Act in May 2010. Initially the obligation will apply only to yen interest rate swaps and CDS. A cabinet ordinance to be implemented by November 2012 includes a requirement for central clearance of "trades that are significant in volume and would reduce settlement risk in the domestic markets."	Legislation relating to clearing services and legislation relating to tax code create the legal basis for promulgation of regulation dealing with central clearing of standardized OTC derivatives. They have both been adopted. Pending regulations that implement new requirements.	Public consultation issued in Feb. 2012. Legislation to be introduced by end-2012.	Financial Markets Bill submitted to the National Treasury.	A working group was set up in 2011. Draft legislation scheduled for consultation in the second half of 2012.	EMIR adopted by the Council and Parliament in July 2012. ESMA is developing technical standards that are expected to be finalized by Sept. 2012 and approved by the Council by end-2012.	Dodd-Frank Act adopted in 2010. CFTC and SEC are finalizing regulations.
No legislation planned.	Legislation proposed in March 2012. A cabinet ordinance will be drafted afterward.	Law regulating electronic platform trading has been adopted; regulations are pending.	Public consultation issued in Feb. 2012; feedback is under review.	The authorities do not anticipate that electronic trading of OTC derivatives will be required.	A working group has been set up to consider the need for any changes.	Final rules on Markets in Financial Instruments Directive and Regulation are expected to be in effect by mid-2014.	Adopted in Dodd Frank Act. Law requires that any swap or security-based swap subject to clearing requirement be traded on a registered platform. CFTC and SEC are finalizing regulations.

(continued)

Table 3.8. Status of Initiatives, by Selected Economy *(continued)*

		Brazil	Canada	China	European Union	Hong Kong SAR
Tightening of OTC derivatives regulation	Reporting of all OTC derivatives trades to a TR	Required under rules enacted by the central bank and the Brazilian Securities and Exchange Commission.	Canadian Securities Administrators published a consultation paper on TRs. Ontario and Quebec have already amended legislation to support reporting to TRs and regulatory access to data. Implementing regulations expected to be finalized by 2012. Anticipated that a small number of trades may not be accepted by TRs and could be reported to securities regulators.	Under current rules, interest rate trades executed outside of the CFETS platform should be reported to CFETS; credit risk mitigation trades should be reported to the National Association of Financial Market Institutional Investors. Need for complementary regulations on details of frequency and content of reporting and on which institutions can be TRs.	EMIR adopted by the Council and Parliament in July 2012. ESMA is developing technical standards, which are expected to be finalized by Sept. 2012 and approved by the EC by end-2012.	Proposal with required amendments intended to go to the legislature by end-2012. Regulators jointly issued a consultation paper including proposed mandatory reporting (consultation period ended Nov. 2011). OTC derivatives transactions that have a bearing on the financial market will be required to be reported to local TR to be developed by HKMA.
Changes to securitization regulation	Skin-in-the game requirements	Implemented.	Not implemented.	Draft regulation expected end-2012.	CRD II establishes some risk retention in securitizations.	Not implemented.
	Change to initial and ongoing disclosure requirements	Implemented.	Draft regulation.	Implemented.	n.a.	Not implemented.
	Underwriting standards imposed for securitization	Implemented.	Supervisory guidance.	Not implemented.	n.a.	Not implemented.
Reducing reliance on credit ratings	Restricted use of CRA ratings in standards, laws, and regulations	Report on replacing or removing references due in June 2012.	Regulation of CRAs should improve confidence in ratings.	n.a.	Mapping exercise in 2011 to identify references to CRAs in EU legislation and proposal to remove references.	Regulatory agencies conducted reviews of existing legislation and regulations.
	Actions taken to introduce alternatives to CRA ratings	Improved disclosures by issuers, internal ratings by banks, and internal controls by asset managers.	Absence of recognized alternatives to CRAs. Internal model for sovereign risk must be used.	n.a.	Considering proposals being developed by international standard setters.	Under consideration.

India	Japan	Russia	Singapore	South Africa	Switzerland	United Kingdom	United States
Legislation not yet proposed. Per existing guidelines, banks and primary dealers should report interest rate swaps and forward rate agreements to CCIL reporting platform. For CDS, all participants must report to the centralized reporting body within 30 minutes. CCIL will extend reporting to foreign exchange forwards and is considering it also for foreign exchange options. Working group on derivatives has recommended that CCIL serve as a single-point reporting platform for all OTC interest rate and foreign exchange derivatives transactions.	Adopted in 2010 via reform to the Financial Instruments and Exchange Act. A cabinet ordinance is expected to be completed by Nov. 2012. In general, trade data will be reported to a TR. Data not accepted by them (exotic OTC trades) will be reported to the Japan Financial Services Authority.	Legislation already adopted involving the Federal Financial Markets Service; regulations pending.	Relevant legislation to be introduced by end-2012.	Financial Markets bill submitted to National Treasury for approval of Cabinet and Parliament.	The legislative process is in progress. Rules apply to derivatives traded on an exchange and require that securities dealers report all information necessary to ensure transparency.	EMIR adopted by the Council and Parliament in July 2012. ESMA is developing technical standards, which are expected to be finalized by Sept. 2012 and approved by the EC by end-2012.	Adopted in Dodd- Frank Act. CFTC already finalized and SEC in the process of finalizing regulations. Reporting to SEC, CFTC if no TR is available.
Draft regulation.	Not required.	Not required.	Not required.	Not required, market insignificant.	Not required.	CRD II establishes some risk retention in securitizations.	Draft regulations published 2011.
Implemented.	Implemented.	Not implemented.	Implemented 2010.	Implemented.	Not implemented.	No change.	Final rules adopted Jan. 2011.
Draft regulation.	Implemented.	Draft legislation.	n.a.	n.a.	Implemented 2007.	Implemented 2011.	Draft regulations published 2011.
Set up standing committee of all regulators to reduce reliance on CRAs.	Japan Financial Services Authority removed several references to CRAs in its regulation in 2009 and 2010 and will continue to closely monitor financial institutions.	Limited reliance on CRAs in prudential regulation and central bank operations.	n.a.	n.a.	Relatively few references to CRAs, and few of those are material.	EU CRA3 proposal will reduce mechanistic reliance on ratings.	Federal Reserve removed references to credit ratings, substituting other measures in their place.
Development of alternatives to be carried out in a manner that allows industry to adapt.	Banks use IRB models for credit risk.	Since 2009, central bank has been conducting internal credit risk analysis of international issuers and counterparties.	n.a.	Market capitalization of issuers being considered as a basis for setting investment limits for collective investment schemes.	Actively participating in international standard setting processes that consider alternative measures.	Considering proposals being developed by international standard setters.	SEC and Federal Reserve have proposed alternative approaches for capital adequacy purposes.

(continued)

Table 3.8. Status of Initiatives, by Selected Economy *(continued)*

		Brazil	Canada	China	European Union	Hong Kong SAR
Reducing reliance on credit ratings	Actions taken by market participants	Rule change in 2009 for pension funds and proposed rule change for investment funds to remove requirement for rating when purchasing securities.	General requirement for firms to establish risk management controls, no specific action.	n.a.	Use of internal risk models for banking sector and asset management. CRA rating used in combination with own risk assessment for collective investment schemes and alternative investment funds.	Banks to conduct internal due diligence on credit risk. Basel III as implemented in 2012 further reduces reliance on ratings in capital adequacy framework.
Tougher regulation of credit rating agencies	Implementation of a registration requirement	Draft regulation.	CRAs subject to regulation as of April 2012. Awaiting revisions to international standards.	n.a.	Implemented.	Implemented.
Structural changes to banks and limitations on bank activities	Recovery and resolution plans (RRPs)	n.a.	No Canadian banks have been identified as G-SIFIs. Draft recovery and resolution plans are being developed for largest banks, due to be completed in 2012.	D-SIBs required to develop recovery and resolution plans. An RRP for Bank of China (G-SIFI) is being developed.	Draft regulation on resolution.	n.a.
	Structural limitations	n.a.	n.a.	n.a.	High-level Expert Group (Liikanen Group) on possible reforms to the structure of the EU banking sector formed in Feb. 2012.	n.a.
Changes in regulation of compensation and corporate governance	Implementation of Principles and Standards for Sound Compensation Practices (FSB, 2009)	A regulation issued in 2010.	Adopted a supervisory approach and integrated with regular supervisory work.	Various regulations and supervisory guidance issued.	Implementation by transposition of CRD III, in force Dec. 31, 2011, and EBA guidance.	A guideline issued in Mar. 2010.
	Pillar 3 disclosure on remuneration	Implemented.	implemented.	Implemented.	Implemented.	implemented.

India	Japan	Russia	Singapore	South Africa	Switzerland	United Kingdom	United States
Banks encouraged to use IRB approach for credit risk. Securities and Exchange Board of India implemented FSB Principles for Mutual Funds 1996, due diligence in investment decisions.	n.a.	n.a.	n.a.	Collective investment schemes to replace reference to CRA ratings in setting regulatory limits for nonequity investments.	The Financial Market Supervisory Authority will conduct education sessions with market participants on use and reliance of ratings.	The Financial Services Authority reviewed a sample of fund mandates and found they did not imply mechanistic reliance on CRAs.	State insurance laws generally require submission of investment guidelines and policies to the state insurance department for review.
Implemented.	Implemented.	Implemented.	n.a.	n.a.	n.a.	Implemented.	Implemented.
n.a.	n.a.	Recovery plans to be developed for D-SIBs in the second half of 2012, and resolution plans in the first half of 2013.	n.a.	Plans to produce RRPs for D-SIBs to be put in place during 2012.	SIBs are required to produce RRPs.	The Financial Services Act adopted in 2010 requires banks to produce RRPs. All banks and systemic investment firms required to complete RRPs by June 2012.	Under the Dodd-Frank Act, bank holding companies with total consolidated assets of $50 billion or more and nonbank financial companies designated by the Financial Stability Oversight Council for supervision by the Federal Reserve must submit resolution plans annually to the Federal Deposit Insurance Corporation and the Federal Reserve.
n.a.	n.a.	n.a.	n.a.	n.a.	Extra capital requirements of Swiss G-SIFIs (the "Swiss finish") go beyond Basel III and must be in place by 2019.	Vickers commission has proposed structural changes in banking. White Paper to implement Vickers report published in June 2012.	Volcker rule to limit proprietary trading in banks and investment in private equity.
Guidelines issued.	Guidelines issued Mar. 2010.	Laws and regulations under preparation.	Changes made to regulations and guidelines in Dec. 2010.	Regulations issued Dec. 2010. Laws amended mid-2011.	Rules issued Jan. 2010.	Implementation by transposition of CRD III, in force Dec. 2011, and EBA guidance.	Supervisory guidance issued June 2010.
Implemented.	Implemented.	Implemented.	Implemented.	Implemented.	Implemented.	Implemented.	Not implemented.

(continued)

Table 3.8. Status of Initiatives, by Selected Economy *(continued)*

		Brazil	Canada	China	European Union	Hong Kong SAR
Higher taxes or fees assessed on financial institutions		n.a.	n.a.	n.a.	The draft resolution directive proposes resolution funds of 1% of insured deposits (built up over 10 years). Harmonized deposit insurance funding levels are under negotiation in draft Deposit Insurance Directive. France, Germany, and some other EU countries introduced bank levies (2011–12).	n.a.
Changes in crisis resolution regimes, including implementation of the Key Attributes (KA) document (FSB, 2011a)		Preparing draft legislation to address gaps in powers vis-à-vis the KA.	The KA is being reviewed to determine any necessary legislative or regulatory changes.	Plans to introduce deposit insurance are being accelerated.	The EC issued a draft resolution directive in June 2012 that would closely align national resolution regimes in the EU with the KA. Implementation of the final directive is planned for 2014. The draft directive on deposit insurance (issued July 2010) is still under discussion.	Review of legislative and regulatory changes needed to implement KA is under way.
Accounting changes	Convergence between IFRS and local GAAP	Reporting under IFRS as adopted locally and under Brazilian GAAP required simultaneously.	IFRS reporting is required, except U.S. GAAP reporting is allowed for U.S. listed companies.	Chinese GAAP reporting. Largely converged with IFRS.	IFRS reporting as adopted by the EU.	IFRS reporting. Hong Kong GAAP reporting for companies incorporated locally.

Sources: Basel Committee on Banking Supervision; European Union; Financial Stability Board; G20; Independent Commission on Banking; International Association of Insurance Supervisors; International

Note: ABS = asset-backed securities; CAR = capital adequacy ratio; CCIL = Clearing Corporation of India Ltd.; CET1 = Core Equity Tier 1; CFETS = China Foreign Exchange Trade System; CFTC = Commodity European Market Infrastructure Regulation; ESMA = European Securities and Markets Authority; GAAP = generally accepted accounting principles; G-SIBs = global SIBs; HKMA = Hong Kong Monetary Authority; systemically important banks; TR = trade repository.

[1]Basel III liquidity framework is not finalized in detail. The entries, therefore, seek to reflect the existence of any quantitative liquidity requirements in the selected countries, and implementation of Principles for

India	Japan	Russia	Singapore	South Africa	Switzerland	United Kingdom	United States
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Annual bank levy of 0.075% introduced in May 2011 and increased to 0.088% in Jan. 2012. Applies to total global consolidated liabilities exceeding £20 billion after excluding, inter alia, Tier 1 capital, insured retail deposits, sovereign repo liabilities, and derivatives on a net basis.	A financial crisis responsibility fee was proposed by the administration in Jan. 2010 but not introduced.
n.a.	n.a.	Review of legislative and regulatory changes needed to implement KA is under way.	Resolution regime was enhanced in 2007 and extended to insurers in 2011. Further enhancements to address some other aspects of KA are planned over the next two years.	n.a.	The resolution regime was strengthened prior to and since the crisis (Banking Act was amended in Sept. 2011) and has most of the tools in the KA.	A temporary resolution regime was introduced in 2008, and replaced with a permanent special resolution regime in 2009. This has many of the powers in the KA but applies only to banks.	The resolution regime was extensively revised under Dodd-Frank, including by extending it to nonbanks and bank holding companies.
IFRS reporting or Indian GAAP reporting.	IFRS reporting as designated by the Financial Services Agency for certain listed companies. Otherwise, Japanese GAAP. Mandatory adoption of IFRS may start in 2015 or 2016.	IFRS reporting both for consolidated financial statements and for standalone financial statements for commercial banks.	IFRS reporting as adopted locally for certain listed companies.	IFRS reporting.	IFRS reporting or U.S. GAAP reporting for firms listed on the main board of the SIX Swiss Exchange. IFRS, U.S. GAAP, and Swiss GAAP reporting allowed for other SIX registrants.	IFRS reporting as adopted by the EU required for consolidated financial statements. Unlisted companies can use U.K. GAAP.	U.S. GAAP reporting. IFRS reporting allowed for foreign private issuers.

Organization of Securities Commissions; and PriceWaterhouse Coopers.

Futures Trading Commission; CoCos = contingent convertible bonds; CRA = credit rating agency; CRD = Capital Requirements Directive; CRR = Capital Requirements Regulation; D-SIBs = domestic SIBs; EMIR = IFRS = International Financial Reporting Standards; IRB = internal-ratings based; MAS = Monetary Authority of Singapore; n.a. = not available or not applicable; SEC = Securities and Exchange Commission; SIBs =

Sound Liquidity Risk Management and Supervision (BCBS, 2008).

Annex 3.3. Exploring the Impact of Regulatory and Crisis Intervention Policies on Financial Structures

The impact of a policy change on financial structure can be estimated using the difference-in-differences (DiD) method. Since the work by Ashenfelter and Card (1985), DiD has been heavily used for the evaluation of socioeconomic developments in regional contexts. The chapter uses this method to examine the impact on financial structures from two types of policies: (1) announcements and implementation of new capital and liquidity rules for the banking sector, and (2) crisis intervention measures taken by governments and central banks. This annex provides an introduction to the DiD method, explains the empirical results presented in Tables 3.5, 3.9, and 3.10 and highlights the limitations of the DiD approach.[67]

The difference-in-differences setup compares two groups of economies at two points in time. One group is exposed to a policy change, which takes place between the first and the second point, while the second group is not exposed to the policy change. By contrasting the differences in the changes of financial structures over time between both groups, one can infer the effect of the policy change on the affected group of economies. Although this method is particularly suited to controlling for permanent differences in characteristics between both groups, a causality claim requires that certain assumptions be imposed. Most crucially, both groups are assumed to have shown equal changes in financial structure over time if the policy would not have affected one of them. While this assumption seems to be rather strong for crisis intervention measures, it might be less problematic in the case of the implementation of Basel II, which was well in train before the crisis. This analysis has taken two steps with regard to this assumption: it indirectly evaluated it by testing for differences in trends of financial structures between groups in the past; and it added controls, such as financial stress measures, to capture differential exposures to the crisis.

Driven by the nature of the policies under consideration, the DiD method uses continuous measures, indicating the magnitude of advancement, rather than zero-one decisions. This choice translates into contrasting many staggered groups instead of only two. Accordingly, the impact of intervention measures, as well as of Basel capital and liquidity regulations, on financial structures is explored using the following three linear regression equations, which are estimated for each financial structures indicator s_i^t individually:

$$s_i^t = \beta_0 + \beta_1 D_t^{Crisis} + \beta_2 Intervention\ Index_i + \beta_3 D_t^{Crisis} * Intervention\ Index_i + \beta_4 Financial\ Stress\ Index_{i,t} + \varepsilon_{i,t} \quad (3.1)$$

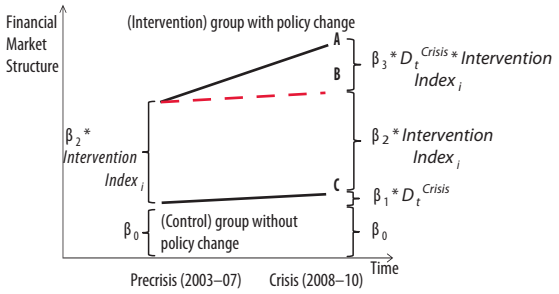
$$s_i^t = \beta_0 + \beta_1 D_t^{Crisis} + \beta_2 Basel\ Capital\ Progress\ Index_i + \beta_3 D_t^{Crisis} * Basel\ Capital\ Progress\ Index_i + \beta_4 Financial\ Stress\ Index_{i,t} + \varepsilon_{i,t} \quad (3.2)$$

$$s_i^t = \beta_0 + \beta_1 D_t^{Crisis} + \beta_2 Basel\ Liquidity\ Progress\ Index_i + \beta_3 D_t^{Crisis} * Basel\ Liquidity\ Progress\ Index_i + \beta_4 Financial\ Stress\ Index_{i,t} + \varepsilon_{i,t} \quad (3.3)$$

As illustrated in Figure 3.6, the three regressions are used to account for

- the different trends in the financial structure variables, which are decomposed into an underlying trend, β_1;
- differences in financial structure between country groups that were observed at the first point in time, before any policy change took place, and

Figure 3.6. Illustration of Difference-in-Differences Method



Source: IMF staff.

