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 improved. 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.

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

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, Geoffrey 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.

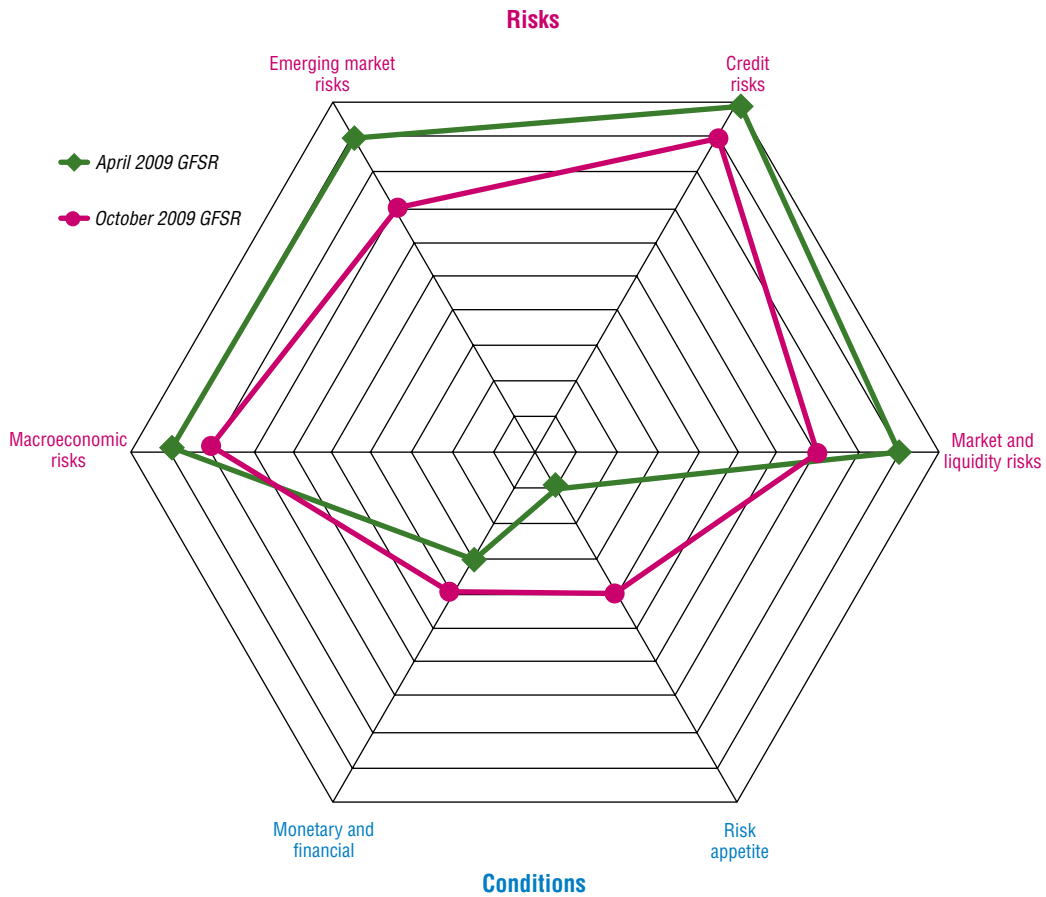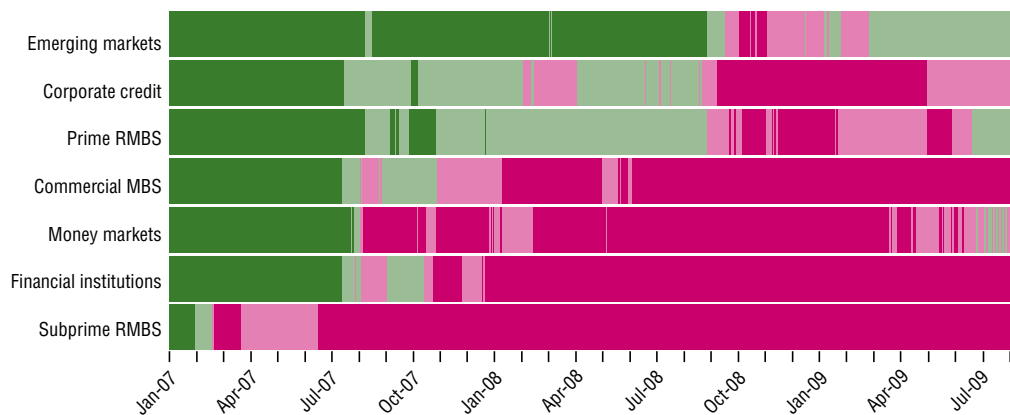**Figure 1.1. Global Financial Stability Map**

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). That deviation is expressed in terms of standard deviations. Dark green signifies a standard deviation under 1, light green signifies 1 to 4 standard deviations, light magenta signifies 4 to 7 standard deviations, and dark magenta signifies greater than 7 standard deviations. MBS = mortgage-backed security; RMBS = residential mortgage-backed security.

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 break-even 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).

