World Economic and Financial Surveys

Global Financial Stability Report

Navigating the Financial Challenges Ahead

October 2009

International Monetary Fund
Washington DC

Cover: Creative Services
Typesetting: Martin Edmonds and
Alicia Etchebarne-Bourdin

Recommended bibliographic citation: International Monetary Fund, 2009, *Global Financial Stability Report: Navigating the Financial Challenges Ahead* (Washington, October).

Please send orders to:
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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, 1997–99 or January–June) to indicate the years or months covered, including the beginning and ending years or months;

/ between years (for example, 1998/99) 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 are equivalent to !/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.

PREFACE

The *Global Financial Stability Report* (GFSR*)* assesses key risks facing the global financial system with a view to identifying those that represent systemic vulnerabilities. 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. In the current issue, the report discusses the evolution of the financial crisis and assesses the policies taken to mitigate its effects on economic activity. Looking forward, it also provides policy advice on navigating the financial challenges on the road to recovery for the global financial system.

The analysis in this report has been coordinated in the Monetary and Capital Markets (MCM) Department under the general direction of José Viñals, Counsellor and Director. The project has been directed by MCM staff Jan Brockmeijer, Deputy Director; Peter Dattels and Laura Kodres, Division Chiefs; and L. Effie Psalida, Deputy Division Chief. It has benefited from comments and suggestions from Hervé Ferhani, Deputy Director.

Contributors to this report also include Myrvin Anthony, Sergei Antoshin, Amitabh Arora, Emanuele Baldacci, Sean Craig, Phil de Imus, Wouter Elsenburg, Vincenzo Guzzo, Kristian Hartelius, Geoff Heenan, Gregorio Impavido, Hui Jin, Andreas Jobst, John Kiff, Michael Kisser, Manmohan Kumar, Vanessa Le Leslé, Yinqiu Lu, Kazuhiro Masaki, Rebecca McCaughrin, Paul Mills, Ken Miyajima, Christopher Morris, Sylwia Nowak, Jaume Puig, Mustafa Saiyid, Jodi Scarlata, and Ian Tower. Martin Edmonds, Oksana Khadarina, Yoon Sook Kim, Ryan Scuzzarella, and Narayan Suryakumar provided analytical support. Nirmaleen Jayawardane, Tsegereda Mulatu, and Ramanjeet Singh were responsible for word processing. David Einhorn of the External Relations Department edited the manuscript and coordinated production of the publication

This particular issue draws, in part, on a series of discussions with accountancies, banks, securities firms, asset management companies, hedge funds, auditors, standard setters, financial consultants, and academic researchers, as well as regulatory and other public authorities in major financial centers and countries. The report reflects information available up to September 17, 2009.

The report benefited from comments and suggestions from staff in other IMF departments, as well as from Executive Directors following their discussion of the *Global Financial Stability Report* on September 14, 2009. 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.

EXECUTIVE SUMMARY

Systemic risks have been substantially reduced following unprecedented policy actions and nascent signs of improvement in the real economy. There is growing confidence that the global economy has turned the corner, underpinning the improvements in financial markets. Nonetheless, the risk of a reintensification of the adverse feedback loop between the real and financial sectors remains significant as long as banks remain under strain and households and financial institutions need to reduce leverage. Although indicators of sovereign risk are lower than six months ago, the transfer of financial risks to fiscal authorities, combined with the financing burden of fiscal stimulus, has raised concerns over crowding out the private sector and the sustainability of public sector finances. These vulnerabilities underscore the need to strengthen financial intermediation, restore health to the financial system, and eventually reduce the private risks now borne by sovereign balance sheets. Great care in disengaging from public support will be necessary to avoid either sparking a secondary crisis through premature withdrawal or endangering monetary and fiscal credibility through a belated exit. Complacency now becomes a risk—banking system problems could go unresolved and much-needed regulatory reforms may be delayed or diluted. Policymakers should promptly provide a plan for the future regulatory framework that mitigates the buildup of systemic risks, grounds expectations, and underpins confidence, thereby contributing to sustained economic growth.

Prospects for the Road Ahead

The immediate outlook for the financial system has improved markedly since the April 2009 *Global Financial Stability Report* (GFSR) and extreme tail risks have abated. Financial markets have rebounded, emerging market risks have eased, banks have raised capital, and wholesale funding markets have reopened. Even so, credit channels are still impaired and the economic recovery is likely to be slow. Chapter 1 first chronicles the path toward reestablishing sound credit intermediation and the near-term risks that could interrupt its restoration, including the rising burden of sovereign financing. The chapter then examines how near-term policies should be managed to provide a secure backdrop for economic recovery and a withdrawal of extraordinary public support to the financial system. Some medium-term policy options are also discussed that aim to reshape the financial landscape.

Extreme systemic risks have abated, but complacency about banking system repair is still a concern.

A key question addressed is whether the financial system can provide sufficient credit to sustain an economic recovery. Recently, bank balance sheets have benefited from capital-raising efforts and positive earnings. Nonetheless, there are still serious concerns that credit deterioration will continue to put pressure on banks' balance sheets. Our analysis suggests that U.S. banks are more than halfway through the loss cycle to 2010, whereas in Europe loss recognition is less advanced, reflecting differences in the economic cycle.

While stronger bank earnings are supporting capital levels, they are not expected to fully offset writedowns over the next 18 months. Moreover, steady-state earnings are likely to be lower in

the post-crisis environment. Stronger action to address impaired assets will help bolster bank earning capability and support lending. The tightening of bank regulation under way is expected to reduce net revenues and require more costly self-insurance through higher levels of capital and liquidity.

Crisis risks in emerging markets have subsided, but vulnerabilities remain.

Tail risks in emerging markets have declined as a result of strong policy measures—including increased IMF resources. Financial stresses have eased substantially in emerging Europe, but vulnerabilities remain high. Western European banks appear able to absorb deteriorating credit conditions in emerging Europe, but may lack sufficient capital to support a recovery in the region. Asia and Latin America have benefited most from the stabilization of core markets and a recovery in portfolio inflows. Although international flows into emerging market debt have recovered, they have been skewed toward higher quality borrowers, leaving many corporates facing substantial rollover risks, particularly in emerging Europe. Financial policies should continue to foster an orderly adjustment of bank, corporate, and household balance sheets. Extending agreements to maintain or even increase sustainable cross-border bank funding channels would also help.

Impaired credit channels may face difficulty meeting even tepid private sector demand.

With ongoing bank deleveraging pressure and dislocations in securitization markets, our scenarios envisage the supply of bank credit falling for the remainder of 2009 and into 2010 both in the United States and Europe. When set against projected demand for credit by the public and private sectors, it appears that ex ante supply may fall short of even anemic private sector demand. As a result, pressure on funding rates could increase and the flow of credit to support recovery could be curtailed. The results highlight which areas are likely to suffer the tightest credit conditions and where prolonged policy interventions are needed to ensure an adequate flow of credit, particularly with the authorities' objective of keeping interest rates low.

The transfer of private risks to sovereign balance sheets needs careful management.

The transfer of risk to public balance sheets as a result of financial system rescues and fiscal stimulus packages has raised concerns that record sovereign issuance could push up interest rates and hurt the nascent recovery. In this context, credit capacity could struggle to meet even tepid private sector demand, while deteriorating public finances may compromise sovereign creditworthiness. Countries should mitigate this risk by designing and articulating medium-term fiscal consolidation plans that take into account their financial sector stabilization policies and contingent liabilities.

Financial institutions need further restructuring to ensure their ability to lend and support economic recovery.

Credit capacity constraints suggest little room for complacency in cleansing bank balance sheets of impaired and illiquid assets and resuscitating securitization. Deeper financial reform and the resolution of weak banks will be needed before authorities in many jurisdictions can fully exit from liquidity and funding provision. This calls for renewed efforts to increase bank capital and cleanse troubled assets from bank balance sheets. Official stress tests are important instruments through which the condition of banks can be diagnosed in order to design appropriate strategies for recapitalization of viable banks and for careful resolution of nonviable banks. However, the public release of bank-by-bank outcomes should be considered only if effective remedies to address any capital shortfalls can also be presented. Nondisclosure should not imply the absence of such remedies, if needed.

Incentives are critical to repair and restart securitization.

Given the importance of repairing credit intermediation, Chapter 2 examines the role of private securitization and assesses proposals to restart the market. A combination of new regulation

and better private sector practice will be needed to align incentives of those institutions taking part in securitization and avoid it contributing to systemic instability once more. In redesigning regulation and market practices, the benefits of transferring credit risk outside the banking system and the ability of lenders to diversify funding sources need to be retained.

The chapter suggests that a robust private securitization market requires policy action in several areas, including credit rating agency oversight, accounting practices, capital charges, and retention policies. This action needs to be coordinated across regulators within a country and internationally. The chapter illustrates the potential dangers of uncoordinated responses by examining the impact of retention policies and capital requirements imposed on originators and shows that these could, in some cases, fail to encourage screening and monitoring or, in other cases, make securitization prohibitively expensive. Undertaking careful impact studies before introducing new regulations should ensure that their interaction and potential for damaging unintended consequences is recognized in advance.

The chapter also examines the benefits and costs of issuing covered bonds, in which the loan cash flows are pooled but kept on the balance sheet of the issuing entity. This method has the advantage that the issuer has an incentive to screen and monitor the loans, but because they remain on the issuer's balance sheet, capital must still be held against them, reducing the benefits of securitization. Nonetheless, the advantages of capital-market-type financing—selling the bonds to investors—allows more intermediation to occur. On balance, the chapter concludes that this model, too, should be encouraged with appropriate legislation and regulation.

Policies Needed to Underpin Financial System Recovery and Reform

The policy response to dislocations in funding and credit markets has been unprecedented and, though definitive conclusions are difficult to make on the longer-term benefits, the initial evidence is generally positive. Chapter 3 takes an early look at the very short-term impact and more medium-term effects of conventional and unconventional policy responses, including whether they stabilized financial markets at the time of their announcement.

Some unconventional policies have provided support better than others.

The chapter looks at the impact of intervention announcements made by 13 advanced economies. Those aimed at supporting liquidity were most effective prior to the Lehman Brothers event, but were less so once it was evident that the financial crisis had become one of solvency rather than liquidity risk in a number of countries. Correspondingly, announcements of capital injections were most effective in reducing the default risk of banks in the post-Lehman period, as was the announcement of the potential use of asset purchases. Another important result is that interventions aimed at domestic institutions or markets had important spillover effects to other countries, with magnitudes sometimes larger than in the home country. This underlines the critical importance of coordinating policy responses.

Although it is too soon to gauge with confidence the longer-term effects of these policy actions, initial evidence suggests that some facilities have been effective in supporting funding and issuance activity. Examples include the bank liability guarantees introduced in several countries, the U.S. Term Asset-Backed Securities Loan Facility with its impact on secondary market spreads and issuance of consumer asset-backed securities, and the European Central Bank's decision to purchase covered bonds outright, which helped to lower spreads and reenergize issuance.

It is too early to withdraw official support policies, but a strategy for disengagement is needed.

While the time is not ripe for a full-fledged disengagement from all the unconventional policies undertaken—indeed in some countries additional public resources may still be needed—it is time for policymakers to consider and articulate how and in what sequence policies may be unwound. Timing is complicated by the fact that some policies may be effective even if their usage is limited, as they may be bolstering confidence or acting as a backstop to a class of institutions or investors.

Chapter 3 outlines some considerations regarding the modalities and timing of unwinding unconventional policies. In general, if a facility can be phased out by raising its costs or gradually decreasing its availability, one can attempt to wean the private sector from support in a gradual manner. Expensive policies or those where costs are not commensurate with the benefits should be considered first for withdrawal, as should policies that significantly distort financial markets. Importantly, given the global nature of the crisis and the types of unconventional policies used, attention must be paid to the cross-border impact of unwinding, and coordination may be helpful, notably with regard to the withdrawal of guarantees for bank debt across countries where potential arbitrage opportunities can arise. Clarity of communication over withdrawal strategy is critical. In this context, the use of signposts—described in terms of indicators of market conditions rather than firm deadlines—may be more helpful for influencing market expectations. Given that this is uncharted territory for policymakers, some experimentation may be appropriate to test market conditions. If warranted, reinstatement of some facilities should not be viewed as a setback.

A clear vision of future financial system regulation is needed to provide clarity and boost confidence.

In addition to a well-defined strategy for unwinding unconventional policies, confidence in the financial system will be bolstered by clarity over future regulatory reforms needed to address systemic risks. The recent easing of tail risks should not prompt authorities to relax their efforts to map out the path to a more robust financial system. A holistic, understandable approach needs to be formulated so that the private sector can plan appropriately.

The priority should be to reform the regulatory environment so that the probability of a recurrence of a systemic crisis is significantly reduced. This includes not only defining the extent to which capital, provisions, and liquidity buffers are to rise, but also how market discipline is to be reestablished following extensive public sector support of systemic institutions in many countries. There are already proposals that will go some way toward removing procyclicality in the financial system and increasing buffers against losses and liquidity dislocations. But hard work lies ahead in devising capital penalties, insurance premiums, supervisory and resolution regimes, and competition policies to ensure that no institution is believed to be "too big to fail." Early guidance at defining criteria for identifying systemically important institutions and markets—such as that being formulated by the International Monetary Fund, Financial Stability Board, and Bank for International Settlements for the G-20—should assist in this quest. Once identified, some form of surcharge or disincentive for marginal contributions to systemic risk will need to be formulated and applied.

A macroprudential approach to global policymaking is needed to restore market discipline and ensure that the benefits of financial integration are preserved.

The further challenge is to place these reforms in the context of an integrated macroprudential policy framework in which both domestic and cross-border institutions can operate securely. There is now recognition that a combination of microprudential and macroeconomic policies operated procyclically and led to a buildup of leverage and systemic risk. Policymakers will need to address ways in which their own actions exacerbate systemic risks, regardless of whether they oversee monetary, fiscal, or financial policy.

Cooperation and consistency in the policy field must extend across borders. Cross-border relationships between institutions and markets have made it impossible for policymakers to act unilaterally without consequences for others. Following the crisis, however, there is a danger that some countries will want to ring-fence their institutions and withdraw from global markets to protect their domestic economies from external shocks. What is needed instead is a way to benefit from increasing financial integration, while ensuring that potential negative spillovers are contained and clarity exists about the roles of home and host authorities. As policymakers move forward on this difficult task, the IMF can play a catalytic role through its surveillance activities and work on global macrofinancial linkages.

CHAPTER 1

THE ROAD TO RECOVERY

Systemic risks have been substantially reduced following unprecedented policy actions and nascent signs of improvement in the real economy. We appear now to be embarking on the road to recovery. Credit, however, remains strained, while household and financial sector balance sheet pressures and ongoing market dysfunctions remain drags on the recovery. This underscores the need for adopted policies to be more fully implemented, while others need to be fine-tuned or extended to ensure that confidence is restored further and credit channels are reopened. Equally, there is a medium-term need to reduce and ultimately reverse the transfer of private risk to sovereign balance sheets. This requires careful management of exit strategies so as not to spawn a secondary crisis, further efforts to strengthen financial intermediation, and regulatory policies to reform the financial landscape.

Against this backdrop, Chapter 1 first outlines the key financial stability risks that have materialized since the April 2009 Global Financial Stability Report (GFSR). Then, it examines the channels of credit deterioration in the United States and Europe, and assesses the implications for financial sector balance sheets and the main challenges faced by financial institutions. The following section revisits the risks and vulnerabilities to emerging markets. The chapter then explores whether reduced credit capacity will be sufficient to meet even tepid private sector demand in the face of record sovereign debt issuance. The next section examines the potential tail risks stemming from the transfer of risk to public balance sheets from financial system rescues. The chapter concludes with a discussion on policy priorities.

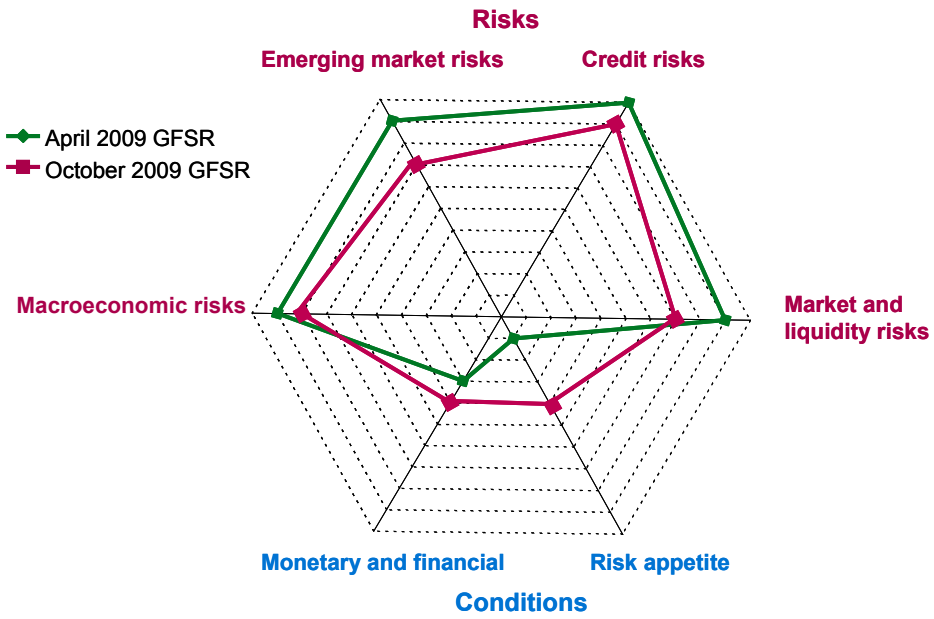
A. Global Financial Stability Map

Our assessment of the risks and underlying conditions affecting global financial stability is summarized in the global financial stability map (Figure 1.1).[1] Financial stability has improved significantly in the past six months. Reflecting the decline of systemic risks, all indicators have been reduced. However, the risk of reversal remains significant and indicators of financial stress remain elevated at the core of the financial system and in some market segments, as also illustrated by Figure 1.2.

Note: This chapter was written by a team led by Peter Dattels and comprised of Myrvin Anthony, Sergei Antoshin, Amitabh Arora, R. Sean Craig, Phil de Imus, Martin Edmonds, Vincenzo Guzzo, Kristian Hartelius, Geoff Heenan, Gregorio Impavido, Hui Jin, Vanessa Le Leslé, Yinqiu Lu, Rebecca McCaughrin, Paul Mills, Ken Miyajima, Chris Morris, Jaume Puig, Mustafa Saiyid, Narayan Suryakumar, and Ian Tower.

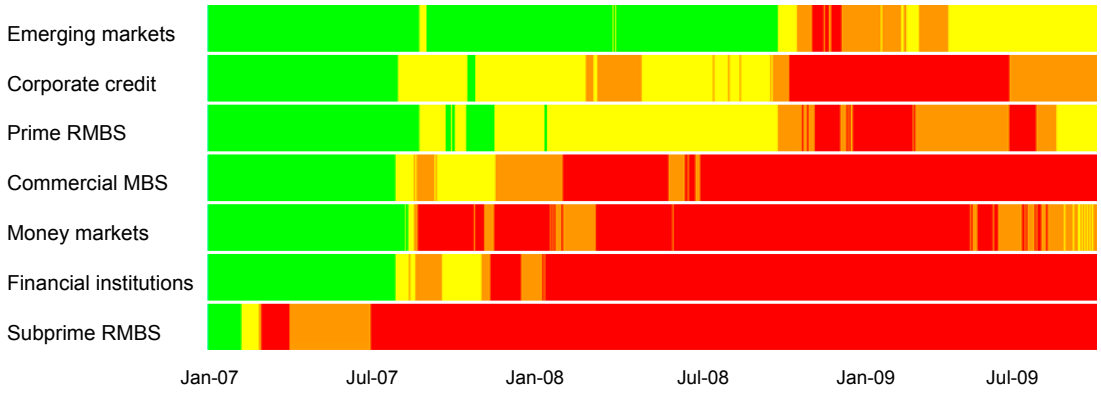
[1]The stability map provides a schematic presentation that incorporates a degree of judgment, serving as a starting point for further analysis. Annex 1.1 details how the indicators that underpin the map are measured and interpreted.

Figure 1.1. Global Financial Stability Map



Source: IMF staff estimates.
Note: Closer to center signifies less risk, tighter monetary and financial conditions, or reduced risk appetite.

Figure 1.2. Heat Map: Developments in Systemic Asset Classes

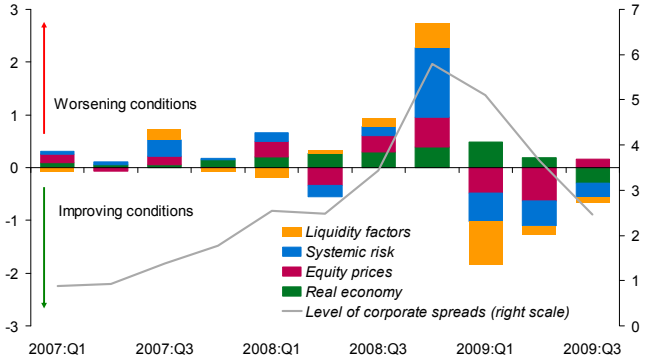


Source: IMF staff estimates.
Note: The heat map measures both the level and one-month volatility of the spreads, prices, and total returns of each asset class relative to the average during 2003-06 (i.e., wider spreads, lower prices and total returns, and higher volatility). The deviation is expressed in terms of standard deviations. Green signifies a standard deviation under 1, yellow 1-4 standard deviations, orange 4-7, and red greater than 7.
MBS = mortgage-backed security; RMBS = residential mortgage-backed security.

Macroeconomic risks have receded as the economic downturn is showing signs of troughing. The IMF's baseline forecast for global growth has been upwardly revised, with advanced economies expected to register positive growth in 2010, and emerging economies projected to rebound significantly. The better outlook for global growth underpins much of the improvement in other categories of the map. Prospects for global trade have improved, and fears of widespread deflation have receded, with global breakeven inflation rates recovering from historical lows. Still, the recovery is expected to be slow, with risks tilted to the downside. Growth is expected to remain below potential in advanced economies, as the deleveraging process runs its course. Credit growth is likely to remain muted, lagging the recovery, as banks and securitization markets (Sections B and D) remain in a state of repair. The transfer of risks from the private sector to the public sector has also raised concerns about sovereign balance sheet risks (Section E).

Emerging market risks have eased overall, as official initiatives have reduced tail risks, portfolio inflows have resumed, and the return of risk appetite has supported emerging market assets. Notwithstanding these developments, vulnerabilities remain, especially in emerging Europe and other countries heavily dependent on external financing. Cross-border funding of emerging market banks remains vulnerable to the deleveraging of mature market banks. Refinancing and default risks in the corporate sector continue to be relatively high, especially in parts of emerging Europe, but also for smaller, leveraged corporations in Asia and Latin America (Section C).

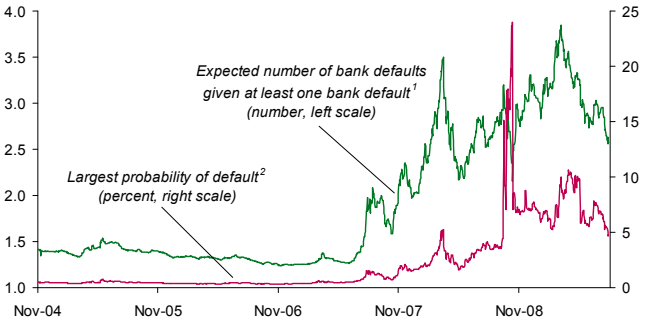
Figure 1.3. Contributions to Changes in Corporate Spreads
(Quarterly changes; percentage points)



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

Our assessment of *credit risks* has retreated from historic highs, though overall risks remain elevated. Corporate bond spreads have narrowed now that liquidity premia and systemic risks have declined (Figure 1.3). As economic conditions have shown tentative signs of stabilizing, projections of corporate default rates have been lowered. Bank stability risks have also receded (Figure 1.4), reflecting government support of balance sheets, and as securities writedowns by financials have begun to taper and capital cushions have increased (Section B). Still, credit risks remain elevated, reflecting rising loan delinquencies. In Sections B and D, we revisit our deleveraging scenarios and assess the implications for credit growth. We find that while bank capital positions have begun to stabilize, there is still a need to build capital buffers and strengthen balance sheets to provide adequate credit to the real economy. There are also pockets of weakness in the nonbank financial sector (Section B), especially where institutions have taken on credit risk from the banking system or have exposure to vulnerable market sectors.

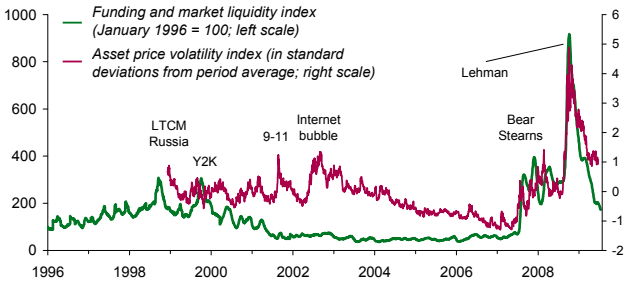
Figure 1.4. Systemic Bank Default Risk



Sources: Bloomberg L.P.; and IMF staff estimates.
[1] Includes 15 large and complex global financial institutions.
[2] Measures the largest probability of default daily among 15 sampled banks.

Market and liquidity risks have fallen as interbank markets and some private wholesale funding have reopened, while market volatility has declined as worries of systemic collapse and economic free-fall have abated (Figure 1.5). Financial institutions are no longer fully reliant on government guarantees for funding, and are now able to raise senior unsecured debt funding, albeit at a concession. Stronger banks have no difficulty obtaining medium- to long-term funding in any major currency. However, tiering and access still remain a problem, with some weaker banks less able to access interbank and capital markets or only at penal rates.

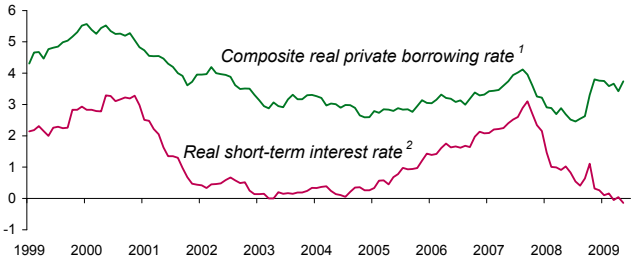
Figure 1.5. Asset Price Volatility and Funding and Market Liquidity



Sources: Bloomberg L.P.; and IMF staff estimates.
Note: Asset price volatility index uses implied volatility derived from options from stock market indices, interest, and exchange rates. Funding and market liquidity index uses the spread between yields on government securities and interbank rates, spread between term and overnight interbank rates, currency bid-ask spreads, and daily return-to-volume ratios of equity markets. A higher value indicates tighter market liquidity conditions.

Monetary and financial conditions have eased, as policy rates have remained low and financial assets have rallied. Central bank policy rate expectations have remained anchored at low levels despite stronger incoming economic data. The pace of tightening of lending standards has also moderated, though overall conditions are still tight. Despite credit and quantitative easing policies, global real private borrowing rates—proxied by borrowing rates and yields on housing, consumer, and corporate loans and securities, weighted by the respective shares of outstanding debt—have remained stable (Figure 1.6). This is due, in part, to declines in mature market corporate bond and asset-backed security (ABS) yields offset by moderate increases in U.S. mortgage rates since the April 2009 GFSR. The gap between short-term interest rates and private borrowing rates is now at its widest level since the beginning of the crisis.

Figure 1.6. Composite Real Private Borrowing Rate and Short-Term Interest Rates
(In percent)



Sources: Bloomberg L.P., European Central Bank; European Securitisation Forum; U.S. Federal Reserve; Haver Analytics; and IMF staff estimates.
[1]The composite real private borrowing rate (RPBR) is a GDP-weighted average of the U.S., Japan, euro area and U.K. RPBRs. The component RPBRs are calculated as the average of nominal bank mortgage, consumer, and coporate lending rates, and corporate bond and mortgage- and asset-backed security yields, weighted by amounts of credit outstanding, minus year-on-year consumper price index.
[2]GDP-weighted average of G-7 short-term interest rates, one-month rolling.

Risk appetite has been raised three notches from depressed levels at the time of the April 2009 GFSR. Improvements in investor confidence surveys and receding counterparty risks have helped to boost sentiment, while the reduction of systemic risks and the improved economic outlook have raised demand for riskier assets. The recovery has not been uniform, though, with still-strong demand for risk-free securities among certain investors.

B. Challenges on the Road to Recovery for the Global Financial System

This section examines the channels of credit deterioration in the United States and Europe—the two areas most affected by the crisis—and assesses the implications for financial sector balance sheets. While conditions have recently improved, financial institutions continue to face three

main challenges: strengthening earnings as business models adapt to the new operating environment, rebuilding capital, and reinforcing funding profiles.[2]

Reduced systemic risks and reopened funding markets have alleviated financial stress, but credit deterioration remains a problem.

Since the April 2009 GFSR, policy actions have reduced systemic and liquidity risks, prompting a substantial narrowing in credit spreads (Table 1.1). Consequently, our estimates of actual and potential global writedowns held by banks and other financial institutions have fallen by some $600 billion from about $4 trillion to $3.4 trillion.[3,4] Nevertheless, the depth of the economic downturn and a still-tentative recovery is weighing on the performance of most asset classes. In particular:

Table 1.1. Credit Market Spreads
(In basis points)

	Current 8/31/2009	April 2009 GFSR 2/28/2009	Pre-Lehman 9/12/2008	Pre-Crisis 6/30/2007
Residential mortgage ABS				
United Kingdom	190	315	215	10
United States	1,328	1,195	875	26
Commercial mortgage ABS				
Europe	975	850	330	20
United States	650	1,100	290	30
Consumer ABS				
United Kingdom	465	650	255	12
United States	55-90	250-350	130-200	0-10
Corporate cash bonds				
Europe high-grade	205	422	209	51
Financial	262	526	242	50
Nonfinancial	142	301	159	52
U.S. high-grade	253	548	344	100
Financial	352	753	432	93
Nonfinancial	203	442	282	106
Europe high-yield	1,116	2,103	900	226
U.S. high-yield	912	1,738	854	298

Sources: JPMorgan Chase & Co.; and Merrill Lynch.

Note: ABS seria are AAA rated and benchmarked over swaps. The U.K. residential index is a five-year maturity and the U.S. index is the JPMorgan ABX 06-2 series. The European commercial mortgage index is 5-year floating, while the U.S. is 10-year, 30 percent fixed. The consumer indices are three-year maturities and comprise credit cards for the U.K. and credit cards and autos for the U.S. The corporate cash bond indices are bellwehter Merrill indices benchmarked over comparable government securities. ABS = asset-backed security.

- *Commercial real estate markets continue to weaken in both the United States and Europe.*[5] The commercial real estate sector turned later than other sectors, but its deterioration is now in full swing. Rising unemployment and vacancy rates, falling property prices, and tighter lending conditions, are contributing to distressed sales and delinquencies in the United States. European commercial real estate markets are also under pressure, especially in Ireland, Spain, and the United Kingdom, where property prices have declined significantly.
- *Residential real estate markets are further along in their cycle.* Downward pressures on residential real estate have started to moderate in both the United States and Europe, though further price declines are expected.[6] U.S. loan charge-off rates are still rising, especially on prime jumbo

[2]See the October 2008 GFSR (IMF, 2008) for a discussion of how different business models are impacted by changes in banks' funding conditions and risk profiles.

[3]This estimate represents global writedowns on credit originated in mature markets over 2007–10. Mark-to-market declines in the pricing of securities may also represent market expectations of cash flow deterioration beyond 2010. The results are subject to considerable uncertainty.

[4]Banks account for about one-half of the overall improvement based on the methodology used in the April 2009 GFSR. The calculation of bank writedowns is discussed separately.

[5]Commercial real estate credit includes direct commercial mortgage lending, and loans to property developers and builders.

[6]In the United States, house prices have fallen around 33 percent since their peak in 2006. The IMF projects additional declines of 4 percent before prices bottom out in 2010. In Europe, house price depreciation has intensified in Ireland (–18 percent from the peak to the latest available datapoint), the United Kingdom (–12 percent), France (–8 percent), Spain (–7 percent), and Norway (–7 percent); price changes are also negative (though to a lesser extent) in Finland (–5 percent) and Denmark (–5 percent).

loans. European delinquencies and defaults are also rising, though from lower levels, and are likely to accelerate as unemployment allowances and other social safety nets that only offer temporary protection are exhausted.

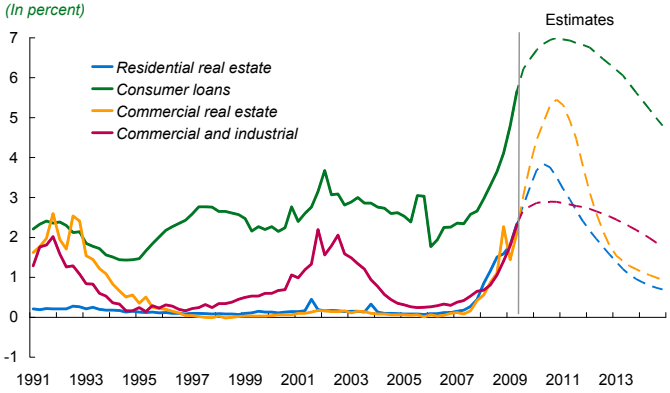
- *Pressures on corporates have eased somewhat as capital markets have reopened, but loan delinquencies have yet to peak and loan losses are rising globally.*[7] U.S. corporate loans have continued to deteriorate, with high-yield defaults reaching an annual rate of 11.5 percent in July. Defaults are expected to peak in late 2009 or early 2010. Pressures have eased somewhat as strong investor interest and a contraction in spreads have enabled many firms—particularly investment-grade—to refinance their liabilities. In the euro area, corporate defaults have remained comparatively low—with high-yield defaults at only 4.6 percent—though weak economic activity is likely to push up future loan losses. In continental Europe, corporate loan deterioration will strongly impact banking systems, as small- and medium-sized enterprises represent 75 percent of European banks' loan books, and are nearly twice as likely to default as larger corporates.
- *Consumer loan portfolios are continuing to weaken as unemployment rises.* In contrast to the corporate sector, U.S. households approached the crisis period with extremely low savings and high indebtedness. As a result, rising unemployment quickly translated into rising delinquencies and defaults on consumer loans.[8] In Europe, with credit card delinquencies rising—especially in the United Kingdom, Ireland, and Greece—consumer credit markets have come under pressure.

What do economic conditions imply for the future trajectory of loan losses?

In this GFSR, we introduce a revised methodology that links macroeconomic developments to credit developments in each region separately, and allows us to project credit deterioration using *World Economic Outlook* (WEO) forecasts. Although improved, this methodology is subject to considerable uncertainty in view of limitations in the underlying data. Nevertheless, it provides a useful basis to assess the impact of the economic downturn and financial stress on loan performance. Some of the key sources of uncertainty are highlighted in Box 1.1 and a detailed methodology is provided in Annex 1.2.

While the pace of decline in economic activity is slowing, unemployment has continued to climb, adversely affecting household creditworthiness. Meanwhile, precautionary savings are picking up, diverting cash from spending. In the United States, consumer loans remain the worst performing segment, with the charge-off rate expected to peak at 6.9 percent under our baseline scenario by end-2010 (Figure 1.7). Residential and commercial mortgage charge-off rates are expected to increase to 3.8 percent and 5.5 percent,

Figure 1.7. U.S. Loan Charge-Off Rates
(In percent)



Sources: National authorities; and IMF staff estimates.

[7]Corporate bond issuance has already reached record levels year-to-date (over $1 trillion global issues by end-July, of which $425 billion was issued by European corporates), partly replacing reduced bank lending.

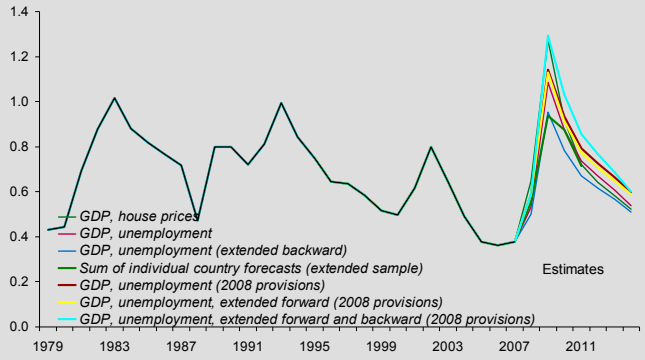
[8]This contrasts with the performance of U.S. consumer credit securities, which has improved significantly as a result of the Federal Reserve's Term Asset-Backed Securities Loan Facility (TALF).

Box 1.1. Uncertainty Surrounding Loan Loss Estimations

Annex 1.2 of this GFSR introduces a revised methodology for estimating credit deterioration using loan loss provisioning data for the euro area and the United Kingdom.[1,2] In contrast with the last GFSR, the new methodology links macroeconomic developments to credit developments in each region separately, and allows for the projection of credit deterioration using WEO forecasts. This box highlights sources of uncertainty surrounding our loan loss estimation and discusses robustness checks used for the new model.

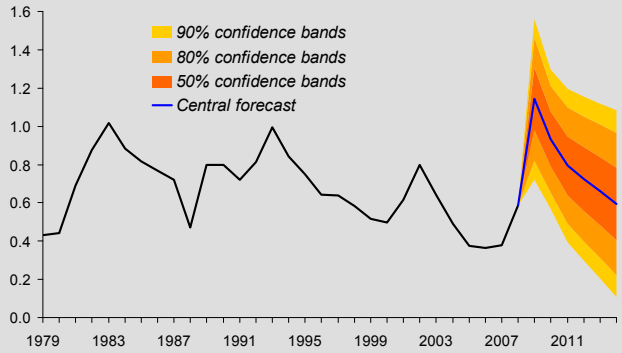
Our loan loss estimations for the United States remain broadly consistent with the last GFSR. For the euro area and the United Kingdom, provision rates were forecast using GDP growth and the unemployment rate, which capture the performance of the corporate and household sectors. To check for robustness, several model specifications were tested, using various samples, including a limited sample from 1979, and alternative explanatory variables. In addition, individual country regressions were carried out and the euro area aggregate was produced as a sum of country-level profiles. All these specifications produced broadly similar results, with the provision rate peaking between 0.9 percent and 1.3 percent in 2009 (see first figure). The predictions of the final model (based on the full country sample starting in 1995 and developed in cooperation with the European Central Bank) are close to a median peak forecast of 1.1 percent in 2009.

Euro Area: Forecasts of Loan Loss Provisions
(In percent)



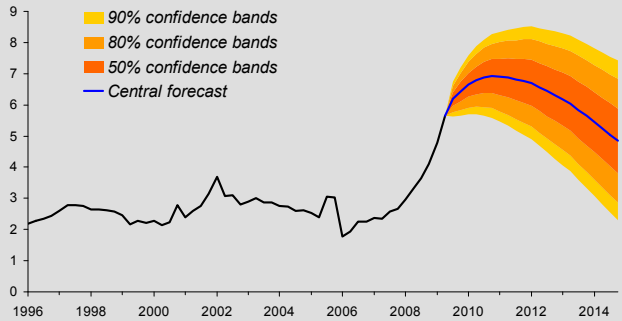
Sources: National authorities; and IMF staff estimates.

Euro Area Provision Rate Model: Confidence Bands
(In percent)



Source: IMF staff estimates.

U.S. Charge-Off Rate Model for Consumer Loans: Confidence Bands
(In percent)



Source: IMF staff estimates.

To highlight the uncertainty surrounding the forecasts, confidence intervals are plotted in the second figure. Despite the limited number of observations and their low frequency, the euro area model compares well with that for the U.S., which is based on a larger sample of quarterly data (see third figure). Importantly, the measure of uncertainty depicted does not capture that related to measurement errors which can arise from consolidation, cross-country variation, and changes in accounting standards. The confidence bands also omit uncertainty associated with our assumptions about exogenous variables. These factors,

Box 1.1 *(concluded)*

along with the full description of the data, accounting nuances, model specifications, estimation, and discussion of the results for the United States, the euro area, and the United Kingdom are described in Annex 1.2. Despite the various sources of uncertainty, the euro area model performed relatively well predicting provision rates out-of-sample for 2008 and the first half of 2009 (the latter based on traded banks).

Note: This box was prepared by Sergei Antoshin.

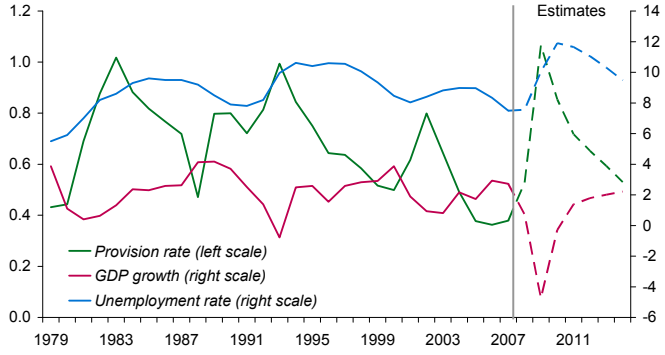
[1]A similar exercise was carried out for the United Kingdom, which produced the standard deviation of 0.5 percent around the mean forecast of 1.7 percent in the second half of 2010, compared with the standard deviation of 0.2 around the mean forecast of 0.9 percent in 2010 for the euro area.

[2]The approach to estimating European loss provisions has benefited from data obtained from national authorities and the European Central Bank. The analysis also benefited from the use of banking system data from Keefe, Bruyette & Woods Limited (KBW) in London (see also KBW, 2009a, b).

respectively, in the second half of 2010, while that for corporate loans is projected to peak at 2.9 percent in the first half of 2010.

In the euro area and the United Kingdom, muted economic activity and rising unemployment are expected to push up loan losses. The provisioning rate on euro area loans is expected to increase from a low of 0.4 percent in 2007 to 1.1 percent in 2009 (Figure 1.8), taking several years to normalize due to the nature of the treatment of provisions by International Financial Reporting Standards (IFRS) and a prolonged period of high unemployment.[9] Euro area losses are likely to be concentrated in corporate and emerging market loans. They should remain lower on residential mortgages overall, but with significant cross-country variation. In the United Kingdom, the overall loss rate is projected to reach 2.7 percent in 2009, with particular pressures on commercial and buy-to-let residential mortgages.

Figure 1.8. Euro Area: Provision Rates



Sources: National authorities; and IMF staff estimates.

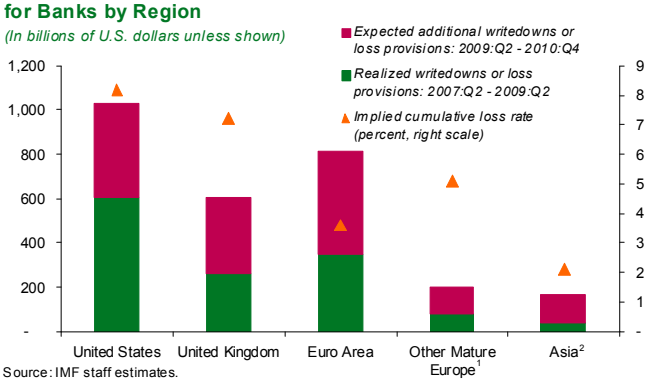
[9]Losses on loans are measured by provisions in the euro area analysis because they are likely to be understated if measured by writedowns, which capture losses with a lag of up to several years owing to legal and accounting issues, whereas in the United States charge-offs track provisions more closely.

Credit deterioration will continue to put pressure on bank balance sheets, as writedowns and loan loss provisions rise over the next few years.

Using our revised methodology, we estimate bank (actual and potential) writedowns of $2.8 trillion on bank holdings of both loans and securities (Table 1.2).[10] Although unchanged from the April GFSR, this figure masks improvements in market conditions that reduced mark-to-market losses. These were offset by methodological changes (detailed in Annex 1.2), including variations in loan loss estimations, assessments of securities pricing, the size of bank assets, and exchange rates.[11] Taking into account global bank writedowns of some $1.3 trillion through the first half of 2009, we expect significant additional writedowns of $1.5 trillion ahead. Figure 1.9 highlights that U.S. domiciled banks have recognized about 60 percent of anticipated writedowns, while euro area and U.K. domiciled banks have recognized about 40 percent. The somewhat slower recognition of bank writedowns in the euro area and the United Kingdom versus the United States is the result of several factors, including: a lag in the credit cycle; the higher proportion of securities on U.S. banks' balance sheets, accounting differences between IFRS and U.S. Generally Accepted Accounting Principles (U.S. GAAP); time lags between data collection and publication by national supervisors; and frequency of reporting.

Figure 1.9. Realized and Expected Writedowns or Loss Provisions for Banks by Region

(In billions of U.S. dollars unless shown)



Source: IMF staff estimates.

[1]Includes Denmark, Iceland, Norway, Sweden, and Switzerland.

[2]Includes Australia, Hong Kong SAR, Japan, New Zealand, and Singapore.

Comparing the overall size of total expected writedowns to the size of each region's banking system, cumulative loss rates show larger proportionate losses in U.S. and U.K. banks compared to the euro area. Despite improvements in securities pricing since April 2009, substantial additional writedowns lie ahead. This is because banks globally are expected to incur further potential writedowns on their loan portfolios. Loan losses are expected to account for around two-thirds of total writedowns over 2007–10. The residential sector is the main driver of loan losses for U.S. banks. In contrast, foreign loans are a large contributor to loan losses for U.K. and euro area banks. This is, in part, due to higher loss rates on foreign lending and, in the case of the United Kingdom, a larger share of foreign loans in the portfolio.

[10]We assume that all bank holdings of securities are marked-to-market regardless of whether they are held in trading or hold-to-maturity (HTM) accounts. Consequently, potential writedowns for banking systems that have taken advantage of recent changes in IAS39 to transfer securities to HTM accounts may be over-estimated under this approach. We also assume that the current pricing of securities fully reflects market expectations of potential cashflow deterioration ahead. Granted, pricing may also be affected by adverse liquidity conditions, in which case we may overestimate ultimate credit losses. For this reason, we only use investment grade security indices for the euro area and the United Kingdom in our analysis.

[11]Using a similar methodology to the last GFSR, our estimates of global bank writedowns over 2007–10 decline from $2.8 trillion in April 2009 to $2.5 trillion now.

Table 1.2. Estimates of Global Bank Writedowns by Domicile (2007-10)

(In billions of U.S. dollars)

	Estimated Holdings	Estimated Writedowns	Implied Cumulative Loss Rate (percent)	Share of Total (percent)
U.S. Banks				
Loans				
Residential mortgage	2,981	230	7.7	22.4
Consumer	1,115	195	17.5	19.0
Commercial mortgage	1,114	100	9.0	9.7
Corporate	1,104	72	6.6	7.1
Foreign[1]	1,745	57	3.3	5.5
Total for loans	8,059	654	8.1	63.8
Securities				
Residential mortgage	1,495	189	12.7	18.5
Consumer	142	0	0.0	0.0
Commercial mortgage	196	63	32.0	6.1
Corporate	1,115	48	4.3	4.7
Governments	580	0	0.0	0.0
Foreign[1]	975	71	7.3	6.9
Total for securities	4,502	371	8.2	36.2
Total for Loans and Securities	**12,561**	**1,025**	**8.2**	**100.0**
U.K. Banks				
Loans				
Residential mortgage	1,636	47	2.9	7.8
Consumer	423	66	15.7	11.0
Commercial mortgage	344	39	11.2	6.4
Corporate	1,828	83	4.5	13.7
Foreign[1]	2,514	261	10.4	43.3
Total for loans	6,744	497	7.4	82.3
Securities				
Residential mortgage	225	27	12.0	4.5
Consumer	58	4	7.4	0.7
Commercial mortgage	51	12	23.5	2.0
Corporate	258	25	9.5	4.1
Governments	360	0	0.0	0.0
Foreign[1]	672	39	5.8	6.5
Total for securities	1,625	107	6.6	17.7
Total for Loans and Securities	**8,369**	**604**	**7.2**	**100.0**
Euro Area Banks				
Loans				
Residential mortgage	4,530	47	1.0	5.8
Consumer	675	27	4.0	3.3
Commercial mortgage	1,272	40	3.1	4.9
Corporate	5,018	85	1.7	10.4
Foreign[1]	4,500	282	6.3	34.6
Total for loans	15,994	480	3.0	59.1
Securities				
Residential mortgage	966	130	13.5	16.0
Consumer	271	5	1.9	0.6
Commercial mortgage	264	62	23.5	7.6
Corporate	1,316	22	1.7	2.7
Governments	2,146	0	0.0	0.0
Foreign[1]	1,943	113	5.8	13.9
Total for securities	6,907	333	4.8	40.9
Total for Loans and Securities	**22,901**	**814**	**3.6**	**100.0**
Other Mature Europe Banks[2]				
Total for loans	3,241	165	5.1	82.3
Total for securities	729	36	4.9	17.7
Total for Loans and Securities	**3,970**	**201**	**5.1**	**100.0**
Asia Banks[3]				
Total for loans	6,150	97	1.6	58.2
Total for securities	1,728	69	4.0	41.8
Total for Loans and Securities	**7,879**	**166**	**2.1**	**100.0**
Total for all bank loans	40,189	1,893	4.7	67.4
Total for all bank securities	15,491	916	5.9	32.6
Total for Loans and Securities	**55,680**	**2,809**	**5.0**	**100.0**

Sources: Bank for International Settlements; Bank of Japan; European Securitisation Forum; Keefe, Bruyette & Woods; U.K. Financial Services Authority; U.S. Federal Reserve; and IMF staff estimates.

Note: Domicile of a bank refers to its reporting country on a consolidated basis, which includes branches and subsidiaries outside the reporting country. Bank holdings are latest available data at time of publication. Mark-to-market declines in securities pricing are as of end-August.

[1]Foreign exposures of regional banking systems are based on BIS data on foreign claims. The same country proportions are assumed for both bank holdings of loans and securities. For each banking system, the proportion of exposure to domestic credit categories is asumed to apply to the overall stock of foreign exposure.

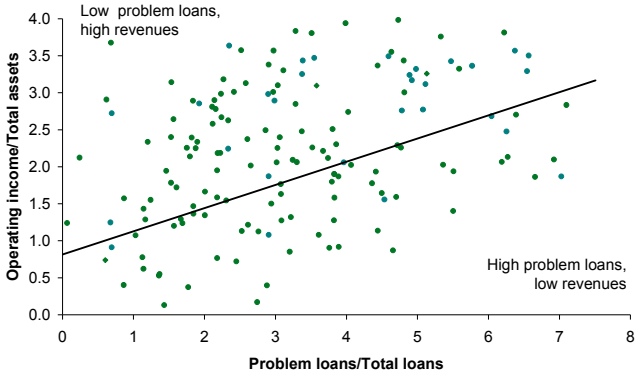
[2]Includes Denmark, Norway, Iceland, Sweden, and Switzerland.

[3]Includes Australia, Hong Kong SAR, Japan, New Zealand, and Singapore.

Will bank earnings be robust enough to absorb writedowns and rebuild capital cushions?

A critical question is what will be a sustainable level of bank revenues in the post-crisis world, and what path will banks take to get there? In the first half of 2009, bank earnings were boosted by heavy capital market trading, debt and equity underwriting, and mortgage refinancing activity. These partially offset mounting losses on impaired assets. However, margins remain under pressure as overcapacity and strong competition in some European markets has squeezed interest income margins despite historically low interest rates. To protect bottom line earnings, banks appear to have priced risky lending more expensively—as shown by the upward sloping trend line for European banks in Figure 1.10. However, heavy competition may have led some banks and banking systems to underprice risks.

Figure 1.10. Bank Problem Loans and Income
(In percent)

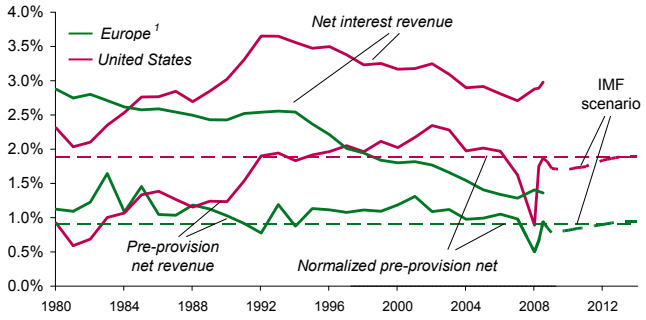


Sources: Bankscope; and IMF staff estimates.

To assess the potential post-crisis level of bank earnings, we estimated bank pre-provision revenues for a wide sample of banks, using credit growth, leverage, the steepness of the yield curve, and various proxies for the regulatory environment as explanatory variables.[12] The analysis suggests that credit growth and the steepness of the yield curve have been major drivers in the United States and the euro area (see Annex 1.3).[13] In the medium term, banks are likely to suffer reduced margins from paying more for deposits (to lower their loan-to-deposit ratios), and incur higher interest costs (to extend the duration of their liabilities). In addition to provisions and charge-offs, banks are likely to have to pay higher deposit insurance premiums, and face higher costs from tighter regulation and the need to hold more and higher-quality capital. Expected profitability should also be lower due to an emphasis on simpler products with lower associated yields. In the long term however, pricing discipline, stronger risk management, and increased focus on simpler and more stable businesses, combined with robust disclosure, should be supportive of bank profitability.

Hence, bank pre-provision revenues are likely to recover somewhat, steadily returning to more "normalized" levels by end-2014 (Figure 1.11). However, stronger earnings are not expected fully to offset writedowns over the next 18 months, resulting in continuing capital pressure.

Figure 1.11. Bank Earnings
(As a percent of total assets; under local accounting conventions)



Sources: Organisation for Economic Co-operation and Development (OECD); and IMF staff estimates.
Note: OECD actuals to 2007.
[1]Europe: unweighted average of up to 10 countries, including United Kingdom; six in 1980; seven in 1981; eight in 1984, nine in 1987, 10 in 1995.

[12]Pre-provision revenues are interest revenues less interest expense (that is "net interest margin") plus noninterest income—mainly from trading and commissions—less noninterest expenses.

[13]Data limitations preclude drawing firm conclusions for the United Kingdom.

Bank capital has stabilized, but will have to be rebuilt further to support the recovery.

The analysis that follows assesses the capacity of bank earnings to absorb potential writedowns and rebuild capital from internal resources. The estimates are subject to a high degree of uncertainty owing to the restrictive assumptions required and data limitations. While this analysis provides a useful top-down approach, cross-country comparisons on bank capital adequacy ratios and assessments of appropriate capital levels are complicated by different accounting conventions and regulatory regimes, and the absence of an agreed-upon common definition and measure of capital.[14] Also capital needs can vary according to different business models. To the extent that some models, such as the mutual ownership common in continental Europe, result in banks holding less risky portfolios, such banks can operate relatively safely with lower measured capital ratios.

Keeping in mind these limitations, Table 1.3 and Figure 1.12 present metrics against which to assess bank capital levels on a forward-looking basis, starting from the third quarter of 2009 through the end of 2010. For this 18-month period, expected writedowns outweigh forecast revenues, resulting in a drain on capital. Notwithstanding this drain, capital ratios exceed 6 percent Tier 1 capital-to-risk-weighted-assets (RWA) ratio in aggregate, owing to increased earnings and successful private capital-raising efforts, as well as government capital injections. We also illustrate the capital required to reach an 8 percent Tier 1 to RWA ratio and find this to be modest as well. Finally, two other metrics—10 percent Tier 1 capital to RWA, and 25 times levered (a tangible common equity/total asset ratio of 4 percent, as presented in the April 2009 GFSR)—are included since they represent measures that many market participants use to assess bank balance sheet health. The use of these metrics for illustrative purposes should not be viewed as an endorsement of them by the IMF. Their calculation depends on a variety of assumptions. For example, full implementation is assumed of the Asset Protection Scheme (APS) in the United Kingdom, without which capital needs could be substantially higher depending on the target ratio applied.[15] In particular, the analysis should not be seen as a substitute for specific analysis of individual institutions or portfolios.

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[14]Several concepts coexist—capital adequacy ratio (CAR); Tier 1/risk-weighted assets ratio (Tier 1 ratio); core Tier 1/RWA; tangible common equity/total assets (TCE ratio); and the leverage ratio. The Basel CAR must be above 8 percent, while Tier 1/RWA should be over 4 percent. For U.S. banks, the Federal Deposit Insurance Corporation considers them "well-capitalized" if they meet three criteria: total risk-based capital ratio equal to or greater than 10 percent, and Tier 1 risk-based capital ratio equal to or greater than 6 percent, and Tier 1 Leverage Capital Ratio equal to or greater than 5 percent. Banks largely exceed their relevant regulatory minima, and market participants, rating agencies, and regulators tend to focus more on the quality and composition of capital. They currently stress the strongest form of capital, tangible common equity, and other components that can absorb losses better and have no maturity or fixed costs. Recently, the more closely watched indicators of underlying bank capital have been core Tier 1 in Europe and TCE/TA in the United States. (Apart from the calculation of "equity-like" capital, the main difference lies on the denominator, as core Tier 1 is compared to RWA, while TCE is compared to unweighted tangible assets.) The Tier 1/RWA ratio is a reasonable indicator for cross-border bank comparison, even if caution is warranted due to accounting differences and the transition to Basel II. In particular, IFRS used in Europe require certain derivative and repurchase transactions to be shown in their "gross" form (i.e., on both sides of the balance sheet) while U.S. GAAP allows the net to be shown. The "true sale" test for recognition of an item as "off balance sheet" is also stricter under IFRS than under U.S. GAAP. Some banks will therefore tend to have larger balance sheets—and thus higher leverage multiples—reporting under IFRS than they would under U.S. GAAP.

[15]The numbers in Tables 1.2 and 1.3 may not be directly comparable for a country or region owing to rounding and differences in assumptions about policy. For example, for the United Kingdom, Table 1.3 incorporates the impact of the APS on writedowns given its focus on capital, whereas Table 1.2 does not.

Table 1.3. Bank Capital, Earnings, and Writedowns
(In billions of U.S. dollars, unless shown)

	United States (ex-GSEs)	Euro Area	United Kingdom[1]	Other Mature Europe[2]
Estimated Capital Positions at end-2009:Q2				
Total reported writedowns to end-2009:Q2	610	350	260	80
Total capital raised to end-2009:Q2	500	220	160	50
Tier 1/RWA capital ratios, in percent at end-2009:Q2 (change from end-2008 in parentheses)	11.5 (+1.1)	8.5 (+1.2)	10.4 (+1.2)	8.9 (+1.6)
Scenario Bringing Forward Expected Earnings and Writedowns				
Expected writedowns 2009:Q3 to end-2010:Q4 (1)	420	470	140	120
Expected net retained earnings 2009:Q3 to end-2010:Q4 (2) (after taxes and dividends)	310	360	110	60
Net drain on equity (retained earnings) (3) = (1) - (2)	110	110	30	60
Capital Needs (to reach target ratio at end-2010:Q4)				
6 percent Tier 1/RWA[3]	0	0	0	0
8 percent Tier 1/RWA	0	150	0	30
10 percent Tier 1/RWA	90	380	0	60
4 percent TCE/TA (25 times leverage)[4]	130	310	120	110

Source: IMF staff estimates.

Note: All figures under local accounting conventions and regulatory regimes, making direct comparisons between countries/regions impossible. The United States, Germany, Ireland, and Spain are among the countries that are in the process of implementing asset purchase and/or asset protection schemes. Some $1 trillion of sales of assets by banks to government asset management corporations (or other non-banks) is assumed. See footnote 1 on treatment of the U.K. Asset Protection Schemes. Columns may not add or compare with Table 1.2 due to roundings. GSE = government-sponsored enterprise. Tier 1 = Tier 1 capital; RWA = risk-weighted assets; TA = tangible assets; TCE = tangible common equity.

[1]Assumes implementation of Asset Protection Schemes (APS) as they are known at mid-September 2009, covering assets with some £585 billion of notional value. APS fees are assumed to be paid in 2009:Q4, and full writedown reduction benefits are assumed to be spread evenly over 5 years. Data in this column are not comparable with data in other tables or figures elsewhere in this document.

[2]Denmark, Iceland, Norway, Sweden, and Switzerland.

[3]The rate the U.S. Federal Deposit Insurance Corporation uses as part of its definition of a "well-capitalized" bank.

[4]The approximate leverage multiple assumed in the deleveraging scenario.

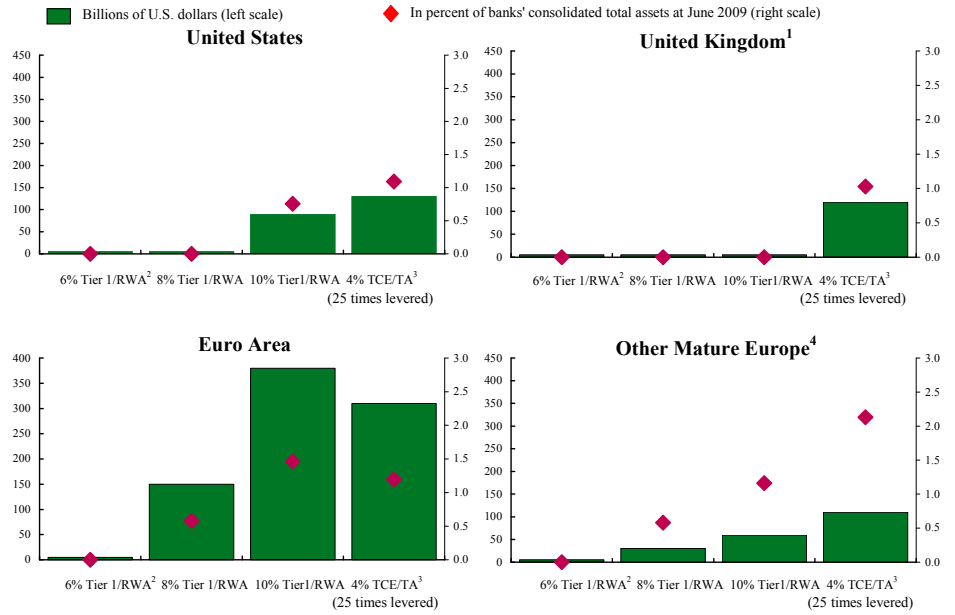
The main message is that banks in all regions have achieved a degree of stability in their capital positions, but that further deleveraging pressures lie ahead, and markets are favoring banks that have already built up their resilience in anticipation of those pressures. Banks with strong capital positions and stable funding profiles will be able to lend as credit demand revives, while those that are still rebuilding capital buffers and terming out their debt will miss that opportunity and will not be able to support the economic recovery. Even if banks raise private capital on the scale indicated in Table 1.3, they will also need to shed assets to achieve the capital adequacy levels indicated. Thus, policies will need to continue to resolve weaker bank balance sheets, protect against downside risks, and strengthen lending capacity. Figure 1.12 summarizes the capital needs under different capital metrics and highlights their scale in relation to the size of respective banking systems.

In many cases, bank capital will need to continue to be rebuilt across all regions. Following the stress test conducted by U.S. authorities, capital markets reopened to U.S. banks, which raised some $104 billion of capital in the first half of 2009, taking their Tier 1 capital to around 11.5 percent of RWA. As investor confidence improved, market focus has switched from initial capital as a limiting factor toward the potential for revenues to keep pace with charge-offs and, thus, for banks to earn their way to stronger capital levels.[16] This is less the case for smaller and regional banks, where capital adequacy remains an issue. Some are likely to experience difficulties, as they are

[16]The capital shortfall of U.S. banks is nearly eliminated on a TCE/TA basis, and substantially reduced on a Tier 1/RWA basis when the same scenarios as in the April 2009 GFSR are re-run under current assumptions. In addition to updating writedown, balance sheet, and capital data, we reduced the stock of assets banks shed through deleveraging by some $3 trillion. Assumed purchases by asset management corporations are also reduced to reflect the more limited scale of the U.S. Public-Private Investment Program, and the fact that governments more generally have shown limited appetite to take assets off bank balance sheets. We also assume a slightly earlier reopening of the securitization market, mainly reflecting the effects of the Federal Reserve's Term Asset-Backed Securities Loan Facility purchases and, to a lesser extent, the ECB's purchases of covered bonds. Top-line bank revenue assumptions have been revised as outlined above.

exposed to late-cycle risks, especially on their commercial real estate exposures. While absolute commercial real estate losses in the United States are likely to be concentrated in large banks, small commercial banks had almost half of their loan exposures tied to commercial real estate as of end-2008. Worryingly, about 12 percent of all U.S. banks had commercial real estate exposures exceeding five times their Tier 1 capital, posing a significant threat to their solvency.

Figure 1.12. Bank Capital Needs



Source: IMF staff estimates.

Note: All figures under local accounting conventions and regulatory regimes, making direct comparisons between countries/regions impossible. The overall deleveraging scenario--which is reflected in the figures in this Figure--incorporates some $1.1 trillion of sales of assets by banks to government asset management corporations (or other nonbanks). The United Stated, Germany, Ireland, and Spain are among the countries that are in the process of implementing asset purchase and/or asset protection schemes. See footnote 1 on treatment of the U.K. Asset Protection Schemes. Tier 1 = Tier 1 capital; RWA = risk-weighted assets; TA = tangible assets; TCE = tangible common equity.

[1]Assumes implementation of Asset Protection Schemes (APS) as they are known at mid-September 2009, covering assets with some £585 billion of notional value. APS fees are assumed to be paid in 2009:Q4, and full writedown reduction benefits are assumed to be spread evenly over five years. Data in this panel are not comparable with data in other tables or figures elsewhere in this document.

[2]The rate the U.S. Federal Deposit Insurance Corporation uses as part of its definition of a "well-capitalized" bank.

[3]The approximate leverage multiple assumed in the deleveraging scenario.

[4]Denmark, Iceland, Norway, Sweden, and Switzerland.

Since the start of the crisis, European banks have raised $437 billion in Tier 1 capital, of which $92 billion has been raised this year—mostly in preferred share and subordinated debt issues.[17] On a system-wide basis, banks exceed minimum capital levels, but would benefit from additional tangible capital to better absorb impending losses and revive lending.

In general, those European banks with significant exposures to emerging Europe also enjoy large and diversified franchises and revenue bases, so a relatively large deterioration of assets domiciled in the region should be manageable. However, losses are likely to be unevenly distributed.

[17]A notable feature has been the high number of bond buybacks and exchanges in 2009, where European banks took advantage of distressed prices to buy back subordinated debt and hybrid capital instruments at heavy discounts, thus locking in capital gains to the issuer and boosting core Tier 1 ratios. Thus far, such exchanges have enabled investors to trade junior securities for more senior debt, but regulators are now pushing for troubled banks to exchange subordinated debt into more junior instruments to strengthen their core capital base.

Austria's two largest banks derive the majority of their revenues from the region, while some Swedish banks have already incurred sizable losses on their exposures to the Baltics. The Balkans account for 12 percent of the Greek banking system's assets. Stress tests conducted by authorities in Austria, Sweden, and Greece concluded that their banking systems' losses should remain manageable.

While we have not completed a comparable analysis of the Japanese banking system, major Japanese banks had raised over ¥3 trillion ($32 billion) in private capital in 2009 through June, helping to maintain their Tier 1 capital at close to 7.7 percent during FY2008. The share of preferred stock and hybrid instruments in Tier 1 capital remains high for major banks, at between 20 and 60 percent, but has been declining over time, while core Tier 1 capital or tangible common equity measures are correspondingly lower. For regional banks (which do not have much preferred equity), Tier 1 ratios have also remained broadly steady at around 8 percent. While major banks' shareholdings halved between FY2001 and FY2004, these holdings are equivalent to nearly half of Tier 1 capital and remain a key source of market risk (as was realized when equity prices collapsed during the crisis). That said, the shareholdings are relatively long-term investments as they mainly reflect cross-shareholdings with key borrowers and related investors.

Dealing with troubled assets remains a policy priority and a challenge.

Reassuring stress test results and signs of economic stabilization have relieved some of the immediate pressure to deal with toxic and other impaired assets on bank balance sheets, but authorities, banks, and investors need to persevere with these programs. In countries where banks remain undercapitalized, dealing effectively with such assets is necessary to crystallize and ring-fence losses; provide capital markets with greater certainty over future losses, earnings, and capital; and facilitate recapitalization as necessary. Only when this source of uncertainty has been substantially reduced can banks fully participate in providing credit for recovery.

In countries where the banking system has sufficient capital, refinement of the mechanisms for addressing toxic and other impaired assets remains a priority. A functioning mechanism for asset transfer will provide reassurance if further market or credit losses place banks' capital adequacy in question. In addition, such a mechanism will provide much-needed pricing transparency for these illiquid assets and loans; attract capital from fresh sources (e.g., distressed asset funds); and help provide balance sheet space so that banks can extend new credit and diversify their current highly correlated exposures.[18]

A range of policies to address legacy assets has been announced but implementation remains gradual.

In the United States, the Private Public Investment Program (PPIP) has faced significant hurdles. Banks have been unwilling to sell loans into the program on concerns of realizing losses, while the results of the Supervisory Capital Assessment Program (SCAP) and the rebound in securities prices has made the sale of legacy securities less attractive. In addition, participation has been interpreted as a potentially negative signal of funding difficulties for banks and may put investors at risk of ex post government expropriation of any supernormal profit. The authorities could make additional adjustments to the program to further encourage bank participation.

"Bad bank" schemes in Europe are mainly in their early stages but show promise. They need to be structured and operated so as to provide adequate relief for banks with legacy positions and toxic assets. For instance, the creation of "bad banks" in Germany, designed to transfer troubled assets to special-purpose vehicles, is a positive step, but the lack of upfront recognition of losses is a

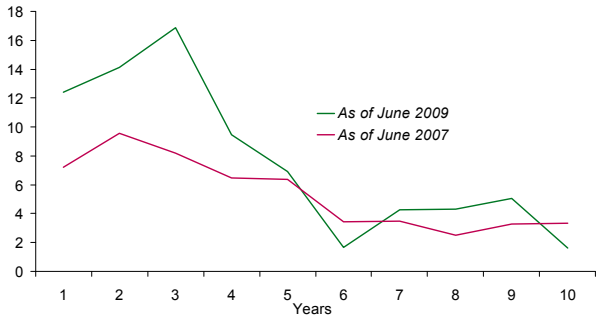
[18]The IMF's Banking Stress Index (derived from credit default swap correlations) remains elevated (Figure 1.38), suggesting that banks remain vulnerable to the failure of one of their counterparts.

concern.[19] In the United Kingdom and Ireland, the authorities are in the process of setting up programs for problem assets, but some details still need to be finalized.[20] In Spain, the creation of a government fund to assist bank restructuring can provide a backstop against systemic risk, and the newly established Fund for Ordered Bank Restructuring could also trigger consolidation among the *Cajas*—indeed, some mergers are already under way. [21]

Can banks rely on private markets for funding without government guarantees and central bank liquidity support?

Despite the reopening of wholesale funding and capital markets, refinancing risks continue to mount for some. Stronger banks are now able to borrow without public guarantees in wholesale markets, but access is still difficult for others. In addition, private-term funding issuance remains well below pre-crisis levels and costly. Banks that issued record volumes of debt during the credit bubble lost the capacity during the crisis to manage their maturity profiles. As a result, rollover volumes now peak around two to three years ahead (versus a much flatter profile prior the crisis), with an unprecedented $1.5 trillion of bank debt due to mature in the euro area, the United Kingdom, and the United States by 2012 (Figure 1.13).[22]

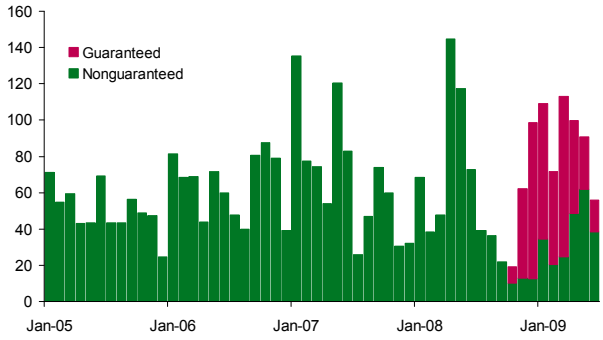
Figure 1.13. Mature Market Banks: Bond Debt Maturity Structure
(Percent of debt maturing over 12-month periods against initial outstanding)



Soruces: Dealogic; and IMF staff estimates.
Note: Percentages do not add to 100 in the above graph since bonds maturing in more than 10 years are not shown.

Although banks are less reliant on government-guaranteed debt support (Figure 1.14), in some cases this reflects a perceived stigma rather than the lack of a need for funding. Many such schemes expire at year end, but consideration should be given to maintaining schemes as a safety net, while ensuring rates charged encourage banks to seek refinancing from wholesale and other sources.

Figure 1.14. Mature Markets: Gross and Guaranteed Bond Issuance by Month
(In billions of U.S. dollars)



Sources: Dealogic; and IMF staff estimtes.

[19]The scheme allows the spreading of losses over 20 years rather than an upfront recognition.

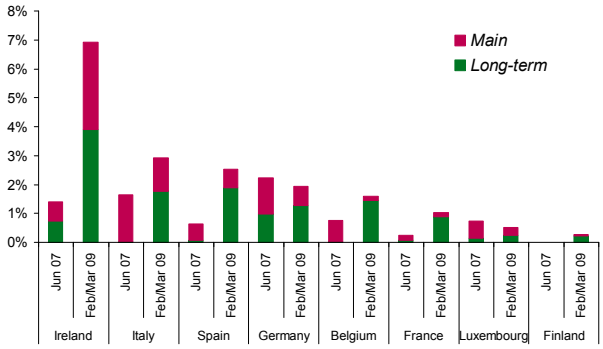
[20]In the United Kingdom, based on information available in mid-September 2009, the APS will provide backstop insurance to RBS and Lloyds Banking Group for £585 billion of assets. In Ireland, the National Asset Management Agency will relieve Irish banks of €77 billion of loans.

[21]The Fund for Ordered Bank Restructuring can borrow up to 10 times its initial capital (of €9 billion) to assist banks in different ways, including providing liquidity.

[22]The peak rollover in 2012 of $730 billion exceeds the peak pre-crisis issuance of $630 billion in 2006 at the height of the credit bubble.

By the same token, further reforms may be needed to strengthen banks before central banks can fully exit from extensive liquidity support. For example, Figure 1.15 shows that the usage of European Central Bank (ECB) liquidity facilities varies substantially across countries. While some demand is driven by carry trades (where cheap ECB liquidity is funding government bond purchases or interbank lending), other banks depend on central bank liquidity because private funding markets have yet to fully reopen. In addition, prior to the crisis, many banks ran aggressive liquidity strategies reliant on repo, rehypothecation, and securities lending (Singh and Aitken, 2009). With greater conservatism from investors, these funding models are becoming less leveraged and less profitable.

Figure 1.15. European Central Bank Refinancing Facilities
(In percent of total assets of domestic banks)

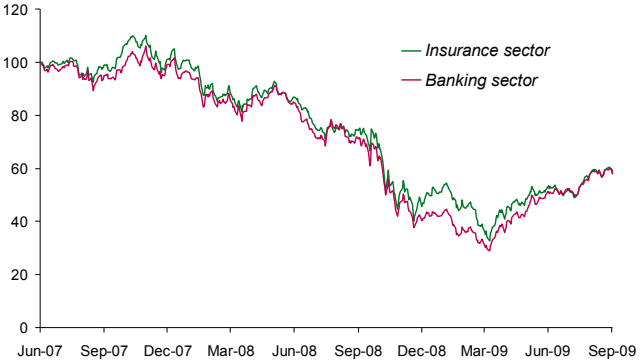


Source: Bankscope; national central banks; and IMF staff estimates.

Life insurance companies have recovered, but risks remain.

The market capitalization of insurance companies came under similar pressures as banks due to exposure to risky assets (notably mortgage-related securities and commercial real estate loans) and as a result of weakened macroeconomic conditions. In addition, life insurance companies have significant investment exposure to banks through equity and bond securities holdings. Hence, despite significantly different asset and liability structures, insurance and bank equities have been highly correlated during the crisis (Figure 1.16).

Figure 1.16. Global Bank and Insurance Equity Indices
(6/1/2007 = 100)



Source: Bloomberg L.P.

On regulatory measures of capital, many companies have reported lower solvency ratios, but they generally remain well above regulatory minima. Life insurers' accounting treatment has enabled a slower recognition of investment losses so that much of the market adjustment since mid-2008 has been reflected in equity rather than earnings. Consequently, unrealized losses could still be a drag on performance and on companies' capacity to increase new business. In addition, vulnerabilities remain from particular risk concentrations, notably commercial real estate loans, property holdings, and commercial mortgage-backed securities. However, the most significant long-term threat to life insurer solvency is a prolonged period of economic weakness accompanied by low interest rates, which would raise the cost of fulfilling guarantees (e.g., on rates of return, values at maturity, or annuity rates).

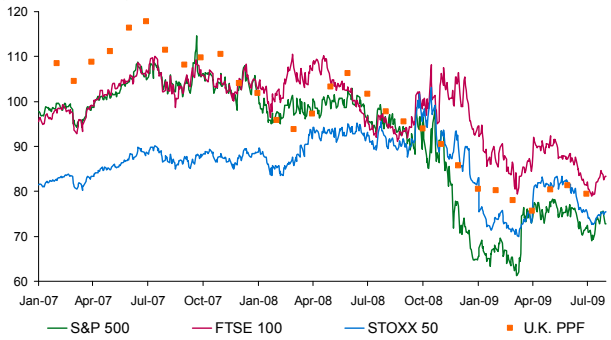
Defined benefit pension plans appear underfunded, notwithstanding the recovery in equity values.

The average funding ratio of privately sponsored defined-benefit plans fell substantially in 2008 and showed only modest recovery in 2009 (Figure 1.17). On average, Organization for

Economic Cooperation and Development (OECD) country pension plans lost 25 percent of their asset value, mainly due to equity exposure.[23] Equity markets have yet to improve sufficiently to offset falls in corporate bond yields used to calculate the present value of many pension plan liabilities.

Figure 1.17. Funding Levels of Defined Benefit Pension Plans of Companies in Major Equity Indices

(100 = fully funded)



Sources: Hewitt; and U.K. Pension Protection Fund (PPF).

The policy response to growing underfunding has included the introduction of temporary measures to relax short-term funding requirements in order to forestall forced fire sales of risky assets in illiquid markets. However, in countries with a large stock of defined-benefit liabilities, such flexibility in funding during difficult market conditions postpones the necessary balance sheet adjustment by plan sponsors and needs to be matched by a determination to increase contributions during better economic times. As with life insurers, low long-term interest rates now pose the greatest threat to defined-benefit plan solvency.[24]

C. Emerging Markets Navigate the Global Crisis but Vulnerabilities Remain

The international policy response has stabilized global markets and eased crisis risks in emerging markets. Still, refinancing and default risks in the corporate sector continue to be relatively high, especially in parts of emerging Europe, but also for smaller, leveraged corporations in Asia and Latin America.[25] Countries heavily dependent on external financing and cross-border funding are most vulnerable. Exiting stimulus policies in recovering economies adds a new challenge.

Crisis risks in emerging markets have been curtailed by a forceful internationally coordinated policy response.

Increased IMF resources and the launch of the Flexible Credit Line have helped boost investor confidence in emerging markets in general.[26] Regional coordination between private and public sector agents has been successful in averting a collapse of capital flows to emerging Europe. Swap lines with central banks have improved foreign exchange swap liquidity in emerging markets, and massive liquidity injections by core market central banks have reduced acute deleveraging pressures and supported investor risk appetite. Against this backdrop, emerging market domestic monetary policies have successfully been aimed at easing liquidity and credit conditions. Mirroring policies in core markets, unconventional credit-easing measures have buffered the crisis in many emerging economies. Countries with high levels of international reserves have judiciously supported corporates with large external financing needs, while at the same time encouraging debt restructuring and burden-sharing with foreign creditors.

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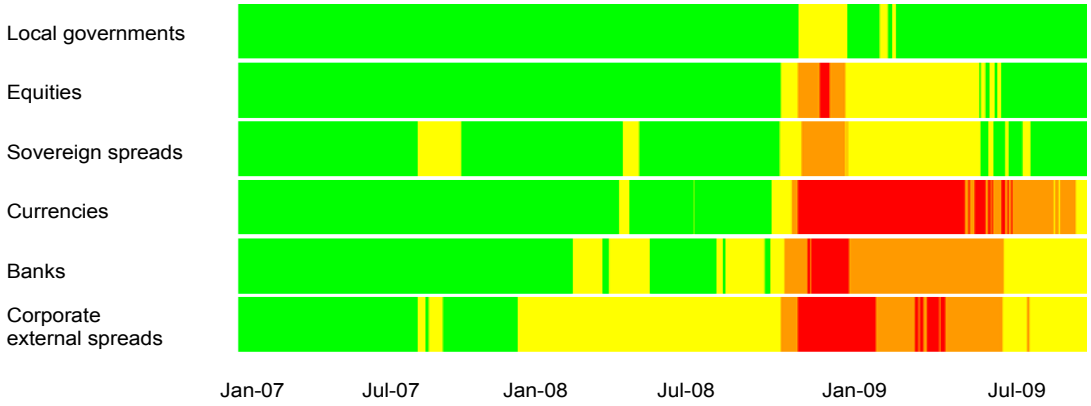
[23]According to the OECD database on pensions.

[24]The U.K. Pension Protection Fund provides a "rule of thumb" that a 0.3 percent reduction in gilt yields increases insured scheme liabilities by approximately 6 percent (about £56 billion).

[25]We use the term "emerging Europe" to signify the group of countries in central and eastern Europe, as well as the largest emerging markets in the Commonwealth of Independent States.

[26]See Box 1.4 in the April 2009 GFSR.

Figure 1.18. Heat Map: Developments in Emerging Market Systemic Asset Classes

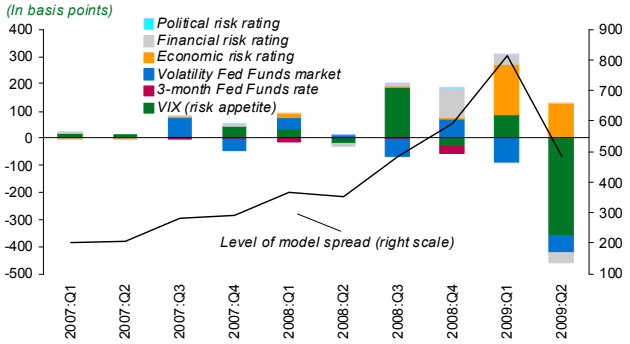


Source: IMF staff estimates.
Note: The heat map measures both the level and one-month volatility of the spreads, prices, and total returns of each asset class relative to the average during 2003-06 (i.e., wider spreads, lower prices and total returns, and higher volatility). The deviation is expressed in terms of standard deviations. Green signifies a standard deviation under 1, yellow 1-4 standard deviations, orange 4-7, and red greater than 7.

Emerging market asset prices have performed strongly since early spring (Figure 1.18), with sustained rallies in equities and external debt. However, our Emerging Market Bond Index Global (EMBIG) spreads model indicates that the decline in sovereign debt spreads has been driven almost entirely by improved global risk appetite and core market liquidity, whereas domestic economic fundamentals continued to deteriorate in many countries through the second quarter (Figure 1.19). More recently, some fundamentals have started to turn around, such as the external balance and official reserves, as well as growth prospects.

Figure 1.19. Contributions to Changes in Emerging Market Sovereign External Spreads

(In basis points)



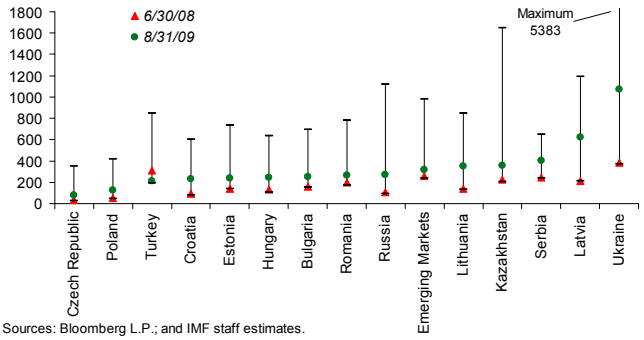
Sources: Bloomberg L.P.; The PRS Group; and IMF staff estimates.
Note: For details of the model, see Box 1.5 of the April 2006 GFSR.

Financial stresses have eased substantially in emerging Europe...

Several economies in emerging Europe rebounded from the extreme strains in early 2009 as policies were able to prevent capital flight, provide support for exchange rates, limit the reversal of foreign funding to domestic banking systems, and reduce default risks. As a result, across a range of financial assets, vulnerable emerging European markets have strengthened and near-term tail risks have abated. This is most evident in sovereign credit default swap (CDS) spreads, which are close to their levels preceding the

Figure 1.20. Emerging Europe Credit Default Swap Spreads, June 30, 2008 to August 31, 2009

(In basis points)



Sources: Bloomberg L.P.; and IMF staff estimates.
Note: Vertical lines represent the high/low range for the period.

collapse of Lehman Brothers (Figure 1.20). In general, financial markets in those countries with stronger macroeconomic fundamentals, such as the Czech Republic and Poland, have fared better throughout the crisis.

...but vulnerabilities remain high in the region.

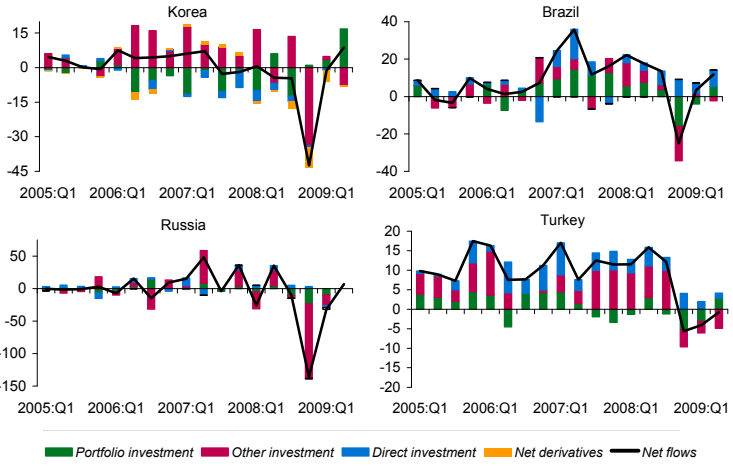
Vulnerabilities remain high in many countries in emerging Europe (Table 1.4). Although current account balances have generally improved in emerging markets, reducing overall external financing needs, this has come at the cost of a collapse in imports and severe recessions in many countries. Moreover, estimated external debt refinancing needs in 2010 are still significantly high relative to foreign reserves in several countries, and dependence on external bank financing, coupled with a high share of foreign-currency private sector debt, continues to expose the region to risks of exchange rate instability and accelerated retrenchment in cross-border lending.

Asia and Latin America have benefited most from the stabilization of core markets and a recovery in portfolio inflows.

As growth prospects have improved for Asia and Latin America, portfolio inflows have more than compensated for the drop-off in bank-related flows in much of these regions during the first half of 2009. Data for the larger and more liquid markets, such as Brazil and Korea, show that the dramatic bank-related outflows (classified as "other investment") in late 2008 have abated. Policymakers in Asia and Latin America have been successful in using international reserves and swap facilities with core market central banks to help restore confidence in domestic banks and corporates, having convinced foreign creditors to maintain exposures.

Although portfolio flows into emerging Europe have also rebounded in recent months, net capital flows have been subdued by bank-related outflows (Figure 1.21). For example, the sharp contraction in other investment flows to Russia in late 2008, reflecting a collapse in external debt rollovers for both banks and corporates, appears to be reversing only gradually.[27] Cross-border bank flows to eastern European subsidiaries have been relatively resilient, reflecting commitments by parent banks to maintain funding, but even these countries' banking systems faced reduced cross-border funding early this year. Going forward, there is a risk of continued retrenchment in cross-border bank flows to these countries, as parent banks seek to curtail credit losses and shrink their balance sheets.

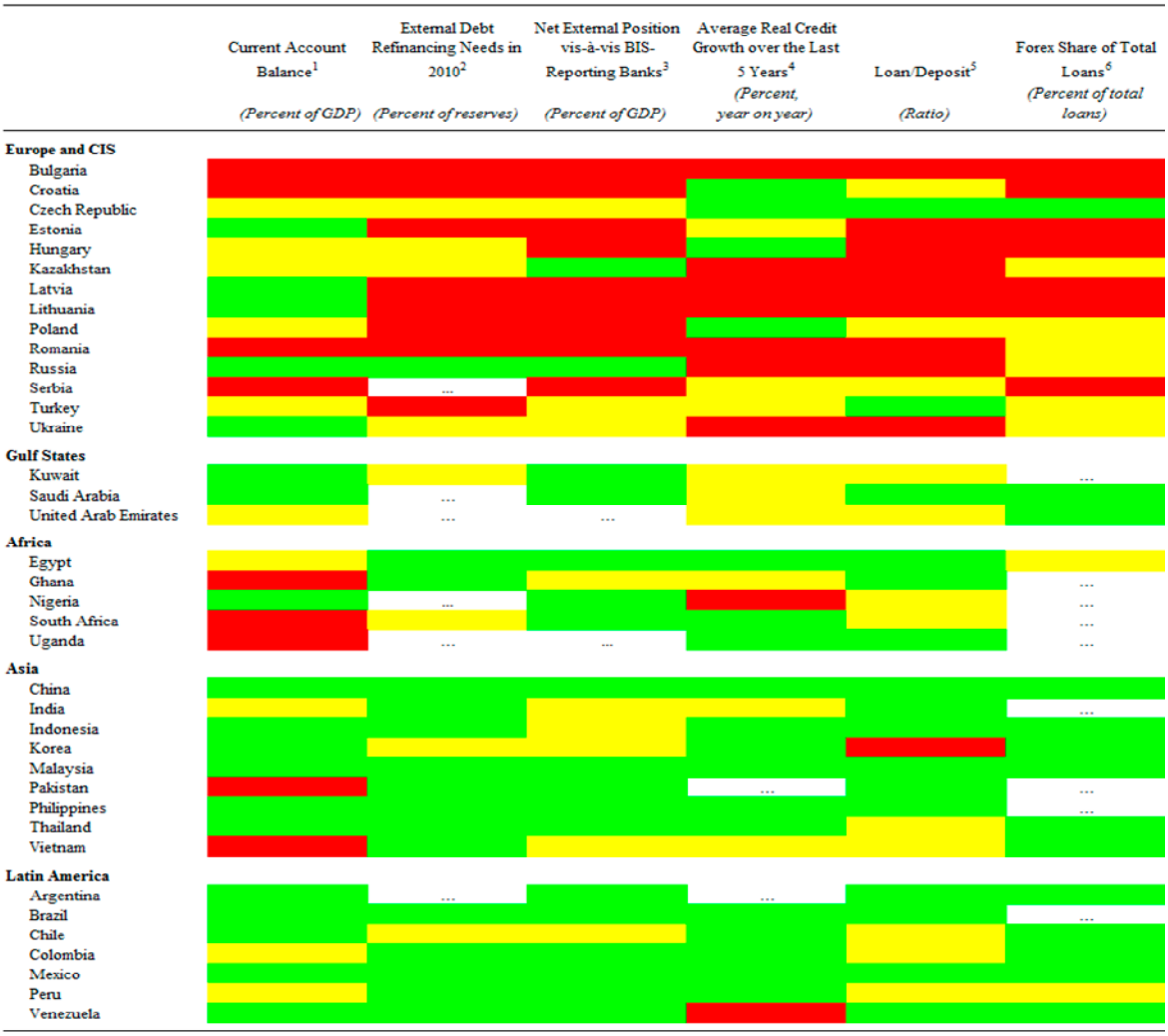
Figure 1.21. Net Capital Inflows
(In billions of U.S. dollars)



Sources: IMF, Balance of Payments database; national authorities; and IMF staff estimates.
Note: Excludes reserves and IMF lending. Data are through 2009:Q2. For Russia, data by investment category for 2009:Q2 were not available when the GFSR went to press.

[27]The decline in other investment inflows was partly ameliorated by the loss of international reserves, which has allowed banks to accumulate foreign currency assets that could be used to pay down maturing debt.

Table 1.4. Heat Map of Macro and Financial Indicators in Selected Emerging Market Countries



Sources: Bloomberg L.P.; Bank for International Settlements (BIS); IMF, Direction of Trade Statistics, International Financial Statistics, and World Economic Outlook databases, and IMF staff estimates.

Note: The heat map measures the extent of vulnerabilities relative to other countries for each indicator. Red represents the quartile with highest vulnerabilities, yellow the quartile with second-highest vulnerabilities, and green the remaining two quartiles. Care should be taken in interpreting the figure, as red shading does not necessarily mean high absolute vulnerabilities. "..." signifies missing data. CIS = Commonwealth of Independent States.

[1]Projections of the current account balance and GDP for 2009 in dollar terms from the WEO.

[2]Estimated short-term debt at initial maturity at end-2009 plus estimated amortizations on medium- and long-term debt during 2010, divided by estimated official reserves at end-2009. Care should be taken in interpreting the figures as circumstances among countries differ. The figures include obligations resulting from lending by foreign parent banks to domestic subsidiary banks, so the stability of the relationship between parents and subsidiaries needs to be taken into account. Some countries have sovereign wealth funds whose assets may not be included in reserves.

[3]Data on external positions of reporting banks vis-à-vis individual countries and all sectors from the BIS (statistics on banking, Table 6A), as of March 2009, scaled by 2008 GDP. Some countries with net external liabilities vis-à-vis BIS reporting banks have net external assets vis-à-vis all institutions.

[4]Five-year average of annual growth of credit to the private sector, adjusted for inflation. Measured over a 60-month period up to June 2009 or latest.

[5]Credit to the private sector relative to demand, time, saving, and foreign currency deposits as of June 2009 or latest from the International Financial Statistics database.

[6]2009 estimates or latest.