Note: Prepared by Michael Kleemann.

[67]For an easily accessible introduction to the DiD method, see also the following note provided by the European Commission: http://ec.europa.eu/regional_policy/sources/docgener/evaluation/evalsed/sourcebooks/method_techniques/counterfactual_impact_evaluation/difference-in-differences/difference-in-differences_en.htm.

which are assumed to remain at the second point in time, when the policies are effective, β_2;
- the *effect* of the policy change itself, β_3.

Results for β_1, β_2, and β_3 are reported in Tables 3.5, 3.9, and 3.10.

More precisely, in regression equation (3.1), the effect of an increase in the *Intervention Index*$_i$—which represents the magnitude of the crisis intervention measures taken by governments and central banks (see Table 3.4)—on any specific structural indicator of financial intermediation, s_i^t, is illustrated by Figure 3.6. The constant, β_0, is the average of structural indicators within the group of nonintervening countries (*Intervention Index*$_i$ of zero) in the first period;[68] while D_t^{Crisis} is a dummy variable indicating the two periods by taking on value zero in the precrisis period (2003–07) and 1 in the following period (2008–10).

The sum of β_0 and β_1 is the average of the structural indicator within the group of nonintervening countries in the second period, and β_1 is an estimate of the underlying trend observed in the absence of any intervention. This trend is further assumed to be identical across all economies. Moreover, β_2 is the coefficient of the *Intervention Index*$_i$, which distinguishes the country groups by the magnitudes of intervention. It therefore varies across countries, as indicated by the subscript *i*; but it does not vary in time, as indicated by the absence of the subscript *t*. Hence, β_2 is an estimate of any permanent differences across country groups. Finally, β_3 is the coefficient of the interaction of the *Intervention Index*$_i$ and the time dummy variable D_t^{Crisis}. Their product varies across countries and over time to capture the differences in trends observed between the differing intensities of intervening groups, which are assumed to deviate from the underlying trend observed for the nonintervening economies only as a result of the interventions.

β_3 is an estimate of the causal effect of interventions on financial structure under the assumption that this underlying trend, which is confounded by the intervention effects and can therefore not be observed, would have been the same across economies in the absence of any interventions. In the case of intervention measures especially, this assumption seems inappropriate, since they are direct reactions to the crisis and their magnitude is also directly related to the severity of the crisis. To tackle this issue, a *Financial Stress Index*$_{it}$ (described in Table 3.1) is introduced to serve as a control and allow for variation in trends across economies according to crisis exposure. The analogue applies to the *Basel Capital and Liquidity Progress Indices* (described in Annex 3.4, Table 3.11).

Despite all potential caveats, the DiD approach is a more structured way to explore the effects of policies on the structure of financial intermediation than unconditional correlations.

[68]Since all economies under consideration intervened to some extent, the group of nonintervening economies is an artificial construct for illustrative purposes.

Table 3.9. Effect of Progress in Basel Liquidity Rules on Intermediation Structures
(Effect on levels; in percent unless noted otherwise)

	(1)	(2)	(3)	(4)	(5)
Structural Indicators	Change in Structure during 2008–11 Crisis (β_1)	Association between Progress on Basel Liquidity Rules and Structure (β_2)[1]	Effect of Progress on Basel Liquidity Rules on Structure during 2008–11 (β_3)[2]	Number of Observations[3]	R^2
Market-based intermediation					
Nontraditional bank intermediation	–1.03	–1.58	**1.37****	24	0.03
Noninterest income to total income	5.21	9.56	–9.77	32	0.00
Other earning assets to total assets	**–18.12****	–16.64	**15.62***	32	0.19
Other interest-bearing liabilities to total liabilities	3.71	**–34.72****	2.83	32	0.22
Nonbank intermediation					
Loans and bonds held by nonbanks relative to the overall financial sector	2.83	38.63	–0.51	20	0.18
Private bond market capitalization to GDP	29.66	**–72.48*****	–39.31	30	0.29
Use of new financial products	–0.65	3.46	1.72	20	
Derivatives turnover to GDP	–0.79	2.02	1.78	24	0.30
Securitization to GDP	–1.49	17.23	0.17	20	0.23
Traditional bank-based intermediation					
Loans and bonds held by banks relative to the overall financial sector	–2.83	–38.63	0.51	20	0.18
Net interest margin	0.38	4.35	2.62	32	0.26
Bank credit versus stocks and bonds[4]	2.36	**–1.86****	**–3.20***	30	0.48
Scale and scope					
Size (index)	–46.92	26.13	23.79	28	0.07
Domestic interconnectedness (index)	**2.49****	–0.75	–2.11	16	0.38
Wholesale funding ratio	**32.40***	**–54.77****	–24.08	18	0.63
Interbank assets to total assets	10.82	2.99	–6.83	22	0.21
Interbank liabilities to total liabilities	8.82	4.37	–5.56	22	0.26
Concentration (asset share of top three banks)	3.11	–40.70	–4.53	32	0.13
Financial globalization	–0.87	0.04	–0.13	22	0.20
Share of foreign banks (number of banks)	**–20.66***	6.22	12.46	32	0.19
Gross foreign assets (percentage points of GDP)	–71.94	–91.96	45.94	28	0.11
Global interconnectedness (index)[5]	–1.05	–1.80	–0.27	32	0.07

Source: IMF staff estimates.

Note: For each structural indicator, the following regression is estimated by the difference-in-differences (DiD) method; see Annex 3.3.

$s_i^t = \beta_0 + \beta_1 D_t^{Crisis} + \beta_2 Basel\ Liquidity\ Progress\ Index_i + \beta_3 D_t^{Crisis} * Basel\ Liquidity\ Progress\ Index_i + \beta_4 Financial\ Stress\ Index_{i,t} + \varepsilon_{i,t}$,

where, s_i^t sit denotes the structural indicator, D_t^{crisis} is a crisis dummy taking the value of 1 in the period 2008–10 and zero in 2003–07, and *Basel Capital Progress Index*$_i$ is taken from Table 3.11; Financial Stress Index$_{i,t}$ is described in Table 3.1. Results for the constant β_0 and the control β_4 are not reported. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels of confidence. Standard errors are clustered by country. See Annex 3.1 for an overview of the structural indicators and the underlying data.

[1]The parameter refers to the structural difference observed between countries for which the Basel Capital Progress Index differs by 1.

[2]The parameter refers to the causal effect of an increase in Basel Capital Progress Index by 1 on the corresponding structural indicator. However, a causal interpretation requires strong assumptions, especially, equal trends in the structural indicators among countries in the absence of the implementation of Basel regulations, which are not testable.

[3]The difference-in-differences approach is based on a pooled panel. Accordingly, the number of observations is two times the number of countries in the corresponding sample.

[4]For structural indicators with data through 2011, a few countries in some cases are included that have data through 2010 only. The signs and levels of significance do not change if data only through 2010 are used instead.

[5]This variable is used to represent the share of traditional versus nontraditional intermediation.

[6]This variable is based on the work of Čihák, Muñoz, and Scuzzarella (2012). See Annex 3.1 and Table 3.6 for further details.

Table 3.10. Effect of Financial Policies on Intermediation Structures: Crisis Intervention Policies
(Effect on levels; in percent unless noted otherwise)

	(1)	(2)	(3)	(4)	(5)
Structural Indicators	Change in Structure during 2008–11 Crisis (β_1)	Association between Crisis Intervention Policies and Structure (β_2)[1]	Effect of Crisis Intervention Policies on Structure during 2008–11 (β_3)[2]	Number of Observations[3]	R^2
Market-based intermediation					
Nontraditional bank intermediation	0.22	**0.37*****	–0.08	50	0.30
Noninterest income to total income	1.59	**3.25****	–0.31	62	0.13
Other earning assets to total assets	–3.24	2.01	0.04	62	0.08
Other interest-bearing liabilities to total liabilities	3.14	**4.67*****	0.04	62	0.29
Nonbank intermediation					
Loans and bonds held by nonbanks relative to the overall financial sector	3.36	–4.52	–0.46	42	0.10
Private bond market capitalization to GDP	–0.60	**7.00****	1.10	54	0.18
Use of new financial products					
Derivatives turnover to GDP	–0.46	**0.14***	0.04	42	0.11
Securitization to GDP	–11.46	1.87	0.74	22	0.18
Traditional bank-based intermediation					
Loans and bonds held by banks relative to the overall financial sector	–3.36	4.52	0.46	42	0.10
Net interest margin	0.68	**–0.39****	–0.04	62	0.29
Bank credit versus stocks and bonds[4]	–0.90	0.09	**0.41*****	53	0.35
Scale and scope					
Size (index)	–15.19	**24.68****	–8.39	54	0.21
Domestic interconnectedness (index)	–0.01	0.24	0.11	28	0.19
Wholesale funding ratio	1.71	**6.04*****	1.52	30	0.54
Interbank assets to total assets	0.78	1.04	0.22	46	0.06
Interbank liabilities to total liabilities	0.12	0.56	0.58	46	0.09
Concentration (asset share of top three banks)	–4.39	**3.23***	–0.21	62	0.10
Financial globalization	–0.21	0.03	–0.03	40	0.05
Share of foreign banks (number of banks)	4.05	–0.46	–0.51	62	0.01
Gross foreign assets (percentage points of GDP)	–8.67	**22.06*****	–2.48	49	0.41
Global interconnectedness (index)[5]	–0.27	**0.65*****	–0.06	60	0.36

Source: IMF staff estimates.

Note: For each structural indicator, the following regression is estimated by the difference-in-differences (DiD) method; see Annex 3.3.

$s_i^t = \beta_0 + \beta_1 D_t^{Crisis} + \beta_2 Intervention\ Index_i + \beta_3 D_t^{Crisis} * Intervention\ Index_i + \beta_4 Financial\ Stress\ Index_{i,t} + \varepsilon_{i,t}$,

where, s_i^t sit denotes the structural indicator, D_t^{crisis} is a crisis dummy taking the value of 1 in the period 2008–10 and zero in 2003–07, and *Basel Capital Progress Index*$_i$ is taken from Table 3.11; Financial Stress Index$_{i,t}$ is described in Table 3.1. Results for the constant β_0 and the control β_4 are not reported. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels of confidence. Standard errors are clustered by country. See Annex 3.1 for an overview of the structural indicators and the underlying data.

[1]The parameter refers to the structural difference observed between countries for which the Basel Capital Progress Index differs by 1.

[2]The parameter refers to the causal effect of an increase in Basel Capital Progress Index by 1 on the corresponding structural indicator. However, a causal interpretation requires strong assumptions, especially, equal trends in the structural indicators among countries in the absence of the implementation of Basel regulations, which are not testable.

[3]The difference-in-differences approach is based on a pooled panel. Accordingly, the number of observations is two times the number of countries in the corresponding sample.

[4]For structural indicators with data through 2011, a few countries in some cases are included that have data through 2010 only. The signs and levels of significance do not change if data only through 2010 are used instead.

[5]This variable is used to represent the share of traditional versus nontraditional intermediation.

[6]This variable is based on the work of Čihák, Muñoz, and Scuzzarella (2012). See Annex 3.1 and Table 3.6 for further details.

Annex 3.4. Indices of Progress on Basel Capital and Liquidity Standards

This annex explains the derivation of the Progress Indices for the Basel II and Basel 2.5 capital and liquidity regulations. These indices are used in the econometric work in the chapter's section on "Analyzing the Effect of Reforms on Structures—An Early Look" (as explained in Annex 3.3).

The Basel Capital Progress Index is derived from BCBS (2012c), which gives number codes for progress on rules and color codes for progress on implementation. For rules, the BIS number codes are as follows: 1 = draft regulation not published; 2 = draft regulation published; 3 = final rule published; 4 = final rule in force. For implementation (BIS color codes transformed to numbers): 6 = implementation completed; 4 = implementation in process; 1 = no implementation. These are shown in columns (1) to (5) in Table 3.11. The idea is to give a large weight to economies that have made good progress on both rules and implementation of Basel II and Basel 2.5, which are stepping stones toward Basel III. The total in Table 3.11, column (6), is derived by multiplying the score on rules by the score on implementation and adding up for Basel II and Basel 2.5. The overall score is divided by the maximum possible, 48, to arrive at column (7).

The Basel Liquidity Progress Index is derived from Annex 3.2, Table 3.8 (the rows labeled "Higher Liquidity Requirements"). Basel III liquidity rules have not been implemented as yet, and liquidity was not covered in Basel II or 2.5. Economies are given a score from 1 to 4 (increasing in implementation) for domestic regulatory initiatives regarding liuqidity in the table. These are (1) quantitative liquidity requirements, (2) liquidity risk management requirements, and (3) foreign exchange liquidity monitoring and management. The scores are then averaged across the three categories. Brazil, for example, has a score of 1 for (1), 4 for (2), and 4 for (3), for an average score of (1 + 4 + 4)/3 = 3, which is then divided by 4, the highest possible score, which brings Brazil's score to 0.8, as shown in Table 3.11, column (8).

Table 3.11. Basel Capital and Liquidity Progress Index
(Index ranges from 0 to 1)

	Basel II		Basel 2.5					
Economies	Rules (1)	Implementation (2)	Rules (3)	Implementation (4)	Basel III Rules (5)	Total (maximum = 48) (6) = (1) * (2) + (3) * (4)	Basel Capital Progress Index (Basel II and 2.5) (7) = (6)/48	Basel Liquidity Progress Index (8)
Argentina	2	4	1	1	1	9	0.19	n.a.
Australia	4	6	4	6	2	48	1.00	n.a.
Belgium	4	6	4	6	2	48	1.00	0.3
Brazil	4	6	4	6	2	48	1.00	0.8
Canada	4	6	4	6	2	48	1.00	0.5
China	4	4	4	4	2	32	0.67	0.6
France	4	6	4	6	2	48	1.00	0.3
Germany	4	6	4	6	2	48	1.00	0.3
Hong Kong SAR	4	6	4	6	2	48	1.00	0.75
India	4	6	4	6	2	48	1.00	0.7
Indonesia	3.5	4	1	1	1	15	0.31	n.a.
Italy	4	6	4	6	2	48	1.00	0.3
Japan	4	6	4	6	3	48	1.00	0.75
Korea	4	6	4	6	1	48	1.00	n.a.
Luxembourg	4	6	4	6	2	48	1.00	0.3
Mexico	4	6	1	1	1	25	0.52	n.a.
Netherlands	4	6	4	6	2	48	1.00	0.3
Russia	2.5	4	1.5	1	1	11.5	0.24	0.6
Saudi Arabia	4	6	3	2	3	30	0.63	n.a.
Singapore	4	6	4	6	2	48	1.00	0.4
South Africa	4	6	4	6	1	48	1.00	0.75
Spain	4	6	4	6	2	48	1.00	0.3
Sweden	4	6	2.5	6	2	39	0.81	n.a.
Switzerland	4	6	4	6	2	48	1.00	0.6
Turkey	4	4	2.5	1	1	18.5	0.39	n.a.
United Kingdom	4	6	4	6	2	48	1.00	0.75
United States	4	4	1.5	1	1	17.5	0.36	0.5
European Union	4	6	4	6	2	48	1.00	0.3

Source: IMF staff estimates based on Basel Committee on Banking Supervision (2012c) and the "Liquidity" row in Table 3.8.

Note: The data for the Basel capital rules given in BCBS (2012c) are as of March 2012. Since then, other countries, for example, Turkey, have introduced Basel II and 2.5.

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CHAPTER 4

CHANGING GLOBAL FINANCIAL STRUCTURES: CAN THEY IMPROVE ECONOMIC OUTCOMES?

Summary

The global financial crisis has required policymakers to reconsider the role that the structure of their financial systems plays in achieving good economic outcomes. A number of forces can be expected to change financial intermediation structures in the period ahead, including crisis intervention measures and an evolving regulatory reform agenda. The changing structures for financial intermediation (through banks or nonbanks, funded by deposits or other sources, interconnected domestically or across borders) can be expected to affect economic growth, its volatility, and financial stability. This chapter investigates these potential relationships from 1998 to 2010 using the measures for financial structures developed in Chapter 3. With this knowledge, the chapter forms ideas about how the evolving financial structures relate to economic outcomes.

It is worth recognizing that forming concrete inferences about the relationship between financial structures and economic growth is difficult—as is most work on the determinants of growth. First, time series of detailed cross-country data on financial structures are short, circumscribing the ability to do long-term analyses. Second, the recent period for which data *is* available included a very severe financial crisis, and while some techniques can control for its influence, the ability to isolate structural effects is difficult. And third, data limitations mean that the series used for the concepts for financial structures are not perfectly aligned—they are proxies—and hence the interpretation of the results needs to factor in this potential imperfection.

Extensive care was taken to account for the limitations. In the end, the empirical results that withstand a battery of methods suggest that some financial intermediation structures are likely to be more closely related to positive economic outcomes than others. On the positive side, protective financial buffers within banks have been associated with better economic outcomes. On the negative side, a domestic financial system that is dominated by some types of nontraditional bank intermediation has in some cases been associated with adverse economic outcomes.

The results also suggest that there may be trade-offs between beneficial effects on growth and stability of some financial structures. For example, the positive association between growth and the size of financial buffers can diminish above a certain, relatively high, threshold—very safe systems may produce less economic growth. Similarly, cross-border connections through foreign banks are beneficial most of the time, but if these banks are not managed well, during a crisis they may import instability or limit growth. Hence, we cannot say that specific characteristics of a financial structure will *always* be associated with better outcomes. The chapter thus suggests where further work could usefully be conducted, particularly since causality between financial structures and economic outcomes cannot be assigned in this framework.