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 impli-

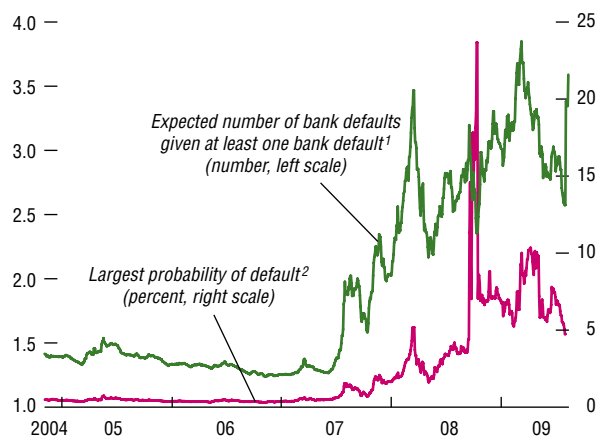**Figure 1.3. Contributions to Changes in Corporate Spreads**
(Quarterly changes; percentage points)
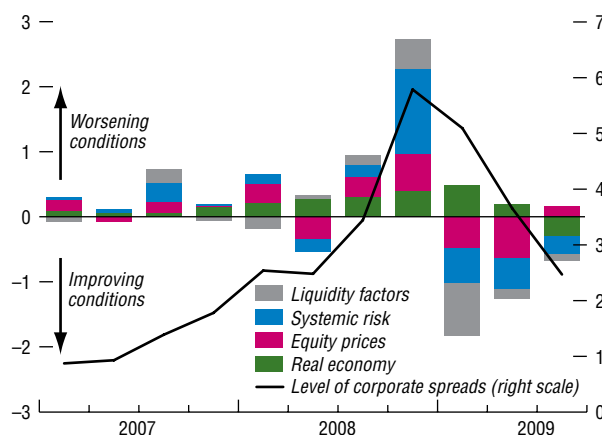
Sources: Bloomberg L.P.; national authorities; and IMF staff estimates.
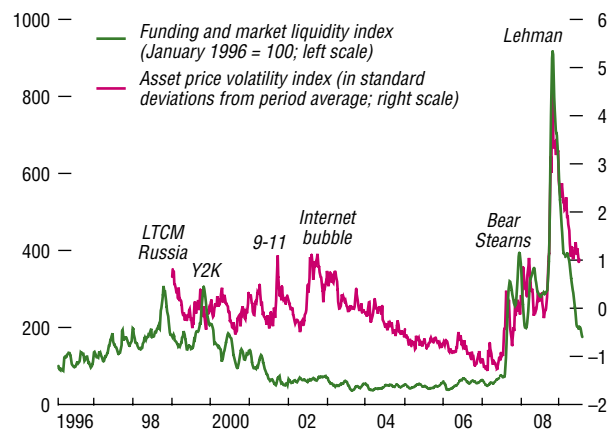
Figure 1.4. Systemic Bank Default Risk

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.

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.

Figure 1.6. Composite Real Private Borrowing Rate and Short-Term Interest Rates
(In percent)
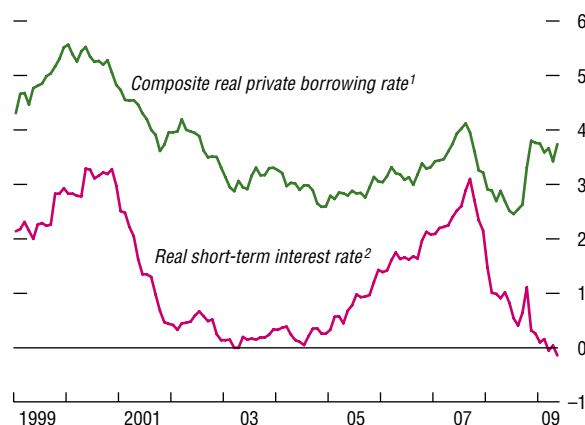
Sources: Bloomberg L.P.; European Central Bank; European Securitisation Forum; U.S. Federal Reserve; Haver Analytics; and IMF staff estimates.
Note: MBS = mortgage-backed security; ABS = asset-backed security; CPI = consumer price inflation.
[1]The composite real private borrowing rate (RPBR) is a GDP-weighted 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 corporate lending rates, and corporate bond and MBS/ABS yields, weighted by amounts of credit outstanding, minus year-on-year CPI.
[2]GDP-weighted average of G-7 short-term interest rates, one-month rolling.

cations 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.

Market and liquidity risks have fallen as interbank markets and some channels of private wholesale funding markets 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.

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.

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

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 series 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 five-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 United Kingdom and credit cards and autos for the United States. The corporate cash bond indices are bellwether Merrill indices benchmarked over comparable government securities. ABS = asset-backed security.

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]

[2]See the October 2008 GFSR (IMF, 2008) for a discussion of how different business models are impacted by

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

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.

recovery is weighing on the performance of most asset classes. In particular:

- *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 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.

---

[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 data point), 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).

[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).

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, 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.