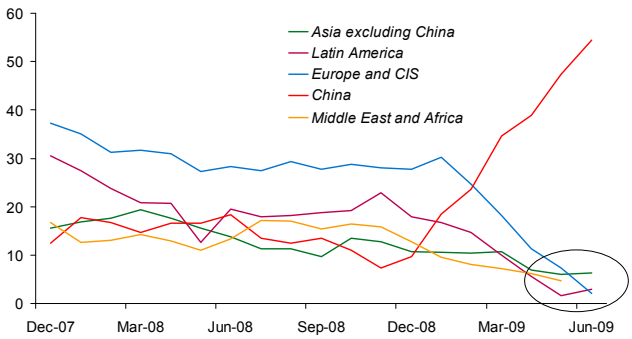
Policies in Asia and Latin America have been successful in supporting credit...

Bank credit growth in Latin America and Asia (excluding China) has stabilized in recent months, suggesting that policy actions have been successful in halting the downward spiral in financial conditions and growth that was occurring in late 2008 and early 2009. Still, credit growth in Latin America remains sluggish, as private banks remain cautious amid uncertainty about the strength of the economic recovery in the region and in the United States. Credit growth has continued to slow in Europe, where many countries are more heavily reliant on cross-border funding that has become scarce (Figure 1.22).

...which together with resurgent capital inflows is shifting the balance of risks toward asset price bubbles in some Asian countries.

In Asia, property and equity prices have appreciated in some countries at an early stage of economic recovery, partly as a result of liquidity inflows from mature markets. In China, the rapid pace of credit growth runs the risk of creating asset price inflation and misallocating resources, ultimately worsening bank credit quality (Figure 1.22). The Chinese authorities have already undertaken some measures to limit credit growth. However, given the risks, policymakers in the region should be prepared to further withdraw monetary stimulus when the ongoing economic recovery is firmly established to avoid risks associated with the buildup of asset price bubbles.

Figure 1.22. Emerging Markets: Bank Credit to the Private Sector
(Six-month percent change, annualized rate)

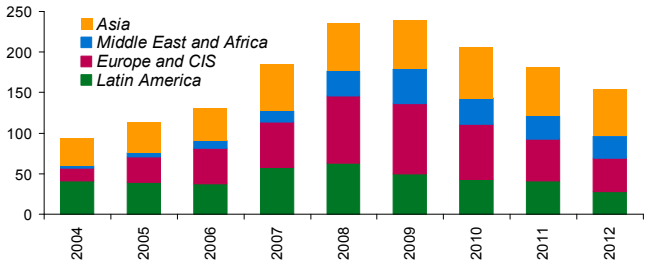


Sources: IMF, International Financial Statistics database; and IMF staff estimates.
Note: CIS = Commonwealth of Independent States.

Many emerging market corporates face substantial rollover risks, particularly in Europe and the Commonwealth of Independent States.

Emerging market corporates and banks are facing large debt maturities going forward, with debt service of foreign-currency-denominated bonds and syndicated loans estimated at a total of $400 billion over the next two years, and with a concentration of maturities in end-2009 and early 2010 (Figure 1.23).[28] Emerging market external bond issuance generally recovered during the first half of 2009, but subinvestment grade corporates remain largely shut out of the market (Figure 1.24). Thus, corporate refinancing risks remain high and are most pronounced in emerging Europe, where the external bond market remains virtually

Figure 1.23. Refinancing Needs of Emerging Market Forex-Denominated Corporate Debt
(In billions of U.S. dollars)



Sources: Bloomberg L.P.; and IMF staff estimates.
Note: Repayment of principal and coupon on bonds and loans. Asia = China, India, Indonesia, Malaysia, Korea; Latin America = Argentina, Brazil, Chile, Mexico; Europe and CIS = Hungary, Kazakhstan, Poland, Russia, Turkey, Ukraine; Middle East and Africa = South Africa, United Arab Emirates. CIS = Commonwealth of Independent States.

[28]Foreign-currency-denominated corporate refinancing needs are higher than those displayed in Figure 1.23, as the underlying data do not account for short-term and bilateral debt.

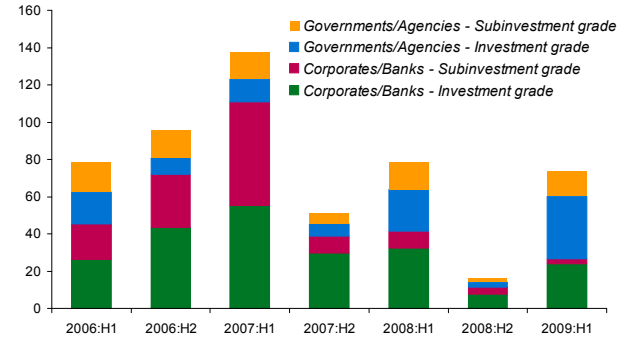
closed to most corporates and banks. Further, corporate external debt rollover rates for the region have been weak compared to historical levels and have not rebounded as in other regions (Figure 1.25).[29]

If risk sentiment deteriorates again, corporate refinancing gaps could reemerge and represent a potential large drain on international reserves, particularly in emerging Europe. Given the need for financing substantial fiscal deficits over the next few years and maintaining a minimum level of precautionary reserves, governments may have to limit the use of reserves for supporting corporates going forward. Indeed, corporates in the Commonwealth of Independent States are increasingly being allowed to default and restructure, rather than being bailed out by their governments, pushing part of the losses on to international creditors. Such burden-sharing will continue to be an important part of resolving the credit crisis in emerging Europe, but will likely exert a drag on market access to external financing over the next couple of years, dimming prospects for a quick recovery in capital inflows.

Reflecting investor perceptions of relative credit risks, bond spreads for emerging European corporates, although having fallen significantly, remain elevated relative to other regions (Figure 1.26). Corporate defaults have picked up in all regions, and market participants expect the default rate to double in the Commonwealth of Independent States over the next year to around 15 percent of outstanding speculative grade debt, from very low levels in earlier years.[30] Debt restructurings in Latin America and

Figure 1.24. Emerging Market External Bond Issuance by Sector and Rating

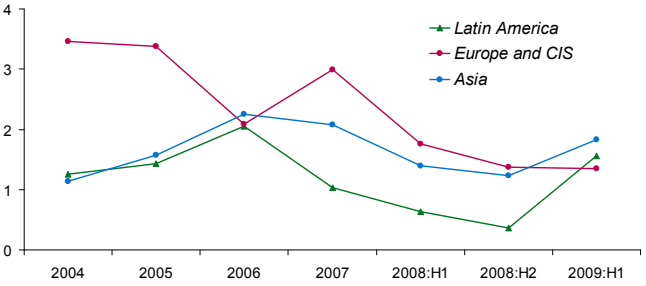
(In billions of U.S. dollars)



Source: Bond Radar.

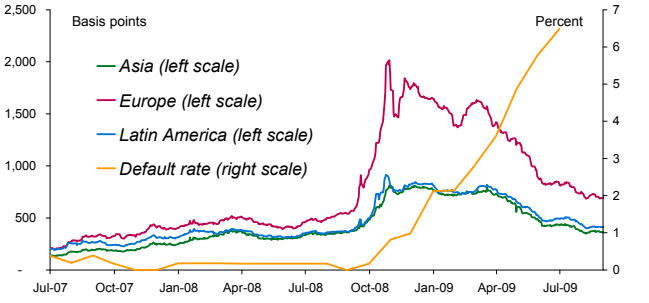
Figure 1.25. Rollover Rate of Emerging Market Forex-Denominated Corporate Debt

(In percent)



Sources: Bloomberg L.P.; and IMF staff estimates.
Note: Issuance over principal and coupon repayment on bonds and loans. Asia = China, India, Indonesia, Malaysia, Korea; Latin America = Argentina, Brazil, Chile, Mexico; Europe and CIS = Hungary, Kazakhstan, Poland, Russia, Turkey, Ukraine. CIS = Commonwealth of Independent States.

Figure 1.26. Emerging Market Corporate Spreads and Speculative-Grade Default Rate



Sources: JPMorgan Chase & Co; and Standard & Poor's.
Note: Regions conform to JPMorgan groupings. Asia = China, Hong Kong SAR, India, Indonesia, Korea, Macao SAR, Malaysia, Philippines, Singapore, Taiwan Province of China, Thailand; Europe = Kazakhstan, Russia, Turkey, Ukraine; Latin America = Argentina, Brazil, Chile, Colombia, Jamaica, Mexico, Panama, Peru, Venezuela.

[29]Owing to aggregation, the estimated rollover rates may contain an upward bias, particularly in emerging Europe, as the rotation of issuance toward large state-owned enterprises masks rollover difficulties for smaller private companies.

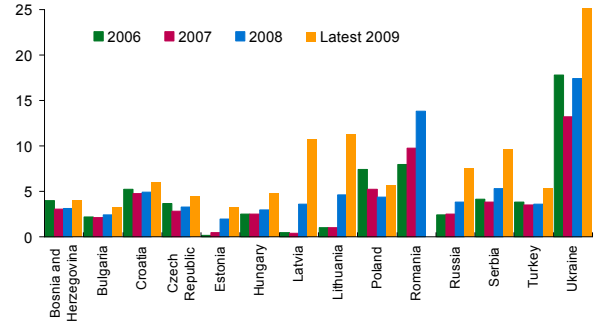
[30]The default rate on Kazakh corporate external bonds has already exceeded 30 percent.

Asia have generally been swifter than in emerging Europe, with creditors more willing to maintain exposures to these regions in light of better macro fundamentals and growth prospects. Government guarantees have helped to reduce refinancing concerns among Korean banks, where risks were relatively more acute at the beginning of the year. Larger corporates in emerging Asia and Latin America have also been able to rely on local capital markets for their refinancing needs.

Rising loan losses are likely to pressure bank balance sheets in emerging Europe for years to come.

As economic conditions have worsened in emerging Europe, the level of nonperforming loans has started to increase (Figure 1. 27). Corporate loan quality has been deteriorating more rapidly than household credit quality, reflecting the higher leverage and the worsening business climate, and overall loan quality is likely to deteriorate further in the next 12 to 18 months.[31] Nonperforming loan ratios are forecast to peak between 50 and 100 percent above current levels, according to various central bank projections. While the current level of provisions is generally sufficient to cover loan losses at this time, the additional provisioning required going forward will limit banks' capital positions and their ability to issue new loans.

Figure 1.27. Emerging Europe: Nonperforming Loan Ratios
(In percent)



Source: National authorities.
Note: Due to differences in national accounting, taxation, and supervisory regimes, as well as changes in definition, nonperforming loans are not strictly comparable across countries or with historical data.

Policies in emerging Europe need to be aimed at restoring the health of the banking system and managing an orderly deleveraging process.

Financial policies in the region should be aimed at managing an orderly adjustment of bank, corporate, and household balance sheets. This will prevent a resumption of the adverse feedback between financial conditions and the real economy and limit the risk of contagion among vulnerable countries. Decisive measures are required to deal with nonperforming assets and troubled banks, including removal of problem assets from bank balance sheets, bank resolution, and recapitalization. This will limit the scope for further banking sector deterioration and prevent the possibility that weak banking systems will impede the recovery from the current recession. Further, while governments should continue to support viable corporates facing rollover difficulties, there may be a need for encouraging further debt restructurings to share the burden of losses with international creditors.

D. Will Credit Constraints Hurt the Recovery?

Credit constraints continue to operate—as bank balance sheets remain under pressure and securitization markets are impaired—and pose a downside economic risk. Private sector credit growth continues to edge lower, reflecting the weak economic backdrop and household sector deleveraging. Total borrowing needs are not decelerating as rapidly, due to burgeoning public sector needs. The likely result is financing gaps in the United States, euro area, and the United Kingdom, which may require further price adjustments and/or continued credit support by central banks.

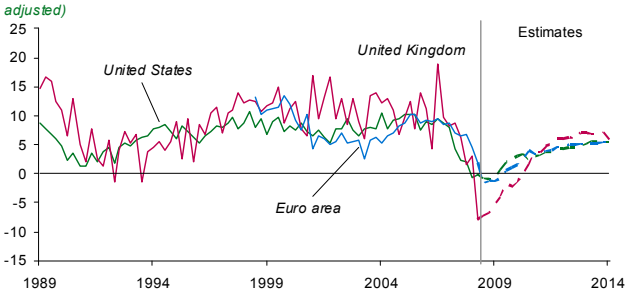
[31]Household debt is generally secured by property, and therefore estimates of loss given default tend to be significantly higher for corporate loans compared to household loans.

Credit has continued to contract across the major economies as leverage is unwound.

As banks and parts of the nonbank sector delever their balance sheets, private credit extended continues to contract.[32] Financial institutions and households had built up record levels of debt, but that leverage needs to be unwound in an orderly manner. In the United States, credit growth to the private sector declined over the latest two quarters of data, but only mildly, and slowed only slightly to 1.9 percent in the euro area, while credit contracted 7.9 percent in the United Kingdom (Figure 1.28) in the latest quarter. These declines represent historically unprecedented credit withdrawals and sharp reversals compared to the rates of growth seen during the preceding credit boom period. In Japan, borrowing rates have fallen considerably from previous highs, while bank credit growth has picked up. This sets Japan apart from the United States, the euro area, and the United Kingdom, and for this reason it is not included in our credit analysis below.

Figure 1.28. Private Sector Credit Growth

(Borrowing as a percentage of debt outstanding, quarter-on-quarter annualized, seasonally adjusted)



Source: IMF staff estimates.

Note: Projections are based on estimated credit demand from households and nonfinancial corporates (Table 1.5). If overall demand exceeds the credit provision capacity in the system (after meeting sovereign borrowing needs), then actual borrowing is assumed to be constrained by the available capacity, including the impact of government and central bank policies. Please see Table 1.7 for more details.

Compared to the April 2009 GFSR, our updated projections have credit declining less sharply in the United States and euro area as a result of actions taken by the authorities and improved conditions for banks that reduce deleveraging pressures, some offset from the relatively robust nonbank channels, and aggressive support provided by central banks, including direct asset purchases.[33] Credit declines more in the United Kingdom in part due to relatively stronger bank deleveraging and other factors discussed below.

Weak economic activity and household deleveraging will restrain private sector credit demand...

Private sector borrowing needs are likely to remain weak in the near term, consistent with reduced investment and consumption spending and household deleveraging on the back of further home price declines (see Table 1.5 and Annex 1.4 for more details).[34] In the United States, overall

[32]This GFSR contends that the credit disruption has been an exogenous and significant factor in the global recession that began in 2008. However, it could be argued that the slowdown in credit is a symptom rather than a cause of the economic slowdown and merely reflects the lower demand for credit—from households and corporates—rather than a supply disruption. Disentangling supply from demand factors in credit growth is a notoriously difficult exercise, and we do not try to resolve this debate by rigorous empirical analysis. See, instead, Kashyap, Lamont, and Stein (1994), Bernanke and Gertler (1995), Oliner and Rudebusch (1996), Kashyap and Stein (2000), and Peek and Rosengren (2000) for a discussion of this issue. The general conclusion is that credit supply side factors appear to affect economic activity.

[33]The strength in corporate bond issuance activity so far this year attests to the strength of the nonbank channel.

[34]Demand is estimated for three broad sectors—nonfinancial corporates, residential mortgages, and nonmortgage consumer credit—by regressing sectoral credit growth on macroeconomic indicators (see Annex 1.4 for further details). We assume that there were no supply constraints operating over our estimation period, and actual borrowings by sector trace out the respective demand curve. The projections are consistent with WEO projections for the relevant macro variables.

Table 1.5. Growth of Credit Demand from Nonfinancial Private Sector
(In percent)

	Percent of Outstanding as of 2008:Q4	Actuals		Projections	
		2002-07	2008	2009	2010
Euro Area		7.2	5.9	1.4	3.5
Household credit[1]	39	7.8	3.6	-0.3	1.7
Mortgages	29	9.4	1.8	-1.3	1.6
Consumer loans	5	3.6	2.3	1.2	1.7
Corporate credit	61	7.0	8.1	2.6	4.5
United Kingdom		10.2	7.1	-3.2	1.1
Household credit	46	10.6	3.3	-0.8	0.1
Mortgages	38	11.4	3.3	-0.6	-0.4
Consumer loans	8	7.3	3.0	-1.5	2.4
Corporate credit	54	10.0	10.6	-5.3	1.9
United States		9.3	2.4	-0.8	1.7
Household credit	55	10.2	0.0	-0.5	1.9
Mortgages	44	11.7	-0.4	0.5	2.8
Consumer loans	11	5.0	1.7	-4.6	-2.0
Corporate credit	45	8.3	5.1	-1.1	1.5

Sources: National authorities; and IMF staff estimates.
Note: Data for 2002-08 are actual borrowing; 2009 and 2010 are projected credit demand. Actuals represent credit growth observed reflecting our assumption that there were no supply constraints over the 2002-2008 period.

[1]Euro area household credit includes other credit categories not shown here, accounting for 5 percent of total private sector debt.

private sector demand is expected to contract this year, with consumer credit leading the decline, followed by corporate credit and mortgages. Overall private credit demand is expected to remain weak through 2010, growing at a historically low annual rate of 0.5 percent, with consumer credit contracting 3.3 percent over 2009–10 on the back of weak consumption growth, while corporate credit should post positive, albeit still modest, growth. Given the bottoming in home prices and policy actions taken to address mortgage affordability, mortgage demand is likely to recover more quickly, but still remain well below the recent historical trend. In Europe, demand for mortgage, consumer, and corporate credit is projected to weaken this year, as unemployment rises, home prices decline further, and private consumption and corporate profits remain weak. Demand for corporate credit is expected to contract especially sharply in the United Kingdom, partially reversing the ramp-up in 2002–08.[35] This brings the overall growth in demand to a low of 1.4 percent in the euro area and an outright decline in the United Kingdom this year. As in the United States, overall demand is expected to remain tepid across all sectors in Europe through 2010.

...but surging sovereign issuance will significantly offset the decrease in private sector credit demand...

Fiscal deficits have surged in most mature market economies as policymakers have sought to counteract weakness in aggregate demand and shore up financial systems (see Section E). Net

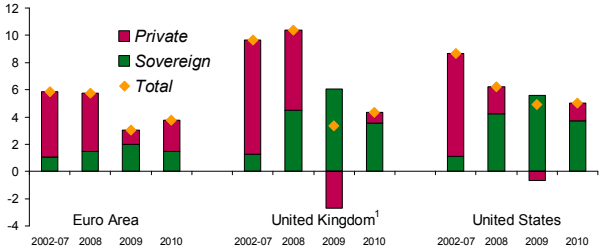
[35]There is a larger degree of error in the U.K. corporate credit demand estimates than others because reliance is placed on the U.S. model as a proxy. However, much of the contraction in overall private credit demand observed year-to-date stems from a larger contraction in corporate credit growth relative to other credit categories. Corporate credit growth in many countries remained strong in 2008, as corporates drew down precommitted credit lines, triggering involuntary bank lending and delaying the deleveraging process. However, many of those unused lines have now expired or been cut. In the euro area, corporate credit growth has been reinforced by the ECB's liquidity operations, which have supported funding for bank loans and retained securitization.

issuance of sovereign debt in 2009 could rise above even the elevated levels in 2008 and stay high in 2010. Since all credit providers can buy sovereign debt, sovereign issuance will effectively compete with—and possibly crowd out—private sector credit needs.

Thus, the pace of growth of nonfinancial borrowing needs is slowing, but not as markedly as the private sector in isolation (Figure 1.29). For example, compared to the heady 9 percent growth during 2002–07, U.S. private sector credit demand is expected to shrink during 2009 and grow only marginally in 2010. However, taking into account the increase in public sector borrowing needs in 2010, overall borrowing needs of the non-financial sector will grow only somewhat slower than during the 2002–07 period.

Figure 1.29. Growth of Nonfinancial Sector Debt: History and Projected Borrowing Needs

(In percent)



Source: IMF staff estimates.
Note: Data for 2002-07 represent average annual totals while 2009 and 2010 are projected borrowing needs. Total growth is broken down into private and sovereign contributions.
[1]There was no reliable fit for corporate credit demand in the United Kingdom, so the U.S. model was used as a proxy.

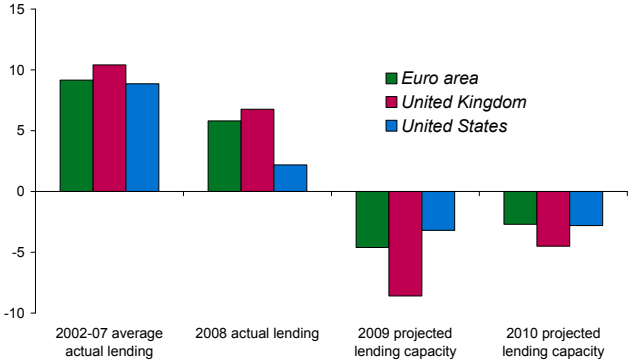
The situation is qualitatively similar in the euro area and the United Kingdom, though the deceleration is more marked in these regions. In the euro area, sovereign issuance is not expected to increase as fast as in the United States because the size of the discretionary stimulus is smaller. In the United Kingdom, by contrast, we project a significant increase in sovereign issuance which will more than compensate for the steep decline in private sector credit demand. In general, however, higher sovereign issuance means that overall borrowing needs will likely show significant positive growth in 2009–10, albeit 25 to 50 percent lower than during the peak 2002–07 levels (Table 1.6).

...in turn, straining already impaired credit channels.

The slower but positive increase in overall borrowing needs contrasts sharply with the projected decline in bank balance sheets discussed in Section B and summarized in Figure 1.30. As discussed in that section, balance sheets will shrink as banks wrestle with increasing loss recognition, while more stringent capital requirements will restrict leverage. Since banks, through on-balance-sheet and off-balance-sheet activities, provide the lion's share of credit (particularly in Europe), credit constraints may restrain economic activity unless there is a significant offset from nonbank credit channels.[36]

Figure 1.30. Bank Lending Capacity Growth

(In percent)



Source: IMF staff estimates.

[36]As discussed in greater detail in Box 1.2, securitization markets remain impaired, especially in sectors not supported by official intervention measures.

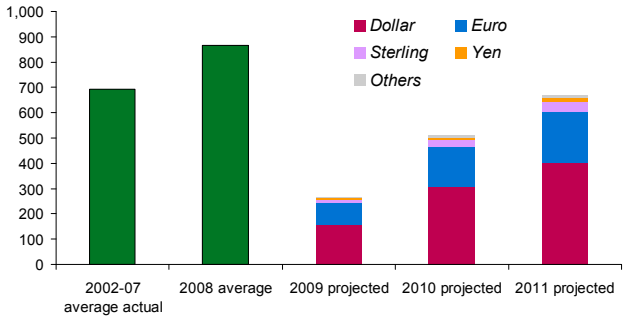
Table 1.6. Total Net Borrowing Needs of Nonfinancial Sectors
(In billions of local currency units rounded to the nearest ten)

	Actual Borrowing		Projected Financing Needs	
	2002-07 average	2008	2009	2010
Euro Area				
Sovereign	180	290	430	320
Private	810	870	220	500
Total	990	1,160	650	820
United Kingdom				
Sovereign	30	160	230	150
Private	230	210	-100	30
Total	260	370	130	180
United States				
Sovereign	250	1,240	1,750	1,220
Private	1,750	590	-200	420
Total	2,000	1,830	1,550	1,640

Source: IMF staff estimates.

The nonbank credit channel—which is primarily comprised of insurance companies, pension funds, mutual funds, and foreign central bank reserve managers—is largely unlevered and relatively less impaired than the bank channel. However, growth in lending by these entities is unlikely to provide a significant offset to the sharp shrinkage in bank balance sheets for a few reasons. First, the growth in nonbank assets has historically tended to track nominal GDP growth, which will be significantly lower in 2009–10 than during the boom period. Second, as discussed in Section B, insurance companies and pension funds have taken significant losses on their asset positions and are unlikely to ramp up asset growth. Finally, the slower pace of reserve accumulation in emerging market central banks will limit overseas demand for mature market debt during 2009–10 (Figure 1.31).

Figure 1.31. Emerging Market Reserve Accumulation
(In billions of U.S. dollars)



Sources: National authorities; and IMF staff estimates.
Note: The analysis projects currency mix of reserve accumulation based on estimated currency allocation as currently reflected in the IMF's Currency Composition of Official Foreign Exchange Reserves database.

In terms of regional vulnerability, the United Kingdom appears most susceptible to credit constraints under our stylized scenario, given its significant reliance on the banking channel and the projected sharp decline in domestic bank balance sheets, as well as substantial public financing needs. The euro area and the United States appear on a par; while U.S. banks have made more progress raising capital and recognizing losses, overall U.S. borrowing needs are also growing more strongly, given the size of the fiscal stimulus. Borrowers who cannot turn to the capital markets, especially households and smaller, early stage, and low cash-flow-generating firms, are likely to be disproportionately affected by constrained credit availability. In addition, entities that are dependent on cross-border sources of lending and are unable to find alternative substitutes are also likely to be particularly affected.

Based on our assumptions about growth in the nonbank channel, Table 1.7 provides a tentative estimate of the "financing gap," that is, the excess of ex ante financing needs of the sovereign and private nonfinancial sector relative to the projected credit capacity of the financial

Table 1.7. Projections of Credit Capacity for and Demand from the Nonfinancial Sector

	2009		2010	
	Amount	Growth	Amount	Growth
Euro Area				
Total credit capacity available for the nonfinancial sector	190	0.9	580	2.7
Total credit demand from the nonfinancial sector	650	3.0	820	3.7
Credit surplus (+)/shortfall (-) to the nonfinancial sector	-460		-240	
Memo: Central bank and government committed purchases[1]	30		30	
United Kingdom				
Total credit capacity available for the nonfinancial sector	-150	-3.9	30	0.8
Total credit demand from the nonfinancial sector	130	3.4	180	4.3
Credit surplus (+)/shortfall (-) to the nonfinancial sector	-280		-150	
Memo: Central bank and government committed purchases[1]	180		0	
United States				
Total credit capacity available for the nonfinancial sector	1,110	3.3	1,550	4.5
Total credit demand from the nonfinancial sector	1,550	4.9	1,640	5.0
Credit surplus (+)/shortfall (-) to the nonfinancial sector	-440		-90	
Memo: Central bank and government committed purchases[1]	1,840		0	

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

Note: Amount is in billions of local currency units rounded to the nearest ten. Growth is in percent. See Annex 1.4 for details of methodology.

[1]This includes committed purchases of debt issued by both public and private sectors, which is considered to be extra credit capacity provided by central banks and governments for the whole nonfinancial sector. The U.S. commitment reflects $1,750 billion committed by the Federal Reserve and $90 billion actually purchased by the Treasury up to August 2009.

sector. As a proportion of GDP, the gap is largest in the United Kingdom, at about 15 percent of GDP during 2009–10, relative to 2.4 percent in the United States and 3 percent in the euro area.[37]

This is the ex ante financing gap, where credit demand is a function of the WEO's baseline growth and fiscal deficit projections and credit provision a function largely of the projected evolution of bank balance sheets. Ex post, a rise in interest rates and/or nonprice rationing would bring demand and supply in balance. Cross-border credit flows associated with exchange rate adjustments may also be part of this clearing process. This may not be a smooth process, however, as our analysis already accounts for flows from emerging market central banks into these markets. Further, banking problems in other mature markets may constrain their ability to engage in cross-border lending.

Positing an ex ante financing gap may seem peculiar given the rise in private savings rate in most of the mature economies. We note, however, that a balance in projected savings and investment (implicit in macro growth forecasts) does not guarantee that adequate credit will flow from savers to borrowers. Impaired financial systems may not channel the requisite credit, in turn constraining private spending and GDP growth.

For the coming period, an expansion of central bank balance sheets remains a policy option to supplement credit provision, despite growing concerns about the implications for central bank independence in the longer term. Both the U.S. Federal Reserve and the Bank of England have committed substantial amounts for direct balance sheet provision (Table 1.7), and the ECB has indirectly provided balance sheet support through its long-term financing arrangements secured

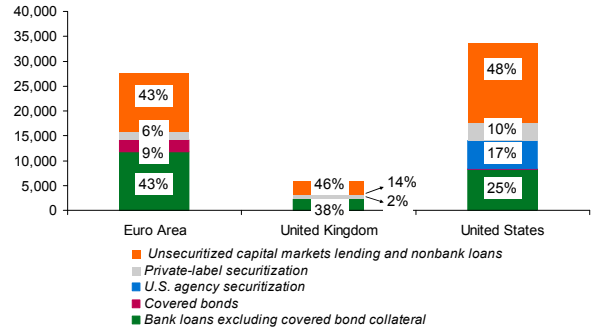
[37]Clearly, the analysis has a considerable degree of imprecision because of the uncertainty around the parameters in our demand functions. However, it does appear that such financing constraints are operating, given the very aggressive balance sheet expansion by most mature market central banks.

Box 1.2. Repairing Securitization Is Critical to Supporting the Supply of Credit

Securitization plays an important role in bank wholesale funding and credit extension, especially in the United States.[1] The first figure shows that securitization (excluding covered bonds) accounted for roughly 28 percent of outstanding credit in the United States, as of the first quarter of 2009, compared to just 6 percent in the euro area and 14 percent in the United Kingdom. While certain types and the overall size and extreme complexity of securitizations that were done during the recent credit boom are no longer desirable, securitization when done prudently still presents benefits for pooling and distributing credit risk and for offering banks an alternative source of financing.

The Credit Crunch of Lending in the Euro Area, United Kingdom, and United States, as of 2009:Q1

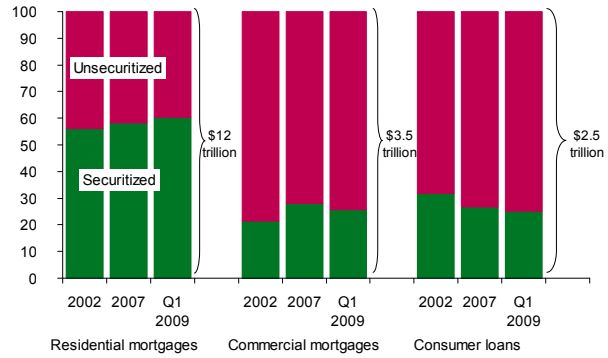
(In billions of U.S. dollars)



Sources: National authorities; and IMF staff estimates.

Share of Securitization in Select U.S. Credit Classes

(In percent)



Sources: U.S. Federal Reserve, *Flow of Funds;* and IMF staff estimates.

The overall share of U.S. securitization of credit is not only sizable, but it is also vital to the real estate and consumer credit markets. Government-sponsored enterprises and private-label securitizations collectively account for 60 percent of the $12 trillion outstanding residential mortgage credit, while securitization represents about one-quarter of each of the $3.5 trillion commercial mortgage and $2.5 trillion consumer credit markets (second figure). During the credit boom, private securitizations of residential mortgages expanded at a rapid pace, rising from just 8 percent of the outstanding volume in 2002 to 19 percent by end-2007.

Dislocations in funding and credit markets triggered a significant policy response.

Central banks and government authorities in major economies have sought to restart securitization markets by offering liquidity to moribund markets and support to issuers and investors through attractive funding opportunities or outright purchases. The Federal Reserve's approach has been the most aggressive—reflecting the greater role played by securitization in the U.S. financial system—while central banks in Europe have been less so. The table details the key initiatives to support securitization.

Note: This box was prepared by Phil de Imus.

[1]See Chapter 2 for a discussion of the various policies aimed at resuscitating securitization markets.

Facilities to Support Securitization

Region	Institution	Program	Type of Support	Term	Amount Committed	Amount Progress	Percent Complete
Euro area	European Central Bank[1]	Refinancing operations	Liquidity, accepts securitized products as collateral	Up to 1 year loan	Unknown		
United Kingdom	Bank of England	Special liquidity scheme	Liquidity, swap of securitized assets for treasury bill collateral	Drawdown window was closed in Jan. 2009	n.a.		n.a.
United Kingdom	Bank of England	Asset Purchase Facility	Outright purchase of secured commercial paper	Asset Protection Scheme for all assets expected to be completed by Nov. 2009, unknown holding period	Small portion of £175 billion	£0[2]	n.a.
United Kingdom	H.M. Treasury	Asset-Backed Securities Guarantee Scheme	Choice of credit or liquidity guarantee for RMBS purchase	Guarantees terms up to 3 to 5 years; program initial window closes Oct. 2009	Initially expected to be £50 billion	No guarantees issued yet	n.a.
United States	Federal Reserve	Term Securities Lending Facility	Liquidity, swap of securitized assets for treasury collateral	Program expires Feb. 1, 2010	n.a.	$2.7 billion[3]	n.a.
United States	Federal Reserve	Asset-backed Commercial Paper Money Market Mutual Fund Liquidity Facility	Liquidity, loans to banks to purchase ABCP from MMMFs	Up to 270 day loan; program expires Feb. 1, 2010	n.a.	$113 million[3]	n.a.
United States	Federal Reserve	Commercial Paper Funding Facility	Liquidity to Fed-sponsored special purpose vehicle to purchases 3-month commercial paper	Program expires Feb. 1, 2010	n.a.	$58 billion[3]	n.a.
United States	Federal Reserve with $20 billion capital from U.S. Treasury	Term Asset-Backed Securities Loan Facility	Liquidity, provide loans to investors to purchases nonmortgage-backed ABS and CMBS	3 & 5 year loans; program for newly issued ABS and legacy CMBS terminates on Mar. 31, 2010 and Jun. 30, 2010 for newly issued CMBS	Authorization of $200 billion	$30 billion[3]	15%
United States	Federal Reserve	Long-term securities purchases	Outright purchase of GSE obligations	Expected to be completed by year-end; unknown holding period	$200 billion	$110 billion[3]	55%
United States	Federal Reserve	Long-term securities purchases	Outright purchase of GSE MBS	Expected to be completed by year-end; unknown holding period	$1.25 trillion	$543 billion[3]	43%
United States	U.S. Treasury	Long-term securities purchases	Outright purchase of GSE MBS	Unknown	n.a.	$158 billion[4]	n.a.
United States	U.S. Treasury with Fed support	Public Private Investment Program: legacy securities portion	Capital and financing for private sector partners to purchase legacy CMBS and private-label RMBS	Capital commitment 3 years, partnership 8 years, loans up to 10 years; program is expected to end this year	$10 billion private capital; $30 billion treasury capital and financing	Nine asset managers named, raising the private funds	No purchases started

Source: IMF staff.
Note: ABCP = asset-backed commercial paper; ABS = asset-backed security; CMBS = commercial mortgage-backed security; GSE = government-sponsored enterprise; MBS = mortgage-backed security; MMMF = money market mutual funds; RMBS = residential mortgage-backed security.
[1]The European Central Bank has a €60 billion covered bond purchase program (with €12 billion purchased to date), but covered bonds are not technically part of the securitization market. There has been €12 billion purchased to date.
[2]Bank of England Asset Purchase Facility results as of August 2009.
[3]Federal Reserve H.4.1 report as of August 2009.
[4]The U.S. Treasury's holdings of agency-backed MBS as of end-July 2009.

against highly rated collateral. Fiscal authorities are supporting these efforts by offering capital to support central bank programs (in the case of the United States) or providing guarantees to encourage securities origination (in the case of the United Kingdom). These measures, along with aggressive monetary policy easing during the crisis, have helped to contain increases in borrowing costs for the private and public sectors. Policies aimed at reinvigorating financial intermediation on a sound footing will help sustain credit supply.

E. Managing the Transfer of Private Risks to Sovereign Balance Sheets

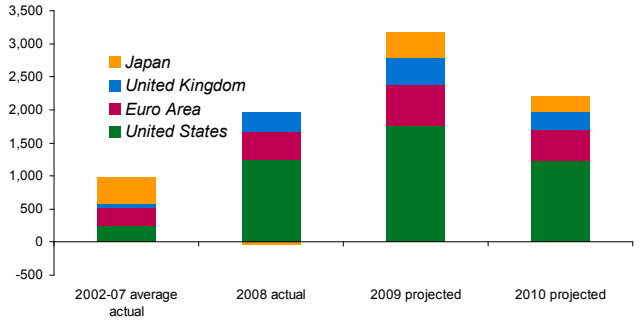
After examining the consequences of public and private demand for funds in the near term, this section examines the effects of rising public debt burdens on perceptions of sovereign credit risks and on longer-term interest rates. Investor concerns about fiscal sustainability have a potential to push up longer-term interest rates unless governments commit to medium-term policies to ensure medium-term fiscal sustainability and anchor expectations.

Public interventions and fiscal stimulus packages have inevitably led to increased supply of sovereign debt, most notably in advanced economies (Figure 1.32). This increase has been absorbed fairly well so far. The demand for liquid, high-quality sovereign paper issued by advanced countries has been well supported by flight-to-quality and general risk aversion sentiment among investors. Several advanced countries, most notably in the euro area, have already met a large proportion of their planned borrowing needs for this year. While both gross and net sovereign issuances are expected to decline in 2010–12 relative to the projections for 2009, they will likely remain well above the 2002–07 average, as fiscal deficits are anticipated to remain high.

However, as discussed in Box 1.3, historical evidence from panel data analysis indicates that a persistent 1 percentage point increase in the fiscal deficit leads to a 10 to 60 basis point increase in long-term interest rates; countries with high initial deficits and low private savings rates are more vulnerable. Even assuming a mid-way sensitivity of 35 basis points, financing the increases in the budget deficit of 5 to 6 percent of GDP may well raise long-term interest rates by 150 to 200 basis points with very adverse growth consequences.

Perceptions of sovereign risk are also influenced by stability developments in the financial system. While private sector risk premiums in general have declined relative to pre-Lehman levels, sovereign spreads have increased. For example, a range of risk premia including LIBOR-overnight index swap (OIS) and investment-grade corporate credit spreads are *tighter* than pre-Lehman levels in the United States as well as Europe, while sovereign spreads are considerably *wider* (Table 1.8). This is consistent with the transfer of private sector risks to sovereign balance sheets as discussed in several IMF publications.[38]

Figure 1.32. Net Sovereign Debt Issuance in Mature Markets
(In billions of U.S. dollars)



Source: IMF staff estimates.
Note: Numbers are converted to U.S. dollars at current exchange rates. Net issuance includes bonds and bills.

Table 1.8. Selected Spreads: Current and Pre-Lehman Brothers
(In basis points)

	Average Jan-Aug 2008	August 5, 2009
Corporate CDS		
U.S. investment grade	126	112
Europe investment grade	95	92
Interbank Conditions		
U.S. 3-month LIBOR-OIS	68	27
Euro 3-month LIBOR-OIS	63	37
Sovereign CDS		
Euro area median (5-year)	15	41

Source: Bloomberg L.P.
Note: CDS = credit default swap; OIS = overnight indexed swap.

Interestingly, a sizable part of the variation in individual countries' sovereign spreads is due to "global" risk factors as opposed to concerns particular to the countries. For example, an index of euro area banks' CDS explains 75 to 85 percent of the time series variation in 10 euro area countries since the credit crisis began in mid-2007.[39,40] The reason is that a further deterioration in bank balance sheets could intensify the global recession in a feedback loop with the financial system.

Countries with weaker starting points are more vulnerable to global risk factors (Table 1.9). While the limited sample does not permit very strong conclusions, it does appear that countries with high (current) debt-to-GDP ratios and/or high contingent liabilities from the financial sector are more vulnerable than other countries.[41] This suggests that countries could reduce their exposure to systemic risk by designing and articulating medium-term fiscal consolidation plans such as to not dangerously stretch countries' fiscal limits.

[38]For a recent discussion, see IMF (2009b).
[39]Germany is not included in the analysis because sovereign spreads are measured relative to bunds.
[40]This analysis largely develops some of the points made in Mody (2009).
[41]Financial sector contingent liabilities are measured using the relative performance of the financial sector to the overall stock market since the start of the financial crisis. This variable is discussed in detail in Mody (2009).

Table 1.9. Sensitivity to Common Risk Factor for Euro Area Countries

	Senstivity to Bank CDS	Debt to GDP (percent)	Relative Financial Sector Underperformance (percent)
France	0.18	68.10	46.62
Netherlands	0.23	58.20	81.64
Finland	0.27	33.40	10.64
Belgium	0.34	89.60	78.13
Austria	0.38	62.50	37.72
Spain	0.39	39.50	33.17
Italy	0.46	105.80	37.79
Portugal	0.48	66.40	47.43
Greece	0.91	97.60	35.02
Ireland	0.99	43.20	92.24

Sources: Haver Analytics; and IMF staff estimates.

Note: Sensitivity to bank credit default swap (CDS) is the coefficient from a time series regression of the country's cash spread on an index of euro area bank CDS. The spread is the difference in yield between the country's 10-year sovereign paper and the 10-year bund yield. The financial sector variable is the extent to which the index of financial sector stocks has underperformed the overall stock market.

The recent evidence of increasing home bias among investors poses a particular risk to interest rates in the United States and United Kingdom as they seek to finance large deficits.[42] Over the past decade, mature market economies running significant fiscal deficits have been able to limit increases in domestic interest rates by tapping foreign savings from emerging market central banks, oil exporters, and sovereign wealth funds. If foreign investors become concerned about long-term fiscal sustainability in these countries, interest rates on government securities would need to adjust higher and the exchange rate would depreciate.

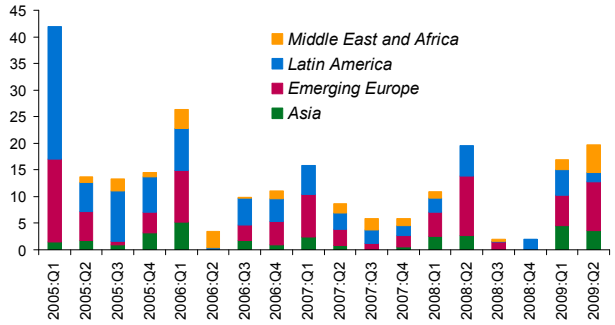
Finally, the increasing rollover risk compounds fiscal sustainability concerns. Some countries have increased the share of short-dated bonds and treasury bills in the issuance mix shortening the average maturity of sovereign debt. For example, in the United States, the average maturity of the marketable debt portfolio has recently fallen to 49 months, from 60 to 70 months between the mid-1980s and 2002.

Risk aversion due to fiscal sustainability concerns in mature markets poses risks to emerging market borrowers.

As highlighted in Section C, emerging market sovereigns have been mostly able to successfully access the international capital markets to meet their financing needs (Figure 1.33), and their borrowing costs have not necessarily increased appreciably. There is a clear distinction between core

Figure 1.33. Emerging Market Sovereign Issuance in International Capital Markets

(In billions of U.S. dollars)



Source: Dealogic.

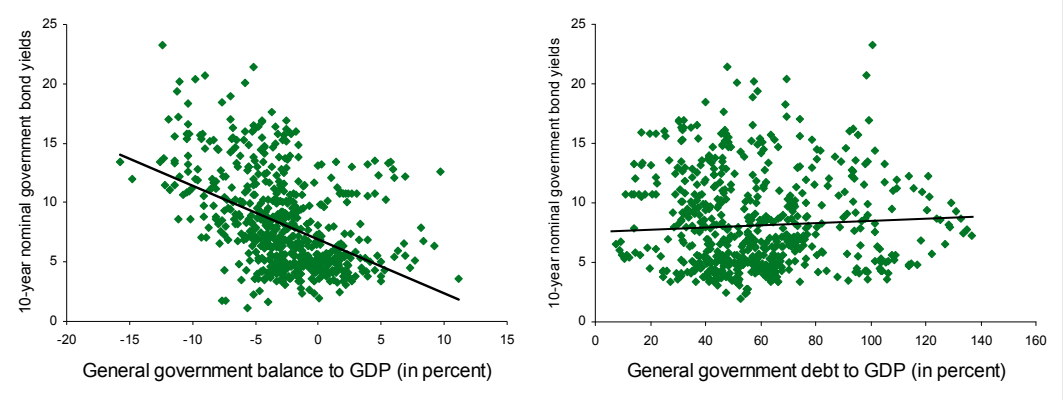
[42]For example, see the April 2009 GFSR (IMF, 2009a, Chapter 1, p. 8) for a discussion of the sharp retrenchment in cross-border flows.

Box 1.3. Rising Public Deficits, Debts, and Bond Yields

There has been a significant increase in fiscal deficits and debts in most of the advanced economies because of the global economic and financial crisis. The average fiscal deficit of the advanced G-20 countries is projected to be around 10 and 8½ percent of GDP in 2009 and 2010, respectively. Although under a baseline scenario of a pick-up in activity these balances will gradually improve, even by 2014, average deficits for the advanced G-20 countries are expected to exceed 4¼ percent of GDP. Correspondingly, public debt ratios in these economies are projected to widen by about 40 percentage points to almost 115 percent of GDP by 2014, the largest increase since the Second World War. Under an adverse scenario of weaker-than-expected growth, both deficits and debt ratios would be even higher.

Such large increases in deficits and debt could raise government bond yields through several channels:[1] (1) higher risk premia, reflecting concerns about fiscal sustainability and government solvency, resulting in higher real yields; (2) increased supply of government securities and rollover risk, given the simultaneous increase in deficits and financial sector support measures in a large number of countries, along with a shortening of debt maturities;[2] and (3) potentially higher inflation expectations, reflecting concerns about the ability of governments to service their debts. If agents are forward-looking, private saving would increase in anticipation of tax rises in the future to service the large debts, reflecting the intertemporal budget constraint. This would ameliorate the impact on bond yields, although the evidence for this Ricardian equivalence is limited. In an open economy, domestic savings can be augmented by foreign savings, again reducing upward pressure on domestic interest rates. However, in the current environment of an increase in the supply of sovereign securities globally, the magnitude of such an effect is uncertain.

Correlation of Government Bond Yields with Fiscal Variables



Source: IMF staff estimates.
Note: Sample of 34 countries over 1980-2007. Excludes outliers, defined as cases with an absolute distance from the mean exceeding three standard deviations; data for Japan are also excluded.

Empirical evidence on the impact of deficits and debts on long-term interest rates appears to be mixed. Gale and Orszag (2003) list, for instance, 29 studies finding a "predominantly positive significant" effect of fiscal deficits on interest rates although there were also several studies that found a "mixed" or "predominantly insignificant" effect. Studies based on cross-country evidence and using measures of expected fiscal positions were more likely to find a significant positive effect of larger fiscal deficits on sovereign bond yields.

A fresh empirical analysis highlights some of the factors that would account for the earlier diversity of findings. The analysis was undertaken for a panel of up to 31 advanced and emerging economies over the period 1980–2007 to explore this issue. This appears to suggest that an increase in the fiscal deficit raises long-term government interest rates (see figure). The increase in interest rates ranges from a minimum of 10 to a maximum of 60 basis points for each 1 percentage point of

GDP increase in the fiscal deficit.[3] The impact of debt accumulation on bond yields is smaller, but still significant. A 1 percent of GDP increase in debt raises government bond yields by 5 to 10 basis points (see figure). The wide range of the estimates reflects their sensitivity to the choice of variables, model specification, sample composition, and time period.[4] Macroeconomic policies are key determinants of long-term rates: higher output growth significantly limits the increase in bond yields, while inflation widens the risk premia on government securities. The impact is larger for emerging market economies and when using expected fiscal deficits (Laubach, 2009).

Four other sets of factors explain the wide variation in the estimates:

- First, initial conditions and expectations regarding future deficits matter. Countries with large initial fiscal imbalances experience sharper increases in nominal rates (consistent with Giavazzi, Jappelli, and Pagano, 2000). Countries with faster age-related spending pressures are also likely to see a larger increase in their bond yields in response to wider fiscal deficits, as market confidence could be undermined by future risk to the budget entailed by social protection programs.
- Second, differences in domestic private savings rates, and institutional features, play a significant role. Countries with structurally high private savings rates are potentially more able to absorb an increase in the public bond supply. Separately, weak institutional quality raises the elasticity of bond yields' response to fiscal expansions.
- Third, capital inflows and spillovers from global sovereign bond markets are important. Countries with larger capital inflows benefit from lower increases in government bond yields when fiscal deficits expand (consistent with Hauner and Kumar, 2006; and Paesani, Strauch, and Kremer, 2006). Higher *global* gross financing needs result in significantly higher yields for individual countries. This is particularly important from the point of view of current circumstances.
- Lastly, investor risk appetite matters. Episodes of financial turmoil and elevated risk aversion lead to a significantly higher impact of deficits on both nominal and real long-term interest, compared to nondistress times.

The above findings imply that even in the baseline scenario, given the rise in deficits and debts, borrowing costs could increase markedly in the medium term, particularly for the advanced economies, but also with spillover effects for the emerging economies,. The evidence also suggests that measures to support economic growth, contain rising public sector liabilities from demographic pressures, and stimulate private sector savings could pay significant dividends in restraining the rise in long-term interest rates. At the same time, an improvement in institutional quality, ensuring continued access to global savings, and underpinning investor risk appetite by anchoring medium-term expectations of fiscal sustainability is likely to be helpful in containing borrowing cost pressures.

Note: This box was prepared by Emanuele Baldacci and Manmohan Kumar of the IMF Fiscal Affairs Department.

[1]There is a large literature in this area: see Barro (1974); Modigliani and Jappelli (1988); Bernheim (1989); Gale and Orszag (2003); Hauner and Kumar (2006); and Baldacci, Gupta, and Mati (2008).

[2]While in the near term supply of private sector securities may be lower given the weak pace of activity, in the medium term this is unlikely to be the case.

[3]This is consistent with the overall conclusion of Gale and Orszag (2003) and the earlier findings by the European Commission (2004).

[4]The general model consists of a fixed-effects regression of the nominal 10-year bond yields on a set of controls that include (1) fiscal balance as a percent of GDP; (2) initial stock of public debt to GDP; (3) short-term interest rates; (4) inflation; (5) lagged output growth; and (6) a measure of investor risk aversion (based on stock market volatility). The impact on these results of a number of variables including age-related government spending, institutional quality, private sector savings rates, trade openness, global sovereign bond supply, and external capital flows were also investigated.

investors in mature market sovereign debt versus those in emerging market sovereign paper, so that the two markets are quite segmented.[43] The relatively small size of the emerging market fixed-income universe underscores its status as a niche investment class; the total emerging market debt (sovereign as well as corporate) represented in the Barclays fixed-income indices is about $440 billion compared to mature market sovereign paper of about $15 trillion.

By implication, the mere fact of a temporarily large increase in mature market sovereign issuance does not prejudice the market for emerging market debt.[44] However, a sustained increase in fiscal deficits in mature markets may increase investors' perception of systemic risk, which would adversely influence all risky assets and emerging market debt in particular.

F. Policy Implications

The systemic phase of the crisis appears to have passed, but policy challenges lie ahead.

Extreme systemic risks in the wake of the Lehman Brothers' bankruptcy have now subsided following unprecedented policy action to stabilize the financial system. However, the road to recovery is unlikely to be straight, and market sentiment could reverse, complicating the withdrawal of policy support. Without further bank balance sheet repair and efforts to smooth adjustments of households and corporates, demand will be impaired and output volatility may return. Against this backdrop, four key near-term policy issues arise:

- What policies should the authorities (in mature and emerging markets) pursue to ensure stability and channel sufficient credit to support economic recovery?
- When and how should policymakers exit extraordinary public support of the financial system?
- How large are the tail risks associated with the transfer of private risks to sovereign balance sheets and how should they be managed to avoid undermining financial stability?
- How should regulation and market forces be combined to shape the future financial landscape to limit the build-up of substantial systemic risks?

Financial policies need to provide a secure backdrop for economic recovery.

A key question is whether the financial system can make sufficient credit available to sustain economic recovery. The ex ante analysis of credit supply and demand undertaken in this GFSR suggests that, after taking into account sovereign financing needs, credit availability may fall short of even depressed private sector demand in some significant economies. This constitutes a downside risk to the global growth rate embodied in the WEO forecast and indicates that continued policy intervention may be needed to support credit flows.

Notwithstanding public capital injections and the reopening of private debt and capital markets, banks continue to restrict credit availability. Our scenarios envisage the supply of bank

[43]Central bank reserve managers, fixed-income money managers, and pension funds (except in the United States) have core holdings in mature market sovereign paper. On the other hand, emerging market paper is largely held by dedicated emerging market mutual funds, hedge funds, and as a cross-over play by certain high-yield credit investors.

[44]The larger effect of higher mature market sovereign issuance will be on the close substitutes for mature market sovereign paper such as high-quality corporate paper.

credit falling for the remainder of 2009 and into 2010 both in the United States and Europe. Furthermore, securitization markets, though stabilizing, have not revived, thereby inhibiting banks' capacity to originate and distribute credit. This underscores the importance of bank balance sheet repair to provide credit to support economic recovery.

The banking system requires further strengthening to resume its role in supplying credit.

The improvement in market conditions since the April 2009 GFSR, together with government interventions and the opening up of private capital markets, have helped stabilize bank balance sheets. However, further substantial asset deterioration lies ahead as delinquencies continue to mount across various loan categories.

Despite the rebound in bank earnings in the first half of this year, core earnings are likely to be lower in the post-crisis environment. First, strong capital market activity currently benefiting a narrow set of banks is likely to decline into 2010. Tighter regulation will reduce net revenues and require more costly self-insurance through higher capital and liquidity buffers. Banks are earning interest margins on smaller balance sheets, while losses on existing loans continue to mount and impaired assets remain. Addressing legacy assets is still necessary to strengthen the core earnings capacity of banks. Depending on the assets in question and circumstances, this can be achieved either through ring-fencing and guarantees, or through transfer to a "bad bank" or alternative distressed asset investors. But banks need to be encouraged to crystallize losses through realistic assessments of asset values.

This underlines the need for banks to build and retain sufficient capital to ensure market confidence in their solvency and to revive credit intermediation. The 19 U.S. bank holding companies that underwent the (SCAP) stress test exercise have raised most of the capital required. However, regulators urgently need to ensure that capital levels are secure. Any signs of unwarranted buy-backs or increased dividends should be resisted to ensure the retention of a high-quality capital base. Under our current scenarios for the euro area, there still appears to be a sizable need for capital to both absorb losses and rebuild lending capacity, although the situation varies significantly by country. In the United Kingdom, core banks have been supported by government stakes and the intention to implement the APS to provide shared insurance against losses and capital relief. However, as the above analysis indicates, capital levels may need to rise further to rebuild sufficient lending capacity to finance recovery.

Reviving securitization markets remains a key element to reinvigorating the channels of credit to the real economy.

Repairing securitization markets is proving to be challenging, and public support of the market is still necessary. The complex structured credit market suffers from a concentrated, narrow, and shrinking sponsorship base. In addition, the global infrastructure for securitization remains frail. International demand for U.S. structured securities has been meager, while the overhang of legacy assets makes new issuance challenging. Accordingly, markets and regulators need to encourage securitization structures that are simple, more standardized, and with greater transparency over asset components and collateral performance (see Chapter 2), with the incentives of originators and end-investors more closely aligned. Such reforms would pave the way for less reliance on rating agencies and help attract more conservative, unlevered investors.

Emerging markets in Europe remain vulnerable to the forces of deleveraging…

Against the backdrop of continuing vulnerabilities in emerging Europe, financial policies should continue to foster an orderly adjustment of bank, corporate, and household balance sheets. Priorities should include measures to deal with nonperforming assets and troubled banks—including the removal of problem assets from bank balance sheets, bank resolution, and recapitalization. Corporate external financing may require debt restructurings when new private funding is not

available. Extending agreements to maintain and even expand cross-border funding, subject to prudential requirements, will smooth adjustment and prevent a further collapse in domestic credit. Continued financial support of vulnerable countries from multilateral sources for macroeconomic adjustment programs will mitigate the risk of contagion in the region.

...while some Asian economies in particular will need to balance downside economic risks against the possibility of keeping domestic policies expansionary for too long.

Emerging economies benefiting from an inflow of external liquidity and expansionary domestic policies need to guard against fueling new asset price bubbles. There is growing concern that the rapid fiscal stimulus implemented in China, along with capital inflows and rapid credit growth, are leading to unsustainable asset price inflation. Property prices have begun to increase sharply in several markets and concerns over excessive credit growth and nascent property bubbles may rise as countries decide when to exit from expansionary policies.

Disengagement from support policies is a delicate balancing act—policy challenges include the policy mix and avoiding missteps.

The right mix of interventions and timing of their withdrawal are critical to restore the financial system to health (see Chapter 3). An appropriate future exit strategy should focus on achieving the right balance between exiting too early—at the cost of causing credit spreads to jump abruptly and risking a loss of confidence—and prolonging stimulus, thereby providing excess liquidity, re-initiating asset price inflation, and funding leveraged and carry-trade activity.

Banks face a "wall of maturities" in the next two years, constituting substantial rollover risk. For weaker banks that still cannot access private markets, the phasing out of government guarantee programs scheduled for the end of 2009 is likely to increase their reliance on short-term funding, resulting in even shorter maturity profiles. An early exit by countries keen to demonstrate their banks' strength could put pressure on countries with weaker banks. Such guarantees can still serve as a useful safety net, but with gradually tightening terms that encourage private market access.

Our analysis of the supply and demand for credit suggests that with banks continuing to delever, central bank balance sheets may still need to support credit intermediation and prevent sovereign issuance from crowding out private credit demand into next year.

The transfer of private risks to sovereign balance sheets needs carefully handling.

Public interventions and fiscal stimulus packages have inevitably led to an increased supply of sovereign debt, most notably in advanced economies. So far, this has been absorbed fairly smoothly, but future conditions could prove more challenging. The risk of continuing recession poses a significant vulnerability to sovereigns, with those countries with high (current) debt-to-GDP levels and significant contingent liabilities to the financial sector most vulnerable to adverse global developments. Therefore, countries need to ensure that such policy initiatives do not pose substantial solvency risks. Anchoring medium-term expectations of fiscal sustainability should help to contain borrowing cost pressures, while ensuring continued access to global savings and underpinning investor risk appetite.

How should regulation be fundamentally changed in response to the crisis?

The 2007–09 crisis has rightly prompted a fundamental reappraisal of financial regulation. In both domestic and international fora, wide-ranging debates and initiatives are proceeding to address the appropriate boundary and structure of regulation, raise capital and liquidity buffers, and reform standards for accounting and disclosure, ratings, remuneration, and securitization. Meanwhile, policymakers and legislators are grappling with how to bring a macroprudential perspective to a complex global system, while fully recognizing that sound supervision of individual institutions is the foundation of systemic stability.

The danger is that, without a clear vision for desirable financial intermediation, piecemeal and potentially contradictory changes will result. For instance, some proposals to restore appropriate incentives in the securitization process could render it too costly (see Chapter 2), while previously proposed accounting changes could reduce the ability of pension funds to absorb market risk (see Annex 1.5). Currently, banks in many jurisdictions are operating in a "no man's land," knowing that regulatory and capital requirements are to be tightened but without clarity on the degree or form that tightening will take. As a result, gradual bank deleveraging continues by default and securities markets are replacing banks as the primary source of corporate credit (see Section B). Recapitalization will be facilitated by clarity over new regulatory requirements and the criteria for withdrawal of extraordinary support measures.

Unprecedented policy interventions during the crisis eventually succeeded in stabilizing the financial system in the short term by transferring liquidity and capital risks to public balance sheets (Chapter 3). Their legacies are a substantial rise in explicit and contingent public liabilities and a further gross distortion of market discipline and risk-taking incentives. The rational response of systemic firms to such forbearance is to become even harder to close in the future while adopting riskier strategies to maximize profit. Hence, authorities need to address moral hazard coherently and firmly—a superficial tightening of regulation could give the impression of greater robustness while increasing underlying systemic dangers.

Priorities for Reform

The appropriate policy response to the crisis is not just "more" or "tougher" regulation, but smarter requirements combined with better-funded supervisors, independent of industry and political pressures. Banking is already heavily regulated and yet proved vulnerable to a systemic shock in some significant jurisdictions because supervisors had limited information and resources, while regulation itself created incentives to transfer risk outside the regulatory boundary while diluting the need for creditors and shareholders to monitor risk-taking. Given the need fundamentally to improve the robustness of the financial system to shocks, policymakers' priorities for reform should include the following areas, as described below. The appropriate combination of measures may vary by country or region, and authorities—both in mature and emerging markets—should recognize the potential trade-offs between them to achieve an optimal policy mix.

Restore Market Discipline

The costs of "failure" have been significantly reduced for equity holders and bond holders of systemic institutions. These already enjoyed a competitive advantage over smaller competitors through beneficial regulatory capital treatment (due to "diversification") and more favorable credit ratings and funding costs due to market expectations of official support. With the latter perception confirmed, moral hazard will be reinforced unless regulatory authorities redress the balance.

Possible approaches. Increasing the level and quality of capital in the financial system (see Box 1.4) should incentivize shareholders to monitor risk-taking more carefully, while giving greater protection against insolvency and the need for bailouts. Exercise of such discipline should be assisted through improved disclosures and governance arrangements for systemic financial firms (to enable more timely and granular analysis of risk positions). When introducing a resolution framework for failed banks and systemic institutions (see below), authorities should have the power to dismiss senior managers, cut discretionary remuneration, and impose losses on unsecured creditors to reinforce the likely penalties for failure. Systemic institutions should be required to maintain a plan for an orderly insolvency, periodically approved at board level and by supervisors, thereby forcing them to understand group structure and raising the credibility of its threat (Brunnermeier and others, 2008; Tucker, 2009).

Address Fiscal Risks Posed by Systemic Institutions

Taxpayers provide implicit economic catastrophe insurance to systemic financial institutions, allowing them to operate with substantially riskier balance sheets. Not only have systemic institutions become more significant as a result of the crisis, but guaranteeing the liabilities of the largest institutions has reinforced market belief in the concepts of "too big to fail" or "too complex to resolve." To redress the balance, financial authorities should penalize contributions to systemic risk while directly addressing its root causes. This will entail exercising greater flexibility over the boundary of oversight, given that many nonbank institutions and sectors have also shown themselves to be systemic (Carvajal and others, 2009). Absent robust action, bond and CDS markets will continue to impose a risk premium on sovereign borrowers to reflect their contingent liabilities to systemic institutions.

Penalizing contributions to systemic risk. Following the analogy of pollution regulation, financial institutions tend to profit when creating systemic risk (the "pollutant"). They will continue to do so until the marginal cost of adding to systemic risk exceeds the marginal expected profit. Hence, private institutions need to be incentivized to address systemic risk by bearing the burden of their marginal contribution to it (the "polluter pays" principle). This can be achieved through additional capital or liquidity requirements established by regulators to incentivize firms to reduce their systemic importance through voluntary de-mergers, diversification, or simplification of operations, and should apply to both domestic- and foreign-owned institutions. Charging systemic-based risk premia to prefinance a bailout fund would operate in similar fashion.[45] While exact calibration of a firm's systemic risk contribution is not yet feasible, promising avenues of enquiry already exist.[46] Absolute accuracy is not necessary before attempting to achieve this critical policy goal. Without action, clearly systemic institutions will simply operate like government-sponsored enterprises for profit until the next crisis is triggered.[47]

Dispelling moral hazard by making the threat of failure and loss more credible. To complement penalties for systemic risk, authorities should also consider institutional changes to facilitate orderly wind-up or directly constrain systemic risk. Such reforms could include:

- Instituting special resolution mechanisms for banks (and other systemic institutions) to ensure an orderly wind-down of assets with a credible threat of loss for unsecured creditors.[48] As a result of the crisis, such regimes have been or are being introduced (e.g., United Kingdom, Germany) or, where they exist, the authorities are proposing their broadening (United States).

- Reducing functional interconnectedness in systemic institutions. A number of proposals have been made to address the commingling of banking functions, including the legal separation or ring-fencing of (guaranteed) deposit liabilities and assets from commercial bank balance sheets ("narrow" banking); separating commercial from investment banking; or eliminating proprietary trading activity from commercial and investment

[45]The combination of risk-based premia and penal capital requirements should complement each other in deterring behavior conducive to systemic risk while reducing the likelihood of firms successfully gaming the system.

[46]See IMF (2009a) and BIS (2009). Contributions to systemic risk are related to a number of dimensions of an institution's operations, including size, concentration, interconnectedness, and risk correlations (Thomson, 2009).

[47] The absence of economies to banking scale above a moderate threshold (e.g., Berger and Humphrey, 1994; OECD, 2001) means that the reduction in size or interconnectedness of systemic institutions should not result in significant efficiency losses (Haldane, 2009).

[48]Under the new U.K. bank resolution framework, payments on some junior securities of both Northern Rock and Bradford & Bingley have been reduced, thereby imposing losses on investors.

banks. In addition, this and previous crises have demonstrated that nonbank group complexity can also pose systemic risks and should be addressed. When assessing these possible policy interventions, authorities should weigh the private efficiency gains (if any) of interlinkages against the systemic risks, moral hazard, and conflicts of interest that can thereby arise, cognizant that private institutions will seek to hold wider economic interests hostage to increase their chances of bailout. In this vein, proposals have been made to prevent systemic institutions from engaging in proprietary trading while enjoying access to central bank liquidity facilities and taxpayer protection, given the absence of a public policy justification.

Institute a Macroprudential Approach to Policymaking

While they are operationally separable, recent events have demonstrated that financial oversight, and monetary and fiscal policy, ultimately coalesce in a financial crisis.[49] If only for the management of such crises, arrangements need to be made for domestic policymakers to cooperate closely. However, macroeconomic stability can be better addressed if these trade-offs are taken into account in the macro-policy setting. For instance, it seems possible to identify excessive credit growth and asset bubbles (if not exact turning points) in major asset classes (see Smithers, 2009; Dudley, 2009; and BIS, 2009). While the appropriate institutional arrangements will vary by country, the response of monetary, fiscal, and prudential policymakers to such macrostability risks should be mutually consistent.

Addressing procyclicality. One aspect of the macroprudential approach is to reform regulations that amplify the economic cycle (see Andritzky and others, 2009). For instance, prior to the crisis, accounting and securities authorities resisted dynamic loan loss provisioning by banks on the grounds of seeking transparency over earnings and actual loan losses. This was one contributor to why many banks in a number of countries entered the crisis with inadequate provisions to meet accumulating losses. Similarly, market risk-adjusted capital requirements for bank trading books facilitated additional risk-taking as market volatility and correlations shrank. As is now being considered by policymakers, some aspects of procyclicality can be addressed by establishing minimum capital requirements and an overall leverage ratio (see Box 1.4) to act as a simple check on balance sheet growth during benign conditions (BCBS and IADI, 2009). This can be complemented by raising supervisory risk weights for rapidly growing loan classes or appreciating assets used as collateral, in addition to dynamic provisioning. Also, as already recommended by the Financial Stability Board, supervisors should encourage risk-adjusted remuneration of senior managers and traders, linked to long-term or realized returns rather than short-term book profits (Financial Services Authority, 2009; Financial Stability Board, 2009).

Integrate the Oversight of Complex Cross-Border Financial Institutions into a Global Financial Market

The crisis has highlighted a significant risk—domestic vulnerability to the failure or retrenchment of systemic cross-border institutions. This has been long recognized but largely ignored by policymakers due to the complexity of mitigating action. However, domestic authorities' responsibility for financial and economic stability means that they need the ability to ensure that critical financial operations in their jurisdictions have sufficient capital and liquidity to meet domestic commitments.

But ring-fencing capital and liquidity reduces the cost efficiency of cross-border institutions and is likely to restrict cross-border bank lending. In the event of a parent company's failure,

[49]See the October 2009 WEO (IMF, 2009c, Chapter 3).

subsidiaries may not retain market confidence in their ability to survive as stand-alone entities. Meanwhile, greater reassurance of host authorities is possible by improving international cooperation and providing information between supervisors through group-wide colleges and intensive crisis management preparations.

Authorities need to blend aspiration with pragmatism. To preserve the benefits of global capital flows, continued progress should be sought on the sharing of information, alignment of the treatment of failing cross-border entities in national insolvency regimes, crisis management preparations, and ex ante agreements to share the burden of failing institutions. However, until these arrangements are sufficiently robust to survive a repetition of the international failures of 2008 and legally enforceable, authorities may need to plan on the basis that cross-border banks are "global in life but national in death." This might entail host and home countries agreeing that operations of cross-border groups that are systemic in the host jurisdiction function as subsidiaries with adequate capital and liquidity. This would help to clarify which authorities would be fiscally responsible for the support of such entities, and encourage their robust oversight.

Emergency policy responses to the crisis were rapid and ultimately effective in restoring market functioning. However, implementation of structural policy reforms has been slow, or has stalled. Stabilization should not prompt regulatory authorities to relax their efforts to map out the path to a more robust financial system. This should entail not only the extent to which capital and liquidity buffers are to rise, but also how market discipline is to be restored. Hard work lies ahead in devising capital penalties, insurance premiums, resolution regimes, and competition policies to ensure that no institution is deemed "too big to fail," thereby endangering sovereign creditworthiness. Placing such reforms in the context of an integrated macroprudential policy framework in which domestic and cross-border institutions can operate securely will remain a challenge for years to come.

Box 1.4. Restoring the Level and Quality of Bank Capital

The crisis revealed serious shortcomings in the level and quality of bank capital. Numerous proposals for change have been made, and the Basel Committee has agreed on some of the broad contours of how international capital requirements are to be reformed (BCBS, 2009). Whatever the outcome, requirements for individual institutions should be set within a framework that addresses systemic concerns. This box describes the range of proposals that have been made to improve the robustness of bank balance sheets without endorsement. Indeed, a combination of these measures is likely to be optimal and vary with national or regional circumstances. Authorities should recognize the trade-offs between them.

Higher (and better quality) risk-weighted capital requirements. The crisis—and subsequent bank rescues—revealed that large banks (especially in Europe) had economized on tangible capital and diluted Tier 1 capital quality through hybrid instruments (IMF, 2009a, Chapter 2). Often, little direct loss-absorptive capacity existed if the bank was to avoid default, insolvency, or a breach of regulatory capital minima. G-20 countries and Basel Committee members have now agreed to increase minimum risk-weighted capital requirements and the quality of such capital. These moves will give shareholders more incentive to discipline risk-taking, while ensuring more resources and time to facilitate resolution without official bailouts. Neutralizing the corporate tax treatment of debt and equity would also remove one incentive for banks to dilute capital quality through issuing hybrid instruments. When calibrating the higher minimum level of capital, authorities need to decide upon their risk appetite for undergoing a forced public recapitalization of the banking system (and not just of an individual bank). Leaving this decision to equity market sentiment will result in the undercapitalization of banks given the systemic risks they pose.

Countercyclical credit loss provisioning. Regulators are following the example of the Banco de España by introducing adjustments to the Basel II framework to enable the greater

building of provisions as Tier II capital during benign times that can be run down during periods of higher charge-offs. Sufficient transparency over the credit-cycle loss assumptions used should ensure that the underlying health of a bank's balance sheet is discernible to investors.

Formal leverage ratio. Other G-20 countries have now agreed to follow the United States, Canada, and Switzerland in adopting a leverage ratio—a minimum ratio of bank capital to total assets. A leverage ratio offers a check on the total size of bank assets for a given amount of capital, since the risk-weighting of assets (by ratings or internal risk models) may prove overly optimistic and offers little restraint on balance sheet expansion through the acquisition of low risk-weighted assets. The danger is that low risk assets migrate to balance sheets requiring less capital and that higher risk is taken for a given capital base to maximize return on equity, so raising the importance of system-wide regulatory vigilance.

Mandatory capital insurance or contingent capital. Systemic institutions could be required to buy collateralized capital insurance from third-party providers for an annual fee or interest rate spread (e.g., Acharya and others, 2009; Kashyap, Rajan, and Stein, 2008). As with catastrophe bonds, following a prespecified trigger event (defining a systemic crisis) or third-party determination, collateral would be released from a dedicated account to either the institution or a bailout fund. The benefits of such insurance or contingent capital are that systemic institutions would be relieved from maintaining a permanent level of expensive capital that may prove unnecessary. A market price for the likelihood of the trigger event would also be generated. Collateralization should ensure that insurance funds are readily available, even in a systemic crisis, although the potential amounts needed in large financial systems probably means that ultimate tail event insurance could only be provided by the fiscal authority.

Convertible capital. Systemic institutions would be required to issue a certain proportion of capital as convertible subordinated debt or preferred shares, with conversion to common equity triggered by third-party determination (e.g., a systemic regulator), a capital shortfall, or external market measures (e.g., credit default swap or bond spreads) during an individual bank failure or systemic crisis (e.g., Flannery, 2005).[1] Such convertibles would facilitate the core recapitalization of systemic institutions in a crisis without recourse to bankruptcy or ex post bailouts, while encouraging risk-monitoring by shareholders fearing dilution.

Subordinated debt. Although intended to promote market discipline under Pillar 3 of Basel II, issuing subordinated debt failed to instill market discipline ex ante due to its small part in banks' capital structure and infrequent issuance. In practice, rescuing authorities were unwilling to impose losses on subordinated debt-holders through fear of the systemic consequences (e.g., U.S. housing government-sponsored enterprises). However, following stabilization, they have suffered mark-to-market losses, subsequently crystallized via banks' debt exchange offers. It has been suggested that more frequent and sizable issuance could offer more credible market-based disciplinary signals.[2]

Prefunding of deposit insurance. Prefunded deposit insurance provides resources for depositor payouts that would otherwise stretch surviving bank balance sheets to find in a systemic crisis. Premiums should be varied countercyclically, to build up the fund during benign times.

Capital charges linked to systemic risk. If systemic institutions are to be penalized for the wider risks they pose, and to redress and reverse the funding advantages they enjoy from "too-big-to-fail" status, then additional capital charges or levies to prefinance a bailout fund could be calibrated to their contribution to systemic risk.

Note: This box was prepared by Paul Mills.

[1]See also Raghuram Rajan, "Cycle-proof Regulation," *The Economist*, April 8, 2009. Hart and Zingales (2009) advocate requiring banks to raise capital whenever their CDS spread rises above a pre-specified trigger value.

[2]See William Poole, "A Market Solution to Secure Banks' Future," *Financial Times*, May 20, 2009.

Annex 1.1. Global Financial Stability Map: Construction and Methodology[50]

This annex outlines our choice of indicators for each of the broad risks and conditions in the global financial stability map (Figure 1.1). To complete the map, these indicators are supplemented by market intelligence and judgment that cannot be adequately represented with available indicators.

To begin construction of the stability map, we determine the percentile rank of the current level of each indicator relative to its history to guide our assessment of current conditions, relative both to the April 2009 GFSR and over a longer horizon. Where possible, we have therefore favored indicators with a reasonable time series history. However, the final choice of positioning on the map is not mechanical and represents the best judgment of IMF staff. Table 1.10 shows how each indicator has changed since the April 2009 GFSR and our overall assessment of the movement in each risk and condition.

Table 1.10. Changes in Risks and Conditions since the April 2009 *Global Financial Stability Report*

Conditions and Risks	Changes since April 2009 GFSR
Monetary and Financial Conditions	↑
G-7 real short rates	↓
G-3 excess liquidity	↓
Financial conditions index	↑
Growth in official reserves	↓
G-3 lending conditions	↑
Risk Appetite	↑↑↑
Investor risk appetite survey	↑
Investor confidence index	↑
Emerging market fund flows	↑
Macroeconomic Risks	↓
World Economic Outlook global growth risks	↓
G-3 confidence indices	↔
OECD leading indicators	↔
Implied global trade growth	↔
Global breakeven inflation rates	↓
Mature market sovereign CDS spreads	↓
Emerging Market Risks	↓↓
Fundamental EMBIG spread	↑
Sovereign credit quality	↔
Credit growth	↓
Median inflation volatility	↑
Corporate spreads	↓
Credit Risks	↓
Global corporate bond index spread	↓
Credit quality composition of corporate bond index	↔
Speculative-grade corporate default rate forecast	↓
Banking stability index	↓
Loan delinquencies	↑
Household balance sheet stress	↓
Market and Liquidity Risks	↓↓
Hedge fund estimated leverage	↔
Net noncommercial positions in futures markets	↔
Common component of asset returns	↔
World implied equity risk premia	↔
Composite volatility measure	↓
Funding and market liquidity index	↓

Source: IMF staff estimates.

Note: Changes are defined for each risk/condition such that ↑ signifies higher risk, easier monetary and financial conditions, or greater risk appetite, and ↓ signifies the converse; ↔ indicates no appreciable change. The number of arrows for the six overall conditions and risks corresponds to the scale of moves on the global financial stability map.

Monetary and Financial Conditions

The availability and cost of funding linked to global monetary and financial conditions (Figure 1.34). To capture movements in general monetary conditions in mature markets, we begin by examining the cost of short-term liquidity, measured as the average level of real short rates across the G-7. We also take a broad measure of excess liquidity, defined as the difference between broad money growth and estimates for money demand. Realizing that the channels through which the setting of monetary policy is transmitted to financial markets are complex, some researchers have found that including capital market measures more fully captures the effect of financial prices and wealth on the economy. We therefore also use a financial conditions index that incorporates movements in real exchange rates, real short- and long-term interest rates, credit spreads, equity returns, and market capitalization.

[50]This annex was prepared by Ken Miyajima.

Rapid increases in official reserves held by the central bank create central bank liquidity in the domestic currency and in global markets. In particular, the recycling of dollar reserves in the United States contributes to looser liquidity conditions. To measure this, we look at the growth of official international reserves held at the U.S. Federal Reserve. While most of the above measures capture the price effects of monetary and financial conditions, to further examine the quantity effects we incorporate changes in lending conditions, based on senior loan officer surveys in mature markets.

Risk Appetite

The willingness of investors to take on additional risk by increasing exposure to riskier asset classes, and the consequent potential for increased losses (Figure 1.35). We aim to measure the extent to which investors are actively taking on more risk. A direct approach to this exploits survey data. The Merrill Lynch Fund Manager Survey asks around 200 fund managers what level of risk they are currently taking relative to their benchmark. We track the net percentage of investors reporting higher-than-benchmark risk-taking. An alternative approach is to examine institutional holdings and flows into risky assets. The State Street Investor Confidence Index uses changes in equity holdings by large international institutional investors relative to domestic investors to measure relative risk tolerance.[51] The index extracts relative risk tolerance by netting out wealth effects and assuming that changes in fundamentals symmetrically affect all kinds of investors. We also take account of flows into emerging market bond and equity funds, as these represent another risky asset class. Taken together, these measures provide a broad indicator of risk appetite.

Macroeconomic Risks

Macroeconomic shocks with the potential to trigger a sharp market correction, given existing conditions in capital markets (Figure 1.36). Our principal assessment of the macroeconomic risks is based on the analysis contained in the IMF's *World Economic Outlook* and is consistent with the overall conclusion reached in that report on the outlook and risks for global growth. We complement that analysis by examining various economic confidence measures. The first of these is a GDP-weighted sum of confidence indices across the major mature markets to determine whether businesses and consumers are optimistic or pessimistic about the economic outlook. Second, recognizing the importance of turning points between expansions and slowdowns of economic activity, we incorporate changes in the Organization for Economic Cooperation and Development's composite leading indicators. Third, in order to gauge inflection points in global trade, we include global trade growth estimates implied by the Baltic Dry Index, a high-frequency indicator based on the freight rates of bulk raw materials that is commonly used as a leading indicator for global trade. The fourth component is market-implied inflation expectations, based on intermediate-dated yield differentials between nominal and inflation-linked domestic bonds. Finally, in order to help assess stress levels on sovereign balance sheets, we examine a GDP-weighted average of the cost that investors need to pay to protect themselves against defaults of selected mature market sovereign debt.

Emerging Market Risks

Underlying fundamentals in emerging markets and vulnerabilities to external risks (Figure 1.37). These risks are closely linked to the macroeconomic risks described above, but conceptually separate as they focus only on emerging markets. Using an econometric model of emerging market sovereign spreads, we identify the movement in Emerging Market Bond Index Global (EMBIG) spreads accounted for by changes in fundamentals, as opposed to the movement in spreads attributable to other factors. Included in the fundamental factors are changes in economic, political, and financial risks within each

[51]The estimated changes in relative risk tolerance of institutional investors from Froot and O'Connell (2003) are aggregated using a moving average. The index is scaled and rebased so that 100 corresponds to the year 2000.

country.[52] This is complemented with a measure of the trend in sovereign rating actions by credit rating agencies, to gauge changes in the macroeconomic environment and progress in reducing vulnerabilities arising from external financing needs. In addition to these factors relating to sovereign debt, we also include an indicator of growth in private sector credit. Other components of the subindex include a measure of the volatility of inflation rates, and a measure of corporate credit spreads relative to sovereign spreads.

Credit Risks

Changes in, and perceptions of, credit quality that have the potential for creating losses resulting in stress to systemically important financial institutions (Figure 1.38). Spreads on a global corporate bond index provide a market price-based measure of investors' assessment of corporate credit risk. We also examine the credit-quality composition of the high-yield index to identify whether it is increasingly made up of higher- or lower-quality issues, calculating the percentage of the index comprised of CCC or lower-rated issues. In addition, we incorporate forecasts of the global speculative-grade default rate produced by Moody's. Another component of the subindex is a banking stability index, which represents the expected number of defaults among large complex financial institutions (LCFIs), given at least one LCFI default (see Segoviano and Goodhart, 2009). This index is intended to highlight market perceptions of systemic default risk in the financial sector. To capture broader credit risks, we also include delinquency rates on a wide range of other credit, including residential and commercial mortgages and credit card loans. Also included is a measure of stress on household balance sheets, constructed as the total amount of financial obligations scaled by disposable income for U.S. households.[53]

Market and Liquidity Risks

The potential for instability in pricing risks that could result in broader spillovers and/or mark-to-market losses (Figure 1.39). An indicator attempting to capture the extent of market sensitivity of hedge fund returns provides an indirect measure of institutional susceptibility to asset price changes. The subindex also includes a speculative positions index, constructed from the net noncommercial positions relative to overall open interest for a range of futures contracts as reported to the Commodity Futures Trading Commission (CFTC). The index typically rises when noncommercial traders take relatively large positions on futures markets, relative to commercial traders.[54] Also included in the index is an estimation of the proportion of variance in returns across a range of asset classes that can be explained by a common factor. The greater the common factor across asset-class returns, the greater the risk of a disorderly correction in the face of a shock. An additional indicator is

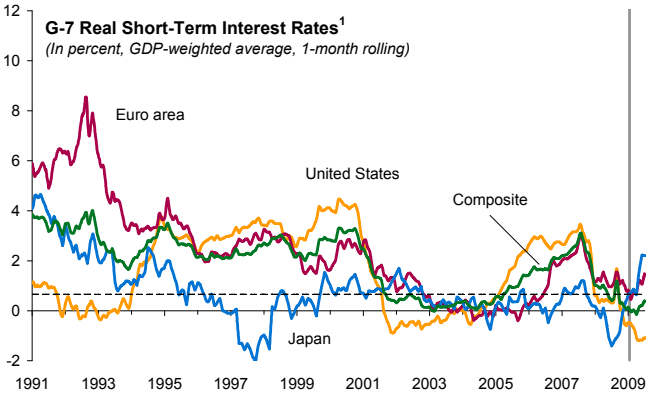
[52]The economic risk rating is the sum of risk points for annual inflation, real GDP growth, the government budget balance as a percentage of GDP, the current account balance as a percentage of GDP, and GDP per capita as a percentage of the world average GDP per capita. The financial risk rating includes foreign debt as a percentage of GDP, debt service as a percentage of GDP, net international reserves as months of import cover, exports of goods and services as a percentage of GDP, and exchange rate depreciation over the last year. The political risk rating is calculated using 12 indicators representing government stability and social conditions.

[53]Estimated payments on outstanding mortgages, consumer debt, auto leases, rental contracts, homeowners' insurance, and property tax.

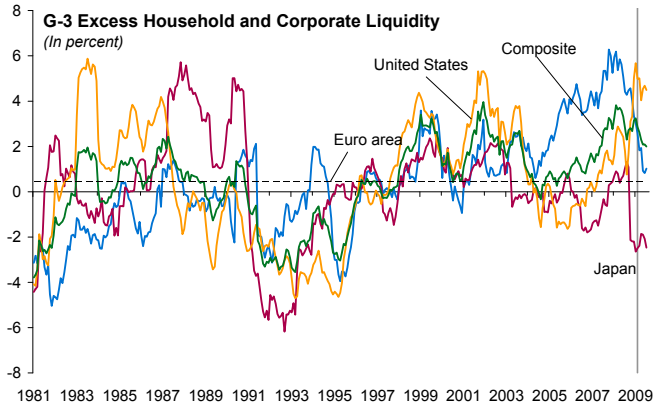
[54]Not all "noncommercial" traders can accurately be described as "speculators." Indeed, as of September 2009, the CFTC no longer uses the terms "commercial" and "noncommercial" to classify traders in its weekly Commitment of Traders report. Instead, the report disaggregates the data into four categories of traders: (1) producer/merchant/processor/user; (2) swap dealer; (3) managed money; and (4) other reportable.

an estimate of equity risk premia in mature markets using a three-stage dividend discount model. Low equity risk premia may suggest that investors are underestimating the risk attached to equity holdings, thereby increasing potential market risks. There is also a measure of implied volatility across a range of assets. Finally, to capture perceptions of funding conditions, secondary market liquidity, and counterparty risks, we incorporate the spread between major mature-market government securities yields and interbank rates, the spread between interbank rates and expected overnight interest rates, bid-ask spreads on major mature-market currencies, and daily return-to-volume ratios of equity markets.

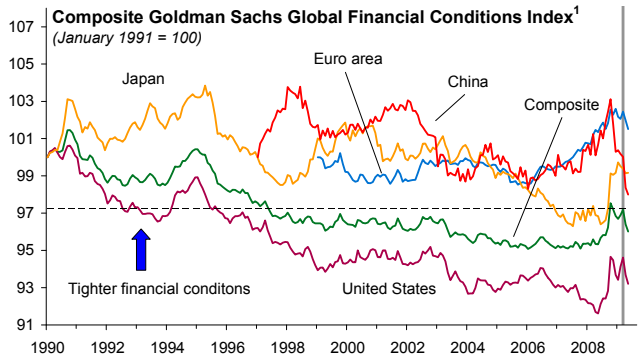
Figure 1.34. Global Financial Stability Map: Monetary and Financial Conditions



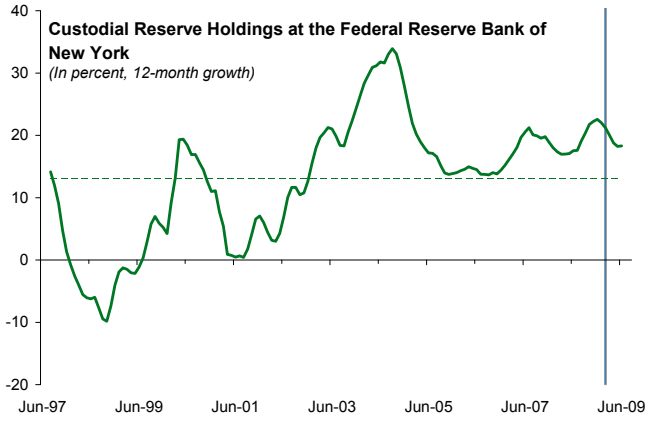
Sources: Bloomberg L.P.; and IMF staff estimates.
[1]Canada and the United Kingdom are included in the composite but not shown separately.



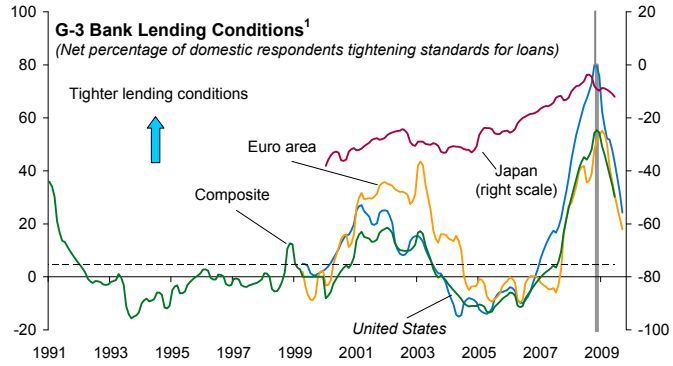
Sources: Bloomberg L.P.; Organization for Economic Cooperation and Development; and IMF staff estimates.



Sources: Goldman Sachs; and IMF staff estimates.
[1]A GDP-weighted average of China, euro area, Japan, and the United States. Each country index represents a weighted average of variables such as interest rates, credit spreads, exchange rates, and financial wealth.



Sources: Federal Reserve Bank of New York; and IMF staff estimates.



Sources: Lending surveys by Bank of Japan, European Central Bank, and the U.S. Federal Reserve for households and corporates; and IMF staff estimates.
[1]Monthly-interpolated GDP-weighted average. Euro area 1999:Q1 to 2002:Q4 based on values implied by credit growth. Composite and Japan showing up to 2009:Q2.

Note: Dashed lines are period averages. Vertical lines represent data as of the April 2009 GFSR

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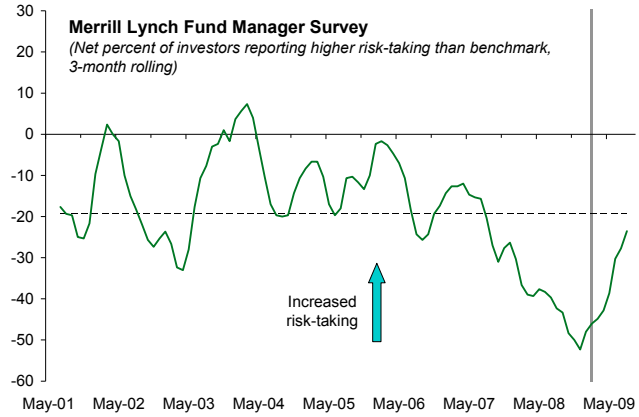
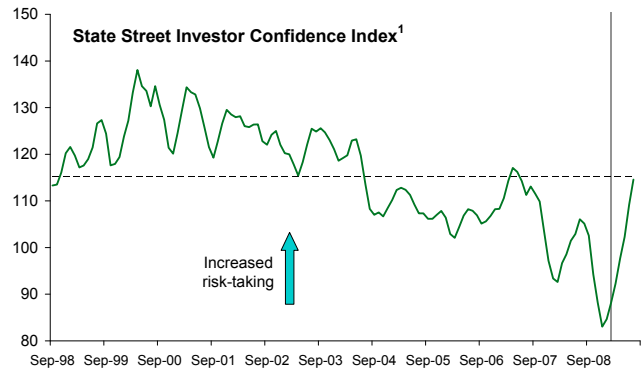
Figure 1.35. Global Financial Stability Map: Risk Appetite

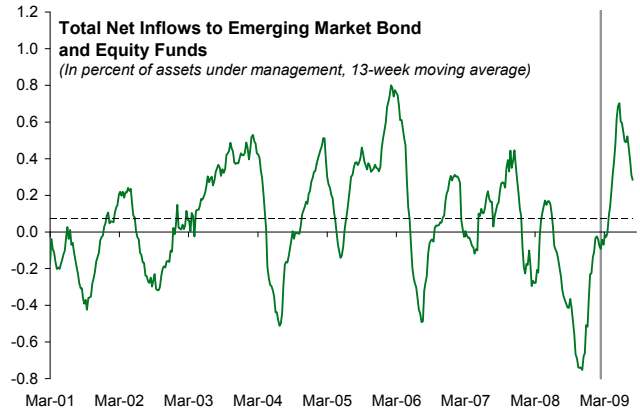


Sources: Merrill Lynch; and IMF staff estimates.



Source: State Street Global Markets.

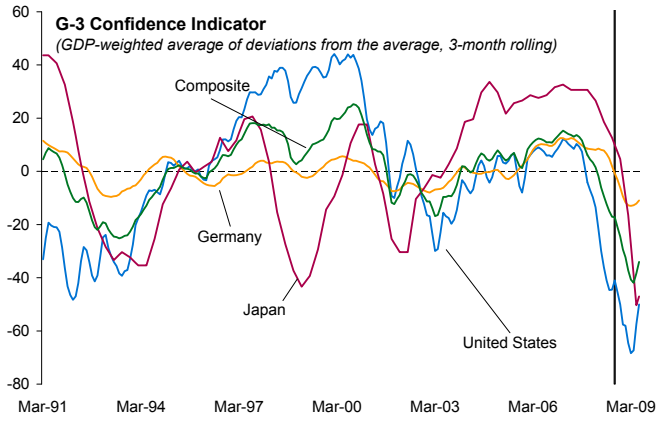
[1]The estimated changes in relative risk tolerance of institutional investors from Froot and O'Connell (2003) are integrated to a level, scaled, and rebased so that 100 corresponds to the average level of the index in the year 2000. Three-month rolling average of the published index.



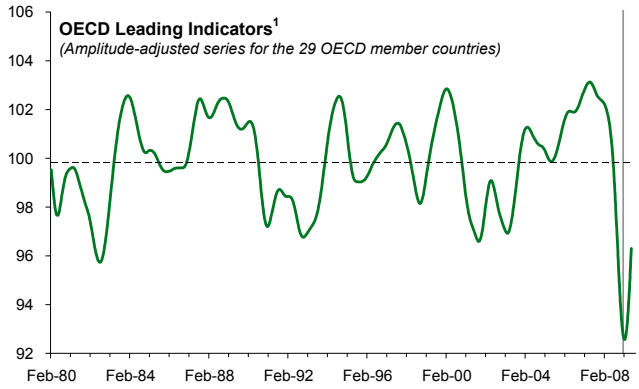
Sources: Emerging Portfolio Fund Research, Inc.; and IMF staff estimates.

Note: Dashed lines are period averages. Vertical lines represent data as of the April 2009 GFSR.

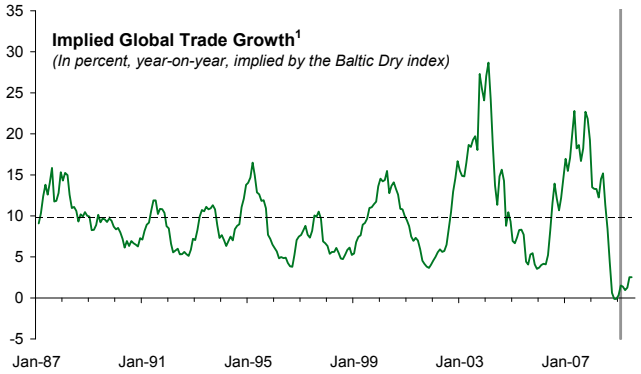
Figure 1.36. Global Financial Stability Map: Macroeconomic Risks



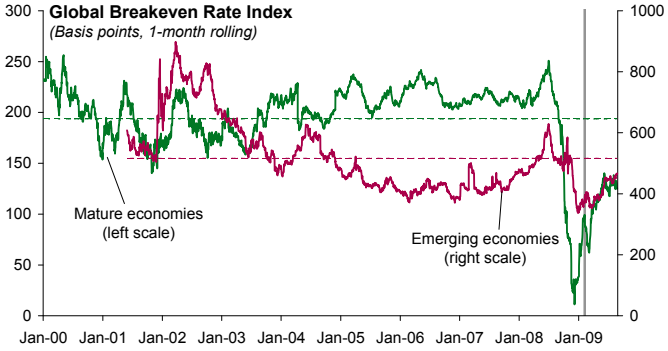
Sources: Bloomberg L.P; and IMF staff estimates.