The following tentative policy implications emerge from the analysis:

- While some structures may be associated with both safety and efficiency, policymakers may also face a trade-off between the safety of financial systems and economic growth.
- Regulatory policies that promote financial buffers help economic outcomes, but they need to consist of high-quality capital and truly liquid assets.

In order to reap the benefits of financial globalization and nontraditional bank intermediation, these phenomena need to be well managed. Any measures to enhance growth and stability will only be effective if they are implemented correctly and overseen intensively. The analysis therefore reinforces the lesson from the crisis that high-quality (domestic *and* global) regulation and supervision should be at the forefront of reform efforts.

The global financial crisis has required policymakers to reconsider the role that the structure of their financial systems plays in achieving good economic outcomes. Going forward, a number of forces—including the crisis itself, ongoing adjustments by market participants, crisis management responses by authorities, and an evolving regulatory reform agenda—can be expected to change the structure of the financial intermediation in fundamental ways. Some of the impact of these forces on financial structures is analyzed in Chapter 3 of this report.

The aim of this chapter is to assess how these expected changes in the financial structures across countries will interact with economic outcomes. We will use the measurements of financial structure developed in Chapter 3 and relate them to three indicators of economic outcomes: (1) the growth of real GDP per capita (real growth); (2) the volatility of real growth (which implies periodic economic booms and busts); and (3) financial stress (financial crises lead to economic and social dislocations).

Since the relationship between the *structure* of the financial sector and economic outcomes has not been studied as intensively as the degree of financial *development*, the overall empirical results of this chapter should be viewed as suggestive.[1] First, data available on structural characteristics are only available from the late 1990s, making long-term relationships difficult to verify. Second, the period over which the empirical work can be conducted contains a very severe financial crisis, suggesting that even with good estimation techniques the results should be interpreted cautiously. Third, the proxies for financial structure are just that—proxies of concepts—and the interpretation of the results needs to consider their representativeness. Despite these provisos, the subject fills an important gap given (1) the prominence of innovative structural features in the near collapse of the financial system following Lehman's failure and (2) the prospect of further structural changes (whether intended or not) as regulatory and other policies seek to prevent a replay of that crisis and to improve economic performance by making the financial system safer (see Chapter 3).

Are the structural changes occurring in the financial system making it safer in a way that will promote better economic outcomes? Rather than on the role of financial depth and development, we focus on structural features—such as the extent of unregulated intermediation (banks vs. nonbanks), competition and concentration, and domestic and cross-border interconnectedness. Which of these features matter? How should they be shaped to produce higher real growth, lower volatility of real growth, and a more stable financial system? These are new questions, not taken up before.

Although the results are to be interpreted cautiously, the preliminary evidence from 1998 to 2010 across 58 economies suggests that, indeed, some structures of financial systems are likely to be more closely related to positive economic outcomes than others. On the positive side, protective financial buffers within institutions have been associated with better economic outcomes. On the negative side, a domestic financial system that is dominated by some types of nontraditional bank intermediation or that has a high proportion of foreign banks has in some cases been associated with adverse economic outcomes, especially during the financial crisis.

The results suggest that there may be levels beyond which the beneficial effects on growth and stability of some financial structures diminish. For example, the positive association with growth of financial buffers can diminish above a certain, relatively high, threshold—a too-safe system may limit the available funds for credit and hence growth. Similarly, cross-border connections through foreign banks are beneficial most of the time, but during a crisis may be associated with instability or limit the active participation of these banks in the local economy. Hence, we cannot say that specific characteristics of a financial structure will *always* be associated with better outcomes, since there are cases where these characteristics may in fact have detrimental effects.

Note: This chapter was written by Tao Sun (team leader), Nicolas Arregui, Ken Chikada, Tom Gole, John Kiff, Erik Oppers, and Era Dabla-Norris. Research support was provided by Yoon Sook Kim. Gianni de Nicolò was a consultant.

[1]A rich theoretical and empirical literature has advanced the view that the amount of credit that the financial sector can intermediate is an important determinant of economic performance (see Annex 4.1). This literature generally concludes that a large, well-functioning financial sector with deep and liquid markets can generate the amount of credit needed to support economic growth and reduce the volatility of growth.

The chapter concludes with a few tentative recommendations for regulatory reform and other financial policies to deliver preferred outcomes. These include (1) encouraging sufficient financial buffers (although not so high so as to inhibit banks' intermediation role); (2) ensuring foreign banks can support healthy financial globalization through effective cross-border risk management and supervision, as well as a robust cross-border resolution framework to ensure that financial flows are less volatile; and (3) ensuring a more concrete discussion of how concentration of banking system assets in just a few large banks might hold the economy hostage through large, expensive implicit government guarantees.

The Relationship between Financial Structures and Economic Outcomes

A rich theoretical and empirical literature exists on the relationship between financial development and economic outcomes. It has focused mostly on the relationship between financial development and growth, using proxies for the size of financial systems, and less on the effect of financial structures. Specifically (see also Annex 4.1):

- On financial development and growth, there have long been two schools of thought with sharply differing perspectives on the potential importance of finance. One school sees financial intermediaries playing a key role in economic activity and growth. Another school believes that causality is reversed: economies with good growth prospects develop institutions to provide the funds necessary to support the expected growth—the economy leads, and finance follows.
- On financial development and growth volatility, a large body of theoretical and empirical evidence suggests that larger and deeper financial systems help diversify risk and reduce the vulnerability of the economy to external shocks, thus smoothing output volatility. However, the literature also suggests that financial depth could reduce volatility up to a point, but too much private credit can increase volatility (Box 4.1).
- In considering the importance of financial structure for economic growth, economists have tended to focus on whether bank-based or market-based financial systems are more conducive to growth, with inconclusive results. Empirically, there has been little resounding evidence in favor of either bank-based or market-based systems.
- On financial structure and stability, there are two main dimensions of stability that matter: the volatility of economic growth and financial stability. Some authors investigate the relationship between financial structure and financial stability.

In all, however, conclusions about the relationships between differing financial structures and economic outcomes have been tentative and largely inconclusive. This is an important gap, since the structure of financial intermediation across the globe is changing, especially during the last two decades. It is important to assess how these changes in financial structures may be associated with economic outcomes. If these changes in financial structures are associated with lower growth or increases in economic volatility, there may be a role for government policies to try and "tweak" the changes in financial structures to promote better economic outcomes.

This chapter focuses on the role of financial structure and economic outcomes, taking three approaches to understanding financial structure performance. Throughout, the implications of certain structural features are assessed with our three measures of outcomes—the growth of real GDP per capita, the volatility of real GDP per capita growth, and financial stress.[2] As noted in Chapter 3, the desirable features of a financial system include one that is less complex and more transparent, better capitalized, and that possesses a more sustainable level of maturity mismatch. A safe system would be competitive but without encouraging excessive risk-taking or dependence on implicit government guarantees without paying for them. Finally, a system that allowed a healthy degree of risk diversification with well-managed institutions, both domestically and across borders, would allow economies to benefit from financial globalization.

[2]For the formal definitions of these variables, see Annex 3.1 in Chapter 3. The financial stress index is a monthly indicator of national financial system strain. See Cardarelli, Elekdag, and Lall (2011) for advanced economies and Balakrishnan and others (2009) for emerging economies. The indicator is used here at an annual frequency.

Box 4.1. Financial Depth and Economic Outcomes[1]

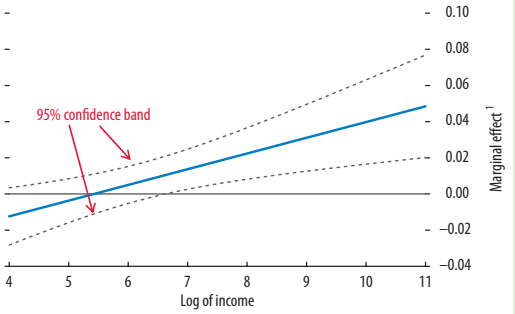
A large body of evidence suggests that as the range and volume of services offered by financial intermediaries and markets expand, countries tend to have stronger and more robust growth, and less pronounced economic fluctuations. However, new empirical analysis indicates that the benefits of increased financial depth do not accrue equally to all countries. This box examines how the above relationships vary across countries.

Financial Depth and Long-Term Growth: Income Level Matters

Financial systems can contribute to higher long-term growth by facilitating trade, mobilizing and allocating funds to productive uses, aiding risk management, and exerting corporate control. Studies find that an increase in financial depth—defined as greater activity by either banks or in capital markets—has a statistically positive and economically meaningful impact on long-term growth.[2] These studies abstract from the specific structure of a countries' financial system (that is, whether they are bank-based or market-based), but they provide a good starting point for an examination of macro-financial interrelations and hence are worthy of review.

Despite the large number of studies linking financial depth to long-term growth, there has been little exploration as to whether this virtuous relationship holds with the same intensity across countries. While the financial depth indicators used in these studies[3] provide a summary measure of the scale of financial sector activities, the degree to which these translate into higher growth could be affected by the institutional environment—the quality of which is closely linked to income level—as well as by how the structure of the *economy* affects incentives and investment. New empirical work revisits the financial depth–growth nexus, examining whether it varies across income levels.[4]

Figure 4.1.1. The Impact of Private Credit on Growth at Different Income Levels



Sources: Dabla-Norris and others (2012); and IMF staff estimates.
[1]Coefficient of ratio of private credit to GDP on growth panel regression.

The analysis suggests that the financial depth–growth nexus in banking is stronger for higher-income countries.[5] Growth regressions reveal that, on average, the coefficient of the private credit-to-GDP ratio is about 40 to 50 percent lower in developing economies[6] than in other countries, and it increases continuously as income per capita rises (Figure 4.1.1).[7] At very low levels of income, the growth impact of financial

Note: This box was prepared by Era Dabla-Norris and Adolfo Barajas.

[1]The analysis was developed as input to the IMF Policy Paper "Enhancing Financial Sector Surveillance in Low-Income Countries: Financial Deepening and Macro-Stability" (Dabla-Norris and others, 2012).

[2]Empirical tests of this relationship have included both cross-country and panel data regressions in which real GDP per capita growth is specified as a function of a set of control variables, augmented by a measure of financial depth. Typically, these include a measure of education attainment, foreign direct investment, the degree of openness, initial GDP per capita to capture convergence effects, and terms of trade, among others. Also, as pointed out by Rousseau and Wachtel (2011), the inclusion of post-1990 data warrants including a dummy variable to account for the disruptive effects of the various financial crises.

[3]Financial depth variables typically used in studies are ratios to GDP of banking sector liquid liabilities, deposits, or credit to the private sector, for banking depth; and of stock market capitalization or value traded (the turnover ratio), for stock market depth.

[4]The regression results reported here rely on a GMM (generalized method of moments) approach within a panel data setting using lags of financial depth and other exogenous variables as instruments.

[5]The panel regressions on the relationship between financial depth and growth consist of 43 high-income, 73 middle-income, and 38 low-income countries—a total of 154 countries.

[6]"Developing economies" refers to low-income countries shown on the IMF's list of countries eligible for the Poverty Reduction and Growth Trust (PRGT) as of May 2012.

[7]This figure shows the marginal effect of the ratio of private sector credit to GDP on growth of real GDP per capita. This effect was obtained from a regression of growth of real GDP per capita on both the level of credit to the private sector and an interaction term of this variable with a proxy for income, the natural logarithm of GDP per capita in 2000 U.S. dollars, and some control variables. This regression thus indicates how the growth implications of credit depend on the level of income. The marginal effect in Figure 4.1.1 traces the predicted growth impact of private credit at various levels of the natural logarithm of GDP per capita, measured using the estimated coefficients of both the level of credit to the private sector and the interaction term. This regression differs from that reported in Table 4.1.1.

Box 4.1 *(continued)*

depth is negligible, and only becomes statistically significant at about the 75th percentile of income in this sample of developing economies.

Financial Depth and Macroeconomic Volatility: More Depth Is Better, though Not Beyond a Certain Level

Financial depth can help diversify risk, alleviate liquidity constraints, and reduce the vulnerability of enterprises, households, and governments to external shocks, thus lessening macroeconomic volatility. This is particularly important for developing economies, which are more vulnerable to sharp swings in terms of trade and to volatile financing flows. Evidence from the recent global financial crises, however, suggests that while financial depth can help reduce the impact of real sector shocks, it can also propagate financial sector shocks, thus amplifying macroeconomic volatility.

A panel regression of 110 advanced, emerging, and developing economies over the period 1974–2008 supports the view that deeper financial systems can moderate the amplitude of macroeconomic volatility.[8] The role of financial depth in dampening macroeconomic volatility is shown in Table 4.1.1 (depth is represented by the ratio of private credit issued by banks and nonbank financial institutions to GDP). The analysis indicates that output, consumption, and investment volatility are all negatively related to financial depth. These results are robust to the inclusion of alternative measures of financial depth, controlling for banking crises, institutional quality, and commodity price volatility. They also hold in different subsamples of the data (for example, in a sample of emerging and developing economies).[9] In addition, the estimates are economically significant, suggesting that financial depth has a particularly pronounced effect in reducing the volatility of consumption and investment.

The analysis also suggests that further increases in financial depth above a certain threshold would increase macroeconomic volatility. To check for the non-monotonic relationship, all regressions include both the level of credit to the private sector and a quadratic term of this variable. While the coefficient associated with the linear term is negative, the quadratic term is positive, indicating a hump-shaped relationship between credit to the private

[8]Panel GMM and simple ordinary least-square regressions were employed to examine the relationship between various proxies of financial system depth and measures of macroeconomic volatility. Macroeconomic volatility is defined as the standard deviation of growth in real GDP per capita, total and private consumption, and investment. For controls, the regressions also incorporate initial real GDP per capita (to control for economic size), growth rates of real GDP per capita, inflation, the central government fiscal balance, financial and trade openness, volatility of the real exchange rate, and time fixed effects. These variables are omitted in Table 4.1.1 and are available upon request. To smooth out cyclical fluctuations, all variables are averaged over consecutive nonoverlapping five-year periods.

[9]Different measures of financial depth include ratios to GDP of bank liquid liabilities, assets, and deposits.

Table 4.1.1. Financial Depth and Macroeconomic Volatility
(Panel GMM regressions, 1974–2008)

	Dependent Variables: Standard Deviation of Growth Rate			
		Consumption		
	GDP	Final	Private	Investment
Private credit to GDP	–0.0397*	–0.0985***	–0.126***	–0.326**
	(0.0214)	(0.0346)	(0.0446)	(0.126)
Square of private credit to GDP	0.000135	0.000371*	0.000529**	0.00154**
	(0.000103)	(0.000198)	(0.000254)	(0.000712)
Threshold value	n.a.	132.9	118.6	106.0
Standard error of threshold value	n.a.	27.78	20.10	11.06
Observations	628	485	506	481
Number of countries	111	110	111	110
Time dummies	Yes	Yes	Yes	Yes
Hansen test *p*-value	0.697	0.712	0.757	0.737
A-B AR(2) test *p*-value	0.750	0.333	0.153	0.783

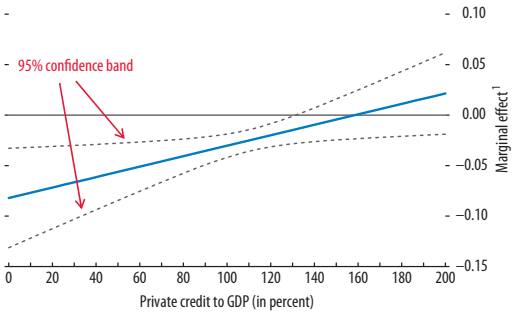
Source: Dabla-Norris and Narapong (forthcoming).

Note: The panel GMM regressions are run on 110 advanced, emerging, and developing economies over the period 1974–2008.

Shaded cells: If the private credit-to-GDP ratios are higher than the values in the shaded cells, the volatilities of the respective dependent variables increase. Standard errors are shown under the estimated coefficients. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels of confidence.

Box 4.1 *(continued)*

Figure 4.1.2. Marginal Effect of Private Credit on Final Consumption Volatility



Source: Dabla-Norris and Narapong (forthcoming).
[1]The projected effect using the coefficients on both the ratio of private credit to GDP and its square in the final consumption volatility regression.

sector and macroeconomic volatility. In particular, the results suggest that finance starts having a negative effect on the volatility of consumption and investment when credit to the private sector exceeds 100 percent of GDP, while the results for GDP volatility are less statistically significant.[10] The level of financial depth in many emerging and developing economies is lower than these point estimates for the thresholds, suggesting that financial deepening can play a beneficial role in smoothing macroeconomic volatility in these countries (Figure 4.1.2.). At very high levels of private credit, as observed in many advanced economies, finance starts to increase macroeconomic volatility.[11]

[10]The results for GDP volatility are statistically significant if we replace the contemporaneous credit-to-GDP ratio with the lagged one and in the subsample comprising advanced and emerging economies.

[11]To test for the threshold effects, joint F-tests for the coefficients of the first and second degrees of the financial depth measure and a Wald test for the threshold estimate were conducted. These indicate whether the variable has one effect below the threshold but another effect when above the threshold.

Investigating the relationships between differing financial structures and economic outcomes is not an easy task, with data constraints and econometric issues being the main challenges (Box 4.2). Attempting to overcome these difficulties, this chapter employs the following three approaches:

- *Simple (unconditional) correlations between structure measures and economic outcomes*. We use data for 58 advanced and emerging economies over the period from 1998 to 2010. The structure measures are mostly from a subset of those analyzed in Chapter 3 (Table 4.1).
- *An assessment of the experiences of five countries with distinctly varying structures*. This assessment considers how ongoing reforms in each country might alter their economic outcomes.
- *A multivariate regression analysis.* The multivariate approach allows for the effects of a change in one variable to be measured while controlling for the effects of other macroeconomic and financial variables, thus isolating the relationship between economic outcomes and specific structural variables. In addition, a model on the probability of banking crises is used to give further insight into the relationship between financial structure and financial stability.