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

Figure 1.7. U.S. Loan Charge-Off Rates
(In percent of total loans)
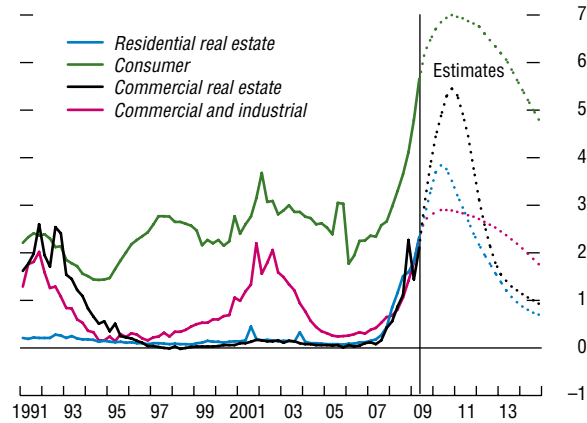
Sources: National authorities; and IMF staff estimates.

Figure 1.8. Euro Area: Provision Rates
(In percent of total loans)
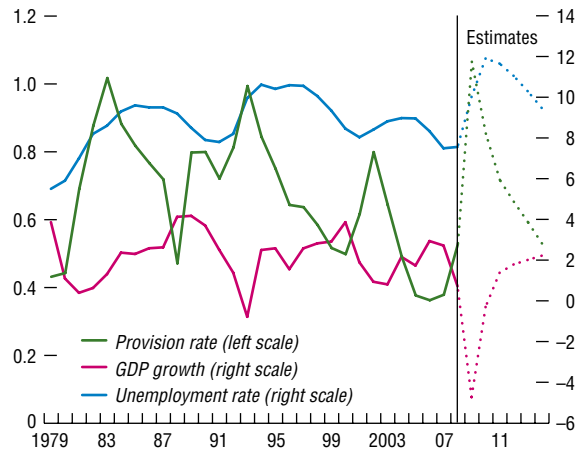
Sources: National authorities; Organization for Economic Cooperation and Development; the Banking Supervision Committee; and IMF staff estimates.

[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.

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 *World Economic Outlook* (WEO) forecasts. This box highlights sources of uncertainty surrounding our loan loss estimations 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.

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 percent 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).

Euro Area: Forecasts of Loan Loss Provisions
(In percent of total loans)
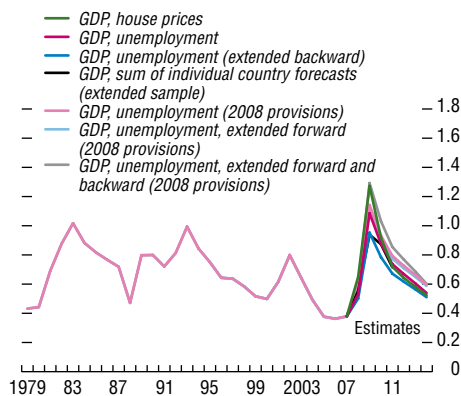
Sources: National authorities; and IMF staff estimates.

Euro Area Provision Rate Model: Confidence Bands
(In percent of total loans)
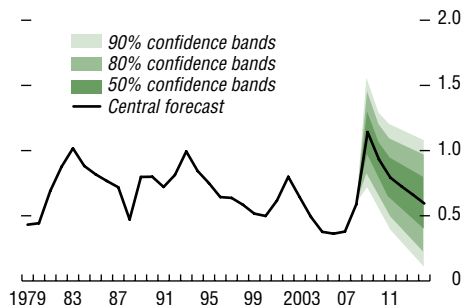
Source: IMF staff estimates.

U.S. Charge-Off Rate Model for Consumer Loans: Confidence Bands
(In percent of total loans)
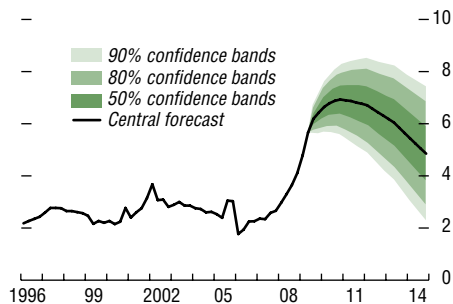
Source: IMF staff estimates.

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 United States, 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, 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).

securities (Table 1.2).[10] Although unchanged from the April 2009 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.

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 overestimated under this approach. We also assume that the current pricing of securities fully reflects market expectations of potential cash flow 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**

Table 1.2 *(continued)*
(In billions of U.S. dollars)

	Estimated Holdings	Estimated Writedowns	Implied Cumulative Loss Rate (percent)	Share of Total (percent)
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 (BIS); 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 assumed 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 have 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.

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

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

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

fully to offset writedowns over the next 18 months, resulting in continuing capital pressure.