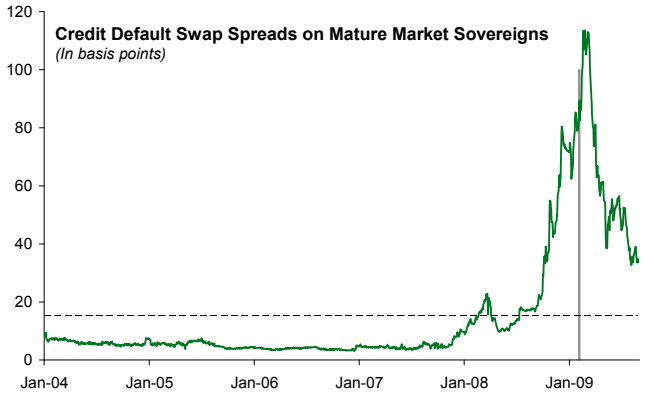
Source: Organization for Economic Cooperation and Development.
[1]Amplitude adjustment is carried out by adjusting mean to 100 and the amplitude of the raw index to agree with that of the reference series by means of a scaling factor.



Sources: The Baltic Exchange; and IMF staff estimates.
[1]The Baltic Dry Index is a shipping and trade index measuring changes in the cost of transporting raw materials such as metals, grains, and fuels by sea.



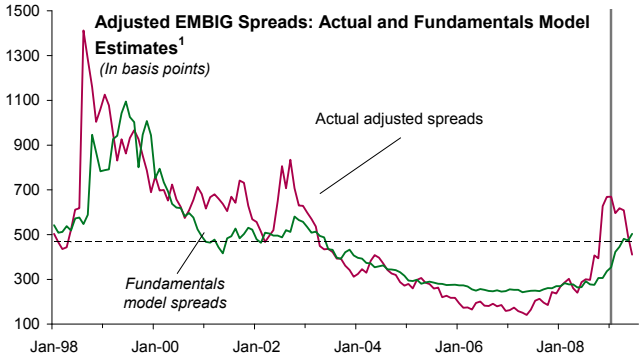
Sources: Barclays Capital; and IMF staff estimates.
Note: Tracking GDP-weighted longer-term breakevens, or inflation expectations, for Australia, Brazil, Canada, Colombia, France, Germany, Italy, Japan, Korea, Mexico, Poland, South Africa, Sweden, Turkey, the United Kingdom, and the United States. The ranking of the observations is determined by z-score in absolute terms relative to their long-run averages.



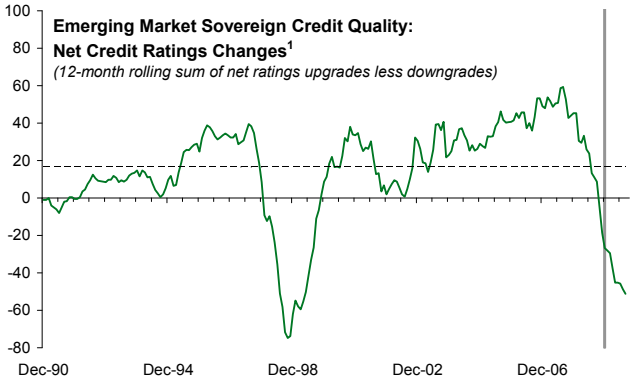
Sources: Datastream; and IMF staff estimates.
Note: GDP-weighted average of France, Germany, Italy, Japan, Spain, United Kingdom, and United States.

Note: Dashed lines are period averages. Vertical lines represent data as of the April 2009 GFSR.

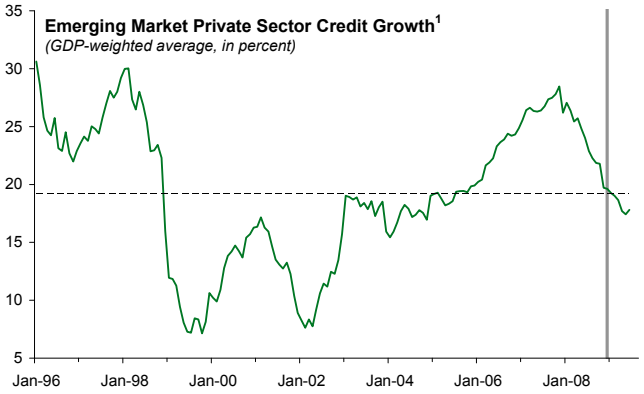
Figure 1.37. Global Financial Stability Map: Emerging Market Risks



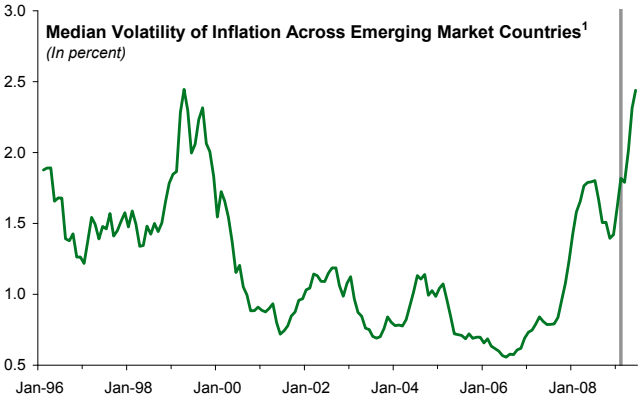
Sources: Bloomberg L.P.; JPMorgan Chase & Co.; The PRS Group; and IMF staff estimates.
[1]EMBIG = Emerging Market Bond Index Global. The model excludes Argentina because of breaks in the data series related to debt restructuring. Owing to the short data series, the model also excludes Indonesia and several smaller countries. The analysis thus includes 32 countries.



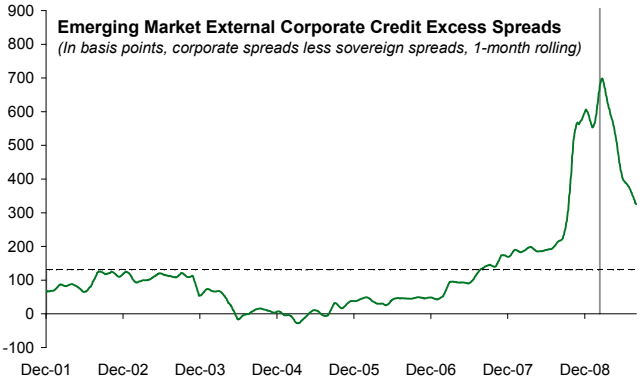
Sources: JPMorgan Chase & Co.; and IMF staff estimates.
[1]Net actions of upgrades (+1 for each notch), downgrades (-1 for each notch), changes in outlooks (+/- 0.25), reviews and creditwatches (+/- 0.5).



Sources: IMF, International Financial Statistics database; and IMF staff estimates.
[1] 44 countries.



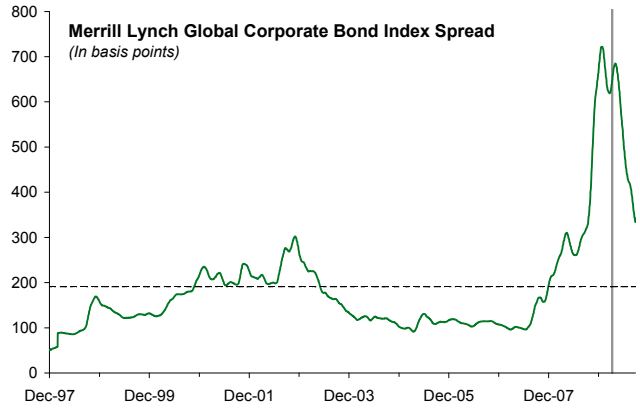
Sources: Bloomberg L.P.; and IMF staff estimates.
[1]Average of 12-month rolling standard deviations of consumer price changes in 36 emerging markets.



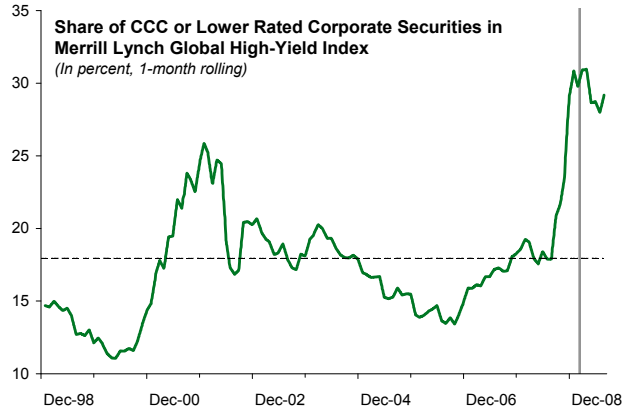
Sources: JPMorgan Chase & Co; and IMF staff estimates.
Note: Unweighted average of Brazil, China, Colombia, Egypt, Kazakhstan, Mexico, Malaysia, Peru, Russia, and Ukraine.

Note: Dashed lines are period averages. Vertical lines represent data as of the April 2009 GFSR.

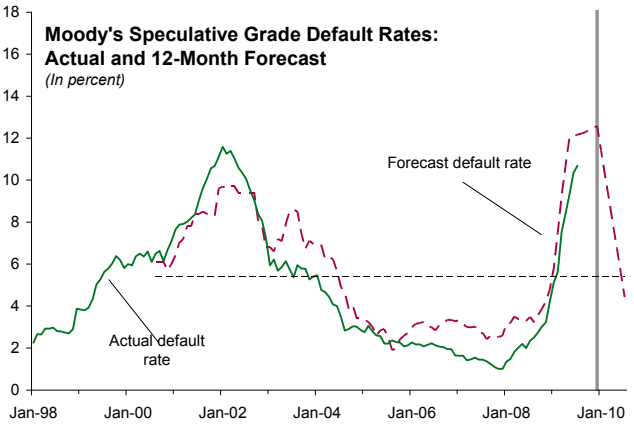
Figure 1.38. Global Financial Stability Map: Credit Risks



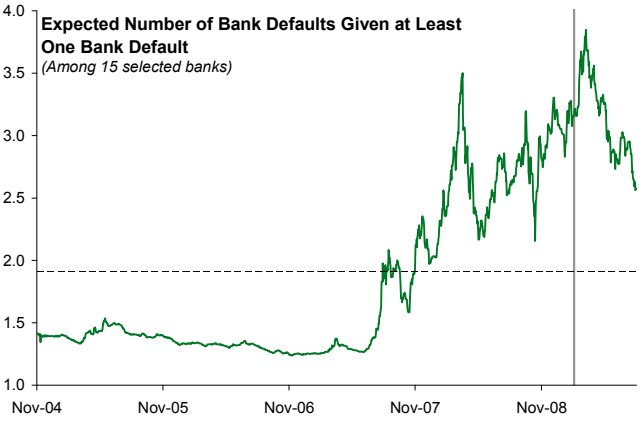
Sources: Merrill Lynch; and IMF staff estimates.



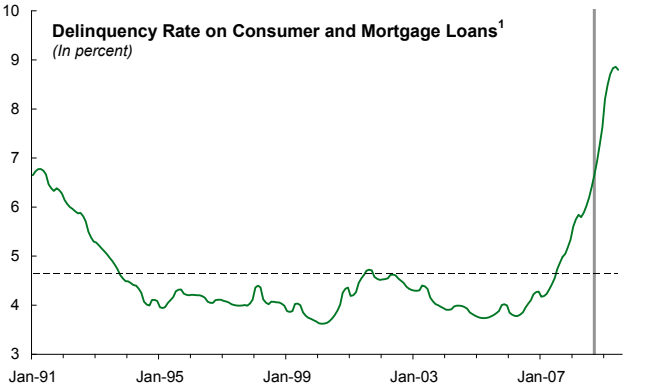
Sources: Merrill Lynch; and IMF staff estimates.



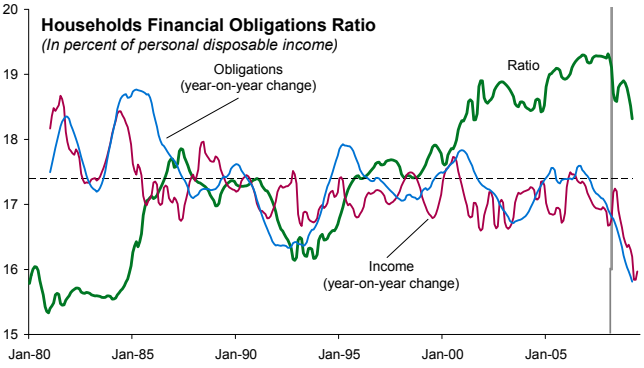
Source: Moody's.



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



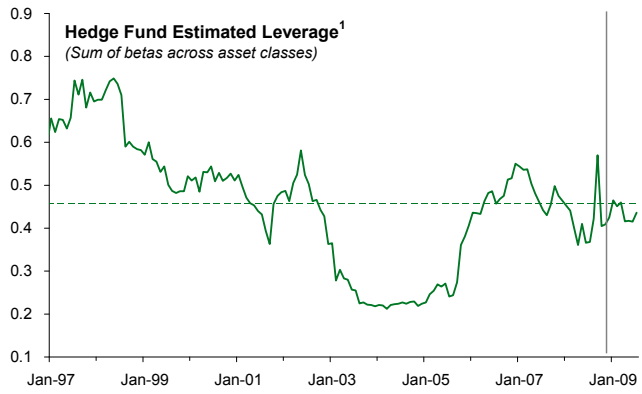
Sources: Federal Reserve; Mortgage Bankers Association; and IMF staff estimates.
[1]30-, 60-, and 90-day delinquencies for residential and commercial mortgages, and credit card loans in the United States. Quarterly data are extrapolated into monthly frequency.



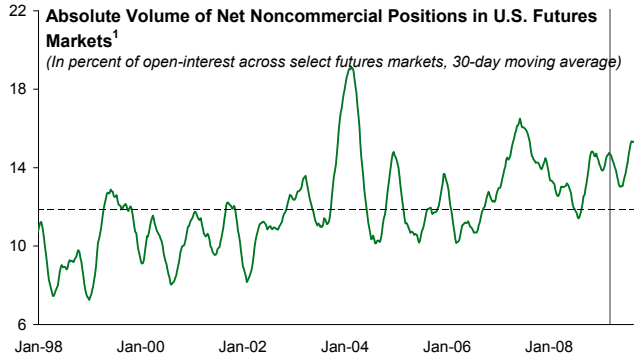
Sources: Federal Reserve; and IMF staff estimates.
Note: Financial obligations consist of the estimated required annual payments on outstanding mortgages, consumer debt, automobile lease, rental on tenant-occupied property, homeowners' insurance, and property tax.

Note: Dashed lines are period averages. Vertical lines represent data as of the April 2009 GFSR.

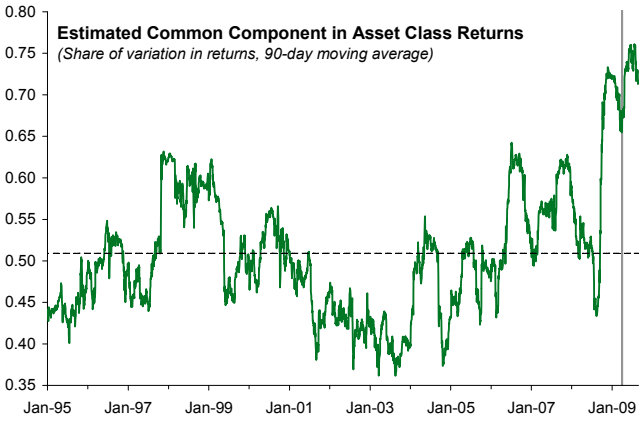
Figure 1.39. Global Financial Stability Map: Market and Liquidity Risks



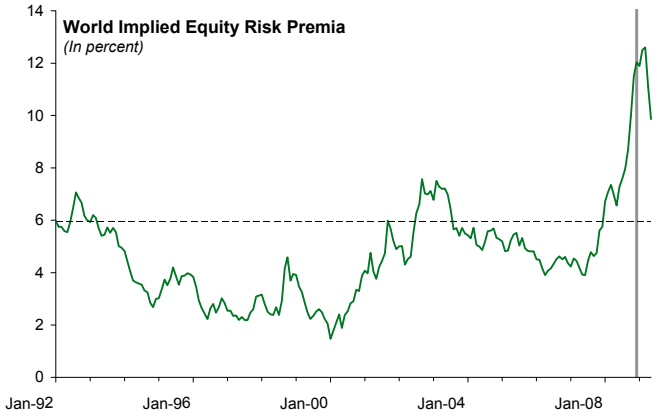
Sources: Credit Suisse Tremont Index LLC; and IMF staff estimates.
[1]36-month rolling regressions of hedge fund performance versus real asset returns.



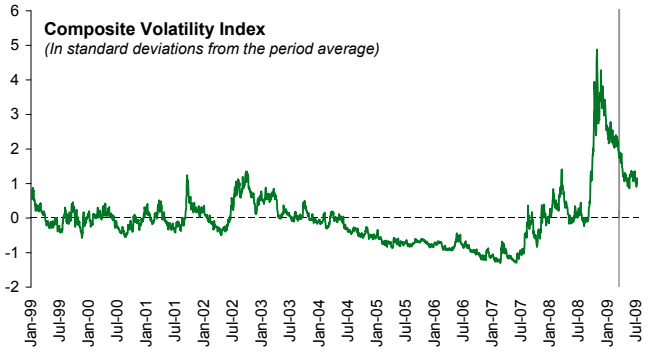
Sources: Bloomberg L.P.; and IMF staff estimates.
[1]Data represent the absolute number of contracts of the net positions taken by non-commercial traders in 17 selected U.S. futures markets. Higher volume is indicative of heavier speculative positioning across markets, either net-long or net-short.



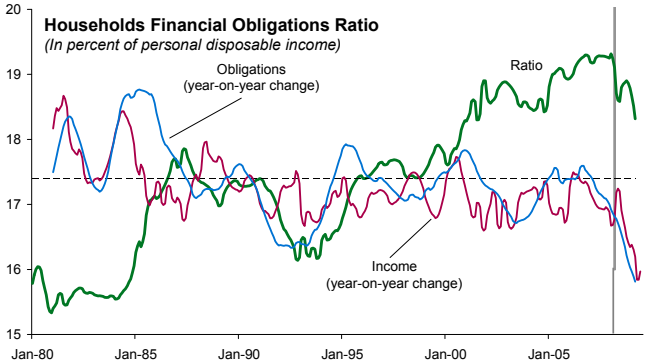
Sources: Bloomberg L.P.; JPMorgan Chase & Co.; and IMF staff estimates.



Sources: IBES; Morgan Stanley Capital International; and IMF staff estimates.



Sources: Bloomberg L.P.; and IMF staff estimates.
Note: Representing an average z-score of the implied volatility derived from options from stock market indices, interest, and exchange rates. A value of 0 indicates the average implied volatility across asset classes is in line with the period average (from 12/31/98 where data is available). Values of +/-1 indicate average implied volatility is one standard deviation above or below the period average.



Sources: Federal Reserve; and IMF staff estimates.
Note: Financial obligations consist of the estimated required annual payments on outstanding mortgages, consumer debt, automobile lease, rental on tenant-occupied property, homeowners' insurance, and property tax.

Note: Dashed lines are period averages. Vertical lines represent data as of the April 2009 GFSR.

Annex 1.2. Loan Loss and Bank Writedown Estimation Methodology[55]

The April 2009 GFSR estimated potential writedowns on credit originated in the United States, Europe, Japan, and emerging markets for global market participants over 2007–10. The methodology used to estimate those losses has been refined here for banks domiciled in the United States, euro area, United Kingdom, other mature Europe,[56] and mature Asia. The analysis now benefits from improved access to official data and a completely revised methodology for loan loss estimation.

Coverage by Credit Category

The loss calculation on U.S origin credit, both loans and securities, is based on a set of assets including residential and commercial real estate mortgages, and on consumer, corporate, and municipal debt. A similar set of instruments, excluding municipal securities, has been used for the euro area and the United Kingdom. The analysis for other mature Europe and Japan is less finely divided, with analysis of the latter being restricted to consumer and corporate debt. Losses have also been estimated on bank holdings of emerging market credit, including both sovereign and corporate debt.

Loan Loss Estimation Methodology

United States

Our methodology for estimating loan losses in the United States is broadly consistent with the technique described in Box 1.7 in the April 2009 GFSR.

Euro Area

By contrast, our estimation of loan losses in the euro area has changed significantly since the April 2009 GFSR. Previously, loan losses in the euro area were based on the forecast profile of the United States and relative security prices, whereas in this iteration, we used much-improved data sources and developed a model to forecast bank loan losses, in coordination with the European Central Bank (ECB).

Data sources

We were primarily interested in estimating potential losses incurred by a country's or a region's banking system, so we focused on consolidated data, where available. Since overall losses were then split into loan types, we were able to calculate potential losses by origin of credit, as well.

We identified four data sources on writedowns and provisions for estimating loan losses in the euro area.

- *The ECB's Monetary and Financial Institutions (MFI) database.* This database is publicly available, and includes data on MFI writedowns, with a breakdown by loan type (residential mortgages, consumer loans, other household lending, and corporate loans) for the euro area as a whole. It is based on the borrower's domicile, and is available monthly beginning in 2003.
- *The Banking Supervision Committee's (BSC) Consolidated Banking Data.* This is publicly available data on loan loss provisions for the euro area as a whole on a consolidated

[55]This annex was prepared by Sergei Antoshin and Mustafa Saiyid.

[56]Other mature Europe is defined as Denmark, Iceland, Norway, Sweden, and Switzerland.

basis, and is available annually beginning in 2002. Country-level data on provisions for 2002–08 were provided on a confidential basis.

- *The Organization for Economic Cooperation and Development's (OECD) Bank Profitability Statistics.* This is publicly available data on loan loss provisions, covering OECD members on a consolidated and unconsolidated basis (Table 1.11), and data are available annually beginning in 1979.
- *Private sector data.* KBW provided forward-looking estimates for bank loan loss provisions by country on a consolidated basis. These data are based on public filings by traded banks.

Table 1.11 OECD Database: Coverage and Degree of Consolidation

	Coverage	Degree of Consolidation			
		Domestic banks		Foreign banks	
		Foreign branches	Foreign subsidiaries	Domestic branches	Domestic subsidiaries
Austria	Banks, builiding & loan associations	Yes	Yes	Yes	Yes
Belgium	Credit institutions, excluding MMF	Yes	No	Yes	Yes
Germany	Banks	Yes	No	No	Yes
Ireland	Banks & building societies	Yes	Yes	Yes	Yes
Italy	Banks	No	No	Yes	Yes
Netherlands	Banks	No	No	Yes	Yes
Spain	Banks	No	No	Yes	Yes

Source: Organization for Economic Cooperation and Development.
MMF = money market funds.

Measures of bank loan losses

We used loan loss provisions instead of writedowns on loans to estimate losses. Provisions are a direct measure of losses from a bank's profit and loss statement (the income statement). Under International Financial Reporting Standards (IFRS), which were adopted by euro area members between 2004 and 2008, loan loss provisions have to be triggered by a credit event.[57] Writedowns on loans usually lag provisions, and are only reliable predictors of loan losses if they track provisions closely, as in the United States. In several European jurisdictions, writedowns can occur several years after a credit event. Our investigation of the ECB's MFI data showed that MFI writedowns respond very weakly to changes in macroeconomic fundamentals. The analysis that follows will demonstrate that provisions, by contrast, are sensitive to changes in the economic environment and thus can be used for modeling and forecasting.

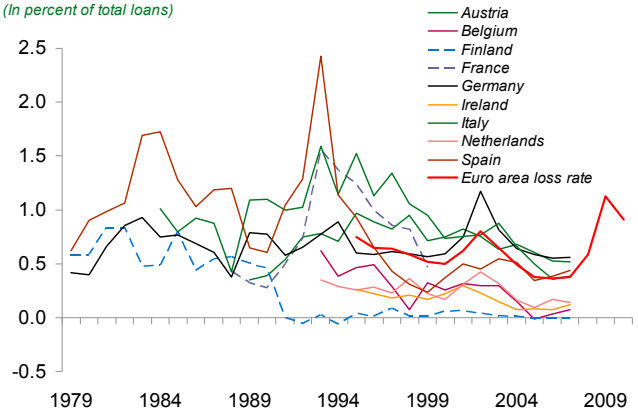
Use of the data sources

We used all four data sources in our calculations.

[57]Thus, under IFRS, loan loss provisions cannot be used for income-smoothing.

The OECD database offers the longest time series at both the country level and the aggregate level. We used the sample of seven euro area members for our time series analysis. The full sample begins in 1995, and an incomplete sample begins in 1979, largely dominated by Germany at the start of the sample period (Figure 1.40).

Figure 1.40. Provisions for Loan Losses
(In percent of total loans)



Source: Organization for Economic Cooperation and Development.

The BSC data were used to expand the sample coverage, take into account that all the euro area countries switched to IFRS by 2008, and introduce a consolidation basis for all the countries. However, while the BSC maintains data on impairment losses for IFRS-reporting countries, only seven euro area countries in 2008 had a breakdown of impairments. Importantly, the sample does not include France, Italy, and Spain. We applied the same ratio of impairments on loans to total impairments as in the aggregated sample of these seven countries for the remaining euro area countries.

Since no breakdown by loan type for provisions is available from either the OECD or the BSC, we used *the ECB's MFI database,* as well as private estimates for mature markets and our own estimates for emerging markets, for greater granularity (including residential mortgages, consumer loans, commercial real estate, corporate loans, and the foreign sector).

Modeling and forecasting

Using the OECD aggregated sample covering 1995–2007, we regressed provision rates on various macroeconomic indicators. Due to a small number of observations, we were limited by the number of explanatory variables. Bank lending standards, which are part of the U.S. estimation, start in the euro area only in 2003, and, thus, could not be employed. We also relied on variables that are forecast in the IMF's WEO. We employed annual GDP growth, *GDP*(t), as a proxy for corporate activity, and the unemployment rate, *UNEMPLOYMENT*(t), as a measure of stress in the household sector. This provided the following specification for euro area provision rates:

$$PROVISION(t) = 0.161 - 0.074 * GDP(t) + 0.062 * UNEMPLOYMENT(t).$$

Table 1.12. Statistical Output for the Euro Area Provision Rate Model

	Mean	Standard Deviation	MC Error	5.00%	Median	95.00%	Start	Sample
Constant	0.161	0.319	0.001	-0.356	0.161	0.677	10,000	100,001
GDP	-0.074	0.039	0.000	-0.137	-0.074	-0.010	10,000	100,001
Unemployment	0.062	0.033	0.000	0.008	0.062	0.117	10,000	100,001

Source: IMF staff estimates.

The estimation was carried out in empirical Bayesian package WINBUGS (Lunn and others, 2000) with 100,000 Markov Chain Monte Carlo runs. The coefficients were found to be significant at 10 percent (Table 1.12).

Since the size of the full sample is small, we tried various alternative specifications, including (1) using housing prices instead of unemployment rates; (2) extending the sample back to 1979; (3) running individual country regressions; (4) extending the sample forward using 2008 provision rates from the BSC; and (5) extending the sample backward and forward. All the specifications yielded broadly similar results. The euro area provision rate peaks around 1.1 percent in 2009 and above the previous peaks in the 1980s and the early 1990s, using the WEO's assumptions on euro area growth and unemployment. The final model's predictions are close to a median forecast.

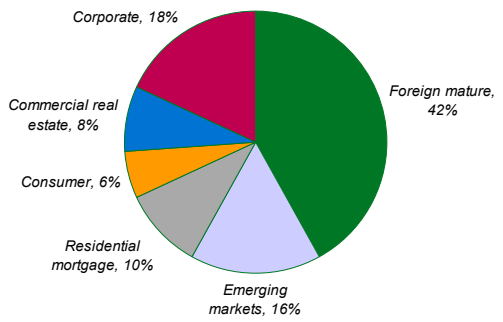
We used relative writedown rates from the ECB's MFI database and relative projected loss rates from the private sector and our own estimates for the absolute loss rates in emerging markets in order to obtain provision rates by loan type (Table 1.13). The use of MFI writedowns introduced a downside bias for mortgages, since the time lag between provisions and writedowns is large. The foreign sector represents 28 percent of total loans in the euro area's consolidated banking system, and the cumulative provision rate on foreign exposures is twice as high as the total provision rate. This results in a substantial share of losses on foreign exposures, at 58 percent, of which the share of losses on emerging market loans is 16 percent (Figure 1.41).

Table 1.13. Forecasts of Euro Area Provision Rates by Loan Type
(In percent)

	Total	Mortgages	Consumer	Commercial Real Estate	Corporate	Foreign
2007	0.4	0.1	0.5	0.4	0.2	0.8
2008	0.6	0.2	0.8	0.6	0.3	1.2
2009	1.1	0.4	1.6	1.2	0.7	2.3
2010	0.9	0.3	1.3	1.0	0.5	1.9
2011	0.8	0.3	1.1	0.8	0.5	1.6
2012	0.7	0.3	1.0	0.8	0.4	1.5
2013	0.7	0.2	0.9	0.7	0.4	1.4
2014	0.6	0.2	0.8	0.6	0.3	1.2
2007-10	3.0	1.1	4.2	3.2	1.7	6.2
2009-10	2.1	0.7	2.8	2.2	1.2	4.3

Source: IMF staff estimates.

Figure 1.41. Estimated Share of Euro Area Bank Loans, 2007-10
(In percent)



Sources: National authorities; and IMF staff estimates.

Discussion of the results

The cumulative loss rate for the euro area (3 percent for 2007–10) is low compared to the United States (8.1 percent) and—as discussed below—to the United Kingdom. A number of biases may have contributed to low loss rates for the euro area:

1. *A low base in 2008*. The recorded provision rate in 2008, which was used as the base for the euro area projected profile, may be low because of the following factors:

- The OECD sample contains countries with banks reporting with different degrees of consolidation. For example, Italy, the Netherlands, and Spain do not report losses on either foreign branches or foreign subsidiaries. Since loss rates are generally higher abroad for euro area banks, the lower the degree of consolidation, the lower the overall provision rate. As a result, the OECD sample presents a lower provision rate than would have been the case if all the countries reported consolidated losses.

- Incomplete data on provisions under IFRS from the BSC. As discussed, we applied the same ratio of impairments on loans to total impairments as in the aggregated sample of

the seven countries to the remaining euro area countries. However, the share of loans in total assets in France, Italy, and Spain are high, and thus the share of impairments on loans may be higher than that for the euro area average.

- Non-IFRS reporting banks may practice income smoothing. Many small banks, which constitute a substantial part of the overall banking system in countries like Germany, are not yet subject to IFRS accounting, and so may practice income-smoothing accounting (which allows a bank to provision more during good years and less during bad years, due to tax and other incentives). In countries with a substantial share of non-IFRS banks, the overall provision rates are then much lower in 2007–09 than they would have been if all banks reported under IFRS.

- More generally, anecdotal evidence on large traded banks suggests that nonperforming loans (NPL) continued to increase faster than loan loss reserves (LLR) over the crisis period, while the coverage ratio (LLR-to-NPL) is declining. This may signal that a bank is underprovisioning, since the coverage ratio should remain stable, if it was not inflated at the beginning of the crisis, given that the loss given default is not decreasing. In the case of Spain, where dynamic provisioning is practiced, banks accumulated large loan loss reserves during the pre-crisis period of expansion, raising LLR more than NPL.

2. *Properties of the model.* A more refined model could produce stronger results suggesting a more aggressive profile for provision rates, due to the following factors:

- The small number of observations resulted in a lower median forecast.

- The omission of lending standards resulted in small sensitivities of losses to the current, unprecedented financial and economic crisis. (This also applies to the United Kingdom.) The forecast peak value of 1.1 percent is comparable to the previous peaks, despite the worst economic growth in several decades.

- The use of GDP growth rather than the cumulative gap may have resulted in low coefficient values. (This also applies to the United Kingdom).

- The use of domestic variables—GDP and the unemployment rate—to model consolidated losses, including those from foreign subsidiaries, may understate the extent of deterioration of foreign loan portfolios. Given that the share of foreign holdings by euro area banks has increased over time, and the extent of deterioration in Eastern Europe has been larger, actual losses should be greater than those implied by the domestic portfolio model.

- The omission of important countries that are sensitive to the downturn may have resulted in lowering sensitivities of the euro area aggregate. For example, in France, unconsolidated domestic provisions rose 225 percent from 2006 to 2008[58], though currently still at a relatively low level, whereas provisions in the euro area aggregate excluding France increased only around 62 percent over 2006–08.

Nevetheless, we believe the exercise provides useful guidance for the lower bound of potential loan losses in the euro area.

[58]Based on data from national authorities.

United Kingdom

The estimation methodology for loan losses in the United Kingdom is broadly similar to the euro area methodology. We exploited various sources to fill data gaps, and employed econometric forecasting to arrive at loss estimates. As in the euro area, we used loan loss provisions instead of writedowns to assess potential losses incurred by the U.K. banking system.

Data sources

With support from the Financial Services Authority (FSA), we identified four data sources on writedowns and provisions for the United Kingdom.

- The Bank of England's MFI data. This is publicly available data on MFI writedowns by loan type, on a borrower's domicile basis, quarterly, from 1993/1996.
- The FSA's BSD03 form data. This is confidential data on specific provisions reported by banks and building societies, on a consolidated basis, semi-annually (for some years) and annually, from 1997.
- The FSA's FSA015 form data. This is confidential data on specific and generic provisions and write-offs by banks and building societies, by detailed loan type, on a consolidated basis, only for 2008H2.[59]
- The FSA's Mortgage Lenders and Administrators Return (MLAR) data. This is confidential data on provisions and writedowns on residential mortgages, on a borrower's domicile basis, quarterly, from 2007. Importantly, the data exclude specialist lenders, whereas the data on amounts outstanding include specialist lenders.

Use of the data sources

We used only the last three data sources on provisions since they provided sufficient information.

The BSD03 form data were used as the longest time series to model banks and building societies' provisions based on an econometric approach with macro variables.

The FSA015 were used to take into account generic provisions and split overall losses into five loan categories (including the foreign sector).

The MLAR data were used to derive the loss rate for residential mortgages.

Modeling and forecasting

Similar to the euro area, we estimated the following equation for the U.K. provision rate:

$$PROVISION(t) = 0.414 - 0.087 * GDP(t) + 0.128 * UNEMPLOYMENT(t).$$

The coefficients on GDP and unemployment are significant at 5 and 10 percent, respectively (Table 1.14). The values of the coefficients are somewhat higher than those for the euro area.

We distribute losses across the five loan type according to the FSA015 form provision rates and the MLAR provision rate for residential mortgages.

[59]Unconsolidated data are also available on a quarterly basis. We focused on consolidated data (see the discussion above on consolidated versus unconsolidated data.)

Table 1.14. Statistical Output for the U.K. Provision Rate Model

	Mean	Standard Deviation	MC Error	2.50%	5.00%	Median	95.00%	97.50%	Start	Sample
Constant	0.414	0.422	0.001	-0.420	-0.279	0.414	1.101	1.242	10,000	100,001
GDP	-0.087	0.043	0.000	-0.173	-0.158	-0.087	-0.017	-0.002	10,000	100,001
Unemployment	0.128	0.079	0.000	-0.027	0.000	0.128	0.257	0.284	10,000	100,001

Source: IMF staff estimates.

The share of losses on foreign exposures is 53 percent of total losses incurred by the U.K banking system (including building societies).

Discussion of the results and cross-regional comparison

The cumulative loss rate for the U.K. banking system is 7.3 percent, which is lower than the loss rate of 8.1 percent in the United States and more than twice the loss rate of 3 percent in the euro area (Table 1.15). The main difference between U.K. and euro area loss rates may be explained by differences in financial stress levels, market structure, and data quality. The period of declining real estate values began earlier in the United Kingdom than in the euro area. U.K. households also traditionally rely more heavily on credit cards for borrowing than, say, German residents, and obtain mortgages more often. The U.K. data are more comprehensive and consistent than the euro area data, since the latter dataset is subject to (1) gaps on a country level; (2) variations in accounting standards and legal systems across countries; and (3) a high share of non-IFRS reporting banks.

Table 1.15. Cumulative Loss Rates, 2007-10
(In percent)

	United States	Euro Area	United Kingdom	Other Mature Europe	Asia
Total	8.1	3.0	7.3	5.1	2.9
Domestic sectors:	9.4	1.8	5.5	1.8	1.6
Mortgages	7.7	1.1	3.0	1.1	0.0
Consumer	17.4	4.2	15.5	4.2	0.0
Commercial real estate	9.0	3.2	11.1	3.2	0.0
Corporate	6.6	1.7	4.5	1.7	0.0
Foreign sector	3.3	6.2	10.3	5.8	5.5

Source: IMF staff estimates.

Securities loss estimation methodology

As in prior GFSRs, losses for debt securities were measured as declines in market valuations of representative indices from mid-2007 to the latest available date (Table 1.16), and calculated in price terms. To estimate mark-to-market loss rates on European structured products, we used only AAA rated indices. This avoids the use of potentially unreliable pricing for relatively illiquid, lower-quality

Table 1.16. List of Security Indexes

United States	
Residential mortgage	ABX, TABX, Barclays U.S. Aggregate MBS.
Commercial mortgage	Markit CMBX
Consumer	Barclays U.S. ABS Auto & Credit Cards
Corporate debt and CLOs	Barclays U.S. Corporate: Investment Grade & High Yield
Municipal	Markit MCDX
United Kingdom	
Residential mortgage	ESF / Markit UK 3-5 year AAA RMBS (Prime)
Commercial mortgage	ESF / Markit Pan-European 3-5 year AAA CMBS
Consumer	ESF / Markit Pan-European 1-4 year AAA ABS
Corporate debt	Barclays Sterling Aggregate Corporates
Euro Area	
Residential mortgage	ESF / Markit European 3-5 year AAA RMBS
Commercial mortgage	ESF / Markit Pan-European 3-5 year AAA CMBS
Consumer	ESF / Markit Pan-European 1-4 year AAA ABS
Corporate debt	Barclays Euro Aggregate Corporates
Other Mature Europe	
Residential mortgage	ESF / Markit European 3-5 year AAA RMBS
Commercial mortgage	ESF / Markit Pan-European 3-5 year AAA CMBS
Consumer	ESF / Markit Pan-European 1-4 year AAA ABS
Corporate debt	Barclays Euro Aggregate Corporates
Japan	
Corporate Debt	Barclays Asian-Pacific Japan Corporate
Emerging Markets	
Corporate debt	JP Morgan CEMBI Broad Diversified
Sovereign debt	JP Morgan EMBI Global Diversified

Sources: Barclays, European Securitisation Forum (ESF); Markit.com; and IMF staff estimates
Note: ABS = asset-backed security; CLO = collateralized debt obligation; CMBS = commercial mortgage-backed security; MBS - mortgage-backed security; RMBS = residential mortgage-backed security.

issues, and allows us to drop an adjustment that gave banks the benefit of holding much better quality securities compared with the average for the whole stock of origination with lower corresponding loss rates on holdings.

For the assessment of loss rates on residential mortgage-backed securities (RMBS) market in the euro area, we used indices compiled by the European Securitization Forum for mortgage securities deals originated in France, Germany, Italy, Netherlands, and Spain. We also assume that the current pricing of securities fully reflects market expectations of potential cash flow deterioration ahead. As pricing may be affected by adverse liquidity conditions, particularly for low quality securities, there is a danger of overestimating ultimate credit losses using this approach. Partly for this reason, we are no longer using security indices rated BBB or below in the euro area and the United Kingdom in our analysis. The mark-to-market loss rates on these indices were weighted by outstanding issuance to compute an overall loss rate on RMBS. Large contributions came from countries with relatively large RMBS markets, including the Netherlands (30 percent of the total), Spain (27 percent), Italy (16 percent), and Ireland (7.5 percent) (Table 1.17).[60] For the euro area as a whole, the cumulative mark-to-market loss rate from mid-2007 through August 2009 was

[60]AAA-rated Markit indexes from the August report of the European Securitisation Forum were used to estimate price declines in residential securities markets in the euro area (available from http://www.europeansecuritisation.com). The use of highly-rated indexes is meant to overcome problems associated with potentially unreliable pricing of illiquid securities. The estimated mark-to-market price declines for RMBS in different euro area countries are not necessarily meant to represent the state of residential markets broadly in those countries.

Table 1.17. Euro Area Residential Securities Market

	Outstanding Amounts (billions of euros)	Weights (percent)	Price Impact (percent)
Netherlands	188	30	7.0
Spain	165	27	32.0
Italy	98	16	12.0
Germany	20	3	3.0
Other (including France, Ireland)	149	24	3.6
Euro area	621	100	13.5

Sources: European Securitisation Forum (2009:Q1); and IMF staff estimates.

estimated at 13.5 percent. By comparison, the mark-to-market loss rate on U.K. residential securities was estimated at 12 percent. These two loss rates came out quite similar in magnitude because we dropped the nonconforming U.K. residential securities market in this analysis. The estimated mark-to-market loss rate for the U.S. RMBS market of 13 percent is also of a similar magnitude to that of the euro area and U.K. markets. This estimate is an average loss rate for the whole mortgage market and includes the guaranteed prime conforming segment, where losses are borne primarily by government-sponsored entities, and insurers, rather than by securities holders (Table 1.18).

Table 1.18. U.S. Residential Securities Market

	Estimated Stock (billions of U.S. dollars)	Mark-to-Market Loss Rate (percent)	Mark-to-Market Loss (billions of U.S. dollars)
Total prime	5,440	4	240
Total nonagency securitized	1,500	43	639
Total securitized mortgages	6,940	13	880

Sources: U.S. Federal Reserve; and IMF staff estimates.

For consumer debt securities, we estimated price declines separately for securities backed by auto loans and credit card receivables. Since European consumer debt indices are not available for each country, we used the same pan-European consumer indices for the United Kingdom, the euro area, and other mature Europe. Given the differences in consumer credit originated in the United Kingdom and the euro area, we used the same loss rate estimated for AAA pan-European consumer asset-backed securities (ABS) for the U.K. market, scaled by relative consumer loan loss rates. On this basis, the four-year cumulative loss rate was estimated at 7.4 percent on U.K. consumer debt securities and 1.9 percent on euro area consumer debt. The loss rate on consumer credit securities originated in other mature Europe countries was assumed to be the same as that for the euro area. In the United States the mark-to-market loss rate on consumer securities was set to zero, as the Federal Reserve's Term Asset-Backed Liquidity Facility has resulted in significant spread compression on consumer ABS in recent months, to the extent that securities holders now bear no losses in valuations relative to mid-2007.

As in the consumer credit market, differentiating securities performance by country was not possible using indices in the commercial real estate market as well. A commonly referenced index, the AAA-rated pan-European commercial mortgage-backed securities (CMBS) index, is not broken out by collateral originated in different countries. We opted to apply the index without distinction, as pricing is fairly consistent across the region. In the United States, we continued to use the CMBX index, which has gained slightly relative to our April exercise. The pan-European CMBS index suggests a cumulative mark-to-market loss rate of 24 percent, while the CMBX indicates a 32 percent price decline.

For the corporate sector, estimating mark-to-market loss rates regionally was more straightforward compared to the other credit categories. For the United States, we weighted mark-to-market loss rates for the Barclays investment-grade and high-yield corporate indices; and for the United Kingdom and euro area, we used the available Barclays Sterling aggregate and euro aggregate corporates indices, respectively. The cumulative mark-to-market loss rate on corporate debt securities was estimated at 5 percent relative to mid-2007 pricing for the United States; 1.7 percent for the euro area; and 9.5 percent for the United Kingdom. The large difference in the loss rate for euro area and U.K. corporates may be partly related to index construction: the Sterling aggregate corporate index has a longer duration (seven years) than the euro aggregate corporate index (four years).

For emerging market debt securities, an overall mark-to-market price decline was inferred by weighting the price returns of the JP Morgan CEMBI broad and EMBI global diversified indices.[61] The CEMBI broad index includes corporate debt issued in 32 emerging markets, and the EMBI global diversified index represents debt issued by 37 emerging markets. Despite significant spread compression for emerging debt securities in recent months, the CEMBI indicates a cumulative price decline of 11.4 percent for corporates since mid-2007, and the EMBI suggests a price decline of some 6.4 percent for sovereigns.

Potential Writedowns for Banks and Their Regional Distribution

As described in the April 2009 GFSR, writedowns for banks domiciled in each region were estimated by multiplying various categories of credit exposure with corresponding loss rates. Two sets of matrices were used to estimate credit exposure: (1) exposure to residential, consumer, commercial real estate, and corporate debt; and (2) exposure to credit originated in different countries. To estimate banking system exposure to various credit categories, we used filings data for a sample of banks. In this GFSR, we relied less heavily on sample filings data to infer system-wide exposures. Instead, exposures were obtained either directly from regional banking authorities, or estimated from the outstanding stock of different credit categories. In the United States, for instance, we use the Federal Reserve's *Flow of Funds* data.

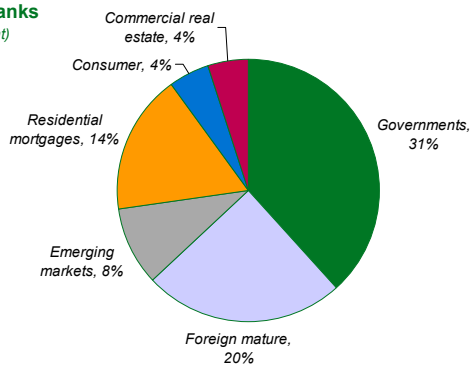
To estimate geographic exposures, we continued to rely on the Bank for International Settlements (BIS) foreign claims data.[62] The total size of banking system assets, defined as loans and securities, in combination with foreign claims data, was used to compute system exposures to credit originated in different countries. We assumed that the domestic breakdown of exposure to different types of credit was the same as the breakdown of credit exposure in foreign countries. The relative sizes of country exposures were also assumed to be the same for both loans and securities portfolios

[61]These indices provide broad coverage of corporate and sovereign debt issuance in emerging markets. Further details are available from the *JPMorgan Emerging Markets Bond Index Monitor,* August 2009.

[62]See Bank of International Settlements, "Consolidated Banking Statistics," Table 9B, March 2009. Available via the Internet: http://www.bis.org/statistics/consstats.htm.

of banks. For instance, BIS data suggest that the exposure of euro area banks to emerging markets is roughly 8 percent of total assets. We assumed this proportion of emerging markets exposure applied to both the loan book and securities portfolio (Figure 1.42). No adjustments were made to reflect any home bias in lending relative to domestic securities holdings.

Figure 1.42. Estimated Breakdown of Securities Exposure of Euro Area Banks
(In percent)



Sources: National authorities; and IMF staff estimates.

Caveats to the Application of Estimated Security Loss Rates to Bank Holdings

Our approach for estimating mark-to-market losses on securities includes only cash instruments, and thus does not account for potential leveraged exposures. As in other iterations, we assumed that derivatives exposures net out to zero for the system as a whole. We did not account for concentrations of counterparty risk.

Finally, mark-to-market loss rates were applied to all bank holdings of securities, regardless of account type. We therefore do not account for the recent large-scale transfers from trading to hold to maturity accounts under IAS39. Such transfers would lower actual mark-to-market losses taken on security holdings relative to our estimated losses, and would notably affect banking systems in the U.K., Ireland, and Greece, where large transfers have taken place. On the other hand, the analysis does not include bank holdings of securities in off-balance-sheet entities, so mark-to-market losses on securities may be underestimated for some banking systems with large off-balance-sheet exposure.

Significant Changes in Bank Writedown Estimation since the April 2009 GFSR

In this GFSR, we adjusted the outstanding amounts of loans and securities held by various banking systems, based on improved access to official data (Table 1.2). For euro area and U.K. banks, a higher forecast exchange rate for the euro and sterling versus the dollar over 2007–10 contributed to higher dollar holdings compared to April 2009. For U.S. banks, we also used the Federal Reserve's *Flow of Funds* data for commercial banks, savings institutions, and broker-dealers as of 2009:Q1, whereas in the April 2009 GFSR, we used Federal Deposit Insurance Corporation data for insured institutions. The impact of this change has been a 5 percent increase in the estimated size of U.S. bank holdings to $12.6 trillion, which corresponds to a bigger universe of banks than before. For euro area banks, we used consolidated data, resulting in a larger size of bank loan portfolios, and we revised down the size of bank holdings of securities to adjust for amounts held by money market funds. This resulted in a 15 percent increase in the size of euro area bank assets to $22.9 trillion.[63] For U.K. banks, we also switched to consolidated data (provided by the Financial Services Authority) from unconsolidated Bank of England data. This resulted in a 31 percent increase in the estimated size of U.K. bank assets to $8.4 trillion. For other mature European countries, we revised down the estimated size of the banking system by about 5 percent to $4 trillion. In Asia, we focused solely on banks domiciled in Australia, Hong Kong SAR, Japan, New Zealand, and Singapore. We excluded South Korea and Taiwan Province of China from our analysis, as these are being considered within the emerging markets context. This adjustment lowered the estimated size of Asian bank assets by 17 percent to $7.9 trillion.

[63]Bank assets, in this annex, refer to bank holdings of loans and securities only, and do not include fixed assets, such as real estate or equipment.

Because our estimates are now based on consolidated data and therefore on larger balance sheets for the banking industry, and also due to other methodological changes, the overall improvement in market conditions is not visible in a decline of our global bank writedowns over 2007–10, which remains at $2.8 trillion. Our estimates of potential writedowns for U.S., and euro area banks are now lower than in April, but have risen significantly for U.K. banks. The increase for U.K. banks is being driven mostly by the larger consolidated balance sheets. It should be cautioned that loss rates applied to U.K. bank holdings do not take account of the APS, whose impact is considered separately in the calculation of bank capital needs in Table 1.3. Writedown estimates remain largely unchanged for banks domiciled in other mature European countries compared to our exercise in April. There was a significant decline in losses for Asian banks, largely because we are considering a smaller universe. These estimates are subject to considerable uncertainty regarding assumptions and pricing, and are only meant to show the possible scale of challenges ahead.

Annex 1.3. Estimating Core Bank Earnings[64]

Using data from Bankscope covering the period 1998 to 2008, we calculated pre-provision net revenue as a percent of total assets. We tried various explanatory variables that had potential to represent the broader demand for credit, the potential to benefit from a steep yield curve, the degree of leverage a bank uses, and the regulatory and market environment. For the United States, a simple equation in the form:

$$PPNR = \beta_0 + \beta_1 \, credit\_growth + \beta_2 \, 2\_10steepness + \beta_3 \, liq\_ass\_liq\_liabs,$$

in which:

Credit_growth is credit to the private sector quarter-on-quarter annualized
2_10steepness is the steepness of the treasury yield curve between 2 and 10 years
liq_ass_liq_liabs is the ratio of liquid assets (cash, interbank assets, and trading securities) to customer deposits and short-term funding.

This yielded the following results:

Dependent Variable: PPNR
Method: Least Squares
Sample: 2000Q1 2009Q1
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CREDIT_GROWTH__	0.182489	0.036602	4.985745	0.0000
_2_10STEEPNESS	0.279429	0.109130	2.560522	0.0152
LIQUID_ASS_LIQ_LIABS	–0.037744	0.014341	–2.631854	0.0128
C	1.302470	0.532724	2.444924	0.0200

R-squared	0.487817	Mean dependent var	1.874634
Adjusted R-squared	0.441255	S.D. dependent var	0.706496
S.E. of regression	0.528101	Akaike info criterion	1.662747
Sum squared resid	9.203386	Schwarz criterion	1.836900
Log likelihood	–26.76082	Hannan-Quinn criter.	1.724144
F-statistic	10.47668	Durbin-Watson stat	1.520206
Prob(F-statistic)	0.000054		

[64]This annex was prepared by Chris Morris.

The results match with intuition, with the requirement to hold more liquid assets having a modest downward impact on pre-provision earnings.

We also ran separate equations for the net interest margin element of pre-provision net revenues (PPNR), and other components. As expected, for net interest margin, yield curve steepness was even more important. The particular version of the steepness of the yield curve (2/10; 3-month/5; 3-month/10) seemed to make little difference. Other proxies for the regulatory environment such as capital adequacy ratios, leverage ratios, and loan-to-deposit ratios, generally performed less well. For all other components of PPNR, credit growth and the volume of issuance in debt capital markets were the main drivers. This helps to explain some of the recent rebound in bank revenues at the start of this year, as issuance volumes have surged.

In the case of the euro area, credit growth again seemed to be a strong driver of pre-provision revenues. The steepness of the yield curve was also important, but in the case of the euro area, the three-month to 5-year steepness performed better than the 2-year to 10-year steepness, possibly reflecting European banks' greater reliance on the European Central Bank and short-term money markets. The ratio of liquid assets to liquid liabilities did not turn out to be significant. The results obtained were:

Dependent Variable: PPNR
Method: Least Squares
Sample: 2002:Q4 2008:Q4
Included observations: 24

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CREDIT_GROWTH__	0.046593	0.017683	2.634913	0.0155
_3MO_5STEEPNESS	0.255854	0.081893	3.124225	0.0051
C	0.310944	0.162858	1.909296	0.0700
R-squared	0.363833	Mean dependent var		0.831285
Adjusted R-squared	0.303245	S.D. dependent var		0.182042
S.E. of regression	0.151954	Akaike info criterion		–0.814015
Sum squared resid	0.484887	Schwarz criterion		–0.666759
Log likelihood	12.76819	Hannan-Quinn criter.		–0.774948
F-statistic	6.005092	Durbin-Watson stat		2.008130
Prob(F-statistic)	0.008660			

Net interest margin was most closely linked with the steepness of the yield curve and, in this case, the ratio of risk-weighted assets to total assets. This suggests that banks were, at least to some degree, being rewarded for the riskier lending they had previously undertaken. As in the United States, the other components of PPNR appeared to be driven by capital growth and the issuance volume in debt capital markets.

The semi-annual reporting of U.K. banks meant data limitations precluded any firm conclusions.

Annex 1.4. Credit Demand and Capacity Estimates in the United States, Euro Area, and the United Kingdom[65]

This annex describes our methodology for estimating nonfinancial sector credit demand and the capacity of lenders to supply credit, the results of which are presented in Sections D and E of this chapter. The goal was to project the ex ante financing gap—that is, the difference between ex ante demand for credit from the nonfinancial sector and the financing capacity available after meeting sovereign financing needs. Ultimately, this exercise was intended to provide some empirical basis to evaluate an appropriate policy response.

As a simplifying assumption for estimating demand, we assumed that supply constraints were nonexistent over our estimation period, and the actual borrowing by each sector constituted the respective demand curves.[66] To the extent that supply constraints were operational over this period, we underestimated credit demand—which only strengthens our finding that financing gaps are potentially sizable.

For our credit demand projections, end-borrowers (issuers) were broken down into three categories: (1) central government, i.e., sovereign borrowers; (2) nonfinancial corporates; and (3) households, which were further subdivided into mortgage and consumer credit components. Projections for sovereign demand were based on deficit forecasts included in the WEO. (We did not explicitly model local government credit demand because we were mostly interested in estimating the financing gap of the private sector.) For nonfinancial corporate credit demand, we found that the primary drivers included investment and capacity utilization in the case of the United States, while gross operating surplus provided the best fit in the euro area.[67] There was no reliable fit for corporate credit demand in the United Kingdom, so we used the U.S. model as a proxy. All three equations included lags of the dependent variable. Mortgage credit borrowing was primarily determined by home prices, private consumption expenditures (representing the private sector's ability or willingness to borrow), and mortgage credit lagged—all of which had a positive sign.[68] For the euro area, substituting private consumption with GDP provided a better fit for mortgage credit demand, while omitting private consumption yielded a better fit in the United Kingdom. Demand for consumer credit was primarily driven by private consumption expenditures and a lagged dependent variable. Table 1.19 summarizes our demand-side regressions.

We projected credit capacity for the nonfinancial sector in two steps. First, we forecast total fixed-income assets under management (AUM)[69] for nonbank lenders; second, we made a pro rata allocation of the total credit capacity between financials and nonfinancials using the total amount outstanding as of end-2008. The credit capacity available to the nonfinancial private sector was then compared with our forecast of credit demand to derive the financing gap.

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[65]This annex was prepared by Sergei Antoshin, Amitabh Arora, Phil de Imus, Hui Jin, Rebecca McCaughrin and Chris Morris.

[66]In effect, credit capacity exceeds demand and some capacity is unutilized.

[67]Gross operating surplus is equal to sales less the cost of intermediate goods and services and less employee compensation. No allowance is made for capital depreciation.

[68]We recognize that housing prices have an impact on both credit demand and supply. Since housing represents a sizable share of total household assets, changes in housing prices have a significant wealth effect on credit demand as well as on the borrowing capacity of the private sector. Similarly, rising home prices increase the value of the collateral (and thus household creditworthiness), increasing banks' willingness to extend loans, in turn boosting the supply of credit.

[69]We used bank and nonbank fixed income AUM (net of interbank lending) instead of lending to the nonfinancial sector, as data limitations did not permit the separation of lending to the real economy from lending to financial institutions.

Table 1.19. Regression Output on Demand for Nonfinancial Private and Public Sector Credit

Euro Area						
Sovereign sector	Consistent with the WEO deficit forecasts					
Nonfinancial private sector						
Mortgage credit =	0.83 + 0.52*HPI + 0.31*GDP + 0.32*L1					
p-value	0.00	0.00	0.04	0.02		*R-squared: 0.56*
Consumer credit =	1.00*PCE + 0.78*L2					
p-value	0.05	0.00				*R-squared: 0.73*
Corporate credit =	0.65 + 0.22*GOS + 0.57*L2					
p-value	0.01	0.00	0.00			*R-squared: 0.54*
United Kingdom						
Sovereign sector	Consistent with the WEO deficit forecasts					
Nonfinancial private sector						
Mortgage credit =	0.002 + 0.10*HPI + 0.53*L1 + 0.29*L2					
p-value	0.05	0.00	0.00	0.01		*R-squared: 0.91*
Consumer credit =	0.001 + 0.78*PCE + 0.23*L1 + 0.31*L2					
p-value	0.72	0.00	0.06	0.01		*R-squared: 0.42*
Corporate credit =	Use U.S. corporate profit regression coefficients to forecast					
United States						
Sovereign sector	Consistent with the WEO deficit forecasts					
Nonfinancial sector						
Mortgage credit =	0.44 + 0.14*PCE + 0.12*HPI + 0.44*L1 + 0.19*L2					
p-value	0.03	0.17	0.00	0.00	0.06	*R-squared: 0.73*
Consumer credit =	-0.31 + 0.43*PCE + 0.61*L1 + 0.16*L2					
p-value	0.03	0.00	0.00	0.02		*R-squared: 0.67*
Corporate credit =	-2.91 + 0.09*I + 0.04*CU + 0.26*L1 + 0.42*L2					
p-value	0.08	0.00	0.05	0.00	0.00	*R-squared: 0.48*

Sources: National authorities; and IMF staff estimates.
Note: HPI = home price index; L = lagged dependent variable; PCE = private consumption expenditures; GOS = gross operating surplus; I = investment; CU = capacity utilization rate.

For bank capacity, we relied on projections for asset growth presented in Section B, using a similar methodology as that presented in the October 2008 and April 2009 GFSRs and detailed in Annex 1.4 of the October 2008 GFSR. This is essentially an accounting approach, which calculates bank profits, capital, and assets based on a number of parameters. Bank revenues are based on returns on assets, as shown in Figure 1.11. Bank writedowns and provisions are determined in accordance with the approach described in Annex 1.3, and writedowns and provision not yet recognized are assumed to be recognized by end-2010. Banks pay taxes at the rate applicable to their jurisdiction, and, importantly, are able to reclaim all tax losses immediately (i.e., no deferred tax assets are capitalized and carried forward). Dividend payout ratios in all regions are assumed to be 20 percent until mid-2010, and then rise to 40 percent by early 2011. Bank assets grow at an underlying rate equal to nominal GDP growth in that country/region, based on projections from the WEO, but several other factors are also assumed to be at play. First, some $2.5 trillion globally of the committed credit lines that banks agreed upon pre-crisis are assumed to be drawn down, but this process is expected to have been completed by end-2009, when many of those facilities expire. Second, the securitization process is assumed to be severely impaired through end-2010, and to open only slowly thereafter. Banks are assumed to extend some $4 trillion of assets globally, which they would normally securitize off their balance sheets, but which they now keep on balance sheet. Third, the new U.S. accounting rule FAS 140 is assumed to take effect starting in early 2010, and to lead to the bringing onto bank balance sheets some $3 trillion of assets previously held in qualifying special-purpose entities. Fourth, to help achieve higher capital ratios, banks are assumed to allow $9.2 trillion

of assets to mature off their balance sheets without being replaced, over the period to 2014. Fifth, banks are also assumed to sell $1.1 trillion of assets to nonbanks by late 2011. In some cases these will be transfers of assets to government asset management corporations or "bad banks," but they will also include the sales of portfolios of assets to distressed debt funds, and the sales of entire business lines to trade buyers. Each of these factors is subdivided between the countries/regions based on the importance of that market to that banking system.

Comparing the assumptions in this GFSR with those in the April 2009 GFSR, we reduced the stock of assets that banks are likely to shed by some $3 trillion (to $9.2 trillion), incorporating the latest WEO estimates on GDP growth; reduced the sales to nonbanks; and assumed a slightly earlier reopening of securitization markets. Capital levels have been updated, and revenues have been revised as described in the main text.

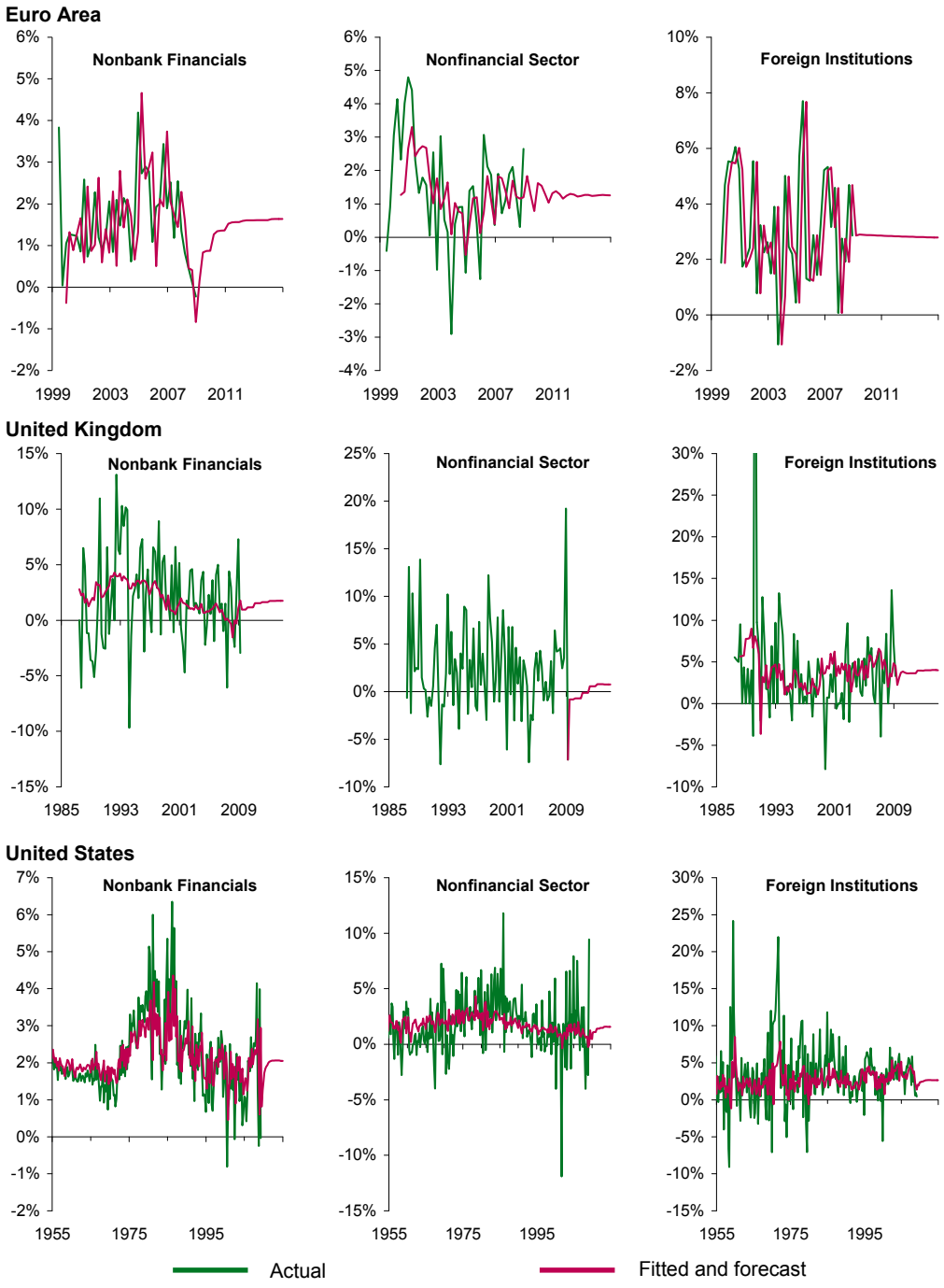
To project the credit capacity of nonbank lenders, we ran regressions to forecast the AUM of nonbank financial institutions, the nonfinancial sector, and foreign institutions.[70] For the first two lenders, we used nominal GDP and gross savings as the major explanatory variables, on the assumption that domestic savings were converted to credit capacity either directly by the nonfinancial sector itself, or indirectly through the nonbank financial channel. The credit capacity of foreign institutions was based on the accumulation of foreign exchange reserves (in the case of lending to the United States), current account balances (in the United Kingdom), and foreign lending momentum (in the euro area). All equations used lags of the dependent variables. Due in part to the high intra-period volatility of the dependent variables, not every nonbank credit supply regression was fully robust, but the historical and fitted time series seem reasonable from a trend perspective, as illustrated in Figure 1.43. As a cross-check, we compared our forecasts with the historical trend during prior banking crises. The trend analysis appears to yield estimates that are fairly close to our forecasts.

We used quarter-on-quarter percent changes of the dependent and independent variables, since the time series are nonstationary (except in the case of euro area foreign institutions and the U.K. nonfinancial sector on the credit capacity side).[71] Our data sources were mostly drawn from government sources, including the various *Flow of Funds* reports, while projections were based on macroeconomic forecasts included in the WEO. Data were at least a quarterly, or in some cases, of a monthly frequency. The sample period covered 1952–2009 in the case of the United States, 1999–2009 in the euro area, and 1987–2009 in the United Kingdom.

[70]Nonbank financial institutions include traditional unlevered institutions, such as mutual funds, pension funds, and insurance companies. The nonfinancial sector covers a broad range of entities, including households, domestic hedge funds, nonfinancial corporates, and local government. Foreign institutions include both official institutions (e.g., central banks, government authorities) and private lenders (e.g., foreign portfolio managers, hedge funds, etc.). Central bank and government lending estimates are not separately projected in our analysis; rather, the near-term lending activity represents the maximum amounts announced by official institutions year-to-date.

[71]Due to data volatility, it was very difficult to model these two lenders using quarter-on-quarter changes. Instead, we used first-order auto-correlation to model the lending amount of euro area foreign institutions, and assumed the U.K. nonfinancial sector's lending growth rate to be the average rate of other U.K. lenders.

Figure 1.43. Growth of Nonbank Fixed Income Assets Under Management
(In percent; quarter-on-quarter)



Source: IMF staff estimates.

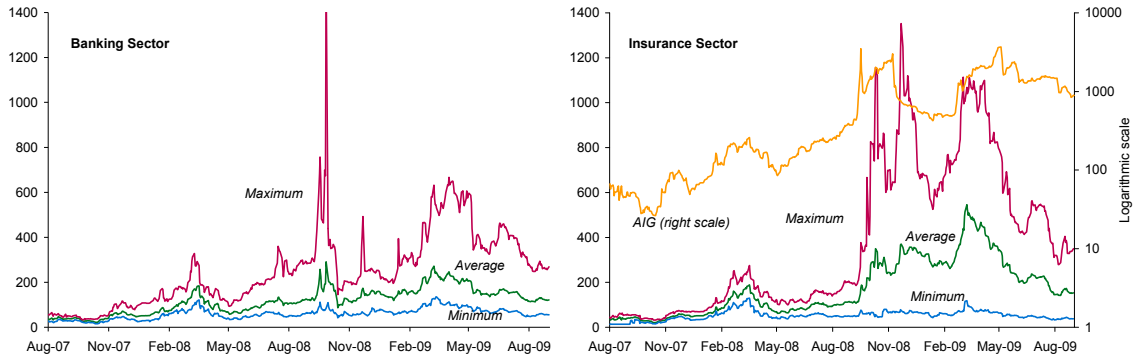
Annex 1.5. The Impact of the Financial Crisis on the Savings Complex—Insurance and Pensions Funds[72]

Life Insurance

Life insurance companies were badly affected by falling asset markets in late 2008 and early 2009. Over the crisis, losses announced by major insurance companies globally total around $175 billion, compared to $2.2 trillion in global insurance sector equity (end-2007). However, the majority of these losses related to credit protection, much of it written on structured finance products by the U.S.-based "monoline" insurers and American International Group (AIG). Exposure to structured finance in other insurance companies was limited.

Access to new capital for insurers has been constrained during the crisis but eased during the second quarter of 2009, allowing insurers to raise around $98 billion. The common exposures of banks and insurers to worsening credit conditions (corporate bonds and loans) and the direct exposures of insurers to banks through holdings of bank-issued bonds and counterparty risks meant that insurers' credit default swap spreads have tracked the market's overall assessment of bank creditworthiness (Figure 1.44).

Figure 1.44. Financial Sector Credit Default Swap Spreads
(In basis points)



Source: Bloomberg L.P.

Life insurance companies have generally reported healthy regulatory measures of capital. Lower solvency ratios have been reported by many companies but these generally remain above regulatory minima,[73] while funding liquidity has remained comfortable. Although, in principle, policyholder withdrawals could threaten life insurers' liquidity if large numbers seek to withdraw funds simultaneously, the associated penalties, forgone bonuses, and minimum holding periods have restrained early terminations.

Policy Lessons from the Crisis

The crisis has made apparent the potential systemic importance and vulnerability of insurers. A number of insurance companies had underwritten risks that exposed them to changes in credit conditions similarly to banks. In the case of the U.S. monolines, these exposures had wide implications due to the scale of the counterparty risk for already weakened banks. It is apparent that

[72]This annex was prepared by Ian Tower and Gregorio Impavido.
[73]Global capital adequacy data comparable to those for banks are not available.

regulators need better information on the extent of exposure of insurers to banks, and of their potential vulnerability to market developments—such as the collateral calls that overwhelmed AIG.[74] Some insurance groups have been subject to government support, bringing insurers within the group of systemic institutions.[75]

Two lessons for policymakers stand out. First, where insurers are writing credit protection, supervisors should ensure that the risks are appropriately managed and brought into macroprudential oversight. This will entail close cooperation between banking and insurance supervisors. Second, where appropriate, authorities need to ensure that insurance groups are subject to oversight as systemically important institutions, and that they have the appropriate tools to resolve systemic insurance groups at low cost.

Authorities are responding to these policy lessons. Stress testing is now being carried out in coordination with that applied by banking supervisors, in the United States and Europe. The European Union (EU) is building lessons from the crisis into the next stage of work on its new insurance sector solvency regime and is considering the introduction of a common EU framework for policyholder compensation. Globally, the International Association of Insurance Supervisors has announced initiatives to investigate the design of a common assessment framework for the supervision of insurance groups.

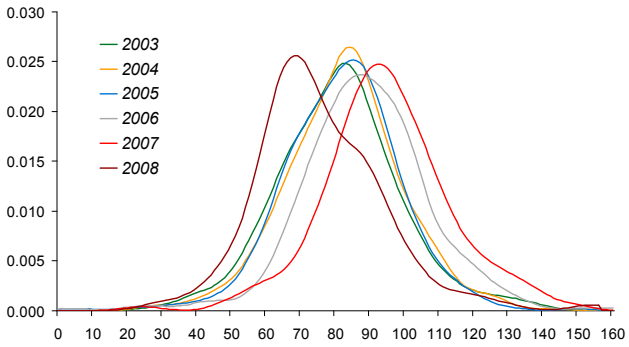
Pension Funds

As highlighted in the main text, defined-benefit pension plans remain underfunded despite the recent recovery in equity markets (Figure 1.17). The following analysis focuses in particular on the impact of the crisis on the defined-benefit schemes sponsored by U.S. firms in the S&P 500 index. It then considers the impact of the crisis on defined-contribution schemes and Eastern Europe and Latin America.

Defined-Benefit Plans—United States

The average funding ratio of defined-benefit plans in the United States improved between 2003 and 2007 but drastically dropped in 2008 (Figure 1.45). Over 2003–07, the number of plans with less than a 100 percent funding ratio decreased from 53 to 44 percent of all S&P 500 plans. However, the average funding ratio of all S&P 500 plans dropped to 75 percent, with only 55 plans meeting the minimum 92 percent funding level required by the U.S. 2006 Pension Protection Act.

Figure 1.45. Worsening Funding Ratio of U.S. Defined-Benefit Plans in 2008



Source: IMF staff estimates from company filings.

[74]In contrast to AIG, monoline insurers avoided immediate collapse by not being required contractually to post collateral to counterparties as a result of rating downgrades of themselves or the insured securities.

[75]Due to their status as bank or thrift holding companies, MetLife was included in the U.S. Supervisory Capital Assessment Program stress test exercise—and deemed not to need additional capital—while Hartford Insurance Group and Lincoln Financial received capital injections from the Troubled Assets Relief Program.

Underfunding is particularly serious in mature industries. Companies in the industrial, energy, and consumer sectors, have the greatest level of underfunding, whereas diversified and financial companies have fewer underfunded pension plans (Table 1.20) due to the larger share of defined-contribution plans in these sectors. The financial crisis has thus not been deepened by heavy exposure of financial companies to increased defined-benefit deficits and the need for markedly higher contributions.

Defined-Contribution Plans—Latin America and Eastern Europe

The negative impact on market values of defined-contribution plans in many emerging market economies has likely contributed to a contraction in private consumption through the wealth effect. Total assets under management in many countries contracted as a share of GDP (Table 1.20), particularly affecting countries where defined-contribution plan exposure to equity risk was largest—such as Chile and Peru in Latin America, or Hungary and Estonia in Eastern Europe (Table 1.21).

System performance seriously deteriorated during the crisis but markets are rebounding. The performance of defined-contribution pensions has been negatively affected by the crisis in all countries shown. In particular, systems heavily exposed to equity or foreign exchange risk—notably Hungary, Peru, Estonia, and Chile—saw double-digit real negative performance in 2008 (Table 1.22).

However, conservative funds succeeded in protecting investors near retirement from recent market volatility. These cohorts are most vulnerable to market risk as they have little time to react to negative shocks before buying an annuity. Countries that have introduced life-cycle default investment options that do not contain equities for individuals close to retirement largely protected these savers from recent market volatility (Table 1.23).

Policy Responses

The policy responses to the crisis have included increased supervision of plan activities and regulatory actions aimed at introducing countercyclical adjustments to funding rules. Regarding surveillance, the Swedish and the German supervisory authorities increased the frequency of stress tests, while Portugal and Slovakia introduced more stringent scenario tests. In addition, various authorities introduced temporary measures to relax short-term defined-benefit funding requirements so as to forestall forced fire sales of risky assets in illiquid markets. Questions over the appropriate accounting rules and discount rate for defined-benefit plans to use have been raised again by the crisis. Elements of current pension accounting (such as smoothing of asset values, and use of expected, rather than actual, rates of return) collectively reduce the volatility of defined-benefit plans on their sponsors' balance sheets. Whereas the International Accounting Standards Board (IASB) had proposed to eliminate these smoothing techniques in its March 2008 discussion paper, questions have been subsequently been raised over the application of fair value rules in the United States, Czech Republic, Spain, and Denmark (IASB, 2008).

Policy Priorities

Jurisdictions now need to focus on policies aimed at improving the risk-sharing properties of pension retirement products. The safe accumulation of long-term retirement savings reduces overall systemic risk by providing a stable source of demand for long-maturity, volatile assets. However, authorities need to investigate further pension risk-sharing solutions among current providers, current workers and retirees, and future generations of taxpayers (such as the indexing of pension commitments to longevity or investment performance).

Table 1.20. Underfunding is More Serious in Mature U.S. Industries
(In percent)

Industry	2008
Basic materials	77.8
Communications	70.9
Consumer, cyclical	77.3
Consumer, noncyclical	77.9
Diversified	94.8
Energy	67.6
Financial	81.8
Industrial	73.4
Technology	71.6
Utilities	73.7
Total	75.5

Source: IMF staff estimates from company filings.

Table 1.21. Mandatory Defined Contribution Pension Assets, Selected Countries
(In percent of GDP)

Country	2008	2008	March 2009
Argentina[1]	11.5	...	...
Bolivia	22.0	22.0	22.9
Chile	64.4	52.8	57.8
Colombia	14.7	16.0	15.1
Costa Rica	5.1	5.3	6.2
Dominican Republic	2.4	3.5	3.8
El Salvador	21.2	24.0	25.2
Mexico	8.5	7.7	7.8
Peru	18.5	13.8	13.7
Uruguay	15.7	9.6	10.1
Bulgaria	2.2	2.2	2.3
Croatia	6.4	6.6	6.9
Estonia	4.6	4.6	5.0
Hungary	7.8	7.0	7.1

Sources: Asociación International de Organismos de Supervisión de Fondos de Pensiones (AIOS); and IMF staff calculations on supervisory data.

[1]In 2008, Argentinean second pillar pension schemes were nationalized.

Table 1.22. Equity Share in Total Portfolios, Selected Countries

(In percent)

Country	2008	2008	March 2009
Argentina[1]	15.0	...	...
Bolivia	0.0	0.0	0.0
Chile	14.5	13.8	13.6
Colombia	22.3	20.0	20.5
Costa Rica	0.4	0.6	0.3
Dominican Republic	0.0	0.0	0.0
El Salvador	0.0	0.0	0.0
Mexico	3.8	5.9	5.1
Peru	41.2	25.3	26.3
Uruguay	0.1	0.2	0.2
Bulgaria	28.3	14.5	12.7
Croatia	18.0	13.3	11.4
Estonia	...	...	...
Hungary[2]	32.8	39.1	41.7

Sources: Asociación International de Organismos de Supervisión de Fondos de Pensiones (AIOS); and IMF staff calculations on supervisory data.

[1]In 2008, Argentinean second pillar pension schemes were nationalized.

[2]Equities and mutual funds.

Table 1.23. Real Performance of Mandatory Defined-Contribution Systems, Selected Countries

(In percent)

Country	Dec. 2006-07	June. 2007-08	Dec. 2007-08	Mar. 2008-09
Argentina[1]	2.2	-8.7	...	...
Bolivia	-2.9	-7.7	-1.9	3.8
Chile	5.5	-3.9	-20.0	-15.1
Colombia	0.9	-1.2	-2.7	7.5
Costa Rica	-0.7	-5.3	-9.0	-7.6
Dominican Republic	-0.4	-3.2	8.0	11.4
El Salvador	1.4	-3.4	-2.3	0.3
Mexico	2.5	-7.3	-6.5	-6.3
Peru	21.6	-4.6	-26.2	-22.7
Uruguay	0.5	-4.6	-21.5	-21.9
Bulgaria[2]	17.2	...	-21.1	...
Croatia[2]	6.8	...	-13.4	-11.4
Estonia[2]	9.0	-6.8	-37.6	-31.1
Hungary[3]	7.9	-6.5	-2.8	3.1

Sources: Asociación Internacional de Organismos de Supervisión de Fondos de Pensiones (AIOS); and IMF staff calculations on supervisory data.

[1]In 2008, Argentinean second pillar pension schemes were nationalized.

[2]Nominal returns.

[3]Nominal return on average assets.

In countries with a large stock of defined-benefit liabilities, flexibility in funding during difficult market conditions must be matched by a consensus to increase contributions during better economic times if defined-benefit plan underfunding is not to become endemic. In addition, authorities should consider the impact on defined-benefit schemes when assessing the benefits of crisis interventions to lower long-term interest rates, since this can have a significant offsetting balance sheet effect.

In jurisdictions with a large stock of defined-contribution assets, the crisis has highlighted the need to reform defined-contribution systems to allow for the protection of individuals close to retirement from market volatility (Table 1.24). This includes (1) reviewing the design of default investment options and promoting their general adoption; (2) assessing the desirability of lifetime rate-of-return guarantees for mandatory pension schemes; and (3) studying policy options for the design of the annuitization phase aimed at improving the risk-sharing properties of the annuity products that are currently allowed by regulations.

Table 1.24. Performance of Default Investment Options, Selected Countries
(In percent)

	Default Option	December 2007	June 2008	December 2008	June 2009
Mexico[1]	Conservative	11.12	7.27	5.18	6.17
	Balanced	11.12	7.65	6.28	6.95
	Aggressive	9.53	7.81	7.96	8.5
Chile[2]	Conservative	1.89	2.26	-0.93	4.5
	Balanced	4.99	-5.01	-18.94	-6.62
	Aggressive (default)	7.46	-6.7	-30.08	-14.14
	Aggressive (no-default)	10.06	-7.94	-40.26	-22.21
Peru[2]	Conservative	6.4	-2.8	-10.2	-1.2
	Balanced	20.2	-4.7	-26.7	-12
	Aggressive	38	-6.2	-41.7	-24
Estonia[3]	Conservative	1.91	4.1	-2.1	-1.13
	Balanced	5.96	-3.52	-26.5	-19.16
	Aggressive	11.1	-9.25	-45.72	-30.1

Sources: Mexico, Comisión Nacional del Sistema de Ahorro para el Retiro; Chile, Superintendencia de Pensiones; and Peru, Superintendencia de Banca, Seguros y AFP.

[1] Last 36 months' annualized nominal returns.

[2] Last 12 months' annualized real return. The negative performance of the conservative fund is due to it containing an equity share of about 30 percent of total assets.

[3] Last 12 months' annualized nominal returns.

Conclusions

The crisis is likely to accelerate pension trends already at work. This further demonstration of the riskiness of defined-benefit provision, and of equity investment, will probably accelerate the closure of existing schemes and encourage closer matching of assets with liabilities through longer-term bond investments. The increasing transfer of portfolio risk to households through defined-contribution schemes is likely to add further to factors encouraging an increase in savings in order to achieve a target minimum income in retirement.

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CHAPTER 2

RESTARTING SECURITIZATION MARKETS: POLICY PROPOSALS AND PITFALLS

This chapter tracks the rise and fall of securitization markets, and evaluates the various initiatives aimed at restarting them on a sounder footing, focusing on the markets for securities not backed by governments or government-sponsored enterprises. The analysis attempts to discern how securitization can positively contribute to financial stability and sustainable economic growth. While most of the current proposals are unambiguously positive for securitization markets and financial stability, some proposals—such as those designed to improve the alignment of securitizer and investor interests and accounting changes that will result in more securitized assets remaining on balance sheets—may be combined in ways that could halt, not restart, securitization, by inadvertently making it too costly for securitizers. While recent regulatory proposals are aimed in the right direction, a careful look at their interactions is warranted before they are finalized.

The opening chapter of this *Global Financial Stability Report* makes the case that restarting private-label securitization markets, especially in the United States, is critical to limiting the real sector fallout from the credit crisis amid financial sector deleveraging pressures (see Box 2.1).[1] Mobilizing illiquid assets and transferring credit risk away from the banking system to a more diversified set of holders continues to be an important objective of securitization, and the structuring technology in which different tranches are sold to various investors is meant to help to more finely tailor the distribution of risks and returns to potential end investors. However, this "originate-and-distribute" securitization model failed to adequately redistribute credit risks, in part due to misdirected incentives. Hence, it is important in restarting securitization to strike the right balance between allowing financial intermediaries to benefit from securitization and protecting the financial system from instability that may arise if the origination and monitoring of loans is not based on sound principles. Ultimately, the value of securitized products relies on the quality of underlying assets.

Meanwhile, with most of these markets effectively shut down, some central banks and governments have taken up the slack, with various asset purchase and liquidity support programs effectively becoming investors of last resort of securitized instruments. Smaller nonbank lenders have been particularly hard hit, as they do not have central bank support or low-cost deposit funding to fill the void left by the securitization market shutdown.

While central bank and government support alleviated private-label securitization market funding pressures, anecdotal evidence suggests that they may have also slowed the market's

Note: This chapter was written by a team headed by John Kiff, and comprised of Andy Jobst, Michael Kisser, and Jodi Scarlata, with research support from Yoon Sook Kim.

[1]Private-label securitization products comprise those not issued or backed by governments and their agencies, that is, excluding those of government-sponsored enterprises (e.g., Fannie Mae and Freddie Mac in the United States), and public sector entities (such as Canada Mortgage and Housing Corporation in Canada).

Box 2.1. The Case for Restarting Securitization

Although recent public opinion has focused on what went wrong with securitization, it is important to recognize the many benefits associated with sound securitization.[1] Given the pivotal role of securitization as an alternative and flexible funding channel, failure to restart securitization would come at the cost of prolonging funding pressures on banks and a diminution of credit.

Current reservations about securitization do not invalidate its economic rationale, arguing instead for repairing the flaws exposed by the recent crisis. Securitization alleviates credit constraints and places asset exposures with entities that are more willing to accept and are able to manage them. Thus, issuers can mitigate disparities in the availability and cost of credit in primary lending markets while conserving capital by more efficiently dispersing risks. Besides improved access to funds, issuers benefit particularly from the market-based valuation of securitized assets, better asset-liability management (as cash flows from securitized credits can be perfectly matched to the repayment of investors until redemption), and the active management of securitized assets. Goswami, Jobst, and Long (2009) show that financial market deepening tends to increase the use of securitization, as the availability of reference assets increases in response to greater capital market maturity. Amid greater pervasiveness of securitization, liability constraints become less binding on bank balance sheets and asset growth, resulting in greater efficiency of loan origination. Furthermore, structuring allows end-investors to obtain a more efficient market portfolio and thereby better diversify their idiosyncratic risks.

Securitization has been a key funding source for consumer and mortgage lending in many mature market economies. Before the collapse of the securitization market, asset-backed securities and covered bonds provided between 20 and 60 percent of the funding for new residential mortgage loans originated in the United States, Western Europe, Japan, and Australia. As of end-June 2009, in the United States, nearly 19 percent of the outstanding stock of the more than $18 trillion worth of real-estate-related loans and consumer credit was funded by private-label securitization. Private-label mortgage-backed securities issued by primary lenders amounted to 26 and 16 percent of all commercial and residential mortgage lending, respectively. Outside the United States, for the

Note: This box was prepared by Andy Jobst and Michael Kisser.

[1]See Shin (2009) and the references therein for such post-mortems.

recovery by substituting for traditional buyers of securitization products.[2] U.S. authorities are experiencing some success with solutions that involve public-private-sector partnering (e.g., the U.S. Federal Reserve's Term Asset-Backed Securities Loan Facility – TALF).[3] The U.K. Asset-Backed Securities Guarantee Scheme introduced in April 2009 has yet to be tapped. The Bank of England's and European Central Bank's (ECB) acceptance of asset-backed securities (ABS) and mortgage-backed securities (MBS) as collateral, and the ECB's recent covered bond purchase program, have provided support to those markets.[4] At the same time, even these

[2]Chapter 3 includes an overview of various crisis intervention measures and analyzes their effectiveness. See Panetta and others (2009) for an assessment of policy measures adopted in mature market countries during the financial crisis.

[3]Although the European Central Bank (ECB) has been offering long-term secured funding against a broader array of collateral (including many securitization products), unlike the U.S. TALF, which provides nonrecourse funding, the ECB's funding is full-recourse funding that leaves users fully exposed to losses.

[4]Covered bonds differ from securitization products in that the risks associated with the underlying assets are retained by the issuer, whereas securitization transfers them to capital markets. See below for more details.

same period, more than $1 trillion of assets were funded by securitization.

Securitization technologies have also been instrumental in supporting a stable supply of housing funding and consumer credit in many emerging market countries. Several governments have pursued and continue to pursue securitization as a way to fund agency programs aimed at overcoming credit constraints for housing and consumer finance. In particular, mortgage securitization has removed constraints on domestic fixed-income markets by accommodating a growing investor base, particularly pension and insurance fund investors with the need for long-term, highly-rated local currency bond investments priced to a more liquid yield curve.

There is little empirical research on the impact of securitization on the general economy. That said, Sabry and Okongwu (2009) demonstrate that in the U.S. context, securitization has increased the availability of credit and decreased its cost. More specifically, they show that a 10 percent increase in securitization activity implies a decrease of between 4 and 64 basis points on yield spreads, depending on the specific type of the loan. They also demonstrate that securitization increases the availability of credit per capita. Focusing on mortgage loans, their results imply that a 10 percent increase in secondary market purchases (of loans) increases mortgage loans per capita by 6.43 percent for a given treasury rate of 4.5 percent. Given that securitization has had such a positive impact in the past on increasing the availability and lowering the cost of credit, and in light of the current constraints on lending capacity, restarting securitization could help get credit growth moving again.

While many incentive problems in securitization remain to be resolved, without the replacement of maturing securitized products, banks face a contraction of their funding sources, which may exacerbate already tight credit conditions. Alternatives to securitization, such as increased covered bond issuance,[2] are not an option for nondeposit-taking primary lenders because they do not have the capital base to retain the loans. At the same time, as banks continue to repair their balance sheets in the current environment, the absence of a risk transfer mechanism is likely to perpetuate deleveraging pressures rather than alleviate them.

[2]See Box 2.4 for a detailed description of the covered bond market and its different national variations. Figure 2.1 categorizes securitization into three main types, which include covered bonds, pass-through securities, and structured finance.

"successful" programs are creating dilemmas for central bank exit strategies, so authorities should strive to move private-label securitization toward a sounder footing.

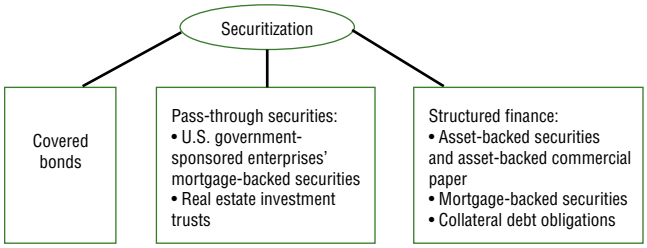
This chapter starts by briefly reviewing recent market developments leading up to the peak activity levels of 2006, and then to the effective shutdown of much of the market in 2008 and 2009 in order to highlight some of the flaws that need to be addressed. It then evaluates the main initiatives for restarting private-label securitization markets. These assessments are made with a vision of a securitization market that reliably permits lenders to redistribute risk to others in the economy without the undue use of leverage and complexity, removing the impetus to return to the "high octane" markets of 2005–07. This requires improving accounting, disclosure, and transparency requirements all along the intermediation chain, and reducing investors' blind reliance on credit rating agencies.

Several initiatives aimed at providing securitizer incentives for diligent loan underwriting and monitoring are also examined. For example, proposals in the United States and Europe have been floated to force securitizers to retain some of their credit risk exposures so that they have more "skin in the game" to better align

their interests with investors. However, it will be shown that, as these proposals currently stand and possibly in conjunction with other measures, they may be so blunt that they will either be ineffective at providing incentives for better securitizer behavior, or alternatively may further slow the market recovery, effectively closing it under some configurations of portfolio characteristics and economic conditions.

The chapter concludes by comparing features of securitization with covered bonds, which have been providing cost-efficient capital markets-based funding in Europe for more than 200 years, examining whether their use should be more broadly encouraged. Because covered bond issuers retain full exposure to the credit risks associated with the underlying assets, rather than passing them on to investors, incentives between issuers and investors for screening and monitoring the underlying assets are aligned, which is frequently not the case in securitization. Yet, loan originators that can transfer the credit risk via securitization can use their capital more efficiently by securitizing loans on which their informational advantages are small relative to those they retain. In principle, this encourages more economic activity, potentially placing the economy on a higher growth path.

Figure 2.1. The Securitization Landscape



Note: Government-sponsored enterprises include Fannie Mae, Freddie Mac, and Ginnie Mae.

The Rise, Decline, and Fall of Securitization

Securitization is a process that involves repackaging portfolios of cash-flow-producing financial instruments into securities for transfer to third parties (Jobst, 2008a) (Figure 2.1).[5] However, this chapter focuses mostly on structured finance techniques that entail dividing the cash flows into "tranches," or slices. Tranche holders are paid in a specific order, starting with the "senior" tranches (least risky) working down

[5]Besides the funding purpose of securitization, in emerging market countries, it can also support local capital market development, facilitate investments in largely unexplored areas of economic activity, and expand the spectrum of financing options to fund housing and consumer credit outside the banking sector (Jobst, 2006).

through various levels to the "equity" tranche (most risky). If some of the expected cash flows are not forthcoming (e.g., some loans default), then, after any cash flow buffers are depleted, the payments to the equity tranche are reduced. If the equity tranche is depleted, then payments to the "mezzanine" tranche holders are reduced, and so on up to the senior tranches.