Simple Correlations

With simple correlations across many economies and over time, we get an initial idea of the relationships between financial structures and economic outcomes. We use data for four key concepts: competition, financial buffers, financial globalization, and nontraditional bank intermediation, examining 58 economies in two periods: 1998–2007 and 2008–10. The purpose is to describe the main developments in the data and to motivate certain methodological controls undertaken in the regression analysis, and not to make inferences about causality. Note that there are no statistical confidence bounds provided and the scatter plots mostly suggest relationships to pursue in the later empirical work. To give a broader picture, this section uses the financial

Table 4.1. Financial Structure Measures in This GFSR

Chapter 3	Chapter 4[1]
Market-Based Intermediation	
Nontraditional bank intermediation	Nontraditional bank intermediation
Noninterest income to total income	Noninterest income to total income
Other earning assets to total assets	**Other earning assets to total assets**
Other interest-bearing liabilities to total liabilities	**Other interest bearing liabilities to total liabilities**
Nonbank intermediation	Nonbank intermediation
Loans and bonds held by nonbanks over loans and bonds held by financial sector	Loans and bonds held by nonbanks over loans and bonds held by financial sector
Private bond market capitalization to GDP	
Use of new financial products	
Derivatives turnover to GDP	
Securitization to GDP	
Traditional Bank-Based Intermediation	
Loans and bonds held by banks relative to the overall financial sector	Loans and bonds held by banks relative to the overall financial sector
Net interest margin	Net interest margin
Scale and Scope	
Size	Size
Domestic interconnectedness	Domestic interconnectedness
Wholesale funding ratio	
Interbank assets to total assets	Interbank assets to total assets
Interbank liabilities to total liabilities	Interbank liabilities to total liabilities
Concentration (share of top three banks)	**Concentration (share of top three banks)**
Financial globalization	Financial Globalization
Share of foreign banks in total number of banks	**Share of foreign banks in total number of banks**
Total bank foreign assets to GDP	**Total bank foreign assets to GDP**
Global interconnectedness[2]	
Global interconnectedness on assets	
Global interconnectedness on liabilities	
Financial Buffers	
Liquid assets to deposits and short-term funding	**Liquid assets to deposits and short-term funding**
Equity to total assets	**Equity to total assets**
Competition	
	Lending spread (lending rate minus deposit rate)
	Net interest margin
Transparency/Disclosure of Financial Intermediation	
	Accounting standards: fraction of accounting items reported

Source: IMF staff.

Note: See Annex 3.1. for the description of data and indices.

[1]Variables in bold are those found to be consistently significant in the panel estimation in this chapter.

[2]See Čihák, Muñoz, and Scuzzarella (2012).

structure indices introduced in Chapter 3, and not individual variables as in the regression analysis.

We found that some measures of financial globalization, financial buffers, and nontraditional bank intermediation had no consistent pattern of correlation with economic outcomes over the 13 years studied. (Only those indices and figures that are helpful to motivate methodological controls undertaken in the regression are discussed in this section—others are not discussed or presented.)

- *Financial globalization* had no discernible correlation with growth volatility or the change in financial stress in 1998–2007, but it was positively correlated with these variables in the crisis period 2008–10 (Figure 4.1), suggesting as globalization increases so does financial contagion under adverse circumstances.
- *Financial buffers* also had no definite correlation with the change in financial stress in the precrisis period (before 2008) and a slight negative correla-

Box 4.2. How Robust Are the Econometric Results?

This box summarizes two major challenges—data constraints and econometric issues—associated with the econometric work in this chapter and discusses the attempts to overcome them.

Data Constraints

Both the lack of data and its quality regarding financial structure measures (both indices and variables) constrain the ability to estimate and interpret the results. These are exhibited as follows.

- *The short sample period.* Data on the financial structure measures are only consistently available across a large enough sample of countries to perform meaningful empirical work since 1998. Hence, they are accompanied by a short, and relatively limited, set of macroeconomic circumstances. In particular, the period under study included a very severe financial crisis.
- *Incomplete measures of financial structure*. The correlation and econometric analysis relies on proxies for the concepts of financial structure. For example, to measure the level of financial globalization, the empirical section uses a measure of foreign bank presence (share of foreign banks in total number of banks) and a measure of domestic bank presence overseas (the ratio of total bank foreign assets to GDP). These variables capture important elements of financial globalization, but only imperfectly as they are only measuring globalization from the perspective of the banking sector.
- *Outliers.* Some variables in certain countries exhibit large swings. As a robustness check, the regressions were re-run using a range of methods excluding these outliers.
- *Difficulties in assessing statistical significance*. The initial analysis included a range of structural variables that show no statistically significant relationship (see Annex 4.2). However, this should not be interpreted as evidence of there being no relationship between these other measures and economic outcomes; instead, this statistically insignificant relationship may be the result of insufficient variation in the data to detect a statistical relationship. In the same vein, the results reported in the chapter are the relationships for which the analysis has shown sufficient evidence.

Note: This box was prepared by Tom Gole.

Econometric Issues

The analysis, as in other similar econometric work on economic growth, faces three main econometric challenges:

- *Potential omitted variable bias.* A possible source of error in the empirical results is that both economic outcomes and financial structure might be caused by some third factor, such as the quality of government institutions or movements in the business cycle. To deal with this potential omitted variable bias, the analysis includes a range of control variables, including government debt, the inflation rate, and an IMF estimate of the output gap. The full list of control variables can be found in Annex 4.2.
- *Possibility of a catch-up effect.* The difference in economic development level may affect econometric results. For instance, countries that start at a lower level of economic activity tend to grow faster than those that start at a higher level. There are also other country-specific factors that drive economic outcomes. Therefore, both a specification controlling for the initial level of GDP per capita and a country-level fixed-effects panel specification were employed.[1] In addition, estimation is also done for advanced and emerging economies separately to broadly reflect the different levels of economic development.
- *Possibility of reverse causality (or endogeneity):* As indicated in some literature, it might be economic outcomes that drive financial structure, rather than the other way around. One approach that can mitigate this problem is the *generalized method of moments* (GMM) approach proposed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). This method is employed in addition to the fixed-effects model with a lagged dependent variable, and provides conclusions that are broadly similar. While the analysis attempts to correct for any reverse causality, the econometric results are presented conservatively as providing information about *associations* between financial structures and economic outcomes, rather than relying on a clear identification of *causal* relationships.

[1]One complication with a country-level fixed-effects approach, combined with the use of a lagged dependent variable, is the possibility of so-called "Nickell bias." See Nickell (1981).

Box 4.2 *(continued)*

In sum, the discussion in the empirical section only presents variables where the estimated coefficients remain statistically significant (or became insignificant and retained the same sign) across various specifications that were used, as well as across time, and across countries (or within subsets of countries), and with or without outliers. The battery of techniques provides some reasonable confidence that the results are "robust" and reflect the "true" association of the variables with economic outcomes.

tion in the crisis period (after 2008), indicating that larger buffers are somewhat helpful in the sense that they were associated with less stress in the crisis. This was true in both advanced and emerging economies (Figure 4.2).

- *Nontraditional bank intermediation* had a positive correlation with financial stress in the precrisis period, but had a negative correlation during the crisis, suggesting these more nontraditional bank businesses were related to higher stress early on, but then became associated with lower stress later.

These time-varying correlations may signal real changes in the underlying relationships but could also reflect the sharp differences in the economic and financial circumstances. For instance, the period 1998–2007 featured rapid financial and economic expansions, whereas 2008–10 brought economic recession and financial crisis to many countries. Indeed, the relationships between financial globalization and economic outcomes likely reflect the fact that financial systems that were relatively isolated from global financial markets tended to suffer less in the financial crisis. These interplays suggest the need to control for these other features of the macroeconomic environment. Also important is the possibility of nonlinear relationships, in which certain structural measures, such as an increase in capital buffers, can be helpful up to a point but can be counterproductive beyond a certain level. That phenomenon is best examined in the multivariate analysis.

Nevertheless, the correlation between a few financial structure measures and economic outcomes appears to be relatively stable across the periods:

- *Financial buffers* show a positive correlation with growth in the pre- and postcrisis periods, for both advanced and emerging economies, suggesting higher buffers are related to higher growth (Figure 4.2).
- *Competition* was slightly negatively correlated with growth throughout the entire period 1998–2010 meaning higher competition (at least with this measure) was associated with lower growth (Figure 4.3).[3]

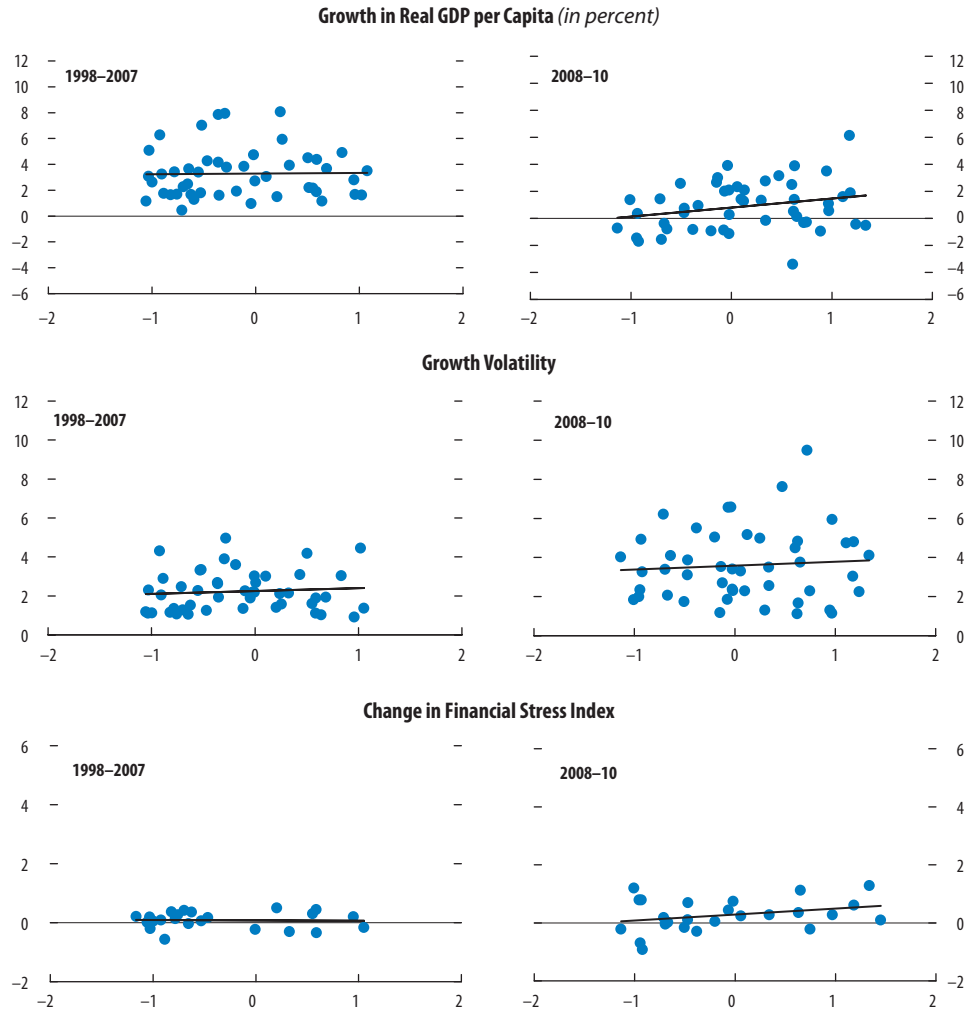
Country Case Studies

Another way to assess the relationship between financial structures and economic outcomes is to look at country case studies. For this purpose, five countries were chosen (Australia, China, Germany, Japan, and the United States) that offer a contrast in their financial structures (Boxes 4.3 to 4.7 and Table 4.2). The main points of contrast are:

- The importance of nonbank financial sectors—the United States versus countries that depend primarily on banking sectors for financial intermediation.
- The depth, resilience, and dynamism of the financial sector—the United States versus countries that are less integrated into globalized financial asset markets or face less intense competition, such as Australia and China.
- The severity of financial distress in the recent crisis—the United States and Germany versus countries that largely avoided it, such as Australia, China, and Japan.

[3]Note that the measures of competition used here are commonly used by researchers evaluating the traditional banking business—making loans and taking deposits. This measure is most applicable to those more traditional banking systems, that is, most economies with the exception of a number of advanced ones, during normal times. Its representativeness could be questioned during a crisis period, when the underlying interest rates are subject to crisis management policies or other distressed conditions.

Figure 4.1. Time Varying Correlations: Financial Globalization Index



Source: IMF staff calculations.

Note: For explanation of the financial structure indices, see Table 4.1. This figure shows the relationship between the financial globalization index from Chapter 3 and economic outcomes for advanced and emerging economies. The index is constructed so that higher values are associated with higher levels of financial globalization. Each index is constructed by standardizing the values, using the mean and standard deviation across all economies and the entire sample period. Not all economies have a value for the financial globalization index.

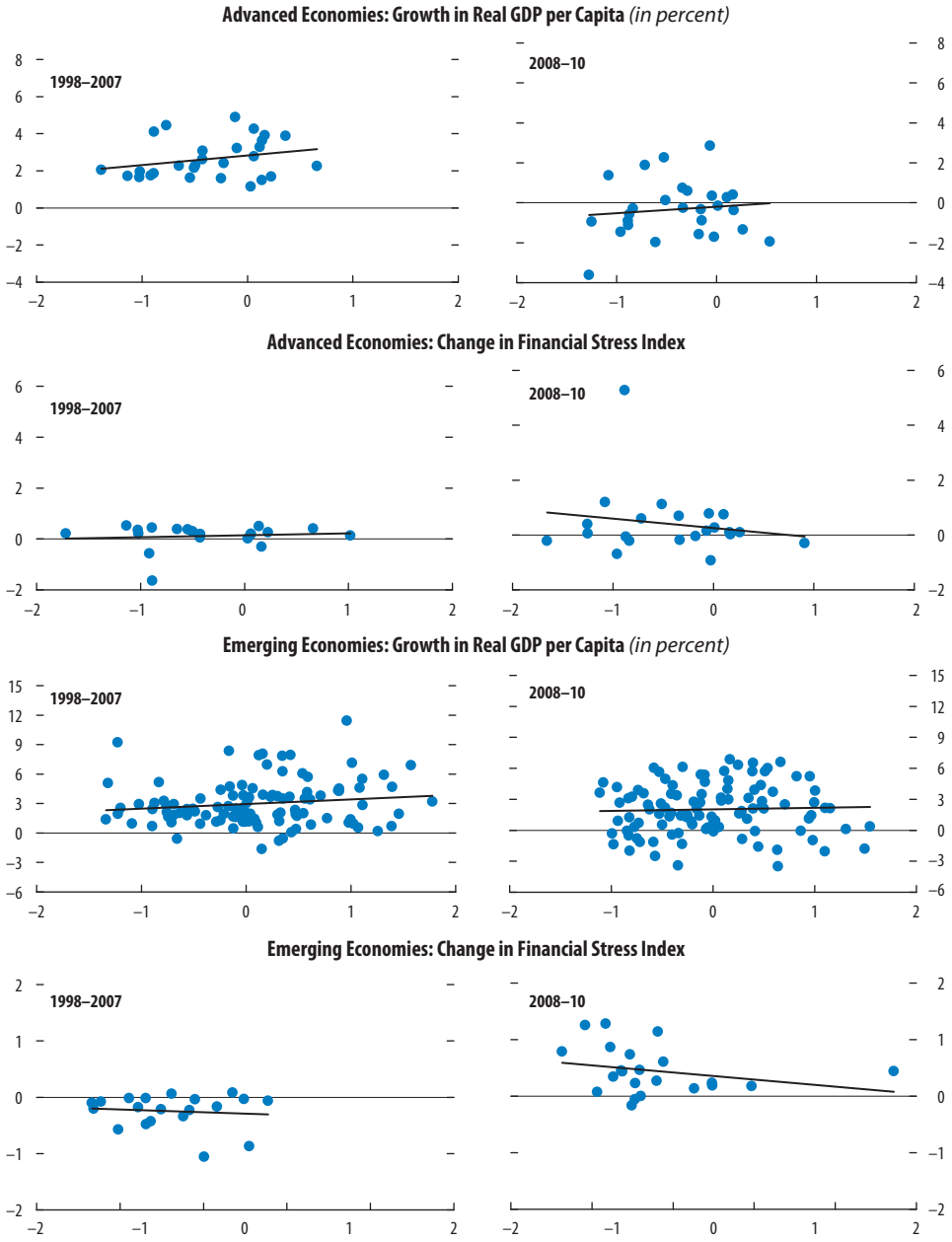
The case studies address a common set of issues for each country:

- The characteristics of the country's financial structure.
- The association, if any, between financial structure and economic outcomes.
- The implications of the ongoing regulatory reforms for the current financial structure and for growth and volatility.

The five case studies suggest the following general conclusions:

- No particular financial structure can ensure best economic outcomes under all circumstances. In other words, there exists no optimal (or one-size-fits-all) structure to generate growth and maintain financial stability. What appeared to give good results on both counts during a certain period may not work in a different period. Japan's "main bank system" and the United States' capital markets are examples of structures that worked well for growth for a while (before the 1980s and 2000s, respectively) but then caused major

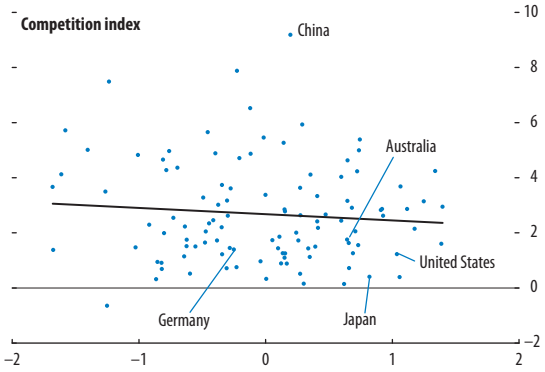
Figure 4.2. Time Varying Correlations: Financial Buffers



Source: IMF staff calculations.

Note: For explanation of the financial structure indices, see Table 4.1. This figure shows the relationship between the financial buffers index from Chapter 3 and economic outcomes for advanced and emerging economies. The index is constructed so that higher values are associated with higher levels of financial buffers. Each index is constructed by standardizing the values, using the mean and standard deviation across all economies and the entire sample period. Not all economies have a value for the financial buffers index.