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 busi-

Figure 1.9. Realized and Expected Writedowns or Loss Provisions for Banks by Region
(In billions of U.S. dollars unless otherwise shown)
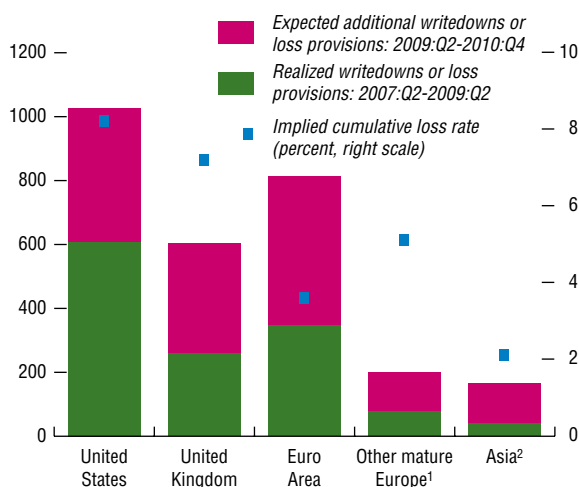
Source: IMF staff estimates.
[1]Includes Denmark, Iceland, Norway, Sweden, and Switzerland.
[2]Includes Australia, Hong Kong SAR, Japan, New Zealand, and Singapore.

[14]Several concepts coexist—capital adequacy ratio (CAR); Tier 1/risk-weighted assets (RWA) 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 in 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 allow 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.

ness 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 the 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.

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

[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.

Figure 1.10. Bank Problem Loans and Income
(In percent)
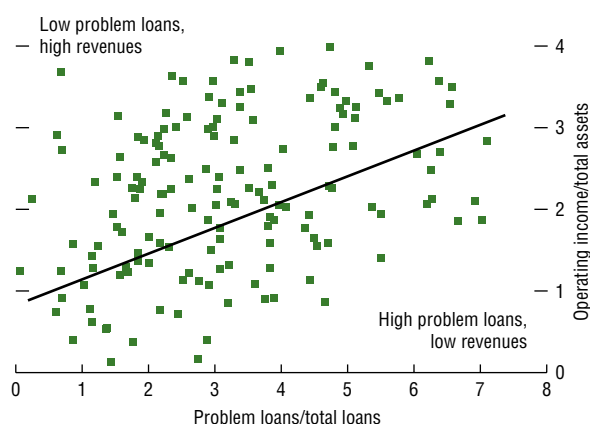
Sources: Bankscope; and IMF staff estimates.
Note: Data as of end-2008.

Figure 1.11. Bank Earnings
(As a percent of total assets; under local accounting conventions)
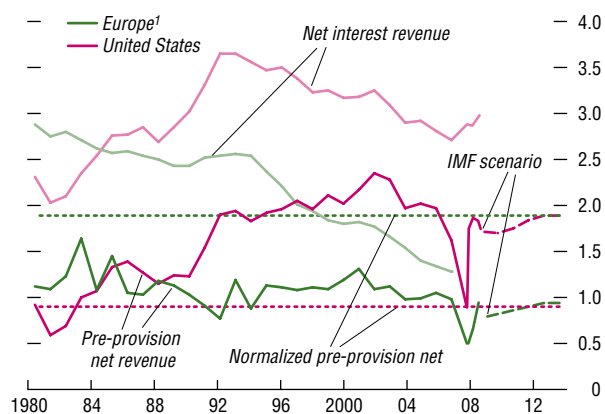
Sources: Organization for Economic Cooperation and Development (OECD); and IMF staff estimates.
Note: OECD actuals to 2007.
[1]Europe: unweighted average of up to 10 countries, including United Kingdom, six in 1980, seven in 1981, eight in 1984, nine in 1987, and 10 from 1995.

Figure 1.12. Bank Capital Needs

■ Billions of U.S. dollars (left scale) ◆ In percent of banks' consolidated total assets in June 2009 (right scale)

Source: IMF staff estimates.

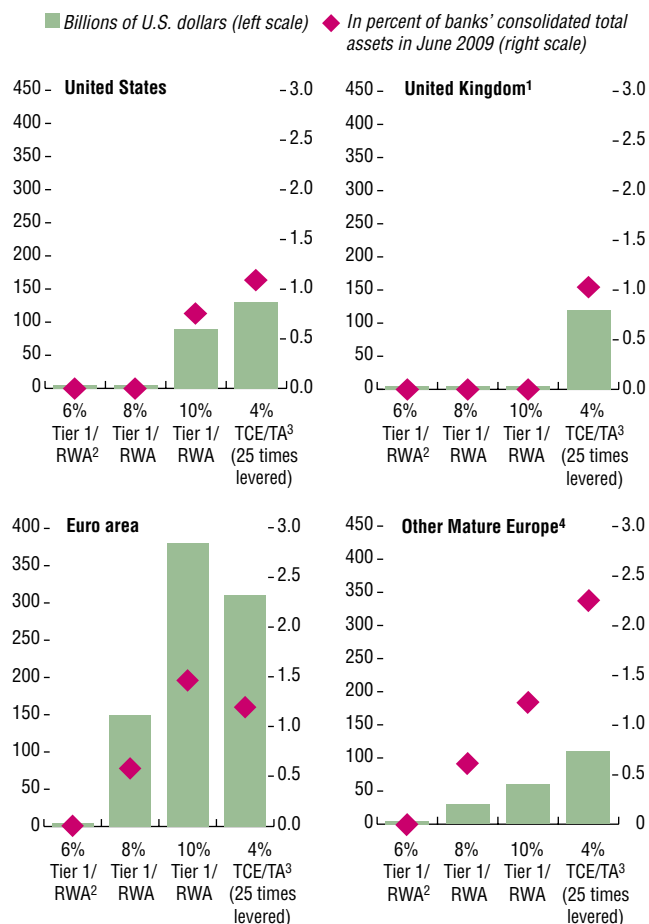Note: All figures under local accounting conventions and regulatory regimes, making direct comparisons between countries/regions impossible. The overall deleveraging scenario—which is reflected in the panels in this figure–incorporates some $1.1 trillion of sales of assets by banks to government asset management corporations (or other nonbanks). 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. See footnote 1 on treatment of the U.K. Asset Protection Scheme. 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.