The amount of loss absorption (or "credit enhancement") provided by the equity and mezzanine tranches is structured so that it should be very unlikely that the senior tranches do not receive their promised payments. For example, it had been thought that a credit enhancement of 20 percent (e.g., if the equity and mezzanine tranches comprise 20 percent of the MBS issue) would make it almost impossible to "break" a senior tranche of a subprime MBS. Although the individual loans were understood not to be of prime quality, they were supposed to be diversified enough to make it extremely unlikely that total losses would exceed 20 percent. However, this turned out not to be the case, as investors and rating agencies underestimated the riskiness and default correlations of the loans.

Securitization allowed banks to more actively manage their credit, funding, and liquidity risk, and leverage up their lending activity, because they were no longer required to warehouse the credit risk permanently. In addition, the demand for more tailored instruments, and the need for securitizers to sell the lower-rated "leftovers," became important motivations during the years leading up to the market collapse. In the United States, private securitizers were at a competitive disadvantage next to the large government-sponsored enterprises, Freddie Mac and Fannie Mae, which were able to acquire standardized prime mortgages with low-cost funding to bundle into securities. All of this was fed by a glut of investable funds, and the search for higher-yielding, safe-rated, fixed-income investments. One of the reasons that securitization grew so quickly and became such a large market was the willingness of credit rating agencies to give their highest ratings (AAA or Aaa) to these senior tranches (see Box 2.2). Another factor was the arbitraging of Basel I regulatory capital requirements, whereby capital adequacy risk weights were absent on securitized products that were held in off-balance-sheet entities (OBSEs).[6] Even the contingent liquidity facilities that some OBSEs used as backup financing drew very low risk weights. Overcoming legal and other institutional frictions was yet another securitization driver.

As a result, global private-label securitization gross issuance soared from almost nothing in the early 1990s to peak at almost $5 trillion in 2006 (Figure 2.2).[7] Since then, volumes have dropped off sharply, particularly for collateralized debt obligations (CDOs) and CDOs backed by other securitization products (CDO^2). Although it would appear that MBS issuance is holding up well, in fact, U.S. private-label MBS markets have collapsed almost completely (Figure 2.3). This collapse has been offset by surging European MBS issuance comprised almost solely of securities retained by issuers as collateral for central bank liquidity facilities (Figure 2.4). Similarly, the small amount of 2008 CDO^2 issuance is also related to these European "structure-to-repo" transactions. More recently, U.S. private-label MBS issuance has bounced back somewhat, although almost all of these relate to "Re-Remics," which effectively resecuritize downgraded formerly AAA-rated senior securities into new AAA-rated securitization products (see Box 2.3).

The issuance of ABS not collateralized by real estate has remained fairly steady, more recently with the support of the U.S. Federal Reserve's TALF (Figure 2.5). Although the volume of newly-originated TALF eligible securities has been modest, the program's implementation has coincided with a significant narrowing of ABS credit spreads (Figure 2.6). Also, in general, although the performance of loans that underlie most ABS

[6]Off-balance-sheet entities will be used in the chapter as a general term that encompasses such terms as "variable-interest entities" and "special-purpose entities" that are more commonly found in accounting and banking.

[7]Private-label transactions exclude issuance of securities backed by the U.S. government-sponsored enterprises.

Box 2.2. Credit Rating Agency Regulatory Developments

Credit rating agencies (CRAs) have played a key role in the origins of the current crisis, prompting calls to rely less on self-regulation. Earlier efforts to regulate CRAs have typically focused on micro-prudential issues, such as reducing conflicts of interest and increasing transparency and competition. Hence, more recent moves by European and U.S. authorities to bring CRAs under more rigorous oversight are welcome developments.

Rating crises—unanticipated and abrupt credit rating downgrades—have occurred about once every three years over the past 22 years (Moody's, 2008). However, the current crisis is striking in the sheer breadth and depth of the downgrades with respect to those on structured credit products and debt instruments issued by financial institutions. Also, thanks to a proliferation of ratings-based regulations and triggers, the impact of these downgrades spread quickly through the financial system with devastating effects.

Previous crises have led to calls for regulation of CRAs, but regulatory action has tended to be reactive and slow. For example, the *Credit Rating Agency Reform Act of 2006* ended a century of industry self-regulation and gave the U.S. Securities and Exchange Commission (SEC) limited oversight authority over CRAs. The act's overriding purpose was to improve the quality of ratings for the protection of investors by fostering accountability, transparency, and competition in the credit rating industry through the establishment of a transparent and rational registration system and oversight regime for "nationally recognized statistical rating organizations" (NRSROs).

Prior to the crisis, the Committee of European Securities Regulators (CESR) was tasked with monitoring CRAs' implementation of the 2004 International Organization of Securities Commissions (IOSCO) Code of Conduct Fundamentals for Credit Rating Agencies. The code set more than 60 high-level objectives for CRAs, regulators, and market participants to (1) improve the quality and integrity of the rating process; (2) maintain CRA independence and avoid conflicts of interest; and (3) enhance CRA responsibilities to the investing public and issuers.[1]

However, since 2007, both U.S. and European authorities have introduced new measures aimed at reforming CRA transparency and disclosure standards, and reducing potential conflicts of interest. Conflicts of interest are inherent in the rating business because the only parties likely to pay for credit ratings—whether issuers or investors—are parties directly interested in the outcomes.

The SEC now requires NRSROs to publish a description of their rating methodologies and procedures, plus certain rating performance analytics.[2] In addition, if the SEC's current rule proposal is implemented, issuers will have to share with the other NRSROs all information they provide to any NRSRO with respect to structured credit product ratings. The European Union also will require CRAs to publicly disclose their methodologies, procedures, and assumptions, as well as information about potential conflicts of interest, including compensation policies.

The European authorities have now also taken a more hands-on approach to their CRA policies, requiring CRAs to register with and be supervised by national authorities, with coordination

Note: This box was prepared by John Kiff drawing on Sy (2009).

[1]The first set of rules adopted by the SEC in 2007 required CRAs to include certain rating performance statistics (e.g., historical downgrade and default rates within each major rating category). These rules were refined in 2009. In addition, CRAs now have to make publicly available, in machine-readable form on a six-month delay, rating action histories for a randomly selected 10 percent of issuer-paid ratings for each class of credit rating for which they have issued 500 or more issuer-paid ratings. Furthermore, all such data must be made publicly available on a 12-month lag.

[2]For example, the IOSCO Code of Conduct calls for CRAs to exclude rating analysts from fee discussions and to separate their analytic work from other activities that could present conflicts of interest.

and oversight by the CESR. In a similar vein, the U.S. government has proposed legislation that will give the SEC more authority to oversee CRA activities and their governance structures.

In addition, the U.S. Treasury is proposing to force CRAs to rate structured credit products on differentiated rating scales. The IMF and other authorities have been calling for this for some time in order to alert rating users to potential rating downgrade "cliff effects."[3] Furthermore, the U.S. authorities will undertake a study of the appropriateness of relying on ratings for use in securities and banking regulations.[4]

The legislation also would require CRAs to disclose preliminary ratings to reduce "rating shopping" whereby an issuer solicits ratings from multiple CRAs but only pays for and discloses the highest rating(s).[5] This, and other schemes meant to identify under- and over-raters, may discourage rating shopping in the short run, but once a CRA has been identified as too conservative, issuers will likely shun it.[6]

Authorities should also continue to seek ways to measure and manage the impact of credit rating usage on financial markets (Sy, 2009). Not only is there the potential procyclicality of ratings, but rating triggers and thresholds, some of which are embedded in regulations, can generate channels for contagion.

Some commentators have called for the abolishment of the major rating agencies' issuer-pay revenue model as a way of eliminating potential incentive conflicts. However, as pointed out in Zelmer (2007), an investor-pay model may result in lower-quality ratings and likely reduced revenues. Also, investor-pay revenue models are not immune to their own incentive issues, as many investors are incentivized by their overseers to seek out high-yielding, highly-rated securities. Furthermore, pushing for more competition in the rating agency business is not a panacea, since it could trigger a "race to the bottom" in rating standards.

[3]When structured credit product downgrades do occur, they tend to be more severe than on traditional corporate and sovereign fixed-income instruments (IMF, 2008). European regulations now require that CRAs use a differentiated scale to highlight the differential risk characteristics, which the Treasury's proposed legislation also calls for.

[4]In 2008, the SEC proposed the differentiated rating scale, and the removal of credit rating references in federal securities laws, but they were not included in the final adopted version of the rules.

[5]Fender and Kiff (2005) identified rating shopping based on methodological differences as a potential problem, and Morkötter and Westerfeld (2009) found strong evidence of rating shopping in the collateralized debt obligation market.

[6]FitchRatings, Standard & Poor's, and Moody's agreed with the New York Attorney General to adopt a fee-for-service compensation structure for residential mortgage-backed securities under which they will be compensated for preliminary ratings regardless of whether the rating is ultimately selected.

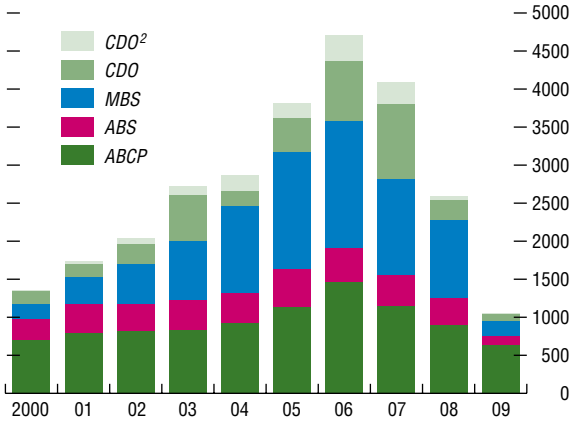
(e.g., credit card receivables and auto loans and leases) is expected to deteriorate, investors still seem to be comfortable with these securities. This comfort level is largely due to their well-understood structures and performance dynamics, and the fact that issuers are seen to have substantial skin in the game.

Outstanding asset-backed commercial paper (ABCP) continues to fade from its 2006 peak, but, in general, global ABCP markets have been holding their own since returning to their roots—that is, issuance programs backed by granular pools of consumer and trade receivables.[8] However, the banks that issue ABCP and/or provide credit enhancement and liquidity

[8]Until 2007, it was common for ABCP programs to boost their returns with securitization (and resecuritization) products. These programs have either collapsed or been phased out.

Figure 2.2. Global Private-Label Securitization Issuance by Type

(In billions of U.S. dollars)

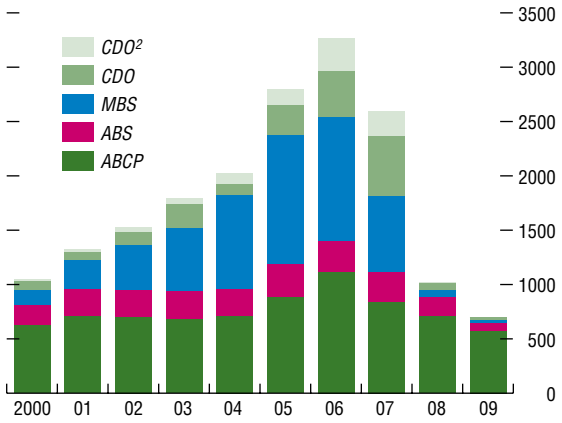


Sources: IMF staff estimates based on data from Dealogic; JPMorgan Chase & Co.; Board of Governors of the Federal Reserve System; Moody's; Mizuho Securities; DBRS; Standard & Poor's; European Securitization Forum; and *Inside Mortgage Finance.*

Note: ABCP = asset-backed commercial paper; ABS = asset-backed security; CDO = collateralized debt obligation; CDO^2 = CDOs backed by CDO, ABS, and MBS; MBS = mortgage-backed security. Data for 2009 cover only U.S. and European issuance through end-June. For European ABCP, 2009 data through end-May. ABCP data represent period-end outstandings.

Figure 2.3. U.S. Private-Label Securitization Issuance by Type

(In billions of U.S. dollars)



Sources: IMF staff estimates based on data from JPMorgan Chase & Co.; Board of Governors of the Federal Reserve System; and *Inside Mortgage Finance.*

Note: ABCP = asset-backed commercial paper; ABS = asset-backed security; CDO = collateralized debt obligation; CDO^2 = CDOs backed by CDO, ABS, and MBS; MBS = mortgage-backed security. Data for 2009 through end-June. ABCP data represent period-end outstandings.

support are reconsidering their operations in this market, in light of stringent Basel II capital requirements for these activities.

MBS issuance by the U.S. government-sponsored enterprises has also held up well, on the strength of the government guarantees (Figure 2.7). Furthermore, the more stringent quality-control requirements for the underlying loans have preserved the attractiveness of these structured credit securities to investors.

Private-label securitization volumes in non-U.S. and non-European markets have tapered off, albeit from already fairly low levels (Figure 2.8). Recent Australian issuance volumes are well off pre-crisis levels, and the Australian Office of Financial Management (the government's debt management agency) has become the dominant buyer. However, the Canadian ABCP market, like its European and U.S. counterparts, is still functioning well without a great deal of official sector support. Japanese securitization markets continue to trundle along at low levels (relative to the size of the economy), also with steady ABCP issuance at its core. Elsewhere, what little activity there was has dwindled to near zero.

Covered bonds are not securitization products in the purest sense, because lenders retain the default risk such that investors have recourse to both lenders and the underlying loans (see Box 2.4). Nevertheless, as mentioned earlier, they have provided European banks with cost-efficient funding for a long period of history, and later will be examined as a potential alternative to securitization. Yet, even these bonds have been severely tested during the current crisis, squeezed out by state-guaranteed bonds and investor concerns about covered-bond underlying mortgage collateral originated in countries suffering from housing market busts (Figures 2.9 and 2.10). The 100 percent risk retention of covered bonds did not save this market from the broader fears generated by other securitized products and questionable assets—regardless of retention levels. The value of the product ultimately depends on the quality of the underlying assets and, as the market recovers, the ability of

transparent performance reporting and valuation to ensure fair market pricing.

The Decline and Fall

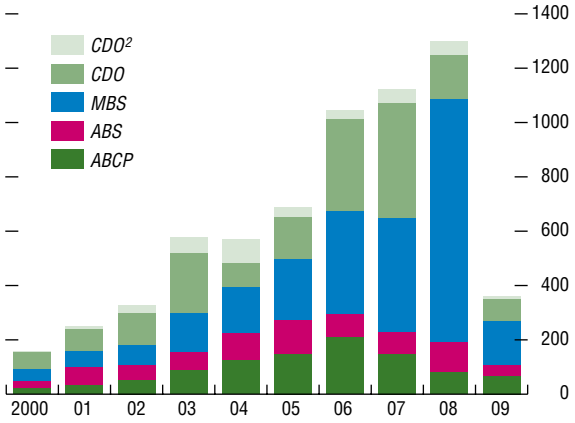
Prior to the crisis, securitization was almost universally hailed as a financial system stabilizer. It supposedly was a key part of a more efficient credit allocation process, dispersing credit risk to a broader and more diverse group of investors rather than concentrating it on bank balance sheets. Hence, the banking and overall financial system would be more resilient, mass bank failures would be a thing of the past, and credit cycles would be smoother. Despite this broad approval, authorities did express concerns about over-reliance on credit rating agencies, and the liquidity and opacity of these markets. For example, IMF (2006) warned that there "was a paucity of data available for public authorities to more quantitatively assess the degree of risk reduction among banks and to monitor where the credit risk had gone."

Securitization Increased Risk Concentration and Interconnectedness

Indeed, it turned out that the degree of risk dispersion fell far short of ideal. Instead, banks themselves remained big holders of these risks, either directly or indirectly. For example, at their peak at end-2006, banks comprised about 51 percent of total financial institutions' exposure to the subprime market.[9] In some cases, they retained what they thought were the least risky (senior) tranches based on the performance of highly-diversified loan pools. In other cases, they bought securitization products originated by other banks. Banks also became indirectly exposed to the loans they securitized via their support of the ABCP conduits and structured investment vehicles (SIVs) to which the risks associated with the loans had been transferred. In the SIVs, banks held these

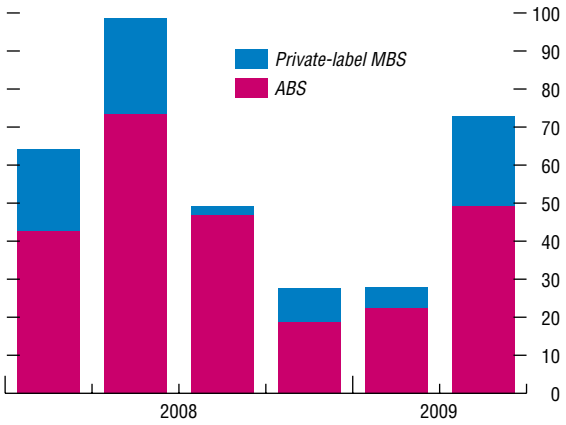
[9]Financial institutions included banks, hedge funds, insurance companies, finance companies, mutual funds, and pension funds (IMF, 2008).

Figure 2.4. European Private-Label Securitization Issuance by Type
(In billions of U.S. dollars)



Sources: IMF staff estimates based on data from European Securitization Forum; JPMorgan Chase & Co.; and Moody's.
Note: ABCP = asset-backed commercial paper; ABS = asset-backed security; CDO = collateralized debt obligation; CDO² = CDOs backed by CDO, ABS, and MBS; MBS = mortgage-backed security. Data for 2009 through end-June. For ABCP, 2009 data through end-May. ABCP data represent period-end outstandings.

Figure 2.5. U.S. Asset-Backed Security (ABS) and Private-Label Mortgage-Backed Security (MBS) Issuance
(In billions of U.S. dollars)

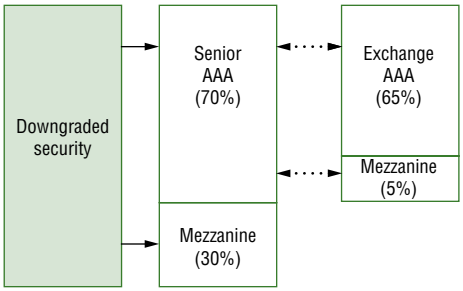


Source: *Inside Mortgage Finance.*

Box 2.3. Re-Remics and the Revival of Resecuritization

Re-Remics are being used to resecuritize senior private-label mortgage-backed security (MBS) tranches that have been downgraded from their initial AAA levels. In a typical Re-Remic, a downgraded tranche is subdivided into a new AAA-rated senior tranche and a lower-rated mezzanine tranche (see figure). About $25 billion were issued during the first half of 2009, mostly against MBSs backed by prime mortgages. Given that most of the AAA private-label MBS tranches issued between 2005 and 2007 have been downgraded, the potential for this market to grow is substantial. However, although these transactions are playing a useful role in dealing with the overhang of legacy assets, they are partly driven by rating/regulatory arbitrage.

Typical Re-Remic Transaction Structure



Re-Remic issuance is being driven by a number of factors, including the need to maintain the AAA ratings that many investors require to hold these securities. Maintaining AAA status can result in substantial capital requirement reductions. For example, the new Basel II risk weight on a BB-rated tranche is 350 percent under the standardized approach, whereas it is 40 percent on an AAA-rated resecuritization. Also, for banks and insurers, big rating downgrades can trigger "other-than-temporary-impairments," which have to be recognized immediately through the income statement. These consequences can be avoided by replacing the downgraded securities with new AAA-rated Re-Remics. In the figure, the new AAA-rated senior tranche comprises 70 percent of the structure, with a mezzanine tranche that absorbs the first 30 percent of losses. Additional credit enhancement is provided by an option for the new senior tranche to be resubdivided into two "exchange classes" should it lose its AAA rating. Also, there is a hedge fund demand for the mezzanine tranches as a means to take a leveraged credit bet.

The holder of the senior tranche that was downgraded to BB could then hold the new AAA tranche, and sell the mezzanine tranche to an investor desiring distressed securities. Hence, only 30 percent of the original holding is sold at distress prices, and the risk-weighted par value of the holding goes from 350 to 28 percent (70 percent of 40 percent). Even if the bank were to retain the mezzanine tranche, the risk-weighted par value could still be less than the original 350 percent.

For example, for single security-backed Re-Remics, the default probability-based rating methodologies used by DBRS, Fitch, and S&P will typically pass the underlying bond's rating through to the new mezzanine tranche. Hence, in the example transaction, the total risk-weighted par value would decline from 350 to 223 percent (70 percent of 40 percent on the AAA-rated tranche plus 30 percent of 650 percent on the BB-rated tranche).[1] In this regard, it is notable that Moody's has been virtually shut out of the Re-Remic rating business, possibly because it rates on the basis of expected loss, which is tougher on mezzanine tranches than the default probability basis (Fender and

Note: This box was prepared by John Kiff.

[1]The new risk weights would be even lower if they were calculated with the securitization exposure weights (20 and 350 percent, respectively, on the AAA and BB tranches), rather than the resecuritization exposure weights (40 and 650 percent). The Basel Committee has defined a resecuritization as a securitization where "at least one of the underlying exposures is a securitization exposure" (BCBS, 2009), but some market participants are hopeful that single-security repacks may not be considered resecuritizations (Mayer Brown, 2009).

Kiff, 2005), and thus issuers prefer not to have Moody's rate their potential securitization.[2]

[2]Another way of looking at the differential rating treatment is that under the expected loss rating basis, a weighted average of the ratings on the two new tranches cannot exceed the old rating, so it cannot create new AAA-rated and BB-rated tranches from a BB-rated legacy tranche. However, because the probability of default on the new mezzanine tranche is the same as that on the BB-rated legacy tranche, it also gets a BB rating.

Although Re-Remics and similar repackaging transactions are playing useful roles in dealing with the legacy asset overhang, they also serve to illustrate the vulnerability of ratings-based regulations to gaming and shopping. Also, these new securities remain exposed to further downgrades if economic and housing market conditions worsen. However, the information underpinning these securitizations and the methodologies applied to their ratings are likely more robust than before and thus pricing is likely to reflect risks more appropriately.

vehicles at arms' length and with little due diligence in some cases, under the assumption that risk was widely dispersed. However, it was not a formal retention policy but reputational concerns that caused these off-balance-sheet exposures to revert to the banks.[10] Tranquil market conditions and low interest rates made it seem profitable and safe for these conduits and vehicles to fund their long-term assets in short-term wholesale money markets. However, when this funding source dried up, sponsoring banks had to step in with backup funding, often at high cost, to bridge the maturity mismatch.

Securitization also led to a lengthening of intermediation chains that increased the complexity and interconnectedness of the financial system (Figure 2.11; and Shin, 2009), increasing the potential for disruptions to spread swiftly across markets and borders. The longer intermediation chain also gave rise to severe principal/agent problems (Ashcraft and Schuermann, 2008). As risks were passed along the chain, those best placed to maintain prudent loan underwriting and monitoring standards were more focused on fee maximization (Bhatia, 2007; Kiff and Mills, 2007). Also, incentive conflicts within the chain may be currently undermining distressed loan workout efforts.

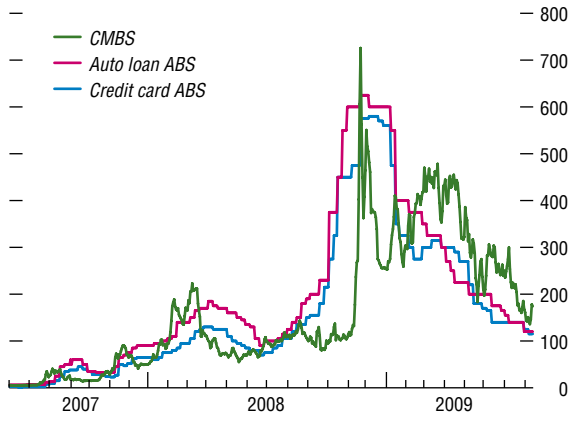
[10] For further discussion, see IMF (2008).

For example, the management of delinquent securitized U.S. mortgages has been outsourced to third-party servicers whose incentives may not be perfectly aligned with the interests of all of the bondholders, possibly resulting in unnecessary foreclosures (Kiff and Klyuev, 2009).

Furthermore, many of the investors at the end of the chain failed to exercise appropriate due diligence, and relied too heavily on credit rating agencies for their risk assessments. Some of this over-reliance on credit ratings stemmed from the increasing complexity of the products, some of which was aimed at gaming credit rating models, and at finding investors for the harder-to-sell tranches. For example, ABS CDOs and CDO^2 were spawned by a need to bundle mezzanine tranches of other securitization products for which there were no natural buyers. Leveraged super-senior products used leverage to enhance the potential returns on CDO senior tranches that were trading at extraordinarily narrow spreads. In addition, some of this "economic catastrophe risk" was transferred to monoline insurers such as American International Group (AIG). Similarly, constant-proportion portfolio insurance products were developed for the CDO, ABS CDO, and CDO^2 equity tranches for which there were no natural buyers. Demand for these and other ingredients in the structured credit "alphabet soup" was facilitated by the

Figure 2.6. Credit Spreads on U.S. AAA Securitization Instruments

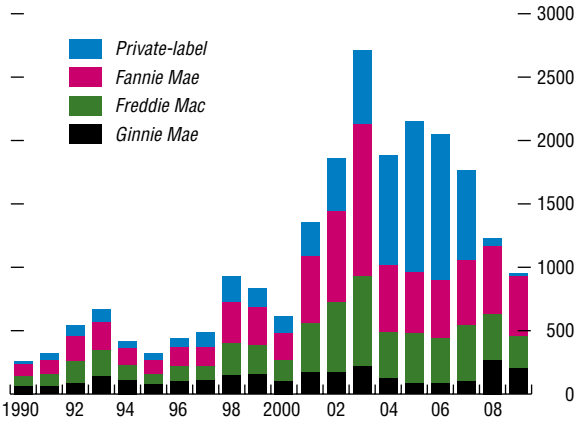
(In basis points)



Sources: JPMorgan Chase & Co.; and Markit.
Note: ABS = asset-backed security; CMBS = commercial mortgage-backed security. Auto loans are three-year spread to swap curve; credit cards are five-year spread to swap curve; and CMBS is Markit CMBX NA-AAA-1 Index.

Figure 2.7. U.S. Government-Sponsored Enterprise versus Private-Label Mortgage-Backed Security Issuance

(In billions of U.S. dollars)



Source: *Inside Mortgage Finance.*
Note: Government-sponsored enterprises include Fannie Mae, Freddie Mac, and Ginnie Mae. Data for 2009 through end-June.

rating agencies' willingness to give them their highest ratings, and the outsourcing of appropriate due diligence by many end-investors. Most of these products existed only to generate fee income and are unlikely to return.

Credit Rating Agency Conflicts of Interest and Methodological Flaws

Rating agencies faced their own incentive conflicts, as an increasing share of their total income came from the narrow set of issuers that dominated the securitization business (CGFS, 2005).[11] The issuers figured out how to game the rating agency criteria, and were perceived to be receiving structuring advice from the rating agencies themselves. In any case, flawed methodologies and data inputs were often used to assign ratings, and the investors who relied on them did not always have access to sufficient information to question and assess them.

The methodologies and inputs used to rate nonprime residential MBS (and CDOs backed by MBS) were particularly flawed, overestimating the quality of the underlying loans and underestimating the correlation of their performance (see IMF, 2006, Boxes 2.2 to 2.4). As a result, most of the senior tranches of such products have either been downgraded, or are soon expected to be. The flaws were particularly evident in the rating of ABS CDOs. For example, Figure 2.12 shows that of all the ABS CDO tranches issued from 2005 to 2007 that were originally rated AAA, only 10 percent are still rated AAA by Standard & Poor's, and almost 60 percent are rated single-B or less, well below the BBB-investment-grade threshold.[12] This serves as an illustration of the long-known fact that, during credit downturns, structured credit ratings are more prone to

[11]See Box 2.2 for a discussion of the conflicts of interest inherent in the major rating agencies' issuer-pay revenue models, and why an investor-pay model may be no better.

[12]Straight private-label residential mortgage-backed securities issued from 2005 to 2007 have not fared much better—63 percent of those rated AAA by S&P had been downgraded by August 7, 2009, 52 percent to BB and lower.

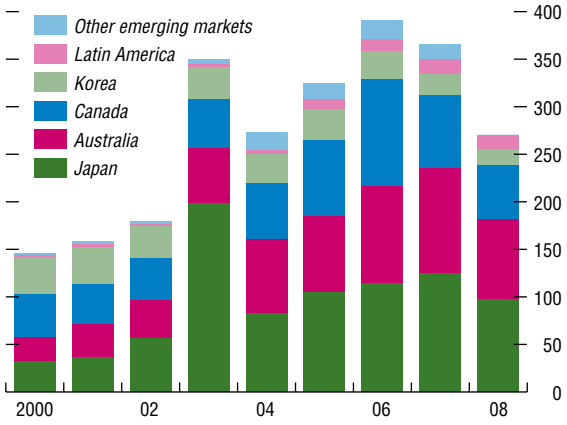
severe downgrades than ratings on corporates and sovereigns (IMF, 2008). Consequently, many investors were apparently shocked by the depth and breadth of these downgrades, as reflected in the extreme spread widening on top-rated securitization products (see Figure 2.6). Even though the rating agencies seemingly made it clear that credit ratings were meant to measure only default risk, and not market and liquidity risk, this point was apparently lost on many investors.

Accounting Standards Fell Behind Securitization Market Developments

Uncertainties regarding accounting rules for consolidation on balance sheet, financial statement disclosure, and the valuation of complex securitization products also played a role in the market collapse by creating doubts about counterparties' creditworthiness. Disclosure standards allowed institutions to be less than transparent about their exposures to securitization products. Furthermore, accounting rules allowed securitization risk exposures to be hidden from investors and regulators in OBSEs such as SIVs and ABCP conduits.[13] While the rules required risk disclosures for on-balance-sheet financial instruments, the bespoke (tailor-made) nature of many securitized products and the total-balance-sheet-risk focus of accounting standards meant that much of the information on instrument-specific risk needed by investors was not disclosed. (Box 2.5 discusses the relevant accounting standards in more detail.)

Also, products held for trading purposes ("intended for sale before maturity") were subject to fair market valuation, but as markets became illiquid, valuations became difficult and nontransparent models were often used. The use of model-based valuations was viewed with suspicion by market participants, even when neces-

Figure 2.8. Non-U.S. and Non-European Private-Label Securitization Issuance
(In billions of U.S. dollars)



Sources: IMF staff estimates based on data from JPMorgan Chase & Co.; Merrill Lynch; Mizuho Securities; DBRS; Standard & Poor's; and Dealogic.

[13]Institutions could avoid on-balance-sheet consolidation by demonstrating that no one institution held the majority of the risks and rewards.

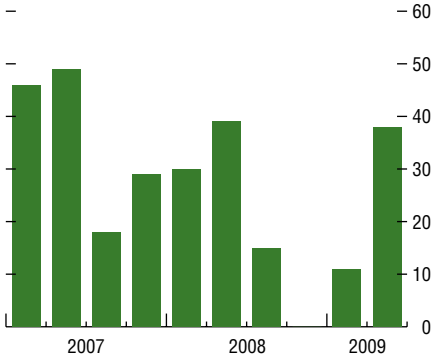
Box 2.4. Covered Bond Primer

On the heels of industry initiatives to revitalize the securitization market, covered bonds have come to the fore as alternative sources of capital market funding. Covered bonds are debt obligations that are secured by a dedicated reference (or "cover") portfolio of assets. Issuers are fully liable for all interest and principal payments, so investors benefit from double protection against default, and rating agencies have given most covered bonds AAA/Aaa ratings. However, covered bonds do not allow the asset to move off the balance sheet of the issuer and thus do not provide any of the risk transfer benefits and regulatory capital relief normally associated with securitization.

In Europe, covered bonds have long been the preferred method of capital market-based mortgage funding, with the German *Pfandbriefe* ("letter of pledge") being the leading example (Jobst, 2008b). The creation of the single currency (euro) improved liquidity and gave the market added momentum, and covered mortgage bonds now constitute a $3 trillion market (equivalent to around 40 percent of European GDP). Another important development was the enhanced liquidity brought to the market with the introduction of "jumbo" covered bonds in 1995.[1]

The classic covered bond is a bond collateralized by a "cover pool" of loans that are legally ring-fenced on the issuer's balance sheet. Bondholders have a priority claim on the collateral, and they rank at or above all the issuer's other creditors. Because covered bonds are both obligations of the issuing lender and collateralized by the underlying cover portfolio, they are viewed as less risky than both. Hence, for example, rating agencies reward covered bonds with a rating "uplift" beyond the stand-alone rating of the issuer.[2]

Global Jumbo Covered Bond Issuance
(In billions of euros)



Sources: Barclays Capital; and Société Générale.

The vast majority of covered bonds are issued under "special law" frameworks that ensure that the dual recourse works properly, and that set uniform standards for product structures and cover pool credit quality.[3] These include French *obligations foncières,* German *Pfandbriefe,* Danish *særligt dækkede realkreditobligationer,* and Spanish *cédulas.* However, banks in countries that do not have special covered bond laws have been issuing "structured" covered bonds in which all of the terms and conditions are defined in the issue-specific legal documentation.

In fact, some structured covered bonds diverge from the classic on-balance-sheet model and use securitization technology to achieve the same economic effect. For example, Bank of America's and Washington Mutual's recent covered bond issues were actually issued by securitization vehicles that hold mortgage-backed securities issued by the

Note: This box was prepared by Andy Jobst, John Kiff, and Jodi Scarlata.

[1]Jumbo covered bonds are typically large (at least €1,000 million outstanding) and meet certain minimum liquidity criteria (e.g., a minimum number of market makers have committed to quote continuous two-way prices).

[2]As an example of the covered bond rating uplift, FitchRatings has assigned an A- rating to Germany's Aareal Bank AG, but its mortgage-backed covered bonds get an AAA rating.

[3]More than 90 percent of currently outstanding covered bonds were issued under special law frameworks (ECBC, 2008).

banks. Also, Kookmin Bank recently issued structured covered bonds that achieved dual recourse via a guarantee from a securitization vehicle into which the cover pool loans had been transferred.[4]

As a result of dual recourse, covered bond spreads historically have been little affected by deteriorating issuer creditworthiness or cover pool credit quality. Even through most of the current crisis until September 2008, covered bond credit spreads, particularly on those issued under special law frameworks, had remained relatively narrow (see Figure 2.10). The same cannot be said of structured covered bonds.[5]

However, spread widening since September 2008 suggests that covered bonds are not immune to the troubles of their issuing banks and the underlying collateral (especially in countries suffering housing busts). In addition, covered bond AAA ratings may be vulnerable to downgrades as rating agencies tighten their liquidity risk management criteria. In particular, the rating agencies are focusing on the impact of issuer default on timely payment of principal, given that the underlying loans typically mature later than the bonds.

The primary market for jumbo issues also languished from September 2008 to March 2009, as state-guaranteed bank bonds, which are eligible for a zero risk weight under Basel II and the European Capital Requirements Directive, may have been crowding out new issuance.[6] Nevertheless, the issuance of nonjumbo and privately-placed covered bonds held in quite well, as they found their place as niche products between government-guaranteed and nongovernment-guaranteed senior unsecured bank debt.[7] In addition, the European Central Bank's (ECB) €60 billion covered bond purchase program (announced in May 2009) has been helpful, as new European issuance has perked up and spreads narrowed (see Figure 2.10 in the main text for spreads and the figure in this box for monthly issuance).[8]

[4]The European Covered Bond Council's covered bond comparative framework database (available at www.ecbc.eu) describes the key features of different covered bond frameworks across Europe.

[5]The underperforming U.K. structured covered bonds would be those issued prior to the introduction of special law in the United Kingdom in 2008.

[6]However, even when jumbo primary markets have been languishing, private placement transactions have continued to get done in fairly substantial volumes.

[7]Some investors also remained attracted to private-placement covered bonds because they are not required to be marked-to-market as are typically jumbo bonds.

[8]The ECB will buy €60 billion euro-denominated covered bonds from July 2009 to June 2010. The bonds must be issued by a euro-area incorporated issuer (which would exclude Canadian, Danish, Norwegian, Swedish, and U.S. bonds), and be governed by the laws of a euro area member state (effectively excluding U.K. covered bonds).

sary, because market prices and valuation inputs were unavailable or not considered reliable.[14]

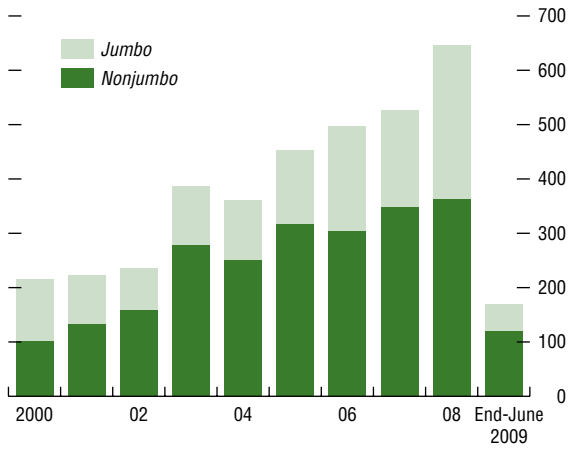
[14]When observable market prices are unavailable for the valuation date, valuations are based on prices on nearby dates, or the use of arbitrage-type valuation models that use the observable prices of other financial instruments. If such valuation inputs are unavailable, valuations can be based on theoretical valuation models that use as inputs various relevant fundamental parameters (IMF, 2008).

Flawed Prudential Regulation

Opportunities for regulatory arbitrage in the Basel I framework were thought to be one of the drivers of securitization, and Basel II addresses many of these gaps.[15] Nevertheless, the financial crisis exposed shortcomings in the Basel II framework in regulation, enforcement, and disclosure. Earlier assumptions of

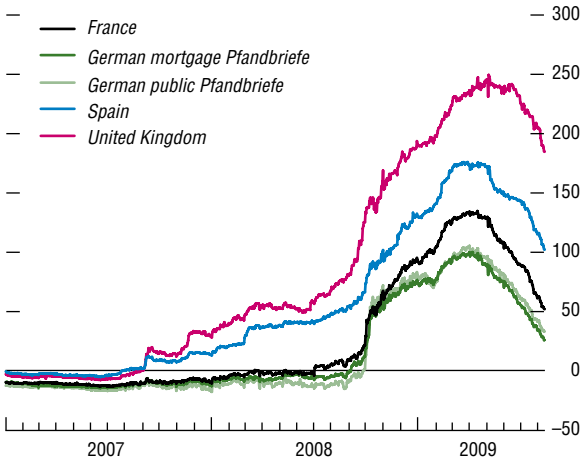
[15]See IMF (2008) for additional background discussion.

Figure 2.9. Global Covered Bond Issuance
(In billions of euros)



Sources: European Covered Bond Council; European Securitization Forum; Barclays Capital; Société Générale; and Dealogic.

Figure 2.10. Selected Covered Bond Spreads
(In basis points)



Sources: iBoxx; and Deutsche Bank.

the risks—credit, liquidity, and counterparty—did not fully account for the complexity of the structured products and the interconnectedness of risks that developed. By hiving off sufficient credit risk, securitized products could be moved off the balance sheet of the originator. This was exacerbated by the fact that some of these entities exposed the originators to continuing contingent credit and funding risks, both explicit and implicit, that remained undisclosed to regulators and investors.

Breakdown of the U.S. Subprime Mortgage Market Triggered the Collapse

All of this pushed the financial system and private-label securitization markets toward the cliff edge, and the breakdown of the U.S. nonprime mortgage market provided the tipping point. Strong growth of highly-leveraged nonprime lending was driven by a combination of low interest rates and rapidly rising house prices. The rising home prices masked the plummeting lending standards, since the overstretched borrowers found it easy to refinance or sell the house at a profit.

As the impact of rising interest rates kicked in and house prices flattened, stretched borrowers were left with no choice but to default as prepayment and refinancing options were not feasible with little or no housing equity. As defaults mounted, the feedback loop that had amplified home price growth dragged prices down, which in turn made it impossible for many overstretched borrowers to refinance to avoid default.

Since the vast majority of these troubled mortgages had been securitized, the impact of the rising tide of foreclosures quickly spread to the broader financial markets. The impact on securitization markets was amplified by the effect of the aforementioned interconnectedness and poor risk management practices of major financial institutions. In particular, investors, and the rating agencies they had come to overly rely on, paid a heavy price for their underestimation of the risks and poor understanding of the impact of the valuation of the increasingly complex structures.

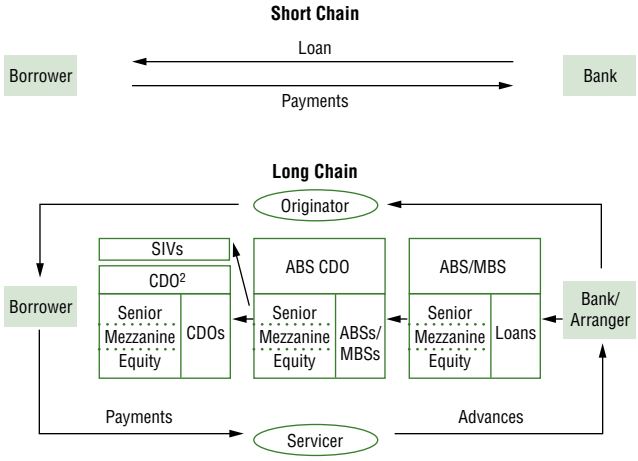
Policy Initiatives Aimed at Restarting Sustainable Securitization

A number of policy initiatives have been proposed that are designed to restart private-label securitization on a sounder footing. In this regard, it is important to ensure that there is less reliance on the use of highly-leveraged and term-mismatched funding structures so that the high-octane type of securitization does not return. In fact, if incentive problems are adequately addressed, some types of securitized products (e.g., CDO^2) will not and should not reemerge. Hence, it is essential to get "real money" investors (insurance companies, mutual funds, and pension funds) back into private-label securitization markets to establish a broader and more stable investor base to support credit risk transfer outside the banking sector. But, it will also be important to ensure that such investors reenter these markets on a sounder footing—for example, with better access to essential information and less reliance on rating agencies. Hence, the vision for revamped securitization will require better incentive alignments all along the intermediation chain.

However, it would clearly help restart primary (new issuance) markets if some of the impaired "legacy securities" could be cleared away, as they require additional supportive capital and funding. In that regard, programs such as the U.S. Federal Reserve's Legacy TALF and the U.S. government's Public-Private Investment Program (PPIP) should be helpful by offering combinations of leveraged funding and (effective) guarantees on legacy asset purchases. There are also private sector solutions such as the previously mentioned Re-Remics.

On the other hand, the use of leveraged funding techniques in public sector programs seems to fly in the face of the idea of building toward a more robust market with more long-term institutional investors. Nevertheless, their use may be necessary to repackage legacy assets and temporarily sustain funding, particularly for nonbank

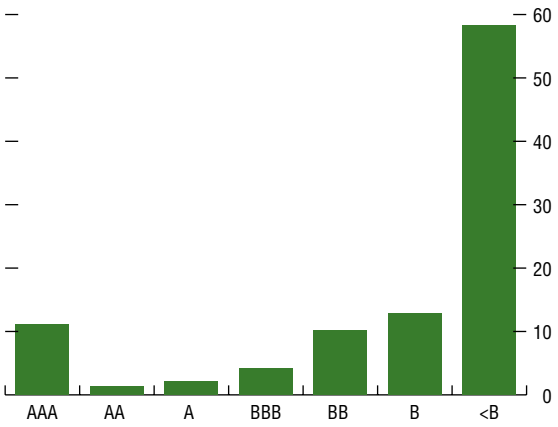
Figure 2.11. Illustrative Intermediation Chain



Note: ABS = asset-backed security; CDO = collateralized debt obligation; CDO^2 = collateralized debt obligation-squared; MBS = mortgage-backed security; SIV = structured investment vehicle.

Figure 2.12. Where Did All the AAAs Go?

(In percent, as of June 30, 2009)



Source: Standard & Poor's.
Note: S&P rating distribution of 2005–07 issued U.S. AAA-rated asset-backed security collateralized debt obligations.

Box 2.5. Accounting for Securitization Exposures

This box discusses two accounting issues relevant to securitization—derecognition and consolidation. Recent and prospective accounting changes within International Financial Reporting Standards (IFRS) and U.S. Generally Accepted Accounting Principles (GAAP) strengthen the separation of off-balance-sheet entities and make it more difficult to move securitized products off balance sheet, but the impact on future securitizations is, as yet, unclear.

Fundamental to securitization growth were the incentives in accounting standards that enabled originators to hive off the risks and rewards, and distance themselves from the control associated with these financial products, thereby moving them off balance sheet and undisclosed to regulators and investors. Two interrelated elements were the derecognition criteria for financial assets and the requirements for consolidation of financial entities, both of which have come under the scrutiny of accounting standard setters.[1,2]

Derecognition

Both major accounting bodies are reconsidering their derecognition standards with the objective of tightening the criteria for moving securitizations off balance sheet. The International Accounting Standards Board (IASB) is reviewing its derecognition criteria both because of the difficulty of determining derecognition for increasingly complex structured products, and to better enable users of financial statements to understand the risks related to off-balance-sheet assets. The current proposal, *Exposure Draft: Derecognition,* calls for reducing the number of derecognition criteria—namely, risks and rewards, control, and continuing involvement—to a simpler, single approach based on control, supplemented by enhanced disclosures for both transferred assets and those that remain on balance sheet.[3] Likewise, the U.S. Financial Accounting Standards Board (FASB) undertook a similar reassessment in Financial Accounting Standard (FAS) 166, *Accounting for Transfers of Financial Assets,* addressing concerns that many derecognized financial assets should actually remain on balance sheet.[4]

Consolidation

With an intent similar to derecognition, changes to U.S. GAAP and proposals for IFRS provide enhanced guidance on the consolidation of entities on balance sheet. Consolidation of off-balance-sheet entities received particular attention in 2007 as major international financial institutions were forced—for both reputational and regulatory reasons—to consolidate on balance sheet various structured investment vehicles and commercial paper conduits requiring support.[5] FAS 167, *Amendments to FASB Interpretation No. 46(R) Consolidation of Variable Interest Entities*, addresses whether an originator has a controlling financial interest in a variable interest entity (VIE) and must be held on balance sheet, where the criteria are, broadly—the ability to control the VIE, and to receive risks and rewards.[6] Similarly, IASB's *Exposure Draft (10): Consolidation* modifies consolidation criteria to one of control, but subsumes that risk and reward are intrinsic to the criteria for

Note: This box was prepared by Jodi Scarlata.

[1]Derecognition of a financial asset or liability is ceasing to recognize that asset or liability in an entity's financial statement of financial position (IASB, 2009b).

[2]Consolidation is assessed at the entity level and a reporting entity prepares a financial statement that "consolidates the assets, liabilities, equity, income, expenses and cash flows with those of the entities that it controls (i.e., its subsidiaries)" (IASB, 2009a).

[3]First, it must be shown that contractual rights have been transferred or the rights to the cash flow have expired. Second, the derecognizing entity has to prove that there is no continuing involvement in the asset portfolio, or third, that the entity transferring the asset retains a continuing involvement in it, but the buyer of the financial asset has the practical ability to transfer assets for its own benefit (IASB, 2009b).

[4]FAS 166 eliminates the concept of a qualified special-purpose entity, which has permitted U.S, securitizations to be housed in off-balance-sheet entities, and could move many securitizations on balance sheet.

[5]See IMF (2008) for additional discussion.

[6]If an enterprise has a controlling interest in a VIE, then the entity must be consolidated (FASB, 2009).

control.[7] Thus, the FASB's changes to consolidation bring it more in line with those of the IASB.

Effects of Standards Changes

An important modification to *Interpretation 46(R)* is that the determination of control and risks and rewards is no longer a quantitative standard, but a qualitative evaluation by the reporting enterprise. The elimination of a quantitative rule might seem a step backward in loss of clarity. However, a quantitative standard makes it easier to structure a securitization such that it does not formally violate accounting standards and can be moved off balance sheet, evading the standard's intent.

Conversely, the decision of whether or not to securitize—its profitability, accounting legality, and regulatory retention requirements—becomes more difficult with qualitative criteria. Originators will spend more time in structuring a securitization—making it costlier to the originator and eventually the investor—but also hopefully ensuring that greater care is taken in assessing potential explicit and implicit risk exposures of the securitization. For auditors and regulators, a qualitative standard can strengthen their hand by permitting judgment and experience in determining whether these criteria have been satisfied, but may also make it more difficult for them to dispute securitizers' activities.

Overall, these standards attempt to enhance the criteria for keeping risk exposures on the balance sheet. The U.S. Federal Reserve's Supervisory Capital Assessment Program estimated that the consolidation on balance sheet resulting from FAS 166 and 167 would increase risk-weighted assets by about $700 billion for the top 19 U.S. financial institutions, or about 9 percent of total risk-weighted assets for these banks (FitchRatings, 2009). In isolation, these changes should also strengthen the bankruptcy remoteness of remaining off-balance-sheet entities. However, when tighter criteria for moving assets off balance sheet are combined with proposed regulatory retention requirements, it may make achieving bankruptcy remoteness more difficult. Nevertheless, this transfer on balance sheet could effectively result in more "skin in the game" and more closely align originators' and investors' interests.

Potential Loopholes

There may yet be opportunities for maneuver. For example, FAS 167 pertains only to VIEs—a U.S. vehicle—while the IASB's ED (10) would apply to all entities. If under U.S. GAAP an originator can share control among multiple parties—without a single controlling interest—then a securitization can be structured among various parties, none of whom has a controlling interest and therefore does not have the product on balance sheet. While the intent for consolidation under the two standards is similar, divergences in the application may introduce opportunities for regulatory arbitrage and adverse incentives for origination.

Although these accounting changes move in the right direction, it is uncertain if they will introduce sufficient incentives to provide a sound basis for securitizations while also ensuring they do not eliminate the legitimate use of such vehicles.

[7]Specifically, "a reporting entity controls another entity when the reporting entity has the power to direct the activities of that other entity to generate *returns* for the reporting entity" (IASC Foundation, 2009).

lenders that depend on securitization markets, until the more robust markets can be achieved. In addition, although the volume of business done through the TALF has been light, it seems to have calmed markets and tightened credit spreads on U.S. ABSs (see Figure 2.6).

Reforms for a More Robust Securitization Market

Even before the crisis, the IMF and other authorities had been calling for a number of the securitization market reforms that are now in the process of being implemented. Table 2.1 provides a summary of these and other recent policy

Table 2.1. Securitization Policy Progress Report

Issue	Status
Credit rating agencies	
Incentive conflicts	All major agencies compliant with internal governance controls called for in the IOSCO Code of Conduct.
Rating over-reliance/shopping	Agencies agree with New York State Attorney General to implement a fee-for-service revenue model for residential mortgage-backed securities. U.S. government calling for publication of preliminary ratings.
Transparency and disclosure Rating differentiation	European and U.S. legislation to force rating agencies to disclose rating performance metrics, and differentiate their structured credit ratings. U.S. Securities and Exchange Commission to require rating agencies to make available details behind rating actions in machine-readable form.
Disclosure and transparency	
At transaction level	American Securitization Forum (Project RESTART) working on introducing enhanced transaction reporting (loan pool composition and ongoing performance detail).
Accounting standards	Accounting standards to require improved disclosure of off-balance-sheet entities and tighten requirements for moving assets off balance sheet.
Regulations	
Capital requirements	Basel II amendments to increase capital requirements where necessary, and to minimize loophole gaming and incentives for regulatory arbitrage.
Compensation policy	FASB ends gain-on-sale accounting for certain securitizations, eliminating upfront revenue recognition.
Securitizer incentives	European Parliament and U.S. government call for securitizer risk retention, and accounting standards make it harder to remove assets from securitizer balance sheets.
Product standardization	No progress on product standardization, although the American Securitization Forum is working on legal documentation standardization.

recommendations and the progress made toward meeting them. Some of them will be described below, and the next subsection will focus on efforts to improve the alignment of securitizer and investor interests ("skin in the game").

Credit Rating Agency Reforms

Investor over-reliance on credit ratings for securitizations and other structured credit products has been long recognized as undesirable, although by embedding ratings in various regulations some authorities have inadvertently encouraged their overuse. However, it seems inevitable that credit rating agencies will continue to play a key role in these markets, so most of the authorities' actions to date have been designed to encourage rating agencies to continue to tighten internal governance and improve their transparency and disclosure standards (see Box 2.2). European regulations will also require rating agencies to differentiate their securitization product ratings from those on regular corporate and sovereign debt. The U.S. Treasury is also advocating differential rating scales in its *Financial Regulatory Reform* white paper released in August 2009. Further requirements have also been introduced regarding the publication of rating performance metrics to facilitate cross-product and cross-rating comparisons.

However, it has to be admitted that poor investor due diligence cannot all be blamed on a lack of necessary information. In most cases, buyers of U.S. private-label MBS could access detailed underlying loan-level information from services such as LoanPerformance (www.loanperformance.com) and Intex Solutions (www.intex.com). Going forward, industry initiatives such as the American Securitization Forum (ASF) Project RESTART may go even further toward making the data more widely available in standardized machine-readable formats, and more reliable through tighter pre-origination due diligence and quality assurance processes, if industry participants adhere to the voluntary standards. In addition, the International Organization of Securities Commissions has introduced

strict new due diligence guidelines for institutional investment managers.

These initiatives are all moving in the right direction, but work remains to reduce the reliance on credit ratings by the authorities, especially with some forces moving in the opposite direction. For example, the longstanding use of credit ratings to screen eligible collateral for various central bank liquidity backstop facilities is viewed as encouraging "rating shopping."[16] Regulations relating to pension fund holdings, for example, typically restrict fixed-income investments to those with investment-grade ratings (i.e., BBB- and higher). That said, the recent U.S. government proposal asks all U.S. regulators to report where ratings are embedded in their regulation with an objective to remove them.

Furthermore, although the differentiation of structured credit ratings is welcome, the ratings remain based on one-dimensional metrics (default probabilities or expected losses) that fail to capture all of the risk dimensions peculiar to tranched products (IMF, 2008). Exploitation of this particular aspect of the methodologies may have played a role in Moody's being "shopped out" of the Re-Remic rating market by DBRS, Fitch, and S&P (see Box 2.3).

Improved Disclosure and Transparency Standards

Standard prescriptions for fixing securitization markets include improving disclosure and transparency standards so that all participants along the intermediation chain can exercise appropriate due diligence. Improving disclosure standards and making detailed information about the assets underlying structured finance products publicly available also could help reduce rating shopping by making it possible for entities other than the credit rating agency hired by the originator to develop and disseminate opinions about the securities. Authorities are introducing legislation that will incentivize securitizers to disclose more information on the underlying portfolios, and on securitizer compensation and risk retention.[17] In addition, industry bodies, such as the ASF and the European Securitization Forum, are leading initiatives that will broaden data availability and standardize data delivery formats.[18] Authorities are also applying moral suasion on securitizers to simplify and standardize securitization products to facilitate risk assessments and valuations.

While the standard setters and financial regulators have long provided supplementary guidance for accounting for financial instruments, this activity surged following the onset of the crisis. An increasing amount of guidance has been produced on the standards for off-balance-sheet treatment of financial assets ("consolidation" and "derecognition"), as well as on the disclosure of the methods used for the valuation of complex financial products. Much of the work has proceeded distinctly in the separate standards of the International Accounting Standards Board and the U.S. Financial Accounting Standards Board (FASB), but the two standard setters have tried to ensure consistent approaches, as over the

[16]Rating shopping involves securitizer selection (i.e., "cherry picking") of the rating agencies that will assign the highest rating to their particular issues or tranches. It has been identified as a potential problem as far back as 2002 (see Peretyatkin and Perraudin, 2002), but it has been difficult to prove that it was actually happening. However, evidence is accumulating that rating shopping was rampant during the period leading up to the crisis (see Benmelech and Dlugosz, 2009).

[17]IOSCO has made a number of recommendations for a regulatory response to the issues raised in the securitization and the CDS markets, including enhanced due diligence and disclosure standards, standardized products to the extent possible, and clearing through a central counterparty (IOSCO, 2009a). It has also issued a report detailing recommendations for enhanced disclosure standards for listed ABS (IOSCO, 2009b).

[18]The ASF's Residential Securitization Transparency and Reporting Project ("Project RESTART") is initially focusing on developing pool- and loan-level standardized RMBS disclosure packages, after which it aims to standardize the various legal contracts that set out the responsibilities along the intermediation chain. In these efforts, the ASF has been joined by the European Securitization Forum and the Australian Securitization Forum under the umbrella of the Global Joint Initiative to Restore Confidence in Securitization Markets. The Japan Securities Dealers Association is leading a similar effort. However, it seems that these other efforts are not as advanced as those in the United States.

Box 2.6. Basel II Securitization- and Resecuritization-Related Enhancements

This box discusses enhancements to Basel II risk weights and credit conversion factors attached to securitizations and resecuritizations that are intended to better reflect the associated risks of these products.[1] However, the interaction of these changes with new accounting standards and proposed retention regimes makes their impact on securitizations uncertain.

Resecuritizations

Risk weights for resecuritization exposures are now significantly increased for both the standardized approach and the internal-ratings based approach.[2] Resecuritizations under the standardized approach, for example, are now double that of securitization exposures, having increased to 40 percent for the highest ratings (AAA to AA-) relative to 20 percent for securitizations. Thus, many of the structured financial products prevalent before the crisis will now be substantially more expensive to hold on balance sheet in terms of regulatory capital, and these considerations will need to be factored into an originator's retention decisions, especially in light of the new potential minimum retention requirements (5 percent of par value or higher). Further, any resecuritization exposure containing an underlying resecuritization would be precluded from qualifying as a senior resecuritization and thus benefiting from a lower risk weight. The tighter capital charges may open the door for more of the origination of securitized and resecuritized products to move to nonregulated entities outside supervisory oversight, such as hedge funds.

Ratings Based on Self-Guarantees

The Basel Committee's regulation to disallow a bank from recognizing external credit ratings when those ratings are based on guarantees or support provided by the bank itself will also have an impact on securitization. For

Note: This box was prepared by Jodi Scarlata.

[1]While there are other revisions to Basel II, this box focuses on the July 2009 BCBS enhancements (BCBS, 2009).

[2]A resecuritization is defined as "a securitization exposure in which the risk associated with an underlying pool of exposures is tranched and at least one of the underlying exposures is a securitization exposure. In addition, an exposure to one or more resecuritization exposures is a resecuritization exposure" (BCBS, 2009). This would capture collateralized debt obligations of asset-backed securities (ABS), a securitization with a single underlying ABS, or a liquidity facility to an asset-backed commercial paper program containing a securitization exposure, for example.

medium run a unified international accounting standard remains the goal. Consequently, the objective has been twofold: to introduce the necessary enhancements to accounting standards as rapidly as is feasible, while concurrently aiming for the eventual adoption of a single standard.

Realigning Regulatory Capital Requirements

The Basel Committee on Banking Supervision (BCBS) has responded to shortcomings in the Basel II framework with various enhancements (see Box 2.6).[19] These changes have multiple goals and aim to better reflect the risks of securitized and resecuritized products by increasing the risk weights attached to these exposures as necessary, and to eliminate opportunities for regulatory arbitrage across the trading and banking books between liquidity facilities with short- versus long-term maturities, and across on- and off-balance-sheet entities. Moreover, the BCBS has not only addressed shortcomings in Pillar I standards, but also observed weaknesses in public disclosure in order to provide a more accurate representation of risk exposures. Revisions to Pillar 3 aim to enhance market discipline across all aspects of securitization—exposures in the trading book, off-balance-sheet entities, liquid-

[19]This discussion focuses on BCBS (2009), which has particular relevance to securitization and resecuritizations.

example, if a bank has purchased asset-backed commercial paper (ABCP) from a liquidity facility that it itself supports (and on whose support its rating depends), then the bank must treat the ABCP as if it were not rated. This change in treatment eliminates a circularity in the securitization process whereby the originator benefits from its relationship with its own liquidity facility and liquidity risk is not spread but is, paradoxically, dependent again on the originator. The revision thus addresses concerns about adverse incentives between originators and the guarantees they provide. Further, "a bank's capital requirement for such exposures held in the trading book can be no less than the amount required under the banking book treatment."[3] While this removes an incentive to operate through the trading book and hold less capital against securitizations, comparable treatment between the banking and trading book may reduce the incentive to use the trading book where assets can be bought and sold more easily, potentially resulting in less liquid markets.

[3]BCBS (2009, page 4, paragraph 565 (g)(ii)).

Liquidity Facilities

Similarly, under the standardized approach, higher credit conversion factors (CCF) will also be associated with eligible liquidity facilities attached to securitizations.[4] Specifically, there will be no distinction between short- and long-term liquidity facilities, as there had been before, and liquidity facilities will have a 50 percent CCF regardless of maturity. Externally-rated facilities will receive a 100 percent credit conversion factor, and the preferential treatment formerly given to liquidity facilities accessed only for general market disruption has been eliminated. All in all, liquidity facilities will be more costly and complex to manage, but should be more transparently reflected in an originator's risk management decisions.

Going forward, these enhancements should improve the incentives for originators of securitizations to appropriately account for the funding risks associated with the on- and off-balance-sheet risk exposures.

[4]To determine capital requirements for off-balance-sheet exposures, a bank must first apply a credit conversion factor to the exposure, and then risk weight the resulting credit equivalent amount (BCBS, 2006, paragraph 567).

ity facilities, and resecuritizations. All in all, these changes aim to minimize Basel II loopholes and eliminate incentives for regulatory arbitrage. However, while eliminating adverse incentives is desirable in order to mitigate problems with the old securitization business model, the new regulatory structure may make some securitizations too costly.

Basing Compensation on Long-Term Performance

Compensation systems based on immediately measurable accounting results also played a role in creating the conditions that led to the crisis. Accounting standards that eliminate the upfront recognition of income from securitizations—and thereby the immediate impact on compensation—could significantly alter compensation schemes, as remuneration will remain tied to the future performance of the securitization. Introducing a longer-term perspective on structuring securitizations should force originators to better account for the risk-return trade-off of the instrument and provide incentives for better underwriting standards. The commissions of those involved at the inception of the securitization, and who would otherwise no longer be engaged after creation, could be disbursed over time in accordance with product performance.

A welcome development in this regard is the FASB's elimination of the gain on sale accounting treatment that had added to the profitability of certain securitizations. Formerly, U.S. Gener-

ally Accepted Accounting Principles (GAAP) permitted the securitizer to recognize the gain on sale at the initiation of the securitization. For example, for certain mortgage securitizations where a transferor had not surrendered control, the sale of the pooled assets to the off-balance-sheet entity could be accounted for by the securitizer at the time of the transfer. Recording the gain on sale of loans securitized in an MBS would require a securitizer to project the future cash flow of the underlying loans and account for it up front. Gain on sale treatment will no longer be allowed under U.S. GAAP for certain mortgage securitizations where control is not surrendered; instead, securitizers will have to recognize the income over time as payments are received, thereby eliminating the upfront profitability of these securitizations. This would enhance the transparency of income statements and provide incentives to originators to better assess risk exposures of securitizations.

Product Standardization and Simplification

Most products could usefully be standardized at least to some extent. This should increase transparency as well as market participants' understanding of the risks, thus facilitating the development of liquid secondary markets. Although there will always likely be investors that demand bespoke complex products, securitization trade associations and securities regulators should encourage standardized building blocks for securitized products. It would also be useful if some standardization could be imposed on the underlying assets to maintain higher quality pools or at least verifiable pools (see the covered bond discussion below).

Valuation difficulties could also be alleviated if securitization products were simplified. Some of the product complexity was well intentioned, such as excess spread traps and triggers designed to bolster the creditworthiness of the senior tranches.[20] Others, such as micro-tranching, were designed to game rating agency models. In any case, this product complexity has made some securities extremely difficult to value and risk-manage, and to the extent that regulation or market practices encourage such complexity, these components should be eliminated.

More "Skin in the Game"

Several recent policy moves attempt to get more securitizer "skin in the game" to ensure that someone is taking responsibility for diligent loan underwriting and monitoring. It is clear that, in many cases, securitization product issuers were poorly incentivized to conduct the appropriate (continuous) due diligence on loan originators, including the review of financial statements, underwriting guidelines, and background checks. In addition, they relied on originator representations and warranties regarding the quality of the loans and the underwriting process that turned out to be inadequate, in some cases because the originators lacked the capital and liquidity to make good on their warranties.

In order to incentivize stronger issuer due diligence effort, European and U.S. authorities are proposing to amend securitization-related regulations to incentivize issuers to retain an economic interest in the securitization products they issue. The European Union (EU) Parliament has amended the Capital Requirements Directive, which sets out the rules for Basel II implementation in Europe, to provide incentives for securitizers to retain at least 5 percent of the nominal value of originations.[21] In a June 17, 2009 white paper, the U.S. government called for similar risk retention requirements for U.S.

[20]Some of the excess spread—the difference between the interest received from the underlying loan portfolio and what is paid out to bondholders—is trapped in a reserve account to cover defaults and provide additional credit enhancement. However, portions of these reserve accounts can accrue to securitizers if the loan portfolio performance exceeds preset trigger levels.

[21]The Committee of European Banking Supervisors (CEBS) will be adding more specificity to the EU retention scheme by year-end 2009. However, so far the CEBS has not initiated a tractable impact or feasibility analysis.

securitizers.[22] Both propose several risk retention options, including retaining the equity tranche and equal amounts of all tranches ("vertical" slices).

However, Fender and Mitchell (forthcoming) and Kiff and Kisser (forthcoming) show that both the size and form of the retention are critical to incentivizing diligence, suggesting that the proposals may be too simplistic. Box 2.7 draws on this work to show that a flexible implementation is required to achieve broad-based incentive alignments and a more flexible implementation would be advisable. It shows that the optimal retention scheme, defined in terms of which tranches are retained and their thickness, depends critically on reasonable assumptions about the quality of the loan pool and the economic conditions expected during the life of the securitization.

The model underlying Box 2.7 verifies that while equity tranche retention is a useful incentive mechanism when the quality of loans is high and the economy is doing well, this is not true for low-quality loan portfolios in a recessionary environment. Recall that equity tranches are the first to absorb losses when the portfolio does not perform well, and if they perform really poorly, the equity tranches are prone to being wiped out. Hence, a securitizer that is forced to retain exposure to an equity tranche backed by a low-quality loan portfolio when an economic downturn is highly probable will have little incentive to diligently screen and monitor the underlying loans, because the chances are high that equity tranche holders will be wiped out irrespective of any screening and monitoring. Thus, securitizers need to be provided with screening and monitoring incentives by holding the next highest tranche, i.e., the mezzanine tranche. Only in a scenario where it is also very likely that the mezzanine tranche gets exhausted will vertical slice retention provide better screening incentives.

[22]Additionally, in its *Mortgage Reform and Anti-Predatory Lending Act*, the U.S. House of Representatives is pushing "assignee liability" that ensures that some entity in the securitization chain remains legally liable for securitized loans that do not meet certain ability-to-pay and "net tangible benefit" standards.

The intent of the Box 2.7 analysis is to provide a framework for thinking about different retention policies. The analysis suggests that a matrix of retention policies defined by the type and quality of the underlying assets, the structure of the securities, and expected economic conditions would better align incentives. The box also shows that there are some combinations of loan portfolios and economic conditions in which forced retention does not induce any screening. Furthermore, in other scenarios, the impact of increased regulatory requirements could even make securitization too costly. Even without formal requirements, in many cases, anecdotal evidence suggests that originators already retain some exposure to the assets they securitize, though it may not always be effective for inducing good origination or monitoring. For example, commercial real estate and consumer loan securitizers typically retain at least 5 percent of nominal value in one way or another, e.g., first-loss or equity tranche retention, and excess spread and cash reserve accounts that revert the profits from good performance to securitizers. European prime mortgage securitizers generally retain at least 5 percent. But the senior tranche retention made by many of the securitizers, motivated mainly by difficulties in placing them, was probably not useful, since they perceived them to be virtually riskless.

More formal evidence from the United States suggests that current policy efforts of introducing a minimum retention requirement of 5 percent or higher could be binding in large areas of the securitization market. According to IMF staff calculations of tranche retention (without considering whether it is equity, mezzanine, or a vertical-slice-retention type) in almost 10,000 ABS, MBS, and CDO transactions issued since 2001, retention of securitized exposure has gradually increased over time, but remains very diverse depending on the type of transaction structure and collateral (Figure 2.13). Incentives to retain skin in the game seem to be higher in more sophisticated areas of the market, such as CDOs, where the decision to retain small, highly customized tranches had become part of elaborate hedging strategies. Based on available data,

Box 2.7. Optimal Retention Policies for Loan Securitization

The European Parliament and the U.S. government are pushing to require securitizers to retain economic interests in securitized assets in order to better align their interests with those of investors. Both are proposing that securitizers hold at least 5 percent of the par value of the underlying loan portfolios, but offer various options as to how this retention is configured. This box illustrates that flexible implementation is required to achieve broad-based incentive alignments. While much attention has been devoted to equity tranche retention, and European and U.S. authorities are considering "vertical slice" retention (equal amounts of each tranche in the securitization structure), the box shows that mezzanine tranche retention may be the better option in certain situations.

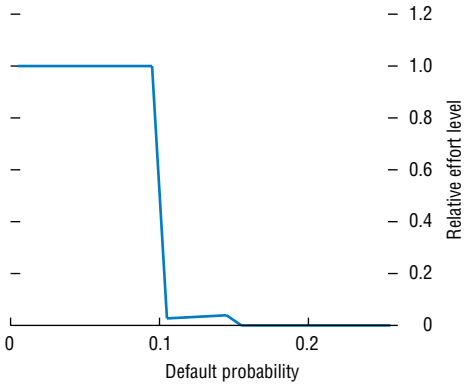
Early discussions on optimal retention schemes for asset securitization focused on the equity tranche, the tranche that takes the first loss (FitchRatings, 2008). The idea of retention is to incentivize securitizers to more effectively screen loans. However, holding just the equity tranche has little impact on screening if it is likely to be exhausted in a downturn and a downturn is likely, because in this case the benefits to screening are nil.

The analysis presented here is based on a model by Fender and Mitchell (forthcoming) that analyzes the optimal effort level of a lender who can screen borrowers and then has the option of securitizing the loan portfolio. By engaging in screening, a lender can increase the probability of making a high-quality loan and thereby increase the expected return of the portfolio. The analysis measures screening effort in relative terms by comparing the amount of effort that would optimally be exerted to maximize profits if only part of the portfolio were retained, compared to that optimally exerted if all of the loan risk were retained.

The Fender and Mitchell (forthcoming) model assumes that there are two classes of loans that differ only in credit quality, and that the economy can either be in a good or a bad "state" during the life of the loan. For example, assume that 80 percent of the loans in the portfolio are "low-quality" and 100 percent of them are likely to default in the low economic state. The other 20 percent are "high-quality" loans, only at risk of defaulting in the low economic state. There is an 80 percent probability of a downturn occurring during the life of the loan. For the sake of simplicity, the probability of a high-quality loan defaulting in a low state is assumed to be the same as the probability of a low-quality loan defaulting in a high state. Also, the example assumes that the loss given default is 100 percent.[1] Figure 1 shows the relative optimal effort levels for different

Note: This box was prepared by Michael Kisser and John Kiff.

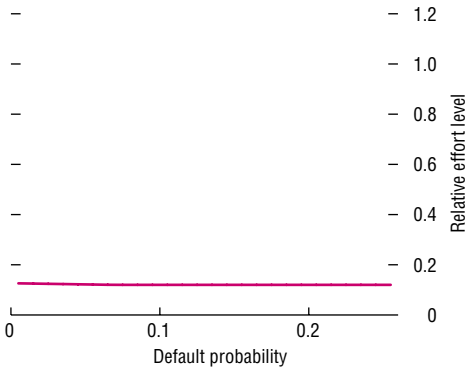
Figure 1. Optimal Effort Level of Equity Retention: Low-Quality Borrowers and High Odds of Recession



Source: IMF staff estimates.
Note: The figure shows implied effort levels under equity retention compared to the benchmark case of retaining the entire loan portfolio. Calculations are done assuming that chances of entering a recession equal 80 percent and further that only 20 percent of the loans are of high quality and that the thickness of the equity tranche equals 12 percent.

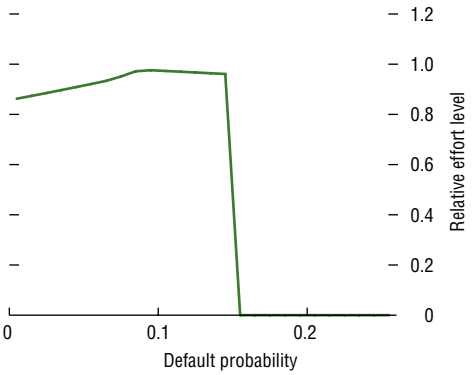
[1]The example used here assumes quadratic screening costs, reflecting the idea that as more bad loans are rejected, more bad loans must be screened to achieve the target portfolio size. A similar assumption is made in Carletti (2004) and Duffie (2008). Fender and Mitchell (forthcoming) also work with a convex cost function, but do not specify the exact functional form. Also, the gross return R is set to 5 percent.

Figure 2. Optimal Effort Level of Vertical Slice Retention: Low-Quality Borrowers and High Odds of Recession



Source: IMF staff estimates.
Note: The figure shows implied effort levels when retaining a vertical slice of 12 percent compared to the benchmark case of retaining the entire loan portfolio. Calculations are done assuming that chances of entering a recession equal 80 percent and further that only 20 percent of the loans are of high quality.

Figure 3. Optimal Effort Level of Mezzanine Retention: Low-Quality Borrowers and High Odds of Recession



Source: IMF staff estimates.
Note: The figure shows implied effort levels under mezzanine retention compared to the benchmark case of retaining the entire loan portfolio. Calculations are done assuming that chances of entering a recession equal 80 percent and further that only 20 percent of the loans are of high quality and that the thickness of the mezzanine tranche equals 12 percent.

default probabilities incentivized by retaining an equity tranche that absorbs the first 12 percent of losses.

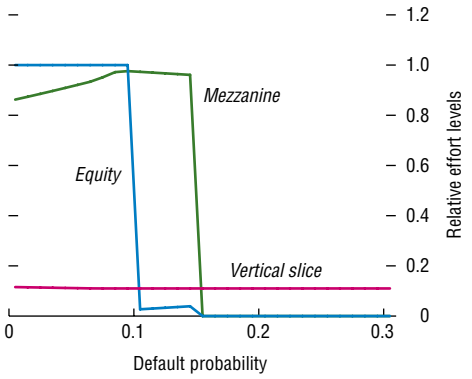
It can be seen that when default probabilities exceed 15 percent (on the x axis), a profit-maximizing originator will not exert any effort if forced to hold the 12 percent equity tranche. This is because there are so many low-quality loans in the portfolio and the low economic state is so likely that the equity tranche is almost sure to be exhausted, regardless of effort exerted. In other words, because the equity tranche holders only receive the residual claim after payments to more senior tranche holders have been made, if chances are high that no residual claim will be left, then there is no incentive for screening loans when the originator is forced to retain the equity tranche. Note that from zero through a default probability of 10 percent, the originator holding a 12 percent equity tranche will screen loans as if the entire loan portfolio were held on the balance sheet.

Figure 2 shows, however, that in the example used here the retention of a 12 percent vertical slice (i.e., 12 percent of each tranche) will incentivize effort, regardless of the default probability (represented by the horizontal line). While this is the case being discussed in regulatory circles, given the very low level of effort to screen that would take place (only 12 percent of the first best effort level), the model can be used to examine other retention schemes and underlying conditions to judge whether there are better options.

For example, Figure 3 shows that mezzanine tranche retention can incentivize very high effort levels for less risky portfolios (those with default probabilities up to about 15 percent). In this specific example, a retained mezzanine tranche that absorbs between 12 and 24 percent of losses incentivizes more effort than equity retention only for default probabilities of between 10 and 15 percent, since effort falls off precipitously when the equity tranche is held after a default probability of 10 percent is reached (see Figure 1). Once default probabilities are too high, mez-

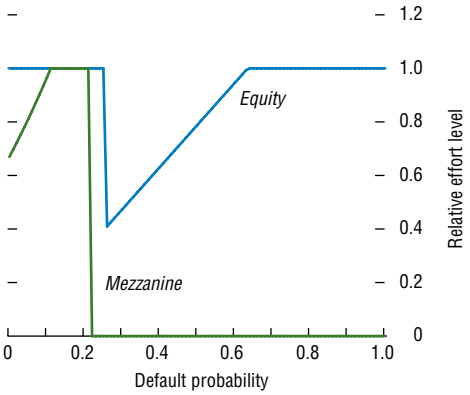
Box 2.7 *(continued)*

Figure 4. Comparison of Optimal Effort Levels: Low-Quality Borrowers and High Odds of Recession



Source: IMF staff estimates.
Note: The figure shows implied effort levels under equity, mezzanine and vertical slice retention compared to the benchmark case of retaining the entire loan portfolio. Calculations are done assuming that chances of entering a recession equal 80 percent and further that only 20 percent of the loans are of high quality and that the thickness of the equity and mezzanine tranche or the vertical slice equals 12 percent.

Figure 5. Comparison of Optimal Effort Levels of Equity and Mezzanine Retention: High-Quality Borrowers and Equal Odds of Recession



Source: IMF staff estimates.
Note: The figure shows implied effort levels under equity and mezzanine retention compared to the benchmark case of retaining the entire loan portfolio. Calculations are done assuming that two out of three loans are of high quality and that the thickness of the equity and mezzanine tranche equals 12 percent. Chances of recessionary and expansiory states are equal.

zanine tranche holders are also likely to receive no payment at all, which again induces zero screening effort when the originator is forced to hold the mezzanine tranche.

Figure 4 combines the previous figures and compares optimal effort levels for retaining a 12 percent equity or mezzanine tranche with a 12 percent vertical slice. In this case, equity retention generates the highest effort level for low default probabilities, whereas mezzanine tranche retention dominates for intermediate default probabilities of around 10 to 15 percent. However, for default probabilities of 15 percent or higher, retaining the 12 percent vertical slice guarantees a higher effort level than those implied by either equity or mezzanine retention.

However, if the previous example is changed by assuming that (1) there is a 50-50 chance of a recession during the evaluation period, i.e., assuming that economic conditions are stable, and (2) two out of three loans are "high-quality," then the implications regarding the optimal retention mechanisms are quite different. In fact, returning to the case of retaining a 12 percent tranche, Figure 5 shows that equity always dominates mezzanine retention.

In summary, as argued in Fender and Mitchell (forthcoming), the choice of retention schemes needed to incentivize more intensive loan screening depends critically on the quality of the loan pool and the economic conditions expected during the life of the securitization. Annex 2.1 and Kiff and Kisser (forthcoming) extend the analysis by explicitly considering the impact of regulatory capital requirements on retention-driven screening effort—yet another element that influences incentives.

As an example, under the Basel II standardized approach, capital charges are calculated for a simple three-tranche structure comprised of a senior tranche rated A- or higher and equal-sized mezzanine and equity tranches. The minimum regulatory capital requirement on the retained tranche(s) is equal to 8 per-

Box 2.7 *(concluded)*

cent of the risk-weighted par value(s). For example, the risk weight on any retained AAA-rated tranche is 20 percent, and 1,250 percent on any tranche rated below BB- (BCBS, 2009). No credit enhancements are considered. The formula below summarizes the calculation of the capital charges:

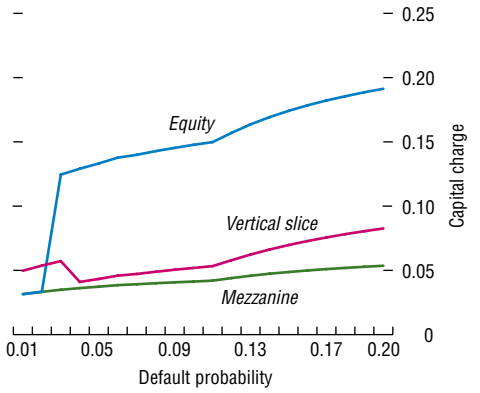
$$\textit{capital charge} = 0.08 \times \textit{risk weight} \times \textit{tranche thickness},$$

where the tranche thickness is the retention amount as a proportion of the total par value.

Figure 6 shows the capital charges over a range of default probabilities associated with retention of the equity or mezzanine tranches, or a vertical slice of the same size.[2] The underlying loan pool is comprised of reasonably high-quality loans (i.e., 60 percent are good) and there is a 50-50 chance of a low state.

Unsurprisingly, in this example, the capital requirements for mezzanine retention are lower than those for equity retention, because the latter almost always draws the maximum risk weight (1,250 percent), whereas the mezzanine tranche usually draws the 100 or 350 percent risk weight associated with BBB and BB rated securitization tranches. The vertical slice retention capital requirements are also higher than those for mezzanine retention, because mezzanine retention incentivizes a higher screening effort that results in higher-rated (lower risk-weighted) mezzanine tranches.[3]

Figure 6. Corresponding Capital Charges for Equity, Mezzanine, and Vertical Slice Retention: High-Quality Borrowers and Equal Odds of Recession



Source: IMF staff estimates.

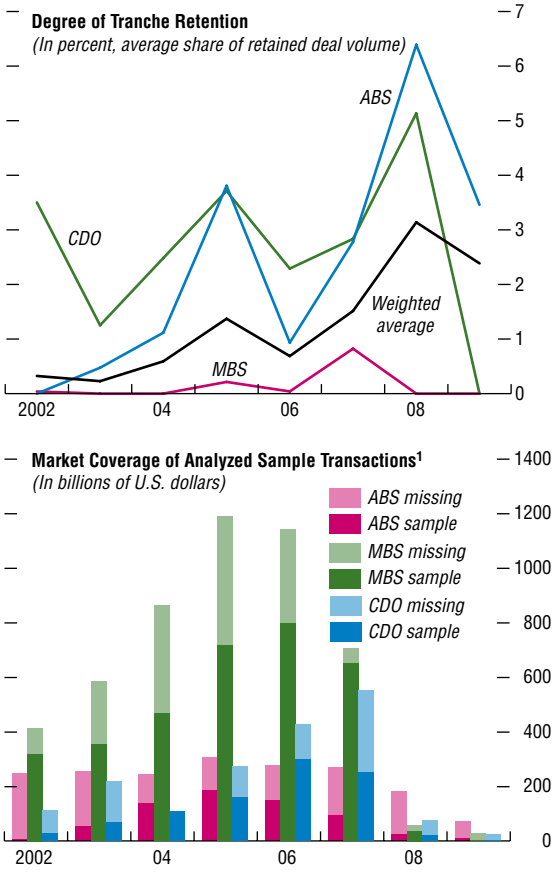
Note: The figure shows capital charges that correspond to optimal retention strategies at particular default probabilities. Calculations assume that chances of entering a recession equal 50 percent and that 60 percent of the loans are of high quality. Capital charges are calculated according to the Standardized Approach following BCBS (2009).

The example thus shows that a better alignment of incentives between investors and the lender by inducing an optimal amount of screening does not necessarily coincide with a commensurate ranking of capital charges. This is due to the fact that the unrated equity tranche draws a risk weight of 1,250 percent, far more than the risk weights on typical mezzanine tranches. The example also suggests that some important feedback effects are missing from this simple model. Extensions of the model could make capital charges part of the effort level optimization calculations. A first step in this direction has been undertaken in Kiff and Kisser (forthcoming). Also, market pricing considerations could be incorporated into the model so that it would reflect the benefit of maximizing the size of the senior tranche. Further details and discussion regarding these potential extensions can be found in Annex 2.1 and in Kiff and Kisser (forthcoming).

[2]For example, at the 5 percent default probability, the three retention scenarios involve retaining a 13 percent equity or mezzanine tranche, or 13 percent of each of the three tranches. The retention amounts depend on the default probability, varying from 11 percent at a 1 percent probability to 19 percent at a 20 percent probability.

[3]In this example, the mezzanine tranche retention requirement incentivized screening effort that resulted in BB rated mezzanine tranches (with a risk weight of 350 percent), whereas the mezzanine tranches were rated below BB- in the vertical slice retention scenario (1,250 percent).

Figure 2.13. U.S. Issuance of Asset-Backed and Mortgage-Backed Securities



Sources: Dealogic; and IMF staff estimates.

Note: ABS = asset-backed security; MBS = mortgage-backed security; CDO = collateralized debt obligation. The data covers a subset of total securitized issues in the United States between 2002 and end-June 2009 whereby transactions with insufficient information in each group (collateral types and securitization category) are eliminated. The subsample excludes all issuance by U.S. government enterprises and issuance related to retention for the purposes of central bank repo operations in 2008 and 2009.

[1]The values correspond to those in Figure 2.2.

transactions with static or substituting reference portfolios, which are most common in loan securitizations (such as ABS on student loans) with fixed balances, show higher degrees of retention than transactions with revolving reference portfolios underlying receivables securitization (such as ABS on auto receivables and credit card receivables). Table 2.2 shows that a 5 percent retention proposal would be binding for most, so careful consideration is needed before an across-the-board requirement is applied.

Additionally, the interplay of retention rates, accounting treatment, and regulatory capital requirements complicates the effectiveness of retention requirements. In principle, tighter accounting standards for consolidation and the movement of OBSEs on balance sheet should promote better management of risk exposures, both explicit and implicit, and achieve the desired alignment of incentives. In practice, tighter rules on consolidation are not seen as having as great an impact on European securitization as they will have in the United States. This is in part because accounting standards are not as tightly woven into European bank regulatory capital requirements as they are in the United States.[23] At the same time, higher risk weights for securitization may make it too costly to retain tranches.

The results of formal modeling suggest that retention that would provide appropriate incentives would result in a complex matrix of rules, which would be difficult to put into operation. On the other hand, it is clear that the decision for regulatory retention requires more in-depth analysis than simply assigning a 5 percent formula. Instead, a quantitative impact study should be conducted, using a variety of economic conditions as well as realistic data on probabilities of default, loss estimates, a variety of types of loans, and so on. From such an analysis, a simpler, second-best retention regime could be recommended that would

[23]Risk-based capital requirements are not as closely tied to accounting in Europe as in the United States (BCBS, forthcoming).

Table 2.2. United States: Issuance of Asset-Backed and Mortgage-Backed Securities—Average Degree of Tranche Retention

(In percent of deal volume)

	ABS	MBS	CDO	Total[1]	ABS-Auto Receivables	ABS-Credit Card Receivables	ABS-Student Loans	CMBS	RMBS
2002	0.0	0.0	3.5	0.3	0.0	0.0	0.0	0.2	0.0
2003	0.5	0.0	1.3	0.2	0.0	0.4	0.0	0.0	0.0
2004	1.1	0.0	2.5	0.6	0.0	0.0	14.3	0.0	0.0
2005	3.8	0.2	3.7	1.4	0.0	0.0	10.2	0.3	0.2
2006	0.9	0.0	2.3	0.7	0.0	0.0	0.0	0.0	0.0
2007	2.8	0.8	2.8	1.5	0.0	0.8	3.6	1.8	0.7
2008	6.4	0.0	5.1	3.1	0.0	0.0	5.3	0.0	0.0
2009	3.5	0.0	0.0	2.4	0.0	1.2	0.0	0.0	0.0

Sources: Dealogic; and IMF staff estimates.

Note: ABS = asset-backed security; CDO = collateralized debt obligation; CMBS = commercial mortage-backed security; MBS = mortgage-backed security; RMBS = residential mortgage-backed security.

[1]Weighted by annual deal volume of ABS, MBS, and CDO.

hold under a variety of conditions. Ultimately, such recommendations should also account for the additional impact of higher capital charges and accounting requirements that might result in an actual retention higher than the regulatory requirement.[24] Authorities should consider other mechanisms that incentivize due diligence and may be able to produce results comparable to a retention requirement, including, perhaps, representations and warranties.

Should the retention scheme, consolidation requirements, or both result in securitized loans remaining on balance sheet, there could be material effects, as the resultant increase in regulatory capital could deter securitization and make it more costly. For example, at a time when banks' capital positions are already under pressure, reconsolidation could be particularly costly for unrated credit card ABSs that draw a 100 percent risk weight (FitchRatings, 2009). Coordination is needed across those responsible for setting accounting standards, capital requirements, and retention schemes to ensure that structuring a securitization promotes greater attention to risk, both explicit and implicit, but does not introduce requirements so burdensome as to eliminate securitization altogether.

[24]Also, although the European and U.S. retention proposals prohibit issuers from hedging their retention-related credit risk exposure, enforcing this prohibition will be challenging.

Covered Bonds Provide Near Perfect Incentive Alignment

An alternative to more risk retention in the securitization context is encouraging covered bond issuance. Covered bonds help redress some of the fundamental incentive problems that contaminated the economic rationale of securitization, because the issuer retains full exposure to the performance of the underlying assets. Also, particularly in the case of "special law" covered bonds (e.g., German *Pfandbriefe* and Spanish *cédulas*), solid prudential standards help limit excessive originator risk-taking and slippage in origination and monitoring standards.

Such standard setting has also been achieved in a securitization context by the mortgage insurance offered by Fannie Mae and Freddie Mac in the United States, and the Canada Mortgage and Housing Corporation in Canada (Kiff, 2009). This layering of strictly enforced underlying asset quality standards on top of issuer credit risk retention makes covered bonds less prone to the effects of dramatic asset quality deterioration. Securitization could benefit from the adoption of such stringent asset quality standards.

Authorities should continue to encourage the use of covered bond markets as a complementary form of capital markets-based funding. However, since covered bonds involve no risk transfer, the prospects for credit and economic growth in a financial economy dominated by

covered bond financing may be less than in an economy in which securitization plays a bigger role. For example, the range of eligible assets is typically quite narrow under most covered bond frameworks.[25] Moreover, the dispersion of credit risk across a diversity of investors will likely be greater with the ability to tranche. Future research could review the evidence in this regard. Also worth exploring is the trade-off between securitization and its potential for fueling higher credit growth (and, seemingly, the associated boom-bust cycles), covered bonds, and the traditional deposit funding of on-balance-sheet assets.

In addition, authorities should balance the encouragement of covered bond markets with the potential impact that they have on bank failure resolution and deposit insurance programs. In any case, potential covered bond investors will require certainty that they not be denied access to the cover pool assets in the event of a bank failure. For example, prior to the August 2009 finalization of its "Covered Bond Policy Statement," the Federal Deposit Insurance Corporation (FDIC) could tie up investor access to cover pool assets when a bank was put into receivership or conservatorship. In this regard, the aforementioned "special law" frameworks ensure that the covered bonds have priority access to the cover pool, although this is not absolutely necessary. For example, in 2008 the FDIC set out policies that ensure predictable performance of covered bonds issued by U.S. banks.[26]

Representations and Warranties Provide Partial Skin in the Game

The securitization industry, led by the ASF, is working on improvements to and standardization of the representations and warranties that, in theory, allow investors in securitization vehicles to return loans that do not meet pre-agreed upon quality standards back to arranger. The current draft of the ASF's standard model representations and warranties includes provisions that cover fraud by any party to the loan origination, the quality of appraisals, and due diligence tests with respect to income, employment, and assets of the borrower. However, the model representations and warranties could be weaker than some other proposed forms of skin in the game because, in reality, the model provisions allow the arranger to negotiate with investors to assert that "to the best of its knowledge" the lender has taken steps to ensure that the quality standards are met and does not require the arranger to scrutinize further. Furthermore, because arrangers and other participants are often playing multiple roles in the ABS market generally, they may be reluctant to trigger a return of the loans.[27]

Along the same lines, "assignee liability" can play a role in incentivizing diligent loan screening. Assignee liability ensures that some entity in the securitization chain remains legally liable for securitized loans that do not meet certain ability-to-pay and "net tangible benefit" standards. Although this is usually seen as a consumer protection mechanism, if it had been in place prior to the crisis, U.S. nonprime lending might have been more prudent. However, it is important that the legal liability be quantifiable at origination and capped at some reasonable level. Otherwise, loan origination would be curtailed, due to a withdrawal of MBS market financing for loans that carry assignee liability, as it was in a failed experiment with uncapped assignee liability in the U.S. state of Georgia in 2002 (Engel and McCoy, 2007).

[25]For instance, *Pfandbriefe* can only be covered by public debt, mortgages, and shipping finance, which, in the absence of viable securitization markets, effectively limits the capital markets access of other important industry sectors such as small and medium-size enterprises.

[26]In addition, the *Equal Treatment of Covered Bonds Act* recently proposed by the U.S. House of Representatives would provide even more certainty as to the treatment of covered bonds upon issuer insolvency.

[27]The analysis of the ASF's model representations and warranties benefited greatly from discussions with Isaac Lustgarten of the IMF's Legal Department.

Conclusions and Policy Recommendations

Restarting private-label securitization markets, especially in the United States, is critical to limiting the fallout from the credit crisis and to the withdrawal of central bank and government interventions. However, policies should not aim to take markets back to their high octane levels of 2005–07, but rather to put them on a solid and sustainable footing. It should also be recognized that the return to a more robust securitization market will not be instantaneous, as it will take time for the new policies to be put in place and become effective, in part because deleveraging will continue for some time. Ongoing regulatory reforms could do much to internalize some of the externalities that result from the misalignment of incentives to securitize. There is still much work to be done in clearing away the legacy assets, and in this regard, public-private sector partnerships such as the TALF and PPIP are helpful. Key policies include the following:

- Authorities should continue to press for the minimization of incentives and rewards for rating shopping and ratings-related regulatory arbitrage, recognizing that credit rating agencies will continue to play a key role in the securitization process. Credit rating agencies should continue to be pushed to disclose methodologies and publish rating performance data to enhance investor due diligence and credit rating agency competition. Authorities should continue to look for ways to reduce or even eliminate regulatory reliance on ratings.
- Proposals for retention requirements should not be imposed uniformly across the board, but tailored to the type of securitization and underlying assets to ensure that those forms of securitization that already benefit from skin in the game and operate well are not weakened. The effects induced by interaction with other regulations will require careful consideration.
- Disclosure and transparency standards should be improved along the intermediation chain, and efforts are well under way. This includes tightening the standards for off-balance-sheet treatment of risk exposures, accounting standards that require more tabular presentations of data, and making transaction performance data more widely available. However, care should be taken to emphasize the materiality of the information and not overburden securitizers and investors by releasing irrelevant information.
- Securitizer compensation should be better linked to the longer-term performance of the securitized assets, and recent changes to accounting standards go a long way toward this goal. Quantity targets for the origination of loans and other compensation incentives to pass risks along the intermediation chain should also be discouraged.
- Securitization products should be simplified and standardized to the extent possible to improve liquidity and reduce valuation challenges. Although industry bodies are usefully working to standardize transaction legal documentation, little interest is seen in taking this to the product structuring level.