Figure 4.3. Financial Structure and Economic Growth, 1998–2010
(Growth in real GDP per capita, in percent)



Source: IMF staff calculations.
Note: For explanation of the financial structure indices, see Table 4.1. This figure shows the relationship between the competition index from Chapter 3 and economic outcomes for advanced and emerging economies. The index is constructed so that higher values are associated with higher levels of competition. Each index is constructed by standardizing the values, using the mean and standard deviation across all economies and the entire sample period. Not all economies have a value for the competition index.

financial disruptions. China, with the smallest financial sector and highest share of financial sector assets held in banks among the case study countries, showed the best economic performance (higher GDP per capita growth and less growth volatility than in other countries) over the last decade. However, this may well be the result of other factors (healthy export markets) and its relatively low level of economic development when economic reforms were initiated in 1978. Moreover, the dominance of large banks in financial intermediation has contributed to inefficiencies in credit allocation and the potential buildup of vulnerabilities. These vulnerabilities are heightened by a relatively low cost of capital as a result of incomplete financial deregulation. Similarly, although Australia showed solid economic performance over the last decade and resilience to the recent financial crisis, it is not clear whether the role of its highly concentrated banking sector was key in this regard as many attribute its success to supervisors' ability to influence the largest banks' behavior alongside the economic support of a substantial commodity boom.[4]

[4]A concentrated banking sector has its risks as well as advantages. On the one hand, monopoly power could lower borrowing firm profitability and incentivizes firms to take excessive risk (Boyd and De Nicolò, 2005). On the other hand, large banks have economies of scale and less concentrated portfolios, which tend to result in higher profits and less risk. A small number of large banks are also easier to supervise than a large number of small banks.

- Some features of the financial structure could make a financial system more susceptible to contagion and thereby undermine economic performance. The case of Germany, with high reliance of part of its banking system on noncustomer deposit funding, and of the United States, with its high domestic and global interconnectedness, make them prone to contagion.
- A financial structure that shields the sector from certain risks may not be sufficient to ensure better economic performance because of other economic linkages. For example, the Japanese financial system showed resilience during the recent crisis partly as a result of its limited reliance on foreign-currency-based wholesale funding. However, the country is reliant on trade, and it could not avert one of the most severe output contractions among advanced economies as global trade plummeted.
- The ongoing global regulatory initiatives are not likely to change the basic financial structures in Australia and Japan much, but they are likely to have effects in China and the United States, where domestic financial reforms are expected to play a large role as well. However, the extent to which these initiatives could ensure better economic outcomes depends equally on (1) how financial structures would change and (2) how the financial structures are related to financial stability. These issues are discussed in Chapter 3, and we explore them more analytically in the next section.

Multivariate Regressions

The earlier basic correlation and case study analyses provide a starting point for a more formal and broader approach to study the interplay between financial structures and economic outcomes. Both multivariate regressions and a probability model of banking crisis are used to investigate the possible relationship between financial structures and

Box 4.3. Australia

Australia's bank-based financial sector is large and mature. Authorized deposit-taking institutions, mostly banks, are the dominant group of financial institutions accounting for more than 50 percent of financial assets (about 200 percent of GDP). Superannuation funds account for 20 percent of financial assets and are the fastest growing group.[1] The insurance sector has 7 percent of financial assets, and non-superannuation managed funds have another 6 percent. Most of the financial sector assets are domestic.

The banking sector is highly concentrated, and dominated by four large Australian-owned banks, whose combined assets account for almost 80 percent of total banking assets. Their share in banking sector assets has risen more than 10 percentage points since mid-2008 largely as a result of the acquisition of smaller banks and the withdrawal of some foreign-owned banks during the crisis. The government has a "four pillars" policy that prohibits mergers among the four major banks but does not automatically object to acquisitions of smaller banks by major banks, which are subject to approval by the competition authority. The Australian banking system is open, with no policy or regulation discriminating against foreign banks. Foreign banks account for 12 percent of total banking assets.

The financial sector grew rapidly over much of the past two decades, but growth has since slowed to a sustainable pace in line with income growth. Financial deregulation in the 1980s and disinflation in the 1990s permitted a strong expansion of the financial sector with little output volatility. The stable expansion of the financial sector has supported two decades of uninterrupted output growth. While some of this financial expansion was enabled by offshore wholesale funding, use of this funding source has been on the decline since the global financial crisis began. The growth in home mortgages, the fastest growing type of banking asset in the past two decades, was for a time accompanied by rapid increases in household debt and house prices, although both household debt and house prices have gradually adjusted downward over the past two years.

Any risks arising from these developments are being managed and there is no plan to change regulation in order to prospectively change the bank-based financial structure to a capital-market-based one. Australia has a well-functioning model of financial regulation, with separate regulatory agencies responsible for prudential regulation and conduct of business. The Australian Prudential Regulation Authority (APRA) takes pride in its "intrusive" approach to financial supervision, which is forward looking and risk based. APRA is preparing to implement Basel III standards in 2013, well ahead of schedule, although the reform is not intended to change the current structure of the financial system. The intense supervisory approach has been broadly effective for Australia as evidenced by the high-quality capital and the strong emphasis on loan serviceability in granting credit. That said, considering the diversity of country circumstances, what is successful in Australia may not necessarily be so elsewhere.

Note: This box was prepared by Xiaoyong Wu.

[1]The program is funded by mandatory contributions by employers and voluntary and tax-privileged contributions by employees.

economic outcomes (Annex 4.2 and Annex 4.3). For the multivariate regression exercise we again use a sample consisting of 58 economies during the 1998–2010 period, separated into advanced and emerging, and the same three outcomes as before—the growth of real GDP per capita (real growth), the volatility of real growth, and a financial stress index. The tables only report relationships that are robust across several panel data specifications, meaning the coefficients were statistically significant using one of the techniques and did not change sign in the other techniques, and as well, did not change substantively if outliers were removed or other controls were introduced.

The results are as follows. In regressions that relate real GDP per capita growth, growth volatility, and changes in financial stress to measures of financial structure, the variables proxying for competition,

Table 4.2. Financial Sector Size, Structure, and Economic Performance in Case Study Countries
(In percent)

	Australia			China			Germany			Japan			United States		
	1998–2002	2003–07	2008–10	1998–2002	2003–07	2008–10	1998–2002	2003–07	2008–10	1998–2002	2003–07	2008–10	1998–2002	2003–07	2008–10
Financial sector size															
Total financial sector asset (relative to GDP)	286	360	382	n.a.	219	252	334	365	377	479	497	508	358	414	430
Financial sector asset share															
Banks (depository institutions)	48	47	52	n.a.	90	87	73	69	66	63	60	61	24	24	27
Insurance and pensions	34	33	29	n.a.	5	6	15	17	18	18	20	20	32	29	25
Other financial institutions	18	21	20	n.a.	5	7	12	14	16	19	20	19	45	47	47
Financial structure variables															
Bank noninterest income[1]	43	36	27	14	20	14	46	51	45	22	29	25	42	42	39
Interbank assets to total assets	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	28	25	24	15	15	16	11	12	12
Bank asset concentration[2]	68	72	65	71	64	55	67	71	75	34	38	45	22	29	35
Net interest margin	1.7	2.2	2.0	2.2	2.3	2.7	1.2	1.0	1.0	1.3	1.3	1.2	3.9	3.4	3.4
Economic performance															
GDP per capita growth (x)	2.5	2.0	0.3	7.4	11.0	9.2	1.6	1.7	–0.1	–0.1	1.8	–0.8	2.1	1.8	–1.1
GDP per capita volatility (y)	1.0	0.8	0.8	0.7	1.8	0.6	1.2	1.9	4.3	1.5	0.4	4.9	1.6	0.6	3.3
Growth-volatility ratio (x/y)	2.5	2.7	0.4	11.2	6.1	14.7	1.3	0.9	0.0	–0.1	4.2	–0.2	1.3	2.9	–0.3

Sources: National flow of funds; national accounts; World Bank, Global Financial Development database; and IMF staff estimates.

Note: All figures are period averages. Financial sector excludes central banks. For Japan, financial sector excludes Fiscal Loan Program; for China, the earliest financial sector data are as of 2005.

[1]Ratio of banks' noninterest income to total income.

[2]Ratio of assets held by the three largest banks to those held by banks.

financial buffers, financial globalization, and nontraditional bank intermediation have some statistical significance over the full period 1998–2010. However, for the proxies for financial globalization, the results seem to be driven mainly by the developments since the crisis as re-estimating the regressions using data through 2007 results in some of the relationships losing statistical significance.[5]

Concentration and Lending Spreads

- Higher concentration and lending spreads are statistically significantly associated with higher growth and less growth volatility. While there are varying possible explanations for this, the result is puzzling and warrants further investigation.[6]

- Similarly, higher concentration (proxied by three banks' concentration ratio—the proportion of assets attributable to the largest three banks compared to their banking system) is associated with higher growth in "good times" and higher financial stress during a banking crisis[7] (Table 4.3, and Table 4.5 in Annex 4.2).

While the panel technique is not able to definitively identify causal relationships, it still suggests that banks in less competitive systems are able to earn more during "good times," easing economic volatility. However, their ability to earn higher profits on their banking business is hindered during a banking crisis.

Liquidity and Capital Buffers

- Higher liquidity buffers (as measured by the ratios of liquid assets to deposits and to short-term

[5]The short period—we have annual data only for 1998–2010—means that the interpretation is based on one business cycle, and hence should not be interpreted as accounting for long-run growth relationships.

[6]Higher lending spreads traditionally signal lower competition, although more recent economic models of competition show how this may not be the case (Annex 4.1). The notion is that higher spreads enable banks to earn higher profits, and as a result they are less motivated to take excessive risk and thus less likely to cause or contribute to economic fluctuations. This result could as easily, however, reflect a reverse causality: during periods of high growth, banks are able to charge higher lending spreads.

[7]This specification controls for the ratio of government debt to GDP and so the result suggests that concentration matters even after accounting for the impact of government debt on financial stress.

Box 4.4. The United States

The U.S. financial system is large and highly diversified, but what sets it apart from that of other countries is the 80 percent share of credit market assets held outside of depository institutions. Depository institutions hold only about 20 percent, largely because only about 10 percent of credit to the corporate sector comes from banks. Insurers and pension funds hold about 12 percent of credit market assets, which is roughly similar to this subsector's share in other countries. "Households" are a large factor (9 percent), comprised mostly of hedge funds, private equity, and personal trusts, as are foreign investors (16 percent).

The remainder of credit market assets is held in a number of subsectors that have become characterized as significant contributors to the crisis. These include government-sponsored enterprises (GSEs), which account for about 14 percent of total credit market assets, mostly concentrated in residential mortgage markets.[1] Their implicit guarantees and social policy mandates contributed to a softening in credit discipline and a buildup of systemic risk. Other large subsectors include investment funds (10 percent), including money market mutual funds (3 percent), and private-label securitization vehicles (4 percent).

The U.S. financial system structure is well suited to fueling credit growth in good times, but it is prone to exacerbating downdrafts (Bhatia and Bayoumi, 2012). For example, dependence on capital-markets-based funding, with much of that foreign and buoyed by securitization, has been associated with greater volatility in the availability of credit (Dagher and Kazimov, 2012). Also, various forms of secured funding increased the amount of interconnectedness and effective leverage in the system (Bhatia and Bayoumi, 2012; and Singh, 2012). In addition, much financial intermediation takes place in the largely unregulated "shadow banking" subsector.

U.S. bank supervision is fragmented and the diffusion of powers across agencies undermines its efficiency, effectiveness, transparency, and accountability (IMF, 2010c). The Dodd-Frank Act has resulted in some streamlining, but the number of U.S. agencies responsible for financial sector oversight has been increased rather than reduced. That said, the new Financial Stability Oversight Council should help coordinate regulatory actions that have a macroprudential objective. Various proposals on the future of the GSEs are being examined, but little action on this agenda is expected soon.

However, authorities are committed to reregulate the banking sector, money market mutual funds, securitization, and over-the-counter (OTC) derivatives. Because many of the new rules remain under development, predicting their impact on the structure of the financial sector is difficult. Nevertheless, profound changes are likely, as investment banking becomes less profitable, and the costs of running OTC derivative and securitization businesses rise.

Note: This box was prepared by John Kiff.

[1]GSE assets here consist of loans held on their balance sheets plus those held in agency- and GSE-backed mortgage pools.

funding) were associated with higher growth for the entire sample and the subsample of emerging economies. Higher capital buffers (as measured by the ratio of equity to total assets) are negatively related to growth volatility in the full sample and are also negatively related to financial stress in advanced economies (Table 4.3, and Table 4.5 in Annex 4.2).[8]

Share of Foreign Banks in the Total Number of Banks

- The share of foreign banks in the total number of banks in a country (as one possible proxy for financial globalization) is associated with lower growth and higher volatility in the full sample during 1998–2010, but the result appears to be driven mainly by developments since the crisis, as this negative relationship diminishes when a sample before the 2007 crisis is used (Table 4.3, and

[8]This chapter uses the ratio of equity to total assets as a proxy for capital buffers, rather than a measure of risk-weighted capital adequacy. This approach has been used by various studies in the literature (Barrell and others 2010a, 2010b; Kato, Kobayashi, and Saita, 2010; Demirgüç-Kunt, Detragiache, and Merrouche, 2010). Moreover, during the crisis, market participants focused on this measure of capital adequacy over those using risk-weighted assets since it appeared to them to be less subject to accounting and risk-management manipulation.

Box 4.5. Germany

The German financial sector is dominated by banks, which account for about 65 percent of financial sector assets. German industry is highly reliant on bank financing and households borrow almost exclusively from domestic banks. The banking system is based on a "three pillar" system (private banks, savings banks and the associated Landesbanken, and networks of cooperative banks). The savings bank and cooperative pillars are each bound together through mutual guarantees, vertical ownership ties, and the so-called regional principle whereby members do not compete with each other.

The large commercial banks (accounting for 25 percent of banking sector assets) are major participants in international financial markets. They compete across the full spectrum of products, including over-the-counter (OTC) derivatives and structured finance products. They are now recalibrating business models around the new regulatory environment. Some of the Landesbanken (17 percent of banking sector assets) were heavily involved in highly speculative markets, fueled until 2005 by cheap and abundant government-guaranteed funding. When those investments turned sour, some of them required extensive public financial support. In addition, the Landesbanken and big private banks are highly dependent on wholesale and capital-market-based funding, which proved to be problematic to some, particularly in 2007–08.

The cooperative and savings banks, which comprise about 25 percent of banking sector assets, have proven to be the most resilient subsector. A focus on retail deposit funding has insulated them to a large degree from the crisis, and they have remained steady providers of credit to the domestic economy while the other banks were scaling back. However, according to the September 2011 Monthly Report of the Deutsche Bundesbank, the postcrisis downturn in lending never approached credit-crunch conditions. In fact, much of the contraction came from reduced loan demand, which in turn was largely due to firms' ability to self-fund out of retained earnings.

The big two commercial banks will be particularly challenged by financial sector reregulation, because of their extensive investment banking activities, high leverage, and capitalization that is not as robust as that of their foreign peers. All the large commercial banks are still bolstering capitalization and refocusing on core banking activities, including competing more aggressively for domestic retail deposits. Six large banks that were called upon to strengthen their capital position as a result of the late-2011 European Banking Authority stress test are well on their way to complying.

Note: This box was prepared by John Kiff.

Table 4.5 in Annex 4.2).[9] Similarly, larger foreign bank share during a banking crisis is associated with lower growth in advanced economies. Hence it appears that most of the detrimental relationship takes place in times of distress.[10]

Previous empirical work on the influence of foreign banks shows that it depends on their business model in the host country. Based on more granular balance sheet and bank ownership data for 137 countries over 1995–2009, Claessens and van Horen (2012) found that foreign banks reduced credit more compared to domestic banks during the crisis but this was limited to those countries where they had a small role in financial intermediation. Detragiache, Tressel and Gupta (2008), using a sample of low-income countries, argue that the foreign banks that are more reliant on "hard information," such as collateral values, are less able to manage their lending relationships compared with those that rely on "soft information," such as entrepreneurial ability, and so they tend to lend less, and to lend predominantly

[9]Being a crude proxy for financial globalization, the share of foreign banks in the total number of banks may capture only a limited dimension of financial globalization.

[10]Earlier work on the costs and benefits of interconnectedness shows how this can be the case. It notes that cross-border connections are helpful in distributing (mitigating) risk in normal times, but can also be mechanisms for the transmission of shocks. Shocks in one part of the system can be amplified and transmitted if globally connected financial institutions pursue similar investment strategies and become collectively overexposed to risk in the upswing of a credit cycle and collectively risk averse in a downswing (IMF, 2010a, 2010b).

Box 4.6. Japan

Relative to its GDP, Japan has one of the largest financial sectors in the world. The sector is predominately bank based, but Japan also has large insurance and pension subsectors (see Table 4.2). Banks (deposit-taking institutions) hold roughly 60 percent of total financial sector assets. There are three major banking groups ("megabanks"), but concentration is relatively low (see Chapter 3), as the banking sector also comprises nearly 400 regional banks and Shinkin banks (cooperative regional financial institutions) and the Japan Post Bank. Foreign banks have traditionally played a minor role in the domestic loan and deposit markets, but they have a significant presence in investment banking and derivatives trading.

While the megabanks and some other large financial institutions have a sizable international presence, the Japanese financial system is very much domestically oriented and has a strong linkage to the sovereign thanks to significant and growing holdings of government securities.[1] The main factors behind this strong link to the sovereign are (1) Japanese households' continued preference for allocating the majority of their assets to bank deposits—despite the prolonged near-zero interest rate environment; (2) a rise in deposits from the corporate sector; and (3) banks' cautious risk-taking strategies following the financial crisis of the late 1990s to early 2000s. The Japanese banking sector's profitability remains very low compared to that in other advanced economies, partly as a result of fierce competition among banks in the face of subdued demand for credit from the corporate and household sectors.[2]

The assessment of the Japanese financial system's effect on economic growth and its stability is mixed. Until the burst of its asset price bubble in the early 1990s, Japanese economic success was often attributed to Japanese banks' close ties with their corporate customers (relationship-based banking, or the so-called "main bank system"). However, since that time these close ties have worked adversely and, at least partially, have encouraged forbearance and ever-greening of credit extended to nonviable companies. Aggravated by banks' thin buffers of capital that can absorb losses, this in turn has prolonged the necessary deleveraging and restructuring process of the financial system and economy, resulting in Japan's so-called "lost decade." However, at the same time, the main bank system has probably contributed to averting severe financial disintermediation and mitigated an acute economic downturn, at the cost of a prolonged period of low growth (which can also be seen in its low growth and low volatility performance in the 1998–2002 period shown in Table 4.2).[3,4]

The Japanese financial system has performed relatively well since the mid-2000s. Financial developments improved in the mid-2000s, reflecting in part an acceleration in balance sheet repair in the early 2000s. During the global financial crisis, the Japanese financial system as a whole was relatively less affected than those in other advanced economies, in part because of its relatively limited exposure to securitized products and foreign claims and limited reliance on foreign-currency-based wholesale funding. However, as global trade plummeted, the resilience of the financial sector could not avert one of the most severe contractions in output experienced among the advanced economies.[5]

Looking ahead, it seems unlikely that the ongoing regulatory changes will alter the structure of the financial system dramatically. Major Japanese banks seem well positioned to meet the new capital requirements, thanks in part to substantial holdings of low-risk-weighted "safe" assets. Also,

Note: This box was prepared by Ken Chikada.