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

[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 rerun 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 European Central Bank's purchases of covered bonds. Top-line bank revenue assumptions have been revised as outlined above.

Table 1.3. Bank Capital, Earnings, and Writedowns

(In billions of dollars, unless otherwise 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 nonbanks) 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 as of 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 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.

to experience difficulties, as they are 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.

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. Austria's two largest banks derive the majority of their revenues from the region, while

[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. So 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.

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 have 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 concern.[19] In the United Kingdom

[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.

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

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]

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

[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.

Figure 1.13. Mature Market Banks: Bond Debt Maturity Structure
(Percent of debt maturing over 12-month periods against initial outstanding)
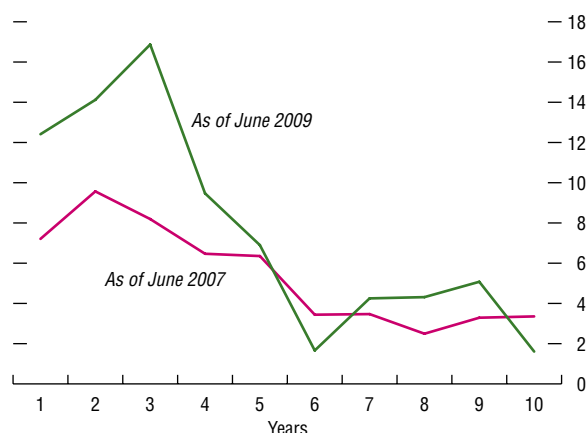
Sources: Dealogic; and IMF staff estimates.
Note: Percentages do not add to 100 in the figure because bonds maturing in more than 10 years are not shown.

Figure 1.14. Mature Markets: Gross and Guaranteed Bond Issuance by Month
(In billions of U.S. dollars)
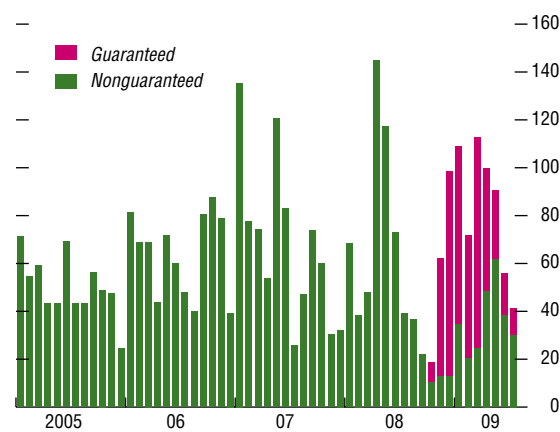
Sources: Dealogic; and IMF staff estimates.

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

■ Main
■ Long-term

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

Figure 1.16. Global Bank and Insurance Equity Indices
(August 1, 2007 = 100)

Source: Bloomberg L.P.

safety net, while ensuring rates charged encourage banks to seek refinancing from wholesale and other sources.

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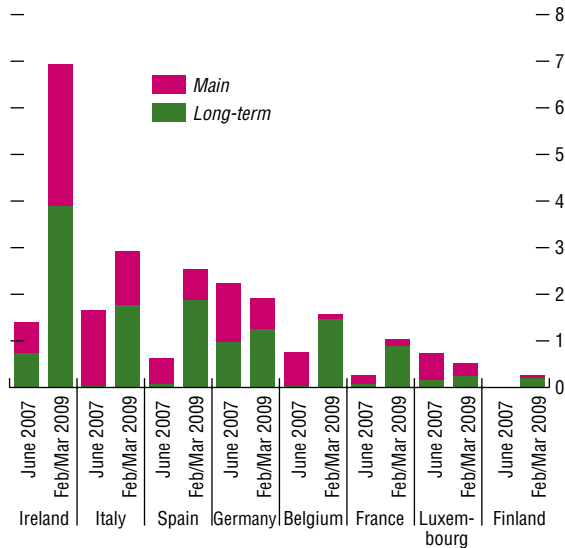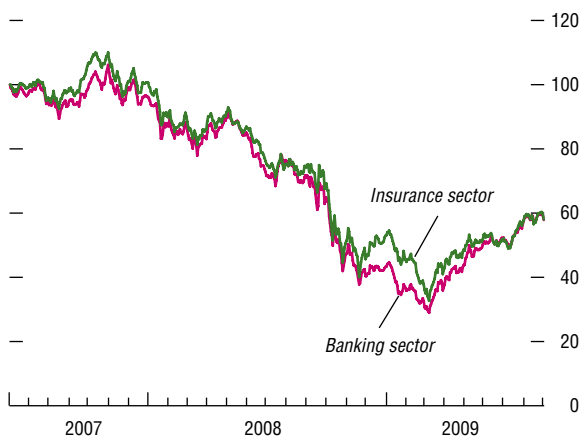) liquidity facilities varies substantially across countries. While some demand is driven by carry trades (where cheap ECB liquidity is funding government bond purchases or interbank lending), other banks depend on central bank liquidity because private funding markets have yet to reopen fully. In addition, 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.