This chapter showed that policies designed to put more securitizer skin in the game also risk closing down parts of securitization markets if poorly designed and implemented. In particular, the analysis presented demonstrates that variations in schemes that force securitizers to retain some slices of their securitization products can have dramatic effects on the incentives to improve loan screening, in some cases with the unintended effect of making some types of securitization too costly to execute, effectively shutting down these markets. Furthermore, the interaction of these schemes with changes to accounting standards and regulatory capital requirements should be carefully considered. Before implementing such schemes, authorities should conduct impact studies to ensure that they fully understand the potential effects of all the regulations in their totality.

Both securitization and covered bond markets can provide the financial system with cost-effective, capital-markets-based funding. However, securitization has the added benefit that it can be used to disperse credit risk outside the banking sector to investors most willing and able to manage it. Securitization that involves tranching has the added advantage of allowing risks to be more closely matched to investor desires, and should result in more credit growth, depending on the amount of retained risk and capital requirements. The key to using these markets successfully is to ensure that market participants and authorities have the knowledge, resources, and information to price and manage the risks accurately. Only then will the real benefits be attainable.

Annex 2.1. Optimal Retention Policy and Capital Requirements[28]

The analysis in Box 2.7 is based on a model by Fender and Mitchell (forthcoming) as well as Kiff and Kisser (forthcoming), who extend their approach. In the baseline model, an originating institution, which subsequently will be referred to as the securitizer, can extend loans to individual borrowers and then choose to securitize the portfolio and sell different tranches to outside investors. The securitizer and the investors are assumed to be risk-neutral and the risk-free rate is set to zero. There are two types of loans, which differ in their quality. The total amount of loans is normalized to one and it is assumed that a performing loan returns $R > 1$, whereas there is zero recovery if the loan defaults. The model further specifies an exogenous probability θ of making a high-quality loan, which can be increased to $(\theta + e)$ by exerting screening effort e. Denoting the probability of making a good- and bad-quality loan by $\alpha_G(e)$ and $\alpha_B(e)$, it follows that $\alpha_G(e) = \max[\theta + e,1]$ and $\alpha_B(e) = \min[1 - \theta - e,0]$. Screening loans is costly, which is captured by the convex cost function $c(e)$.[29]

The model follows Chiesa (2008) by introducing a systemic risk component. Specifically, it is assumed that the economy can take on two different states of nature; "high" and "low" states with probabilities p_H and p_L, respectively. Default probabilities of individual loans are contingent on the state of the economy. The model assumes that low-quality loans always default in the downturn and high-quality loans never default in the upturn.

It is further assumed that at the time when the loans are extended, the securitizer has already decided if and in what form the loan portfolio will be securitized. Effort level is chosen accordingly and then different tranches of the portfolio are sold to outside investors. Specifically, the model compares total expected profit (π) under vertical slice (v), equity (E) or mezzanine (M) tranche retention by solving the following maximization problems:

$$\max \pi_v(e) = \Omega S_v + Rv\,[p_L \Delta_L \alpha_G(e) + p_H(1 - (1 - \alpha_G(e))\Delta_H)] - c(e) - 1$$

$$\max \pi_E(e) = \Omega S_E + p_L \max\{\Delta_L R\alpha_G(e) - B_1,0\} + p_H \max\{R(1 - (1 - \alpha_G(e))\Delta_H) - B_1,0\} - c(e) - 1$$

$$\max \pi_M(e) = \Omega S_M + p_L \min\{\max\{\Delta_L R\alpha_G(e) - B_2,0\}, B_M\} + p_H \min\{\max\{R(1 - (1 - \alpha_G(e))\Delta_H) - B_2,0\}, B_M\} - c(e) - 1,$$

where ΩS captures the upfront payment that outside investors are willing to pay for the exposure to the loan portfolio under the different retention mechanisms, where S is the cash proceeds at issuance, and Ω reflects institution- and instrument-specific securitization benefits to the issuer. B_1 is the promised payment to both mezzanine and senior tranche holders and B_M is the promised payment to mezzanine tranche hold-

[28]This annex was prepared by Michael Kisser and John Kiff.

[29]Box 2.7 assumes that the specific functional form of the cost function is given by $e^2/2$.

ers. Finally, the added benefits from screening in the low and high states are given by $\Delta_L = 1 - PD_L$ and $\Delta_H = PD_H$, where PD_L is the probability of a high-quality loan defaulting in a downturn, and PD_H is the probability of a low-quality loan defaulting in an upturn.

Box 2.7 analyzes the implied effort level under the different retention schemes by comparing different scenarios, finding that vertical slice retention can actually dominate mezzanine and equity retention even when the vertical slice is small.

As a last step, the box derives implied capital charges by relating the optimal retention amounts to capital requirements following the standardized Basel II approach. Having calculated optimal effort levels for the different maximization problems, the next step specifically involves calculating the probability of default of the entire portfolio, assuming the three possible retention mechanisms. This is done by evaluating

$$TPD_i = \alpha_B(e_i^*)[p_L + PD_H p_H] + \alpha_G(e_i^*)PD_L p_L ,$$

where i denotes the equity, mezzanine, and vertical slice retention schemes.

Assuming a 100 percent loss-given-default, the Moody's binomial extension technique (BET) is applied to the calculated default probability to generate a loss distribution for a portfolio of 1,000 equal-sized loans.[30] The loss distribution is then applied to the Box 2.7 three-tranche example based on this portfolio and assuming a 10-year term to maturity to calculate expected losses for each tranche. These expected losses are then used to back out credit ratings based on the Moody's idealized expected loss tables (Table 2.3).[31]

[30]See Fender and Kiff (2005) for implementation details. Although more accurate loss distributions can be calculated with Monte Carlo methods, the binomial expansion technique is a sufficient approximation for this purpose.

[31]Alternatively, ratings could have been implied from the default probabilities, which is the way that DBRS, Fitch, and S&P derive their ratings (Fender and Kiff, 2005).

Table 2.3. Credit Ratings versus Idealized Expected Losses and Basel II Risk Weights
(In percent)

Credit Rating	Maximum Expected Loss for Each Rating Level	Risk Weight
AAA	0.0055	20
AA+	0.0550	
AA	0.1100	
AA–	0.2200	
A+	0.3850	50
A	0.6600	
A–	0.9900	
BBB+	1.4300	100
BBB	1.9800	
BBB–	3.3550	
BB+	5.1700	350
BB	7.4250	
BB–	9.7130	
B+ and lower	≥ 12.2100	1,250

Sources: Yoshizawa (2003) for the idealized expected losses and BCBS (2009) for the risk weights.

The capital charge calculation example in Box 2.7 assumes that the exogenous probability of making a good loan (θ) is 60 percent and the probability of the low state (p_L) is 50 percent. In order to show the details of the capital charge calculation, assume that the probability of a good loan defaulting in a low state (PD_L) and a bad loan defaulting in a high state (PD_H) are always identical. Hence, if these default probabilities are 5 percent, an effort level (e) of 20 percent will imply that the probability of making a good loan ($\alpha_G(e)$) increases from 60 to 80 percent, and a total probability of default (TPD) of 12.5 percent.

If the loan defaults in this portfolio were uncorrelated, at this point the tranche-by-tranche expected loss calculations could be done with a huge spreadsheet comprised of (in this case) 1,000 binomial probabilities. However, the systematic risk factor (represented by p_L in this case) implies that the loan defaults will indeed be correlated, and the BET is used to produce reasonably accurate approximations of the true loss probability distributions under these conditions.

In this case, by assuming that the pairwise default correlations between the 1,000 loans are all equal to 10 percent, the actual portfolio can be replaced by a simpler portfolio of just

Table 2.4. Calculation of Tranche Sizes (Steps 1 and 2) with Assumed 20 Percent Effort Level

Defaults	Probability (%) (1)	Dollar Losses			
		Total ($)	Equity ($) (2)	Mezzanine ($) (3)	Senior ($) (4)
0	26.31	0	0	0	0
1	37.58	100	100	0	0
2	24.16	200	133.20	66.80	0
3	9.20	300	133.20	133.20	33.60
4	2.30	400	133.20	133.20	133.60
5	0.39	500	133.20	133.20	233.60
6	0.05	600	133.20	133.20	333.60
7	0.00	700	133.20	133.20	433.60
8	0.00	800	133.20	133.20	533.60
9	0.00	900	133.20	133.20	633.60
10	0.00	1,000	133.20	133.20	733.60
Expected loss ($)		125	85.68	32.06	7.26
Tranche size		1,000	133.20	133.20	733.60
Expected loss/tranche size (%)		12.50	64.3254	24.0668	0.9900
Credit rating			No rating	B-to CCC	A–
Risk weight (%)			1,250	1,250	50

Source: IMF staff estimates.
Note: (1) Probability of n defaults = $(10!/(n!(10-n)!)\text{TPD}^n(1-\text{TPD})^{10-n}$
(2) Loss(equity) = min{Total Loss, Size(equity)}
(3) Loss(mezzanine) = min{Total Loss-Loss(equity), Size(mezzanine)}
(4) Loss(senior) = Total Loss-Loss(equity)–Loss (mezzanine)

10 homogeneous uncorrelated loans.[32] The mechanics of the calculation for this example (p_L = 50 percent, θ = 60 percent, e = 20 percent, and $PD_L = PD_H$ = 5 percent) are illustrated in Table 2.4.

The first step in the calculation process was to determine the senior tranche size that would result in the expected loss for this tranche such that an A- rating is obtained according to Table 2.3 (0.99 percent). This turns out to be $733.60 of the assumed $1,000 portfolio, which implies a size for both of the equal-sized equity and mezzanine tranches of $133.20. (The equity and mezzanine tranches are equal by assumption.)

This scenario puts the risk weights of the three tranches at 1,250, 1,250 and 50 percent, respectively, for the equity, mezzanine, and senior tranches. However, this first iteration assumed a 20 percent screening effort level, whereas the optimal effort level will vary according to the retention scheme (equity, mezzanine, or vertical slice) and size.

At the 5 percent default probability level the optimal absolute effort levels are 40 percent (equity retention), 31.2 percent (mezzanine), and 7 percent (vertical slice), and these effort levels were fed back into the rating/risk weight calculations of Table 2.5 to produce the total capital charges plotted in Figure 6 in Box 2.7.[33]

[32]The details of all of these calculations and the more accurate Monte Carlo simulation methodologies can be found in Fender and Kiff (2005). The pairwise default correlations used here measure the likelihood of two credits defaulting simultaneously. More specifically, the default correlation between two credits (A and B) is

$$\text{Corr}(A,B) = \text{Prob}(A \wedge B)\text{Prob}(A)\text{Prob}(B)/(\text{StDev}(A)\text{StDev}(B),$$

where $\text{Prob}(x)$ is the probability of credit x defaulting, $\text{Prob}(x \wedge y)$ is the probability of credits x and y simultaneously defaulting, and $\text{StDev}(x)$ is the standard deviation of the credit x default event:

$$\text{StDev}(x) = [\text{Prob}(x)(1 - \text{Prob}(x)]^{1/2}.$$

[33]The point of step one was to calculate the tranche sizes so that the senior tranche would be A- rated and the equity and mezzanine tranches were equal sized, given an assumed 20 percent effort level. The point of step four is to calculate the credit ratings of the three tranches given the new effort levels.

Table 2.5. Calculation of Ratings and Risk Weights (Step 3) with 31.2 Percent Effort Level: Mezzanine Tranch Retention

Defaults	Probability (%) (1)	Dollar Losses			
		Total ($)	Equity ($) (2)	Mezzanine ($) (3)	Senior ($) (4)
0	48.92	0	0	0	0
1	36.26	100	100	0	0
2	12.09	200	133.20	66.80	0
3	2.39	300	133.20	133.20	33.60
4	0.31	400	133.20	133.20	133.60
5	0.03	500	133.20	133.20	233.60
6	0.00	600	133.20	133.20	333.60
7	0.00	700	133.20	133.20	433.60
8	0.00	800	133.20	133.20	533.60
9	0.00	900	133.20	133.20	633.60
10	0.00	1,000	133.20	133.20	733.60
Expected loss ($)		69.00	56.00	11.71	1.29
Tranche size		1,000	133.20	133.20	733.60
Expected loss/tranche size (%)		6.90	42.0420	8.7937	0.1755
Credit rating			No rating	BB	AA
Risk weight (%)			1,250	350	20

Source: IMF staff estimates.
Note: (1) Probability of n defaults = $(10!/(n!(10-n)!)TPD^n(1-TPD)10-n$
(2) Loss(equity) = min{Total Loss, Size(equity)}
(3) Loss(mezzanine) = min{Total Loss-Loss(equity), Size(mezzanine)}
(4) Loss(senior) = Total Loss-Loss(equity)–Loss (mezzanine)

For example, the 31.2 percent effort level associated with mezzanine tranche retention decreases the TPD to 6.9 percent, which, as shown in Table 2.5, reduces the senior tranche expected loss to 0.1755 percent (AA rating) and the mezzanine tranche to 8.7937 percent (BB). On the other hand, the 7 percent effort level associated with vertical slice retention would increase the TPD to 19 percent, which increases the senior tranche expected loss to 3.1939 percent (BBB) (not shown).

The last step involves mapping the revised credit ratings and risk weights into the corresponding capital charges (*CC*) using the formula below:

$$CC = 0.08 \sum [t_{equity} RW_{equity} + t_{mezz} RW_{mezz} + t_{senior} RW_{senior}],$$

where the *t*s are the relevant retained tranche sizes or "thicknesses." Table 2.5 shows, for example, that the mezzanine tranche retention scenario results in a risk weight of 20 percent on the $733.60 senior tranche, 350 percent on the $133.20 mezzanine tranche, and 1,250 percent on the $133.20 equity tranche. However, only the mezzanine risk weight is relevant in this case, so the retained tranche capital charge will be $37.30 (0.08 x $133.20 x 350 percent).

This is where the Box 2.7 analysis stops, and where Kiff and Kisser (forthcoming) continue on with various extensions. Specifically, the upfront payment is endogenized and capital costs introduced into the analysis.

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CHAPTER 3

MARKET INTERVENTIONS DURING THE FINANCIAL CRISIS: HOW EFFECTIVE AND HOW TO DISENGAGE?

This chapter assesses the short-term effectiveness of the unprecedented market interventions announced and undertaken by the authorities of major advanced economies during the current financial crisis toward achieving the twin objectives of calming stressed markets and regaining financial stability. An initial, preliminary examination of the longer-term impact of these interventions on their intended target markets is also presented. The chapter lastly discusses disengagement from these crisis interventions by touching upon issues of timing, sequencing, and market distortion.

Increasing pressures on the financial system have prompted wide-ranging central bank and government interventions. While the ultimate goal of these interventions has been to help normalize credit conditions and thereby the resumption of sustainable economic growth, their immediate aim was to restore confidence in the financial system by focusing on three broad objectives: (1) contain and reverse the stress in financial markets through liquidity provision and funding guarantees; (2) cleanse banks' balance sheets of impaired assets; and (3) recapitalize and restructure viable but undercapitalized financial institutions and resolve nonviable ones.

To reach these objectives, the authorities have explored a multiplicity of policy measures. These include (1) unprecedented amounts of liquidity injections, accessible to a broadened set of counterparties; (2) credit easing through purchases of credit instruments (such as commercial paper and corporate bonds) or taking them as collateral for nonrecourse liquidity provision; (3) guaranteeing bank liabilities; (4) injecting capital into financial institutions; and (5) in some cases, introducing schemes to relieve banks of their impaired assets.

Given the fiscal costs that these market interventions entail and the distortions they potentially create in financial intermediation, it is important to assess their effectiveness in achieving their short-term goal of calming financial markets. Although policymakers are now focused on the effectiveness of their interventions over the longer term, it is clearly too early to assess this impact concretely, as more time and observations are needed for a comprehensive analysis. However, given the multiplicity of issues to be considered in assessing the effectiveness of crisis resolution, there are several aspects one can usefully evaluate in the interim.

This chapter first assesses effectiveness in terms of its impact on normalizing market conditions in the short term. This assessment is performed by conducting a number of event studies that measure the effect of the announcements of market interventions by the authorities on different financial stress indicators. The study is limited to 13 advanced economies over a two-year period (June 2007 to June 2009), but covers 153 identifiable events.

The conclusions from the empirical work are only indicative of short-term responses, given

Note: This chapter was prepared by a team led by L. Effie Psalida, comprising Wouter Elsenburg, Andy Jobst, Kazuhiro Masaki, and Sylwia Nowak, with research support from Oksana Khadarina. Data contribution for the event study from the database of Aït-Sahalia and others (2009) is gratefully acknowledged.

the nature of event studies. The results indicate that in an environment of high market uncertainty and counterparty risks, such as that in the early phase of the crisis when solvency concerns were still nebulous, liquidity support announcements were the most promising. Announcements of recapitalization and, to a lesser extent, asset purchases were most effective in the later stages of the crisis as these measures helped alleviate credit risk.

The chapter also examines longer-term effectiveness by looking at volumes of issuance and general price movements of the financial instruments that the authorities have attempted to influence. While tying the specific policy interventions to longer-term effectiveness is very difficult due to intervening events and other confounding factors, the initial conclusions are that some market prices appear to be stabilizing and issuance is picking up. The chapter then summarizes Japan's experience during the latter part of its "lost decade" and draws parallels to the current crisis.

Knowing what was effective when crisis policies were introduced may not necessarily provide guidance about unwinding these policies. In principle, however, if a measure is ineffective (in the short or long term) one might want to exit sooner than if it has worked upon entry. Other factors in assessing the effectiveness and cost of interventions are the ease with which they can be reversed or removed and the degree of distortion their ongoing use creates.

The chapter concludes with a summary of the key results and policy takeaways.

Interventions during the Crisis—Market Reaction to Announcements

In response to the severe disruption in financial markets, the authorities introduced a host of policy measures to unfreeze markets and restore confidence in the financial system. Figure 3.1 shows the cumulative set of interventions for the two years spanning the duration of the crisis for a sample of major advanced economies, indicating the acceleration of announced measures immediately following the Lehman Brothers collapse on September 14, 2008. Given the importance at the height of the turmoil to urgently restore market confidence and prevent the collapse of the financial system in the near future, this section examines the short-term effectiveness of intervention announcements during the crisis. Specifically, this section analyzes the effectiveness of central bank and government intervention announcements on institutions and markets in stabilizing the market by utilizing a set of event studies drawing in part on Aït-Sahalia and others (2009).[1]

The event study analysis concentrates on the immediate reaction of financial markets to crisis policy announcements. This methodology is well established, especially in the finance literature,[2] and is well suited to the statistical examination of a repeated set of actions. It focuses on announcement effects for a short period around an event, thus providing reliable and relevant evidence for understanding the impact of different policy interventions on financial market indicators. In this context, a policy is effective if, following the announcement, we observe a short-term positive market response

[1]Regarding similar research on the assessment of crisis measures and specific effects of central bank interventions on interbank and derivatives markets, see Artuç and Demiralp (forthcoming); Baba and Packer (2009); Cihák, Harjes, and Stavrev (forthcoming); Deutsche Bank (2009); Meier (2009); Panetta and others (2009); and Taylor and Williams (2009).

[2]See Campbell, Lo, and McKinlay (1997) for a discussion of event studies. Kothari and Warner (2007) report that more than 500 event studies have been published since the 1970s. The event study is particularly suitable for the current setting, which allows us to define abnormal response as any permanent deviation from the recent past. Since all interventions in a particular country are tested on one country-specific market indicator at a time before the results are aggregated, we avoid common correlation problems if similar events are tested across different market indicators simultaneously. Any contamination effects of overlapping time windows are eliminated by the exclusion of clustered policy announcements (which, however, does not remove possible dependence of market responses to repeated policy measures). In addition, some events are excluded if they are too close to another large event that dominates in terms of economic magnitude.

that constitutes a break point in a downward spiral of declining financial stability and investor confidence.

The study covers the period from the inception of the financial crisis in the summer of 2007 to the end of June 2009 and is separated into three subsamples: (1) the *pre-Lehman period* from June 1, 2007 to September 14, 2008, which is characterized by a series of predominantly central bank measures with a relatively narrow focus on arresting the downward spiral of counterparty confidence and unfreezing interbank markets; (2) *global crisis 1* from September 15, 2008 to December 31, 2008, which witnessed the most frequent and diverse types of policy intervention announcements by both central banks and governments in an environment of heightened urgency, when a clearer link was made between the financial crisis and a severe economic downturn; and (3) *global crisis 2* from January 1, 2009 to June 30, 2009, which continued with diverse but lower-frequency interventions, while witnessing the first signs of bottoming out.

The splitting of the period helps establish a consistent identification of effectiveness at different points in time, given the differential volatility of markets across the periods.[3] Since the market response presumably hinges on the perceived timeliness and adequacy of announced measures contingent on the credibility of their sponsor, the examination of effectiveness is complicated by time-varying market perception of the underlying problem and the ability of public intervention to address it.

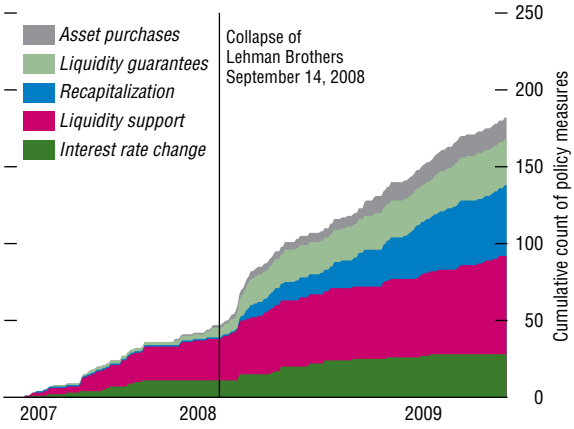
Event Database Construction

For the purpose of our analysis we classify policy events into five broad categories. Central bank actions are divided into (1) interest rate changes and (2) liquidity support, while government actions are divided into (1) recapitalization, (2) liability guarantees, including decisions

[3]Moreover, the tests for differences of means of the indicators of financial stress used in this study indicate significant differences between the subperiods.

Figure 3.1. Time Pattern of Crisis Measures in Sample Countries

(June 1, 2007–June 30, 2009; only front-page policy events)



Sources: National sources; and IMF staff estimates.

Note: Euro area sample countries, Japan, Sweden, Switzerland, United Kingdom, and United States. This figure adds up the total number of policy measures introduced over time; it disregards the scale of each intervention, in both relative and absolute terms.

Table 3.1. Classification of Events

Central Bank—Monetary Policy and Liquidity Support	
Interest rate change	Reduction of interest rates
Liquidity support	Reserve requirements, longer funding terms, more auctions and/or higher credit lines
	Domestic system lender of last resort: broader set of eligible institutions, wider collateral rules, and/or eligible collateral
	Other liquidity support (e.g., support of money market funds)
	Foreign exchange lender of last resort: forex swap lines (with other central banks) and forex repos
Government—Financial Sector Stabilization Measures	
Recapitalization	Capital injection (common stock/preferred equity)
	Capital injection (subordinated debt)
Liability guarantees[1]	Enhancement of depositor protection
	Debt guarantee (all liabilities)
	Debt guarantee (new liabilities)
	Government lending to an individual institution
Asset purchases[2]	Asset purchases (individual assets, bank by bank)
	Asset purchases (individual "bad bank")
	Provisions of liquidity in context of bad asset purchases/removal
	On-balance-sheet "ring-fencing" with toxic assets kept in the bank
	Off-balance-sheet "ring-fencing" with toxic assets moved to a "bad bank"
	Asset guarantees

Source: IMF staff estimates.

[1]Includes the Federal Reserve's liquidity support to AIG for toxic asset removal to a special-purpose vehicle, coupled with government's loss sharing.

[2]Includes business loan guarantees as part of financial sector stabilization measures (e.g., the United Kingdom, Germany); for some countries, asset purchases were not conducted by the government, but (also) by the central bank (or a central bank-sponsored) agent, such as in the case of the United States and Switzerland.

to expand depositor protection schemes, and (3) asset purchases and guarantees. (Table 3.1 classifies the interventions in greater detail.)[4]

The database contains the official announcement of significant crisis-related policy measures by the following 13 countries: Austria, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, Spain, Switzerland, Sweden, the United Kingdom, and the United States. The measures that are recorded as events include central bank interventions and government actions. In contrast to other compilations of crisis policies, our event study dataset exclusively contains actual announcements, dated as of their publication in official press releases, major newspapers, and news search engines.[5]

Since the analysis is predicated on the determination of the immediate market impact of significant policy decisions, announcements are screened as to the prominence of their media coverage and concentrate on the "front page" news events during the past two years.[6] It is

[4]Quantitative and credit easing were included in the interventions examined in an early version of the study. These have been dropped due to the very limited number of observations in the sample and because these measures do not directly address the stability of the financial sector.

[5]See also IMF (2009a). The degree of financial stress experienced during the crisis varies considerably across countries. In particular, stress in Japan has been less acute than in other sample countries primarily due to a lower exposure to subprime-related assets. In this analysis, however, the same analytical framework is used for all 13 countries for the sake of cross-country comparison and to be able to identify statistical significance.

[6]In the United Kingdom and the United States these are defined as events that appeared on the front page of the *Financial Times* or the *Wall Street Journal* during a window of four working days around the date of the

assumed that events that contain multiple types of measures, the largest and most significant measure, representing a "driving force" for financial markets, would receive prominent news coverage. Table 3.2 reports the number of crisis interventions included in the study by country and by crisis subperiod.

In the event study, we test whether the announcements about a given type of intervention have a statistically significant impact on the following financial indicators: two index measures of stress—the Financial Stress Index (FSI) and the Economic Stress Index (ESI), constructed to broadly measure these stresses—the three-month LIBOR-OIS spread,[7] and a composite index of the credit default swap (CDS) spread of the respective national banks. The event study is performed in two stages. The first stage tests the effectiveness of various interventions on measures that proxy policy objectives, as described below.

The impact of monetary easing via interest rate cuts is measured by its effect on the ESI. This index tracks the broad economic stress by integrating (1) forward-looking measures of business activity, approximated by the consumer and business confidence indices; and (2) forward-looking indicators of nonfinancial firms' health, approximated by equity prices of nonfinancial companies and corporate credit spreads. (Annex 3.1 provides details on the construction of the ESI and the FSI.)

The impact of liquidity provisions is measured by its effect on the respective three-month LIBOR-OIS spread in the country of interest, which is used as a proxy for the liquidity risk premium.[8]

Table 3.2. Number of Interventions

Country	Pre-Lehman	Global Crisis 1	Global Crisis 2
Euro area	13	19	17
Japan	0	4	3
Sweden	1	11	10
Switzerland	1	5	2
United Kingdom	7	6	5
United States	18	18	13
Total	**40**	**63**	**50**

Sources: National sources; and IMF staff estimates.
Note: Only announcements of crisis policy measures that passed the "front page criterion" of sufficient news coverage have been considered. Any announcements of subsequent changes or revisions to policy measure are not included.

The impact of financial sector policies, which include recapitalization, liability guarantees, and asset purchases and guarantees, is measured by their effect on the CDS spread of the respective national banks, which is used as a proxy for the credit risk premium.

In the second stage, the more general impact of policy events on the financial stress index is tested. The financial stress index is a composite measure of the relative stress in the domestic banking and credit sector that integrates the cumulative effect of (1) liquidity and credit risk (approximated by the LIBOR-OIS spread and the CDS spread); (2) expected profits/losses (approximated by banks' equity prices); (3) the level of bank capital; and (4) lending condi-

official announcement. Thus, we also acknowledge that the intensity of news reporting may contribute to market perception as much as policy measures eliciting strong market movements that became front page news. For continental Europe and Japan, we broaden our screen of news sources to include all major national newspapers and test the robustness of our selection criterion by testing the consistency of eliminated observations for each sample subperiod and type of policy measure.

[7]LIBOR is the London Interbank Offered Rate; OIS is the overnight index swap rate.

[8]The LIBOR contains at least four identifiable components: the expected overnight risk-free interest rate, the term premium, the credit risk premium, and the liquidity risk premium (McAndrews, Sarkar, and Wang, 2008; IMF, 2008b). As the OIS contains little counterparty risk (McAndrews, Sarkar, and Wang, 2008), the LIBOR-OIS spread measures mainly the credit and liquidity risk premia in the interbank market, as confirmed in IMF (2008b), except for the pound sterling LIBOR-OIS spread, where the forex swap spread is also an important component. Further, McCormick (2007) interprets the LIBOR-OIS spread as the best way to measure the effectiveness of the coordinated action by international central banks to increase the willingness among banks to lend.

tions measured by the credit standards applied by banks.[9]

To measure the impact of each type of intervention announcement, we examine the *abnormal changes* of the selected stress indicator over a short period of time before and after each policy announcement—the *event window*. In this study, the event window covers one day prior to the announcement, the day of the announcement, and three days after the announcement. The abnormal changes are computed as a difference between the expected daily change of the market indicator and its actual daily change,[10] under an assumption that no other factors moved the stress indicators in the short run. We then aggregate these day-to-day changes through time to construct cumulative abnormal differences for the event window. These differences are averaged across the same type of policy measure to calculate *average cumulative abnormal differences* for each country during each of the three identified crisis periods.[11] This allows us to statistically test whether the given *type* of intervention announcement has a systematic, significant effect on the stress indicator under consideration. The tests employed in this chapter are parametric and nonparametric tests of means before and after the announcements. Tables 3.3 and 3.4 report the results for the two sets of tests. These results need to be interpreted with caution given the limitations of an event study, as discussed at the end of this section.

Summary of Findings of the Event Study

Table 3.3 summarizes the effectiveness of interventions on the different stress indicators as noted above.

Interest Rate Cuts—Effect on the Economic Stress Index

Most central banks reduced policy rates in all three subperiods of the crisis. However, only on a few occasions did this lead to a statistically significant reduction in the ESI. This is not surprising, since the effect of these cuts on the economic outlook, which has a longer horizon, is likely to be overshadowed by the more immediate negative effect of the financial crisis. In addition, these actions were to a large extent anticipated by market participants, implying that their effect was already taken into account before the actual cut took place. In general, however, lower policy rates contributed to lowering the funding cost to financial institutions of attracting additional liquidity.

Liquidity Support—Effect on the LIBOR-OIS Swap Spread

The results show the importance of liquidity support in the first period of the crisis (pre-Lehman). Even though most countries announced liquidity support measures during all three sample subperiods, the announcement of such measures is statistically significant primarily during the first subperiod. This response showed the need for additional liquidity when concern

[9]A caveat applies to event study results based on the stress indices. The indices consist of daily and monthly data series, in which the lower frequency monthly series are converted into daily/weekly series by interpolating between the available data points. Including interpolated monthly data could be viewed as expanding the event window. In late 2008, with a series of large shocks as well as policy announcements from various major countries clustered, estimation with a larger implied window is likely to be contaminated by other events.

[10]We refer to the daily change of the LIBOR-OIS spread during the crisis period as abnormal, since the average precrisis change in this spread was close to zero, leading to a noncrisis expectation of positive and negative spread changes cancelling each other out (i.e., level stationarity of mean-reverting spreads). This definition of abnormality implies a random walk process of the LIBOR-OIS spread with a diffusion commensurate to the length of the crisis time period under consideration. For the CDS spreads and the stress indices, the assumption of a random walk since the onset of the financial crisis in the summer of 2007 does not apply, so the expected daily change of the market indicator is subtracted from the actual daily change on each day of the event window in order to obtain abnormal differences (see Annex 3.2).

[11]For the euro area, CDS spreads, the ESI, and the FSI are country-specific. Country-specific variables are used alongside the euro LIBOR-OIS spread to test the impact of domestic interventions as well as the European Central Bank's interventions. We then average the results over all euro area countries.

Table 3.3. Effectiveness of Crisis Interventions

	Monetary Policy		Financial Sector Policy		
	Interest rate cuts	Liquidity support	Recapitalization	Liability guarantees	Asset purchases
Index/Indicator	Economic Stress Index	LIBOR-OIS spread	Bank credit default swap spread		
Country	Event window (–1/+3 days)				
	Period 1: Pre-Lehman (06/01/07 to 09/14/08)				
Euro area	–	x	x	x	x
Japan	–	–	–	–	–
Sweden	–	x	x	x	–
Switzerland	–	x	–	–	–
United Kingdom	x	x	–	x	–
United States	x	x	–	x	x
	Period 2: Global Crisis 1 (09/15/08 to 12/31/08)				
Euro area	x	x	x	x	x
Japan	x	x	x	–	–
Sweden	–	x	–	x	–
Switzerland	x	x	x	x	x
United Kingdom	x	x	x	–	–
United States	x	x	x	x	x
	Period 3: Global Crisis 2 (01/01/09 to 06/30/09)				
Euro area	x	x	x	x	x
Japan	–	x	x	–	–
Sweden	–	x	–	–	–
Switzerland	x	x	–	–	x
United Kingdom	x	–	x	–	x
United States	x	x	x	x	x

Source: IMF staff estimates.

Note: Shading denotes a statistically significant intervention at the 10 percent level. The statistical significance of the short-term impact of intervention announcements is tested as follows: (1) interest rate cuts on the economic stress index; (2) liquidity support on the three-month LIBOR-overnight index swap (OIS) spread; and (3-5) financial sector interventions on credit default swap spreads of local banks, weighted by the size of total assets. Only the front page policy announcements have been considered. An unshaded "x" denotes statistically insignificant interventions and a "–" denotes that there were fewer than two front page policy events during the given subperiod. Statistical significance is attributed to policy measures only if both the parametric and the nonparametric tests concur (see Annex 3.2).

about counterparty credit risk meant banks were unwilling to lend in the interbank market.

As the crisis worsened, the announcement of liquidity support measures no longer had a direct impact on interest rate spreads. The knowledge by the markets that central banks would step in to provide the needed liquidity translated into a nonsignificant announcement value. This does not necessarily mean that liquidity measures were less effective, but rather that they may have been anticipated.[12] Moreover, by this time, solvency concerns had come to the fore. The event study results indicate that the effectiveness of liquidity injections diminished in the later stages of the crisis consistent with the notion that credit risk, rather than liquidity risk, became the main concern.

[12]One can test for the difference in effectiveness between surprises and anticipated events in those announcements of monetary interventions for which market expectations are publicly available. Aït-Sahalia and others (2009) find that policy surprises during the crisis have some positive yet statistically insignificant impact on the market perception of counterparty risk.

Table 3.4. Effectiveness of Crisis Interventions on the Financial Stress Index

	Monetary Policy		Financial Sector Policy		
	Interest rate cuts	Liquidity support	Recapitalization	Liability guarantees	Asset purchases
Country	Event window (–1/+3 days)				
	Period 1: Pre-Lehman (06/01/07 to 09/14/08)				
Euro area	–	x	x	x	x
Japan	–	–	–	–	–
Sweden	–	x	x	x	–
Switzerland	–	x	–	–	–
United Kingdom	x	x	–	x	–
United States	x	x	–	x	x
	Period 2: Global Crisis 1 (09/15/08 to 12/31/08)				
Euro area	x	x	x	x	x
Japan	x	x	x	–	–
Sweden	–	x	–	x	–
Switzerland	x	x	x	x	x
United Kingdom	x	x	x	–	–
United States	x	x	x	x	x
	Period 3: Global Crisis 2 (01/01/09 to 06/30/09)				
Euro area	x	x	x	x	x
Sweden	–	x	–	–	–
Switzerland	x	x	–	–	x
Japan	–	x	x	–	–
United Kingdom	x	–	x	–	x
United States	x	x	x	x	x

Source: IMF staff estimates.

Note: Shading denotes a statistically significant intervention at the 10 percent level. The statistical significance of the short-term impact of intervention announcements is tested on the financial stress index. Only the front page policy announcements have been considered. An unshaded "x" denotes statistically insignificant interventions and a "– " denotes that there were fewer than two front page policy events during the given subperiod. Statistical significance is attributed to policy measures only if both the parametric and the nonparametric tests concur (see Annex 3.2).

Financial Sector Policy—Effect on the Composite Credit Default Swap Spread

In almost all cases, where there were enough events, announcements of capital injections have a significant impact on the average composite CDS spread, indicating that they were effective in reducing credit risk, although most of these events occurred during the second and third stage of the crisis. Announcements of liability guarantees reduced credit risk significantly in some cases (euro area and the United Kingdom), but not in the United States, perhaps because liability guarantees secure only a subset of creditors and not the bank as a whole. Wholesale funding guarantees are primarily aimed at restoring long-term funding markets, thereby targeting credit risk only indirectly. Regarding the increase in retail deposit protection schemes, the effectiveness of this measure is related to bank runs, which is hard to measure with an indicator of credit risk.

Table 3.3 shows that announcements of asset purchases or guarantees led to a statistically significant reduction in a country's average bank CDS spread in only two cases, Switzerland and the United Kingdom. This confirms the initial success of the U.K.'s asset protection scheme (announced in January 2009) in reducing credit risk. The significant result for Switzerland is due to the government's purchase of UBS assets. Given the large size of this bank in the domestic banking sector, the purchase of assets has led to a reduction in the average credit risk. Announcements of asset purchase schemes in

Germany and the United States were less successful, according to the event study results. The Dutch government's asset guarantee of ING had a small impact on the average credit risk premium for the sample of Dutch banks.

Effect on the Financial Stress Index

Table 3.4 summarizes the effectiveness of the same crisis policy announcements, in this case using the FSI as a composite indicator for overall financial stress (see Annex 3.1 for more details).[13]

An important difference with the results discussed above is that this test, in most cases, shows recapitalization announcements not having a significant effect on the FSI. This result could be explained by the lower sensitivity of this index to credit risk compared with CDS spreads, but also possibly because recapitalizations dilute future profits, which has a downward effect on equity prices. The other key difference compared to our earlier results is that announcements of monetary easing are more effective in reducing financial stress than economic stress. This might reflect the upward effect on equity prices, partly resulting from the positive income effect of lower interest rates for banks. During a financial crisis, bank profits might be more sensitive to funding costs given the limited extension of new credit compared to periods of normal market conditions.

Spillovers from Global and U.S. Crisis Interventions—Effect on the Financial Stress Index

Figure 3.2 illustrates the impact of global and U.S. crisis policy announcements on the FSIs of the euro area, Switzerland, and the United Kingdom, where "global" is defined as the policies of all foreign countries in the event study sample. The results suggest that global spillovers matter and are mostly driven by crisis interventions in the United States. In general, during the phase preceding the Lehman Brothers collapse, spillovers were relatively small and primarily negative, increasing the FSI, except to the United Kingdom, which was influenced positively by U.S. interventions (first column of panels in Figure 3.2). Spillovers became much larger and adverse across all countries in the sample in the immediate post-Lehman period, as indicated by a large rise in the FSI (second column of panels). Once financial conditions began to stabilize alongside the introduction of sizable interventions in most affected countries and the economic outlook started to show signs of improvement in 2009, cross-border spillovers of policy announcements were favorably received, as measured by a fall in the FSI (third column of panels).

Assessing the Relative Efficiency of Interventions

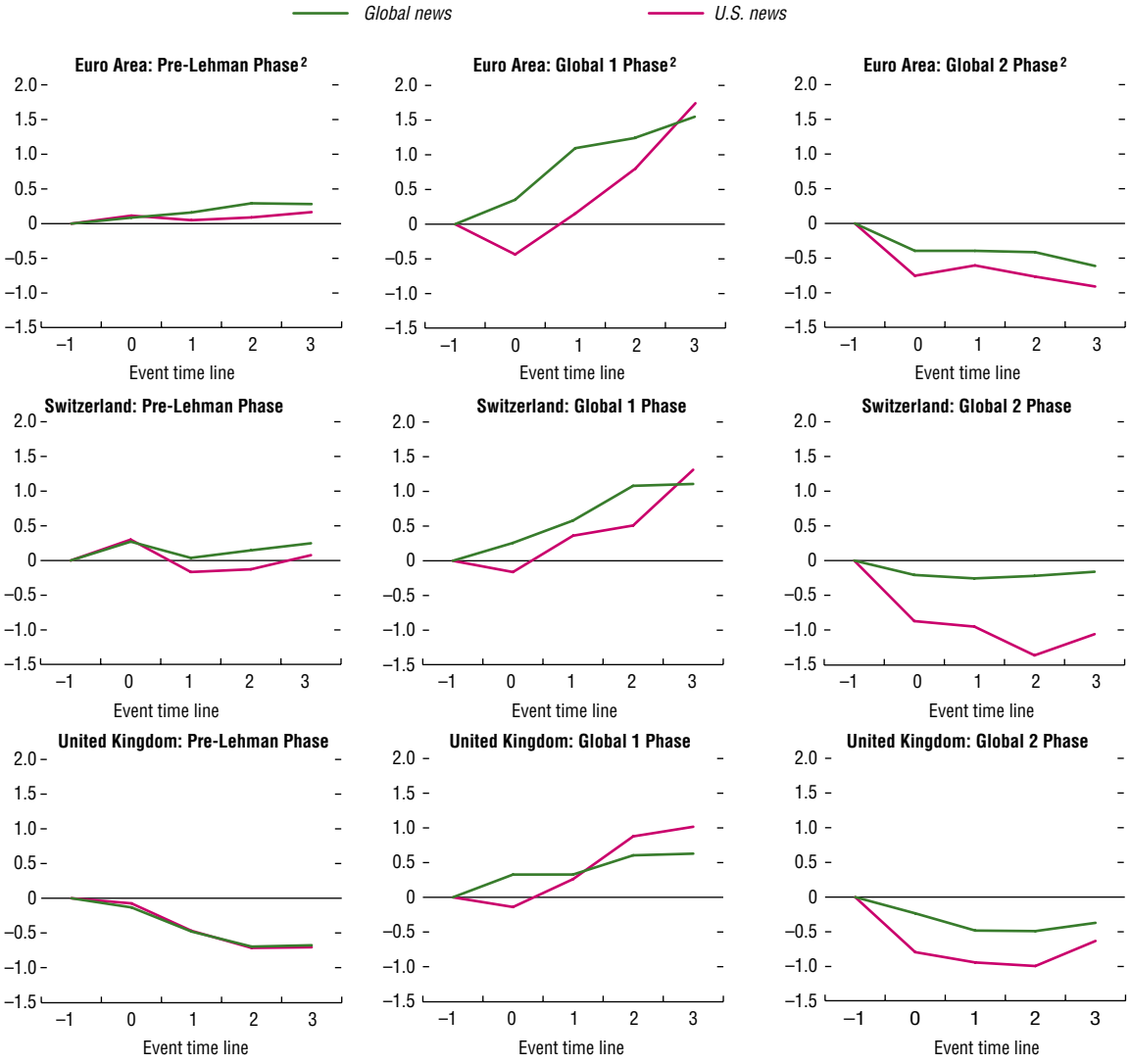
Table 3.5 illustrates the impact of a number of financial sector interventions (using only those that were statistically significant results of the event study) and compares it to the size of the intervention measured in percent of GDP. It indicates that liability guarantees were relatively efficient (biggest "bang for the buck") early on in the United Kingdom, and their efficiency (measured by their impact relative to the scale of the intervention) declined in later phases of the crisis as shown by the effects in the euro area. Capital injections were efficient, especially once major stresses had abated, but their efficiency (although not shown) was highest if they were combined with other measures (e.g., after adoption of guarantees in the United Kingdom) or if they were repeated (e.g., second round of capital injections in the euro area).

Addressing the Shortcomings of the Event Study as an Analytical Tool

The results presented in the previous section should be interpreted in the context of a number of challenges that are associated with event studies along both the conceptual and the analytical fronts. This subsection proposes ways of addressing some of them.

[13]By combining indicators of both risk and performance, the FSI aims to provide a broad measure of conditions in the financial sector. One should be aware, however, that interventions can affect the individual underlying indicators differently and in opposite directions. For example, a bank recapitalization reduces risk but can have a downward effect on equity prices through the dilution of future profits.

Figure 3.2. Spillovers from Global and U.S. Crisis Interventions Reflected on the Financial Stress Index[1]
(Average cumulative abnormal differences in index units)



Source: IMF staff estimates.
[1]The Financial Stress Index is scaled between 0 and 100 over the sample period, with 100 denoting the most stressful episode.
[2]Sample euro area countries covered by the event study.

First on the conceptual front is the challenge of *identification*. Specifically, markets can react negatively because they perceive a policy measure as being introduced too late, or as inappropriate, insufficient, or not credible. Separating the information content of a measure from the measure itself is difficult, too. During the early stages of the crisis, interventions may have been interpreted negatively by market participants, who may have seen the intervention as a signal that the condition of certain financial markets or institutions was worse than they had previ-

Table 3.5 Efficiency of Financial Sector Policy Measures

	Scale of Intervention				Impact[1]		
Country	Liability guarantees	Recapitalizations	Asset purchases	Total	Liability guarantees	Recapitalizations	Asset purchases
	(In percent of GDP)				*(In percent of periodic amplitude of credit default swap composite)*		
Euro area[2]	15.79	1.82	1.08	18.7	Global crisis 1 –25.0	Pre-Lehman/Global crisis 1 –1.5/–12.0	Global crisis 2 –13.4
Japan	–	0.02	0.00	0.0	–	Global crisis 2 –5.9	–
Sweden	44.65	1.95	0.00	46.6	Global crisis 1 2.1	Global crisis 2 0.2	–
Switzerland	–	1.06	7.86	8.9	–	Global crisis 1 –2.6	Global crisis 1 –2.6
United Kingdom	10.94	2.19	38.89	52.0	Pre-Lehman –55.4	Global crisis 1/Global crisis 2 –21.7/–6.1	Global crisis 2 –5.4
United States	2.18	3.19	3.62	9.0	Pre-Lehman 16.6	Global crisis 1 –13.5	Pre-Lehman 16.6

Source: IMF staff estimates.

[1]Pre-Lehman period: 06/01/07 to 09/14/08; global crisis 1: 09/15/08 to 12/31/08, and global crisis 2: 01/01/09 to 6/30/09. The number below the crisis subperiod label shows the ratio between the average market response of the respective type of financial sector policy and the amplitude of the LIBOR-overnight index swap (OIS) spread over the subperiod. A green number highlights a positive response due to a short-term reduction of the credit default swap spread, whereas a red number flags a negative market response.

[2]GDP-weighted composite of Austria, France, Germany, Greece, Ireland, Italy, Netherlands, and Spain.

ously thought. This could bias the event study results negatively. There is little we can do to distinguish among these possibilities to attain more precise identification.

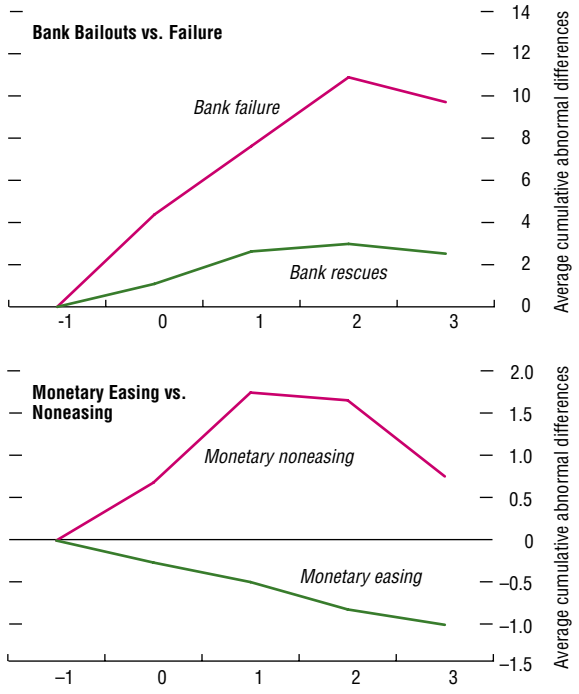
A second conceptual challenge is *endogeneity,* as policymakers respond to market pressures and markets respond to policy announcements. Our approach addresses endogeneity effectively by looking for post-announcement effects that are large relative to the pre-announcement period and by focusing on a narrow event window, such as five days, a period in which policymakers are unlikely to be able to respond to markets.[14]

Finally, *interpretation* is another conceptual challenge as we address the question of whether to assess effectiveness of policy in terms of a short-term market response or a sustained response. In addition, there is no clear guidance from the literature on how to address the difficulty of disentangling effects of different policies ex post, and we also have no formal counterfactual with which to compare.

That said, as a general way of examining a potential counterfactual, we have compared the relative short-term effectiveness of actions taken by the authorities to their *counterproductive actions,* defined as policy events that would be expected ex ante to increase market stress. Specifically, we examine the response of the FSI to no change in the policy rate and outright bank failures versus monetary easing and bank interventions. The results for the United States, for which we have a set of counterproductive interventions as defined above, indicate that

[14]The current choice of the event window attempts to control for different market conditions by keeping the time horizon short. A long time horizon before the event date would condition the magnitude of market response on the potential anticipation of interventions (as the realization of greater systemic risk manifests itself in higher perceived chances of policy action). Similarly, allowing a longer response time after the announcement of policies would acknowledge the sometimes very complex nature of some policy measure, whose impact is a result of a drawn-out information absorption by market participants. That said, an overly generous time horizon runs the risk of generating overlap in the timing and impact of a multitude of announcements within and across sample countries, including the chances of repeated policy announcements of the same type of intervention occurring within the same window.

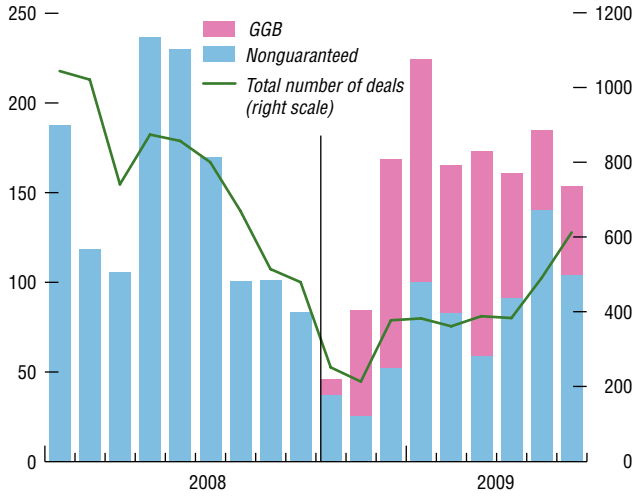
Figure 3.3. United States: Impact of Counterproductive Interventions on the Financial Stress Index



Source: IMF staff estimates.
Note: The Financial Stress Index is scaled between 0 and 100 over the sample period, with 100 denoting the most stressful episode.

Figure 3.4. Government-Guaranteed Bonds (GGB) and Nonguaranteed Investment-Grade Bank Bonds

(In billions of U.S. dollars; left scale)



Source: DCM Analytics.
Note: The vertical line refers to the introduction of the bank liquidity guarantee scheme.

although policy interventions were not always highly successful in lowering financial market stress, the counterproductive interventions yielded a much worse response (Figure 3.3).

Follow-Up to Initial Market Reaction—Longer-Term Effects of Intervention

It is intrinsically difficult to discern trends of longer-term effectiveness, especially because as more time elapses from the time of the intervention, the more other events or general market developments influence the results. Despite such difficulties, this section discusses the effectiveness of crisis policies, with the understanding that such analysis will be, by definition, incomplete and heuristic.

The Impact of Crisis Interventions on Issuance

Bank liability guarantees. The financial crisis that began in the summer of 2007 brought about an abrupt decline in bonds issued by banks, with a particularly severe drop in investment-grade paper after April 2008 (Figure 3.4). Bank bond issuance rebounded in late 2008 but primarily under the protection of government guarantees. As noted in Figure 3.5, the guarantee schemes put in place by governments helped revive the bank bond market. Issuance increased in 2009 in all regions examined, with the largest portion of the increase coming from issuance of government-guaranteed bonds, except for Japan, which has not introduced a bond guarantee scheme. The effect of guarantees on bank liabilities was strongest in the United Kingdom, where the issuance of guaranteed paper replaced nonguaranteed issuance almost completely.

U.S. commercial paper. The Federal Reserve's Commercial Paper Funding Facility (CPFF), which was introduced in October 2008, helped to briefly revive issuance by financial institutions, but the declining trend returned in early 2009 (Figure 3.6). The CPFF did not appear to appreciably support the issuance of asset-backed commercial paper (ABCP), whose downward trend accelerated in 2009. This trend may have more to do

with the high proportion of ABCP that had been used as funding for structured credit product entities, which have themselves closed or obtained other funding sources. The issuance of commercial paper by nonfinancial corporations has been fairly stable throughout, although it declined somewhat in 2009, which might reflect the worsened economic outlook and unemployment, therefore the diminished demand for working capital often associated with commercial paper.

Securitization. The issuance of mortgage-backed securities (MBS) increased in the United States, most notably beginning in March 2009, when the Term Asset-Backed Securities Loan Facility (TALF) was announced and the Federal Reserve's agency MBS purchase program was expanded (Figure 3.7) (see also Chapter 2).[15] The November 2008 original announcement of the MBS purchase program had been associated with only a small increase in MBS issuance. In Europe, higher securitization issuance in late 2008 was due to banks' strong increase in demand for liquidity, as nearly all issuance was pledged as collateral for central bank funding.

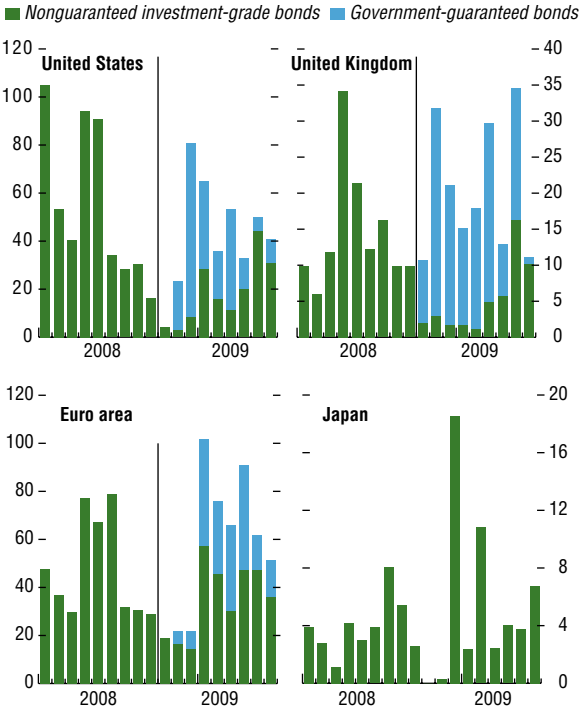
As regards covered bonds, the May 2009 announcement by the European Central Bank (ECB) that it would purchase €60 billion has been successful in reviving the euro area covered bond market, ending a two-quarter drought of jumbo issuance. The higher issuance has been accompanied by a decline in spreads.

Credit to the nonfinancial private sector. Bank credit growth to the nonfinancial sector has declined, although with a considerable lag. The abrupt drops exhibited in the United States, the United Kingdom, and the euro area did not come about until the second half of 2008. Although throughout the crisis both demand and supply factors have contributed to the decline in credit growth, the sharp drop after the Lehman collapse signals that supply was the dominant factor at that time (Figure 3.8). This is also reflected

[15]The TALF includes loans for the purchase of commercial MBS but not residential MBS, so its direct effect is only on a portion of the mortgage-related issuance.

Figure 3.5. Impact of Liability Guarantees on Bond Issuance

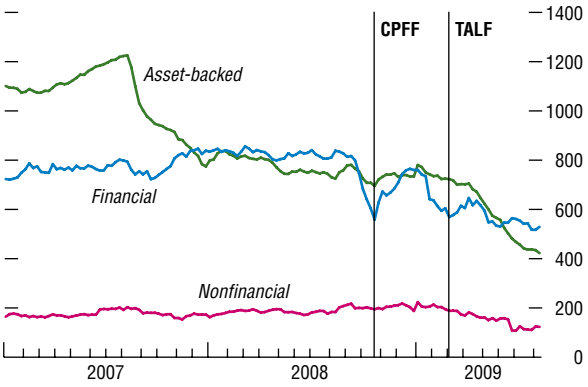
(Issuance in billions of U.S. dollars)



Sources: DCM Analytics; and national sources.
Note: Data include preferred shares. The vertical line refers to the introduction of the bank liquidity guarantee scheme in each country.

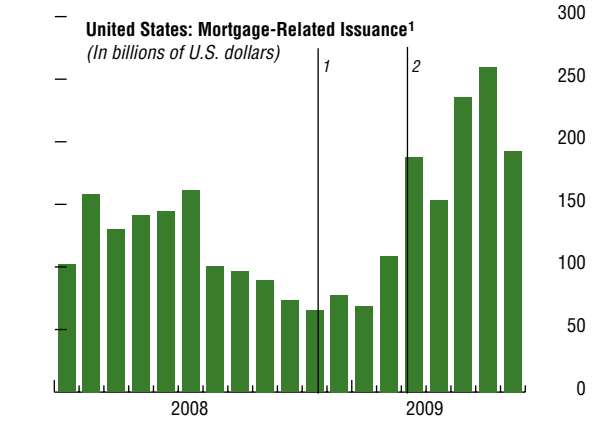
Figure 3.6. United States: Outstanding Amount of Commercial Paper

(In billions of U.S. dollars; seasonally adjusted)

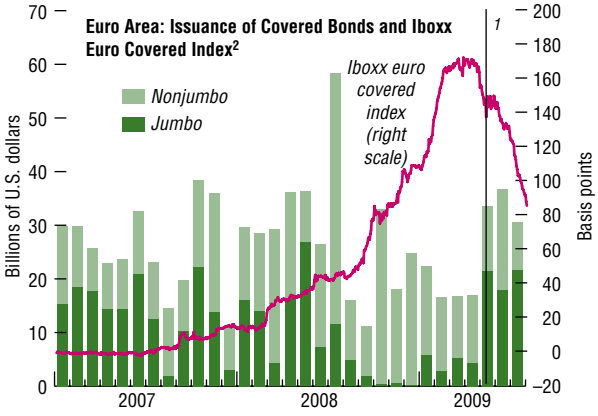


Source: U.S. Federal Reserve.
Note: CPFF = Commercial Paper Funding Facility; TALF = Term Asset-Backed Securities Loan Facility.

Figure 3.7. Securitization in the United States and Europe



1 - 11/25/2008: Fed announces GSE asset purchasing program
2 - 3/3/2009: Fed introduces TALF



1 - 5/7/2009: ECB announces €60 billion covered bond purchase program

Sources: Datastream; DCM Analytics; SIFMA; and European Securitization Forum.

[1]Includes GNMA, FNMA, FHLMC mortgage-backed securities, CMOs, and private-label MBS/CMOs.

[2]Iboxx euro covered index is an indicator of the difference in the yield on a basket of euro-denominated covered bonds and interest rate swaps with a similar maturity; 7–10 year maturity of covered bonds and 10-year euro vs. LIBOR interest rate swaps are used for this figure.

in the tightening of credit standards by banks.[16] Since the beginning of 2009 credit growth has returned to some extent in the United States and the United Kingdom, while it has continued to decline in both the euro area and Japan.

The Impact of Crisis Interventions on Liquidity and Credit Risk Indicators

LIBOR-OIS spreads. The longer-term effects of the various interventions on the LIBOR-OIS spread show improvement, according to the statistics in Table 3.6. As of end-June 2009, spread levels of all sample countries have declined between 53 and 90 percent from their respective crisis peaks. Based on standardized LIBOR-OIS spreads, however, we find that in some countries with large declines in absolute terms, spreads remain unusually high relative to their historical levels and compared to spread changes in other countries.

Another way of assessing the longer-term impact of interventions is by tracing their usage over time and plotting it against the LIBOR-OIS. In the United States, the immediate positive market response to liquidity support schemes, such as the Term Auction Facility (TAF) and CPFF, appears to be associated with a persistent decline of LIBOR-OIS spreads as these facilities gained popularity starting in late 2008 (Figure 3.9).

The extent of the usage of various unconventional central bank and government crisis policies should also be taken into account when contemplating the timing and modalities regarding their unwinding. Box 3.1 provides information on usage, while the section below on disengagement discusses the general principles of unwinding.

CDS spreads. The interventions that policymakers claimed targeted a reduction in credit risk were effective to some degree in reducing the average credit risk premium for banks, although the relative effectiveness differs across mea-

[16]See Chapter 1 for a more complete analysis of credit developments.

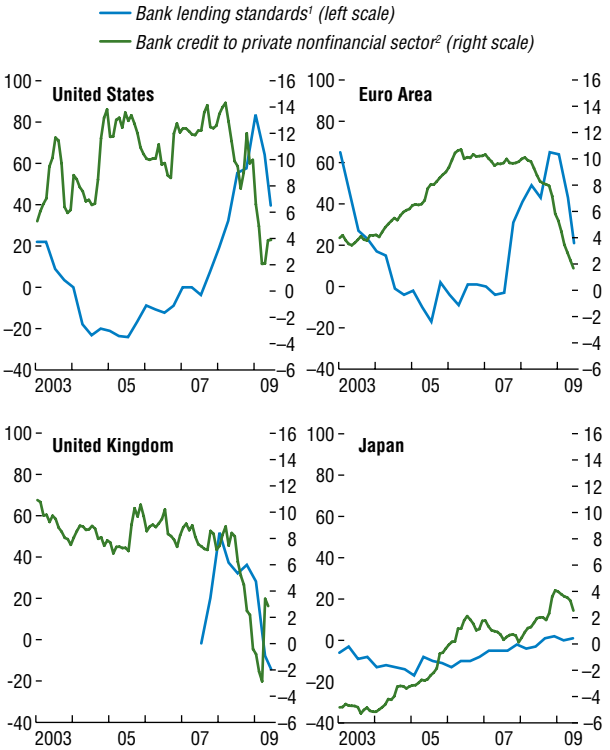
sures and countries (Figure 3.10). The rescue of Bear Stearns in March 2008 reduced credit risk premia not only in the United Stated but also in other countries, reflecting the degree of systemic interconnectedness and the importance of this rescue. This action contrasts with the rescues of other financial institutions, such as IKB in Germany, Northern Rock in the United Kingdom, and Anglo Irish Bank in Ireland, where the effect on perceived credit risk was smaller and primarily local. The collapse of Lehman Brothers marked a watershed in the financial crisis, as can be seen from the large jump in the risk premia in all countries shown.

The panel for the United Kingdom and to a lesser extent those for Germany and Ireland show a reduction in credit risk after the coordinated European Union (EU) measures in response to the financial crisis were announced on October 7, 2008. Ireland had already imposed wide-ranging guarantees, which were also effective in reducing credit risk. The panels of the two EU countries also show the effect of the recapitalization of domestic banks, which had a positive but limited effect compared to the internationally coordinated measures.

In all four countries examined, sovereign credit risk started to rise after October 2008, although less so for the United States, pointing to the negative effect of the crisis on public finances as financial risks were transferred to the public sector. Despite the numerous government measures, bank spreads continued to rise through March 2009. Since then, risk premia show a descending trend, perhaps reflecting that concerted fiscal measures have begun to stabilize the economic outlook.

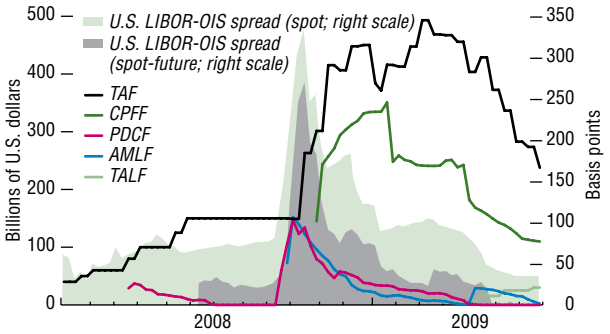
Mortgage rates have been on a downward trend since October 2008. In addition, the U.S. authorities aimed to reduce mortgage rates through the agency MBS purchase program. As shown in Figure 3.11, there was some downward movement after both announcements, while the rates returned to an increasing trend in recent months. In the United Kingdom, where a guarantee scheme for ABS was announced in January 2009, mortgage rates continued their downward

Figure 3.8. Credit Growth and Bank Lending Standards



Sources: Haver Analytics; and national sources.
[1]Net percentage change, a positive number indicates tightening of standards. Net percentage change refers to the difference between the percentage of banks that tightened standards and the percentage of banks that eased standards.
[2]Year-on-year percent changes through June 2009.

Figure 3.9. United States: Outstanding Amount of Unconventional Measures by the Federal Reserve



Sources: U.S. Federal Reserve; Bloomberg L.P. ; and Datastream.
Note: OIS = overnight index swap; TAF = Term Auction Facility; CPFF = Commercial Paper Funding Facility; PDCF = Primary Dealer Credit Facility; AMLF = Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility; TALF = Term Asset-Backed Securities Loan Facility. The difference between the green and the gray shaded areas shows the U.S. LIBOR-OIS spread that is expected to remain over 1.5 years at each point in time since 2008.

trend, although there does not seem to be a direct link to the introduction of the guarantees. Mortgage rates also declined in the euro area, where no additional programs were introduced.

Japan's Experience during the Latter Part of Its "Lost Decade"

As discussed above, it is too early to conduct a full assessment of the long-term impact of crisis policies, as more time is needed to observe outcomes in both the financial and economic spheres. In that sense, the Japanese experience from the "lost decade" might serve as a unique precedent for investigating the effectiveness of a variety of interventions, since most of the measures that have been employed during the current crisis—both monetary and financial sector policies—were tested during the 1990s and early 2000s. That said, we should pay due attention to the differences in the underlying economic conditions.

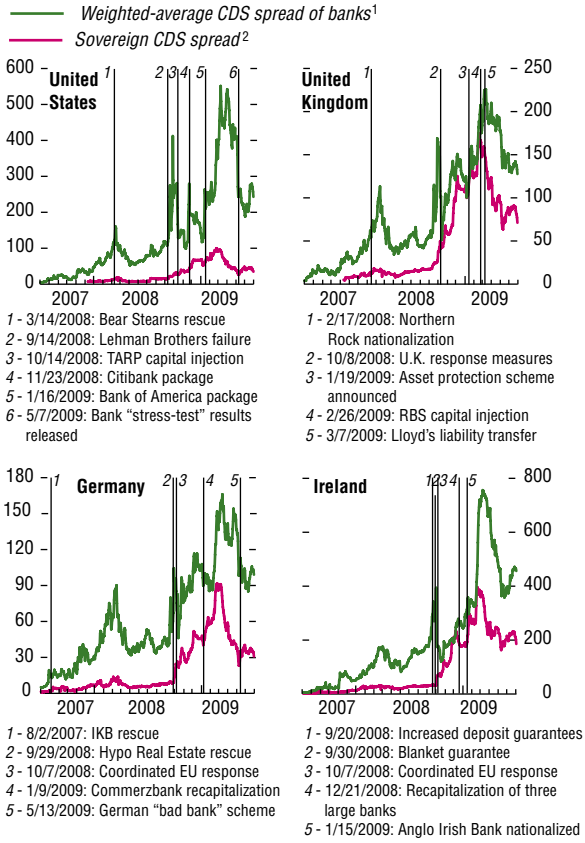
Effectiveness of Quantitative Easing in Earlier Japanese Experience

After a temporary recovery in 2000 led by the global dot-com boom, the Japanese economy worsened again. (Box 3.2 provides a summary of the Japanese experience in the 1990s.) The Bank of Japan (BoJ) responded with a large quantitative easing intervention. The targeted amount of liquidity (defined as the current account balance held by banks with the BoJ) increased gradually, finally reaching 35 trillion yen during the peak of the policy, or about eight times required reserves (Figure 3.12).

During the quantitative easing period, despite the more serious nature of the crisis relative to the 1997–98 phase in terms of the number of failed banks (Figure 3.13), the TIBOR/LIBOR spread,[17] which had spiked in 1997–98, did not move (Figure 3.14). This suggests that the massive liquidity provision under quantitative easing was effective in reducing liquidity and counterparty credit concerns in money markets,

[17]TIBOR is the Tokyo Interbank Offered Rate.

Figure 3.10. Impact of Financial Sector Stabilization Measures on Credit Default Swap (CDS) Spreads
(In basis points)



Sources: Datastream; and national sources.
[1]The asset-weighted average of CDS spreads of the top banks.
[2]Five-year sovereign CDS spreads.

although the longer-term effect of quantitative easing on inflation is not clear (Figure 3.15).

Government Initiatives for Disposing of Nonperforming Loans

Quantitative easing, however, was not helpful in addressing the root causes of the financial crisis regarding doubts about bank solvency. In the fall of 2002, the Japanese government introduced the Program for Financial Revival, under which banks were urged to accelerate the disposal of their nonperforming loans after conducting a rigorous examination of their loan portfolio with more stringent standards for provisioning than before. The major banks also faced quantitative objectives for disposing of nonperforming loans. The liquidity provision under quantitative easing allowed for the implementation of these measures without disruption to the financial markets.

The stringent measures to cleanse bank balance sheets helped restore stability in Japan's financial system during the course of 2003, and there have been no bank failures since then. The blanket guarantee on bank liabilities initiated in 1996 was finally removed in March 2005. A year later, when the annual consumer price index growth turned positive, the BoJ terminated the quantitative easing policy, shifting to the short-term interest rate as its operating target for conducting monetary policy.

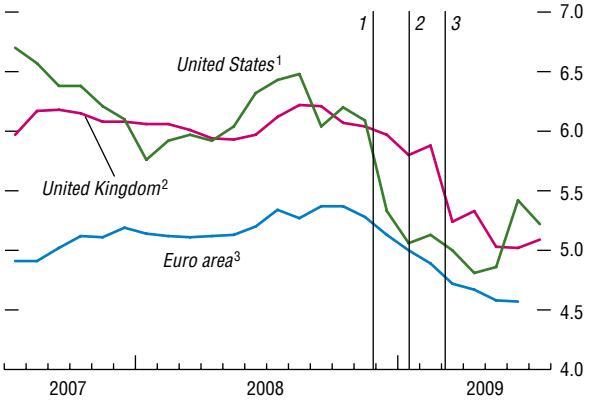
Lessons from the Japanese Experience

Some parallels drawn from the Japanese experience and the current crisis are discussed below.

- In Japan, government guarantees on bank liabilities, as a stand-alone measure, were not sufficient to arrest the downward spiral of financial stress. Although the Japanese government introduced such guarantees at an early stage, a prolonged financial crisis was not avoided. In the current crisis, the individual effectiveness of liability guarantees is hard to determine, as these were introduced mostly alongside other measures. Their early

Figure 3.11. Mortgage Rates

(In percent)

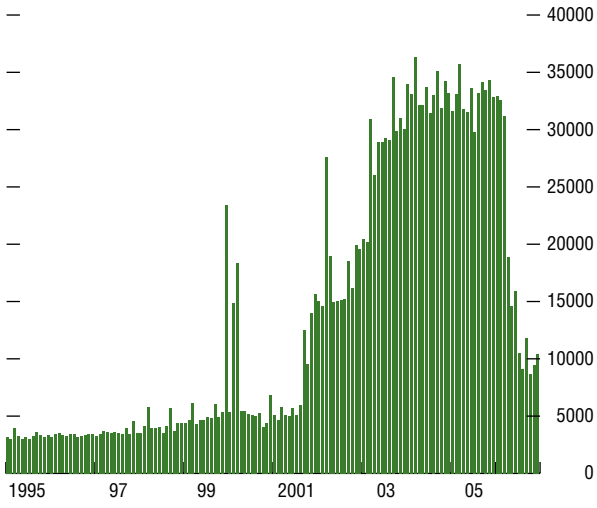


1 - United States: 11/25/2008: U.S. Federal Reserve announces government-sponsored enterprise asset purchasing program.
2 - United Kingdom: 1/19/2009: U.K. government to provide guarantees on eligible AAA-rated mortgage-backed securities.
3 - United States: 3/3/2009: U.S. Federal Reserve introduces Term Asset-Backed Securities Loan Facility.

Sources: Haver Analytics, Bank of England, and European Central Bank.
[1]Conventional 30-year mortgage rate.
[2]Monthly average of U.K. resident banks' sterling weighted average interest rate on loans secured on dwellings to households, new advances, initial fixation over 10 years.
[3]Interest rate on loans to households for house purchase, initial fixation over 10 years.

Figure 3.12. Banking Sector Current Account Balance with the Bank of Japan

(In billions of yen)



Source: Bank of Japan.

Table 3.6. Three-Month LIBOR-Overnight Index Swap (OIS) Spread: Declines from Peak

Crisis Period	Euro Area	Japan	Sweden	Switzerland	United Kingdom	United States
Current LIBOR-OIS spread level (as of June 30, 2009), in basis points	50	37	44	32	78	37
Current LIBOR-OIS spread decline (as of June 30, 2009), in basis points	–149	–43	–112	–127	–166	–324
In percent of peak level (Lehman collapse)[1]	–75	–53	–72	–80	–68	–90
In standard deviations from peak level (weighted by periods)[2]	–2.0	–3.4	–1.8	–0.5	–1.8	–1.5
Memorandum items:						
LIBOR-OIS peak level, in basis points	199	80	155	159	244	361
LIBOR-OIS peak level, in standard deviations	3.4	5.6	5.0	6.1	3.6	5.2

Source: IMF staff estimates.

[1]The peaks of the LIBOR-OIS are specific to each country or region: euro area (10/13/2008), Japan (12/18/2008), Sweden (11/27/2008), Switzerland (11/12/2008), the United Kingdom (12/4/2008), and the United States (10/10/2008).

[2]The decline of the LIBOR-OIS spread series relative to their peak levels is expressed in terms of standard deviations from the median change in each subperiod weighted by the number of days in that subperiod (pre-Lehman, global crisis 1, and global crisis 2). Using such a standardized measure of changes in LIBOR-OIS spreads allows better comparability across sample countries (and helps quantify relative policy effectiveness over the longer term by allowing the different subperiods to reflect the different lengths of periods).

introduction in the United Kingdom and the United States did not forestall the crisis.

- Aggressive liquidity provision by the BoJ coupled with recapitalization by the government was effective in reducing financial market stress. As indicated in the event study results, this seems to hold in the current crisis as well. Although the 2002 crisis in Japan was much more severe than its 1997–98 experience in terms of the number of failed banks, financial markets remained surprisingly stable. Much of this has been attributed to the large amount of excess reserves provided by the BoJ during the quantitative easing policy.
- While massive liquidity provision by the BoJ was effective in reducing stress in the markets, it did not address the root cause of the financial crisis or the solvency of financial institutions. On the contrary, the high liquidity levels could have discouraged banks from taking aggressive action to cleanse their balance sheets. Japan only exited its "lost decade" after the introduction of the Program for Financial Revival in 2002, which dealt effectively with the solvency issue.

Contrary to conventional economic theory, the massive provision of excess reserves by the BoJ did not seem to have a discernible impact on credit growth. This has also been the case with the current crisis, especially in the United States, where reserves have increased 80-fold. In Japan, the amount of bank loans outstanding continued to decline for nine years and growth did not turn positive until 2006 (with an associated significant drop in the money multiplier). There are two likely factors, which are not mutually exclusive but whose relative impact is hard to analyze: (1) there was no strong demand for credit, since large-scale deleveraging was taking place in the real sector (corporates in particular); and (2) on the supply side, even with massive reserves at hand, banks were reluctant to extend credit because impaired assets continued to reside on their balance sheets. This points all the more urgently to the need for well designed and communicated policy initiatives for dealing with impaired assets.

Disengagement: A Conventional Primer for Unwinding Unconventional Policies

In addition to assessing the short- and longer-term effectiveness of crisis policies, it is important to consider the ease with which these can be unwound and the degree to which they distort the market. The large variety of measures introduced during the current crisis as well as cross-border considerations render the sequencing of disengagement important.

The market response to a particular crisis policy is not necessarily a criterion for how easy it is to exit such a policy, though ineffective interventions, if these can be clearly identified, should be removed early. Moreover, an insignificant market response to an intervention or its low utilization by institutions and markets does not necessarily mean that such a policy is a failure, since its presence alone may have provided a stabilizing influence. It is therefore difficult to predict how financial stability will be affected by a premature unwinding.

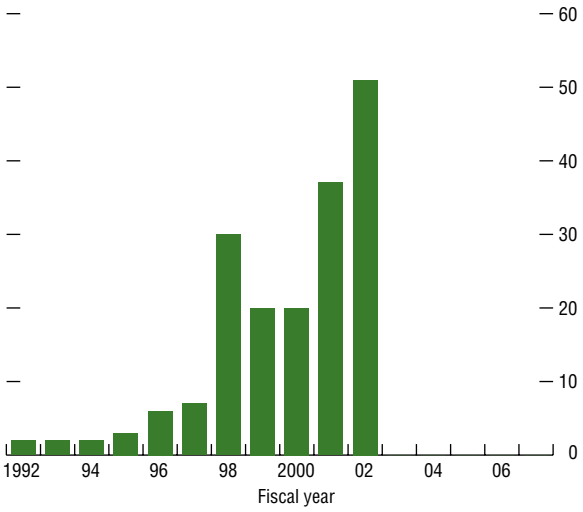
Objectives of Exit Strategies

It is important to develop at an early stage credible and coherent disengagement strategies to roll back crisis interventions when market conditions permit and the economic outlook is on a firm recovery path. Successful disengagement will require coherent sequencing and clear communications from monetary, regulatory, and fiscal authorities. Specific unwinding plans will need to be tailored to the various policy areas and carefully coordinated, providing assurances to markets on achieving medium-term policy goals, while avoiding the risk of a premature withdrawal of support when conditions are still fragile.

Central banks can usefully devise and communicate plans to unwind unconventional measures to ensure a smooth return to market-based financial intermediation and to forestall concerns that excessive liquidity could eventually drive a resurgence of inflation. Some liquidity support measures have already started to unwind naturally as market conditions normalize, but central banks will need to ensure that they have the tools to start tightening the policy stance, while recognizing that they may have to keep some illiquid assets on their balance sheets for some time.

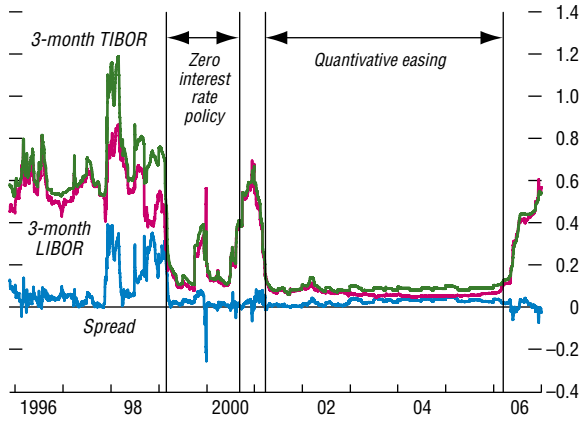
In light of the large fiscal costs of the crisis, governments, too, will need to consider how to remove financial risks acquired from their interventions. As the recovery becomes firmly established, forceful fiscal consolidation

Figure 3.13. Failed Banks Assisted by Deposit Insurance Corporation of Japan
(In numbers)



Source: Deposit Insurance Corporation of Japan.

Figure 3.14. Three-Month Spread between TIBOR and LIBOR
(In percent)



Source: Bloomberg L.P.

Box 3.1. Usage of Unconventional Central Bank Facilities

This box examines the current usage levels of various unconventional central bank market operations.

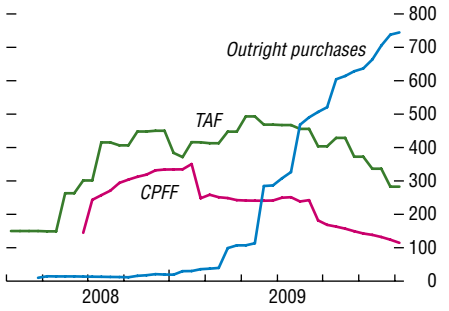
Central Bank Facilities

In the United States, the Federal Reserve introduced a variety of instruments to provide short-term liquidity to the money markets, including the Term Auction Facility (TAF) and the Commercial Paper Funding Facility (CPFF) in an earlier stage of the crisis (see table). Later, the Fed launched programs that use longer-term instruments as collateral for loans, such as the Term Asset-Backed Securities Loan Facility (TALF, up to five years) as well as outright purchases of agency debt, agency mortgage-backed securities (MBS), and U.S. treasury securities. There is still a large amount of room for further outright purchase of agency MBS. Moreover, actual subscriptions for the TALF have been limited, while the program could expand to $1 trillion. On the other hand, outstanding amounts from the TAF and the CPFF have been shrinking in recent months as liquidity concerns in money markets have receded (see figure).[1]

The Bank of England, which had relied upon existing instruments for liquidity provision, introduced the Asset Purchase Facility in March 2009, under which it can purchase government bonds (gilts), commercial paper, and corporate bonds on an outright basis. The ceiling for purchases under this facility was raised in August 2009 from £125 billion to £175 billion.

The European Central Bank (ECB) has extensively used its Long-Term Refinancing Operations for liquidity provision. Since last autumn, auctions have been conducted on a fixed-rate, full allotment basis in order to fully accommodate the demand for liquidity of banks. The duration of the operations has been lengthened gradually up to one year. In addition, the ECB announced in June 2009 that it will start purchasing covered bonds up to €60 billion, which is relatively small for the size of its balance sheet.

Outstanding Amount of U.S. Federal Reserve's Operations
(In billions of U.S. dollars)



Source: U.S. Federal Reserve.
Note: Total outright purchases of agency debt, agency mortgage-backed securities, and U.S. treasury securities. For U.S. treasury securities, the figures are the changes from end-March 2009. TAF = Term Auction Facility; CPFF = Commercial Paper Funding Facility.

Note: Kazuhiro Masaki prepared this box.
[1]The focus of the discussion is on the TAF and CPFF as the two largest of the short-term liquidity provision facilities.

becomes necessary to ensure the sustainability of public finances.[18]

To avoid an overly abrupt adjustment at the global level, disengagement will need to be considered in a multilateral context. Multilateral coordination will be important to mitigate cross-border distortions for some types of interventions during both the exit phase and the post-crisis period.

This section elaborates on these main objectives of disengagement strategies and lays out elements for planning the unwinding process.

[18]A discussion of the fiscal implications of government interventions in the financial system is beyond the scope of this chapter. See IMF (2009b).

Major Crisis Interventions Introduced by Central Banks

	Maximum Amount	Amount Used as of end-June 2009
Bank of England (in billions of pounds sterling)		
Outright purchases of assets		
Asset Purchase Facility[1]	175	105
Bank of Japan (in billions of yen)		
Short-term liquidity provisions		
SFSOFCF[2]	Unlimited	7,467
Outright purchases of assets		
Commercial paper	3,000	197
Corporate bonds	1,000	174
European Central Bank (in billions of euros)		
Short-term liquidity provisions		
Long-term refinancing operations[3]	Unlimited	728
Outright purchases of assets		
Covered bonds	60	0
U.S. Federal Reserve (in billions of U.S. dollars)		
Short-term liquidity provision		
TAF	—[4]	282
CPFF	—[5]	114
Long-term liquidity provision		
TALF	1,000	25
Outright purchases of assets		
Agency mortgage-backed securities	1,250	462
Agency debt	200	97
Treasury securities	300	184

Sources: Bank of England; Bank of Japan; European Central Bank; and U.S. Federal Reserve.
Note: TAF =Term Auction Facility; CPFF = Commercial Paper Funding Facility; TALF = Term Asset-Backed Securities Loan Facility; SFSOFCF = Special Funds-Supplying Operations to Facilitate Corporate Financing.
[1]Purchasing commercial paper, corporate bonds, and gilts.
[2]Providing liquidity against collateral of private credit instruments at a fixed rate, full allotment basis up to three months.
[3]Providing liquidity at a fixed rate, full allotment basis up to one year.
[4]The amount is determined at each auction.
[5]There is a limit per issuer.

The Bank of Japan (BoJ) launched the Special Funds-Supplying Operations to Facilitate Corporate Financing (SFSOFCF), which provides liquidity on a fixed-rate, full allotment basis against corporate debt as eligible collateral. In addition, the BoJ started purchasing commercial paper and corporate bonds on outright basis.[2] Actual subscriptions have been very limited compared to the maximum allocated amount.

[2]Corporate bonds with a residual maturity up to one year are eligible.

Central Bank Interventions

For expository purposes, it is useful to discuss separately the mechanics of the central bank's unwinding process, which depend on the tools that the central bank has at its disposal, and its monetary policy targets. Clearly the two go hand-in-hand. The central bank has to consider when and how to withdraw from the segments of the markets in which it had intervened (asset side). The objective is to return to the use of the interest rate as the monetary policy instrument aiming at price stability and, where relevant, the outlook for growth. This can be done even in the face of high excess reserves, although the scale of reserve accumulation to date is a challenge.

In terms of mechanics, when the central bank holds short-term assets, it can easily mop up excess reserves by simply letting these assets mature. (Box 3.3 discusses the role of excess reserves as an indicator of liquidity and discusses their role in this crisis.) In particular, if liquidity facilities are demand-driven, unwinding takes place automatically when funding markets improve and banks reduce their demand for precautionary excess liquidity. This unwinding process can be encouraged further if borrowing from the central bank is provided at a rate that would restore normal market incentives.

As suggested by Figure 3.16, in the case of central banks whose increase in reserves is larger than the increase in short-term instruments, such as the Bank of England (BoE) and the Federal Reserve, retiring short-term instruments would not be sufficient to mop up excess reserves entirely. The ECB, on the other hand, which has provided liquidity through relatively short-term instruments (up to one year), can absorb excess reserves fully by reducing just part of these short-term instruments. It should be noted, however, that the ECB has also increased the duration of its liquidity provision after the one-year liquidity operation it carried out earlier this summer, so reducing excess reserves would take a bit longer if the ECB let the borrowing expire at maturity.

When the central bank extends liquidity by purchasing long-term instruments, such as government and corporate bonds or a variety of impaired structured credit products, it would need to sell or exchange them in order to unwind excess liquidity.[19] Specifically, central banks such as the Fed and the BoE that increasingly relied upon long-term instruments (some with maturities of up to 30 years) will likely need to sell or exchange a substantial part of their long-term holdings in the process of disengaging.

[19]If assets on the central bank balance sheet remain impaired, their sale would incur a loss for the central bank. The decision about whether the central bank balance sheet would be cleansed of impaired assets through, for example, an exchange for government securities, would need to be part of a comprehensive fiscal package that deals with the legacy of the crisis.

Asset sales can proceed if a market for the assets exists, which is not necessarily the case for some central bank holdings. Sales of relatively illiquid instruments or large quantities should proceed with caution as selling could destabilize still fragile markets. (See Box 3.4 for a discussion of the changes in the balance sheets of the major central banks during the crisis.) Moreover, when central banks hold large portfolios of government debt, the government should avoid the temptation to influence their disposal and respect the independence of the central bank.

On the liabilities side, the central bank can use additional instruments of market operations, such as liquidity-draining repo operations, and central bank bills, to absorb excess reserves (Table 3.7). In addition, by remunerating excess reserves, the central bank can determine the policy rate by setting a floor on the overnight rate.[20,21] These operations could prove to be highly costly for a central bank, as they would also channel interest income from the central bank to banks. One of the concerns at present is whether the technical modalities of the withdrawal of excess liquidity will impair the ability of central banks to control interest rates, their main monetary policy tool, and whether the impact of the present high level of liquidity on credit growth could become inflationary.[22] Experience since the fall of 2008—as well as Japan's experience earlier in this decade—suggests that the existence of excess reserves

[20]Interest-paying deposit facilities, where banks can store their liquidity surplus with the central bank, have a similar function depending on rates applied to the facilities.

[21]Raising reserve requirements can also be used when excess reserves have an inflationary impact through an aggressive credit expansion by banks. However, given the size of excess reserves at the major central banks, an unprecedented increase in reserve requirement ratios would likely be needed to have a meaningful impact. In addition, it is difficult to forecast banks' precautionary demand for reserves precisely, if banks still feel nervous about their liquidity condition. Moreover, the policy signal of raising reserve requirements—often interpreted by markets as a permanent measure—may not be most fitting for managing the transition phase of exiting from a crisis.

[22]Keister and McAndrews (2009) elaborate on how remunerating reserves addresses the risk of uncontrolled credit creation.

in itself does not necessarily have an inflationary effect when the financial system is seriously impaired. However, the timing of unwinding excess liquidity and, hence, the extent to which the central bank can rely fully on remuneration to deal with excess reserves, depends critically on the condition of the financial system.

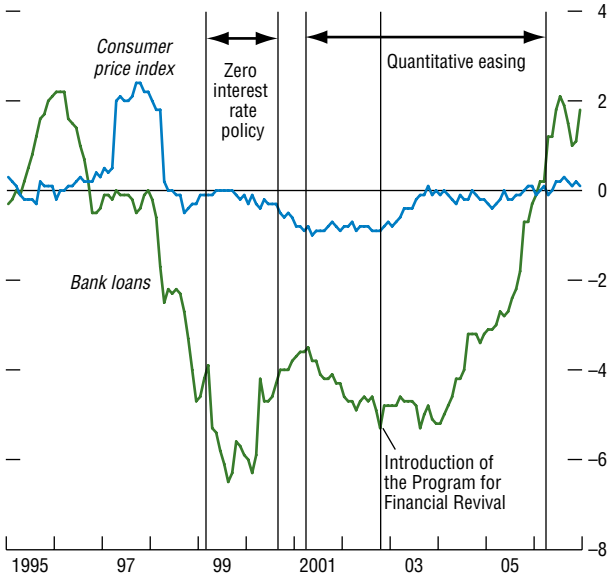
In sum, both the timing and the modalities of removing liquidity from the system are crucial to preserving price stability in the transition to the post-crisis period. It is yet unclear how the technical aspects of removing liquidity will interact with normal monetary policy decisions regarding the interest rate. A central bank could mop up excess reserves by issuing bills, performing liquidity-draining repo operations, auctioning fixed-term deposits, and/or raising the overnight rate by remunerating excess reserves. The remuneration of excess reserves could work as a useful monetary policy instrument in the transition period, when large amounts of excess reserves in the financial system may pose a risk of uncontrolled credit creation, although a monetary policy framework that relies entirely on remuneration has not been fully tested and may have specific drawbacks that would need to be addressed.[23]

Therefore, the central bank should prepare credible plans regarding the timing and modalities of unwinding crisis interventions, including the introduction of additional operational tools as needed, so as to be able to withdraw the monetary stimulus in a timely manner if inflation expectations begin to rise. Additionally, the central bank should attempt to ensure that capital and money markets will not be adversely affected during this process.

[23]The remuneration of excess reserves at a rate close to the liquidity-providing rate of the central bank could create an environment in which bank treasurers can borrow from and lend to the central bank at low cost. In this context banks may have little incentive to trade reserves in the overnight interbank deposit market. This could have a negative effect on the functioning of the money market and could lead, for example, to questions regarding pricing and the relevance of money market indices.

Figure 3.15. Japan: Bank Loans and the Consumer Price Index

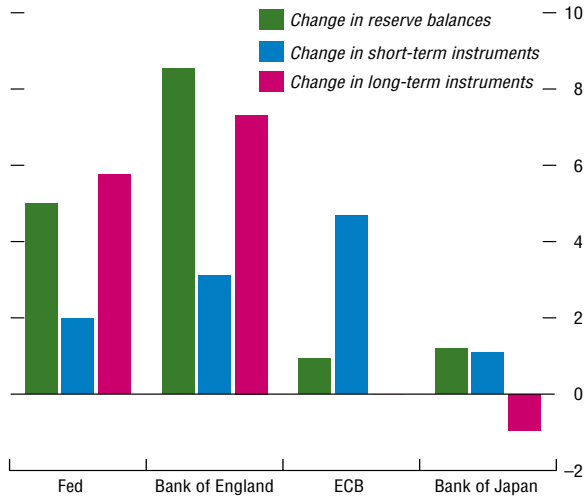
(Year-on-year changes; in percent)



Sources: Bank of Japan; and the Ministry of Internal Affairs and Communications of Japan.

Figure 3.16. Changes in the Major Components of Central Banks' Balance Sheet

(In percent of nominal GDP in 2008)



Sources: Bank of England; Bank of Japan; European Central Bank (ECB); and U.S. Federal Reserve.

Note: Changes between end-June 2007 and end-June 2009. Short-term instruments are of maturity up to one year; long-term instruments are one-year maturity or longer (at the time of intervention).

Box 3.2. Interventions during Japan's 1990s Financial Crisis

This box summarizes the crisis measures employed in Japan during the 1990s, prior to the introduction of quantitative easing in 2001.

The Japanese financial crisis became serious in 1995, when several regional banks and credit unions failed—virtually the first bank failures in the postwar history. The Bank of Japan (BoJ) initiated unprecedented measures such as emergency liquidity assistance. In an attempt to avoid a system-wide financial crisis, the government quickly responded by introducing a blanket guarantee on bank liabilities.

However, the blanket guarantee in itself was not effective in preventing larger-scale failures in subsequent years. In fact, Japan experienced the most acute phase of the financial crisis toward the end of 1997. After an outright failure of a medium-sized broker—the first default in the Japanese interbank market—money-market funding conditions tightened significantly due to mounting concerns about counterparty risk. Under these circumstances, several financial institutions, including Yamaichi Securities, one of the four major dealers, were forced to close within a couple of weeks.

After those large-scale failures, the use of taxpayer money finally gained political support and in March 1998 the first round of capital injections took place. However, since the injections were carried out on a voluntary basis, banks were reluctant to apply for them and their low usage failed to stabilize the financial market.

During the fourth quarter of 1998, two of the largest banks in Japan, Long-Term Credit Bank and Nippon Credit Bank, were nationalized as part of a newly introduced resolution framework. In March 1999, a second round of capital injections took place, which, unlike the first round, included an examination of banks, urging them to apply for sufficient capital so as to raise their capital-adequacy ratio to about 10 percent. On the monetary policy front, the BoJ introduced a zero-interest rate policy in mid-February 1999 by providing excess reserves into the banking system, though on a smaller scale than the quantitative easing of later years. These crisis measures were helpful in ending the most acute phase of the financial crisis, as shown by the TIBOR/LIBOR spread.[1]

Note: Kazuhiro Masaki prepared this box.