[1]Banks (including the Japan Post Bank) hold about 40 percent of the outstanding amount of Japanese government securities issued; insurance companies and pension funds hold about 20 percent. See IMF (2012a) for cross-country comparison.

[2]Profitability is a challenge for regional banks, which are predominantly involved in domestic lending and have relatively thin capital buffers.

[3]For discussions on the main bank model, see Aoki and Patrick (1995) for example; for the prolonged adjustment, see Caballero, Hoshi, and Kashyap (2008); for somewhat different perspectives on Japan's lost decade, see Shirakawa (2012).

[4]It is noteworthy that banks held sizable equity exposures to their large corporate clients, which in turn exposed banks' capital to volatile and downward-trending stock market prices. Although banks' stock holdings declined substantially in the last decade, they remain a large risk factor for the major banks (Bank of Japan, 2012).

[5]During the fourth quarter of 2008 and the first quarter of 2009, Japan's real GDP shrank by nearly seven percent.

Box 4.6 *(continued)*

their abundant holdings of Japanese government securities should make it easier to meet the Liquidity Coverage Ratio. However, it would also imply that the Japanese financial system remains exposed to a potential spike in yields, perhaps associated with risks to longer-term fiscal sustainability. And the challenge remains for the Japanese financial system to contribute to a still-needed revival of economic dynamism and higher potential growth in the Japanese economy, which is under considerable downward pressure because of a rapidly aging population.[6]

[6]See IMF (2012b, 2012c) for more details.

to governments and large corporations. Yet another study examining crisis periods, Detragiache and Gupta (2004), shows that the most relevant differences in performance during the Asian crisis are not based on the differences between foreign and domestic banks, but between subsidiaries of foreign banks whose operations were not concentrated in Asia and other banks, suggesting that foreign banks that are more "embedded" in a region are likely to help the economy perform better than others. Overall, the more committed foreign banks are to the host country the better is economic performance.

Ratio of Other Interest-Bearing Liabilities to Total Liabilities

- The ratio of other interest-bearing liabilities to total liabilities (as a proxy for nontraditional bank intermediation) is positively associated with financial stress in emerging economies (Table 4.3, and Table 4.5 in Annex 4.2).
- This ratio is negatively (positively) associated with economic growth (growth volatility) in the full sample and in advanced economies (Table 4.3, and Table 4.6 in Annex 4.2).

These results suggest that nontraditional funding structures that depend on other interest-bearing liabilities may be unfavorable to economic outcomes.

Further analysis also shows that the effects of the buffer variables are nonlinear (Table 4.3, and Table 4.6 in Annex 4.2). For instance, up to a certain threshold, higher capital buffers tend to be related to higher economic growth, but beyond that threshold they can be associated with lower growth. The threshold in this exercise should not be viewed as a prudential maximum since what may be an appropriate set of buffers for a specific country will depend on the ability of its financial institutions to manage risk properly and the incidence and size of shocks to which it is subject. In any event, the thresholds for the capital buffers are in all cases above 25 percent and most of the countries that exceed the thresholds were low-income or emerging economies.

Applying the multivariate regression exercise to advanced and emerging economies separately shows some differences between the two groups (see Table 4.3, and Tables 4.5 and 4.6 in Annex 4.2). For emerging economies, liquidity buffers play an important role, with the nonlinear relationship to growth (and to growth volatility) confirmed for this subset. Those results were absent for advanced economies. There is also a nonlinear relationship for emerging economies as regards one of the financial globalization variables: at lower levels, the ratio of foreign banks to all banks is associated with higher financial stress, but it is associated with lower stress when it exceeds a certain level in emerging economies.

The model on the probability of banking crises indicates that a more highly concentrated system is associated with a lower probability of banking crises (Table 4.7 in Annex 4.3).[11] This result may be related to the issue of too-important-to-fail: If there is high concentration with only a few important banks, then authorities will be more likely to take action to prevent a banking crisis. It is also consistent with the work that shows that excessive

[11]The measure of a banking crisis is taken from Laeven and Valencia (2010).

Box 4.7. China

China's financial structure has undergone rapid changes as the country moves toward a more commercially oriented financial system, supported by rapid financial development. The current financial structure is still predominantly bank based, with bank assets and private credit accounting for 240 percent of GDP and 140 percent of GDP in 2011, respectively. Though having declined in the last decade, the degree of concentration in the banking sector remains large: The large commercial banks, which are mostly state owned, make up almost half of commercial bank assets, and the assets of each of the four largest banks exceed 20 percent of GDP. The fixed-income market has grown as an alternative funding channel (with total debt securities outstanding amounting to 56 percent of GDP in 2011), but it remains heavily concentrated in public sector securities. The equity market remains relatively small (stock market capitalization amounted to only 46 percent of GDP in 2011), and mainly meets the needs of large enterprises in spite of recent initiatives to encourage securities financing for small and medium-sized enterprises. A notable recent development is the increasing importance of the nonbank financial sector, such as wealth management products, private equity, trust products, and private lending. Though no official estimates exist on the size of the nonbank financial sector, its linkages to the traditional banking system and the real estate sector have been growing.

The rapid financial development and structural changes have been largely supportive of China's rapid growth of GDP through at least two channels. One channel is the increasing number of financial institutions, which make it easier for people to save. The high saving rate supports a high level of investment, which boosts economic growth. Indeed, during the period 2000–11, private saving and investment reached average levels of 41 percent and 42 percent of GDP, respectively. The other channel is a reduction in information asymmetries between savers and investors, which lowers intermediation costs and thus promotes investment. To the extent that the ongoing financial reforms help reduce intermediation costs, this second channel will become increasingly important in sustaining the rapid economic growth.

However, the current financial structure and the governments' role in shaping it may affect the volatility of growth going forward. The dominance of large banks in financial intermediation, against the backdrop of the macroeconomic and institutional environment, has contributed to inefficiencies in credit allocation and a buildup of vulnerabilities. First, the relatively low cost of capital (partly as a result of incomplete interest rate deregulation) spurs excessive investment. Second, underdeveloped capital markets limit the alternatives for corporate funding and placement of household savings. Third, owing to incomplete interest rate deregulation and limited exchange rate flexibility, banks and other market participants lack sufficient incentives to improve their assessment, management, and pricing of risks. This managed approach to deregulation has generated significant downside risks in the form of overcapacity, a capital-intensive means of production, a tendency for asset bubbles, and a periodic need for publicly funded bank recapitalizations—although these have yet to be manifested in large downswings in output.

Going forward, the ongoing international regulatory reforms together with China's domestic financial reforms are expected to reshape China's financial structure. Specifically, the securities markets are expected to play a larger role in financial intermediation, and the banking sector will see more competition with the share of four large commercial banks declining. The Basel III rules will be phased in from 2013, and the capital and liquidity requirements are expected to be fully implemented. Whether these changes will underpin a healthier and more efficient financial system remains to be seen, as vulnerabilities from imbalances remain.

Note: This box was prepared by Tao Sun.

Table 4.3. Summary of Fixed-Effects Panel Estimation Results on Economic Outcomes, 1998–2010

Category of Financial Structure	Financial Structure Variable	Term	Dependent Variable								
			Growth			Volatility			Change in Financial Stress		
			Full Sample	Advanced Economies	Emerging Economies	Full Sample	Advanced Economies	Emerging Economies	Full Sample	Advanced Economies	Emerging Economies
Financial globalization	Share of foreign banks in total number of banks	Linear	−***	−**	−***	+**	+**		+*		+**
		Interaction with crisis	−*	−**	−*	−**	−***				+*
		Linear	−***	−***			+*		+**		+***
		Quadratic[1]									−**
	Ratio of total bank foreign assets to GDP	Linear			−*						
		Interaction with crisis	−**	−**		−**					+***
		Linear	−*	−**		+***	+***		−**		
		Quadratic[1]	+***	+***		−***	−***		+***		
Competition	Lending spread	Linear	+***		+**	−***		−***			
		Interaction with crisis				+**				−**	
		Linear	+*		+*	−***		−**			
		Quadratic[1]				+*					
	Concentration	Linear	+***	+***	+***	−***	−**	−*			
		Interaction with crisis					+**		+***	+**	
		Linear									
		Quadratic[1]									
Financial buffers	Liquid assets/ deposits and short-term funding	Linear	+***		+**						
		Interaction with crisis						−***	+***	+***	
		Linear			+***	−**		−**	−**		−***
		Quadratic[1]			−***	+**		+***	+**		+***
	Equity to total assets	Linear				−**				−***	
		Interaction with crisis				+*			−***	−***	
		Linear	+***					−**			
		Quadratic[1]	−***					+**			
Nontraditional bank intermediation	Ratio of other earning assets to total assets	Linear	+***								
		Interaction with crisis			−**			+***	+*	+*	
		Linear					+*				
		Qudratic[1]					−*				
	Ratio of other interest-bearing liabilities to total liabilities	Linear							+*		+**
		Interaction with crisis			+**			−***			
		Linear	−**	−**		+***	+***	+*	+*	+*	+***
		Qudratic[1]	+*	+**		−***	−***				−***

Source: IMF staff estimates.

Note: This table summarizes the results of the fixed-effects panel estimation on growth, growth volatility, and financial stress. For each variable, the first two rows represent the coefficients in the interaction specification (see Table 4.5) while the third and fourth rows represent the coefficients in the quadratic specification (see Table 4.6). +/- indicate the sign of estimated coefficients. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels of confidence based on robust standard errors. For the definition of dependent variables and independent variables, see Tables 4.1 and 4.4, respectively. For sample countries, see Annex 4.2.

[1]Square of financial structure measures.

competition can lead to excessive risk-taking by institutions that aim to maintain a high return on equity or profitability.

Policy Implications

This chapter has tried to bring empirical methods to bear to investigate the relationship between financial structures and economic outcomes. It has found some relationships that are statistically significant, but before summarizing these findings and attempting to draw some general policy implications, it is useful to remind ourselves of the limitations of the investigation.

First, the period under study was relatively short. Detailed data on many measures of financial structures has been available only since the late 1990s, limiting the time series substantially; for example, it did not include a number of business cycles, which would be desirable to make inferences about the long-term relationship between financial structures and economic activity. As we go forward and longer data series become available, additional analysis may make it possible to draw more definite conclusions.

Second, the period under study was exceptional in that it included a very severe financial crisis. While the empirical setup attempted to take account of its effects, the crisis and the policy measures taken to combat it probably affect the results. In some cases, the sequence of events is crucial and may distort apparent causality. For example, during the upswing, growth accelerated and financial institutions facing high demand for credit were able to expand lending spreads. Even though these events happened simultaneously, there may be no contemporaneous causality that would suggest that a more lucrative banking sector leads to better growth performance. This shows that the interpretation of the results needs to carefully take into account the specific economic and financial context, as is done below.

Third, there are important data gaps that hamper the analysis. As discussed in Chapter 3, the available measures are incomplete and can only proxy for the true financial structure. It is therefore important to consider exactly for which relationship the proxy data are being used and we need to keep asking ourselves whether it is telling the whole story. Also in this case, more extensive, timely, and accurate data would allow more definite conclusions to be drawn on the relationship between financial structures and economic outcomes.

Extensive care was taken in the empirical analysis to take account of these limitations. In the end, the following sets of results appear robust—across various specifications that were used, as well as across time, and across countries (or within subsets of countries), and with or without outliers:

- Some features can enhance the effectiveness and resilience of a financial system and thus contribute to better economic outcomes. The main features that have these beneficial effects are capital and liquidity buffers. The analysis showed this most clearly for emerging economies; the effect was not significant for advanced economies. This is not as surprising as it may seem: it became clear in the financial crisis that the measured capital and liquidity buffers that we thought were in place in advanced economies were not large enough nor of sufficiently high quality, did not offer the liquidity and solvency protection they were supposed to provide, and had to be raised in the subsequent period of economic downturn.[12] Buffers in emerging economies were larger and were consistently of higher quality and protected these financial systems more effectively from instability.
- Some features that improve the resilience of a financial system can adversely interact with economic outcomes once they exceed a certain threshold. Capital and liquidity buffers are a case in point. While these financial buffers generally tend to help economic outcomes, the analysis found that beyond certain (fairly high) levels in low-income and emerging economies, they may be associated with lower economic growth, higher volatility of economic growth, and higher financial stress. This result is generally in line with findings of the Basel Committee on Banking Supervision (BCBS, 2010) on the diminishing benefits of buffers. A similar result has also been found in other studies for the influence of

[12]Alternatively, the insignificant relationship could reflect the notion that crisis intervention measures substitute for the use of the buffers in past advanced economy crises, serving to cushion economic growth and its volatility.

credit-to-GDP ratio on economic volatility (see Box 4.1).

- Some features of a financial system appear to make it more susceptible to financial instability and to poor economic outcomes. These features include a higher level of nontraditional bank intermediation and a high share of foreign banks in the financial sector. This is where a careful interpretation of the results is important: they do *not* imply that nontraditional bank intermediation and financial globalization are not beneficial. Instead, they suggest that there are some costs to foreign bank presence—particularly in a period leading up to and including severe financial distress. Some previous empirical work suggests that foreign banks' positive role is most likely when those banks are well managed, know their local customer base, and have a commitment to the economy or region.

Keeping in mind the caveats mentioned above, the following tentative policy conclusions emerge:

- *Regulatory policies that promote financial buffers help economic outcomes, but they need to consist of high-quality capital and truly liquid assets.* The regulatory initiatives to enhance liquidity management and capital requirements as encompassed in Basel III go in the right direction. That said, buffers beyond certain high levels may hurt growth by limiting credit intermediation, although the number of countries in the sample that exceeded the thresholds were small and typically were low-income countries with traditionally high capital buffers and a large proportion of liquid assets in the form of government debt. The thresholds implied by the models here should not be interpreted as prudential maximums as they will vary according to the strength of the financial system, the type of economy, and the nature and size of typical shocks.
- *In order to reap the benefits of financial globalization and nontraditional bank intermediation, these phenomena need to be well managed.* Global regulations should avoid incentives that may exacerbate the volatility of cross-border flows. Supervisory colleges or other means of discussing the cross-border business activities of financial institutions could go some way to ensuring foreign banks play a positive role in host countries even in times of stress. And a robust cross-border resolution regime could help relieve disruptive unwinding of global institutions. At a minimum, oversight arrangements should be put in place that allow for a more careful monitoring of these aspects of financial structures. Additional information about cross-border relationships within and between financial institutions as well as monitoring exercises such as those performed by the Financial Stability Board on shadow banking is welcome. Further work could usefully explore in more detail how financial globalization and nontraditional bank intermediation (such as non-deposit funding structures of banks) may influence economic outcomes.
- *Competition and concentration measures are often too influenced by regulatory, supervisory, and macroeconomic policies to use them to assess their direct relationship with economic outcomes.* Some of the results suggest bank concentration is associated with higher economic activity and lower financial stress, but this could be consistent with policies that in effect permit banks to become too-big-to-fail, allowing them to grow large alongside the economy and with sufficient profits to keep financial stress at bay. It is also possible that too much competition (the "opposite" of concentration) is damaging to growth and financial stability if it encourages (and if supervisors allow) excessive risk-taking behavior. In either case, policymakers should be aware that there are potential trade-offs between growth and stability that depend on competition in the banking sector in perhaps complicated ways. Hence, to evaluate the longer-run prospects for both a healthy financial system and economic stability a broader discussion about the role played by financial sector concentration is in order.
- *No particular financial system model can ensure the best economic outcomes under all circumstances.* In other words, there exists no optimal (or one-size-fits-all) recipe for the structural make-up of the financial sector to generate growth and maintain financial and economic stability. What appears to work well in one period or circumstance may not do so during different times. Indeed, complacency

and over-confidence regarding a particular type of financial structure may well plant the seeds for future financial instability—a lesson to be learned from past experience.

- *The policy implications may depend on countries' preferences regarding the trade-off between the safety of financial systems and economic growth.* For instance, our case study of China suggests that a preference for remaining somewhat isolated in terms of foreign-bank presence may have helped to protect the domestic economy from volatility, at least so far.

Finally, whatever financial regulatory measures are adopted to enhance growth and stability, they are likely to be effective only if they are implemented correctly—the quality of (domestic *and* global) regulation and supervision is essential. Hence, this chapter should be interpreted as a first, tentative step in showing that some elements of financial structure do indeed have an effect on economic activity, its volatility, and financial stress—some positive and some negative. A deeper understanding of these relationships will allow policy responses to help improve economic outcomes.

Annex 4.1. What Does the Literature Say About the Relationship between Financial Structures and Economic Outcomes?

A rich theoretical and empirical literature exists on the relationship between financial and economic outcomes. It has focused mostly on financial development—using proxies of size of financial systems—and less on financial structures. This annex reviews what the literature tells us about these various relationships.