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 macro-economic 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).

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.

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]

Figure 1.17. Funding Levels of Defined-Benefit Pension Plans of Companies in Major Equity Indices
(100 = fully funded)
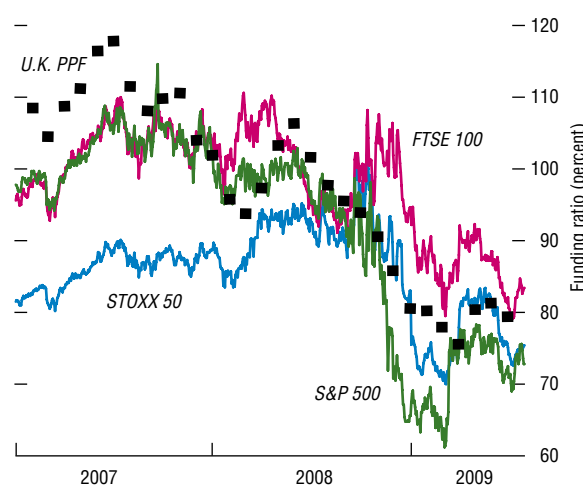
Sources: Hewitt Associates; and U.K. Pension Protection Fund (PPF).

---

[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).

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. Dark green signifies a standard deviation under 1, light green signifies 1 to 4 standard deviations, light magenta signifies 4 to 7 standard deviations, and dark magenta signifies greater than 7.

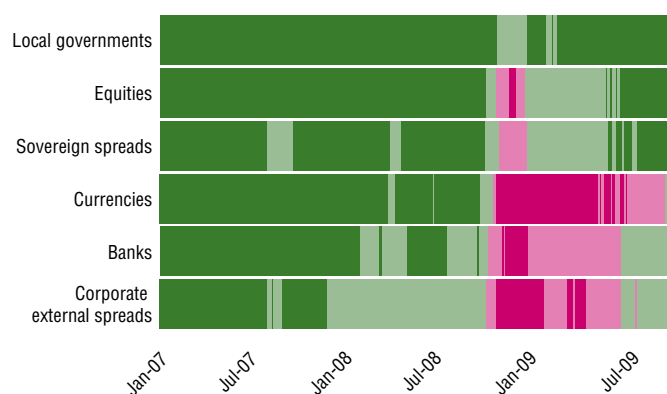## C. Emerging Markets Navigate the Global Crisis but Vulnerabilities Remain

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 bank 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 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.

Emerging market asset prices have performed strongly since early spring (Figure 1.18), with sustained rallies in equities and external debt.

---

[25]We use the term "emerging Europe" to signify 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.

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.

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 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.

Figure 1.19. Contributions to Changes in Emerging Market Sovereign External Spreads
(In basis points)
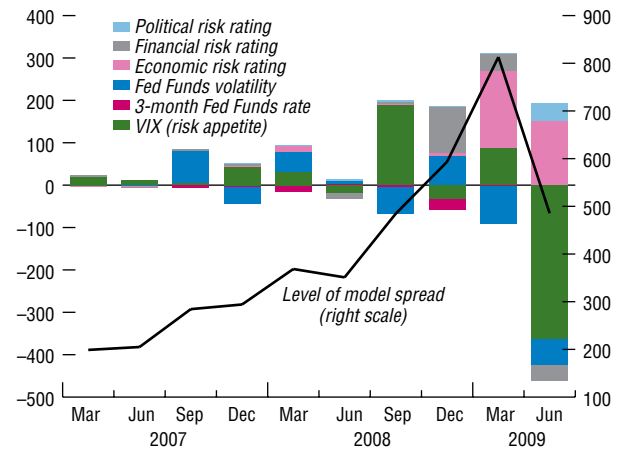
Sources: Bloomberg L.P.; and IMF staff estimates.
Note: For details of the model, see Box 1.5 of the April 2006 GFSR.

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.