[1]The TIBOR (Tokyo Interbank Offered Rate) is a reference rate that is compiled by the Japanese Bankers' Association. Most of the reference banks for TIBOR are Japanese banks, while the reference banks for LIBOR are dominated by non-Japanese banks. The spread between TIBOR and LIBOR is often used as an indicator for measuring financial stress for Japanese banks during the financial crisis beginning in the late 1990s, because the crisis was specific to Japanese banks.

Government Policy Regarding the Financial Sector

The timing of unwinding the government's crisis interventions should be determined by how much of their intended goals has been achieved, whether they have unintended harmful side effects that distort the markets, and by the size of fiscal costs, including contingencies. Guarantees by the government on bank liabilities or the losses stemming from their assets are examples of this kind of contingent liabilities. Regarding the ease of unwinding, some measures can be removed by simply letting them expire, while others require additional financial transactions to roll them back, which may have implications, including for the functioning of potentially still fragile markets.

Interventions made by the government can be categorized as in the paragraphs that follow (Table 3.8).

(1) Government Guarantees on Bank Debt[24]

[24]In addition to guarantees on banks' wholesale liabilities, a number of governments have expanded deposit

Table 3.7. Supplementary Operations for Managing the Central Bank Balance Sheet

	U.S. Federal Reserve	European Central Bank	Bank of England	Bank of Japan
Issuance of central bank bills (debt certificates)	Not available (Supplementary Financing Program used instead)	Not used	x	x
Reverse-repos	x	Not used (deposit auctions would be used instead)	Not regularly used	x
Remuneration on excess reserves	x (Recent)	Deposit facility for surplus reserves	x (Recent)	x (Recent)

Sources: Bank of Japan; Bank of England; European Central Bank; and U.S. Federal Reserve.

The government can withdraw the guarantee by simply not extending it, although guarantees on existing debt should remain in place until the date specified at the time of issuance. In addition, as conditions normalize, a reduction in the risk premium for nonguaranteed debt could create an incentive for banks to repay the guaranteed bonds early, given the additional fee that needs to be paid for the guarantee.

Although in a crisis bank debt guarantees help preserve financial stability by supporting funding liquidity, they are highly distortionary, since the government assumes the credit risk in place of the debt-issuing entity, thereby reducing the market incentive to monitor credit risk.[25] In addition, the measure carries contingent liabilities for the government, whose potential fiscal cost might be substantial. A timely exit from such guarantees is necessary, while international coordination is important to prevent cross-border arbitrage, potentially distorting international capital flows.

(2) Recapitalization

While selling of government stakes in the marketplace may have a negative impact on equity markets, repayment from recapitalized banks would normally signal an improved financial position for banks, with a potentially positive effect. This was demonstrated in the United States, where markets welcomed the repayment of Troubled Assets Recovery Plan funds by several financial institutions. The fact that the government owns a stake in financial institutions per se does not necessarily have a direct distortionary impact, as long as the recapitalized banks are managed on a commercial basis. However, the loss of a level playing field may influence market prices for bank securities, particularly if the government owns a large stake, since the public will likely presume that the government guarantees recapitalized banks' liabilities.

(3) Asset Purchases by Government

In some cases the government has purchased impaired, illiquid assets to help banks clean their balance sheet. As such, the measure is not likely to have a major distorting impact on banks' investment decisions going forward. These assets can be resold in the market, or governments could hold on to them until they expire. Here the most important government goal should be to generate

insurance by raising the maximum protected amount (some countries offer unlimited guarantees on certain types of depositors). The unwinding of expanded deposit insurance is not addressed in this section as it is primarily a crisis measure to protect retail depositors.

[25]As an indicator of the degree of market distortion created by the public sector's assumption of private sector credit risk, we calculated the difference in the risk premium between government-guaranteed and nonguaranteed debt issued for a sample of three major banks. In the second quarter of 2009, the average risk premium for government-guaranteed paper was 350 basis points lower than for nonguaranteed paper for the banks in our sample.

Table 3.8. Reversibility and Impact of Financial Sector Measures

	Additional Transactions Required for Unwinding	Market Impact of Unwinding	Distortion to Market Mechanism	Contingency for Fiscal Cost
Guarantee on new liabilities	Not required	Relatively small Depends on market conditions at exit	Significant	Potentially significant
Recapitalization	Required	Sales in markets: Potentially large Repayment with market funding: Potentially large Repayment with retained earnings: Small	Minority stakes: Relatively small Controlling stakes: Relatively large, especially when: (1) the recapitalized bank is run by the government, or (2) implicit guarantee by the government is observed	Limited downside risk
Asset purchase	Required	Depending on how disposal of purchased assets is conducted	Small, though it depends on the type of asset	Limited downside risk (depending on purchase price and leverage)
Guarantee on existing assets (insurance)	Not required	Minimum	Relatively small	Potentially significant

the highest possible return by managing them well.

Since the appetite by the market for some of these instruments is likely to be small for some time to come, they may need to be held by the government for an extended period. If the government sells the assets only when there is sufficient demand, the market impact would be small. The potential cost to the government is largely determined by the price at which assets are sold and the amount of assets held by the government, both of which vary across countries and depend on market conditions.

(4) Asset Guarantees (Insurance) by Government

As long as this guarantee does not need to be utilized, it is relatively easy to unwind by simply letting it expire. Given that banks pay a guarantee fee, they are likely to have an incentive to end the guarantee as soon as conditions allow. The market impact of unwinding this measure is likely to be relatively small, if it is only unwound when the banks' financial position has improved or when the uncertainty about their underlying assets is adequately reduced. The potential fiscal costs depend on the size of the guarantee, which can be substantial. Unwinding the measures eliminates the uncertainty about future government finances related to the guarantee.

The size of the overall fiscal costs of supporting the financial system during the crisis varies across countries and depends crucially on the size of government's crisis intervention in the financial system, and the length of time that the crisis policies need to remain in place. Those factors need to be considered when designing the disengagement.

Cross-Border Coordination of Exit Strategies

In globalized financial markets, lack of cross-border coordination could lead to unexpected consequences, including a disruption of international capital flows. On the other hand, given that the modalities and timing of recovery paths are likely to differ across countries, some divergence of unwinding may be natural and even desirable for some types of crisis policies.

In general, measures should be taken to prevent regulatory and financial arbitrage across jurisdictions, particularly where guarantees

Box 3.3. Excess Reserves as an Indicator of Funding Liquidity Concerns

This box discusses why excess reserves may be a more accurate barometer of liquidity provision during the crisis than the change in the overall size of the central bank balance sheet. It goes on to compare developments in excess reserves across the four main central banks.

Indicators for Gauging the Magnitude of Liquidity Provision by Central Banks

During a financial crisis, specifically one with funding liquidity problems, the size of the central bank's balance sheet is often used as an indicator of the amount of liquidity extended to the banking system. However, since currency in circulation remains largely unchanged in the short run, focusing on the total liabilities of the central bank may underestimate the impact of liquidity provided to the banking system. Banks' deposits with the central bank (alternatively called the "current account balance" or "reserves") may be a good additional indicator—and in some cases more accurate—for analyzing the supply and demand dynamics of liquidity provision and their implication for the financial system.

Reserves under Normal Circumstances

When conducting open market operations, the central bank, as the sole provider of reserves, determines the amount of reserves to be supplied to the banking system so that the actual overnight interest rates in the money market (the price of reserves) is determined to be close to the target rate set by the central bank based on its estimate of banks' demand for reserves on that day.[1] During normal times and in systems where central banks do not remunerate reserves, reserve balances rarely exceed required reserves as banks have no incentive to hold them.

Note: Kazuhiro Masaki prepared this box.

[1]Banks may demand reserves for a variety or reasons, including (1) to meet reserve requirements; (2) for funds settlement between banks; and (3) to secure against a potential liquidity shortage (precautionary demand). Under normal circumstances, however, meeting reserve requirements is sufficient to cover the other types of demand, except for such special occasions as high payment days (e.g., at year-end).

Reserve Balances

(In percent of nominal 2008 GDP)

	Reserve Balances before Crisis (a)[1]	Reserve Balances end-June 2009 (b)	Ratio (b)/(a)
U.S. Federal Reserve	0.06	5.06	83.95
European Central Bank	2.03	2.96	1.46
Bank of England	1.23	9.73	7.89
Bank of Japan	1.85	3.09	1.67

Sources: Bank of England; Bank of Japan; Bloomberg L.P.; European Central Bank; U.S. Federal Reserve; and IMF, International Financial Statistics.

[1]Average balance of April–June 2007.

Reserves during the Financial Crisis

Since the outbreak of the financial crisis in the summer of 2007, several major central banks have increased their reserves provision dramatically, although the relative magnitude has varied across countries. The dramatic rise in reserve balances suggests that banks' precautionary demand for reserves increased significantly due to their heightened liquidity concerns and that the central banks accommodated this demand to stabilize the financial markets. Several points relating to this development are worth noting:

- With the overnight interest rate approaching zero, the opportunity cost of holding excess reserves decreased, which might have increased precautionary demand. Put differently, excess reserves have worked as liquidity insurance with affordable premia.
- Some central banks (most notably, the Fed) started paying interest on excess reserves, giving banks an incentive to hold excess reserves. Remuneration changed the supply and demand dynamics of reserves, although the impact depends on the risk-adjusted differential between what the central bank and what the market would pay.
- Some central banks introduced new facilities, according to which liquidity can be drawn at the request of banks (e.g., full allotment refinancing operations at the European Central Bank). This allows the reserve balance to respond more swiftly to changing liquidity conditions.

Box 3.3 *(concluded)*

Cross-Country Comparison

The magnitude of the increase in reserve balances varies significantly across the four main central banks (see table). A comparison of the balance at end-June 2009 with the average balance before the crisis shows that the change in the United States is by far the largest in absolute terms (84-fold).[2] Increases of reserve balances in the European Central Bank and the Bank of Japan are comparatively modest, at less than 100 percent of the average balance. However, such a comparison may be misleading, not least because there is a significant difference in the size of reserve balances with the central banks in relation to the size of the economy. Specifically, before the crisis, the ratio of the average reserve balances to nominal GDP was about 1 to 2 percent in the euro area, Japan, and the United Kingdom, while the same ratio was less than 0.1 percent in the United States.

In terms of the magnitude of the recent liquidity provision relative to GDP, the United Kingdom (9.73 percent) exceeds the United States (5.06 percent), while the euro area and Japan are comparatively modest at 2.96 and 3.09 percent, respectively.

[2]Average reserve balances before the crisis (April to June 2007) are used as a proxy for required reserves in the steady state because the concept of required reserves varies from country to country and, therefore, could lead to misleading comparisons. For example, vault cash can be used to meet the reserve requirement in the United States, while in some cases financial institutions not subject to reserve requirements keep balances with the central bank even under normal circumstances (Japan).

apply to cross-border institutions or markets. Crisis policies that have a large distorting impact on financial markets would warrant cross-border coordination for unwinding, as arbitrage transactions across national borders with different degrees of guarantees could cause a disruption of international capital flows. Maintaining a level playing field across countries is essential for avoiding such arbitrage consequences.

A potential for cross-border arbitrage is particularly relevant when the removal of guarantees on bank liabilities is not coordinated across countries. Specifically, in cases of countries whose liability guarantee applies to all banks operating within the jurisdiction, including subsidiaries, banks can choose the location in which they issue debt through their subsidiaries in different jurisdictions. Spreads between guaranteed and nonguaranteed debt in various jurisdictions can be monitored so that such opportunities can be countered or anticipated.

On the other hand, cross-border coordination might be less crucial for measures dealing with banks' impaired assets, depending on the assets. Since already-purchased assets that are held on the government's balance sheet are unlikely to have a major distorting impact on market mechanisms, the government can enjoy some latitude in completing their unwinding. The government should carefully determine the timing of reversal so as to achieve the highest return with the minimum market impact. Since the pace of the recovery of the market for impaired assets is likely to vary across countries, some divergence in this area is also to be expected.

Conclusions and Policy Takeaways

Although it may be premature for a comprehensive assessment of the effectiveness of the authorities' crisis interventions, it is possible to examine different aspects of this complex area and to draw some preliminary policy conclu-

Box 3.4. Implications of the Changes on Central Bank Balance Sheets

As a result of unconventional interventions, central bank balance sheets have expanded and changed in composition. This box examines the potential risks involved and the implications for withdrawing the large amounts of excess liquidity provided during the crisis.

Basic Structure

A central bank provides the "monetary base" (i.e., banknotes in circulation and reserves held by banks with the central bank) by conducting monetary operations with financial institutions and/or by purchasing financial instruments. As an increase in liabilities goes hand-in-hand with an increase in assets (intervention in financial markets), so too the central bank must reduce its assets to reduce the monetary base on its liability side.

Note: Wouter Elsenburg and Kazuhiro Masaki prepared this box.

Changes during the Crisis

Under normal circumstances, central banks set the amount of reserves so that the overnight interest rate in the money market reaches the targeted policy rate. Banks have no strong incentive to hold additional liquidity, and actual reserve balances are about equal to required balances in most cases (see Box 3.3). Since the outbreak of the crisis these relationships have broken down, as central banks were no longer using reserve balances primarily to conduct monetary policy but rather to provide liquidity to financial institutions that were unable to access it in the interbank market. This in turn put downward pressure on overnight interest rates. Although it is not a direct concern at present—as central banks have been reducing overnight rates in response to lower inflation expectations and a deteriorating economic outlook—central banks are likely to reduce the

U.S. Federal Reserve

(In millions of U.S. dollars)

	27 June 07	1 July 09		27 June 07	1 July 09
Assets			**Liabilities**		
U.S. treasury bills	277,019	18,423	Currency in circulation	812,339	911,609
Primary credit	5	35,708	Government general account	4,039	78,142
Term Auction Facility		282,808	Supplementary Financing Program		199,939
Commercial Paper Funding Facility		114,693	Reserve balances	9,730	722,043
AMLF		14,807	Other	76,424	133,088
U.S. treasury notes	513,478	645,047			
Agency MBS, federal agency		560,272			
TALF		25,021			
Bear Stearns, AIG-related		105,616			
Other	112,030	242,426			
Total	**902,532**	**2,044,821**	**Total**	**902,532**	**2,044,821**

Note: AMLF = Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility; MBS = mortage-backed securities; TALF = Term Asset-Backed Securities Loan Facility.

Bank of England

(In millions of pounds sterling)

	27 June 07	1 July 09		27 June 07	1 July 09
Assets			**Liabilities**		
Short-term operations	31,469	0	Banknotes in circulation	39,786	46,413
Long-term operations	14,999	91,212	Short-term operations (reverse)		0
Asset Purchase Facility		105,585	Reserve balances	17,354	140,453
Other	33,268	29,784	Other	22,596	39,715
Total	**79,736**	**226,581**	**Total**	**79,736**	**226,581**

Short-term instruments (less than one year)

Long-term instruments (one year or longer)

Box 3.4 *(concluded)*

level of excess liquidity. Until this process has been completed, central banks can control the policy rate through a variety of instruments.

Changes in the Risk Profile

The purchase of assets such as mortgage-backed securities and commercial paper, by central banks has increased their credit and valuation risks (see tables). In addition, extending liquidity through new facilities that have broadened the set of eligible securities that central banks accept as collateral as well as the number of eligible counterparties has also raised counterparty credit risk.

In addition, the crisis has changed the income position of central banks, although the net effect is not necessarily clear cut. On the one hand, low returns on central bank assets that correspond to both banknotes and reserves have reduced revenue. On the other hand, liquidity injections have increased the amount of reserves over which interest is received, thereby increasing central bank profits.

Issues with Withdrawing Liquidity

Looking ahead, central banks may face some important trade-offs. A careful exit strategy might warrant a gradual reduction of reserves, as a quick sell-off could disrupt financial markets. If, at the same time, inflation expectations start increasing, central banks may need to increase the remuneration rate they pay on excess reserves as a means to implement the targeted policy rate. Although this extra cost for the central banks could be offset by the extra revenue resulting from the expanded balance sheet, central banks face a substantial income risk. In addition to remunerating excess reserves, central banks have a variety of other options for reducing liquidity such as issuing central bank bills, reverse repos, or increasing the reserve requirement.

European Central Bank

(In millions of euros)

	29 June 07	26 June 09		29 June 07	26 June 09
Assets			**Liabilities**		
Gold and foreign currency	338,836	475,476	Banknotes in circulation	633,076	762,146
Main refinancing operations	313,499	167,902	Government account	69,701	153,378
Long-term refinancing operations	150,002	728,598	Current account balances	182,086	268,244
Marginal Lending Facility	1,104	326	Deposit facility	1,100	236,235
Other	405,012	625,017	Other	322,490	577,316
Total	**1,208,453**	**1,997,319**	**Total**	**1,208,453**	**1,997,319**

Bank of Japan

(In billions of Japanese yen)

	30 June 07	30 June 09		30 June 07	30 June 09
Assets			**Liabilities**		
Japanese government bills (short-term)	21,493	20,871	Banknotes in circulation	75,837	76,739
Short-term repo	18,538	24,278	Current account balances	9,691	15,746
Commercial paper		197	Other	14,543	17,357
Corporate bonds[1]		174			
Japanese government bonds (long-term)	49,653	45,182			
Other	10,387	19,140			
Total	**100,071**	**109,842**	**Total**	**100,071**	**109,842**

[1]Corporate bonds with a residual maturing up to one year.

Short-term instruments (less than one year)

Long-term instruments (one year or longer)

sions. This chapter has followed a multi-pronged approach by assessing (1) short-term effectiveness of policies in terms of their immediate impact in stabilizing the market; (2) longer-term effectiveness by looking at debt volumes and price indicators; and (3) effectiveness in terms of the ease with which policies can be unwound. A number of parallels have been drawn between the effectiveness of interventions during Japan's "lost decade" and those during the current crisis.

Although policymakers are now naturally looking to the effectiveness of their crisis interventions in the longer term, a number of conclusions can be drawn from the results of the event study regarding short-term effectiveness in reducing the market turmoil. Such effects may be short-lived, but nonetheless they could be useful if they provide information on what calmed financial markets and, hence, improve the policy response to future crises that exhibit similar types of market stress. The event study conclusions are summarized below.

- Liquidity support announcements were initially effective, as measured by the reduction in the LIBOR-OIS spread. They lost significance as the crisis worsened and markets began to anticipate the provision of additional liquidity as the crisis evolved from one of liquidity to one of solvency.
- In almost all cases, announcements of capital injections were effective in reducing credit risk, while announcements of guarantees on bank liabilities were effective only in a few cases. Announcements of government support of bank assets, through either guarantees or outright purchases, were effective in the short run in even fewer cases.
- The results of the event study illustrate that the short-term impact of interventions depended on the particular circumstances that prevailed during each phase of the crisis.

The results of the event study that focus on short-term effectiveness in calming markets have a number of similarities with the Japanese crisis of the previous decade.

- In Japan, as well as now, government guarantees on bank liabilities as a stand-alone measure were not sufficient in arresting the downward spiral of financial stress at the peak of the crisis.
- Aggressive liquidity provision by the BoJ coupled with recapitalization by the government was effective in reducing financial market stress.
- While massive liquidity provision by the BoJ was effective in reducing stress in the markets, it did not address the root cause of the financial crisis or the solvency of financial institutions.

The chapter also examined longer-term effectiveness by looking at volumes of issuance and general price movements of liquidity and credit risk indicators that the authorities have attempted to influence. While tying the specific policy interventions to longer-term effectiveness is very difficult due to intervening events and other confounding factors, the initial conclusions are that some market prices appear to be stabilizing and issuance is picking up.

While the evidence is, as yet, circumstantial, the rebound in bank debt issuance following bank debt guarantees is striking, especially in the United Kingdom. While overall bank credit appears relatively unresponsive, some specific credit markets have responded well—for example, the TALF in the United States has encouraged some types of securitization and the covered bond markets in Europe have rebounded following the ECB's introduction of the covered bond purchase plan. The longer term responsiveness of prices in some targeted markets is also evident: the LIBOR–OIS spread has retraced much of its widening and mortgage rates are lower.

Regarding the criteria for planning the disengagement of crisis interventions by central banks and governments, some key principles are summarized below.

- In principle, the interest rate policy of central banks should be guided by inflation expectations and the economic outlook, as is the case with monetary policy during normal circumstances. However, under the current circumstances, the unwinding of market interventions by central banks, including quanti-

tative easing, should also take into account financial market conditions depending on the types of interventions.

- The reversibility of unconventional measures differs significantly depending on the types of interventions. For the measures that require additional transactions to unwind or those that will have a major market impact at the time of exit, a gradual unwinding would be warranted. In such cases, disengagement should be designed and communicated so that the unwinding can be completed in an orderly manner. For instance, central banks could start reducing excess reserves before a policy rate increase becomes imminent, although if a rate increase is needed to stem inflation expectations, the central bank need not delay. As for the reprivatization of intervened banks, a credible plan should be formulated and communicated as early as possible.
- Regarding the monetary stimulus provided by unconventional policies, if policy rates are very low, the absorption of excess reserves could help ensure better control over monetary policy, since the two are intertwined, and skillful management of the central bank balance sheet is warranted. The central bank could use additional instruments such as sales of its own bills to mop up liquidity or remuneration on excess reserves. The use of these instruments would come at the cost of reduced income for the central bank.
- In determining the sequencing of disengagement from various government financial sector measures, once financial stability has been established, priority should be given to exiting from those that have a significant distortionary impact on financial markets or involve considerable contingent liabilities for the government. Based on these criteria, it would be reasonable to unwind government guarantees on bank debt earlier than disposing of impaired assets acquired by the public sector. In both cases, however, the relevant markets need to be able to withstand the disengagement without reverting to unstable financial market conditions.
- Cross-border coordination is especially important for measures that have a major distortionary impact on financial markets in order to discourage arbitrage transactions that could cause disruptions to international capital flows. This is especially relevant for government guarantees of cross-border bank liabilities, where market participants can easily take advantage of arbitrage opportunities. The timing for the withdrawal of guarantees should be discussed by the relevant national authorities.

Given the complexities of disengagement, clear communication about unwinding strategies—not only *when* to start the process, but also *how* the entire process is designed (pace, duration, etc.)—is imperative to retain market stability and manage expectations, especially regarding inflation. In particular, policymakers need to send clear messages that starting the exit process does not necessarily mean a rapid withdrawal of policy support.

Managing expectations in financial markets is essential to achieve a smooth transition to the post-crisis environment. For example, although careful and early planning for disengagement is advised, it would not help to pre-announce dates for reversing policies, as this would be likely to provide arbitrage opportunities. On the other hand, policymakers can usefully allow market participants to prepare for disengagement in advance of the actual unwinding. It could be desirable, for example, to identify trends for a set of financial and/or macroeconomic indicators that can be used as guideposts for timing the unwinding, while keeping in mind that such guideposts can sometimes be difficult to interpret when there are large, short-term fluctuations. Nonetheless, policymakers should attempt to provide some guidance to markets prior to disengaging so that the chances of renewed instability are avoided.

Annex 3.1. Financial and Economic Stress Indices[26]

This annex defines the construction of the financial and economic stress indices.

Financial Stress Index

The financial stress index draws partly on the index used in IMF (2008a) and consists of the following data series:

(a) LIBOR-OIS spread of country or currency area;

(b) CDS spreads of local banks, weighted by the size of total assets;

(c) The inverse of the stock prices of local banks, weighted by the size of total assets;

(d) The inverse of tangible common equity of local banks, weighted by the size of total assets;

(e) Country lending standards; for the euro area countries covered in the study, the euro area survey was used;

(f) Amount of nonfinancial credit extended per country.

All these indicators are standardized by subtracting the mean and dividing by the standard deviation for every observation. In addition, all lower frequency series are converted into daily/weekly series by linearly interpolating between the available data points.

Economic Stress Index

The economic index consists of the following series:

(a) Inverse of consumer confidence;

(b) Inverse of business confidence;

(c) The average spread of A, AA, and BB rated corporates vis-à-vis government bonds;

(d) The inverse of the stock prices of nonfinancial companies.

All lower frequency series are converted into weekly series, by linearly interpolating between the available data points.

[26]Wouter Elsenburg and Sylwia Nowak prepared this annex.

The sample period for the indices is from January 1, 2007 to June 30, 2009, a total of 130 weekly observations.

Banks Included in Indices

The banks were selected based on size and data availability. The banks included by country are as follows:

Austria: Bank Austria, Erste Bank, Volksbank.

France: BNP Paribas, Société Générale, Credit Agricole, Natixis.

Germany: Deutsche Bank, Commerzbank, BHV, Deutsche Postbank.

Greece: Ergasias.

Ireland: Bank of Ireland, Allied Irish Bank, Anglo Irish Bank.

Italy: UniCredito, Intesa, Monte di Paschi, Popolare.

Netherlands: ING, Fortis, Rabobank.

Spain: Santander, Bilbao, Banesto, Banco Popular, Español.

Sweden: Skandinavska, Svedska, Swedbank.

Switzerland: UBS, Credit Suisse.

United Kingdom: Barclays, RBS, HSBC, HBOS, Lloyds, Standard Chartered.

United States: JP Morgan, Bank of America, Citigroup, Wachovia, Wells Fargo, National Citi Corp.

Annex 3.2. Event Study Methodology and Data[27]

The event study assesses the effects of a policy intervention on the price of a particular asset or index of assets, such as the LIBOR-OIS spread, as well as composite measures of financial and economic stress. This annex describes the methodology of different parametric and nonparametric event study test statistics that analyze the market response to policy events since the onset of the financial crisis in July 2007.

The effect is examined over a short period of time before and after each policy announcement—the *event window*—covering one day prior to the announcement, the day of the announce-

[27]Andy Jobst prepared this annex.

ment, and three days after the announcement.[28] The daily changes of the indicator variable are assessed (for example, the LIBOR-OIS spread) within each event window. In order to determine whether these differences are economically meaningful and statistically significant, these changes are measured conditional on the relative change of volatility before and during each event window. In addition, the analysis also considers the possibility of asymmetric tail behavior of abnormal changes and the incidence of abnormal changes independent of any distributional assumptions.

The event study technology aggregates the abnormal differences of the selected market indicator within each observation window to construct cumulative abnormal differences. These differences are averaged across the same type of policy measure to calculate average cumulative abnormal differences for each country during each of the three identified crisis periods. Studying the day-to-day differences in the series over a short period of time implies that there is no need to model time-varying behavior of the LIBOR-OIS spread, including nonlinearities and nonstationarity.

We assume that the daily changes of the LIBOR-OIS spread during the crisis period constitute abnormal changes (without reliance on historical sensitivity to general market movements in conventional market model methods), given that the average pre-crisis change in this spread was close to zero.[29] However, the expectation of positive and negative spread changes offsetting each other over a short period of time cannot be applied to the other market indicators. Thus, the expected daily change of the market indicator, estimated to be the average daily change over the previous 20 working days, is subtracted from the actual daily change on each day of the event window in order to obtain abnormal differences.

Based on the historical information about the time trend and volatility of daily changes of the market indicators, we perform tests of means before and after the announcements[30]—both parametric and nonparametric—to judge whether the event induces a significant market response.[31]

We define the *parametric* test statistic as the ratio between average cumulative abnormal differences and three different measures of historical volatility of the market indicator over an estimation period of 20 days before the event window: (1) the square root of the sum of squared differences; (2) the standard deviation of simple differences; and (3) the expected prediction error (derived from a simple autoregressive process with a one-period lag) adjusted by the ratio between the volatility during both the estimation and event periods. As opposed to the first two (conventional) measures of volatility (Mikkelson and Partch, 1986), the alternative specification of volatility in (3) accounts for changes in volatility on a day-to-day basis within the event window relative to the empirical experience. The last specification gives some weight in the volatility measure to cases in which crisis policies may have been anticipated by markets. The standardized abnormal changes derived from these parametric measures are tested for convergence to both the standard normal distribution and a generalized extreme value distribution calibrated to the higher moments of daily changes during the

[28]The results from the event study analysis are robust to shortening the event window from five to three days. However, we do not consider lengthening the event window due to clustering of the events, especially in the fall of 2008. Further, we implicitly assume that starting the event window one day prior to the official announcement is sufficient to capture the possibility that the policy measures could have been anticipated one day in advance.

[29]In contrast to event studies using equity prices that often control for moves in the overall stock market (a market model) or control for multiple variables (a factor model), this assumption implies a zero-factor model of abnormal returns based on a random walk of changes in levels.

[30]We specify both parametric and nonparametric tests in line with Patell (1976), Brown and Warner (1985), Boehmer, Masumeci, and Poulsen (1991), and McKinlay (1997).

[31]Studying the day-to-day differences in the series with permanent changes over a short period of time implies that there is no need to model time-varying behavior, including nonlinearities and nonstationarity.

estimation window. The latter null hypothesis of expected changes of abnormal returns restricts statistical significance only to those observations that are truly exceptional even at a time of large changes in the market indicator.

In light of the time trend of market indicators during the different crisis periods under consideration, nonparametric tests are also used. Based on Corrado and Zivney (1992), we apply a standard sign test, which determines whether the incidence of positive or negative responses to a particular type of policy measure is statistically significant under normality. However, such a test statistic captures only the dominant direction of market responses and ignores the relative magnitude of market response in either direction. Thus, we introduce the new sign-size test that can accumulate the different magnitudes of individual market responses to the various event types. Using this test, a crisis measure would be deemed significant only if there is a positive market response, which, on average, is also larger than any negative response to the same type of policy measure over the sample time period.

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STATISTICAL APPENDIX

This statistical appendix presents data on financial developments in key financial centers and emerging markets. It is designed to complement the analysis in the text by providing additional data that describe key aspects of financial market developments. These data are derived from a number of sources external to the IMF, including banks, commercial data providers, and official sources, and are presented for information purposes only; the IMF does not, however, guarantee the accuracy of the data from external sources.

Presenting financial market data in one location and in a fixed set of tables and charts, in this and future issues of the GFSR, is intended to give the reader an overview of developments in global financial markets. Unless otherwise noted, the statistical appendix reflects information available up to August 12, 2009.

Mirroring the structure of the chapters of the report, the appendix presents data separately for key financial centers and emerging market countries. Specifically, it is organized into three sections:

- Figures 1–14 and Tables 1–9 contain information on market developments in key financial centers. This includes data on global capital flows, and on markets for foreign exchange, bonds, equities, and derivatives as well as sectoral balance sheet data for the United States, Japan, and Europe.
- Figures 15 and 16, and Tables 10–21 present information on financial developments in emerging markets, including data on equity, foreign exchange, and bond markets, as well as data on emerging market financing flows.
- Tables 22–27 report key financial soundness indicators for selected countries, including bank profitability, asset quality, and capital adequacy.

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Key Financial Centers

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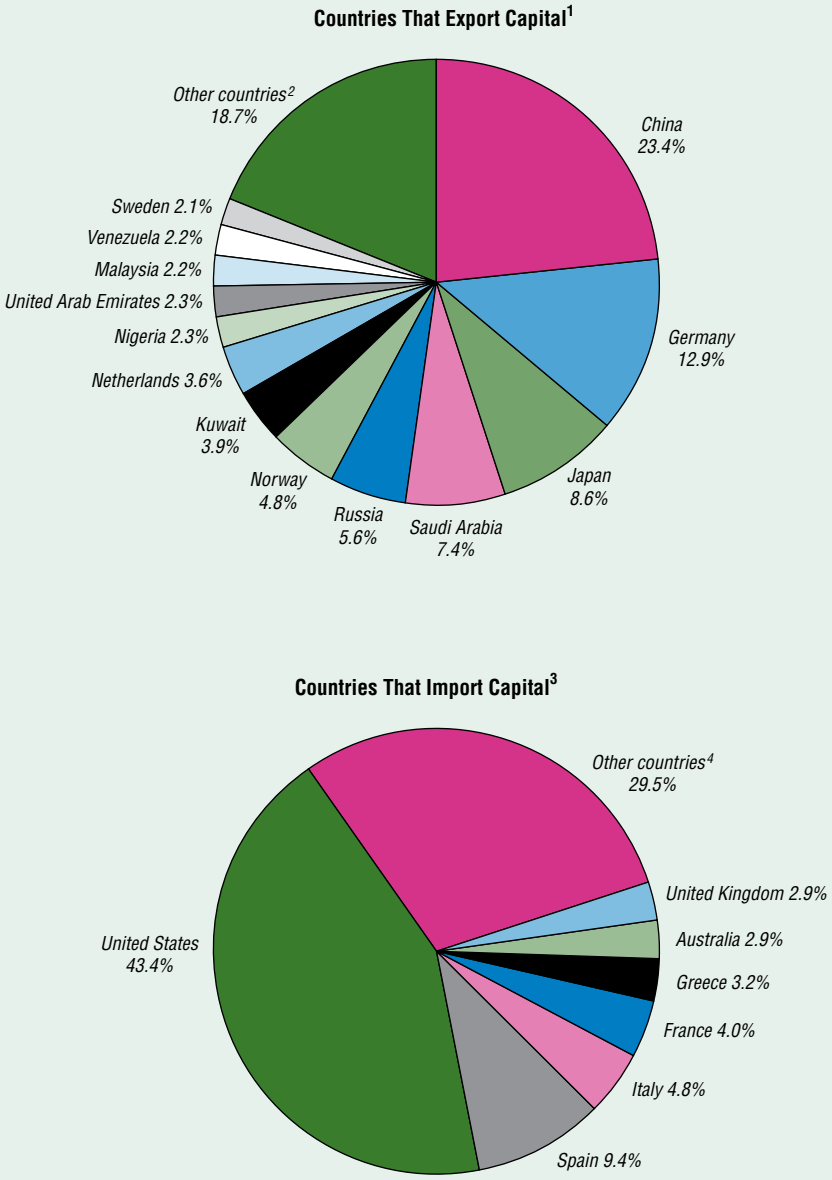
Financial Soundness Indicators

Figure 1. Major Net Exporters and Importers of Capital in 2008



Source: IMF, World Economic Outlook database as of September 23, 2009.

[1]As measured by countries' current account surplus (assuming errors and omissions are part of the capital and financial accounts).

[2]Other countries include all countries with shares of total surplus less than 2.1 percent.

[3]As measured by countries' current account deficit (assuming errors and omissions are part of the capital and financial accounts).

[4]Other countries include all countries with shares of total deficit less than 2.9 percent.

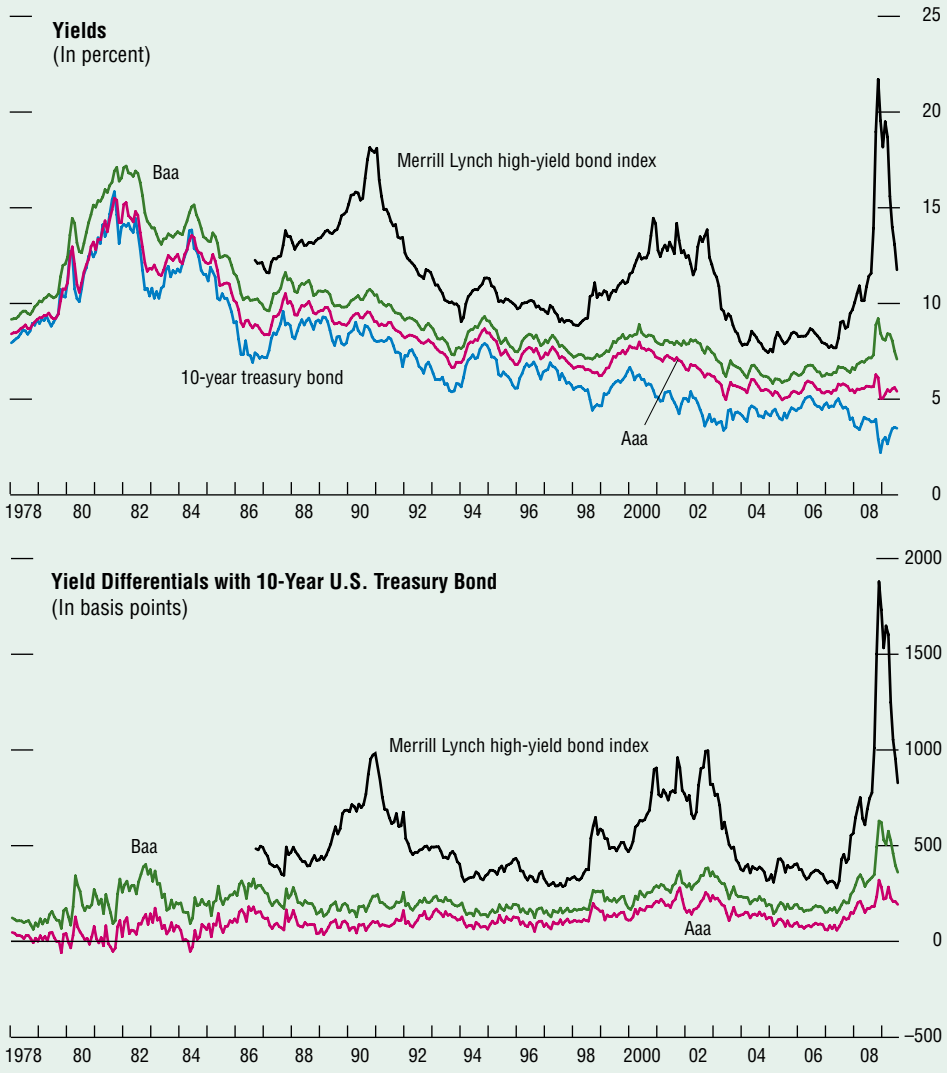
Figure 2. Exchange Rates: Selected Major Industrial Countries

(Weekly data)

Sources: Bloomberg L.P.; and the IMF Global Data System.
Note: In each panel, the effective and bilateral exchange rates are scaled so that an upward movement implies an appreciation of the respective local currency.
[1]Local currency units per U.S. dollar except for the euro area and the United Kingdom, for which data are shown as U.S. dollars per local currency.
[2]2000 = 100; constructed using 1999–2001 trade weights.

Figure 3. United States: Yields on Corporate and Treasury Bonds

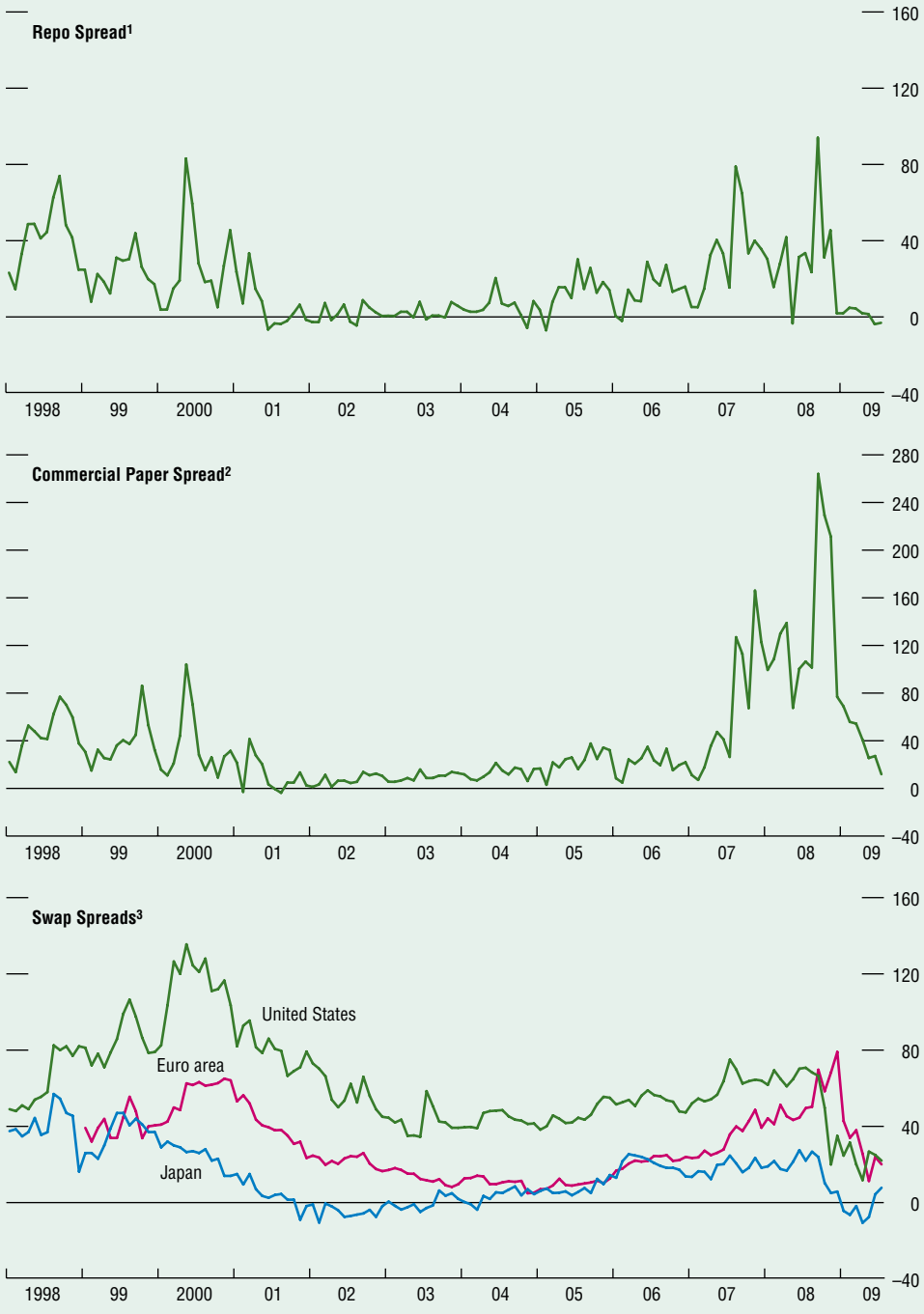
(Monthly data)



Sources: Bloomberg L.P.; and Merrill Lynch.

Figure 4. Selected Spreads

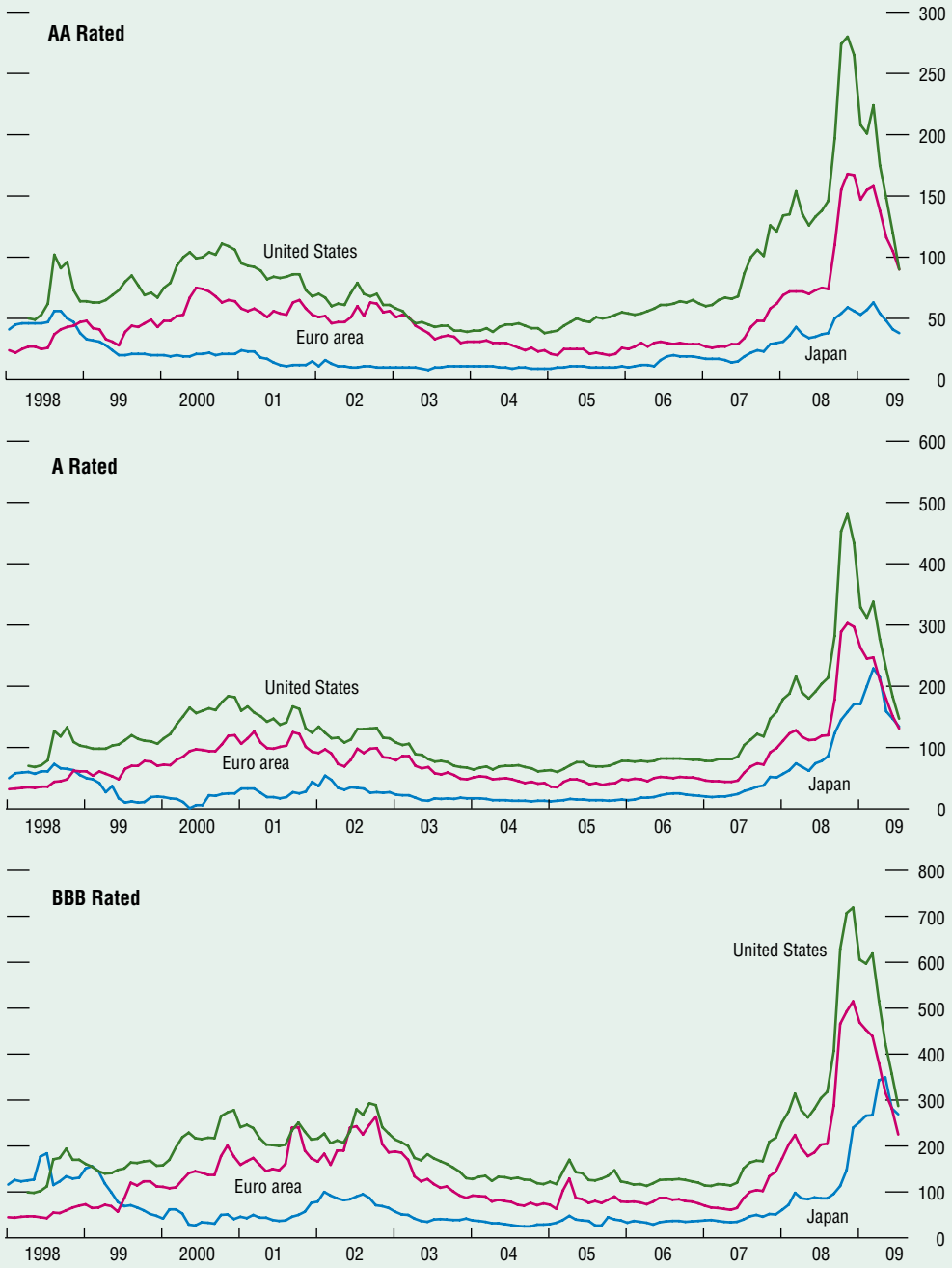
(In basis points; monthly data)



Sources: Bloomberg L.P.; and Merrill Lynch.
[1]Spread between yields on three-month U.S. treasury repo and on three-month U.S. treasury bill.
[2]Spread between yields on 90-day investment-grade commercial paper and on three-month U.S. treasury bill.
[3]Spread over 10-year government bond.

Figure 5. Nonfinancial Corporate Credit Spreads

(In basis points; monthly data)



Source: Merrill Lynch.
Note: Option-adjusted spread.

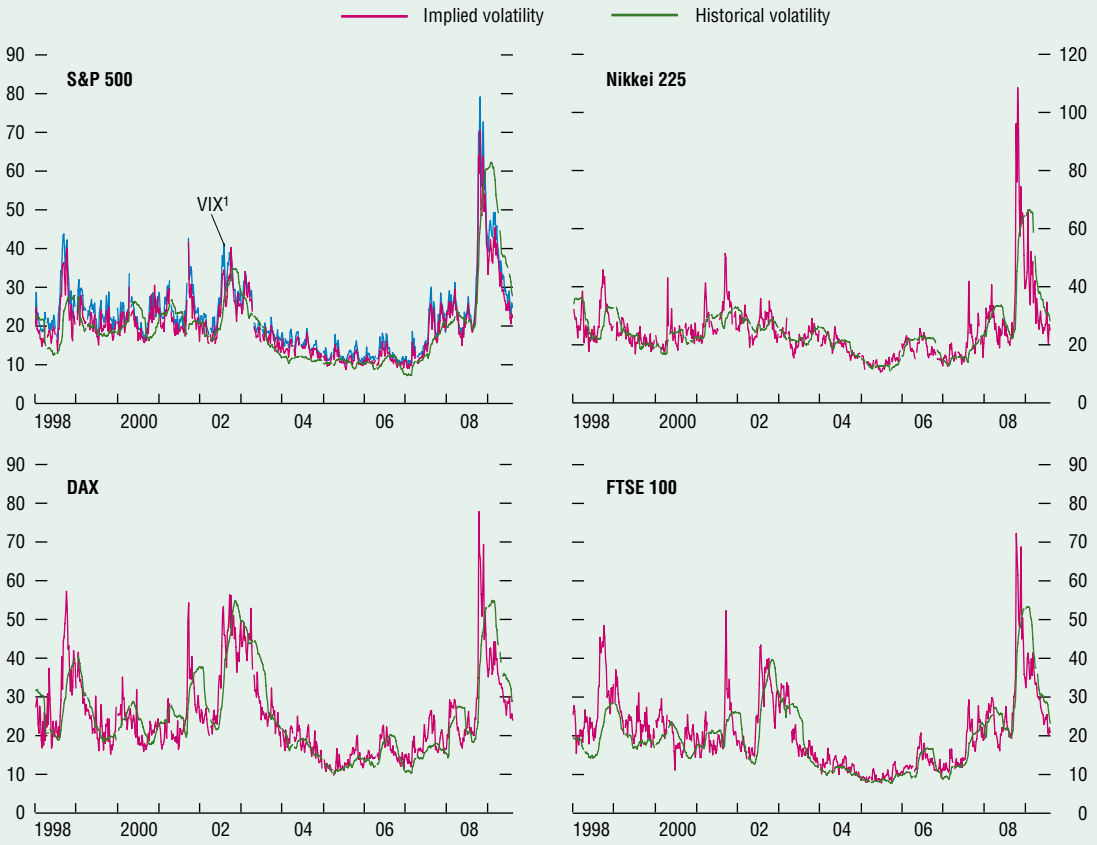
Figure 6. Equity Markets: Price Indices

(January 1, 1990 = 100; weekly data)

Source: Bloomberg L.P.

Figure 7. Implied and Historical Volatility in Equity Markets

(Weekly data)



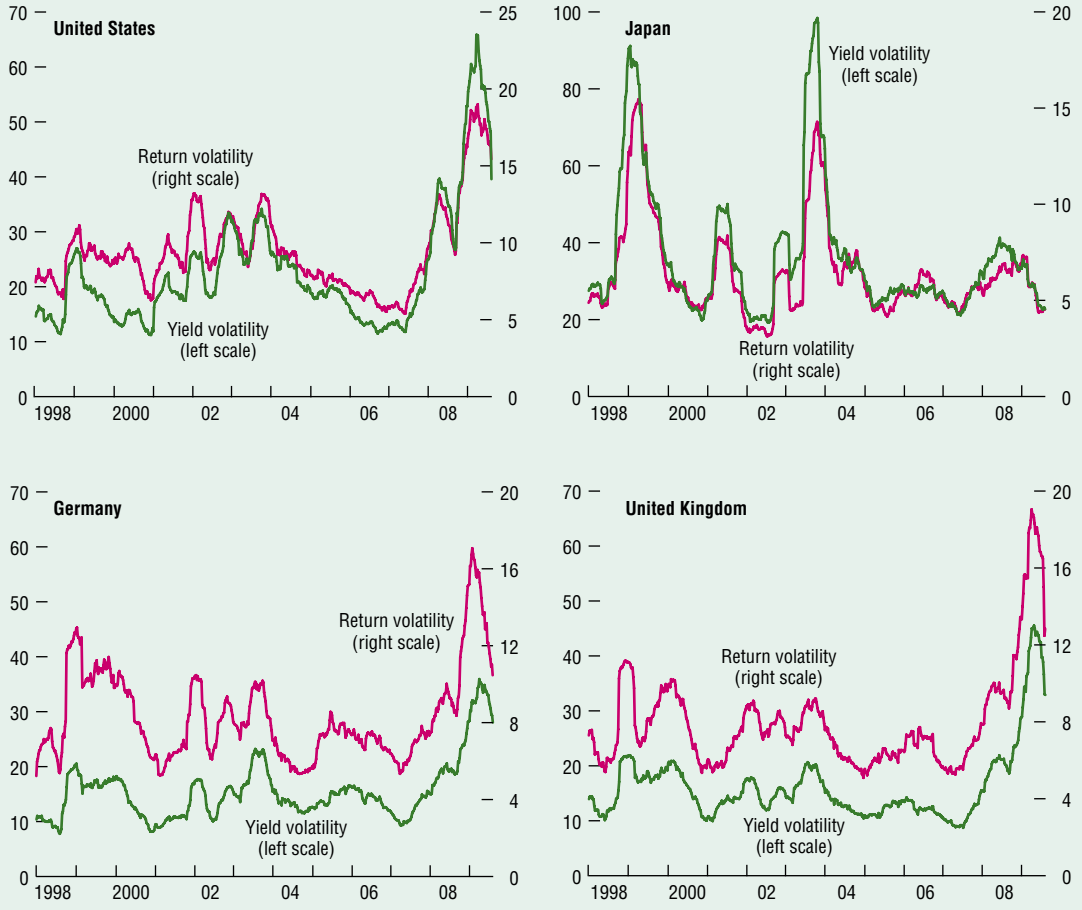
Sources: Bloomberg L.P.; and IMF staff estimates.

Note: Implied volatility is a measure of the equity price variability implied by the market prices of call options on equity futures. Historical volatility is calculated as a rolling 100-day annualized standard deviation of equity price changes. Volatilities are expressed in percent rate of change.

[1]VIX is the Chicago Board Options Exchange volatility index. This index is calculated by taking a weighted average of implied volatility for the eight S&P 500 calls and puts.

Figure 8. Historical Volatility of Government Bond Yields and Bond Returns for Selected Countries[1]

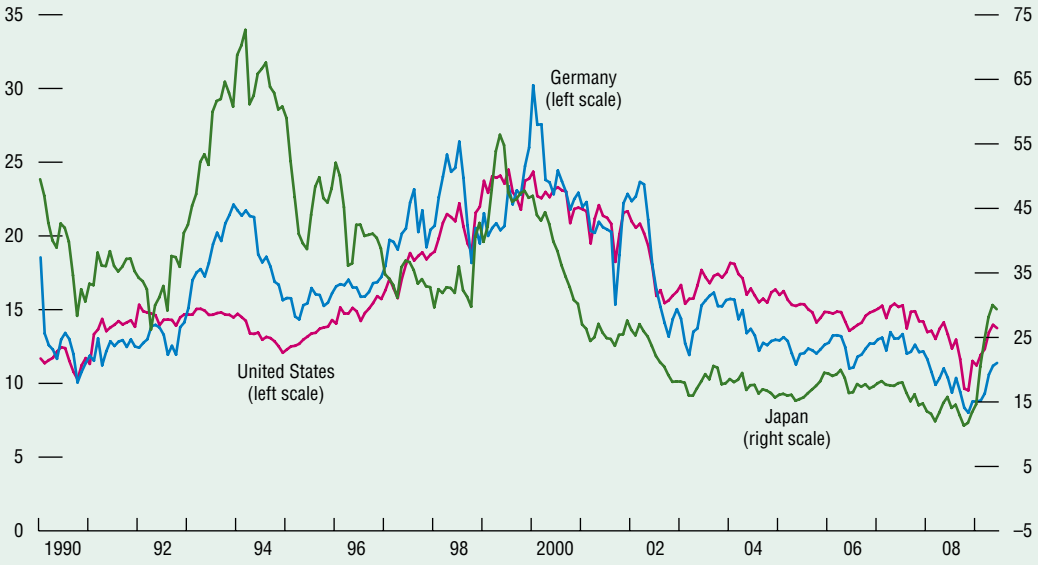
(Weekly data)



Sources: Bloomberg L.P.; and Datastream.

[1]Volatility calculated as a rolling 100-day annualized standard deviation of changes in yield and returns on 10-year government bonds. Returns are based on 10-plus-year government bond indices.

Figure 9. Twelve-Month Forward Price/Earnings Ratios

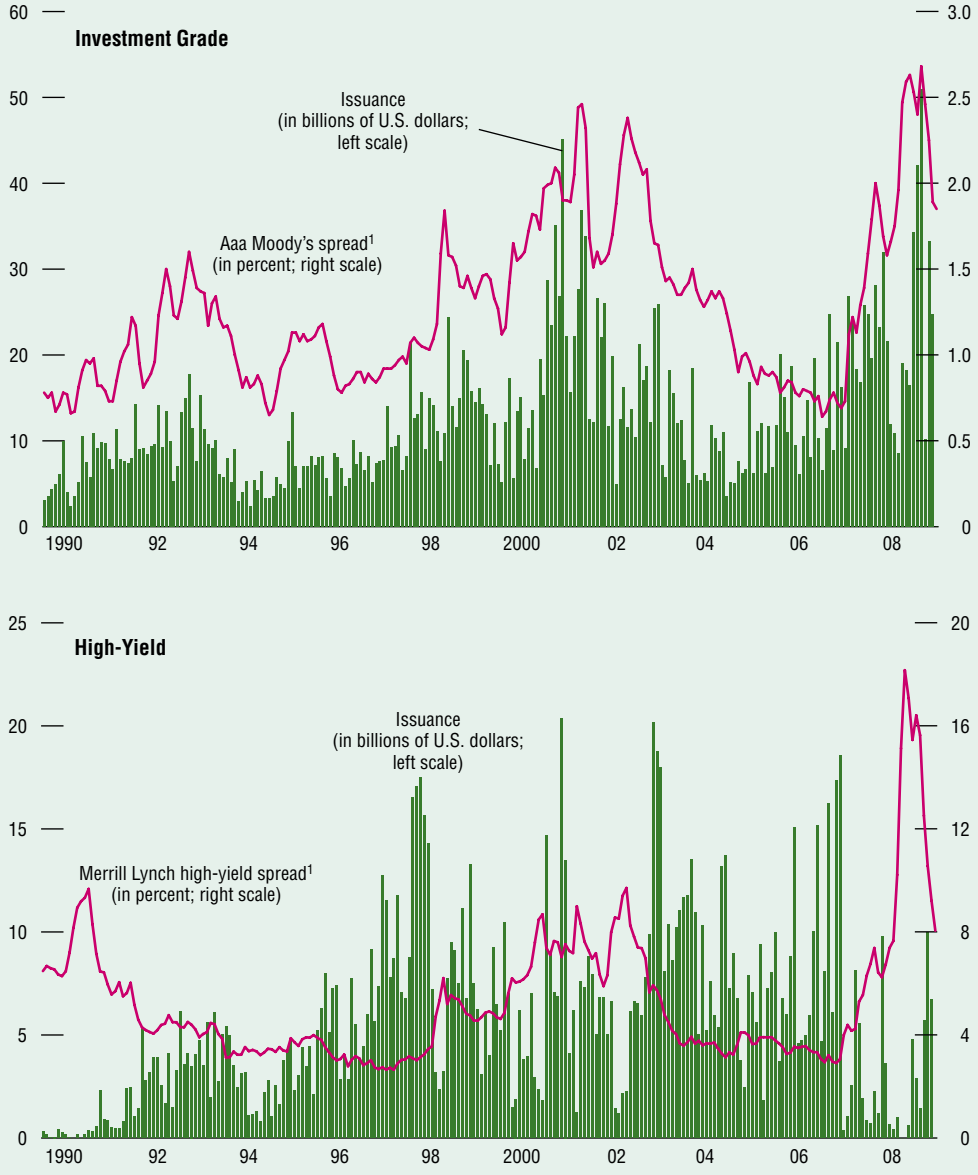


Source: I/B/E/S.

Figure 10. Flows into U.S.-Based Equity Funds

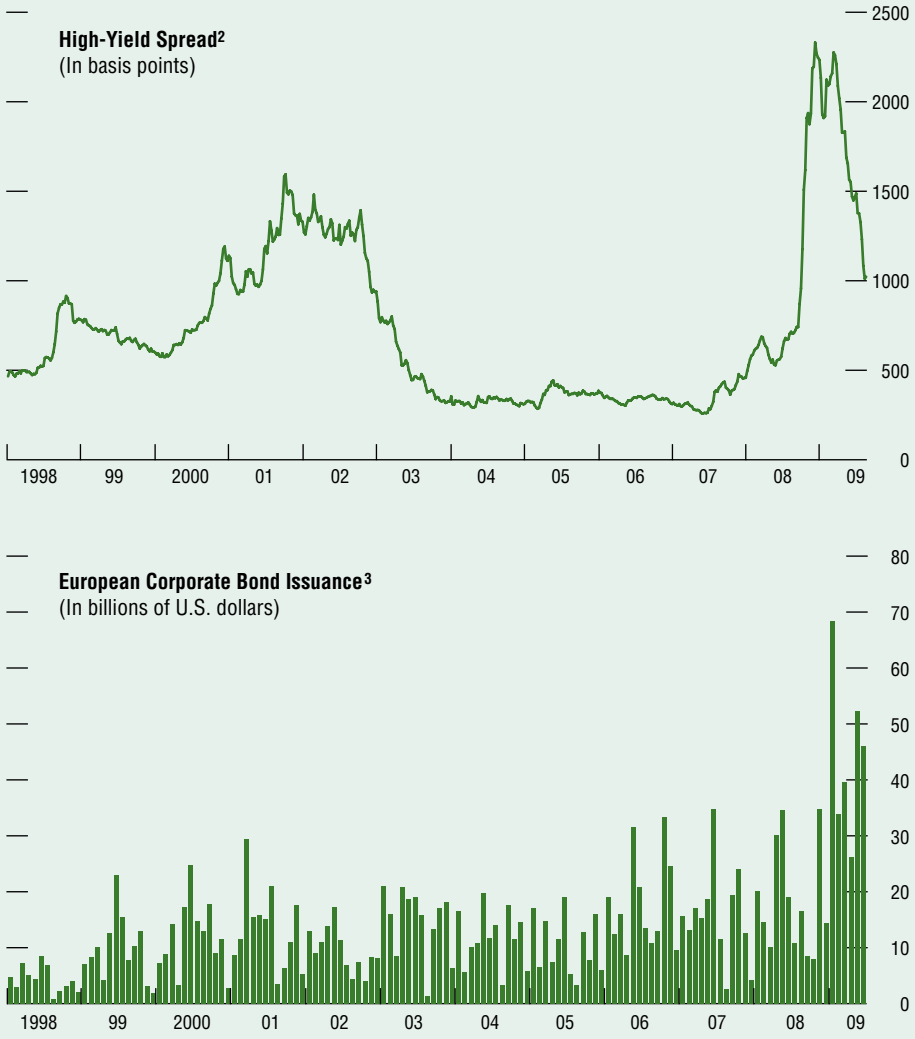
Sources: Investment Company Institute; and Datastream.
[1]In billions of U.S. dollars.

Figure 11. United States: Corporate Bond Market



Sources: Board of Governors of the Federal Reserve System; and Bloomberg L.P.
[1]Spread against yield on 10-year U.S. government bonds.

Figure 12. Europe: Corporate Bond Market[1]



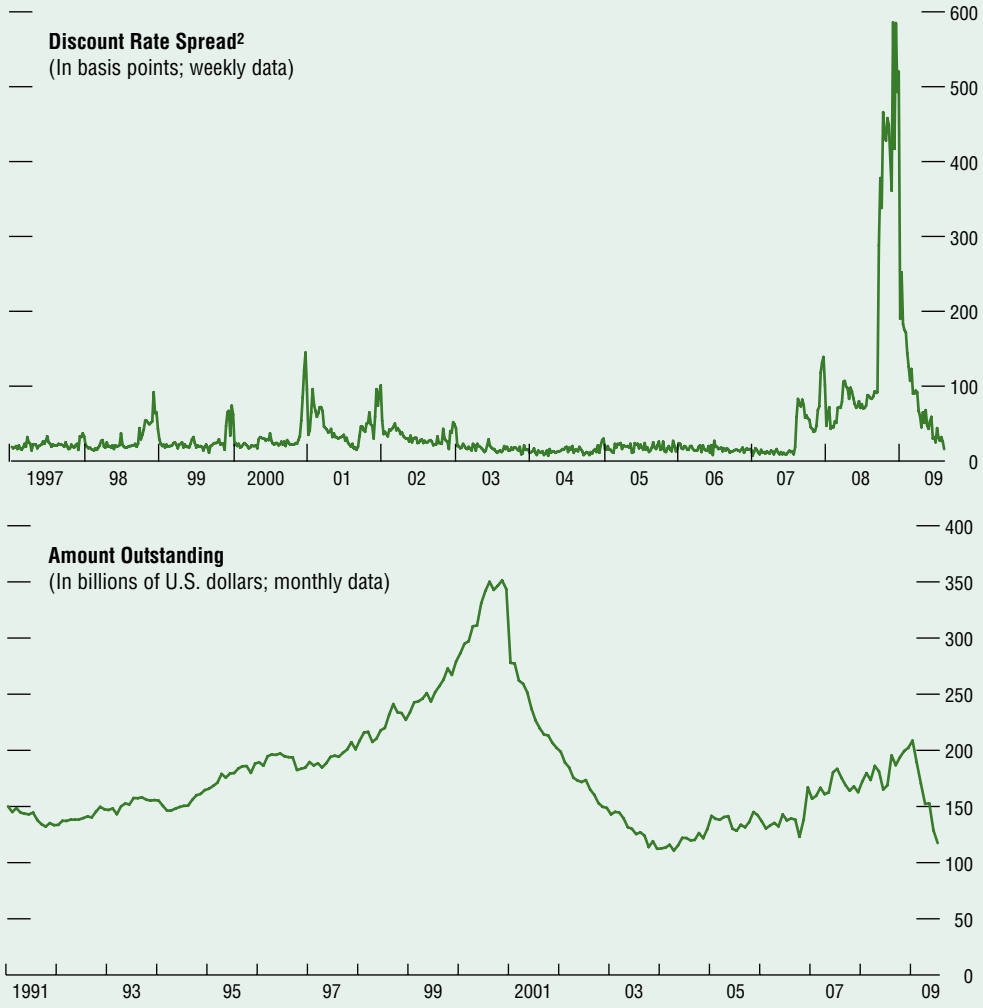
Sources: DCM Analytics; and Datastream.

[1]Nonfinancial corporate bonds.

[2]Spread between yields on a Merrill Lynch High-Yield European Issuers Index bond and a 10-year German government benchmark bond.

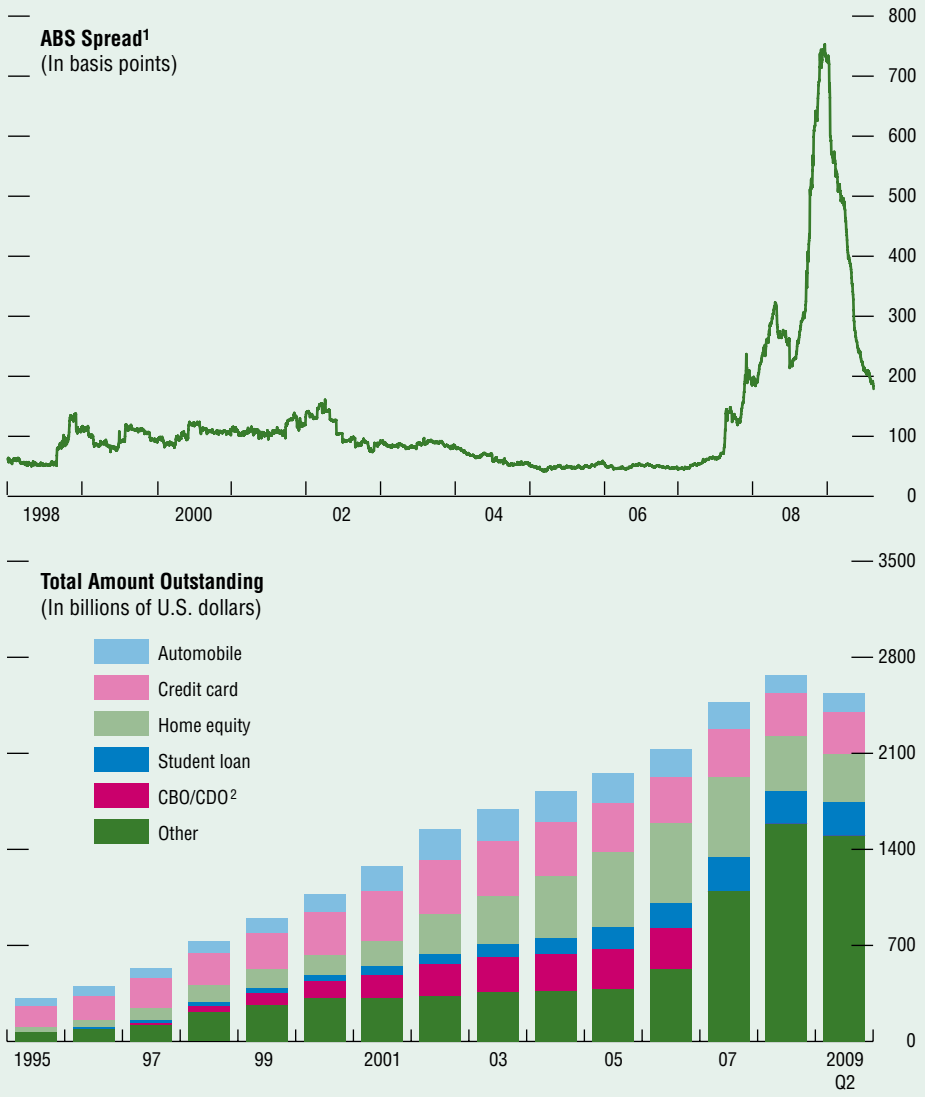
[3]Nonfinancial corporate bond issuance in euro-area countries.

Figure 13. United States: Commercial Paper Market[1]



Source: Board of Governors of the Federal Reserve System.
[1]Nonfinancial commercial paper.
[2]Difference between 30-day A2/P2 and AA commercial paper.

Figure 14. United States: Asset-Backed Securities



Sources: Merrill Lynch; Datastream; and the Securities Industry and Financial Markets Association.
[1]Merrill Lynch AAA Asset-Backed Master Index (fixed rate) option-adjusted spread.
[2]Collateralized bond/debt obligations; from 2007 onward, CBO/CDO amount outstanding is included in Other.

Table 1. Global Financial Flows: Inflows and Outflows[1]

(In billions of U.S. dollars)

	Inflows										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
United States											
Direct investment	179.0	289.4	321.3	167.0	84.4	63.8	146.0	112.6	243.2	275.8	319.7
Portfolio investment	187.6	285.6	436.6	428.3	427.6	550.2	867.3	832.0	1,126.7	1,154.7	527.7
Other investment	54.2	167.2	280.4	187.5	283.2	244.4	519.9	302.7	695.3	699.0	–313.4
Reserve assets	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total capital flows	420.8	742.2	1,038.2	782.9	795.2	858.3	1,533.2	1,247.3	2,065.2	2,129.5	534.1
Canada											
Direct investment	22.7	24.8	66.1	27.7	22.1	7.2	–0.7	25.9	59.8	111.4	45.4
Portfolio investment	16.6	2.7	10.3	24.2	11.9	14.1	41.8	10.9	27.6	–32.5	29.6
Other investment	5.4	–10.8	0.8	7.8	5.1	12.3	–3.9	30.0	34.3	60.3	13.8
Reserve assets	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total capital flows	44.8	16.6	77.2	59.7	39.0	33.6	37.1	66.7	121.7	139.2	88.7
Japan											
Direct investment	3.3	12.3	8.2	6.2	9.1	6.2	7.8	3.2	–6.8	22.2	24.6
Portfolio investment	56.1	126.9	47.4	60.5	–20.0	81.2	196.7	183.1	198.6	196.6	–103.0
Other investment	–93.3	–265.1	–10.2	–17.6	26.6	34.1	68.3	45.9	–89.1	48.9	62.0
Reserve assets	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total capital flows	–34.0	–125.9	45.4	49.1	15.7	121.5	272.8	232.3	102.6	267.7	–16.4
United Kingdom											
Direct investment	74.7	89.3	122.2	53.8	25.5	27.6	57.3	177.4	154.1	197.8	97.5
Portfolio investment	35.2	171.3	268.1	59.1	74.3	172.8	178.3	237.0	285.5	406.7	456.0
Other investment	110.5	87.1	365.1	346.6	92.7	387.9	781.7	902.0	666.3	1,439.2	–1,554.1
Reserve assets	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total capital flows	220.3	347.8	755.3	459.5	192.6	588.3	1,017.4	1,316.5	1,105.9	2,043.6	–1,000.5
Euro area											
Direct investment	. . .	216.3	416.3	199.8	184.9	153.3	114.8	194.1	331.8	524.8	162.5
Portfolio investment	. . .	305.2	267.9	318.1	298.6	381.4	521.5	681.8	1,032.0	808.4	631.9
Other investment	. . .	199.2	340.2	238.6	60.4	198.4	356.0	801.7	928.3	1,287.6	303.6
Reserve assets	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total capital flows	. . .	720.7	1,024.4	756.5	543.8	733.0	992.3	1,677.6	2,292.1	2,620.9	1,098.0
Emerging and Developing Economies[2]											
Direct investment	171.2	170.2	167.0	182.7	172.9	173.9	250.5	334.8	416.4	610.0	666.6
Portfolio investment	43.8	33.9	33.1	2.9	–5.0	55.3	109.0	176.1	287.6	357.8	–30.2
Other investment	41.2	–2.3	25.1	–2.7	4.7	76.7	104.6	126.7	212.6	698.4	87.9
Reserve assets	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total capital flows	256.2	201.8	225.2	182.8	172.5	305.9	464.1	637.5	916.7	1,666.2	724.3

Sources: IMF, International Financial Statistics and World Economic Outlook databases as of September 23, 2009.

[1]The total net capital flows are the sum of direct investment, portfolio investment, other investment flows, and reserve assets. "Other investment" includes bank loans and deposits.

[2]This aggregate comprises the group of Emerging and Developing Economies defined in the World Economic Outlook.

Outflows										
1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
–142.6	–224.9	–159.2	–142.4	–154.5	–149.6	–316.2	–36.2	–244.9	–398.6	–332.0
–130.2	–122.2	–127.9	–90.6	–48.6	–123.1	–177.4	–257.5	–498.9	–396.0	117.4
–74.2	–165.6	–273.1	–144.7	–87.9	–54.3	–510.1	–267.0	–544.3	–677.4	219.4
–6.7	8.7	–0.3	–4.9	–3.7	1.5	2.8	14.1	2.4	–0.1	–4.8
–353.8	–504.1	–560.5	–382.6	–294.7	–325.4	–1,000.9	–546.6	–1,285.7	–1,472.1	–0.1
–34.1	–17.3	–44.5	–36.2	–26.8	–23.6	–42.6	–27.6	–44.5	–59.6	–79.0
–15.1	–15.6	–43.0	–24.4	–18.6	–13.8	–18.9	–44.2	–69.4	–42.8	10.0
9.4	10.2	–4.2	–10.7	–7.9	–14.2	–7.1	–17.8	–30.6	–54.5	–31.0
–5.0	–5.9	–3.7	–2.2	0.2	3.3	2.8	–1.3	–0.8	–3.9	–1.8
–44.8	–28.5	–95.4	–73.4	–53.2	–48.4	–65.8	–91.0	–145.3	–160.8	–101.8
–24.6	–22.3	–31.5	–38.5	–32.0	–28.8	–31.0	–45.4	–50.2	–73.5	–130.8
–95.2	–154.4	–83.4	–106.8	–85.9	–176.3	–173.8	–196.4	–71.0	–123.5	–189.6
37.9	266.3	–4.1	46.6	36.4	149.9	–48.0	–106.6	–86.2	–260.8	139.5
6.2	–76.3	–49.0	–40.5	–46.1	–187.2	–160.9	–22.3	–32.0	–36.5	–30.9
–75.8	13.4	–168.0	–139.2	–127.7	–242.3	–413.6	–370.8	–239.4	–494.2	–211.9
–122.8	–202.5	–246.3	–61.8	–50.3	–65.6	–93.9	–80.8	–85.6	–275.5	–139.3
–53.2	–34.3	–97.2	–124.7	1.2	–58.4	–259.4	–273.4	–257.0	–179.6	210.2
–22.9	–68.7	–374.4	–250.8	–108.5	–420.9	–595.9	–926.2	–708.3	–1,484.3	933.4
0.3	1.0	–5.3	4.5	0.6	2.6	–0.4	–1.7	1.3	–2.6	3.1
–198.6	–304.5	–723.2	–432.9	–157.0	–542.4	–949.7	–1,282.1	–1,049.6	–1,941.9	1,007.4
. . .	–348.7	–413.3	–297.9	–163.7	–164.7	–215.2	–453.5	–542.5	–653.4	–517.9
. . .	–341.8	–385.2	–254.8	–163.5	–318.1	–428.8	–514.6	–660.3	–601.1	–8.1
. . .	–30.5	–166.2	–244.3	–219.6	–282.3	–392.6	–699.9	–932.7	–1,230.2	–57.4
. . .	11.6	16.2	16.4	–3.0	32.8	15.6	22.9	–2.6	–5.7	–5.7
. . .	–709.4	–948.6	–780.5	–549.7	–732.2	–1,021.0	–1,645.1	–2,138.1	–2,490.4	–589.1
–14.5	–17.6	–20.3	–12.0	–21.3	–23.8	–58.9	–83.0	–162.0	–198.7	–241.6
–30.6	–23.3	–65.4	–58.6	–37.2	–71.4	–106.0	–169.0	–396.0	–336.9	–139.5
–92.0	–78.9	–121.9	–21.2	–36.0	–84.7	–125.7	–197.5	–274.1	–521.8	–312.3
6.4	–37.7	–83.3	–89.4	–153.3	–302.6	–425.2	–541.6	–719.1	–1227.3	–676.9
–130.7	–157.5	–290.9	–181.2	–247.8	–482.5	–715.7	–991.1	–1,551.3	–2,284.7	–1,370.3

Table 2. Global Financial Flows: Amounts Outstanding and Net Issues of International Debt Securities by Currency of Issue and Signed International Syndicated Credit Facilities by Nationality of Borrower

(In billions of U.S. dollars)

	2004	2005	2006	2007	2008	2009 Q1
Amounts outstanding of international debt securities by currency of issue						
U.S. dollar	4,905.7	5,378.9	6,390.3	7,535.2	8,225.5	8,569.5
Japanese yen	529.8	471.4	486.6	577.3	750.2	682.8
Pound sterling	979.8	1,061.3	1,446.2	1,704.4	1,701.9	1,772.8
Canadian dollar	112.4	146.6	177.9	266.2	240.1	238.5
Swedish krona	21.0	23.2	34.3	46.7	48.4	57.4
Swiss franc	227.9	208.4	253.3	300.6	331.6	322.1
Euro	6,211.4	6,308.8	8,303.8	10,535.1	10,875.1	10,683.6
Other	282.9	352.0	451.4	605.6	559.0	542.8
Total	13,270.9	13,950.6	17,543.9	21,571.1	22,731.9	22,869.4
Net issues of international debt securities by currency of issue						
U.S. dollar	369.0	473.1	1,011.5	1,144.9	690.3	344.1
Japanese yen	26.9	3.8	19.3	67.2	20.9	–8.2
Pound sterling	132.2	197.3	221.1	226.8	564.3	103.8
Canadian dollar	25.5	29.4	32.1	51.1	30.9	3.8
Swedish krona	3.4	6.2	7.0	9.4	11.7	11.4
Swiss franc	12.7	12.9	27.9	23.9	13.4	12.3
Euro	918.2	986.6	1,200.2	1,149.9	954.3	279.3
Other	52.0	86.3	79.2	105.0	68.8	–6.2
Total	1,539.8	1,795.6	2,598.3	2,778.1	2,354.6	740.4
Signed international syndicated credit facilities by nationality of borrower						
All countries	1,346.8	1,725.1	2,064.0	2,770.0	1,682.4	166.2
Industrial countries	1,192.6	1,490.0	1,722.3	2,256.6	1,303.8	130.8
Of which:						
United States	643.1	700.7	778.3	1,069.9	521.4	66.6
Japan	31.9	27.6	52.0	75.5	46.4	16.5
Germany	87.2	84.3	133.0	126.4	42.9	7.6
France	67.9	112.5	101.1	167.5	77.7	5.6
Italy	21.3	40.8	38.9	36.5	28.5	0.4
United Kingdom	123.7	158.3	189.4	240.8	173.8	5.3
Canada	22.0	40.2	61.5	78.9	52.3	3.2

Source: Bank for International Settlements.

Table 3. Selected Indicators on the Size of the Capital Markets, 2008

(In billions of U.S. dollars unless noted otherwise)

	GDP	Total Reserves Minus Gold[1]	Stock Market Capitalization	Debt Securities			Bank Assets	Bonds, Equities, and Bank Assets[2]	Bonds, Equities, and Bank Assets[2] *(In percent of GDP)*
				Public	Private	Total			
World	60,917.5	6,787.8	33,513.1	31,665.9	51,863.7	83,529.6	97,381.4	214,424.0	352.0
European Union	17,037.4	278.4	7,262.8	8,845.3	20,291.7	29,137.0	46,802.4	83,202.1	488.3
Euro area	13,538.4	167.7	4,984.7	7,781.1	16,012.2	23,793.3	32,510.8	61,288.8	452.7
North America	15,941.0	110.4	12,771.1	8,642.9	23,521.3	32,164.2	16,528.7	61,464.0	385.6
Canada	1,499.6	43.8	1,033.4	750.9	755.7	1,506.6	2,532.2	5,072.2	338.2
United States	14,441.4	66.6	11,737.6	7,892.1	22,765.6	30,657.7	13,996.5	56,391.8	390.5
Japan	4,910.7	1,009.4	3,209.0	9,116.3	2,362.1	11,478.4	10,027.0	24,714.4	503.3
Memorandum items:									
EU countries									
Austria	414.8	8.9	76.3	216.4	480.1	696.5	719.5	1,492.4	359.8
Belgium	506.2	9.3	167.4	501.0	612.2	1,113.2	1,908.8	3,189.5	630.1
Denmark	340.0	40.5	140.0	100.4	631.4	731.8	1,333.5	2,205.3	648.6
Finland	271.9	7.0	157.5	119.0	123.5	242.5	410.5	810.5	298.1
France	2,867.0	33.6	1,490.6	1,481.6	3,052.8	4,534.3	10,469.0	16,494.0	575.3
Germany	3,673.1	43.1	1,110.6	1,646.7	3,842.9	5,489.6	6,540.9	13,141.0	357.8
Greece	357.5	0.3	90.9	478.6	162.2	640.9	556.3	1,288.1	360.3
Ireland	267.6	0.9	49.5	106.5	488.8	595.3	1,360.0	2,004.8	749.3
Italy	2,313.9	37.1	522.1	1,998.7	2,495.2	4,493.9	3,295.3	8,311.3	359.2
Luxembourg	55.0	0.3	66.6	0.0	107.1	107.1	776.4	950.1	1,728.3
Netherlands	877.0	11.5	206.6	402.8	1,655.1	2,057.9	3,044.0	5,308.5	605.3
Portugal	244.6	1.3	74.8	188.9	292.7	481.6	277.2	833.5	340.7
Spain	1,602.0	12.4	948.4	634.0	2,692.4	3,326.4	2,954.5	7,229.2	451.3
Sweden	479.0	25.9	270.0	128.6	512.8	641.4	616.5	1,527.9	319.0
United Kingdom	2,680.0	44.3	1,868.2	835.1	3,135.2	3,970.3	12,341.6	18,180.1	678.4
Emerging market countries[4]	20,605.9	4,286.8	8,558.9	4,712.2	3,103.2	7,815.4	18,020.0	34,394.2	166.9
Of which:									
Asia	8,902.0	2,356.3	5,326.7	2,735.7	2,097.2	4,832.9	11,708.4	21,868.0	245.7
Latin America	4,209.0	497.2	1,456.6	1,153.8	654.3	1,808.1	2,189.8	5,454.4	129.6
Middle East	2,087.0	320.8	689.6	44.8	76.3	121.1	1,363.6	2,174.2	104.2
Africa	1,282.4	332.9	444.5	72.7	82.3	155.0	693.1	1,292.6	100.8
Europe	4,125.5	779.6	641.6	705.1	193.2	898.3	2,065.2	3,605.1	87.4

Sources: World Federation of Exchanges; Bank for International Settlements; IMF, International Financial Statistics (IFS) and World Economic Outlook databases as of September 23, 2009; ©2003 Bureau van Dijk Electronic Publishing-Bankscope; and Standard & Poor's Emerging Markets Database.

[1]Data are from IFS.

[2]Total assets of commercial banks, including subsidiaries.

[3]Sum of the stock market capitalization, debt securities, and bank assets.

[4]This aggregate comprises the group of Other Emerging Market and Developing Countries defined in the World Economic Outlook, together with Hong Kong SAR, Israel, Korea, Singapore, and Taiwan Province of China.

Table 4. Global Over-the-Counter Derivatives Markets: Notional Amounts and Gross Market Values of Outstanding Contracts[1]

(In billions of U.S. dollars)

	Notional Amounts					Gross Market Values				
	End-Dec. 2006	End-June 2007	End-Dec. 2007	End-June 2008	End-Dec. 2008	End-Dec. 2006	End-June 2007	End-Dec. 2007	End-June 2008	End-Dec. 2008
Total	**418,131**	**516,407**	**595,341**	**683,726**	**591,963**	**9,791**	**11,140**	**15,813**	**20,353**	**33,889**
Foreign exchange	**40,271**	**48,645**	**56,238**	**62,983**	**49,753**	**1,266**	**1,345**	**1,807**	**2,262**	**3,917**
Forwards and forex swaps	19,882	24,530	29,144	31,966	24,562	469	492	675	802	1,732
Currency swaps	10,792	12,312	14,347	16,307	14,725	601	619	817	1,071	1,588
Options	9,597	11,804	12,748	14,710	10,466	196	235	315	388	597
Interest rate[2]	**291,581**	**347,312**	**393,138**	**458,304**	**418,678**	**4,826**	**6,063**	**7,177**	**9,263**	**18,420**
Forward rate agreements	18,668	22,809	26,599	39,370	39,262	32	43	41	88	153
Swaps	229,693	272,216	309,588	356,772	328,114	4,163	5,321	6,183	8,056	16,573
Options	43,221	52,288	56,951	62,162	51,301	631	700	953	1,120	1,694
Equity-linked	**7,488**	**8,590**	**8,469**	**10,177**	**6,494**	**853**	**1,116**	**1,142**	**1,146**	**1,113**
Forwards and swaps	1,767	2,470	2,233	2,657	1,632	166	240	239	283	338
Options	5,720	6,119	6,236	7,520	4,862	686	876	903	863	775
Commodity[3]	**7,115**	**7,567**	**8,455**	**13,229**	**4,427**	**667**	**636**	**1,899**	**2,209**	**955**
Gold	640	426	595	649	395	56	47	70	68	65
Other	6,475	7,141	7,861	12,580	4,032	611	589	1,829	2,142	890
Forwards and swaps	2,813	3,447	5,085	7,561	2,471	. . .	. . .	. . .	. . .	. . .
Options	3,663	3,694	2,776	5,019	1,561	. . .	. . .	. . .	. . .	. . .
Credit default swaps	**28,650**	**42,581**	**57,894**	**57,325**	**41,868**	**470**	**721**	**2,002**	**3,172**	**5,652**
Single-name instruments	17,879	24,239	32,246	33,334	25,730	278	406	1,143	1,889	3,695
Multi-name instruments	10,771	18,341	25,648	23,991	16,138	192	315	859	1,283	1,957
Unallocated	**43,026**	**61,713**	**71,146**	**81,708**	**70,742**	**1,709**	**1,259**	**1,788**	**2,301**	**3,831**
Memorandum items:										
Gross credit exposure[4]	n.a.	n.a.	n.a.	n.a.	n.a.	2,036	2,672	3,256	3,859	5,004
Exchange-traded derivatives[5]	69,390	95,091	79,078	82,008	57,860	. . .	. . .	. . .	. . .	. . .

Source: Bank for International Settlements.

[1]All figures are adjusted for double-counting. Notional amounts outstanding have been adjusted by halving positions vis-à-vis other reporting dealers. Gross market values have been calculated as the sum of the total gross positive market value of contracts and the absolute value of the gross negative market value of contracts with nonreporting counterparties.

[2]Single-currency contracts only.

[3]Adjustments for double-counting are estimated.

[4]Gross market values after taking into account legally enforceable bilateral netting agreements.

[5]Includes futures and options on interest rate, currency and equity index contracts.

Table 5. Global Over-the-Counter Derivatives Markets: Notional Amounts and Gross Market Values of Outstanding Contracts by Counterparty, Remaining Maturity, and Currency[1]

(In billions of U.S. dollars)

	Notional Amounts					Gross Market Values				
	End-Dec. 2006	End-June 2007	End-Dec. 2007	End-June 2008	End-Dec. 2008	End-Dec. 2006	End-June 2007	End-Dec. 2007	End-June 2008	End-Dec. 2008
Total	**418,131**	**516,407**	**595,341**	**683,726**	**591,963**	**9,791**	**11,140**	**15,813**	**20,353**	**33,889**
Foreign exchange	**40,271**	**48,645**	**56,238**	**62,983**	**49,753**	**1,266**	**1,345**	**1,807**	**2,262**	**3,917**
By counterparty										
With other reporting dealers	15,532	19,173	21,334	24,845	19,380	438	455	594	782	1,427
With other financial institutions	16,023	19,144	24,357	26,775	21,214	521	557	806	995	1,753
With nonfinancial customers	8,716	10,329	10,548	11,362	9,158	307	333	407	484	737
By remaining maturity										
Up to one year[2]	30,270	36,950	40,316	43,639	32,375	. . .	. . .	. . .	. . .	. . .
One to five years[2]	6,702	8,090	8,553	10,701	9,664	. . .	. . .	. . .	. . .	. . .
Over five years[2]	3,299	3,606	7,370	8,643	7,715	. . .	. . .	. . .	. . .	. . .
By major currency										
U.S. dollar[3]	33,755	40,513	46,947	52,152	42,170	1,069	1,112	1,471	1,838	3,133
Euro[3]	16,037	18,280	21,806	25,963	20,969	509	455	790	1,010	1,567
Japanese yen[3]	9,490	10,602	12,857	13,616	12,128	325	389	371	433	916
Pound sterling[3]	6,135	7,770	7,979	8,377	5,606	197	174	260	280	692
Other[3]	15,124	20,125	22,888	25,858	18,632	431	561	723	963	1,526
Interest rate[4]	**291,581**	**347,312**	**393,138**	**458,304**	**418,678**	**4,826**	**6,063**	**7,177**	**9,263**	**18,420**
By counterparty										
With other reporting dealers	127,432	148,555	157,245	188,982	162,970	1,973	2,375	2,774	3,554	6,629
With other financial institutions	125,708	153,370	193,107	223,023	214,107	2,223	2,946	3,786	4,965	10,731
With nonfinancial customers	38,441	45,387	42,786	46,299	41,601	630	742	617	745	1,061
By remaining maturity										
Up to one year[2]	104,098	132,402	127,601	153,181	137,278	. . .	. . .	. . .	. . .	. . .
One to five years[2]	110,314	125,700	134,713	150,096	138,263	. . .	. . .	. . .	. . .	. . .
Over five years[2]	77,170	89,210	130,824	155,028	143,137	. . .	. . .	. . .	. . .	. . .
By major currency										
U.S. dollar	97,430	114,371	129,756	149,813	146,249	1,661	1,851	3,219	3,601	10,200
Euro	111,791	127,648	146,082	171,877	154,773	2,300	2,846	2,688	3,910	5,200
Japanese yen	38,113	48,035	53,099	58,056	56,419	297	364	401	380	815
Pound sterling	22,238	27,676	28,390	38,619	29,593	311	627	430	684	1,189
Other	22,009	29,581	35,811	39,939	31,644	257	375	439	689	1,016
Equity-linked	**7,488**	**8,590**	**8,469**	**10,177**	**6,494**	**853**	**1,116**	**1,142**	**1,146**	**1,113**
Commodity[5]	**7,115**	**7,567**	**8,455**	**13,229**	**4,427**	**667**	**636**	**1,899**	**2,209**	**955**
Credit default swaps	**28,650**	**42,581**	**57,894**	**57,325**	**41,868**	**470**	**721**	**2,002**	**3,172**	**5,652**
Unallocated	**43,026**	**61,713**	**71,146**	**81,708**	**70,742**	**1,709**	**1,259**	**1,788**	**2,301**	**3,831**

Source: Bank for International Settlements.

[1]All figures are adjusted for double-counting. Notional amounts outstanding have been adjusted by halving positions vis-à–vis other reporting dealers. Gross market values have been calculated as the sum of the total gross positive market value of contracts and the absolute value of the gross negative market value of contracts with nonreporting counterparties.

[2]Residual maturity.

[3]Counting both currency sides of each foreign exchange transaction means that the currency breakdown sums to twice the aggregate.

[4]Single-currency contracts only.

[5]Adjustments for double-counting are estimated.

Table 6. Exchange-Traded Derivative Financial Instruments: Notional Principal Amounts Outstanding and Annual Turnover

	1997	1998	1999	2000	2001	2002
			(In billions of U.S. dollars)			
Notional principal amounts outstanding						
Interest rate futures	7,586.7	8,031.4	7,924.9	7,907.8	9,269.6	9,955.6
Interest rate options	3,639.9	4,623.5	3,755.5	4,734.2	12,492.8	11,759.5
Currency futures	42.3	31.7	36.7	74.4	65.6	47.0
Currency options	118.6	49.2	22.4	21.4	27.4	27.4
Stock market index futures	210.9	291.5	340.1	368.5	333.7	350.8
Stock market index options	808.9	947.7	1,508.6	1,141.1	1,560.7	1,687.9
Total	12,407.3	13,975.0	13,588.2	14,247.5	23,749.8	23,828.2
North America	6,348.1	7,395.5	6,931.0	8,168.6	16,188.9	13,706.5
Europe	3,587.3	4,397.1	4,008.8	4,195.0	6,141.7	8,801.4
Asia-Pacific	2,235.7	1,882.4	2,398.7	1,597.7	1,308.0	1,191.2
Other	236.2	300.1	249.7	286.2	111.2	129.1
			(In millions of contracts traded)			
Annual turnover						
Interest rate futures	701.6	760.0	672.7	781.2	1,057.5	1,152.1
Interest rate options	116.8	129.7	118.0	107.7	199.6	240.3
Currency futures	73.6	54.5	37.1	43.5	49.1	42.6
Currency options	21.1	12.1	6.8	7.0	10.5	16.1
Stock market index futures	115.9	178.0	204.9	225.2	337.1	530.6
Stock market index options	178.2	195.0	322.5	481.5	1,148.2	2,235.5
Total	1,207.1	1,329.3	1,362.0	1,646.0	2,801.9	4,217.2
North America	463.5	530.0	462.8	461.3	675.7	912.3
Europe	482.8	525.9	604.7	718.6	957.7	1,075.1
Asia-Pacific	126.9	170.9	207.7	331.3	985.1	2,073.1
Other	134.0	102.5	86.8	134.9	183.4	156.7

Source: Bank for International Settlements.