Financial Development and Growth

There have long been two schools of thought with sharply differing perspectives on the potential importance of finance. On the one hand, economists such as Schumpeter (1911), Goldsmith (1969), and McKinnon and Shaw (1973) saw financial intermediaries and markets as playing a key role in economic activity and growth. A battery of models articulates the mechanisms through which the financial system may affect long-term growth, stressing that financial markets enable small savers to pool funds, that these markets allocate investment to the use with the highest return, and that financial intermediaries partially overcome problems of adverse selection in credit markets. Empirically, researchers have shown that a range of financial indicators for size, depth, and functioning are robustly positively correlated with economic growth. For instance, Levine (2005) showed that deep and well-functioning financial systems are associated with higher long-term growth. On the other hand, Robinson (1952) believed that the causality was reversed. Economies with good growth prospects develop institutions to provide the funds necessary to support those good prospects. In other words, in this view, the economy leads, and finance follows. Lucas (1988) also dismissed the finance–economic growth relationship, stating that economists "badly over-stress" the role that financial factors play in economic growth.

Financial Development and Growth Volatility

A large body of theoretical and empirical evidence suggests that larger and deeper financial systems help diversify risk and reduce the vulnerability of the economy to external shocks, thus smoothing output volatility. Easterly, Islam, and Stiglitz (2000) suggest that financial depth (as measured by the ratio of private credit to GDP) reduces volatility up to a point, but too much private credit can increase volatility. Rancière, Tornell, and Westermann (2008) argue that countries with large financial sectors feature both higher growth and higher volatility. Moreover, Dabla-Norris and Narapong (forthcoming) summarize the theoretical literature that outlines various mechanisms through which financial development can affect macroeconomic volatility. Aghion, Banerjee, and Piketty (1999) develop a theoretical model that combines financial market imperfections and unequal access to investment opportunities. They show that economies with poorly developed financial systems tend to be more volatile, as the demand for and supply conditions for credit tend to be more deeply cyclical. Empirically, Aghion and others (2010) find that deep financial systems can alleviate liquidity constraints on firms and facilitate long-term investment, reducing the volatility of investment and growth. In the same vein, Raddatz (2006) finds that in countries with underdeveloped financial systems, sectors with larger liquidity needs are more volatile and their economies experience deeper crises. Similarly, access to bank finance dampens the volatility of output at the industrial level owing to countercyclical borrowing by financially constrained sectors (Larrain, 2006). Evidence at the household level suggests that access to financial services allows for greater risk smoothing (i.e., lessening the deviations of realized income from mean income). Dabla-Norris and Narapong (forthcoming) also investigate the relationship between volatility and financial development in both advanced and developing economies (see Box 4.1).

Financial Structure and Growth

In considering the importance of financial structure for economic growth, economists have tended to focus on whether bank-based or market-based financial systems are more conducive to growth, with inconclusive results. Those who argue for the superiority of bank-based systems emphasize the advantages that banks and other intermediaries have

in information acquisition and relationship formation (Grossman and Hart, 1980; Stiglitz, 1985; Bhide, 1993; Allen and Gale, 2000). However, proponents of market-based systems argue that bank-based systems tend to include intermediaries with monopoly power, and that bank-based systems tend to be more conservative and less flexible in nature (see Rajan, 1992). Still others argue that neither type is more effective than the other at promoting growth; what matters is the financial system's overall level of development (see for example, Rajan and Zingales, 1998).

Empirically, there has been little resounding evidence in favor of either bank-based or market-based systems. Beck and Levine (2004), Demirgüç-Kunt and Maksimovic (2002), and Levine (2003) all suggest that financial structure does not play a decisive role in growth. Others, however, find that after controlling for the effect of overall financial development on growth, the structure of the financial system can still matter. When countries have inflexible judicial systems so that they are less able to adapt laws to changing economic conditions, the degree of bank orientation is positively correlated with long-term economic growth (Ergungor, 2008).

Some in the literature have considered in some depth whether a competitive or monopolistic banking structure is better for promoting growth. Some authors find support for high levels of competition (Jayaratne and Strahan, 1996; Cetorelli and Strahan, 2006; World Bank, 2007), whereas others find that a more oligopolistic system better promotes growth (Jackson and Thomas, 1995; Petersen and Rajan, 1995). As for financial stability, Allen and Gale (2004) argue that excessive risk taking is contained when banks enjoy monopoly power, while Boyd and De Nicolò (2005) argue that monopoly power lowers borrowing firm profitability and incentivizes firms to take excessive risk. Borrowing firm profitability may depend on industrial development stage. In early stages, firm profitability can be higher with larger investments of other firms (e.g., nineteenth century railroads and, more recently, the dot-com boom). In such cases, financial intermediaries compete (if allowed) to facilitate investments, resulting in higher growth and more stability (Ueda, forthcoming).

Financial Structure and Stability

There are two main dimensions of stability that matter: the volatility of economic growth and financial stability. Most research has been concerned with the volatility of economic growth, that is, the effect of financial structure on the occurrence of booms and recessions. Two papers analyze the role of the relative importance of equity and debt financing in macroeconomic volatility. Denizer, Iyigun, and Owen (2000) find that a higher share of equity financing leads to greater macroeconomic volatility; Huizinga and Zhu (2006) reach the opposite conclusion. There has been some research related to financial structure and financial stability. For instance, Rajan (2005) posits that the increasing complexity of the modern financial system may create more financial-sector-induced procyclicality than in the past, and create a great probability of a catastrophic meltdown.

Some authors investigate the relationship between financial structure and financial stability. Barrell and others (2010a, 2010b) and Kato, Kobayashi, and Saita (2010) expand existing work on early warning systems for banking crises to include buffer measures like capital and liquidity. They find that higher buffers markedly reduce the probability of a banking crisis. Lund-Jensen (2012) finds that financial interconnectedness, proxied by ratio of noncore to core bank liabilities, has a positive significant impact on the probability of a systemic banking crisis. Additionally, the BCBS (2010) report on the long-term economic impact of stronger capital and liquidity requirements studies how higher buffers may reduce the amplitude of normal business cycles. In another study, Rosengren (2012) finds that certain financial structures (taking the presence of money market mutual funds and broker-dealers as aspects of structure) can make the financial system vulnerable to stresses.

The aim of this chapter differs from seemingly similar work (IMF, 2006), which focused on comparing the economic cycle dynamics associated with "arms-length" versus "relationship-based" financial systems. Still, the work reported in the September 2006 *World Economic Outlook* (IMF, 2006) was influential regarding the choice of variables used in this chapter. That work also abstracts from the detailed financial and regulatory factors considered here.

Annex 4.2. Econometric Study on Financial Structures and Economic Outcomes: Data, Methodology, and Detailed Results

Cross-country panel regression models were used to relate economic outcomes (real GDP per capita growth, volatility of real GDP per capita growth, and financial stress) to financial structures and a set of controls, country fixed effects, and common time effects.

Data and Methodology

Panel fixed-effects data models are employed to examine the relationships between financial structures and economic outcomes, using annual data during 1998–2010.

A "baseline" regression relates economic outcomes to financial structures and a set of controls. In addition, we include an interaction term between the financial structure variable being examined and a crisis dummy indicating whether a given country is undergoing a banking crisis. The purpose is to explore the possible differences in their relationships between good times and crisis periods.

The baseline regression is then augmented to investigate the presence of nonlinearities in the relationship between financial structures and economic outcomes. We allow for these nonlinear effects by including a second-degree polynomial specification for the financial structure variables.

The fixed-effects panel regressions are run on available data in a sample of 58 economies during the 1998–2010 period:[13]

- *Advanced economies*: Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong SAR, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Portugal, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, the United Kingdom, and the United States
- *Emerging economies*: Brazil, Bulgaria, China, Colombia, Costa Rica, Croatia, Guyana, Hungary, India, Indonesia, Lithuania, Malaysia, Mexico, Moldova, Nicaragua, Peru, Philippines, Poland, Romania, Russia, South Africa, Suriname, Thailand, Turkey, and Ukraine

To determine whether the relationship between financial structures and economic outcomes differs depending on different levels of economic development, the analysis is also conducted separately for each group of economies. Also, to control for the level of development the GDP per capita level was introduced, but it did not gain significance, as the fixed effect captured this concept in the cross-section of countries.

The dependent variables and "control" independent variables in the regressions are shown in Table 4.4. The independent variables related to financial structure measures are listed in Table 4.1.

Most of the variables related to financial structure and analyzed in Chapter 3 were included in the regressions, but many of these variables were not consistently statistically significant. Insignificant variables included the ratios of noninterest income to total income, interbank assets to total assets, interbank liabilities to total liabilities, loans and bonds held by nonbanks to loans and bonds held by the financial sector, and loans and bonds held by banks to the overall financial sector. Net interest margin and the transparency (disclosure) of financial information had inconsistent results, which may be due to limitations in the data.

In addition, we used the indices developed in Chapter 3 in the regressions. However, the results were not as statistically significant as the individual variables. This may reflect the potential loss of information in such aggregated indexes.

Finally, panel GMM (generalized method of moments) regressions are employed to further examine the relationships between financial structures and economic outcomes, using annual data during 1998–2010. The results are broadly in line with those in fixed-effects models presented below.

Note: Prepared by Ken Chikada, Tom Gole, and Tao Sun.

[13]The group of advanced and emerging economies is defined in the *World Economic Outlook*. The 1998 starting date is chosen as this is the year in which there are enough data available regarding most of the structural variables to allow panel estimation.

Table 4.4. List of Variables Used in Regression Analysis

Concept	Variables	Source
	Dependent Variables	
Output growth	Growth rate of real GDP per capita	IMF, World Economic Outlook database
Growth volatility	Standard deviation of real GDP per capita growth, computed on a backward-looking five-year rolling window	IMF, World Economic Outlook database
Financial stress	Financial stress index (FSI) built using market-based indicators in real time and at high frequency. The FSI for each country is constructed as an average of three banking-related variables, three securities-market-related variables, and one foreign exchange variable.[1]	IMF staff estimates
	Macroeconomic and Institutional Control Variables	
Lagged value of the dependent variable	Lagged value of the dependent variable (see above)	See above
Inflation	CPI inflation rate	IMF, World Economic Outlook database
Government debt	Government debt-to-GDP ratio	IMF, World Economic Outlook database
Government consumption	Government consumption-to-GDP ratio	IMF, World Economic Outlook database
Trade openness	Sum of imports and exports-to-GDP ratio	IMF, World Economic Outlook database
Institutional quality (government stability)	Composite index of individual country risk guide	The PRS Group, ICRG database
Output gap	Difference between nominal GDP and potential GDP relative to potential GDP (scaled by 100)	IMF, World Economic Outlook database

Source: IMF staff.

[1]See Cardarelli, Elekdag, and Lall (2011); and Balakrishnan and others (2009).

Results

Fixed-Effects Panel Regressions with Interaction Terms

To investigate the possible differences between financial structures and economic outcomes during both good times and crisis periods, we run fixed-effects panel regressions with interaction terms (Table 4.5).

Results for Growth

- A larger share of foreign banks in the domestic banking sector is associated with lower economic growth. This result is robust in the full sample as well as separately for advanced and emerging economies. However, these relationships weaken when regressions are run using a sample that includes only data prior to 2007. Similarly, the interaction terms with crises are also significant in advanced economies, suggesting that having a banking sector with a high share of foreign banks is associated with poor outcomes during crisis periods. This difference between precrisis and crisis periods indicates a potentially destabilizing role played by foreign banks during the crisis as they could—and were sometimes forced to—deleverage and retrench relatively quickly.
- The ratio of liquid assets to deposits and short-term funding is positively associated with economic growth in the full sample and in emerging economies, suggesting a positive role for liquidity buffers, possibly driven by the relatively larger emphasis on emerging economies.
- The lending spreads are positively related to growth in the full sample and in emerging economies, which suggests that good growth and profitable commercial lending go together.
- The bank concentration ratio is positively associated with economic growth in the full sample and separately in each economy group. This result could have several interpretations, including that positive growth allows the already dominant banks to remain so and even become more dominant.

Results for Volatility

- The share of foreign banks in the domestic banking sector is positively associated with volatility, in the full sample and in advanced economies. The interaction term with crises is negative in the

Table 4.5. Fixed-Effects Panel Estimation with Interaction Term, 1998–2010

Category	Variable	Growth			Volatility			Change in Financial Stress		
		Full Sample	Advanced Economies	Emerging Economies	Full Sample	Advanced Economies	Emerging Economies	Full Sample	Advanced Economies	Emerging Economies
Financial globalization	Share of foreign banks in total number of banks (percent)	–0.212***	–0.181**	–0.229***	0.0322**	0.0350**	0.0174	0.0584*	–0.0165	0.0995**
		(0.0605)	(0.0679)	(0.0648)	(0.0129)	(0.0149)	(0.0267)	(0.0343)	(0.0470)	(0.0343)
	Interaction of banking crisis dummy and share of foreign banks in total number of banks	–0.0326*	–0.0387**	–0.0497*	–0.00633**	–0.00956***	0.000918	–0.0222	–0.0202	0.0244*
		(0.0172)	(0.0176)	(0.0245)	(0.00257)	(0.00230)	(0.00715)	(0.0143)	(0.0315)	(0.0119)
	Number of observations	559	346	213	510	317	193	354	210	144
	R^2	0.483	0.506	0.557	0.621	0.669	0.599	0.373	0.466	0.402
	Ratio of total bank foreign assets to GDP (percent)	–0.00506	–0.00459	–0.403*	0.000244	0.000934	–0.00184	0.00102	0.00344	–0.202
		(0.00557)	(0.00550)	(0.213)	(0.00157)	(0.00169)	(0.0481)	(0.00883)	(0.00955)	(0.140)
	Interaction of banking crisis dummy and ratio of total bank foreign assets to GDP	–0.00211**	–0.00187**	–0.0213	–0.000460**	–0.000320	–0.0200	0.0106	0.00220	1.307***
		(0.000947)	(0.000897)	(0.296)	(0.000212)	(0.000218)	(0.103)	(0.0143)	(0.0131)	(0.232)
	Number of observations	429	277	152	389	252	137	256	169	87
	R^2	0.412	0.465	0.551	0.631	0.669	0.611	0.439	0.519	0.524
Competition	Lending spread (lending rate minus deposit rate, percentage points)	0.198***	0.258	0.178**	–0.0813***	–0.0453	–0.0766***	–0.119	–0.242	–0.0874
		(0.0720)	(0.293)	(0.0659)	(0.0177)	(0.106)	(0.0164)	(0.135)	(0.434)	(0.128)
	Interaction of banking crisis dummy and lending spread	–0.285	–0.553	–0.140	0.171**	0.0617	0.0996	–0.197	–1.854**	–0.0915
		(0.204)	(0.517)	(0.173)	(0.0650)	(0.0887)	(0.0734)	(0.212)	(0.821)	(0.120)
	Number of observations	426	219	207	397	208	189	256	130	126
	R^2	0.396	0.436	0.444	0.586	0.636	0.582	0.335	0.419	0.384
	Asset concentration for top three banks (percent)	0.0822***	0.0752***	0.0952***	–0.0135***	–0.0142**	–0.0129*	–0.00653	0.000984	–0.0118
		(0.0193)	(0.0204)	(0.0291)	(0.00411)	(0.00619)	(0.00717)	(0.0105)	(0.0160)	(0.0185)
	Interaction of banking crisis dummy and asset concentration for top three banks	0.0150	0.00553	0.0602	–0.000763	0.00915**	0.00507	0.0647***	0.0657**	–0.0164
		(0.0197)	(0.0301)	(0.0614)	(0.00520)	(0.00416)	(0.0100)	(0.0171)	(0.0248)	(0.0220)
	Number of observations	548	328	220	500	300	200	350	207	143
	R^2	0.423	0.462	0.470	0.609	0.666	0.586	0.379	0.474	0.380
Financial buffers	Liquid assets/deposits and short-term funding (percent)	0.0406***	0.0218	0.0870**	0.000865	–0.000661	0.00402	0.00495	0.00943	–0.00302
		(0.0141)	(0.0149)	(0.0318)	(0.00587)	(0.00597)	(0.0136)	(0.0142)	(0.0164)	(0.0249)
	Interaction of banking crisis dummy and liquid assets/deposits and short-term funding	0.0100	0.0108	0.0811	–0.00175	0.00783	–0.0318***	0.0696***	0.0706***	0.0309
		(0.0222)	(0.0222)	(0.0546)	(0.00669)	(0.00657)	(0.0112)	(0.0207)	(0.0216)	(0.0245)
	Number of observations	572	342	230	522	313	209	353	210	143
	R^2	0.393	0.432	0.480	0.590	0.657	0.558	0.384	0.489	0.377
	Ratio of equity to total assets (percent)	0.0506	0.0305	0.0494	–0.0129**	–0.00396	–0.0349	–0.0166	–0.0268***	–0.00907
		(0.0345)	(0.0265)	(0.0424)	(0.00630)	(0.00700)	(0.0232)	(0.0129)	(0.00619)	(0.0271)
	Interaction of banking crisis dummy and ratio of equity to total assets	–0.0575	–0.120	–0.133	0.0304*	–0.00287	0.0430	–0.463***	–1.306***	–0.0857
		(0.0512)	(0.0839)	(0.270)	(0.0175)	(0.0162)	(0.0536)	(0.150)	(0.178)	(0.149)
	Number of observations	577	346	231	527	317	210	354	210	144
	R^2	0.378	0.429	0.417	0.594	0.655	0.565	0.386	0.506	0.377
Nontraditional bank intermediation	Ratio of other earning assets to total assets (percent)	0.0569***	0.0459	0.0557	–0.00917	–0.000762	–0.0221	0.0256	0.0282	–0.00426
		(0.0210)	(0.0278)	(0.0356)	(0.00654)	(0.00680)	(0.0149)	(0.0161)	(0.0260)	(0.0227)
	Interaction of banking crisis dummy and ratio of other earning assets to total assets	0.0331	0.0342	–0.305**	0.00282	0.000476	0.169***	0.0549*	0.0594*	–-0.0466
		(0.0313)	(0.0326)	(0.114)	(0.00838)	(0.00927)	(0.0596)	(0.0299)	(0.0329)	(0.0653)
	Number of observations	462	269	193	415	242	173	305	174	131
	R^2	0.454	0.490	0.499	0.580	0.670	0.513	0.421	0.492	0.398
	Ratio of other interest-bearing liabilities to total liabilities (percent)	–0.0145	–0.0188	–0.0124	0.0116	0.00700	0.0342	0.0377*	0.0275	0.0973**
		(0.0212)	(0.0219)	(0.0385)	(0.00772)	(0.00744)	(0.0240)	(0.0190)	(0.0179)	(0.0434)
	Interaction of banking crisis dummy and ratio of other interest-bearing liabilities to total liabilities	0.0314	–0.0139	0.117**	–0.000111	0.0141	–0.0792***	0.0196	0.0273	–0.0311
		(0.0405)	(0.0376)	(0.0515)	(0.0107)	(0.0102)	(0.0149)	(0.0242)	(0.0384)	(0.0368)
	Number of observations	442	266	176	396	239	157	302	173	129
	R^2	0.450	0.479	0.539	0.597	0.672	0.523	0.425	0.488	0.442

Source: IMF staff estimates.