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

Sources: IMF, Balance of Payments database; national authorities; and IMF staff estimates.
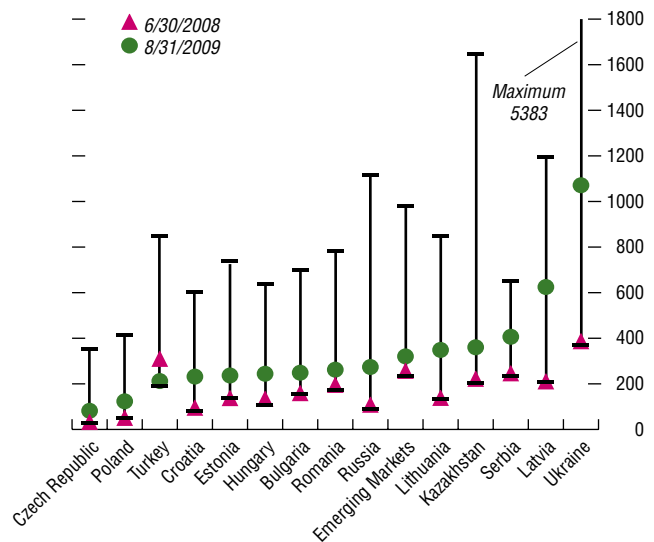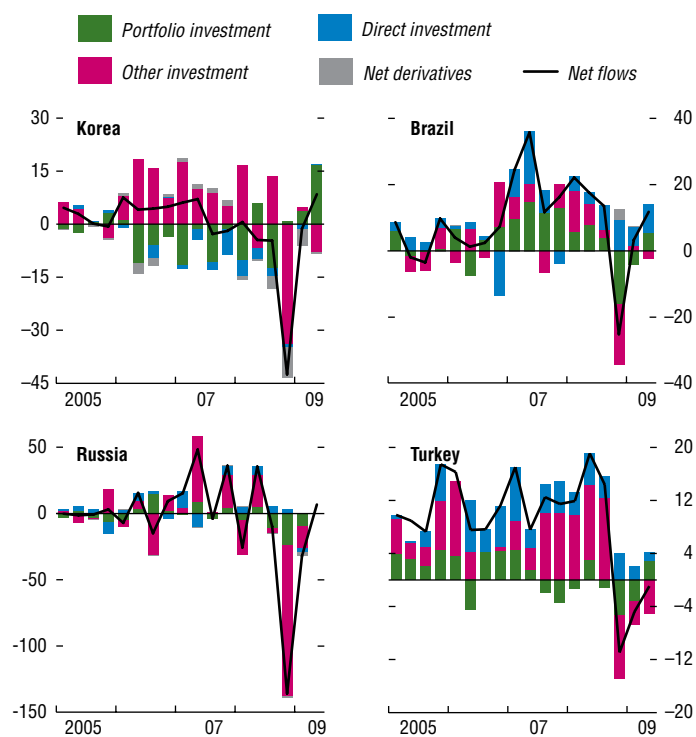Note: Excludes reserves and IMF lending. Data are through 2009:Q2, except for Russia, for which detailed data are only available through 2009:Q1.

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 inter-national reserves and swap facilities with core market central banks to help restore confidence in domestic banks and corporates, having con-vinced 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 cor-porates, appears to be reversing only gradually.[27] Cross-border bank flows to central and eastern European subsidiaries have been relatively resil-ient, 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.

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

---

[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

	Current Account Balance[1] (percent of GDP)	External Debt Refinancing Needs in 2010[2] (percent of reserves)	Net External Position vis-à-vis BIS-Reporting Banks[3] (percent of GDP)	Average Real Credit Growth over the Last Five Years[4] (percent, year on year)	Loan/ Deposit[5] (ratio)	Forex Share of Total Loans[6] (percent of total loans)
Europe and CIS						
Bulgaria						
Croatia						
Czech Republic						
Estonia						
Hungary						
Kazakhstan						
Latvia						
Lithuania						
Poland						
Romania						
Russia						
Serbia		. . .				
Turkey						
Ukraine						
Gulf States						
Kuwait						. . .
Saudi Arabia		. . .				
United Arab Emirates		. . .	. . .			
Africa						
Egypt						
Ghana						. . .
Nigeria		. . .				. . .
South Africa						. . .
Uganda		. . .	. . .			. . .
Asia						
China						. . .
India						. . .
Indonesia						
Korea						
Malaysia						
Pakistan				. . .		. . .
Philippines						. . .
Thailand						
Vietnam						
Latin America						
Argentina		. . .		. . .		
Brazil						. . .
Chile						
Colombia						
Mexico						
Peru						
Venezuela						

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

Note: The heat map measures the extent of vulnerabilities relative to other countries for each indicator. Magenta represents the quartile with highest vulnerabilities, light green the quartile with second-highest vulnerabilities, and dark green the remaining two quartiles. Care should be taken in interpreting the figure, as magenta 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 International Financial Statistics database.

[6]2009 estimates or latest.