2003	2004	2005	2006	2007	2008	2009 Q1
			(In billions of U.S. dollars)			
13,123.7	18,164.9	20,708.7	24,476.2	26,769.6	18,732.3	17,833.7
20,793.8	24,604.1	31,588.2	38,116.4	44,281.7	33,978.8	33,005.8
79.9	103.5	107.6	161.4	158.5	95.2	86.1
37.9	60.7	66.1	78.6	132.7	124.8	107.3
501.5	631.2	776.5	1,030.8	1,110.8	656.0	592.5
2,160.4	2,954.7	4,004.3	5,527.0	6,624.7	4,272.8	4,132.4
36,697.0	46,519.1	57,251.4	69,390.4	79,077.9	57,859.9	55,757.9
19,461.2	27,538.0	35,852.0	41,505.4	42,501.5	29,814.7	26,811.0
15,406.9	16,308.2	17,972.8	23,215.5	30,567.0	24,622.5	26,067.6
1,612.4	2,423.6	3,001.1	4,044.0	4,964.0	2,685.9	2,242.4
216.5	249.3	425.5	625.5	1,045.5	736.8	636.9
			(In millions of contracts traded)			
1,576.8	1,902.6	2,110.4	2,621.2	3,076.6	2,582.9	443.0
302.3	361.0	430.8	566.7	663.3	617.7	131.7
58.8	83.7	143.0	231.1	353.1	433.8	71.1
14.3	13.0	19.4	24.3	46.4	59.8	9.2
725.8	804.5	918.7	1,233.7	1,930.2	2,467.9	600.6
3,233.9	2,980.1	3,139.8	3,177.5	3,815.6	4,174.1	959.0
5,911.8	6,144.9	6,762.1	7,854.4	9,885.2	10,336.2	2,214.6
1,279.8	1,633.6	1,926.8	2,541.8	3,146.5	3,079.6	575.8
1,346.5	1,412.7	1,592.9	1,947.4	2,560.2	2,939.5	620.5
3,111.6	2,847.6	2,932.4	2,957.1	3,592.5	3,753.6	892.3
174.0	251.0	310.0	408.1	586.0	563.5	126.1

Table 7. United States: Sectoral Balance Sheets

(In percent)

	2003	2004	2005	2006	2007	2008
Corporate sector						
Debt/net worth	48.7	45.8	41.2	39.7	43.2	49.4
Short-term debt/credit market debt	27.8	28.0	27.6	28.0	30.5	30.6
Interest burden[1]	11.8	8.6	7.8	7.7	8.1	9.0
Household sector						
Net worth/assets	82.5	82.5	82.6	82.2	81.4	78.4
Equity/total assets	25.2	25.5	24.8	26.5	26.9	18.6
Equity/financial assets	40.3	41.1	40.6	42.4	41.5	29.8
Net worth/disposable personal income	568.0	597.1	640.0	645.2	615.4	485.9
Home mortgage debt/total assets	12.2	12.5	12.6	13.0	13.7	15.9
Consumer credit/total assets	3.7	3.5	3.3	3.2	3.3	3.9
Total debt/financial assets	28.1	28.4	28.4	28.4	28.8	34.6
Debt-service burden[2]	13.6	13.6	14.0	14.2	14.2	13.9
Banking sector[3]						
Credit quality						
Nonperforming loans[4]/total loans	1.2	0.9	0.8	0.8	1.3	3.0
Net loan losses/average total loans	0.9	0.7	0.6	0.4	0.6	1.3
Loan-loss reserve/total loans	1.8	1.5	1.3	1.2	1.4	2.3
Net charge-offs/total loans	0.9	0.6	0.6	0.4	0.6	1.3
Capital ratios						
Total risk-based capital	12.8	12.6	12.3	12.4	12.2	12.7
Tier 1 risk-based capital	10.1	10.0	9.9	9.8	9.4	9.7
Equity capital/total assets	9.2	10.1	10.3	10.2	10.2	9.4
Core capital (leverage ratio)	7.9	7.8	7.9	7.9	7.6	7.4
Profitability measures						
Return on average assets (ROA)	1.4	1.3	1.3	1.3	0.9	0.1
Return on average equity (ROE)	15.3	13.7	12.9	13.0	9.1	1.4
Net interest margin	3.8	3.6	3.6	3.4	3.4	3.3
Efficiency ratio[5]	56.5	58.0	57.2	56.3	59.2	58.4

Sources: Board of Governors of the Federal Reserve System, *Flow of Funds*; Department of Commerce, Bureau of Economic Analysis; Federal Deposit Insurance Corporation; and Federal Reserve Bank of St. Louis.

[1]Ratio of net interest payments to pre-tax income.

[2]Ratio of debt payments to disposable personal income.

[3]FDIC-insured commercial banks.

[4]Loans past due 90+ days and nonaccrual.

[5]Noninterest expense less amortization of intangible assets as a percent of net interest income plus noninterest income.

Table 8. Japan: Sectoral Balance Sheets[1]

(In percent)

	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
Corporate sector							
Debt/shareholders' equity (book value)	146.1	121.3	121.5	101.7	98.2	97.1	106.8
Short-term debt/total debt	39.0	37.8	36.8	36.4	35.3	34.1	34.6
Interest burden[2]	27.8	22.0	18.4	15.6	15.2	16.2	28.3
Debt/operating profits	1,370.0	1,079.2	965.9	839.9	820.4	798.6	1,538.6
Memorandum item:							
Total debt/GDP[3]	100.9	90.9	96.4	85.7	89.8	83.3	93.7
Household sector							
Net worth/assets	84.3	84.5	84.6	84.9	85.1	85.1	. . .
Equity	3.5	4.9	5.7	8.7	8.7	5.4	. . .
Real estate	34.7	33.0	31.5	29.9	29.9	30.9	. . .
Net worth/net disposable income	722.5	725.9	721.0	737.7	742.8	731.9	. . .
Interest burden[4]	5.1	4.9	4.8	4.6	4.7	4.8	. . .
Memorandum items:							
Debt/equity	448.2	317.6	268.4	174.5	172.2	274.4	. . .
Debt/real estate	45.1	47.0	49.0	50.6	49.8	48.3	. . .
Debt/net disposable income	134.2	133.2	131.5	131.6	130.1	128.4	. . .
Debt/net worth	18.6	18.4	18.2	17.8	17.5	17.5	. . .
Equity/net worth	4.1	5.8	6.8	10.2	10.2	6.4	. . .
Real estate/net worth	41.2	39.0	37.2	35.2	35.2	36.3	. . .
Total debt/GDP[3]	79.4	77.5	76.1	76.3	75.2	72.8	. . .
Banking sector							
Credit quality							
Nonperforming loans[5]/total loans	7.4	5.8	4.0	2.9	2.5	2.4	2.4
Capital ratio							
Stockholders' equity/assets	3.3	3.9	4.2	4.9	5.3	4.5	3.6
Profitability measures							
Return on equity (ROE)[6]	–19.5	–2.7	4.1	11.3	8.5	6.1	–6.9

Sources: Ministry of Finance, *Financial Statements of Corporations by Industries*; Cabinet Office, Economic and Social Research Institute, *Annual Report on National Accounts*; Japanese Bankers Association, *Financial Statements of All Banks*; and Financial Services Agency, *The Status of Nonperforming Loans*.

[1]Data are fiscal year beginning April 1. Stock data on households are only available through FY2006.

[2]Interest payments as a percent of operating profits.

[3]Revised due to the change in GDP figures.

[4]Interest payments as a percent of disposable income.

[5]Nonperforming loans are based on figures reported under the Financial Reconstruction Law.

[6]Net income as a percentage of stockholders' equity (no adjustment for preferred stocks, etc.).

Table 9. Europe: Sectoral Balance Sheets[1]

(In percent)

	2003	2004	2005	2006	2007	2008
Corporate sector						
Debt/equity[2]	70.9	69.0	70.4	74.4	76.2	87.1
Short-term debt/total debt	33.8	33.8	36.4	37.0	39.2	35.7
Interest burden[3]	16.0	15.6	16.2	17.5	20.0	20.3
Debt/operating profits	320.1	320.5	342.6	374.9	395.1	424.5
Memorandum items:						
Financial assets/equity	1.4	1.4	1.5	1.5	1.6	1.8
Liquid assets/short-term debt	85.9	95.1	96.7	95.4	97.5	103.1
Household sector						
Net worth/assets	83.8	81.5	84.5	84.3	84.5	83.5
Equity/net worth	11.8	13.9	12.3	12.1	11.7	11.9
Equity/net financial assets	34.4	44.9	34.8	34.5	33.6	35.0
Interest burden[4]	5.7	5.4	5.4	5.4	5.4	5.5
Memorandum items:						
Nonfinancial assets/net worth	65.6	68.0	64.6	64.9	65.3	66.2
Debt/net financial assets	52.7	70.8	48.3	48.0	48.1	53.8
Debt/income	100.4	105.4	106.4	109.6	112.0	109.1
Banking sector[5]						
Credit quality						
Nonperforming loans/total loans	2.3	2.1	2.0	1.9	2.0	2.9
Loan-loss reserve/nonperforming loans	73.0	72.8	73.6	67.2	64.5	60.5
Loan-loss reserve/total loans	2.4	1.8	1.5	1.3	1.3	1.7
Capital ratios						
Equity capital/total assets	2.9	3.7	3.7	3.6	3.5	2.6
Capital funds/liabilities	5.0	5.7	5.9	5.8	5.8	4.8
Profitability measures						
Return on assets, or ROA (after tax)	0.5	0.5	0.5	0.6	0.4	–0.2
Return on equity, or ROE (after tax)	11.3	13.5	14.5	15.8	12.1	–8.4
Net interest margin	1.5	1.2	1.0	0.9	0.9	0.9
Efficiency ratio[6]	73.1	64.8	61.1	59.4	62.4	78.7

Sources: Banque de France; Bundesbank; U.K. Office for National Statistics; ©2003 Bureau van Dijk Electronic Publishing-Bankscope; and IMF staff estimates.

[1]GDP-weighted average for France, Germany, and the United Kingdom, unless otherwise noted.

[2]Corporate equity adjusted for changes in asset valuation.

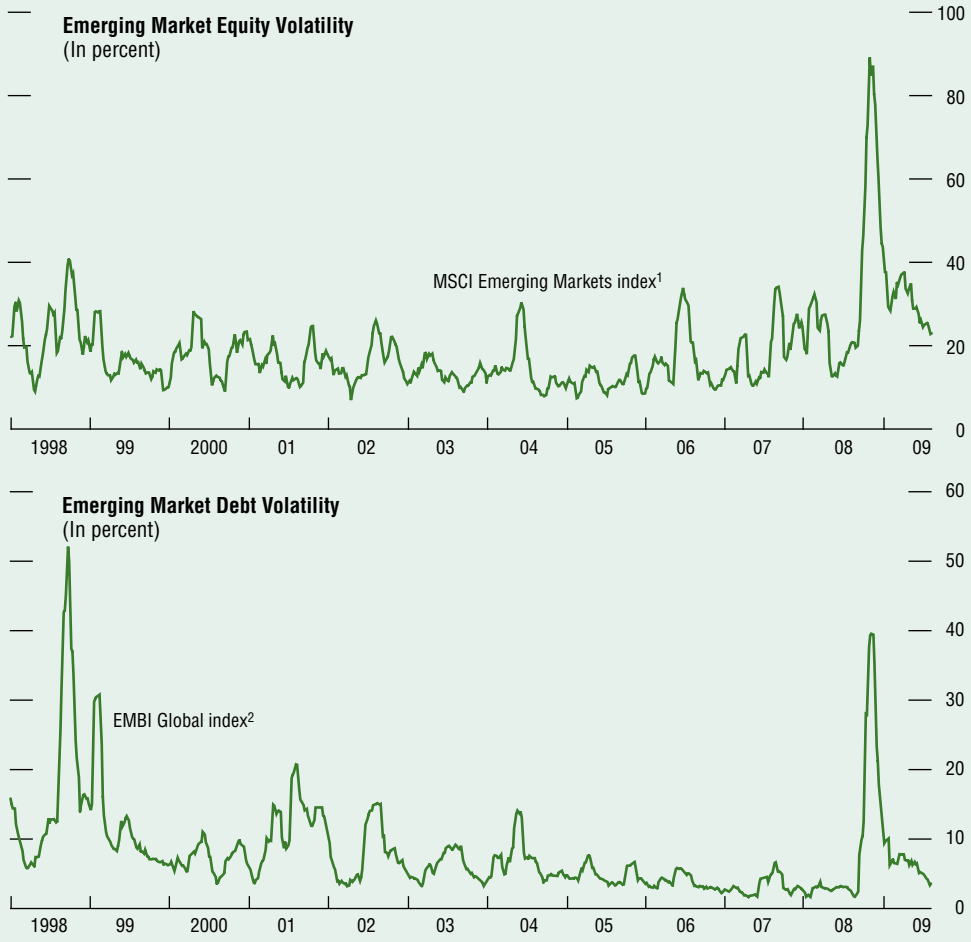
[3]Interest payments as a percent of gross operating profits.

[4]Interest payments as percent of disposable income.

[5]Fifty largest European banks. Data availability may restrict coverage to less than 50 banks for specific indicators.

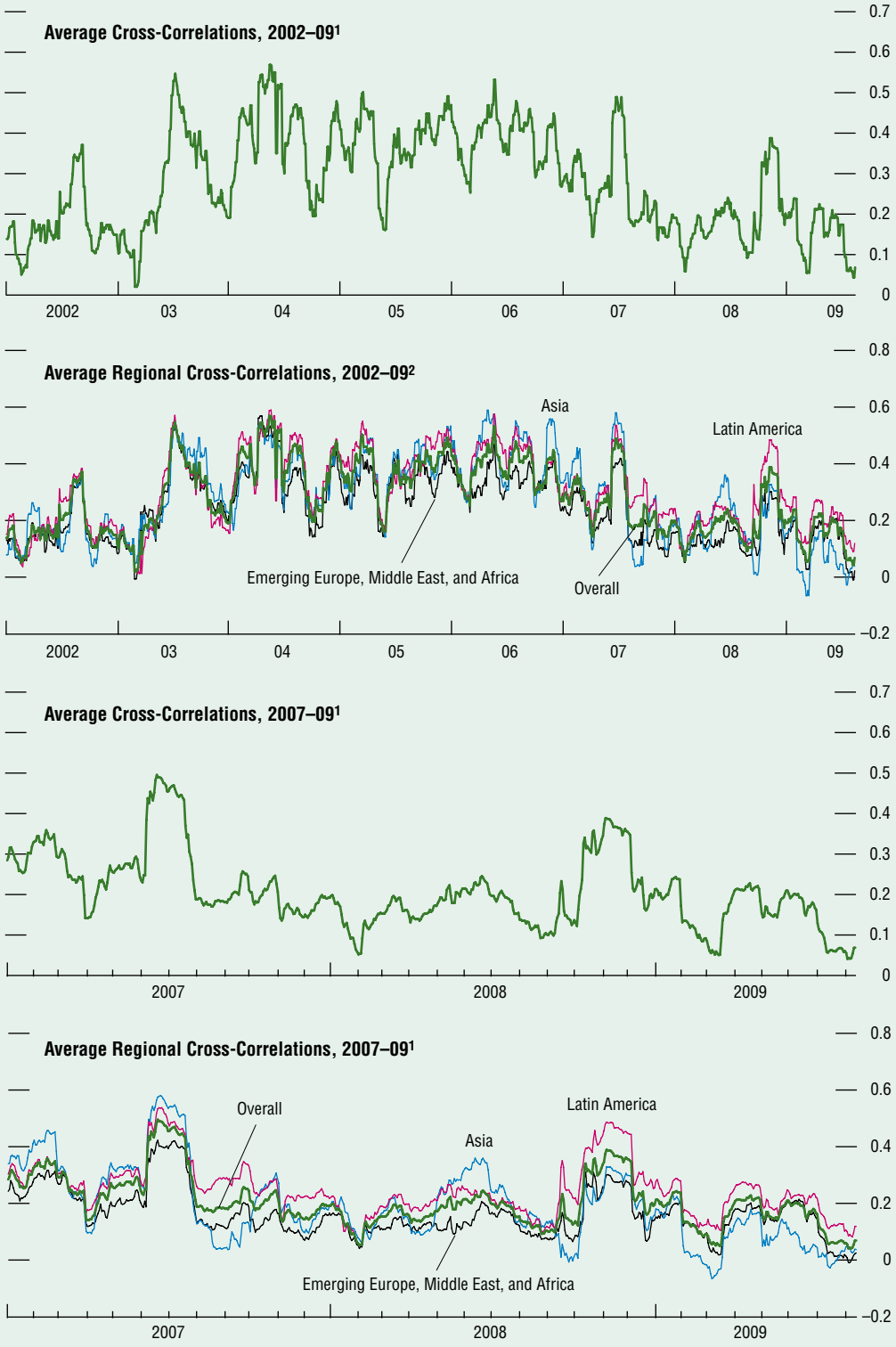
[6]Cost-to-income ratio.

Figure 15. Emerging Market Volatility Measures



Sources: Morgan Stanley Capital International; JPMorgan Chase & Co.; and IMF staff estimates.
[1]Data utilize the MSCI Emerging Markets index in U.S. dollars to calculate 30-day rolling volatilities.
[2]Data utilize the EMBI Global total return index in U.S. dollars to calculate 30-day rolling volatilities.

Figure 16. Emerging Market Debt Cross-Correlation Measures



Sources: JPMorgan Chase & Co.; and IMF staff estimates.
[1]Thirty-day moving simple average across all pair-wise return correlations of 20 constituents included in the EMBI Global.
[2]Simple average of all pair-wise correlations of all markets in a given region with all other bond markets, regardless of region.

Table 10. Equity Market Indices

	2009		2008				End of Period				12-Month High	12-Month Low	All-Time High[1]	All-Time Low[1]
	Q1	Q2	Q1	Q2	Q3	Q4	2005	2006	2007	2008				
World	**805.2**	**964.1**	**1,437.4**	**1,402.1**	**1,182.4**	**920.2**	**1,257.8**	**1,483.6**	**1,588.8**	**920.2**	**1,392.6**	**688.6**	**1,682.4**	**423.1**
Emerging Markets	**570.0**	**761.3**	**1,104.6**	**1,087.1**	**786.9**	**567.0**	**706.5**	**912.7**	**1,245.6**	**567.0**	**1,068.8**	**454.3**	**1,338.5**	**175.3**
Latin America	**2,171.4**	**2,974.7**	**4,316.1**	**4,751.5**	**3,186.4**	**2,077.7**	**2,150.0**	**2,995.7**	**4,400.4**	**2,077.7**	**4,626.3**	**1,659.2**	**5,195.4**	**185.6**
Argentina	1,107.5	1,517.3	3,120.7	4,187.7	2,341.9	1,304.0	1,857.1	3,084.1	2,918.8	1,304.0	4,108.1	976.1	4,187.7	152.6
Brazil	1,833.4	2,552.3	3,648.3	4,292.5	2,652.1	1,638.2	1,569.4	2,205.4	3,867.2	1,638.2	4,160.9	1,286.5	4,727.6	84.1
Chile	1,280.4	1,693.6	1,972.2	1,714.7	1,534.3	1,130.9	1,180.7	1,492.4	1,802.8	1,130.9	1,818.9	996.4	2,057.9	183.0
Colombia	400.9	601.7	590.0	607.1	551.6	447.9	495.7	549.8	619.3	447.9	671.4	341.3	734.0	41.2
Mexico	2,885.8	3,885.4	6,288.2	5,947.3	4,806.2	3,356.8	3,943.6	5,483.3	5,992.1	3,356.8	5,850.9	2,335.1	6,775.7	308.9
Peru	764.4	842.7	1,306.7	1,320.9	860.1	719.3	441.3	671.4	1,248.7	719.3	1,301.9	443.8	1,488.3	73.5
Asia	**238.7**	**317.3**	**439.0**	**396.7**	**301.3**	**235.8**	**286.2**	**371.5**	**513.7**	**235.8**	**402.9**	**187.7**	**571.9**	**104.1**
China	41.3	55.1	64.8	61.7	45.8	40.8	29.2	52.1	84.9	40.8	65.0	27.2	137.2	12.9
India	229.8	366.2	487.9	390.3	334.0	233.6	262.3	390.6	668.9	233.6	453.1	187.1	694.2	71.2
Indonesia	290.4	444.1	633.8	597.4	436.2	287.5	264.9	449.3	677.6	287.5	610.7	204.6	894.5	42.6
Korea	190.2	237.9	375.8	346.9	262.7	193.1	302.8	336.7	437.5	193.1	351.4	138.1	491.3	29.0
Malaysia	222.5	283.3	367.9	331.8	269.7	231.3	216.9	288.6	408.6	231.3	328.2	209.2	458.4	54.2
Pakistan	62.6	64.0	205.7	149.6	94.2	46.1	143.6	141.2	187.1	46.1	148.9	37.1	211.7	25.3
Philippines	174.9	215.8	296.2	221.7	226.1	167.9	169.4	263.2	363.4	167.9	258.6	145.8	697.6	76.4
Taiwan Province of China	163.4	204.1	309.5	276.2	198.5	150.8	239.8	278.8	294.0	150.8	272.9	130.0	529.3	108.7
Thailand	124.9	188.5	273.3	238.4	181.9	132.8	177.7	189.7	267.4	132.8	238.4	110.2	651.7	44.0
Europe, Middle East, & Africa	**188.9**	**248.5**	**403.4**	**423.8**	**300.5**	**198.2**	**300.3**	**364.4**	**458.2**	**198.2**	**414.9**	**159.3**	**473.8**	**80.8**
Czech Republic	384.0	486.0	825.7	905.6	662.4	455.5	421.5	546.5	828.9	455.5	929.2	300.9	929.2	54.4
Egypt	511.2	689.9	1,383.9	1,227.8	880.8	591.7	722.1	829.2	1,284.0	591.7	1,252.2	426.7	1,468.8	61.3
Hungary	304.0	505.0	981.7	1,004.7	800.9	427.1	765.0	1,003.0	1,137.4	427.1	1,118.3	234.6	1,304.8	77.3
Israel	192.2	221.3	249.9	277.6	233.9	182.4	209.3	194.4	264.0	182.4	280.9	172.5	284.4	67.6
Jordan	151.3	155.0	246.9	286.3	248.5	162.5	309.8	209.1	252.9	162.5	295.9	142.5	362.2	52.6
Morocco	414.0	482.0	697.5	668.0	520.3	453.6	222.5	361.9	521.2	453.6	688.4	369.4	703.4	99.4
Poland	450.7	608.7	1,442.9	1,303.1	1,079.5	657.5	903.9	1,223.4	1,501.2	657.5	1,448.5	363.2	1,671.9	98.2
Russia	418.4	569.6	1,359.5	1,492.8	815.8	397.0	813.4	1,250.3	1,536.4	397.0	1,443.9	328.9	1,641.5	30.6
South Africa	289.4	378.3	429.9	445.8	367.3	305.1	377.9	443.1	508.3	305.1	458.6	204.4	578.2	98.3
Turkey	239.4	366.6	461.2	442.8	439.9	275.0	486.6	441.7	751.1	275.0	579.3	194.1	789.8	66.1
Sectors														
Energy	474.9	639.7	985.1	1,141.6	718.4	437.0	548.6	760.0	1,154.2	437.0	1,117.8	342.9	1,255.4	81.7
Materials	338.8	409.4	645.9	654.1	422.3	314.2	325.4	442.1	657.9	314.2	642.6	247.5	750.5	98.5
Industrials	126.4	169.8	290.9	246.0	181.1	130.6	156.1	210.7	351.1	130.6	253.5	96.4	403.8	52.6
Consumer discretionary	233.1	341.0	439.4	403.5	329.8	229.8	381.1	422.6	490.9	229.8	413.6	187.2	527.8	74.1
Consumer staples	197.1	253.4	313.3	307.3	252.3	209.6	197.0	266.2	330.2	209.6	308.9	166.2	343.1	80.4
Health care	378.1	436.0	437.0	442.6	416.2	375.2	393.3	356.3	458.8	375.2	458.7	332.0	476.4	83.3
Financials	181.8	265.1	351.0	326.7	263.7	194.1	240.6	328.8	424.0	194.1	343.3	147.3	473.0	74.6
Information technology	128.9	158.9	220.8	204.5	154.0	111.4	209.1	231.8	231.5	111.4	203.9	92.7	300.0	73.1
Telecommunications	164.6	199.7	295.6	272.7	219.9	180.7	158.9	218.0	328.0	180.7	273.6	140.9	343.2	62.9
Utilities	211.9	276.1	330.2	333.3	265.1	214.5	197.0	282.1	379.2	214.5	344.8	170.2	389.1	63.1

Table 10 *(continued)*

	Period on Period Percent Change									
	2009		2008							
	Q1	Q2	Q1	Q2	Q3	Q4	2005	2006	2007	2008
World	**–12.5**	**19.7**	**–9.5**	**–2.5**	**–15.7**	**–22.2**	**7.6**	**18.0**	**7.1**	**–42.1**
Emerging Markets	**0.5**	**33.6**	**–11.3**	**–1.6**	**–27.6**	**–27.9**	**30.3**	**29.2**	**36.5**	**–54.5**
Latin America	**4.5**	**37.0**	**–1.9**	**10.1**	**–32.9**	**–34.8**	**44.9**	**39.3**	**46.9**	**–52.8**
Argentina	–15.1	37.0	6.9	34.2	–44.1	–44.3	59.7	66.1	–5.4	–55.3
Brazil	11.9	39.2	–5.7	17.7	–38.2	–38.2	50.0	40.5	75.3	–57.6
Chile	13.2	32.3	9.4	–13.1	–10.5	–26.3	18.4	26.4	20.8	–37.3
Colombia	–10.5	50.1	–4.7	2.9	–9.1	–18.8	102.3	10.9	12.6	–27.7
Mexico	–14.0	34.6	4.9	–5.4	–19.2	–30.2	45.2	39.0	9.3	–44.0
Peru	6.3	10.2	4.6	1.1	–34.9	–16.4	28.5	52.1	86.0	–42.4
Asia	**1.2**	**32.9**	**–14.5**	**–9.6**	**–24.0**	**–21.7**	**23.5**	**29.8**	**38.3**	**–54.1**
China	1.3	33.3	–23.7	–4.7	–25.7	–11.0	15.9	78.1	63.1	–51.9
India	–1.6	59.3	–27.1	–20.0	–14.4	–30.1	35.4	49.0	71.2	–65.1
Indonesia	1.0	52.9	–6.5	–5.8	–27.0	–34.1	12.6	69.6	50.8	–57.6
Korea	–1.5	25.0	–14.1	–7.7	–24.3	–26.5	54.3	11.2	30.0	–55.9
Malaysia	–3.8	27.3	–10.0	–9.8	–18.7	–14.2	–1.5	33.1	41.5	–43.4
Pakistan	36.0	2.1	9.9	–27.3	–37.0	–51.1	56.5	–1.7	32.5	–75.4
Philippines	4.2	23.4	–18.5	–25.2	2.0	–25.7	19.9	55.4	38.0	–53.8
Taiwan Province of China	8.3	24.9	5.3	–10.8	–28.1	–24.0	3.3	16.3	5.4	–48.7
Thailand	–5.9	50.9	2.2	–12.8	–23.7	–27.0	4.8	6.8	40.9	–50.3
Europe, Middle East, & Africa	**–4.7**	**31.6**	**–12.0**	**5.1**	**–29.1**	**–34.0**	**34.9**	**21.3**	**25.8**	**–56.7**
Czech Republic	–15.7	26.5	–0.4	9.7	–26.9	–31.2	43.5	29.6	51.7	–45.1
Egypt	–13.6	35.0	7.8	–11.3	–28.3	–32.8	154.5	14.8	54.8	–53.9
Hungary	–28.8	66.1	–13.7	2.3	–20.3	–46.7	15.6	31.1	13.4	–62.4
Israel	5.4	15.1	–5.3	11.1	–15.7	–22.0	25.0	–7.1	35.8	–30.9
Jordan	–6.8	2.4	–2.4	16.0	–13.2	–34.6	71.7	–32.5	20.9	–35.8
Morocco	–8.7	16.4	33.8	–4.2	–22.1	–12.8	8.7	62.6	44.0	–13.0
Poland	–31.4	35.0	–3.9	–9.7	–17.2	–39.1	21.0	35.3	22.7	–56.2
Russia	5.4	36.1	–11.5	9.8	–45.3	–51.3	69.5	53.7	22.9	–74.2
South Africa	–5.2	30.7	–15.4	3.7	–17.6	–16.9	24.0	17.3	14.7	–40.0
Turkey	–13.0	53.2	–38.6	–4.0	–0.7	–37.5	51.6	–9.2	70.0	–63.4
Sectors										
Energy	8.7	34.7	–14.6	15.9	–37.1	–39.2	57.2	38.5	51.9	–62.1
Materials	7.8	20.8	–1.8	1.3	–35.4	–25.6	22.8	35.9	48.8	–52.2
Industrials	–3.2	34.3	–17.1	–15.4	–26.4	–27.9	22.0	35.0	66.6	–62.8
Consumer discretionary	1.4	46.3	–10.5	–8.2	–18.3	–30.3	30.4	10.9	16.2	–53.2
Consumer staples	–5.9	28.6	–5.1	–1.9	–17.9	–17.0	34.0	35.1	24.1	–36.5
Health care	0.8	15.3	–4.8	1.3	–6.0	–9.8	35.2	–9.4	28.8	–18.2
Financials	–6.3	45.8	–17.2	–6.9	–19.3	–26.4	28.1	36.7	28.9	–54.2
Information technology	15.8	23.3	–4.6	–7.4	–24.7	–27.7	29.5	10.9	–0.1	–51.9
Telecommunications	–8.9	21.3	–9.9	–7.8	–19.4	–17.8	20.8	37.2	50.4	–44.9
Utilities	–1.2	30.3	–12.9	1.0	–20.5	–19.1	31.5	43.2	34.4	–43.4

Table 10 *(concluded)*

	2009		2008				End of Period				12-Month High	12-Month Low	All-Time High[1]	All-Time Low[1]
	Q1	Q2	Q1	Q2	Q3	Q4	2005	2006	2007	2008				
Developed Markets														
Australia	460.6	586.8	873.2	903.1	656.2	476.4	628.7	799.0	998.8	476.4	889.7	367.3	1,127.4	176.2
Austria	933.4	1,216.1	2,947.3	3,057.3	1,790.5	1,015.9	2,411.0	3,248.9	3,273.2	1,015.9	2,991.2	708.9	3,661.2	606.1
Belgium	665.3	823.5	2,074.4	1,625.9	1,107.7	696.5	1,696.4	2,260.7	2,141.6	696.5	1,600.5	551.3	2,496.2	497.6
Canada	986.7	1,280.2	1,804.2	1,993.6	1,552.4	1,030.9	1,302.2	1,512.9	1,930.1	1,030.9	1,977.0	823.8	2,144.6	304.7
Denmark	2,755.9	3,689.8	5,991.2	5,915.9	4,356.3	3,129.8	3,551.2	4,859.4	6,036.6	3,129.8	5,889.5	2,419.2	6,380.6	708.5
Finland	330.6	422.9	873.6	738.9	537.4	429.2	534.3	679.3	985.1	429.2	774.6	271.8	1,329.0	33.2
France	1,052.1	1,246.2	2,084.3	1,958.8	1,585.5	1,253.2	1,558.1	2,051.6	2,275.1	1,253.2	1,938.4	902.4	2,350.4	422.2
Germany	1,066.4	1,281.4	2,219.3	2,116.1	1,681.0	1,330.0	1,429.8	1,902.1	2,520.7	1,330.0	2,121.0	913.1	2,538.9	467.9
Greece	298.3	408.4	872.1	743.8	582.3	341.2	609.2	801.7	1,036.1	341.2	781.3	239.1	1,053.1	157.5
Hong Kong SAR	4,653.2	6,226.3	8,054.7	7,639.1	5,840.4	4,696.9	5,741.7	7,249.8	9,966.9	4,696.9	7,644.6	3,796.0	10,589.5	1,427.6
Ireland	107.8	114.9	431.8	352.2	201.9	120.4	393.1	565.4	441.8	120.4	348.0	86.3	606.8	86.3
Italy	248.4	312.6	576.4	527.7	408.6	312.8	496.6	636.0	653.0	312.8	526.2	190.0	689.7	132.0
Japan	1,741.9	2,141.5	2,772.7	2,838.5	2,318.9	2,108.2	3,053.0	3,208.3	3,034.4	2,108.2	2,838.9	1,579.5	4,132.1	1,385.4
Netherlands	1,210.9	1,486.6	2,720.4	2,433.1	1,898.9	1,458.6	1,939.4	2,486.8	2,922.6	1,458.6	2,440.0	1,053.3	3,070.7	558.3
New Zealand	63.8	78.6	129.1	109.8	89.5	67.4	134.5	147.9	153.9	67.4	111.4	52.3	178.7	49.5
Norway	1,561.3	1,901.7	3,891.6	4,313.3	2,551.5	1,512.6	2,392.2	3,386.3	4,348.9	1,512.6	4,290.8	1,190.4	4,992.1	534.0
Portugal	99.8	121.7	203.2	169.2	137.8	108.5	134.8	193.3	234.0	108.5	173.5	88.6	246.4	66.0
Singapore	1,930.3	2,763.0	3,895.5	3,795.2	2,918.0	2,125.4	2,395.8	3,399.8	4,212.7	2,125.4	3,850.6	1,614.4	4,664.3	893.9
Spain	397.3	533.7	810.5	733.0	601.6	492.7	494.4	716.0	864.0	492.7	733.2	326.9	909.2	101.2
Sweden	3,070.1	4,039.0	6,509.9	5,662.9	4,372.4	3,276.0	4,867.9	6,839.0	6,746.0	3,276.0	5,917.3	2,570.3	8,152.0	737.9
Switzerland	2,430.4	2,799.5	4,126.2	3,857.7	3,345.7	2,899.6	3,241.1	4,079.3	4,237.3	2,899.6	3,841.3	2,078.6	4,449.8	527.2
United Kingdom	694.3	867.1	1,406.8	1,381.5	1,080.7	787.7	1,205.6	1,521.5	1,593.4	787.7	1,349.1	600.0	1,737.3	425.9
United States	759.2	874.7	1,254.8	1,222.8	1,105.6	854.4	1,180.6	1,336.3	1,390.9	854.4	1,240.5	645.4	1,493.0	273.7
							Period on Period Percent Change							
Developed Markets														
Australia	–3.3	27.4	–12.6	3.4	–27.3	–27.4	12.5	27.1	25.0	–52.3	. . .	. . .	. . .	. . .
Austria	–8.1	30.3	–10.0	3.7	–41.4	–43.3	23.0	34.8	0.7	–69.0	. . .	. . .	. . .	. . .
Belgium	–4.5	23.8	–3.1	–21.6	–31.9	–37.1	5.6	33.3	–5.3	–67.5	. . .	. . .	. . .	. . .
Canada	–4.3	29.7	–6.5	10.5	–22.1	–33.6	26.7	16.2	27.6	–46.6	. . .	. . .	. . .	. . .
Denmark	–11.9	33.9	–0.8	–1.3	–26.4	–28.2	22.5	36.8	24.2	–48.2	. . .	. . .	. . .	. . .
Finland	–23.0	27.9	–11.3	–15.4	–27.3	–20.1	14.0	27.1	45.0	–56.4	. . .	. . .	. . .	. . .
France	–16.0	18.4	–8.4	–6.0	–19.1	–21.0	7.8	31.7	10.9	–44.9	. . .	. . .	. . .	. . .
Germany	–19.8	20.2	–12.0	–4.7	–20.6	–20.9	7.7	33.0	32.5	–47.2	. . .	. . .	. . .	. . .
Greece	–12.6	36.9	–15.8	–14.7	–21.7	–41.4	12.7	31.6	29.2	–67.1	. . .	. . .	. . .	. . .
Hong Kong SAR	–0.9	33.8	–19.2	–5.2	–23.5	–19.6	4.8	26.3	37.5	–52.9	. . .	. . .	. . .	. . .
Ireland	–10.5	6.5	–2.3	–18.4	–42.7	–40.4	–4.7	43.9	–21.9	–72.7	. . .	. . .	. . .	. . .
Italy	–20.6	25.8	–11.7	–8.5	–22.6	–23.5	–1.3	28.1	2.7	–52.1	. . .	. . .	. . .	. . .
Japan	–17.4	22.9	–8.6	2.4	–18.3	–9.1	24.1	5.1	–5.4	–30.5	. . .	. . .	. . .	. . .
Netherlands	–17.0	22.8	–6.9	–10.6	–22.0	–23.2	10.6	28.2	17.5	–50.1	. . .	. . .	. . .	. . .
New Zealand	–5.3	23.1	–16.1	–14.9	–18.5	–24.7	–3.5	10.0	4.0	–56.2	. . .	. . .	. . .	. . .
Norway	3.2	21.8	–10.5	10.8	–40.8	–40.7	20.0	41.6	28.4	–65.2	. . .	. . .	. . .	. . .
Portugal	–8.0	21.9	–13.2	–16.7	–18.6	–21.3	–4.5	43.4	21.0	–53.6	. . .	. . .	. . .	. . .
Singapore	–9.2	43.1	–7.5	–2.6	–23.1	–27.2	10.8	41.9	23.9	–49.5	. . .	. . .	. . .	. . .
Spain	–19.4	34.3	–6.2	–9.6	–17.9	–18.1	1.5	44.8	20.7	–43.0	. . .	. . .	. . .	. . .
Sweden	–6.3	31.6	–3.5	–13.0	–22.8	–25.1	8.1	40.5	–1.4	–51.4	. . .	. . .	. . .	. . .
Switzerland	–16.2	15.2	–2.6	–6.5	–13.3	–13.3	14.9	25.9	3.9	–31.6	. . .	. . .	. . .	. . .
United Kingdom	–11.9	24.9	–11.7	–1.8	–21.8	–27.1	3.7	26.2	4.7	–50.6	. . .	. . .	. . .	. . .
United States	–11.1	15.2	–9.8	–2.5	–9.6	–22.7	3.8	13.2	4.1	–38.6	. . .	. . .	. . .	. . .

Note: Data are provided by Morgan Stanley Capital International. Regional and sectoral compositions conform to Morgan Stanley Capital International definitions.
[1]From 1990 or initiation of the index.

Table 11. Foreign Exchange Rates

(Units per U.S. dollar)

	2009		2008				End of Period				12-Month High	12-Month Low	All-Time High[1]	All-Time Low[1]
	Q1	Q2	Q1	Q2	Q3	Q4	2005	2006	2007	2008				
Emerging Markets														
Latin America														
Argentina	3.72	3.80	3.17	3.03	3.13	3.45	3.03	3.06	3.15	3.45	3.01	3.80	0.98	3.86
Brazil	2.32	1.95	1.75	1.60	1.90	2.31	2.34	2.14	1.78	2.31	1.56	2.51	0.00	3.95
Chile	583.20	533.65	435.24	527.89	552.11	638.50	512.00	533.38	497.95	638.50	490.74	682.75	295.18	759.75
Colombia	2,548.30	2,143.15	1,831.30	1,913.50	2,192.16	2,248.58	2,286.50	2,240.00	2,018.00	2,248.58	1,734.25	2,608.85	689.21	2,980.00
Mexico	14.17	13.19	10.64	10.31	10.94	13.67	10.63	10.82	10.91	13.67	9.86	15.57	2.68	15.57
Peru	3.15	3.01	2.75	2.96	2.98	3.13	3.42	3.20	3.00	3.13	2.77	3.26	1.28	3.65
Venezuela	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	0.56	2.15
Asia														
China	6.83	6.83	7.01	6.85	6.85	6.83	8.07	7.81	7.30	6.83	6.81	6.89	4.73	8.73
India	50.73	47.91	40.12	43.04	46.96	48.80	45.05	44.26	39.42	48.80	42.06	51.97	16.92	51.97
Indonesia	11,700.00	10,208.00	9,229.00	9,228.00	9,506.00	11,120.00	9,830.00	8,994.00	9,400.00	11,120.00	9,073.00	12,650.00	1,977.00	16,650.00
Korea	1,383.10	1,273.80	990.30	1,046.05	1,206.85	1,259.55	1,010.00	930.00	936.05	1,259.55	1,002.70	1,570.65	683.50	1,962.50
Malaysia	3.65	3.52	3.19	3.27	3.44	3.47	3.78	3.53	3.31	3.47	3.22	3.73	2.44	4.71
Pakistan	80.51	81.43	62.70	68.40	78.25	79.10	59.79	60.88	61.63	79.10	68.40	83.80	21.18	83.80
Philippines	48.33	48.14	41.74	44.96	47.05	47.52	53.09	49.01	41.23	47.52	43.79	49.94	23.10	56.46
Taiwan Province of China	33.91	32.81	30.38	30.35	32.21	32.79	32.83	32.59	32.43	32.79	30.35	35.17	24.48	35.19
Thailand	35.50	34.06	31.44	33.44	33.86	34.74	41.03	35.45	29.80	34.74	33.32	36.28	23.15	55.50
Europe, Middle East, & Africa														
Czech Republic	20.65	18.49	15.98	15.16	17.38	19.22	24.55	20.83	18.20	19.22	14.43	23.49	14.43	42.17
Egypt	5.63	5.59	5.45	5.34	5.44	5.49	5.74	5.71	5.53	5.49	5.28	5.68	3.29	6.25
Hungary	232.52	194.10	165.14	149.41	171.82	190.10	212.97	190.29	173.42	190.10	143.50	252.45	90.20	317.56
Israel	4.22	3.93	3.56	3.35	3.46	3.78	4.61	4.22	3.86	3.78	3.23	4.26	1.96	5.01
Jordan	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.64	0.72
Morocco	8.40	8.04	10.13	10.08	9.27	9.47	11.94	11.70	10.43	9.47	7.23	8.84	7.21	12.06
Poland	3.50	3.17	2.22	2.13	2.41	2.97	3.25	2.90	2.47	2.97	2.03	3.90	1.72	4.71
Russia	33.95	31.15	23.49	23.44	25.64	29.40	28.74	26.33	24.63	29.40	23.16	36.37	0.98	36.37
South Africa	9.50	7.71	8.09	7.82	8.29	9.53	6.33	7.01	6.86	9.53	7.22	11.57	2.50	12.45
Turkey	1.67	1.54	1.32	1.23	1.27	1.54	1.35	1.42	1.17	1.54	1.15	1.81	—	1.81
Developed Markets														
Australia[2]	0.69	0.81	0.91	0.96	0.79	0.70	0.73	0.79	0.88	0.70	0.98	0.60	0.98	0.48
Canada	1.26	1.16	1.03	1.02	1.06	1.22	1.16	1.17	1.00	1.22	1.00	1.30	0.92	1.61
Denmark	5.60	5.31	4.72	4.73	5.29	5.33	6.30	5.65	5.11	5.33	4.68	5.98	4.67	9.00
Euro area[2]	1.33	1.40	1.58	1.58	1.41	1.40	1.18	1.32	1.46	1.40	1.59	1.25	1.60	0.83
Hong Kong SAR	7.75	7.75	7.78	7.80	7.77	7.75	7.75	7.78	7.80	7.75	7.75	7.81	7.70	7.83
Japan	98.96	96.36	99.69	106.21	106.11	90.64	117.75	119.07	111.71	90.64	87.24	110.53	80.63	159.90
New Zealand[2]	0.56	0.65	0.79	0.76	0.67	0.58	0.68	0.70	0.77	0.58	0.77	0.49	0.82	0.39
Norway	6.74	6.43	5.10	5.09	5.86	6.95	6.74	6.24	5.44	6.95	5.05	7.22	4.96	9.58
Singapore	1.52	1.45	1.38	1.36	1.44	1.43	1.66	1.53	1.44	1.43	1.35	1.55	1.35	1.91
Sweden	8.25	7.70	5.94	6.01	6.92	7.83	7.94	6.85	6.47	7.83	5.94	9.32	5.09	11.03
Switzerland	1.14	1.09	0.99	1.02	1.12	1.07	1.31	1.22	1.13	1.07	1.01	1.23	0.98	1.82
United Kingdom[2]	1.43	1.65	1.98	1.99	1.78	1.46	1.72	1.96	1.98	1.46	2.01	1.38	2.11	1.37

Table 11 *(concluded)*

	Period on Period Percent Change									
	2009		2008							
	Q1	Q2	Q1	Q2	Q3	Q4	2005	2006	2007	2008
Emerging Markets										
Latin America										
Argentina	–7.1	–2.0	–0.6	4.7	–3.4	–9.2	–1.9	–1.0	–2.8	–8.8
Brazil	–0.4	19.0	1.5	9.2	–15.8	–17.7	13.7	9.4	20.0	–23.1
Chile	9.5	9.3	14.4	–17.6	–4.4	–13.5	8.5	–4.0	7.1	–22.0
Colombia	–11.8	18.9	10.2	–4.3	–12.7	–2.5	3.0	2.1	11.0	–10.3
Mexico	–3.5	7.5	2.5	3.2	–5.7	–20.0	4.8	–1.7	–0.8	–20.2
Peru	–0.6	4.9	9.0	–7.1	–0.7	–4.8	–4.1	7.1	6.6	–4.4
Venezuela	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Asia										
China	–0.1	0.0	4.1	2.3	0.1	0.3	2.6	3.4	7.0	6.9
India	–3.8	5.9	–1.8	–6.8	–8.3	–3.8	–3.5	1.8	12.3	–19.2
Indonesia	–5.0	14.6	1.9	0.0	–2.9	–14.5	–5.7	9.3	–4.3	–15.5
Korea	–8.9	8.6	–5.5	–5.3	–13.3	–4.2	2.5	8.6	–0.6	–25.7
Malaysia	–4.9	3.6	3.5	–2.2	–5.0	–0.9	0.5	7.1	6.7	–4.6
Pakistan	–1.7	–1.1	–1.7	–8.3	–12.6	–1.1	–0.6	–1.8	–1.2	–22.1
Philippines	–1.7	0.4	–1.2	–7.1	–4.4	–1.0	5.9	8.3	18.9	–13.2
Taiwan Province of China	–3.3	3.4	6.7	0.1	–5.8	–1.8	–3.3	0.7	0.5	–1.1
Thailand[3]	–2.1	4.2	–5.2	–6.0	–1.2	–2.5	–5.1	15.7	19.0	–14.2
Europe, Middle East, & Africa										
Czech Republic	–6.9	11.7	13.9	5.4	–12.8	–9.5	–8.7	17.9	14.4	–5.3
Egypt	–2.4	0.6	1.6	2.1	–1.9	–1.0	6.1	0.5	3.2	0.7
Hungary	–18.2	19.8	5.0	10.5	–13.0	–9.6	–15.0	11.9	9.7	–8.8
Israel	–10.4	7.4	8.3	6.2	–3.1	–8.5	–6.1	9.2	9.3	2.0
Jordan	0.0	0.1	0.0	0.1	–0.1	–0.1	0.1	–0.1	0.0	0.0
Morocco	12.7	4.4	2.9	0.5	8.8	–2.1	–7.1	2.0	12.3	10.1
Poland	–15.1	10.4	11.4	4.3	–11.7	–18.9	–7.2	11.8	17.5	–16.8
Russia	–13.4	9.0	4.9	0.2	–8.6	–12.8	–3.6	9.2	6.9	–16.2
South Africa	0.2	23.2	–15.2	3.5	–5.6	–13.0	–10.5	–9.7	2.1	–28.0
Turkey	–7.5	8.1	–11.6	8.0	–3.4	–17.6	–0.6	–4.7	21.1	–24.0
	Period on Period Percent Change									
Developed Markets										
Australia	–1.6	16.6	4.3	5.0	–17.3	–11.3	–6.1	7.6	11.0	–19.7
Canada	–3.3	8.4	–2.6	0.4	–4.0	–12.7	3.4	–0.3	16.8	–18.1
Denmark	–5.2	5.9	8.2	–0.2	–10.6	–0.6	–12.9	11.5	10.5	–4.0
Euro area	–5.2	5.9	8.2	–0.2	–10.6	–0.9	–12.6	11.4	10.5	–4.2
Hong Kong SAR	0.0	0.0	0.2	–0.2	0.4	0.2	0.2	–0.3	–0.3	0.6
Japan	–8.4	2.7	12.1	–6.1	0.1	17.1	–12.8	–1.1	6.6	23.2
New Zealand	–3.4	15.4	2.6	–3.0	–12.1	–13.5	–4.8	3.0	8.8	–24.4
Norway	3.2	4.8	6.7	0.1	–13.2	–15.7	–9.8	8.1	14.7	–21.8
Singapore	–6.1	5.2	4.7	1.2	–5.3	0.4	–1.9	8.4	6.5	0.7
Sweden	–5.0	7.1	8.9	–1.2	–13.1	–11.7	–16.2	15.9	5.9	–17.4
Switzerland	–6.2	4.9	14.1	–2.7	–9.0	5.0	–13.2	7.7	7.5	6.1
United Kingdom	–1.9	14.9	–0.1	0.4	–10.6	–18.0	–10.2	13.7	1.3	–26.5

Source: Bloomberg L.P.

[1]High value indicates value of greatest appreciation against the U.S. dollar; low value indicates value of greatest depreciation against the U.S. dollar. "All-Time" refers to the period since 1990 or initiation of the currency.

[2]U.S. dollars per unit.

[3]The exchange rate for Thailand is an onshore rate.

Table 12. Emerging Market Bond Index: EMBI Global Total Returns Index

	2009		2008				End of Period				12-Month High	12-Month Low	All-Time High[1]	All-Time Low[1]
	Q1	Q2	Q1	Q2	Q3	Q4	2005	2006	2007	2008				
EMBI Global	**376**	**417**	**411**	**408**	**387**	**364**	**350**	**384**	**409**	**364**	**417**	**296**	**418**	**63**
Latin America														
Argentina	43	74	97	93	70	47	83	126	112	47	95	36	194	36
Brazil	650	692	636	651	624	670	505	580	633	670	694	496	694	68
Chile	211	220	204	199	200	205	177	185	197	205	220	183	220	98
Colombia	304	332	313	315	305	308	256	283	309	308	333	239	333	70
Dominican Republic	156	181	187	187	175	120	156	184	198	120	191	105	198	83
Ecuador	283	355	834	862	687	220	636	561	811	220	861	201	889	61
El Salvador	138	151	159	158	151	122	134	152	165	122	159	105	165	95
Mexico	367	396	390	382	373	379	333	353	377	379	402	297	402	58
Panama	644	729	691	694	667	639	567	637	691	639	729	509	729	56
Peru	621	667	641	639	604	601	514	591	633	601	672	474	672	52
Uruguay	165	194	181	186	174	162	151	177	188	162	195	119	195	38
Venezuela	397	473	546	565	468	338	562	634	563	338	568	308	638	59
Asia														
China	317	324	299	295	297	314	260	271	289	314	327	267	327	98
Indonesia	135	162	160	150	143	131	133	154	159	131	165	90	165	90
Malaysia	249	264	248	244	244	244	215	224	240	244	264	210	264	64
Philippines	435	453	428	411	419	403	337	394	425	403	462	306	462	81
Vietnam	113	121	119	110	108	99	101	112	117	99	124	77	124	77
Europe, Middle East, & Africa														
Bulgaria	683	719	729	720	709	646	643	676	713	646	730	596	746	80
Egypt	187	191	175	176	175	178	155	161	171	178	191	165	191	87
Hungary	149	161	168	168	170	149	148	153	168	149	175	131	176	97
Iraq	99	128	124	130	120	81	…	102	115	81	136	64	136	64
Lebanon	272	287	240	250	252	249	212	215	236	249	287	197	287	99
Pakistan	79	110	120	110	67	57	112	123	111	57	110	49	160	49
Poland	379	392	385	375	377	373	327	340	373	373	396	332	396	71
Russia	544	602	619	614	562	494	538	568	607	494	619	438	627	26
Serbia[1]	99	121	121	122	112	82	108	117	121	82	125	76	125	76
South Africa	384	404	371	373	360	357	337	349	373	357	404	287	404	99
Tunisia	165	176	164	162	161	159	143	149	160	159	176	149	176	98
Turkey	384	424	384	368	379	383	336	356	392	383	424	274	424	91
Ukraine	195	326	380	362	316	172	334	353	372	172	365	151	386	100
Latin America	334	370	373	375	350	331	316	354	372	331	379	266	383	62
Non-Latin America	451	500	482	471	456	425	413	443	476	425	500	347	500	72

Table 12 *(concluded)*

	Period on Period Percent Change									
	2009		2008				End of period			
	Q1	Q2	Q1	Q2	Q3	Q4	2005	2006	2007	2008
EMBI Global	**3.4**	**10.8**	**0.6**	**–0.8**	**–5.0**	**–6.0**	**10.7**	**9.9**	**6.3**	**–10.9**
Latin America										
Argentina	–9.0	73.7	–12.7	–4.7	–24.4	–33.1	2.7	51.3	–11.1	–57.9
Brazil	–2.9	6.4	0.5	2.3	–4.2	7.4	13.2	14.8	9.1	5.8
Chile	2.6	4.5	3.7	–2.2	0.3	2.7	3.2	4.1	6.4	4.5
Colombia	–1.1	9.2	1.3	0.4	–3.1	0.8	12.4	10.7	9.1	–0.5
Dominican Republic	29.4	16.0	–5.3	–0.2	–6.3	–31.2	24.1	18.0	7.3	–39.0
Ecuador	28.7	25.2	2.9	3.3	–20.3	–67.9	13.2	–11.8	44.6	–72.9
El Salvador	12.5	9.9	–3.3	–0.9	–4.2	–19.0	8.8	14.1	8.0	–25.6
Mexico	–3.4	8.0	3.4	–1.9	–2.4	1.7	8.1	6.0	6.9	0.7
Panama	0.9	13.2	–0.1	0.6	–4.0	–4.2	11.1	12.3	8.5	–7.6
Peru	3.3	7.5	1.2	–0.2	–5.4	–0.6	6.0	14.8	7.1	–5.1
Uruguay	1.7	17.8	–3.6	2.4	–6.1	–7.2	16.3	17.3	6.6	–14.0
Venezuela	17.6	19.1	–3.0	3.6	–17.2	–27.8	16.1	12.8	–11.2	–39.9
Asia										
China	1.1	2.2	3.4	–1.3	0.4	5.7	3.0	4.1	6.7	8.4
Indonesia	3.3	19.6	1.0	–6.1	–4.9	–8.3	9.7	15.9	3.0	–17.3
Malaysia	2.0	6.4	3.2	–1.8	0.2	–0.1	3.7	4.3	7.4	1.4
Philippines	7.9	4.0	0.8	–4.1	2.0	–3.7	20.6	16.8	7.9	–5.1
Vietnam	13.8	7.2	1.4	–7.3	–1.3	–8.7	. . .	10.6	4.5	–15.3
Europe, Middle East, & Africa										
Bulgaria	5.7	5.2	2.2	–1.2	–1.6	–8.9	2.1	5.1	5.6	–9.5
Egypt	5.3	1.8	2.6	0.4	–0.7	1.8	3.8	3.8	5.9	4.2
Hungary	–0.3	8.6	0.1	–0.2	1.4	–12.4	2.8	3.7	9.4	–11.2
Iraq	22.3	29.7	7.4	4.8	–7.1	–33.0	…	…	12.4	–29.9
Lebanon	9.3	5.5	1.5	4.3	1.0	–1.4	8.7	1.6	9.9	5.3
Pakistan	39.5	39.4	7.9	–7.6	–39.4	–15.4	4.5	10.3	–10.0	–48.8
Poland	1.6	3.3	3.0	–2.5	0.5	–1.0	5.0	3.8	9.9	–0.1
Russia	10.1	10.6	2.1	–0.9	–8.6	–12.0	13.3	5.5	6.9	–18.5
Serbia[1]	21.6	22.4	–0.2	1.4	–8.8	–27.0	…	8.3	3.7	–32.6
South Africa	7.5	5.4	–0.5	0.4	–3.5	–0.8	4.3	3.7	6.8	–4.3
Tunisia	3.7	6.7	2.1	–1.2	–0.7	–1.1	3.7	3.8	7.8	–0.9
Turkey	0.2	10.3	–2.1	–4.2	3.0	1.0	9.5	6.1	10.2	–2.3
Ukraine	13.4	67.2	2.4	–5.0	–12.6	–45.6	7.7	5.9	5.2	–53.8
Latin America	0.8	10.8	0.1	0.7	–6.9	–5.3	10.9	11.9	5.2	–11.1
Non-Latin America	6.0	10.8	1.2	–2.3	–3.2	–6.7	10.6	7.2	7.5	–10.7

Source: JPMorgan Chase & Co.
[1]Data prior to 2006 refer to Serbia and Montenegro.

Table 13. Emerging Market Bond Index: EMBI Global Yield Spreads

(In basis points)

	2009		2008				End of Period				12-Month High	12-Month Low	All-Time High[1]	All-Time Low[1]
	Q1	Q2	Q1	Q2	Q3	Q4	2005	2006	2007	2008				
EMBI Global	**657**	**433**	**324**	**308**	**442**	**724**	**237**	**171**	**255**	**724**	**891**	**291**	**1631**	**151**
Latin America														
Argentina	1,894	1,062	581	614	953	1,704	504	216	410	1,704	1,965	586	7,222	185
Brazil	424	282	283	227	333	429	308	190	220	429	688	216	2,451	138
Chile	286	161	176	177	223	343	80	84	151	343	411	161	411	52
Colombia	486	301	258	221	318	498	244	161	195	498	741	198	1,076	95
Dominican Republic	1,118	858	489	463	671	1,605	378	196	281	1,605	1,785	463	1,785	122
Ecuador	3,568	1,322	662	596	1,001	4,731	661	920	614	4,731	5,069	598	5,069	436
El Salvador	670	492	296	285	384	854	239	159	199	854	928	286	928	99
Mexico	441	280	193	194	275	434	143	115	172	434	627	181	1,149	89
Panama	481	277	244	218	305	539	239	146	184	539	648	199	769	114
Peru	425	272	223	199	310	509	257	118	178	509	653	177	1,061	95
Uruguay	636	383	343	294	412	685	298	185	243	685	907	298	1,982	133
Venezuela	1,570	1,208	661	596	959	1,864	313	183	523	1,864	1,887	594	2,658	161
Asia														
China	210	122	154	137	191	228	68	51	120	228	333	50	364	39
Indonesia	742	433	329	381	490	762	269	153	275	762	1,143	330	1,143	136
Malaysia	344	167	144	153	194	370	82	66	119	370	487	151	1,141	65
Philippines	432	324	273	303	324	546	302	155	207	546	797	241	993	132
Vietnam	574	379	283	368	404	747	190	95	203	747	1,101	309	1,101	89
Europe, Middle East, & Africa														
Bulgaria	591	431	221	204	302	674	90	66	153	674	725	186	1,679	42
Egypt	190	150	258	201	333	385	58	52	178	385	458	88	646	20
Hungary	540	373	163	134	174	504	74	58	84	504	613	131	613	–29
Iraq	1,053	675	545	474	594	1,282	. . .	526	569	1,282	1,398	438	1,398	376
Lebanon	599	459	594	469	514	794	246	395	493	794	1,204	438	1,204	111
Pakistan	1,700	1,037	562	687	1,600	2,112	198	154	535	2,112	2,222	752	2,225	122
Poland	319	219	112	115	169	314	62	47	67	314	401	111	410	17
Russia	630	418	208	197	388	805	118	99	157	805	915	181	7,063	87
Serbia[1]	929	509	389	332	526	1,224	238	186	304	1,224	1,351	317	1,351	134
South Africa	426	292	271	232	364	562	87	84	164	562	805	211	805	50
Tunisia	445	245	214	197	320	464	81	83	140	464	656	184	656	48
Turkey	528	339	348	384	391	534	223	207	239	534	887	293	1,196	168
Ukraine	2,777	1,226	376	467	868	2,771	184	172	303	2,771	3,660	456	3,660	125
Latin America	**695**	**464**	**347**	**313**	**470**	**746**	**272**	**180**	**275**	**746**	**914**	**309**	**1,532**	**157**
Non-Latin America	**612**	**397**	**297**	**303**	**409**	**699**	**179**	**159**	**227**	**699**	**880**	**267**	**1,812**	**142**

Table 13 *(concluded)*

	Period on Period Spread Change									
	2009		2008				End of Period			
	Q1	Q2	Q1	Q2	Q3	Q4	2005	2006	2007	2008
EMBI Global	**–68**	**–224**	**70**	**–16**	**134**	**282**	**–110**	**–66**	**84**	**470**
Latin America										
Argentina	190	–832	171	33	339	751	–4,023	–288	194	1,294
Brazil	–5	–142	63	–56	106	96	–68	–118	30	209
Chile	–57	–125	25	1	46	120	16	4	67	192
Colombia	–12	–185	63	–37	97	180	–88	–83	34	303
Dominican Republic	–487	–260	208	–26	208	934	–446	–182	85	1,324
Ecuador	–1,163	–2,246	48	–66	405	3,730	–29	259	–306	4,117
El Salvador	–184	–178	97	–11	99	470	–6	–80	40	655
Mexico	7	–161	21	1	81	159	–31	–28	57	262
Panama	–58	–204	60	–26	87	234	–35	–93	38	355
Peru	–84	–153	45	–24	111	199	18	–139	60	331
Uruguay	–49	–253	100	–49	118	273	–90	–113	58	442
Venezuela	–294	–362	138	–65	363	905	–90	–130	340	1,341
Asia										
China	–18	–88	34	–17	54	37	11	–17	69	108
Indonesia	–20	–309	54	52	109	272	25	–116	122	487
Malaysia	–26	–177	25	9	41	176	4	–16	53	251
Philippines	–114	–108	66	30	21	222	–155	–147	52	339
Vietnam	–173	–195	80	85	36	343	. . .	–95	108	544
Europe, Middle East, & Africa										
Bulgaria	–83	–160	68	–17	98	372	13	–24	87	521
Egypt	–195	–40	80	–57	132	52	–43	–6	126	207
Hungary	36	–167	79	–29	40	330	42	–16	26	420
Iraq	–229	–378	–24	–71	120	688	. . .	. . .	43	713
Lebanon	–195	–140	101	–125	45	280	–88	149	98	301
Pakistan	–412	–663	27	125	913	512	–35	–44	381	1,577
Poland	5	–100	45	3	54	145	–7	–15	20	247
Russia	–175	–212	51	–11	191	417	–95	–19	58	648
Serbia[1]	–295	–420	85	–57	194	698	. . .	–52	118	920
South Africa	–136	–134	107	–39	132	198	–15	–3	80	398
Tunisia	–19	–200	74	–17	123	144	–10	2	57	324
Turkey	–6	–189	109	36	7	143	–41	–16	32	295
Ukraine	6	–1,551	73	91	401	1,903	–71	–12	131	2,468
Latin America	**–51**	**–231**	**72**	**–34**	**157**	**276**	**–143**	**–92**	**95**	**471**
Non-Latin America	**–87**	**–215**	**70**	**6**	**106**	**290**	**–60**	**–20**	**68**	**472**

Source: JPMorgan Chase & Co.
[1]Data prior to 2006 refer to Serbia and Montenegro.

Table 14. Emerging Market External Financing: Total Bonds, Equities, and Loans

(In millions of U.S. dollars)

						2008		2009	
	2004	2005	2006	2007	2008	Q3	Q4	Q1	Q2
Total	**327,145.4**	**457,092.5**	**541,891.7**	**724,627.3**	**453,994.5**	**112,594.8**	**49,534.2**	**107,535.6**	**124,630.7**
Africa	**12,715.3**	**12,445.5**	**15,983.4**	**30,584.6**	**9,456.5**	**2,215.0**	**781.6**	**2,612.9**	**3,220.3**
Algeria	307.9	489.3	2.0	411.0	1,738.0	—	—	—	—
Angola	2,900.0	3,122.7	91.9	74.6	—	—	—	136.3	123.1
Botswana	28.4	—	—	—	—	—	—	—	—
Burkina Faso	—	11.0	—	14.5	—	—	—	—	—
Cameroon	48.0	30.0	—	—	—	—	—	—	—
Cape Verde	—	—	—	13.0	—	—	—	—	—
Central African Republic	—	—	—	305.5	—	—	—	—	—
Côte d'Ivoire	—	—	—	—	45.0	—	—	150.7	—
Djibouti	40.0	—	—	—	—	—	—	—	—
Ethiopia	40.0	—	—	—	100.2	—	—	—	46.8
Gabon	22.0	—	34.4	1,000.0	600.0	—	—	—	—
Ghana	850.0	706.5	860.0	1,464.3	1,000.0	1,000.0	—	—	55.0
Kenya	135.1	64.0	330.1	10.0	277.0	25.0	68.9	—	62.8
Lesotho	—	—	—	19.7	—	—	—	—	—
Malawi	4.8	—	—	—	—	—	—	—	—
Mali	288.9	—	—	180.9	110.4	—	—	—	—
Mauritius	—	99.3	180.0	—	29.0	20.0	—	—	—
Morocco	803.5	1.9	158.7	1,721.0	472.6	275.7	—	—	—
Mozambique	422.4	—	38.8	—	834.0	8.5	—	55.0	—
Namibia	—	50.0	100.0	—	97.6	10.0	—	—	—
Nigeria	875.0	874.0	640.0	4,884.3	223.5	—	68.5	74.7	78.1
Senegal	10.0	—	31.6	—	—	—	—	—	—
Seychelles	—	—	200.0	30.0	—	—	—	—	—
South Africa	5,324.8	6,265.9	12,700.7	19,797.5	2,935.9	750.9	468.0	2,169.8	2,774.5
Sudan	31.0	—	—	—	—	—	—	—	—
Tanzania	—	136.0	—	—	446.1	—	176.1	—	—
Togo	—	—	—	—	125.0	125.0	—	—	—
Tunisia	583.6	579.9	24.7	403.4	402.0	—	—	1.4	—
Uganda	—	—	12.6	—	—	—	—	—	—
Zambia	—	—	505.0	255.0	20.0	—	—	25.0	—
Zimbabwe	—	15.0	73.0	—	—	—	—	—	80.0
Asia	**152,357.7**	**189,506.2**	**221,354.8**	**299,440.3**	**184,925.9**	**45,714.0**	**23,622.4**	**37,110.9**	**63,986.0**
Bangladesh	176.8	16.7	106.5	57.5	65.4	—	—	15.0	—
Brunei Darussalam	—	—	—	—	505.0	505.0	—	—	—
Cambodia	—	—	96.3	220.0	—	—	—	—	—
China	25,661.6	38,804.6	50,039.5	75,006.1	29,041.4	7,162.5	1,824.8	12,537.1	11,559.8
Fiji	—	—	150.0	—	—	—	—	—	—
Hong Kong SAR	19,291.2	19,997.7	25,450.3	22,967.7	15,213.1	6,361.6	1,485.6	1,144.6	4,671.0
India	13,301.1	21,660.0	29,534.4	59,932.5	37,570.0	8,240.2	5,470.2	4,961.4	20,103.0
Indonesia	4,115.3	5,193.3	8,432.4	8,106.2	13,748.8	1,574.7	2,268.2	3,012.2	2,025.0
Korea	31,016.0	47,668.6	38,677.3	59,814.5	34,258.3	4,546.5	3,725.3	7,475.1	13,367.3
Lao P.D.R.	210.0	1,000.0	—	—	592.0	—	592.0	213.7	—
Macao SAR	382.0	729.0	3,692.7	4,531.3	646.5	466.5	—	—	997.4
Malaysia	7,977.8	6,154.6	7,686.9	7,068.2	5,260.2	3,462.0	412.5	1,135.0	1,200.3
Marshall Islands	—	24.0	170.0	1,069.3	204.0	—	—	—	—
Mongolia	—	30.0	6.0	85.0	6.8	2.8	—	—	—
Nepal	—	—	—	—	15.0	10.0	—	—	—
Pakistan	970.0	739.2	3,260.0	2,158.3	885.2	42.4	347.4	298.9	132.7
Papua New Guinea	—	—	—	1,024.3	—	—	—	—	78.5
Philippines	6,358.3	6,194.8	7,041.8	6,319.0	3,066.1	698.4	934.1	1,570.8	1,280.0
Singapore	11,949.3	14,546.2	19,449.6	20,552.8	20,573.4	6,377.6	1,771.5	2,447.1	3,230.2
Sri Lanka	135.0	383.0	129.8	755.0	538.7	25.0	170.0	—	—
Taiwan Province of China	26,558.0	19,084.9	22,189.9	24,623.2	18,012.2	5,068.4	3,540.1	1,492.8	4,703.9
Thailand	4,141.3	6,310.9	4,784.1	2,494.2	3,070.4	958.4	738.9	203.1	443.7
Vietnam	114.0	968.8	457.4	2,655.2	1,653.5	212.0	341.8	604.2	193.0
Europe	**70,204.0**	**103,724.6**	**127,628.8**	**161,455.9**	**126,286.7**	**26,664.5**	**13,468.2**	**38,098.0**	**27,499.8**
Albania	—	—	—	—	78.1	—	42.4	—	—
Belarus	21.4	32.0	338.6	302.8	327.0	135.0	—	—	10.0
Bulgaria	1,099.9	1,103.7	1,727.1	1,360.0	1,415.0	676.1	—	45.7	46.6
Croatia	2,737.4	1,263.7	1,896.7	2,786.5	1,472.3	816.1	—	—	1,361.1
Cyprus	1,178.4	1,189.9	3,660.6	3,098.7	3,236.0	439.6	1,260.2	125.0	3,385.8
Czech Republic	4,066.2	4,001.1	2,181.4	4,262.7	8,424.7	1,237.8	200.2	927.7	3,119.1
Estonia	1,181.4	692.8	470.9	299.2	328.9	32.5	—	—	53.0
Faroe Islands	—	85.3	273.8	431.2	217.8	—	—	—	—
Gibraltar	—	1,897.1	2,371.7	994.8	—	—	—	—	—

Table 14 *(concluded)*

	2004	2005	2006	2007	2008	2008 Q3	2008 Q4	2009 Q1	2009 Q2
Europe *(continued)*									
Hungary	9,260.3	9,341.7	7,328.7	5,330.8	9,103.9	1,053.2	178.4	241.8	70.0
Latvia	881.6	516.1	1,457.4	1,614.7	1,892.0	46.5	706.3	—	132.0
Lithuania	986.0	1,220.0	1,292.0	1,645.3	263.3	21.3	133.5	187.9	727.3
Macedonia, FYR	66.0	176.5	—	14.4	—	—	—	65.0	387.9
Malta	242.7	—	256.0	—	218.7	218.7	—	—	—
Moldova	7.0	13.1	—	—	171.3	63.0	108.3	—	—
Montenegro	—	—	0.8	21.4	6.4	—	6.4	—	—
Poland	5,259.4	16,391.7	8,332.1	7,274.7	9,331.5	284.1	2,178.5	1,295.6	2,385.9
Romania	1,116.7	2,611.0	747.2	1,129.1	1,890.0	158.8	137.2	132.9	—
Russia	22,121.2	37,003.6	59,165.3	84,535.9	61,275.3	14,730.7	5,626.0	29,851.0	8,864.4
Serbia[1]	213.4	1,252.6	60.2	568.6	243.3	14.6	—	—	—
Slovak Republic	1,319.0	711.5	1,210.7	1,354.2	—	—	—	—	2,648.5
Slovenia	1,321.9	1,887.3	1,837.8	4,537.8	4,222.9	42.5	335.3	3,631.4	700.4
Turkey	14,506.9	18,999.6	27,641.6	31,220.1	17,278.6	5,401.1	1,752.2	1,371.5	3,587.8
Ukraine	2,617.1	3,334.4	5,378.1	8,672.9	4,889.8	1,293.0	803.4	222.5	20.0
Middle East and Central Asia	**33,909.8**	**63,510.7**	**102,020.4**	**97,529.7**	**71,919.8**	**26,055.0**	**3,128.5**	**9,557.4**	**13,306.3**
Armenia	—	1.3	30.0	19.1	11.0	—	—	—	2.4
Azerbaijan	1,217.2	400.2	183.8	315.7	116.6	31.0	15.0	260.0	10.0
Bahrain	1,888.6	2,913.8	3,825.7	6,170.1	1,245.0	820.0	—	—	1,800.1
Egypt	1,465.0	3,426.1	4,379.6	5,471.7	6,128.5	368.0	105.5	566.8	—
Georgia	—	11.1	220.8	341.6	649.6	3.7	45.9	—	35.5
Iran, I.R. of	2,419.4	1,928.8	142.5	—	—	—	—	—	—
Iraq	—	107.8	2,877.0	—	—	—	—	—	—
Israel	3,977.9	5,113.0	3,518.4	3,497.3	2,468.9	198.4	151.6	2,000.0	511.9
Jordan	199.4	—	60.0	180.0	—	—	—	—	—
Kazakhstan	6,376.2	8,199.1	16,655.8	18,049.7	11,137.1	4,911.4	1,458.8	70.0	23.1
Kuwait	1,788.2	4,445.0	5,346.6	1,919.9	3,146.8	656.1	130.0	—	115.0
Kyrgyz Republic	—	2.0	—	—	7.4	6.6	—	—	—
Lebanon	5,382.8	2,558.0	6,040.0	2,420.0	3,203.2	500.0	65.0	2,365.6	—
Libya	—	—	—	38.0	—	—	—	—	—
Oman	1,328.6	3,320.7	3,430.2	3,580.7	950.6	404.6	—	—	51.9
Qatar	2,042.7	10,768.5	10,527.9	14,700.5	11,318.1	6,511.4	380.0	833.8	3,952.2
Saudi Arabia	2,749.6	5,791.0	9,115.5	7,110.6	7,232.5	2,674.9	—	—	—
Syrian Arab Republic	—	—	—	—	80.0	—	—	—	—
Tajikistan	5.2	1.2	—	2.0	16.7	16.7	—	3.2	—
United Arab Emirates	3,041.0	14,519.5	35,661.6	33,712.6	21,769.2	8,952.2	760.4	3,405.3	6,804.2
Uzbekistan	28.0	3.6	4.9	—	16.4	—	16.4	5.0	—
Republic of Yemen	—	—	—	—	2,422.2	—	—	47.6	—
Latin America	**57,958.5**	**87,905.5**	**74,904.3**	**135,616.9**	**61,405.7**	**11,946.2**	**8,533.5**	**20,156.5**	**16,618.2**
Argentina	1,790.0	20,663.0	3,343.6	10,472.2	1,301.4	—	—	—	45.0
Bolivia	—	54.0	—	—	100.0	—	—	—	—
Brazil	16,669.8	27,486.0	31,219.4	73,737.4	31,043.1	8,107.3	1,761.2	7,059.3	11,698.9
Chile	7,956.8	6,808.6	6,009.9	3,743.2	5,680.4	400.0	1,817.5	600.0	872.0
Colombia	1,628.4	3,063.3	5,036.1	7,879.4	1,991.7	39.7	—	1,000.0	1,083.9
Costa Rica	334.2	91.7	1.7	31.1	85.0	20.0	—	—	—
Cuba	69.8	1.9	—	—	—	—	—	—	—
Dominican Republic	140.5	284.4	779.8	657.9	479.6	379.6	—	—	—
Ecuador	—	759.0	19.1	104.0	—	—	—	—	—
El Salvador	340.2	454.5	1,326.6	—	—	—	—	—	—
Guatemala	439.3	365.0	—	15.0	—	—	—	—	—
Haiti	—	—	134.0	—	—	—	—	—	—
Honduras	119.0	4.6	—	—	113.6	113.6	—	—	—
Jamaica	905.3	1,466.6	1,076.1	1,275.0	450.0	—	—	335.0	160.0
Mexico	19,930.0	14,104.2	16,341.9	17,678.9	10,147.9	1,815.4	3,427.3	9,022.7	2,545.3
Nicaragua	22.0	—	—	—	—	—	—	—	—
Panama	1,416.0	2,442.1	2,342.2	2,814.0	2,931.7	720.7	1,227.4	589.4	213.1
Paraguay	—	—	—	—	98.8	—	—	—	—
Peru	1,388.2	2,583.9	1,489.9	5,724.4	2,330.0	350.0	300.0	1,550.0	—
St. Lucia	—	—	—	—	—	—	—	—	—
Trinidad and Tobago	415.0	100.0	2,708.0	955.4	—	—	—	—	—
Uruguay	—	1,061.2	2,700.0	1,148.3	2.6	—	—	—	—
Venezuela	4,394.0	6,111.3	376.1	9,381.0	4,650.0	—	—	—	—

Source: Dealogic, using the Bond, Equity and Loan database of the International Monetary Fund.
Note: Deal inclusion conforms to the vendor's criteria for external publicly-syndicated issuance, generally excluding bilateral deals.
[1]Data prior to 2006 refer to Serbia and Montenegro.

Table 15. Emerging Market External Financing: Bond Issuance

(In millions of U.S. dollars)

						2008		2009	
	2004	2005	2006	2007	2008	Q3	Q4	Q1	Q2
Total	**129,552.9**	**180,901.6**	**165,100.9**	**185,680.3**	**106,246.7**	**21,432.0**	**5,685.0**	**31,403.9**	**47,877.0**
Africa	**2,250.1**	**3,170.0**	**4,898.9**	**13,243.3**	**1,532.8**	**551.2**	**468.0**	**100.0**	**1,818.9**
Gabon	—	—	—	1,000.0	—	—	—	—	—
Ghana	—	—	—	950.0	—	—	—	—	—
Morocco	—	—	—	671.3	—	—	—	—	—
Nigeria	—	—	—	525.0	—	—	—	—	—
Seychelles	—	—	200.0	30.0	—	—	—	—	—
South Africa	1,696.5	2,681.4	4,698.9	9,813.6	1,532.8	551.2	468.0	100.0	1,818.9
Tunisia	553.6	488.6	—	253.4	—	—	—	—	—
Asia	**44,566.9**	**44,502.1**	**41,705.3**	**47,324.3**	**28,279.6**	**6,250.6**	**1,439.9**	**10,923.2**	**14,004.6**
China	4,362.0	3,858.2	1,110.0	2,144.2	2,055.3	1,755.3	—	—	146.5
Fiji	—	—	150.0	—	—	—	—	—	—
Hong Kong SAR	3,316.8	4,626.9	3,595.8	5,122.6	2,457.2	1,168.6	22.1	224.5	821.8
India	3,199.8	2,118.3	2,644.2	7,549.4	1,407.5	—	—	—	—
Indonesia	1,363.6	2,817.3	2,000.0	1,750.0	4,200.0	—	—	3,000.0	750.0
Korea	17,717.7	17,953.7	18,345.6	22,250.3	14,719.2	2,516.5	1,417.8	6,098.7	11,092.8
Malaysia	1,975.0	1,184.1	2,076.2	918.6	439.7	439.7	—	—	—
Mongolia	—	—	—	75.0	—	—	—	—	—
Pakistan	500.0	—	1,050.0	750.0	—	—	—	—	—
Philippines	4,446.7	3,900.0	4,623.2	1,000.0	350.0	350.0	—	1,500.0	1,000.0
Singapore	5,727.9	4,245.7	4,750.5	4,498.8	2,124.4	20.5	—	—	193.5
Sri Lanka	100.0	—	—	500.0	—	—	—	—	—
Taiwan Province of China	457.4	806.0	304.7	—	2.4	—	—	—	—
Thailand	1,400.0	2,241.8	1,055.0	765.4	523.8	—	—	—	—
Vietnam	—	750.0	—	—	—	—	—	100.0	—
Europe	**33,016.7**	**52,290.5**	**50,649.5**	**60,476.1**	**45,821.6**	**9,861.3**	**1,665.6**	**7,782.1**	**18,261.2**
Belarus	—	—	2.5	19.4	3.0	—	—	—	—
Bulgaria	10.0	383.4	220.8	—	—	—	—	—	—
Croatia	1,654.3	—	384.9	746.4	—	—	—	—	1,050.2
Cyprus	1,178.4	1,135.5	1,694.9	2,427.8	1,662.6	50.0	1,260.2	—	3,385.8
Czech Republic	2,546.7	1,345.2	907.4	2,168.9	4,564.3	1,237.0	—	190.8	3,103.4
Estonia	958.5	426.6	—	38.0	—	—	—	—	—
Gibraltar	—	—	—	900.8	—	—	—	—	—
Hungary	5,002.1	7,351.4	6,900.9	4,088.2	5,281.3	344.4	—	—	70.0
Latvia	528.4	123.1	266.1	—	607.6	—	—	—	—
Lithuania	811.2	778.6	1,241.6	1,484.2	104.9	—	104.9	187.9	700.1
Macedonia, FYR	—	176.5	—	—	—	—	—	—	243.9
Poland	3,545.2	11,851.5	4,693.5	4,111.0	3,785.1	—	—	1,291.7	1,271.0
Romania	—	1,197.0	—	—	1,162.5	—	—	—	—
Russia	7,150.8	15,365.7	20,804.6	30,190.3	22,063.1	6,229.9	300.5	1,850.3	4,288.3
Serbia[1]	—	1,018.5	—	165.2	—	—	—	—	—
Slovak Republic	1,188.7	—	1,208.8	1,354.2	—	—	—	—	2,648.5
Slovenia	67.3	156.5	—	1,614.8	1,477.3	—	—	3,261.4	—
Turkey	6,060.1	8,875.0	9,209.9	7,132.2	4,150.0	1,500.0	—	1,000.0	1,500.0
Ukraine	2,315.0	2,105.9	3,113.5	4,035.0	960.0	500.0	—	—	—

Table 15 ***(concluded)***

	2004	2005	2006	2007	2008	2008 Q3	2008 Q4	2009 Q1	2009 Q2
Middle East and Central Asia	**14,783.4**	**18,576.9**	**35,156.1**	**25,327.1**	**12,810.6**	**3,808.8**	—	**4,365.6**	**8,844.4**
Azerbaijan	—	—	5.0	100.0	49.6	10.0	—	—	—
Bahrain	665.6	1,296.7	1,120.0	1,767.7	350.0	—	—	—	750.0
Egypt	—	1,250.0	—	1,803.5	—	—	—	—	—
Georgia	—	—	—	200.0	500.0	—	—	—	—
Iraq	—	—	2,700.0	—	—	—	—	—	—
Israel	2,250.0	1,177.9	1,500.0	—	1,335.3	85.3	—	2,000.0	240.7
Jordan	145.0	—	—	—	—	—	—	—	—
Kazakhstan	3,225.0	2,850.0	7,055.8	8,808.6	3,575.0	—	—	—	—
Kuwait	500.0	500.0	1,137.0	575.0	305.7	—	—	—	—
Lebanon	5,382.8	1,780.0	5,741.6	2,300.0	3,138.2	500.0	—	2,365.6	—
Oman	250.0	—	25.0	—	—	—	—	—	—
Qatar	665.0	2,250.0	3,040.0	—	—	—	—	—	3,000.0
Saudi Arabia	—	1,800.0	2,913.8	—	—	—	—	—	—
United Arab Emirates	1,700.0	5,672.4	9,917.9	9,772.4	3,556.8	3,213.4	—	—	4,853.7
Latin America	**34,905.7**	**62,362.1**	**32,691.1**	**39,309.5**	**17,802.0**	**959.7**	**2,111.9**	**8,233.0**	**4,947.9**
Argentina	1,290.0	18,984.4	1,745.5	3,400.9	65.0	—	—	—	45.0
Brazil	9,716.4	17,769.0	12,303.9	9,916.9	6,734.7	435.0	—	1,025.0	2,910.0
Chile	2,350.0	900.0	1,100.0	250.0	99.8	—	—	600.0	300.0
Colombia	1,545.4	2,435.5	3,177.6	3,133.7	1,039.7	39.7	—	1,000.0	1,000.0
Costa Rica	310.0	—	—	—	—	—	—	—	—
Dominican Republic	—	196.6	550.0	430.0	—	—	—	—	—
Ecuador	—	650.0	—	—	—	—	—	—	—
El Salvador	286.5	375.0	625.0	—	—	—	—	—	—
Guatemala	380.0	200.0	—	—	—	—	—	—	—
Jamaica	809.0	1,050.0	880.0	625.0	350.0	—	—	335.0	160.0
Mexico	11,384.2	9,165.1	6,207.2	6,341.4	4,472.9	335.0	2,111.9	3,700.0	532.9
Panama	1,176.0	1,395.0	1,976.3	770.0	240.0	—	—	323.0	—
Peru	1,298.2	2,155.0	445.0	4,449.0	150.0	150.0	—	1,250.0	—
Trinidad and Tobago	100.0	100.0	980.7	900.0	—	—	—	—	—
Uruguay	—	1,061.2	2,700.0	342.6	—	—	—	—	—
Venezuela	4,260.0	5,925.3	—	8,750.0	4,650.0	—	—	—	—

Source: Dealogic, using the Bond, Equity and Loan database of the International Monetary Fund.
Note: Deal inclusion conforms to the vendor's criteria for external publicly-syndicated issuance, generally excluding bilateral deals.
[1]Data prior to 2006 refer to Serbia and Montenegro.

Table 16. Emerging Market External Financing: Equity Issuance

(In millions of U.S. dollars)

	2004	2005	2006	2007	2008	2008 Q3	2008 Q4	2009 Q1	2009 Q2
Total	**49,026.2**	**85,807.2**	**124,448.7**	**207,757.5**	**54,206.8**	**6,918.1**	**2,469.9**	**8,930.6**	**24,578.1**
Africa	**2,742.4**	**1,199.2**	**4,008.6**	**8,980.0**	**1,476.9**	**395.9**	**68.9**	**122.4**	**193.7**
Algeria	—	—	2.0	—	—	—	—	—	—
Central African Republic	—	—	—	305.5	—	—	—	—	—
Ghana	—	—	—	9.8	—	—	—	—	—
Kenya	—	—	—	—	252.0	–	68.9	—	—
Morocco	800.9	—	133.3	1,049.7	472.6	275.7	—	—	—
Namibia	—	—	—	—	87.6	—	—	—	—
Nigeria	—	—	—	692.8	—	—	—	—	—
South Africa	1,910.5	1,184.2	3,800.2	6,922.3	664.7	120.2	—	122.4	193.7
Sudan	31.0	—	—	—	—	—	—	—	—
Zimbabwe	—	15.0	73.0	—	—	—	—	—	—
Asia	**36,755.1**	**62,997.1**	**79,237.6**	**101,876.3**	**28,042.5**	**3,514.0**	**1,729.3**	**7,831.5**	**17,767.5**
Bangladesh	—	16.7	23.0	39.9	—	—	—	—	—
Cambodia	—	—	96.3	220.0	—	—	—	—	—
China	13,763.8	23,188.4	40,517.1	48,134.6	12,754.1	1,618.3	1,275.8	6,318.9	9,333.6
Hong Kong SAR	3,704.6	4,076.6	5,807.6	5,347.4	1,888.0	161.1	37.3	57.1	1,898.9
India	5,023.5	8,571.0	11,009.0	21,007.8	6,017.1	176.4	27.7	4.9	3,846.2
Indonesia	849.3	1,334.2	675.9	2,674.5	2,327.2	379.2	—	12.2	861.0
Korea	5,314.4	12,606.7	7,313.7	6,423.7	2,232.4	—	361.8	1,038.3	857.4
Macao SAR	—	—	1,316.8	581.3	466.5	466.5	—	—	90.0
Malaysia	964.7	672.3	559.4	1,790.9	660.0	10.0	–	129.7	425.2
Pakistan	—	—	922.2	793.4	109.3	—	—	—	—
Papua New Guinea	—	—	—	1,024.3	—	—	—	—	—
Philippines	47.0	740.2	1,515.7	2,226.8	201.0	—	—	—	—
Singapore	2,601.1	3,996.7	4,131.7	5,109.8	30.7	—	26.7	201.0	70.3
Sri Lanka	—	55.5	—	—	3.7	—	—	—	—
Taiwan Province of China	3,388.5	7,171.6	3,543.4	5,080.4	846.0	702.4	—	49.7	374.0
Thailand	1,098.4	567.2	1,805.8	819.9	416.6	—	—	19.7	11.0
Vietnam	—	—	—	601.4	90.0	—	—	—	—
Europe	**5,559.6**	**10,660.2**	**18,237.3**	**36,686.8**	**7,484.3**	**37.2**	**598.3**	**–**	**386.0**
Bulgaria	—	93.5	85.7	—	—	—	—	—	—
Croatia	—	—	220.0	1,377.6	—	—	—	—	—
Cyprus	—	54.4	999.9	19.6	28.4	—	—	—	—
Czech Republic	174.4	295.1	287.3	278.0	2,516.1	0.9	—	—	—
Estonia	—	266.2	21.5	216.1	—	—	—	—	—
Faroe Islands	—	—	67.7	225.1	—	—	—	—	—
Gibraltar	—	1,897.1	437.5	94.1	—	—	—	—	—
Hungary	884.7	48.8	—	191.8	—	—	—	—	—
Lithuania	—	51.2	—	—	15.0	—	—	—	—
Poland	964.7	1,249.8	1,588.5	430.0	908.5	—	598.3	—	221.6
Romania	—	—	172.5	116.9	—	—	—	—	—
Russia	2,554.9	6,458.2	13,165.4	29,596.8	2,850.3	1.8	—	—	164.4
Slovak Republic	—	88.8	1.9	—	—	—	—	—	—
Slovenia	—	—	—	231.4	248.9	—	—	—	—
Turkey	980.8	—	1,164.3	2,576.6	—	—	—	—	—
Ukraine	—	157.1	25.3	1,332.9	917.0	34.5	—	—	—
Middle East and Central Asia	**1,783.2**	**5,303.8**	**7,749.1**	**12,689.3**	**4,484.2**	**648.8**	**73.3**	**–**	**1,240.9**
Armenia	—	—	—	—	—	—	—	—	2.4
Bahrain	—	87.2	420.5	266.4	—	—	—	—	—
Egypt	141.0	686.8	483.7	592.1	483.6	—	—	—	—
Georgia	—	—	159.8	—	100.0	—	—	—	—
Israel	1,357.9	1,894.7	921.6	2,294.3	679.1	113.1	73.3	—	271.1
Kazakhstan	—	1,548.2	4,303.6	5,030.4	219.9	—	—	—	15.1
Kuwait	260.7	—	—	—	1,642.0	501.1	—	—	—
Lebanon	—	778.0	248.4	—	—	—	—	—	—
Oman	23.6	148.4	—	—	34.6	34.6	—	—	—
Qatar	—	—	234.8	171.4	900.0	—	—	—	952.2
Saudi Arabia	—	—	—	41.8	—	—	—	—	—
United Arab Emirates	—	160.5	976.6	4,293.0	425.0	—	—	—	—
Latin America	**2,186.0**	**5,646.8**	**15,216.1**	**47,525.1**	**12,719.0**	**2,322.3**	**–**	**976.8**	**4,990.0**
Argentina	—	—	987.1	1,845.3	—	—	—	—	—
Brazil	1,830.5	3,782.8	11,177.1	39,242.8	10,435.4	2,322.3	—	976.8	4,906.1
Chile	105.5	598.1	742.9	317.7	—	—	—	—	—
Colombia	—	—	54.2	3,365.7	—	—	—	—	83.9
Mexico	250.1	903.8	1,513.8	2,111.1	2,127.2	—	—	—	—
Panama	—	362.3	164.1	—	156.4	—	—	—	—
Peru	—	—	576.9	642.6	—	—	—	—	—

Source: Dealogic, using the Bond, Equity and Loan database of the International Monetary Fund.
Note: Deal inclusion conforms to the vendor's criteria for external publicly-syndicated issuance, generally excluding bilateral deals.