Note: This table summarizes the results of fixed-effects panel estimation of growth, growth volatility, and financial stress. Standard errors are shown under the estimated coefficients. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels of confidence based on robust standard errors, with 5 percent and 1 percent levels shown in shaded cells. For the definition of dependent variables and independent variables, see Tables 4.1 and 4.4, respectively. For sample countries, see Annex 4.2.

full sample and advanced economies, suggesting that this positive relationship turns negative if a country is in a banking crisis.
- The relationship between the foreign assets of domestic banks and volatility is not statistically significant in any of the samples. However, the interaction term with crises is significant and negative for the full sample. This may suggest that in times of crisis having large overseas assets could help reduce growth volatility, but the effect is negligible as the coefficient is not economically significant.
- The ratio of liquid assets to deposits has a largely insignificant relationship with economic volatility. For emerging economies, however, the interaction term for liquid assets ratio is significant and negative, suggesting that in times of crisis liquid assets may lower volatility. In the full sample, a higher ratio of equity to total assets is associated with lower volatility.
- The lending spreads have a relationship with volatility that depends on the state of the economy. In noncrisis periods, a higher spread is associated with lower volatility, which may reflect the potentially stabilizing effects of limited competition in the banking sector. However, during crisis periods the higher spread is associated with higher volatility.
- Higher concentration in the banking sector is associated with lower economic volatility in the full sample and in advanced economies.

Results for Financial Stress

- The share of foreign banks in the total number of banks is significant and positive for emerging economies. This indicates that emerging economies are more susceptible to stress related to foreign banks.
- Concentration in the banking sector is insignificant in the full sample, suggesting a limited role for concentration in reducing financial stress. However, the interaction terms are significant and positive in the full sample and advanced economies. This suggests that concentration does not matter much under normal circumstances but increases financial stress in times of banking crisis.

Fixed-Effects Panel Estimation with Quadratic Term

To investigate the possibility of a nonlinear relationship among some variables, we use a second-degree polynomial (quadratic) approximation for the relations, using fixed-effects panel regressions (Table 4.6).

Results for Growth

- The ratio of liquid assets to deposits and short-term funding is associated with higher growth in emerging economies, and the ratio of equity to total assets is associated with higher growth in the full sample. However, the quadratic term is of the opposite sign, suggesting that the link between the level of financial buffers and positive economic outcomes weakens as buffers accumulate. The thresholds are quite high, approximately 74 percent for liquidity buffers and 25 percent for capital buffers, suggesting any dampening economic effect occurs only after these buffers are more than high enough to act as prudential buffers and begin to constrict a bank's normal intermediation activities.
- The ratio of other interest-bearing liabilities to total liabilities is negatively associated with economic growth in the full sample and in advanced economies. This may suggest that a funding structure that depends on other interest-bearing liabilities is unfavorable to economic growth.
- The share of foreign banks in the domestic banking system is negatively related to growth in the full sample and in advanced economies. This is in line with the results in the panel regressions with interaction terms.

Results for Growth Volatility

- In the full sample and advanced economies, greater foreign asset holdings by domestic banks is associated with higher economic volatility, but is associated with lower volatility beyond a certain point.
- A higher level of liquid assets is associated with lower economic volatility in the full sample and in emerging economies. However, beyond a certain point, higher liquidity buffers could increase the volatility, reflecting the possible adverse impact of

Table 4.6. Fixed-Effects Panel Estimation with Quadratic Term, 1998–2010

Category	Variable	Growth			Volatility			Change in Financial Stress		
		Full Sample	Advanced Economies	Emerging Economies	Full Sample	Advanced Economies	Emerging Economies	Full Sample	Advanced Economies	Emerging Economies
Financial globalization	Share of foreign banks in total number of banks (percent)	–0.291***	–0.281***	–0.119	0.0301	0.0348*	–0.0219	0.109**	–0.0395	0.180***
		(0.0766)	(0.0886)	(0.0810)	(0.0233)	(0.0181)	(0.0420)	(0.0513)	(0.0891)	(0.0390)
	Square of share of foreign banks in total number of banks	0.000832	0.00100	–0.00144	1.67e–05	3.41e–06	0.000486	–0.000898	–5.48e–05	–0.00107**
		(0.00121)	(0.00119)	(0.00103)	(0.000202)	(0.000238)	(0.000303)	(0.000674)	(0.00159)	(0.000503)
	Number of observations	559	346	213	510	317	193	354	210	144
	R^2	0.457	0.481	0.552	0.620	0.667	0.599	0.307	0.412	0.403
	Ratio of total bank foreign assets to GDP (percent)	–0.0147*	–0.0154**	–0.897	0.00312***	0.00427***	0.152	–0.0291**	–0.0205	–0.185
		(0.00791)	(0.00647)	(0.546)	(0.000934)	(0.000920)	(0.107)	(0.0132)	(0.0179)	(0.592)
	Square of ratio of total bank foreign assets to GDP	4.43e–06***	4.53e–06***	0.0281	–8.57e–07***	–1.00e–06***	–0.00808	0.000129***	8.46e–05	–0.000187
		(1.56e–06)	(1.25e–06)	(0.0220)	(1.85e–07)	(1.75e–07)	(0.00575)	(4.33e–05)	(5.72e–05)	(0.0385)
	Number of observations	429	277	152	389	252	137	256	169	87
	R^2	0.396	0.454	0.554	0.633	0.674	0.612	0.353	0.450	0.476
Competition	Lending spread (lending rate minus deposit rate, percentage points)	0.456*	0.293	0.461*	–0.139***	–0.205	–0.126**	–0.106	–0.284	–0.0841
		(0.236)	(0.494)	(0.256)	(0.0476)	(0.181)	(0.0475)	(0.209)	(0.815)	(0.193)
	Square of lending spread	–0.00808	–0.00215	–0.00841	0.00190*	0.0236	0.00155	0.000364	–0.00770	0.000657
		(0.00505)	(0.0681)	(0.00534)	(0.00102)	(0.0218)	(0.000941)	(0.00215)	(0.167)	(0.00206)
	Number of observations	426	219	207	397	208	189	256	130	126
	R^2	0.384	0.426	0.438	0.585	0.636	0.579	0.277	0.350	0.365
	Asset concentration for top three banks (percent)	0.0767	0.0792	0.0874	–0.0264	0.0156	–0.0685	0.0408	0.0992	0.0310
		(0.0806)	(0.131)	(0.119)	(0.0287)	(0.0365)	(0.0409)	(0.0700)	(0.107)	(0.0937)
	Square of asset concentration for top three banks	4.23e–05	–1.83e–05	4.69e–05	9.46e–05	–0.000202	0.000429	–0.000314	–0.000645	–0.000316
		(0.000578)	(0.000872)	(0.000904)	(0.000203)	(0.000253)	(0.000275)	(0.000500)	(0.000756)	(0.000668)
	Number of observations	548	328	220	500	300	200	350	207	143
	R^2	0.397	0.436	0.454	0.609	0.665	0.586	0.296	0.408	0.377
Financial buffers	Liquid assets/deposits and short-term funding (percent)	0.106	0.0573	0.291***	–0.0353**	–0.00295	–0.0828**	–0.0777**	–0.00953	–0.149***
		(0.0697)	(0.0720)	(0.0605)	(0.0153)	(0.0141)	(0.0297)	(0.0381)	(0.0716)	(0.0325)
	Square of liquid assets/deposits and short-term funding	–0.000667	–0.000355	–0.00196***	0.000356**	2.96e–05	0.000781***	0.000828**	0.000283	0.00131***
		(0.000589)	(0.000643)	(0.000466)	(0.000146)	(0.000153)	(0.000232)	(0.000319)	(0.000680)	(0.000241)
	Number of observations	572	342	230	522	313	209	353	210	143
	R^2	0.373	0.407	0.516	0.597	0.656	0.586	0.318	0.417	0.447
	Ratio of equity to total assets (percent)	0.121***	0.0657	0.0538	–0.0160	0.00645	–0.149**	–0.0338	–0.0927	–0.132
		(0.0423)	(0.0444)	(0.201)	(0.0185)	(0.0225)	(0.0551)	(0.0464)	(0.0603)	(0.112)
	Square of ratio of equity to total assets	–0.00136***	–0.000683	–0.000351	8.20e–05	–0.000150	0.00249**	0.000172	0.000728	0.00251
		(0.000429)	(0.000405)	(0.00345)	(0.000206)	(0.000234)	(0.000988)	(0.000511)	(0.000666)	(0.00201)
	Number of observations	577	346	231	527	317	210	354	210	144
	R^2	0.360	0.404	0.405	0.593	0.655	0.570	0.302	0.418	0.379
Nontraditional bank intermediation	Ratio of other earning assets to total assets (percent)	0.111	0.0391	0.180	0.0241	0.0732*	–0.0193	0.0124	0.0235	0.0357
		(0.101)	(0.150)	(0.148)	(0.0238)	(0.0406)	(0.0259)	(0.0777)	(0.140)	(0.0827)
	Square of ratio of other earning assets to total assets	–0.000583	0.000102	–0.00150	–0.000367	–0.000775*	–2.85e–05	0.000198	6.66e–05	–0.000542
		(0.00100)	(0.00145)	(0.00163)	(0.000243)	(0.000404)	(0.000339)	(0.000927)	(0.00158)	(0.000821)
	Number of observations	462	269	193	415	242	173	305	174	131
	R^2	0.427	0.463	0.483	0.582	0.683	0.503	0.331	0.415	0.384
	Ratio of other interest-bearing liabilities to total liabilities (percent)	–0.0873**	–0.117**	0.000233	0.0442***	0.0456***	0.0994*	0.0673*	0.0736*	0.264***
		(0.0332)	(0.0447)	(0.121)	(0.0113)	(0.0105)	(0.0539)	(0.0362)	(0.0359)	(0.0809)
	Square of ratio of other interest-bearing liabilities to total liabilities	0.00112*	0.00132**	–0.000236	–0.000513***	–0.000548***	–0.00244	–0.000361	–0.000586	–0.00572***
		(0.000587)	(0.000556)	(0.00352)	(0.000116)	(0.000114)	(0.00160)	(0.000446)	(0.000406)	(0.00188)
	Number of observations	442	266	176	396	239	157	302	173	129
	R^2	0.430	0.476	0.513	0.608	0.687	0.520	0.345	0.429	0.448

Source: IMF staff estimates.

Note: This table summarizes the results of fixed-effects panel estimation of growth, growth volatility, and financial stress. Standard errors are shown under the estimated coefficients. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels of confidence based on robust standard errors, with 5 percent and 1 percent levels shown in shaded cells. For the definition of dependent variables and independent variables, see Tables 4.1 and 4.4, respectively. For sample countries, see Annex 4.2.

excess requirements on holdings of liquid assets. A similar pattern exists for the ratio of equity to total assets in emerging economies.

Results for Financial Stress

- The share of foreign banks is positively associated with changes in financial stress in the full sample and in emerging economies. The ratio of total bank foreign assets to GDP is negatively associated with changes in the financial stress in the full sample, suggesting a role for bank foreign assets in smoothing financial stress.
- A higher ratio of liquid assets to deposits and short-term funding is associated with lower financial stress in the full sample and in emerging economies. But this relationship may reverse beyond a certain point in line with its relationship with volatility.
- The ratio of other interest-bearing liabilities to total liabilities is positively associated with financial stress in emerging economies.

For the two models, these results represent those for which the results were either statistically significant across a number of specifications of both the fixed-effects model and the GMM estimation technique or, in some instances, maintained constant signs across specifications. Further, the regressions were also run with a range of approaches to removing outliers, with little change in the results.

Annex 4.3. Financial Structure Variables and the Probability of Banking Crises: Data, Methodology, and Detailed Results

This Annex draws on the methodology in the September 2011 GFSR to study the relationship between financial structure variables and the probability of banking crises.

Data and Methodology

The probability of a banking crisis is estimated with a probit panel data model with country fixed effects:[14]

$$Pr(y_{i,t} = 1|x_{i,t-h}) = \Phi(\alpha_i + x_{i,t-h}\theta)$$

where $y_{i,t}$ denotes a binary banking crisis variable; $x_{i,t-h}$ is a row vector of indicator variables; α_i denotes the fixed effect for country i; Φ is the cumulative distribution function of a standard normal distribution; and θ is a column vector of unknown parameters to be estimated. Note that all the indicator variables are known at time $t - h$. This analysis considers forecast horizons at one, two, and three years.

We adopt the Laeven and Valencia (2010) definition under which a banking crisis is systemic if two conditions are present: (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.

The basic specification above, in which the growth in equity prices and the change in the ratio of credit to GDP are explanatory variables, is expanded to include two additional sets of variables: macroeconomic controls and financial structure variables.[15] The macroeconomic controls include the change in the real effective exchange rate, the growth rate of real GDP, and the ratio of the current account balance to GDP.[16]

The financial structure variables are (1) bank interconnectedness, measured as the ratio of interbank deposit assets to total assets; (2) the net interest margin; and (3) bank concentration, measured as the three-bank asset concentration ratio. The main challenge is that the time coverage of these three financial structure variables is rather limited, which reduces the number of crises covered in the sample.

Results

The results on the extended specification with financial structure variables (Table 4.7) show that the coefficients on "equity growth" and "change in credit to GDP" are mostly significant and roughly stable. The growth rate of real GDP and the ratio of current account balance to GDP are significant at some lag specification. Specifically:

- The coefficient on the net interest margin is negative and significant at one lag, suggesting that a higher interest rate margin (less competition) is associated with a lower probability of banking crises.
- The coefficient on concentration is negative and significant at two lags, suggesting that a higher concentration (possibly related to "too important to fail" or to excessive risk taking that may be associated with high competition) is associated with a lower probability of banking crises.
- The coefficient on interconnectedness is positive and significant at one and three lags, suggesting that a higher degree of interconnectedness is associated with a higher probability of banking crises.

As a robustness check, a logit model with fixed effects was also estimated. In such a model, the bank concentration ratio has a negative and significant association with the probability of a banking crisis. The estimated coefficients for net interest margin and interconnectedness are insignificant.

Note: Prepared by Nicolas Arregui.

[14]Probit models with fixed effects are subject to the incidental parameters problem (Neyman and Scott, 1984; Lancaster, 2000). Heckman and MaCurdy (1980) found that, for $N = 100$ and $T = 8$, the bias appeared to be on the order of 10 percent. We restrict our database to countries with at least eight years of data. A logit fixed-effect model was also estimated as a robustness check. Results are presented only for the probit model, as it allows for comparability with previous GFSR work.

[15]See the September 2011 GFSR, Chapter 3, Annex 3.2, Table 3.5.

[16]The ratio of the fiscal surplus to GDP was considered but appeared not to be significant at any lag specification, so the results are not included in this Annex.

Table 4.7. Systemic Banking Crises and Financial Structure Variables: Probit Model

	Lag Length (h)														
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Equity growth	–0.000	0.007***	–0.002	–0.001	0.019***	–0.005	–0.009**	0.025***	0.001	0.000	0.007**	–0.004	0.003	0.005	–0.005
	0.488	0.009	0.213	0.352	0.003	0.147	0.042	0.004	0.454	0.456	0.020	0.172	0.154	0.104	0.107
Change in credit to GDP	0.053***	0.036**	0.047***	0.058**	0.050*	0.033*	0.051	0.042	0.100**	0.071**	0.028	0.072***	0.077***	0.031	0.098***
	0.005	0.028	0.010	0.028	0.054	0.075	0.121	0.122	0.011	0.013	0.134	0.009	0.01	0.118	0.004
REER growth				0.020	–0.006	0.008	–0.002	–0.047*	–0.031	0.037	0.006	0.024	0.025	0.013	0.046*
				0.247	0.429	0.378	0.482	0.069	0.171	0.105	0.410	0.185	0.185	0.323	0.061
Real GDP growth				0.195**	0.063	0.038	0.373***	0.184**	0.110*	0.148**	0.083	0.098	–0.028	0.077	0.199**
				0.014	0.238	0.301	0.004	0.016	0.097	0.015	0.113	0.102	0.329	0.126	0.029
Current account to GDP				–0.133*	–0.080	–0.027	–0.260**	–0.091	–0.029	–0.340***	–0.092*	–0.014	–0.227***	–0.075	–0.012
				0.051	0.122	0.475	0.015	0.121	0.339	0.000	0.068	0.411	0.004	0.115	0.429
Fiscal surplus to GDP				0.001	0.034	–0.004									
				0.494	0.356	0.282									
Interconnectedness							0.212**	0.092	0.184**						
							0.044	0.196	0.05						
Net interest margin									–	31.9391***	14.956	3.538			
										0.009	0.129	0.389			
Concentration													–2.039	–3.392**	–2.952*
													0.163	0.040	0.076
Number of observations	457	457	457	333	333	333	180	180	180	360	360	360	335	335	335
Number of countries	36	36	36	33	33	33	17	17	17	35	35	35	32	32	32
R^2 McFadden	0.15	0.17	0.15	0.30	0.32	0.20	0.30	0.26	0.25	0.33	0.23	0.21	0.28	0.22	0.28
Number of crises	27	27	27	20	20	20	15	15	15	24	24	24	22	22	22

Source: IMF staff calculations.

Model specification: $Pr(y_{i,t} = 1|x_{i,t-h}) = \Phi(\alpha_i + x_{i,t-h}\theta)$

Note: The dependent variable is a binary systemic banking crises variable from Laeven and Valencia (2010). Interconnectedness is computed as the ratio of interbank deposit assets to total assets from the OECD Bank Income Statement and Balance Sheet database. Net interest margin and concentration (asset concentration for top three banks) are from World Bank, Global Foundation for Democracy and Development database. The model parameters are estimated using country fixed effects. The *p*-values are shown under the estimated coefficients. ***, **, and * indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels of confidence based on robust standard errors, respectively.

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