Table 17. Emerging Market External Financing: Loan Syndication

(In millions of U.S. dollars)

	2004	2005	2006	2007	2008	2008 Q3	2008 Q4	2009 Q1	2009 Q2
Total	**148,596.3**	**190,383.8**	**252,342.1**	**331,189.5**	**293,541.0**	**84,245.1**	**41,378.9**	**67,201.0**	**52,175.6**
Africa	**7,722.8**	**8,076.3**	**7,076.0**	**8,361.2**	**6,446.8**	**1,268.0**	**244.6**	**2,390.5**	**1,207.8**
Algeria	307.9	489.3	—	411.0	1,738.0	—	—	—	—
Angola	2,900.0	3,122.7	91.9	74.6	—	—	—	136.3	123.1
Botswana	28.4	—	—	—	—	—	—	—	—
Burkina Faso	—	11.0	—	14.5	—	—	—	—	—
Cameroon	48.0	30.0	—	—	—	—	—	—	—
Cape Verde	—	—	—	13.0	—	—	—	—	—
Côte d'Ivoire	—	—	—	—	45.0	—	—	150.7	—
Djibouti	40.0	—	—	—	—	—	—	—	—
Ethiopia	40.0	—	—	—	100.2	—	—	—	46.8
Gabon	22.0	—	34.4	—	600.0	—	—	—	—
Ghana	850.0	706.5	860.0	504.5	1,000.0	1,000.0	—	—	55.0
Kenya	135.1	64.0	330.1	10.0	25.0	25.0	—	—	62.8
Lesotho	—	—	—	19.7	—	—	—	—	—
Malawi	4.8	—	—	—	—	—	—	—	—
Mali	288.9	—	—	180.9	110.4	—	—	—	—
Mauritius	—	99.3	180.0	—	29.0	20.0	—	—	—
Morocco	2.6	1.9	25.4	—	—	—	—	—	—
Mozambique	422.4	—	38.8	—	834.0	8.5	—	55.0	—
Namibia	—	50.0	100.0	—	10.0	10.0	—	—	—
Nigeria	875.0	874.0	640.0	3,666.5	223.5	—	68.5	74.7	78.1
Senegal	10.0	—	31.6	—	—	—	—	—	—
South Africa	1,717.8	2,400.3	4,201.6	3,061.6	738.5	79.5	—	1,947.5	761.9
Tanzania	—	136.0	—	—	446.1	—	176.1	—	—
Togo	—	—	—	—	125.0	125.0	—	—	—
Tunisia	30.0	91.2	24.7	150.0	402.0	—	—	1.4	—
Uganda	—	—	12.6	—	—	—	—	—	—
Zambia	—	—	505.0	255.0	20.0	—	—	25.0	—
Zimbabwe	—	—	—	—	—	—	—	—	80.0
Asia	**71,035.7**	**82,007.0**	**100,411.9**	**150,239.7**	**128,603.8**	**35,949.4**	**20,453.2**	**18,356.3**	**32,213.8**
Bangladesh	176.8	—	83.6	17.6	65.4	—	—	15.0	—
Brunei Darussalam	—	—	—	—	505.0	505.0	—	—	—
China	7,535.7	11,757.9	8,412.3	24,727.2	14,232.0	3,788.9	549.0	6,218.2	2,079.7
Hong Kong SAR	12,269.8	11,294.2	16,046.8	12,497.7	10,867.9	5,031.9	1,426.2	863.0	1,950.3
India	5,077.8	10,970.7	15,881.2	31,375.3	30,145.4	8,063.8	5,442.6	4,956.5	16,256.8
Indonesia	1,902.4	1,041.8	5,756.5	3,681.7	7,221.6	1,195.5	2,268.2	—	414.0
Korea	7,983.9	17,108.2	13,017.9	31,140.5	17,306.7	2,030.0	1,945.7	338.1	1,417.1
Lao P.D.R.	210.0	1,000.0	—	—	592.0	—	592.0	213.7	—
Macao SAR	382.0	729.0	2,375.9	3,950.1	180.0	—	—	—	907.4
Malaysia	5,038.1	4,298.2	5,051.2	4,358.8	4,160.5	3,012.3	412.5	1,005.3	775.2
Marshall Islands	—	24.0	170.0	1,069.3	204.0	—	—	—	—
Mongolia	—	30.0	6.0	10.0	6.8	2.8	—	—	—
Nepal	—	—	—	—	15.0	10.0	—	—	—
Pakistan	470.0	739.2	1,287.8	614.9	775.9	42.4	347.4	298.9	132.7
Papua New Guinea	—	—	—	—	—	—	—	—	78.5
Philippines	1,864.7	1,554.6	902.9	3,092.2	2,515.0	348.4	934.1	70.8	280.0
Singapore	3,620.4	6,303.7	10,567.4	10,944.2	18,418.3	6,357.1	1,744.7	2,246.1	2,966.4
Sri Lanka	35.0	327.5	129.8	255.0	535.0	25.0	170.0	—	—
Taiwan Province of China	22,712.1	11,107.4	18,341.9	19,542.8	17,163.7	4,366.0	3,540.1	1,443.1	4,329.9
Thailand	1,642.9	3,501.8	1,923.3	908.8	2,130.0	958.4	738.9	183.4	432.8
Vietnam	114.0	218.8	457.4	2,053.8	1,563.5	212.0	341.8	504.2	193.0
Europe	**31,627.7**	**40,773.9**	**58,742.1**	**64,293.1**	**72,980.7**	**16,766.1**	**11,204.3**	**30,315.9**	**8,852.7**
Albania	—	—	—	—	78.1	—	42.4	—	—
Belarus	21.4	32.0	336.1	283.5	324.0	135.0	—	—	10.0
Bulgaria	1,089.9	626.8	1,420.6	1,360.0	1,415.0	676.1	—	45.7	46.6
Croatia	1,083.1	1,263.7	1,291.9	662.6	1,472.3	816.1	—	—	310.9
Cyprus	—	—	965.7	651.3	1,545.0	389.6	—	125.0	—
Czech Republic	1,345.1	2,360.8	986.8	1,815.8	1,344.3	—	200.2	737.0	15.8
Estonia	222.9	—	449.4	45.1	328.9	32.5	—	—	53.0
Faroe Islands	—	85.3	206.2	206.1	217.8	—	—	—	—
Gibraltar	—	—	1,934.2	—	—	—	—	—	—
Hungary	3,373.4	1,941.4	427.8	1,050.9	3,822.6	708.8	178.4	241.8	—
Latvia	353.2	393.0	1,191.3	1,614.7	1,284.3	46.5	706.3	—	132.0

Table 17 ***(concluded)***

	2004	2005	2006	2007	2008	2008 Q3	2008 Q4	2009 Q1	2009 Q2
Europe *(continued)*									
Lithuania	174.8	390.2	50.4	161.2	143.5	21.3	28.7	—	27.2
Macedonia, FYR	66.0	—	—	14.4	—	—	—	65.0	144.0
Malta	242.7	—	256.0	—	218.7	218.7	—	—	—
Moldova	7.0	13.1	—	—	171.3	63.0	108.3	—	—
Montenegro	—	—	0.8	21.4	6.4	—	6.4	—	—
Poland	749.4	3,290.4	2,050.2	2,733.7	4,637.8	284.1	1,580.1	3.9	893.4
Romania	1,116.7	1,414.0	574.7	1,012.2	727.5	158.8	137.2	132.9	—
Russia	12,415.5	15,179.7	25,195.4	24,748.9	36,362.0	8,498.9	5,325.4	28,000.7	4,411.7
Serbia[1]	213.4	234.1	60.2	403.4	243.3	14.6	—	—	—
Slovak Republic	130.3	622.7	—	—	—	—	—	—	—
Slovenia	1,254.6	1,730.8	1,837.8	2,691.6	2,496.7	42.5	335.3	370.0	700.4
Turkey	7,466.0	10,124.6	17,267.4	21,511.3	13,128.6	3,901.1	1,752.2	371.5	2,087.8
Ukraine	302.1	1,071.4	2,239.3	3,305.0	3,012.8	758.5	803.4	222.5	20.0
Middle East and Central Asia	**17,343.2**	**39,630.0**	**59,115.2**	**59,513.2**	**54,625.0**	**21,597.4**	**3,055.2**	**5,191.8**	**3,221.1**
Armenia	—	1.3	30.0	19.1	11.0	—	—	—	—
Azerbaijan	1,217.2	400.2	178.8	215.7	67.0	21.0	15.0	260.0	10.0
Bahrain	1,223.0	1,530.0	2,285.2	4,136.0	895.0	820.0	—	—	1,050.1
Egypt	1,324.0	1,489.3	3,895.9	3,076.1	5,644.8	368.0	105.5	566.8	—
Georgia	—	11.1	61.0	141.6	49.6	3.7	45.9	—	35.5
Iran, I.R. of	2,419.4	1,928.8	142.5	—	—	—	—	—	—
Iraq	—	107.8	177.0	—	—	—	—	—	—
Israel	370.0	2,040.4	1,096.8	1,203.0	454.6	—	78.3	—	—
Jordan	54.4	—	60.0	180.0	—	—	—	—	—
Kazakhstan	3,151.2	3,800.9	5,296.4	4,210.7	7,342.2	4,911.4	1,458.8	70.0	8.0
Kuwait	1,027.5	3,945.0	4,209.6	1,344.9	1,199.1	155.0	130.0	—	115.0
Kyrgyz Republic	—	2.0	—	—	7.4	6.6	—	—	—
Lebanon	—	—	50.0	120.0	65.0	—	65.0	—	—
Libya	—	—	—	38.0	—	—	—	—	—
Oman	1,055.0	3,172.2	3,405.2	3,580.7	916.0	370.0	—	—	51.9
Qatar	1,377.7	8,518.5	7,253.1	14,529.2	10,418.1	6,511.4	380.0	833.8	—
Saudi Arabia	2,749.6	3,991.0	6,201.7	7,068.8	7,232.5	2,674.9	—	—	—
Syrian Arab Republic	—	—	—	—	80.0	—	—	—	—
Tajikistan	5.2	1.2	—	2.0	16.7	16.7	—	3.2	—
United Arab Emirates	1,341.0	8,686.6	24,767.1	19,647.3	17,787.5	5,738.8	760.4	3,405.3	1,950.6
Uzbekistan	28.0	3.6	4.9	—	16.4	—	16.4	5.0	—
Yemen Arab Republic	—	—	—	—	2,422.2	—	—	47.6	—
Latin America	**20,866.9**	**19,896.5**	**26,997.0**	**48,782.4**	**30,884.7**	**8,664.2**	**6,421.6**	**10,946.5**	**6,680.3**
Argentina	500.0	1,678.6	611.0	5,226.0	1,236.4	—	—	—	—
Bolivia	—	54.0	—	—	100.0	—	—	—	—
Brazil	5,122.9	5,934.3	7,738.3	24,577.6	13,873.0	5,350.0	1,761.2	5,057.5	3,882.8
Chile	5,501.3	5,310.6	4,166.9	3,175.5	5,580.7	400.0	1,817.5	—	572.0
Colombia	83.0	627.8	1,804.4	1,380.0	952.0	—	—	—	—
Costa Rica	24.2	91.7	1.7	31.1	85.0	20.0	—	—	—
Cuba	69.8	1.9	—	—	—	—	—	—	—
Dominican Republic	140.5	87.8	229.8	227.9	479.6	379.6	—	—	—
Ecuador	—	109.0	19.1	104.0	—	—	—	—	—
El Salvador	53.8	79.5	701.6	—	—	—	—	—	—
Guatemala	59.3	165.0	—	15.0	—	—	—	—	—
Haiti	—	—	134.0	—	—	—	—	—	—
Honduras	119.0	4.6	—	—	113.6	113.6	—	—	—
Jamaica	96.3	416.6	196.1	650.0	100.0	—	—	—	—
Mexico	8,295.7	4,035.4	8,620.9	9,226.4	3,547.9	1,480.4	1,315.5	5,322.7	2,012.4
Nicaragua	22.0	—	—	—	—	—	—	—	—
Panama	240.0	684.8	201.8	2,044.0	2,535.3	720.7	1,227.4	266.4	213.1
Paraguay	—	—	—	—	98.8	—	—	—	—
Peru	90.0	429.0	468.0	632.9	2,180.0	200.0	300.0	300.0	—
St. Lucia	—	—	—	—	—	—	—	—	—
Trinidad and Tobago	315.0	—	1,727.3	55.4	—	—	—	—	—
Uruguay	—	—	—	805.7	2.6	—	—	—	—
Venezuela	134.0	186.0	376.1	631.0	—	—	—	—	—

Source: Dealogic, using the Bond, Equity and loan database of the International Monetary Fund.
Note: Deal inclusion conforms to the vendor's criteria for external publicly-syndicated issuance, generally excluding bilateral deals.

Table 18. Equity Valuation Measures: Dividend-Yield Ratios

						2008		2009	
	2004	2005	2006	2007	2008	Q3	Q4	Q1	Q2
Emerging markets	**2.6**	**2.6**	**2.2**	**1.9**	**4.1**	**3.2**	**4.1**	**3.9**	**2.9**
Asia	**2.5**	**2.6**	**2.1**	**1.8**	**4.2**	**3.4**	**4.2**	**3.7**	**2.5**
Europe/Mideast/Africa	**2.4**	**2.1**	**2.0**	**2.0**	**4.3**	**3.2**	**4.3**	**4.2**	**3.2**
Latin America	**3.3**	**3.0**	**2.4**	**2.1**	**4.0**	**2.7**	**4.0**	**3.9**	**3.5**
Argentina	1.0	1.7	0.8	1.6	2.7	1.9	2.7	2.9	3.1
Brazil	4.4	3.9	3.1	2.2	4.7	2.9	4.7	4.4	4.0
Chile	3.0	3.0	1.9	1.7	2.6	2.4	2.6	2.4	2.4
China	2.3	2.7	1.5	1.2	3.1	2.8	3.1	3.2	2.4
Colombia	2.5	1.7	2.5	2.3	2.4	2.0	2.4	2.4	3.2
Czech Republic	4.3	1.3	3.3	2.5	6.0	4.6	6.0	7.3	7.4
Egypt	2.0	1.4	2.3	1.8	6.3	3.7	6.3	8.7	6.3
Hungary	2.0	2.2	2.5	2.3	4.6	2.7	4.6	5.3	1.8
India	1.5	1.3	1.0	0.7	1.8	1.3	1.8	1.7	1.1
Indonesia	3.2	3.3	2.3	1.5	5.4	4.0	5.4	5.2	3.7
Israel	1.4	2.0	2.0	2.1	2.8	2.3	2.8	2.7	2.0
Jordan	1.6	1.1	3.4	1.8	3.4	1.9	3.4	3.7	3.0
Korea	2.4	1.7	1.6	1.6	2.7	2.2	2.7	1.9	1.3
Malaysia	2.2	2.9	2.6	2.0	4.1	3.4	4.1	4.0	3.1
Mexico	1.9	1.6	1.2	1.6	2.8	2.3	2.8	3.2	2.8
Morocco	3.6	3.8	3.5	2.7	3.2	2.8	3.2	3.3	3.3
Pakistan	7.0	5.0	5.8	4.1	12.5	6.0	12.5	9.1	9.1
Philippines	1.7	2.2	2.3	2.2	4.4	3.3	4.4	4.1	3.3
Poland	1.3	2.7	4.2	3.6	5.9	4.7	5.9	7.2	4.5
Russia	3.1	1.6	1.0	1.2	3.5	2.1	3.5	3.2	2.0
South Africa	2.6	2.5	2.4	2.7	4.5	4.0	4.5	4.5	4.2
Sri Lanka	2.6	1.7	1.4	1.9	9.8	11.8	9.8	7.0	2.0
Taiwan Province of China	2.9	3.9	3.5	3.8	8.5	6.6	8.5	7.3	4.4
Thailand	3.0	3.7	3.9	2.9	6.5	4.8	6.5	5.5	3.9
Turkey	1.9	2.0	2.9	2.3	5.8	4.3	5.8	4.9	2.9
Venezuela	5.8	7.3	2.3	1.9	. . .	. . .	. . .	. . .	. . .

Source: Morgan Stanley Capital International.

Table 19. Equity Valuation Measures: Price-to-Book Ratios

	2004	2005	2006	2007	2008	2008 Q3	2008 Q4	2009 Q1	2009 Q2
Emerging markets	**1.9**	**2.4**	**2.5**	**2.8**	**1.4**	**1.8**	**1.4**	**1.4**	**1.8**
Asia	**1.8**	**2.1**	**2.4**	**2.8**	**1.4**	**1.7**	**1.4**	**1.5**	**1.9**
Europe/Mideast/Africa	**2.1**	**2.9**	**2.8**	**2.7**	**1.2**	**1.7**	**1.2**	**1.2**	**1.5**
Latin America	**2.1**	**2.6**	**2.8**	**3.1**	**1.7**	**2.2**	**1.7**	**1.7**	**2.0**
Argentina	2.2	3.1	3.5	2.9	0.9	2.0	0.9	0.8	1.0
Brazil	1.8	2.4	2.5	3.1	1.5	2.1	1.5	1.6	1.9
Chile	1.8	1.9	2.3	2.4	1.8	2.1	1.8	1.7	2.0
China	2.0	2.1	3.2	4.5	1.8	2.0	1.8	1.8	2.4
Colombia	1.9	3.4	1.9	1.8	1.5	1.8	1.5	1.5	2.0
Czech Republic	1.6	2.5	2.7	3.6	2.0	2.7	2.0	1.7	2.2
Egypt	3.9	8.0	4.7	5.5	1.7	2.7	1.7	1.5	2.1
Hungary	2.6	3.0	3.0	2.6	0.9	1.7	0.9	0.8	1.0
India	3.6	4.4	5.2	6.4	2.2	3.0	2.2	2.3	3.2
Indonesia	3.1	3.1	4.4	5.8	2.4	3.2	2.4	2.6	3.2
Israel	2.6	3.1	2.3	2.5	1.7	2.1	1.7	1.9	2.2
Jordan	3.0	4.7	2.2	2.4	1.7	2.6	1.7	1.6	1.8
Korea	1.4	1.9	1.7	1.8	1.0	1.4	1.0	1.1	1.3
Malaysia	2.0	1.8	2.2	2.5	1.5	1.7	1.5	1.5	1.8
Mexico	2.6	3.3	3.6	3.3	2.4	2.6	2.4	2.0	2.4
Morocco	2.4	2.7	4.2	6.1	5.2	5.9	5.2	4.9	5.1
Pakistan	2.4	3.6	2.9	3.7	1.1	2.1	1.1	1.6	1.4
Philippines	1.6	2.0	2.8	2.9	1.8	2.2	1.8	1.9	2.2
Poland	2.1	2.6	2.6	2.5	1.2	1.6	1.2	1.0	1.3
Russia	1.1	2.4	2.7	2.4	0.7	1.3	0.7	0.7	1.0
South Africa	2.4	3.2	3.3	3.1	1.9	2.3	1.9	1.7	1.9
Sri Lanka	1.4	2.0	2.6	1.7	0.8	1.3	0.8	0.8	1.7
Taiwan Province of China	1.9	2.0	2.2	2.2	1.2	1.5	1.2	1.3	1.7
Thailand	2.4	2.4	1.9	2.4	1.1	1.5	1.1	1.1	1.6
Turkey	1.9	2.2	2.0	2.3	1.1	1.4	1.1	1.0	1.5
Venezuela	1.6	1.0	2.2	1.3	. . .	. . .	. . .	. . .	. . .

Source: Morgan Stanley Capital International.

Table 20. Equity Valuation Measures: Price/Earnings Ratios

	2004	2005	2006	2007	2008	2008 Q3	2008 Q4	2009 Q1	2009 Q2
Emerging markets	**12.2**	**15.0**	**15.6**	**17.0**	**8.5**	**10.7**	**8.5**	**9.1**	**14.3**
Asia	**11.2**	**14.2**	**15.8**	**19.0**	**9.4**	**11.1**	**9.4**	**10.2**	**19.0**
Europe/Mideast/Africa	**13.7**	**17.3**	**15.7**	**14.6**	**6.7**	**9.1**	**6.7**	**6.4**	**9.0**
Latin America	**13.1**	**14.5**	**14.7**	**16.0**	**9.0**	**11.8**	**9.0**	**10.6**	**13.3**
Argentina	47.2	19.5	16.7	13.1	3.7	7.8	3.7	4.6	6.3
Brazil	10.8	12.4	12.8	15.5	7.9	11.3	7.9	9.5	11.8
Chile	23.1	21.7	23.6	22.1	13.3	18.2	13.3	12.9	15.5
China	13.8	12.2	21.0	27.0	10.3	11.3	10.3	10.4	16.2
Colombia	17.7	29.7	20.1	27.0	13.4	15.8	13.4	13.5	15.5
Czech Republic	26.6	23.8	20.2	23.6	9.7	13.9	9.7	8.8	9.6
Egypt	14.2	31.5	19.1	21.5	7.1	10.4	7.1	6.3	10.0
Hungary	11.3	12.8	11.3	12.8	3.7	7.2	3.7	3.7	6.1
India	17.7	20.2	22.9	32.8	10.5	14.9	10.5	12.0	18.2
Indonesia	12.9	12.1	19.5	21.5	8.7	11.6	8.7	9.0	13.1
Israel	20.1	21.1	17.9	15.5	14.3	15.1	14.3	16.7	15.9
Jordan	32.5	41.5	15.3	21.3	14.4	48.5	14.4	15.8	13.1
Korea	8.2	12.3	11.4	13.3	9.1	10.2	9.1	10.4	20.6
Malaysia	16.1	14.5	18.4	16.9	10.2	11.2	10.2	12.0	17.3
Mexico	15.0	17.1	17.3	16.4	12.3	12.7	12.3	14.0	20.1
Morocco	15.6	19.5	22.8	27.2	26.0	29.5	26.0	22.2	22.9
Pakistan	9.5	12.9	10.0	13.4	3.8	7.4	3.8	6.1	8.5
Philippines	14.9	15.7	17.7	16.5	11.7	13.6	11.7	12.5	17.4
Poland	13.3	15.7	13.2	15.2	7.3	9.1	7.3	7.1	12.8
Russia	8.2	15.8	15.8	14.1	3.4	6.8	3.4	3.6	6.1
South Africa	15.0	17.0	16.5	14.9	10.7	12.4	10.7	9.8	10.6
Sri Lanka	11.0	15.5	21.5	14.7	7.1	10.8	7.1	9.0	19.9
Taiwan Province of China	12.4	18.6	18.1	16.4	8.1	10.3	8.1	9.1	29.0
Thailand	11.5	10.2	9.1	14.8	7.1	10.7	7.1	6.5	16.1
Turkey	13.6	16.5	12.4	10.9	5.3	6.4	5.3	5.0	9.2
Venezuela	12.4	7.8	14.1	5.7	. . .	. . .	. . .	. . .	. . .

Source: Morgan Stanley Capital International.

Table 21. Emerging Markets: Mutual Fund Flows

(In millions of U.S. dollars)

							2008		2009	
	2003	2004	2005	2006	2007	2008	Q3	Q4	Q1	Q2
Bonds	3,153.3	1,946.6	5,729.0	6,233.1	4,294.9	–14,717.6	–4,254.2	–17,630.9	–999.9	27,608.3
Equities	8,500.0	2,783.6	21,706.1	22,440.8	40,827.1	–39,490.0	–20,685.1	–6,501.5	2,037.3	26,731.5
Global	2,119.2	–5,348.3	3,147.7	4,208.6	15,223.3	–9,114.1	–5,850.3	3,127.2	3,599.4	10,138.8
Asia	5,148.4	5,609.0	6,951.8	16,790.2	16,404.6	–19,586.8	–5,551.4	–4,208.2	–1,260.7	11,998.2
Europe/Middle East/Africa	856.5	2,184.9	7,587.2	–1,877.4	–953.3	–4,928.7	–4,467.9	–3,374.1	–1,309.4	705.3
Latin America	375.9	338.0	4,019.5	3,319.5	10,152.6	–5,860.4	–4,815.5	–2,046.4	1,007.9	3,889.2

Source: Emerging Portfolio Fund Research, Inc.

Table 22. Bank Regulatory Capital to Risk-Weighted Assets

(In percent)

	2003	2004	2005	2006	2007	2008	2009	Latest
Latin America								
Argentina	14.5	14.0	15.3	16.8	16.9	16.8	17.6	May
Bolivia[1]	15.3	14.9	14.7	13.3	12.6	13.7	13.9	May
Brazil	18.8	18.6	17.9	18.9	18.7	18.4	18.5	May
Chile	14.1	13.6	13.0	12.5	12.2	12.5	13.6	April
Colombia	13.0	14.2	14.7	13.1	13.6	13.4	14.8	April
Costa Rica[2]	16.5	19.1	20.6	18.8	16.1	15.1	15.4	June
Dominican Republic[1]	8.9	12.9	12.5	12.4	13.0	13.4	14.5	March
Ecuador[1]	12.2	12.0	11.6	12.0	12.5	13.0	14.2	May
El Salvador	12.8	13.4	13.5	13.8	13.8	15.1	16.0	May
Guatemala	15.6	14.5	13.7	13.6	13.8	13.5	. . .	December
Mexico[1]	14.2	14.1	14.3	16.1	15.9	15.3	15.2	June
Panama[30]	18.1	17.6	16.8	15.8	13.6	14.4	15.2	March
Paraguay[3]	20.9	20.5	20.4	20.1	16.8	16.2	15.2	May
Peru	13.3	14.0	12.0	12.5	12.1	11.9	12.9	May
Uruguay[4]	18.1	21.7	22.7	16.9	17.8	16.7	18.5	June
Venezuela	25.1	19.2	15.5	14.3	12.1	13.4	14.3	May
Emerging Europe								
Albania	28.5	21.6	18.6	18.1	17.1	17.2	. . .	December
Belarus	26.0	25.2	26.7	24.4	19.3	21.8	19.1	June
Bosnia and Herzegovina	20.3	18.7	17.8	17.7	17.1	16.3	16.3	March
Bulgaria	22.0	16.6	15.3	14.5	13.9	14.9	16.5	March
Croatia[5]	16.5	16.0	15.2	14.4	16.9	14.5	. . .	December
Czech Republic	14.5	12.5	11.9	11.5	11.5	12.3	13.7	June
Estonia	12.5	11.5	10.7	10.8	10.8	13.3	15.2	March
Hungary	11.8	12.4	11.6	11.0	10.4	11.1	12.3	June
Israel	10.3	10.8	10.7	10.8	11.0	11.1	. . .	December
Latvia[6]	11.7	11.7	10.1	10.2	11.1	11.8	12.8	May
Lithuania[7]	13.2	12.4	10.3	10.7	10.9	12.9	13.9	March
Macedonia, FYR[8]	25.8	23.0	21.3	18.3	17.0	16.2	16.5	March
Moldova	31.6	31.4	27.2	27.9	29.1	32.2	32.4	May
Montenegro[9]	. . .	31.3	27.8	21.3	17.1	15.0	12.4	March
Poland	13.8	15.4	14.5	13.2	12.0	11.2	11.7	April
Romania[10]	21.1	20.6	21.1	18.1	13.8	12.3	. . .	December
Russia	19.1	17.0	16.0	14.9	15.5	16.8	18.5	June
Serbia	31.1	27.9	26.0	24.7	27.9	21.9	21.2	June
Slovak Republic	22.4	18.7	14.8	13.0	12.8	11.1	12.2	May
Slovenia	11.5	11.8	10.5	11.1	11.2	10.5	. . .	September
Turkey	30.9	28.8	24.2	22.1	19.0	18.1	19.2	June
Ukraine	15.2	16.8	15.0	14.2	13.9	14.0	14.5	June
Western Europe								
Austria[11]	14.5	12.4	11.8	11.8	12.7	12.9	. . .	December
Belgium	12.8	13.0	11.5	11.9	11.2	16.2	15.1	March
Denmark	13.8	13.4	13.2	13.8	12.3	. . .	. . .	December
Finland[12]	18.7	19.1	17.2	15.1	15.4	13.5	. . .	June
France	11.9	11.5	11.3	10.9	10.2	. . .	. . .	December
Germany	12.4	12.4	12.2	12.5	12.9	. . .	. . .	December
Greece	12.0	12.8	13.2	12.2	11.2	9.4	. . .	December
Iceland[13]	12.3	12.8	12.8	15.1	12.1	. . .	. . .	December
Ireland[14]	13.9	12.6	12.0	10.9	10.7	10.6	10.5	March
Italy[15]	11.4	11.6	10.6	10.7	10.4	10.8	. . .	December
Luxembourg[16]	17.1	17.5	16.3	14.9	13.9	16.1	17.7	March
Malta	. . .	21.3	20.4	22.0	21.0	17.7	. . .	December
Netherlands	12.3	12.3	12.6	11.9	13.2	11.9	13.1	March
Norway	12.4	12.2	11.9	11.2	11.7	11.2	11.8	June
Portugal[17]	10.0	10.4	11.3	11.0	10.2	10.3	. . .	December
Spain	11.1	11.0	11.0	11.2	10.6	11.3	. . .	December
Sweden[18]	10.0	10.1	10.1	10.0	9.8	10.2	. . .	December
Switzerland[19]	12.4	12.6	12.4	13.4	12.1	14.8	. . .	December
United Kingdom	13.0	12.7	12.8	12.9	12.6	12.9	. . .	December

Table 22 ***(continued)***

	2003	2004	2005	2006	2007	2008	2009	Latest
Asia								
Bangladesh	8.4	6.9	7.3	5.1	7.4	10.1	. . .	June
China	–5.9	–4.7	2.5	4.9	8.4	12.0	. . .	December
Hong Kong SAR	15.3	15.4	14.9	15.2	13.4	14.2	. . .	June
India[20]	12.7	12.9	12.8	12.3	12.3	13.0	. . .	March
Indonesia	22.3	19.4	19.3	21.3	19.3	16.8	17.8	April
Korea	11.1	12.1	13.0	12.8	12.3	12.3	12.9	March
Malaysia	13.8	14.4	13.7	13.5	13.2	12.7	14.2	April
Philippines[21]	17.4	18.4	17.6	18.1	15.7	15.5	. . .	December
Singapore	17.9	16.2	15.8	15.4	13.5	14.3	. . .	September
Thailand	13.4	12.4	13.2	13.6	14.8	13.8	. . .	December
Middle East & Central Asia								
Armenia	33.8	32.3	33.7	34.9	30.1	27.5	28.0	June
Egypt	11.1	11.4	13.7	14.7	14.8	14.7	. . .	March
Georgia	34.0	36.0	31.0	36.0	30.0	24.0	27.2	July
Jordan	15.9	17.8	17.6	21.4	20.8	18.3	. . .	December
Kazakhstan	16.9	15.3	14.9	14.8	14.2	14.9	–3.9	July
Kuwait	18.4	17.3	21.3	21.8	18.5	16.0	. . .	September
Lebanon[22]	22.3	21.2	22.9	25.0	12.5	11.4	. . .	September
Morocco	9.6	10.5	11.5	12.3	10.6	11.2	. . .	December
Oman	17.6	17.6	18.1	17.2	15.9	14.7	. . .	December
Pakistan	8.5	10.5	11.3	12.7	13.2	12.2	12.9	March
Saudi Arabia	19.3	17.8	17.8	21.9	20.6	16.0	. . .	December
Tunisia[23]	9.3	11.6	12.4	11.8	11.6	11.7	. . .	December
United Arab Emirates[24]	18.6	16.9	17.0	16.7	14.4	13.3	16.2	March
Sub-Saharan Africa								
Gabon[25]	19.9	22.3	19.8	17.8	14.3	19.4	. . .	December
Ghana	9.3	13.9	16.2	15.8	14.8	13.8	14.6	March
Kenya	17.3	16.6	16.4	16.5	18.0	18.9	19.7	May
Lesotho	. . .	22.0	25.0	19.0	14.0	15.0	. . .	September
Mozambique	17.0	18.7	16.0	12.5	17.1	13.8	. . .	September
Namibia	14.8	15.4	14.6	14.2	15.7	15.5	. . .	December
Nigeria	17.8	14.7	17.8	22.6	21.0	21.9	21.5	March
Rwanda	2.9	14.0	14.0	13.7	16.6	15.9	19.1	March
Senegal	12.1	11.9	11.1	13.1	13.6	13.9	14.8	March
Sierra Leone[26]	27.3	38.1	35.7	33.3	35.0	43.5	. . .	December
South Africa[27]	12.4	14.0	12.7	12.3	12.8	13.0	13.5	April
Swaziland	14.0	14.0	15.0	20.0	21.0	18.0	. . .	September
Uganda	16.9	20.5	18.3	18.0	19.5	20.7	. . .	December
Other								
Australia	10.0	10.4	10.4	10.4	10.2	10.9	11.4	March
Canada	13.4	13.3	12.9	12.5	12.1	12.7	10.3	March
Japan[28]	11.1	11.6	12.2	13.1	12.3	12.4	13.4	June
United States[29]	13.0	13.2	12.9	13.0	12.8	12.8	13.5	March

Sources: National authorities; and IMF staff estimates.

Note: Due to differences in national accounting, taxation, and supervisory regimes, FSI data are not strictly comparable across countries.

[1]Commercial banks.

[2]Banking sector excludes offshore banks.

[3]Staff estimates.

[4]In 2006, the Central Bank of Uruguay changed the methodology for calculating the regulatory capital ratio, changing the weights and adding a factor to the denominator to account for market risk. Therefore, regulatory capital ratios are smaller from 2006 onwards, compared to previous years. The data exclude the state mortgage bank.

[5]From 2006 the data have been revised.

[6]Preliminary data for May 2009.

[7]The data exclude foreign bank branches.

[8]From end–2007 the calculation of the ratio is based on a revised methodology.

[9]A revised banking law took effect affecting the series from March 2009 onwards.

[10]The National Bank of Romania amended the capital adequacy requirements effective January 1, 2007 to be consistent with EU minimum requirements and Basel II. The former 12 percent capital adequacy ratio and 8 percent Tier I ratio were substituted by a new 8 percent solvency ratio.

[11]Starting in 2004 data reported on a consolidated basis.

[12]Break in the data series starting in 2003.

Table 22 ***(concluded)***

[13]Covers the three largest commercial banks and large savings banks (six through 2005, five in 2006, and four in 2007).
[14]Domestic banks.
[15]Consolidated reports for banking groups and individual reports for banks not belonging to groups.
[16]End-year data for 2007 and 2008; annual average for previous years.
[17]For 2005–06 the figures are for the sample of institutions that are already complying with IFRS, accounting as of December 2004 for about 87 percent of the usual aggregate considered. In 2006–07, the sample of banking institutions under analysis was expanded to include the institutions that adopted IFRS in 2006. 2008 data are preliminary.
[18]Data for the four large banking groups.
[19]The 2007 and 2008 ratios were calculated from numbers that originate from the Basel I as well as from the Basel II approach. Therefore, interpretation must be done carefully since they can vary within +/–10 percent.
[20]Unless otherwise indicated, data refer to the end of the fiscal year, i.e., March of the indicated calendar year.
[21]On a consolidated basis.
[22]From 2007 onwards, based on revised risk weights (Basel II).
[23]Prior to 2006, the capital to risk-weighted assets includes only private and public banks; from 2006 forward, it includes former development banks. Data for 2008 are preliminary.
[24]Reflects conversion of government deposits into Tier 2 in the first quarter of 2009.
[25]Specific loan loss provisions are excluded from the definition of capital. General loan loss provisions are included in Tier 2 capital up to an amount equal to 1.25 percent of risk-weighted assets. Regulatory capital is the sum of Tier 1 capital and the minimum of Tier 1 and Tier 2 capital. Risk-weighted assets are estimated using the following risk weights: 0 percent – cash reserves in domestic and foreign currency and claims on the central bank and the government; 20 percent – claims on correspondent banks in foreign currency; 100 percent – all other assets.
[26]Capital requirement over risk-weighted assets (solvency ratio).
[27]Total (banking and trading book).
[28]Unless otherwise indicated, data refer to the end of the fiscal year, i.e., March of the next calendar year; for major banks.
[29]All FDIC-insured institutions.
[30]Onshore banking sector.

Table 23. Bank Capital to Assets

(In percent)

	2003	2004	2005	2006	2007	2008	2009	Latest
Latin America								
Argentina	11.9	11.8	12.9	13.4	13.1	12.9	13.1	May
Bolivia[1]	12.1	11.5	11.3	10.0	9.6	9.3	8.5	May
Brazil	9.6	10.1	9.8	9.9	9.8	9.1	9.2	May
Chile	7.3	7.0	6.9	6.6	6.7	6.9	7.4	April
Colombia	11.6	12.1	12.3	12.0	12.1	12.2	12.5	April
Costa Rica[2]	11.3	9.4	9.7	10.3	10.1	13.3	13.5	June
Dominican Republic[1]	7.7	8.9	9.4	10.0	9.5	9.7	8.8	March
Ecuador[1]	8.8	8.5	8.4	8.7	8.7	8.8	9.2	May
El Salvador	9.4	9.7	10.1	10.7	11.8	12.7	11.9	May
Guatemala	9.0	8.9	8.5	8.2	9.2	10.3	10.2	June
Mexico[1]	11.4	11.2	12.5	13.6	13.8	9.6	9.1	June
Panama[3]	12.2	13.2	12.8	12.0	13.7	13.4	13.5	March
Paraguay	9.5	10.5	11.0	12.5	11.6	11.2	10.5	May
Peru	9.3	9.8	7.7	9.5	8.8	8.3	9.0	May
Uruguay[4]	7.2	8.3	8.6	9.8	10.5	8.9	9.4	June
Venezuela	14.3	12.5	11.6	8.8	8.3	9.4	10.2	May
Emerging Europe								
Albania	4.7	4.8	5.4	5.9	5.8	6.7	. . .	December
Belarus	. . .	19.0	19.0	17.8	15.9	17.4	17.1	March
Bosnia and Herzegovina	17.0	15.7	14.4	13.8	13.1	. . .	. . .	September
Bulgaria[5]	13.1	10.2	7.4	7.3	7.7	8.5	10.0	March
Croatia	8.9	8.6	9.0	10.3	12.5	13.5	. . .	December
Czech Republic[6]	5.7	5.2	5.4	6.0	5.7	5.7	6.2	June
Estonia	10.5	9.9	8.7	7.6	7.7	9.3	9.3	March
Hungary	8.3	8.5	8.2	8.3	8.2	8.0	8.1	June
Israel	5.3	5.5	5.6	5.9	6.1	5.7	. . .	December
Latvia[7]	8.4	8.0	7.6	7.6	7.9	7.3	7.8	May
Lithuania[8]	9.8	8.7	7.2	7.1	7.3	7.6	7.7	March
Macedonia, FYR	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
Moldova[9]	19.7	18.3	15.7	16.7	16.3	17.0	17.7	May
Montenegro[10]	. . .	20.4	15.3	10.4	8.0	8.4	8.4	March
Poland[11]	8.3	8.0	7.9	7.8	8.1	7.9	. . .	December
Romania[12]	10.9	8.9	9.2	8.6	7.3	7.0	. . .	December
Russia	14.6	13.3	12.8	12.1	13.3	13.6	. . .	December
Serbia	22.5	18.8	16.0	15.6	17.1	20.5	19.6	March
Slovak Republic[13]	8.9	7.7	7.4	7.0	8.0	9.8	8.3	May
Slovenia	8.3	8.1	8.5	8.4	8.4	8.4	. . .	December
Turkey[14]	13.7	14.4	12.9	11.3	13.0	11.7	12.1	March
Ukraine	12.3	13.8	12.4	13.3	12.5	14.0	13.1	March
Western Europe								
Austria[15]	4.9	4.9	4.8	5.2	6.5	6.3	6.3	March
Belgium	3.1	3.1	2.7	3.3	4.1	3.3	3.4	March
Denmark	5.9	5.7	5.7	6.2	5.7	. . .	. . .	December
Finland	10.9	9.6	9.9	9.8	8.3	7.4	. . .	September
France	5.4	5.1	4.4	4.5	4.1	4.2	. . .	May
Germany	4.2	4.0	4.1	4.3	4.3	4.5	. . .	December
Greece[16]	6.9	5.3	5.9	6.7	6.6	4.5	. . .	December
Iceland[17]	7.1	7.1	7.4	7.8	6.9	. . .	. . .	December
Ireland[22]	5.3	6.0	5.2	5.4	5.5	4.7	5.1	March
Italy	6.4	6.4	6.9	4.9	6.4	6.6	. . .	June
Luxembourg[18]	5.8	5.5	5.3	5.0	4.6	5.2	5.7	March
Malta	. . .	13.7	12.9	14.2	13.7	12.6	. . .	December
Netherlands	4.3	3.9	4.2	3.0	3.3	3.2	3.5	March
Norway	5.9	5.9	5.1	4.9	4.7	4.2	. . .	December
Portugal[19]	5.8	6.1	5.8	6.2	6.2	6.1	. . .	December
Spain	7.3	6.7	6.8	7.2	6.7	6.4	. . .	December
Sweden[20]	5.0	4.8	4.8	4.9	4.7	4.7	. . .	December
Switzerland[21]	5.7	5.3	5.1	4.9	4.6	. . .	. . .	December
United Kingdom[22]	6.6	7.0	6.1	6.1	5.5	4.4	. . .	December

Table 23 ***(continued)***

	2003	2004	2005	2006	2007	2008	2009	Latest
Asia								
Bangladesh	3.2	4.3	4.7	3.3	4.6	6.5	. . .	June
China[23]	3.8	4.0	4.4	5.1	5.8	6.1	5.4	June
Hong Kong SAR	10.6	10.8	11.8	11.2	12.0	. . .	. . .	November
India[24]	5.7	5.9	6.4	6.6	6.4	. . .	. . .	March
Indonesia	10.4	10.0	9.3	9.7	9.8	9.2	9.4	January
Korea[25]	7.0	8.0	9.3	9.2	9.0	8.8	9.5	March
Malaysia	8.5	8.2	7.7	7.6	7.4	8.0	8.9	April
Philippines	13.1	12.6	12.0	11.7	11.7	11.1	11.0	March
Singapore[26]	10.7	9.6	9.6	9.6	9.2	8.5	. . .	September
Thailand	7.4	8.0	8.9	8.9	9.5	. . .	. . .	December
Middle East & Central Asia								
Armenia	18.1	17.8	21.5	22.9	22.5	23.0	22.3	June
Egypt[31]	5.3	5.1	5.3	5.6	5.1	5.3	5.7	March
Georgia	26.5	22.0	18.8	21.2	20.4	17.1	19.8	June
Jordan	6.4	7.2	8.2	10.7	10.6	10.4	. . .	December
Kazakhstan[27]	9.0	13.1	13.0	13.2	15.2	12.2	–6.1	August
Kuwait	10.7	12.1	12.7	11.7	12.0	11.6	. . .	September
Lebanon	6.9	6.8	7.5	9.1	8.1	7.8	7.8	February
Morocco	7.6	7.6	7.7	7.4	6.9	7.3	. . .	December
Oman	12.6	12.9	13.7	13.2	14.1	15.5	. . .	December
Pakistan	5.4	6.5	7.9	9.4	10.5	10.4	10.3	March
Saudi Arabia	8.8	8.0	8.8	9.3	9.9	10.0	. . .	December
Tunisia	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
United Arab Emirates	11.4	11.1	11.4	11.1	9.4	10.6	. . .	June
Sub-Saharan Africa								
Gabon[28]	13.1	13.2	11.1	10.2	7.0	10.7	. . .	December
Ghana	12.0	12.5	13.0	11.9	11.8	12.8	. . .	December
Kenya	11.8	11.9	12.1	12.4	12.6	11.4	. . .	May
Lesotho	17.0	16.9	14.6	. . .	8.1	7.9	. . .	September
Mozambique	9.0	9.5	8.0	6.1	6.4	6.7	. . .	December
Namibia	8.3	8.8	7.8	7.5	7.9	8.0	. . .	December
Nigeria	9.6	9.9	12.4	14.7	16.3	18.0	18.4	March
Rwanda	2.9	8.7	9.4	9.3	10.3	12.3	14.3	March
Senegal	7.8	7.7	7.6	8.3	8.3	9.1	9.5	March
Sierra Leone[9]	. . .	12.7	10.3	17.0	16.7	18.7	. . .	December
South Africa	8.0	8.2	7.9	7.9	7.9	. . .	. . .	December
Swaziland	13.7	22.4	22.9	24.4	22.9	20.7	20.3	May
Uganda	8.6	10.3	10.3	10.9	10.3	13.8	. . .	September
Other								
Australia[9]	5.2	5.1	5.2	4.9	4.9	4.2	4.5	March
Canada	4.7	4.4	4.4	5.7	5.0	5.1	5.1	March
Japan[29]	3.9	4.2	4.9	5.3	4.5	3.6	. . .	March
United States[30]	9.2	10.3	10.3	10.5	10.3	9.3	10.1	March

Sources: National authorities; and IMF staff estimates.

Note: Due to differences in national accounting, taxation, and supervisory regimes, FSI data are not strictly comparable across countries.

[1]Commercial banks.

[2]Banking sector excludes offshore banks.

[3]General licensed banks; onshore banking sector.

[4]The data exclude the state mortgage bank.

[5]Ratio based on Tier 1 capital.

[6]Numerator is total own funds.

[7]Preliminary data for May 2009.

[8]Capital is the items in bank balance sheet under Shareholders' Equity and Foreign Bank Branches Funds Received from the Head Office (the latter until end-2007).

[9]Tier 1 capital to total assets.

[10]A revised banking law took effect affecting the series from March 2009 onwards.

[11]The data exclude foreign bank branches.

[12]The National Bank of Romania amended the capital adequacy requirements effective January 1, 2007 to be consistent with EU minimum requirements and Basel II. The former 12 percent capital adequacy ratio and 8 percent Tier I ratio were substituted by a new 8 percent solvency ratio.

[13]Share of shareholders' equity on the balance sheet.

[14]Break in the data series in 2007.

Table 23 *(concluded)*

[15]Based on unconsolidated data for the whole banking system.
[16]Data on an unconsolidated basis. From 2004 in accordance with IFRS.
[17]Covers the three largest commercial banks and large savings banks (six through 2005, five in 2006, and four in 2007).
[18]End-year data for 2006, 2007, and 2008; annual average for previous years.
[19]For 2005–06 the figures are for the sample of institutions that are already complying with IFRS, accounting as of December 2004 for about 87 percent of the usual aggregate considered. In 2006–07, the sample of banking institutions under analysis was expanded to include the institutions that adopted IFRS in 2006. Data on accounting basis, consolidated. 2008 data are preliminary.
[20]Data for the four large banking groups.
[21]The 2007 and 2008 ratios were calculated from numbers that originate from the Basel I as well as from the Basel II approach. Therefore, interpretation must be done carefully since they can vary within +/–10 percent.
[22]Regulatory capital to total assets.
[23]Banking institutions (policy banks, state-owned commercial banks, joint stock commercial banks, city commercial banks, rural commercial banks, urban credit cooperatives, rural credit cooperatives, postal savings, foreign banks, and nonbank financial institutions).
[24]Unless otherwise indicated, data refer to the end of the fiscal year, i.e., March of the indicated calendar year.
[25]Tier 1 capital to total risk-weighted assets.
[26]Shareholders' funds to total assets.
[27]For 2003 and 2008 Tier 1 capital to total assets.
[28]Loan loss provisions are excluded from the definition of capital. The 2007 decline of capital to total assets is related to the financing of Gabon's buyback of its Paris Club debt. In December Gabon issued a US$1 billion eurobond whose proceeds were deposited in the local branch of a foreign bank, which in turn deposited the money at its headquarters. In January 2008 the eurobond proceeds were used to finance the Paris Club debt buyback.
[29]Unless otherwise indicated, data refer to the end of the fiscal year, i.e., March of the next calendar year; for all banks.
[30]All FDIC-insured institutions.
[31]Annual data reflect Egypt's fiscal year (i.e., end-June).

Table 24. Bank Nonperforming Loans to Total Loans

(In percent)

	2003	2004	2005	2006	2007	2008	2009	Latest
Latin America								
Argentina	17.7	10.7	5.2	3.4	2.7	2.7	3.4	May
Bolivia[1]	16.7	14.0	11.3	8.7	5.6	4.3	4.8	May
Brazil	4.1	2.9	3.5	3.5	3.0	3.1	4.3	May
Chile[43]	1.6	1.2	0.9	0.7	0.8	1.0	1.2	May
Colombia	6.8	3.3	2.7	2.6	3.3	4.0	4.7	April
Costa Rica[2]	1.7	2.0	1.5	1.5	1.2	1.5	2.0	June
Dominican Republic[1]	8.7	7.3	5.9	4.5	4.0	3.5	4.1	March
Ecuador[1]	7.9	6.4	4.9	3.3	2.9	2.5	3.7	May
El Salvador[3]	2.8	2.3	1.9	1.9	2.1	2.8	3.6	May
Guatemala	6.5	7.1	4.2	4.6	5.8	2.4	3.0	June
Mexico[1]	3.2	2.5	1.8	2.0	2.7	3.2	3.8	June
Panama[4]	2.5	1.8	1.8	1.5	1.4	1.7	1.5	March
Paraguay	20.6	10.8	6.6	3.3	1.3	1.2	1.7	May
Peru[5]	14.8	9.5	6.3	4.1	2.7	2.2	2.6	May
Uruguay[6]	14.3	4.7	3.6	1.9	1.1	1.0	1.0	May
Venezuela	7.7	2.8	1.2	1.1	1.2	1.9	2.7	May
Emerging Europe								
Albania	4.6	4.2	2.3	3.1	3.4	6.6	. . .	December
Belarus	3.7	2.8	1.9	1.2	0.7	0.6	1.1	March
Bosnia and Herzegovina	8.4	6.1	5.3	4.0	3.0	3.1	4.0	June
Bulgaria	3.2	2.0	2.2	2.2	2.1	2.4	3.2	March
Croatia	8.9	7.5	6.2	5.2	4.8	4.9	6.0	June
Czech Republic	4.9	4.0	3.9	3.7	2.8	3.3	4.4	June
Estonia	0.4	0.3	0.2	0.2	0.4	1.9	3.2	March
Hungary	2.6	2.7	2.5	2.5	2.5	3.0	4.8	June
Israel	2.6	2.5	2.3	1.9	1.4	1.5	. . .	December
Latvia[7]	1.4	1.1	0.7	0.4	0.4	3.6	10.7	May
Lithuania[8]	2.4	2.2	0.6	1.0	1.0	4.6	11.3	June
Macedonia, FYR[9]	22.4	17.0	15.0	11.2	7.5	6.8	7.5	March
Moldova	6.4	6.9	5.3	4.4	3.7	5.2	8.9	May
Montenegro[10]	. . .	5.2	5.3	2.9	3.2	7.2	8.8	March
Poland[11]	21.2	14.9	11.0	7.4	5.2	4.4	5.7	April
Romania	8.3	8.1	8.3	8.0	9.7	13.8	. . .	December
Russia	5.0	3.8	2.6	2.4	2.5	3.8	7.6	June
Serbia[12]	24.1	22.2	23.8	4.1	3.8	5.3	9.7	June
Slovak Republic[13]	3.7	2.6	5.0	3.2	2.5	3.2	3.9	May
Slovenia	3.7	3.0	2.9	2.5	1.8	1.6	. . .	December
Turkey	11.5	6.0	4.8	3.8	3.5	3.6	5.3	August
Ukraine[14]	28.3	30.0	19.6	17.8	13.2	17.4	29.9	June
Western Europe								
Austria[15]	3.0	2.7	2.6	2.1	2.2	2.0	2.2	March
Belgium[16]	2.6	2.3	2.0	1.7	1.1	1.7	2.1	June
Denmark	0.8	0.7	0.4	0.3	0.3	. . .	. . .	December
Finland[17]	0.5	0.4	0.3	0.3	0.3	0.4	. . .	June
France[18]	4.8	4.2	3.5	3.0	2.7	2.8	. . .	December
Germany	5.2	4.9	4.0	3.4	2.7	. . .	. . .	December
Greece	7.0	7.0	6.3	5.4	4.5	5.0	. . .	December
Iceland[19]	2.1	0.9	1.1	0.8	. . .	. . .	. . .	December
Ireland	0.9	0.8	0.7	0.7	0.8	2.6	3.7	March
Italy	6.7	6.6	5.3	4.9	4.6	4.9	5.5	March
Luxembourg[20]	0.5	0.3	0.2	0.2	0.2	. . .	. . .	December
Malta	. . .	6.5	3.9	2.8	1.8	1.6	. . .	December
Netherlands	2.0	1.5	1.2	0.8	. . .	. . .	. . .	December
Norway	1.6	1.0	0.7	0.6	0.5	0.8	1.1	June
Portugal[21,22]	2.4	2.0	1.5	1.2	1.3	2.0	. . .	December
Spain[23]	1.0	0.8	0.8	0.7	0.9	3.4	4.6	June
Sweden[24]	1.9	1.1	0.8	0.8	0.6	1.0	. . .	December
Switzerland	1.3	0.9	0.5	0.3	0.3	0.5	. . .	December
United Kingdom	2.5	1.9	1.0	0.9	0.9	1.6	. . .	December

Table 24 *(continued)*

	2003	2004	2005	2006	2007	2008	2009	Latest
Asia								
Bangladesh	22.1	17.5	13.2	12.8	14.5	11.2	. . .	June
China[25]	20.4	13.2	8.6	7.1	6.2	2.4	1.8	June
Hong Kong SAR[26]	3.9	2.3	1.4	1.1	0.8	0.9	. . .	June
India[27]	8.8	7.2	5.2	3.3	2.5	2.3	. . .	March
Indonesia[28]	6.8	4.5	7.6	6.1	4.1	3.2	4.1	April
Korea[29]	2.6	1.9	1.2	0.8	0.7	1.1	1.5	March
Malaysia	13.9	11.7	9.6	8.5	6.5	4.8	4.6	April
Philippines[30]	16.1	14.4	10.3	7.5	5.8	4.5	4.7	March
Singapore	6.7	5.0	3.8	2.8	1.5	1.4	. . .	September
Thailand	13.5	11.9	9.1	8.4	7.9	5.7	. . .	December
Middle East & Central Asia								
Armenia	5.4	2.1	1.9	2.5	2.4	4.4	10.2	June
Egypt	24.2	23.6	26.5	18.2	19.3	14.8	. . .	June 2008
Georgia	2.4	2.0	1.2	0.8	0.8	4.1	8.6	July
Jordan	15.5	10.3	6.6	4.3	4.1	4.2	. . .	December
Kazakhstan[31]	. . .	. . .	. . .	. . .	. . .	5.1	14.8	July
Kuwait	6.1	5.3	5.0	3.9	3.2	3.1	. . .	September
Lebanon[42]	. . .	17.7	16.4	13.5	10.1	7.5	7.2	February
Morocco	18.7	19.4	15.7	10.9	7.9	6.0	. . .	December
Oman	12.5	9.9	6.5	4.6	3.2	2.4	. . .	December
Pakistan	17.0	11.6	8.3	6.9	7.2	9.1	11.5	March
Saudi Arabia[32]	5.4	2.8	1.9	2.0	2.1	1.4	. . .	December
Tunisia[33]	24.2	23.6	20.9	19.3	17.6	15.5	. . .	December
United Arab Emirates	14.3	12.5	8.3	6.3	2.9	2.5	. . .	June
Sub-Saharan Africa								
Gabon[34]	13.9	16.0	14.1	10.7	7.6	8.5	. . .	December
Ghana	18.3	16.3	13.0	7.9	6.4	7.7	9.6	March
Kenya[35]	34.9	29.3	25.6	21.3	10.9	9.0	9.9	May
Lesotho	. . .	1.0	2.0	2.0	1.7	3.5	. . .	September
Mozambique[36]	14.4	6.4	3.8	3.3	4.6	2.8	. . .	September
Namibia	3.9	2.4	2.3	2.6	2.8	3.1	. . .	December
Nigeria	20.5	21.6	18.1	8.8	8.4	6.3	6.6	March
Rwanda	33.0	31.0	29.0	25.0	18.1	12.6	13.9	March
Senegal[37]	13.3	12.6	11.9	16.8	18.6	19.1	19.1	March
Sierra Leone	7.4	16.5	26.8	27.8	31.7	23.3	. . .	December
South Africa[38]	2.4	1.8	1.5	1.1	1.4	3.9	5.1	April
Swaziland	2.0	3.0	2.0	3.6	6.4	8.4	. . .	June
Uganda	7.2	2.2	2.3	2.9	4.1	2.2	. . .	December
Other								
Australia[39]	0.3	0.2	0.2	0.2	0.2	0.5	1.0	March
Canada	1.2	0.7	0.5	0.4	0.7	1.1	0.9	March
Japan[40]	5.2	2.9	1.8	1.5	1.4	1.7	. . .	March
United States[41]	1.1	0.8	0.7	0.8	1.4	3.0	3.8	March

Sources: National authorities; and IMF staff estimates.

Note: Due to differences in national accounting, taxation, and supervisory regimes, FSI data are not strictly comparable across countries.

[1]Commercial banks.

[2]Banking sector excludes offshore banks.

[3]Official definition based on past-due loans.

[4]Banking system; onshore banking sector.

[5]Nonperforming loans include restructured and refinanced loans.

[6]The data exclude the state mortgage bank.

[7]Preliminary data for May 2009. Data for 2003–07 reflect loans classified as substandard, doubtful and loss. Data for 2008 onward reflect loans past due over 90 days as a measure of nonperforming loans.

[8]Until 2004 nonperforming loans are defined as loans in "substandard," "doubtful," and "loss" loan categories. Data for 2005 to 2007 nonperforming loans are loans with payments overdue past 60 days. Data for 2008 onward nonperforming loans are impaired loans plus nonimpaired loans overdue more than 60 days.

[9]Includes only loans to the nonfinancial sector.

[10]A revised banking law took effect affecting the series from March 2009 onwards.

[11]Includes only loans to the nonfinancial sector.

[12]Break in the time series starting in 2006. Prior to 2006, assets classified in risk categories C, D, and E. From 2006, loans overdue past 90 days. 2008 and 2009 data are for the whole banking sector, previous years data are for nine largest banks. Net of provisions.

[13]Break in series in 2006.

Table 24 *(concluded)*

[14]The increase in nonperforming loans in 2003 reflects a revision in the official definition. Nonperforming loans are those classified as substandard, doubtful, and loss.

[15]Refers to unconsolidated data for whole banking system. Comparability across years is limited due to changes in reporting requirements or introduction of new reporting schemes.

[16]Unconsolidated data.

[17]Loans are defined as the sum of claims on credit institutions, the public, and public sector entities.

[18]Gross doubtful debts. A break in the data series starting in 2006.

[19]Covers two largest commercial banks and large savings banks (six through 2005, five in 2006, and four in 2007).

[20]Nonperforming large exposures to total loans. End-year data for 2007; annual average for previous years.

[21]For 2005–06 the figures are for the sample of institutions that are already complying with IFRS, accounting as of December 2004 for about 87 percent of the usual aggregate considered. In 2006–07, the sample of banking institutions under analysis was expanded to include the institutions that adopted IFRS in 2006.

[22]On a consolidated basis. Nonperforming loans are defined as credit to customers overdue. Data for 2008 are preliminary.

[23]Doubtful exposures to other resident sectors over total lending to other resident sectors.

[24]Data for the four large banking groups.

[25]Break in 2005; data started to cover all commercial banks. Previous years data covered "major commercial banks" (comprising state-owned commercial banks and joint stock commercial banks).

[26]Loans classified as "substandard," "doubtful," and "loss."

[27]Unless otherwise indicated, data refer to the end of the fiscal year, i.e., March of the indicated calendar year.

[28]Reported nonperforming loan ratio for commercial banks.

[29]Loans classified as "substandard," "doubtful," and "loss."

[30]The data exclude interbank loans.

[31]Loans overdue past 90 days (series starts in 2008).

[32]Gross nonperforming loans to net loans.

[33]Includes former development banks; data for 2008 are preliminary.

[34]Total loans are the sum of claims on the economy net of claims on financial institutions, credits to nonresidents, and claims on government net of treasury bonds and related instruments (bons d'équipement).

[35]The ratios were computed using gross nonperforming loans and gross loans. After 2006, the decline in nonperforming loans reflects the impact of government recapitalization of the National Bank of Kenya.

[36]Nonperforming loans are defined according to Mozambican regulatory standards.

[37]Nonperforming loan changes in 2006 were due to Chemical Industries of Senegal (Industries Chimiques du Sénégal – ICS). In 2008, ICS was recapitalized and the government guarantee for its bank loans was lifted. However, the loans in question remain classified as nonperforming for the time being, although without the need to provision.

[38]The definition of nonperforming loans until end-2007 comprised doubtful and loss loans. Doubtful are loans overdue for 180 days unless well secured, or with a timely realization of the collateral. Since 2008, the indicator reflects the ratio of impaired advances to total advances (in line with Basel II definitions), a more stringent definition.

[39]Impaired assets to total assets. Figures exclude loans in arrears that are covered by collateral.

[40]Unless otherwise indicated, data refer to the end of the fiscal year, i.e., March of the next calendar year; for major banks.

[41]All FDIC-insured institutions.

[42]Uses gross nonperforming loans; previous editions used net nonperforming loans.

[43]After adoption of IFRS in 2009, nonperforming loans include defaulted loans and loans overdue 90 days or more, but 2009 figure here is consistent with pre-2009 definition, i.e., only includes defaulted loans.

Table 25. Bank Provisions to Nonperforming Loans

(In percent)

	2003	2004	2005	2006	2007	2008	2009	Latest
Latin America								
Argentina	79.2	102.9	124.5	129.9	129.6	131.4	115.3	May
Bolivia[1]	74.0	84.2	85.9	106.5	132.4	153.7	142.8	May
Brazil	171.8	214.5	179.8	179.9	181.9	189.8	157.3	May
Chile[33]	130.9	165.5	177.6	198.5	210.2	179.9	178.0	May
Colombia	98.1	149.7	166.9	153.6	132.6	120.5	113.7	April
Costa Rica[2]	145.9	122.6	153.0	162.2	180.5	121.6	97.6	June
Dominican Republic[1]	66.9	110.8	127.6	144.7	134.5	133.1	116.9	March
Ecuador[1]	127.3	119.0	143.7	182.7	199.8	215.9	177.7	May
El Salvador	129.8	132.3	126.7	116.4	120.0	110.4	99.2	May
Guatemala	. . .	. . .	43.2	39.6	42.7	73.2	70.2	June
Mexico[1]	167.1	201.4	241.3	210.0	168.9	161.2	143.7	June
Panama[3]	150.3	149.4	116.2	128.5	132.9	104.9	120.4	May
Paraguay	54.8	54.6	57.7	59.1	78.2	77.7	72.4	May
Peru[4]	67.1	68.7	80.3	100.3	131.4	151.4	139.1	May
Uruguay[5]	. . .	. . .	220.8	410.6	666.0	806.8	685.4	June
Venezuela	103.7	130.2	196.3	229.1	175.7	148.0	129.8	May
Emerging Europe								
Albania	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
Belarus	29.9	32.4	48.4	51.3	61.5	70.0	62.5	June
Bosnia and Herzegovina[6]	42.9	44.6	40.1	39.6	37.2	37.9	38.5	March
Bulgaria[7]	50.0	48.5	45.3	47.6	. . .	. . .	. . .	September
Croatia[8]	60.6	62.3	60.0	56.8	54.4	49.6	. . .	December
Czech Republic	76.7	71.2	64.5	61.5	70.4	67.5	61.3	June
Estonia	214.5	276.9	215.0	153.6	. . .	. . .	. . .	November
Hungary	47.3	51.3	54.4	53.9	58.1	59.6	52.6	June
Israel	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
Latvia[9]	89.4	99.1	98.8	116.6	129.8	61.3	40.7	May
Lithuania	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
Macedonia, FYR	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
Moldova	86.8	85.4	98.9	117.3	113.8	94.2	67.9	May
Montenegro[10]	. . .	77.3	67.4	78.8	73.6	55.6	53.1	March
Poland	53.4	61.3	61.6	57.8	. . .	. . .	. . .	September
Romania[11]	12.6	16.1	14.4	18.2	25.7	28.7	. . .	December
Russia[12]	118.0	139.5	156.3	159.3	144.0	118.4	90.8	June
Serbia	54.0	58.9	47.8	. . .	. . .	. . .	. . .	September
Slovak Republic[13]	85.8	86.4	84.0	101.7	93.3	91.4	88.3	May
Slovenia	81.0	80.1	80.6	84.3	. . .	. . .	. . .	December
Turkey	88.6	88.1	89.8	90.8	88.4	81.4	79.4	March
Ukraine[32]	22.3	21.1	25.0	23.1	26.3	29.6	29.8	June
Western Europe								
Austria[14]	68.0	70.8	71.5	75.3	76.4	64.0	63.0	March
Belgium[15]	52.8	54.2	51.6	50.8	48.0	67.0	57.0	June
Denmark	63.0	66.0	75.7	. . .	. . .	. . .	. . .	December
Finland	77.7	78.5	85.8	. . .	. . .	. . .	. . .	December
France[16]	59.6	61.3	63.8	62.9	61.3	56.7	. . .	December
Germany	. . .	. . .	49.1	50.0	51.3	. . .	. . .	December
Greece	49.9	51.4	61.9	61.8	53.4	48.9	. . .	December
Iceland[17]	77.5	80.9	112.9	99.6	84.1	. . .	. . .	December
Ireland	97.0	92.7	75.1	56.7	49.1	47.2	48.1	March
Italy[18]	. . .	. . .	. . .	46.0	49.4	46.1	. . .	December
Luxembourg	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
Malta	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
Netherlands[19]	73.8	69.2	65.5	56.0	. . .	. . .	. . .	December
Norway	96.8	124.7	109.3	74.2	67.0	53.5	51.7	June
Portugal[20]	73.0	83.4	79.0	83.9	75.7	. . .	. . .	December
Spain[21]	263.8	322.1	255.5	272.2	214.6	70.8	59.5	June
Sweden[22]	50.3	70.6	73.6	58.0	60.4	47.1	. . .	December
Switzerland	89.9	90.9	116.0	122.6	124.0	. . .	. . .	December
United Kingdom[23]	69.8	61.5	54.0	54.6	. . .	. . .	. . .	December

Table 25 ***(continued)***

	2003	2004	2005	2006	2007	2008	2009	Latest
Asia								
Bangladesh	18.3	26.8	28.3	45.2	43.0	50.1	. . .	June
China[24]	19.7	14.2	24.8	34.3	39.2	116.4	134.3	June
Hong Kong SAR	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
India[25]	46.4	56.6	60.3	58.9	56.1	52.6	. . .	March
Indonesia[26]	112.4	110.8	82.2	99.7	120.5	153.0	132.4	April
Korea	84.0	104.5	131.4	175.2	205.2	146.3	125.3	March
Malaysia[27]	53.1	55.0	59.1	64.6	77.3	89.0	88.5	April
Philippines	51.5	58.0	73.8	75.0	81.5	86.0	84.2	March
Singapore	64.9	73.6	78.7	89.5	115.6	119.9	. . .	September
Thailand	72.8	79.8	83.7	82.7	86.5	97.9	. . .	December
Middle East & Central Asia								
Armenia	34.3	77.0	70.7	64.3	66.6	38.2	26.6	June
Egypt	57.0	60.2	51.0	76.2	74.6	92.1	. . .	June 2008
Georgia	149.5	199.4	172.6	158.1	154.4	146.3	113.1	July
Jordan	51.9	63.8	78.4	79.6	67.8	63.3	. . .	December
Kazakhstan[28]	. . .	. . .	. . .	. . .	. . .	215.3	219.0	July
Kuwait	77.7	82.5	107.2	95.8	92.0	84.7	. . .	September
Lebanon	46.3	46.1	50.2	54.4	56.6	61.0	61.8	February
Morocco	54.9	59.3	67.1	71.2	75.2	75.3	. . .	December
Oman	59.8	75.3	72.7	102.8	107.6	119.3	. . .	December
Pakistan	63.9	71.6	76.7	77.8	85.1	74.7	69.2	March
Saudi Arabia	128.2	175.4	202.8	182.3	142.9	153.3	. . .	December
Tunisia[29]	44.1	45.1	46.8	49.0	53.2	56.8	. . .	December
United Arab Emirates	88.5	94.6	95.7	98.2	100.0	101.5	. . .	June
Sub-Saharan Africa								
Gabon	53.9	53.6	55.5	57.4	59.8	61.4	. . .	December
Ghana	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
Kenya	79.2	102.9	115.6	115.6	. . .	. . .	. . .	September
Lesotho	. . .	. . .	. . .	125.0	152.4	107.8	. . .	September
Mozambique	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
Namibia	. . .	95.2	85.3	90.3	77.2	77.4	. . .	December
Nigeria	76.4	96.2	81.0	59.5	. . .	. . .	. . .	December
Rwanda	54.6	55.1	48.8	83.5	67.0	66.3	66.9	March
Senegal	75.3	75.7	75.4	52.0	53.8	51.5	49.2	March
Sierra Leone	. . .	43.1	10.3	59.7	44.5	54.4	. . .	December
South Africa	54.2	61.3	64.3	. . .	. . .	. . .	. . .	December
Swaziland	78.0	78.0	78.0	76.0	. . .	. . .	. . .	December
Uganda	76.5	97.8	103.8	74.4	71.8	120.3	. . .	December
Other								
Australia	131.8	182.9	203.0	202.5	183.7	75.8	72.3	March
Canada	43.5	47.7	49.3	55.3	42.1	34.7	29.8	March
Japan[30]	29.9	31.2	28.1	28.8	26.4	20.3	25.5	September
United States[31]	140.4	168.1	155.0	135.0	93.1	74.9	66.5	March

Sources: National authorities; and IMF staff estimates.

Note: Due to differences in national accounting, taxation, and supervisory regimes, FSI data are not strictly comparable across countries.

[1]Commercial banks.

[2]Banking sector excludes offshore banks.

[3]General licensed banks; onshore banking sector.

[4]Provisions with respect to nonperforming loans including restructured and refinanced loans.

[5]Definition has changed from previous years. Provisions include specific, general, off-balance sheet, and statistical provisions. The data exclude the state mortgage bank.

[6]Provisions to nonperforming assets.

[7]Provisions to nonstandard loans.

[8]From 2006 the data have been revised.

[9]Preliminary data for May 2009. Nonperforming loan data for 2003–07 reflect loans classified as substandard, doubtful and loss. Data for 2008 onward reflect loans past due over 90 days as a measure of nonperforming loans.

[10]A revised banking law took effect affecting the series from March 2009 onwards.

[11]Nonperforming loans reflect unadjusted loans classified as "substandard," "doubtful," and "loss," according to the National Bank of Romania's loan classification regulations, as a percent of total loans, which may differ from the data published in the NBR's Monthly Bulletin. Provisioning rates allow for collateral.

[12]Change in definition in 2004; not strictly comparable with previous years.

[13]Break in series in 2006.

Table 25 *(concluded)*

[14]Refers to unconsolidated data for whole banking system. Comparability across years is limited due to changes in reporting requirements or introduction of new reporting schemes.
[15]Unconsolidated data.
[16]Coverage of doubtful loans to customers by provisions.
[17]Covers two largest commercial banks and large savings banks (six through 2005, five in 2006, and four in 2007).
[18]Banking groups.
[19]Data for large banking groups.
[20]For 2005–06 the figures are for the sample of institutions that are already complying with IFRS, accounting as of December 2004 for about 87 percent of the usual aggregate considered. In 2006–07, the sample of banking institutions under analysis was expanded to include the institutions that adopted IFRS in 2006. On a consolidated basis. Nonperforming loans are defined as credit to customers overdue.
[21]Allowances and provisions to doubtful exposures.
[22]Data for the four large banking groups.
[23]Data for large banking groups. Break in the data series in 2006.
[24]Break in 2008; data started to cover all commercial banks. Previous years data covered "major commercial banks" (comprising state-owned commercial banks and joint stock commercial banks).
[25]Unless otherwise indicated, data refer to the end of the fiscal year, i.e., March of the indicated calendar year.
[26]Write-off reserve on earning assets to classified earning assets.
[27]General, specific, and interest-in-suspense provisions.
[28]Provisions to nonperforming loans on a 90-day basis (series starts in 2008).
[29]Includes former development banks; data for 2008 are preliminary.
[30]Unless otherwise indicated, data refer to the end of the fiscal year, i.e., March of the next calendar year; coverage of nonperforming loans by provisions for all banks. Does not include collateral or guarantee coverage.
[31]All FDIC-insured institutions.
[32]Nonperforming loans are those classified as substandard, doubtful, and loss.
[33]After adoption of IFRS in 2009, nonperforming loans include defaulted loans and loans overdue 90 days or more, but 2009 figure here is consistent with pre-2009 definition, i.e., only includes defaulted loans.

Table 26. Bank Return on Assets

(In percent)

	2003	2004	2005	2006	2007	2008	2009	Latest
Latin America								
Argentina	–3.0	–0.5	0.9	1.9	1.5	1.6	1.9	May
Bolivia[1]	0.3	–0.1	0.7	1.3	1.9	1.7	1.5	May
Brazil[2]	2.0	2.2	2.9	2.7	2.9	1.5	1.1	May
Chile[9]	1.2	1.2	1.2	1.2	1.1	1.2	1.1	May
Colombia	1.9	2.7	2.7	2.5	2.4	2.4	5.5	April
Costa Rica[2,3]	2.1	2.0	2.5	2.5	1.5	1.8	1.6	June
Dominican Republic[1,33]	0.0	1.8	1.9	2.5	2.6	2.7	2.5	March
Ecuador[1]	1.1	1.2	1.5	2.0	2.0	1.7	1.4	May
El Salvador	1.1	1.0	1.2	1.5	1.2	1.0	0.4	May
Guatemala	1.1	1.3	1.6	1.2	1.5	1.7	2.0	June
Mexico[1,2]	2.0	2.1	3.2	3.5	2.7	1.2	1.2	June
Panama[2,4]	1.9	1.8	2.1	1.7	2.0	2.3	1.5	March
Paraguay	0.4	1.7	2.1	3.3	3.1	3.5	3.2	May
Peru	1.1	1.2	2.2	2.2	2.5	2.6	2.3	May
Uruguay[5]	–1.1	–0.1	0.8	1.0	1.3	1.0	0.8	June
Venezuela	6.2	5.9	3.7	3.0	2.6	2.5	1.9	May
Emerging Europe								
Albania	1.2	1.3	1.4	1.4	1.6	0.9	. . .	December
Belarus	1.5	1.5	1.3	1.7	1.7	1.4	1.5	March
Bosnia and Herzegovina	0.4	0.7	0.7	0.9	0.9	0.4	0.3	March
Bulgaria	2.4	2.1	2.0	2.2	2.4	2.1	1.6	March
Croatia	1.6	1.7	1.6	1.5	1.6	1.6	. . .	December
Czech Republic	1.2	1.3	1.4	1.2	1.3	1.2	1.3	June
Estonia[2]	1.7	2.1	2.0	1.7	2.6	1.2	0.8	March
Hungary	1.5	2.0	2.0	1.8	1.4	1.1	1.1	June
Israel	0.7	1.0	1.1	1.0	1.2	0.0	. . .	December
Latvia[6]	1.4	1.7	2.1	2.1	2.0	0.3	–1.6	May
Lithuania[7]	1.2	1.3	1.1	1.5	2.0	1.2	–0.1	March
Macedonia, FYR[8]	0.5	0.6	1.2	1.8	1.8	1.4	0.2	March
Moldova	4.4	3.7	3.2	3.4	3.9	3.5	0.7	May
Montenegro[32]	. . .	–0.3	0.8	1.1	0.7	–0.6	–1.5	March
Poland[9]	0.5	1.4	1.6	1.7	1.7	1.5	1.1	April
Romania	2.7	2.5	1.9	1.7	1.3	1.7	. . .	December
Russia[10]	2.6	2.9	3.2	3.3	3.0	1.8	0.5	June
Serbia	–0.3	–1.2	1.1	1.7	1.7	2.1	1.5	March
Slovak Republic	1.1	1.2	1.2	1.3	1.0	1.0	0.3	May
Slovenia[11]	1.0	1.0	1.0	1.3	1.4	0.7	. . .	December
Turkey[12]	2.3	2.3	1.7	2.5	2.8	2.0	3.0	March
Ukraine	1.0	1.1	1.3	1.6	1.5	1.0	–3.3	June
Western Europe								
Austria[13]	0.3	0.6	0.6	0.7	0.8	0.1	. . .	December
Belgium	0.4	0.5	0.5	0.7	0.4	–1.3	–0.5	March
Denmark	1.2	1.2	1.3	1.3	1.0	. . .	. . .	December
Finland	0.7	0.8	0.9	1.0	1.2	0.8	. . .	June
France	0.4	0.5	0.6	0.6	0.4	0.0	. . .	December
Germany	0.0	0.1	0.4	0.4	0.3	. . .	. . .	December
Greece	0.6	0.4	0.9	0.8	1.0	0.2	. . .	December
Iceland[14]	1.3	1.8	2.3	2.6	1.5	. . .	. . .	December
Ireland[2]	0.9	1.1	0.8	0.8	0.7	. . .	. . .	December
Italy	0.5	0.6	0.7	0.8	0.8	0.3	. . .	December
Luxembourg[15]	0.6	0.7	0.7	0.9	0.8	0.8	0.9	March
Malta	. . .	1.4	1.4	1.3	1.0	0.7	. . .	December
Netherlands	0.5	0.4	0.4	0.4	0.6	–0.4	. . .	December
Norway	0.6	0.9	1.0	0.9	0.8	0.5	0.6	June
Portugal[16]	0.8	0.8	0.9	1.0	1.0	0.6	. . .	December
Spain	0.8	0.8	0.9	1.0	1.1	1.0	. . .	December
Sweden[17]	0.6	0.7	0.7	0.8	0.8	0.6	. . .	December
Switzerland[18]	0.7	0.8	0.9	0.9	0.7	0.3	. . .	December
United Kingdom[2]	0.6	0.7	0.8	0.5	0.4	–0.5	. . .	December

Table 26 *(continued)*

	2003	2004	2005	2006	2007	2008	2009	Latest
Asia								
Bangladesh[19]	0.5	–0.5	0.6	–1.2	0.9	1.3	. . .	June
China	0.3	0.5	0.6	0.9	0.9	1.0	. . .	December
Hong Kong SAR[20]	1.9	1.7	1.7	1.8	1.9	1.9	. . .	June
India[21]	1.0	0.8	0.9	0.7	0.9	1.0	. . .	March
Indonesia[2]	2.6	3.5	2.6	2.6	2.8	2.3	2.7	April
Korea[22]	0.2	0.9	1.3	1.1	1.1	0.5	. . .	December
Malaysia[2]	1.3	1.4	1.4	1.3	1.5	1.5	. . .	December
Philippines[2]	1.1	0.9	1.1	1.3	1.3	0.8	0.8	March
Singapore	1.0	1.2	1.2	1.4	1.3	1.1	. . .	September
Thailand	0.6	1.2	1.4	0.8	0.1	1.0	. . .	December
Middle East & Central Asia								
Armenia[2]	2.7	3.2	3.1	3.6	3.4	3.1	–0.1	June
Egypt[34]	0.5	0.5	0.6	0.8	0.9	0.8	0.8	March
Georgia[2]	3.9	1.9	3.0	2.7	1.9	–2.6	–1.6	June
Jordan	0.7	1.1	2.0	1.7	1.6	1.4	. . .	December
Kazakhstan[2]	2.0	1.2	1.6	1.4	2.6	0.2	–21.4	August
Kuwait	2.0	2.5	3.0	3.2	3.4	3.2	. . .	September
Lebanon[9]	0.7	0.7	0.7	0.9	1.0	1.1	0.9	February
Morocco	–0.2	0.8	0.5	1.3	1.5	1.2	. . .	December
Oman[35]	0.2	1.7	2.3	2.3	2.1	2.3	. . .	December
Pakistan[23]	1.0	1.2	1.9	2.1	1.5	1.2	1.1	March
Saudi Arabia[2]	2.2	2.4	3.4	4.0	2.8	2.3	. . .	December
Tunisia[24]	0.5	0.5	0.6	0.7	0.9	1.0	. . .	December
United Arab Emirates	2.3	2.1	2.7	2.2	2.0	2.2	. . .	June
Sub-Saharan Africa								
Gabon[25]	0.7	2.8	2.6	2.5	2.7	1.8	. . .	December
Ghana[2]	6.2	5.8	4.6	4.8	3.7	3.2	3.4	March
Kenya	2.3	2.1	2.4	2.8	3.0	2.8	2.9	May
Lesotho[26]	. . .	3.0	2.0	2.0	2.6	2.4	. . .	September
Mozambique	1.2	1.4	1.8	3.5	2.8	3.6	. . .	September
Namibia	3.6	2.1	3.5	1.5	3.5	4.2	. . .	December
Nigeria	1.7	3.1	0.9	1.6	2.1	4.0	1.8	March
Rwanda[27]	2.0	1.8	0.9	2.4	1.5	2.3	1.7	March
Senegal	1.8	1.8	1.6	1.6	1.6	. . .	. . .	December
Sierra Leone	10.5	9.9	8.1	5.8	3.1	2.2	. . .	December
South Africa[28]	0.8	1.3	1.2	1.4	1.4	2.1	1.0	May
Swaziland[27]	4.0	2.9	3.1	5.9	2.9	3.6	. . .	September
Uganda	3.7	4.3	3.4	3.1	3.9	3.5	. . .	December
Other								
Australia[29]	1.6	1.1	1.0	1.0	1.0	0.7	. . .	December
Canada[12]	0.7	0.8	0.7	1.0	0.8	0.4	0.5	March
Japan[30]	–0.1	0.2	0.5	0.4	0.2	0.2	. . .	March
United States[31]	1.4	1.3	1.3	1.3	0.8	0.0	0.2	March

Sources: National authorities; and IMF staff estimates.

Note: Due to differences in national accounting, taxation, and supervisory regimes, FSI data are not strictly comparable across countries.

[1]Commercial banks.

[2]Before tax.

[3]Banking sector excludes offshore banks.

[4]General licensed banks; onshore banking sector.

[5]The data exclude the state mortgage bank.

[6]After tax. Preliminary data for May 2009.

[7]Net income before extraordinary items and taxes to average total assets.

[8]Adjusted for unallocated provisions for potential loan losses. Since end-March 2009 adjusted for unrecognized impairment.

[9]After tax.

[10]Not annualized.

[11]Before extraordinary items and taxes.

[12]Annualized for 2009.

[13]Starting in 2004 data reported on a consolidated basis. Comparability across years is limited due to changes in reporting requirements or introduction of new reporting schemes.

[14]Covers the three largest commercial banks and large savings banks (six through 2005, five in 2006, and four in 2007).

Table 26 *(concluded)*

[15]Income before provisions and before taxes to total assets; March 2009 data annualized.
[16]For 2005–06 the figures are for the sample of institutions that are already complying with IFRS, accounting as of December 2004 for about 87 percent of the usual aggregate considered. In 2006–07, the sample of banking institutions under analysis was expanded to include the institutions that adopted IFRS in 2006. After tax. 2008 data are preliminary; for Q4 only.
[17]Data for the four large banking groups. The data refer to a four-quarter moving average for the assets. The profit is accumulated over four quarters and adjusted.
[18]Income before provisions and taxes to total assets.
[19]In early 2008, following the corporatization of the state-owned commercial banks, goodwill assets were created for three of these banks equal to their accumulated losses.
[20]Net interest margin, not comparable with the other indicators in the table.
[21]Unless otherwise indicated, data refer to the end of the fiscal year, i.e., March of the indicated calendar year.
[22]Excludes earnings from sale of equity stakes.
[23]The series has been changed from before tax to after tax.
[24]Includes former development banks; data for 2008 are preliminary.
[25]The ratio of after-tax profits to the average of beginning- and end-period total assets.
[26]Since 2005, affected by the operations of two new banks.
[27]Latest data not annualized.
[28]There is a break in the series in 2008. The figure shown for 2008 is the return on interest-earning assets.
[29]Gross profits until 2003; return on assets after taxes from 2004.
[30]Unless otherwise indicated, data refer to the end of the fiscal year, i.e., March of the next calendar year.
[31]All FDIC-insured institutions; 2009 data annualized.
[32]A revised banking law took effect affecting the series from March 2009 onwards.
[33]Break in 2005.
[34]Annual data reflect Egypt's fiscal year (i.e., end-June).
[35]2008 figure staff estimate, before tax.

Table 27. Bank Return on Equity

(In percent)

	2003	2004	2005	2006	2007	2008	2009	Latest
Latin America								
Argentina	–22.7	–4.2	7.0	14.3	11.0	13.4	15.6	May
Bolivia[1]	2.8	–1.2	6.4	13.3	21.2	20.3	18.0	May
Brazil[2]	21.1	22.1	29.5	27.3	28.9	15.6	11.6	May
Chile[27]	16.7	16.7	17.9	18.6	16.2	15.2	14.7	May
Colombia	17.1	23.0	22.1	20.2	19.5	20.0	44.8	April
Costa Rica[2,3]	17.2	16.7	20.1	18.7	13.4	14.3	12.4	June
Dominican Republic[1,37]	–0.1	21.3	22.1	26.1	28.0	28.3	27.2	March
Ecuador[1]	14.7	16.5	18.5	24.0	20.9	20.0	13.4	May
El Salvador	11.5	10.9	11.8	14.6	11.3	8.7	3.1	May
Guatemala	12.2	14.0	19.1	15.0	16.8	16.3	20.3	June
Mexico[1,2]	17.7	19.0	25.4	25.9	19.9	12.5	12.7	June
Panama[4]	16.9	16.7	15.7	13.3	15.7	16.6	11.4	March
Paraguay	4.5	18.3	22.6	35.3	38.2	43.9	34.2	May
Peru	10.9	11.3	22.2	23.9	27.9	31.1	27.8	May
Uruguay[5]	–15.3	–0.9	10.3	11.6	12.8	10.9	8.5	June
Venezuela	44.0	45.2	32.2	31.6	32.4	29.4	22.6	May
Emerging Europe								
Albania	19.5	21.1	22.2	20.2	20.7	11.4	. . .	December
Belarus	8.4	7.8	6.8	9.6	10.7	9.6	10.2	March
Bosnia and Herzegovina	3.4	5.8	6.2	8.5	8.9	4.3	3.4	March
Bulgaria[6]	22.7	19.6	21.4	25.0	24.8	23.1	15.7	March
Croatia[7]	14.1	16.1	15.1	12.7	10.9	10.1	. . .	December
Czech Republic	23.8	24.6	26.4	23.4	25.4	21.7	23.4	June
Estonia	14.1	20.0	21.0	19.8	30.0	13.2	8.7	March
Hungary	19.3	25.3	24.7	24.0	18.1	11.6	15.3	June
Israel	14.1	17.9	19.4	17.6	20.0	0.2	. . .	December
Latvia[8]	16.7	21.4	27.1	25.6	24.3	4.6	–19.7	May
Lithuania[9]	11.4	13.4	13.8	21.4	27.3	16.1	–1.0	March
Macedonia, FYR[10]	2.3	3.1	7.5	12.3	15.0	12.5	1.8	March
Moldova	19.7	17.8	15.4	20.5	24.0	19.9	3.5	May
Montenegro[11]	. . .	–1.2	4.2	6.8	6.2	–6.9	–17.8	March
Poland[12]	5.8	16.9	20.6	22.5	22.4	20.7	15.6	April
Romania	20.0	19.3	15.4	13.6	11.5	18.1	. . .	December
Russia[13]	17.8	20.3	24.2	26.3	22.7	13.3	3.6	June
Serbia	–1.2	–5.3	6.7	10.0	10.2	10.7	7.8	March
Slovak Republic[14]	10.8	11.9	16.9	16.6	16.6	14.1	4.1	May
Slovenia[15]	11.9	12.5	13.8	15.1	16.3	9.0	. . .	December
Turkey[16]	16.0	16.4	11.8	19.8	21.6	16.6	25.1	March
Ukraine	7.6	8.4	10.4	13.5	12.7	8.5	–24.5	June
Western Europe								
Austria[17]	7.0	14.8	14.8	16.9	17.0	2.6	. . .	December
Belgium	13.6	15.8	18.5	22.4	13.2	–36.5	15.5	March
Denmark	20.8	21.2	22.2	21.9	17.3	. . .	. . .	December
Finland	11.3	12.4	10.1	11.1	14.3	10.9	. . .	June
France	8.5	10.6	11.8	14.0	9.8	–1.0	. . .	December
Germany	0.7	4.2	13.0	9.4	6.6	. . .	. . .	December
Greece	8.9	6.4	15.9	12.7	14.8	3.0	. . .	December
Iceland[18]	22.1	30.9	41.7	39.1	22.4	. . .	. . .	December
Ireland[2]	18.0	20.7	19.6	19.1	16.4	. . .	. . .	December
Italy	7.4	9.3	9.7	14.3	12.8	4.8	. . .	December
Luxembourg[19]	8.9	9.9	10.5	16.5	15.1	5.5	7.2	March
Malta	. . .	11.9	13.0	12.7	11.9	4.5	. . .	December
Netherlands	14.8	16.8	15.4	15.4	18.7	–12.5	. . .	December
Norway	9.6	14.9	18.4	18.4	17.0	10.7	13.2	June
Portugal[20]	13.9	12.8	14.5	16.9	15.2	10.1	. . .	December
Spain	15.3	14.8	17.5	20.6	20.9	13.9	. . .	December
Sweden[21]	13.3	16.0	18.7	21.0	19.7	14.3	. . .	December
Switzerland[22]	11.7	14.3	18.0	17.7	15.4	5.4	. . .	December
United Kingdom[2]	8.6	10.9	11.8	8.9	6.2	–10.8	. . .	December

Table 27 ***(continued)***

	2003	2004	2005	2006	2007	2008	2009	Latest
Asia								
Bangladesh[23]	9.8	–12.1	12.1	–37.3	18.7	20.3	. . .	June
China[24]	. . .	13.7	15.1	14.9	16.7	17.1	. . .	December
Hong Kong SAR[25]	17.8	20.3	19.1	. . .	. . .	. . .	. . .	December
India	18.8	20.8	13.3	12.7	13.2	12.5	. . .	March
Indonesia	26.6	34.5	32.3	33.2	28.5	24.6	17.4	April
Korea	3.4	15.2	18.4	14.6	14.6	7.1	. . .	December
Malaysia[2]	15.6	16.3	16.8	16.2	19.7	18.5	. . .	December
Philippines	8.5	7.1	8.8	10.6	10.8	6.9	6.9	March
Singapore[26]	8.7	11.6	11.2	13.7	12.9	11.9	. . .	September
Thailand	10.3	16.8	14.2	8.8	7.3	. . .	. . .	December
Middle East & Central Asia								
Armenia[2]	14.4	18.4	15.5	15.9	15.0	13.6	–0.3	June
Egypt[38]	8.9	9.8	10.2	14.3	15.6	14.1	13.5	March
Georgia[2]	15.0	7.9	15.1	15.7	9.7	–12.6	–8.4	June
Jordan	10.9	13.6	21.7	14.8	14.0	13.0	. . .	December
Kazakhstan[2,40]	14.2	11.5	16.6	14.6	18.4	1.9	. . .	December
Kuwait	18.6	20.9	22.9	27.1	28.1	27.8	. . .	September
Lebanon[27]	10.9	9.3	11.0	10.1	12.1	14.0	11.9	February
Morocco	–2.0	10.9	6.3	17.4	20.6	16.7	. . .	December
Oman[39]	1.8	13.5	15.6	17.8	14.3	12.8	. . .	December
Pakistan[28]	20.0	20.3	25.8	23.8	15.5	11.3	10.7	March
Saudi Arabia[29]	25.9	31.7	38.5	43.4	28.5	22.7	. . .	December
Tunisia[30]	4.6	4.8	5.9	7.0	10.1	11.2	. . .	December
United Arab Emirates	16.4	18.6	22.5	18.2	22.0	21.1	. . .	June
Sub-Saharan Africa								
Gabon[31]	5.7	21.3	21.1	23.5	32.3	20.8	. . .	December
Ghana[2]	32.7	33.7	23.6	39.6	35.8	23.7	21.6	March
Kenya	23.2	22.0	25.0	28.6	27.5	25.2	26.1	May
Lesotho[32]	. . .	27.0	15.0	27.0	31.6	31.7	. . .	September
Mozambique	16.3	18.7	27.4	55.4	36.4	44.3	. . .	September
Namibia	43.2	24.2	45.6	19.9	44.9	52.1	. . .	December
Nigeria	19.8	27.4	7.1	10.4	13.1	22.0	10.0	March
Rwanda[33]	66.8	20.3	9.9	27.0	15.5	18.0	11.8	March
Senegal	22.1	17.6	15.8	14.6	15.3	. . .	. . .	December
Sierra Leone	67.1	32.9	28.0	17.0	10.3	7.2	. . .	December
South Africa	11.6	16.2	15.2	18.3	18.1	28.7	17.2	May
Swaziland[33]	29.0	20.0	19.7	52.0	15.1	14.4	. . .	September
Uganda	38.1	37.6	28.6	25.7	31.4	25.0	. . .	December
Other								
Australia[34]	24.2	16.0	14.7	16.8	18.1	13.7	. . .	December
Canada[16]	14.7	16.7	14.9	20.9	16.1	9.1	9.5	March
Japan[35]	–2.7	4.1	11.3	8.5	6.1	–6.9	. . .	March
United States[36]	15.0	13.2	12.7	12.3	7.8	0.4	2.3	March

Sources: National authorities; and IMF staff estimates.

Note: Due to differences in national accounting, taxation, and supervisory regimes, FSI data are not strictly comparable across countries.

[1]Commercial banks.

[2]Before tax.

[3]Banking sector excludes offshore banks.

[4]General licensed banks; onshore banking sector.

[5]The data exclude the state mortgage bank.

[6]Ratio based on Tier 1 capital.

[7]From 2006 the data have been revised.

[8]After tax. Preliminary data for May 2009.

[9]Capital is defined as bank shareholders' equity and foreign bank branches' funds received from the head office (the latter until end-2007). Net income before extraordinary items and taxes.

[10]Adjusted for unallocated provisions for potential loan losses. Since end-March 2009 adjusted for unrecognized impairment.

[11]A revised banking law took effect affecting the series from March 2009 onwards.

[12]After tax. Data for domestic banking sector.

[13]Not annualized.

[14]Excluding foreign branches.

Table 27 *(concluded)*

[15]Before extraordinary items and taxes.
[16]Annualized for 2009.
[17]From 2004 on a consolidated basis. Comparability across years is limited due to changes in reporting requirements or introduction of new reporting schemes.
[18]Covers the three largest commercial banks and large savings banks (six through 2005, five in 2006, and four in 2007).
[19]Net after-tax income to total regulatory capital; March 2009 data annualized.
[20]For 2005–06 the figures are for the sample of institutions that are already complying with IFRS, accounting as of December 2004 for about 87 percent of the usual aggregate considered. In 2006–07, the sample of banking institutions under analysis was expanded to include the institutions that adopted IFRS in 2006. After tax. 2008 data are preliminary; for Q4 only.
[21]Data for the four large banking groups.
[22]Gross profits.
[23]In early 2008, following the corporatization of the state-owned commercial banks, goodwill assets were created for three of these banks equal to their accumulated losses.
[24]Total banking industry, except for 2006, which refers only to four listed state-owned banks.
[25]2005 figure on a domestic consolidation basis; not strictly comparable with previous years.
[26]Local banks.
[27]After taxes.
[28]The series has been changed from before tax to after tax.
[29]IMF staff estimates. Cover commercial banks, calculated as profits divided by capital (Tier1) plus reserves.
[30]Includes former development banks; data for 2008 are preliminary.
[31]The ratio of after-tax profits to the average of beginning- and end-period capital net of specific loan loss provisions.
[32]Since 2005, affected by the operations of two new banks.
[33]Latest data not annualized.
[34]Gross profits until 2003; return on equity after taxes from 2004.
[35]Unless otherwise indicated, data refer to the end of the fiscal year, i.e., March of the next calendar year.
[36]All FDIC-insured institutions; 2009 data annualized.
[37]Break in 2005.
[38]Annual data reflect Egypt's fiscal year (i.e., end-June).
[39]2008 figure staff estimate, before tax.
[40]System is making losses on negative capital.