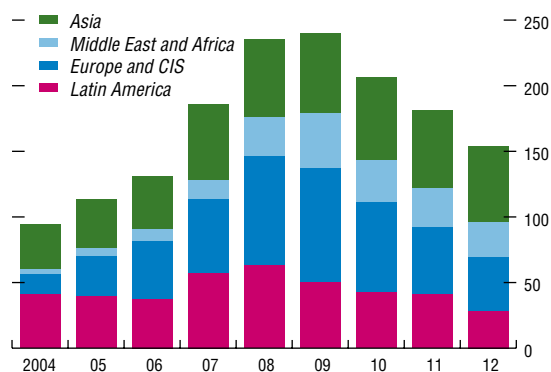**Figure 1.22. Emerging Markets: Bank Credit to the Private Sector**
(Six-month percent change, annualized rate)
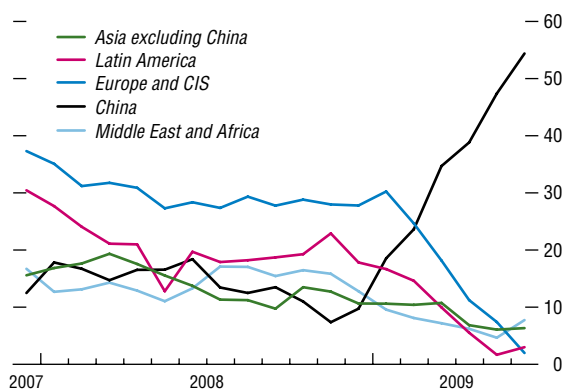
Sources: IMF, International Financial Statistics database; and IMF staff estimates.
Note: CIS = Commonwealth of Independent States.

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.

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 are 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.

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-

[28]"Actual" 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.

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 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]
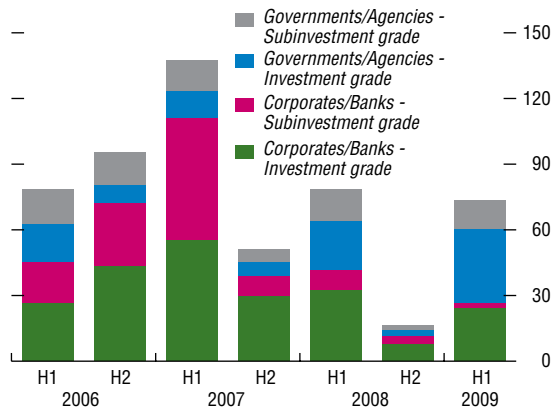
If risk sentiment deteriorates again, corporate refinancing gaps could reemerge and represent a potential large drain on international reserves, particularly in emerging Europe. Given the need for financing substantial fiscal deficits over the next few years and maintaining a minimum level of precautionary 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 Asia have generally been swifter

[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.

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.

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 up to twice the 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.

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

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

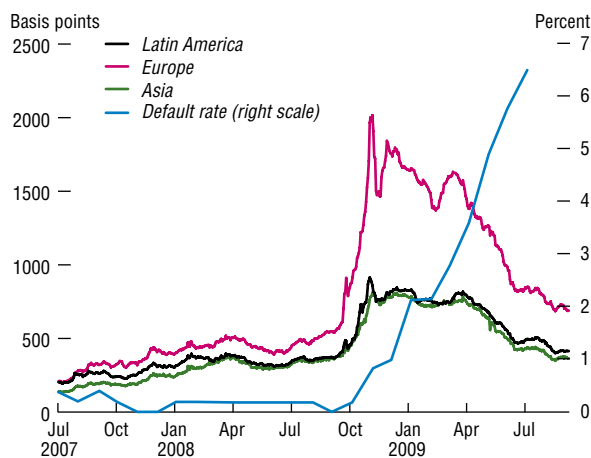**Figure 1.26. Emerging Market Corporate Spreads and Speculative-Grade Default Rate**

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.

---

[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.

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.

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

[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 discussions of this issue. The general conclusion is that credit supply-side factors appear to affect economic activity.

Figure 1.27. Emerging Europe: Nonperforming Loan Ratios
(In percent)
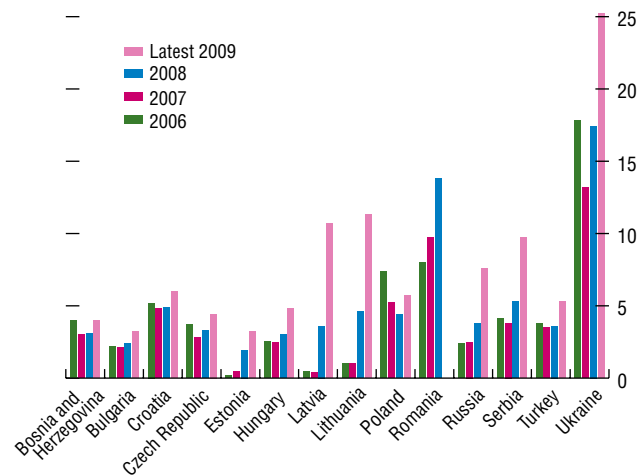
Source: National authorities.
Note: Due to differences in national accounting, taxation, and supervisory regimes, as well as changes in definition, nonperforming loans are not strictly comparable across countries or with historical data.

Figure 1.28. Private Sector Credit Growth
(Borrowing as a percentage of debt outstanding, quarter-on-quarter annualized, seasonally adjusted)
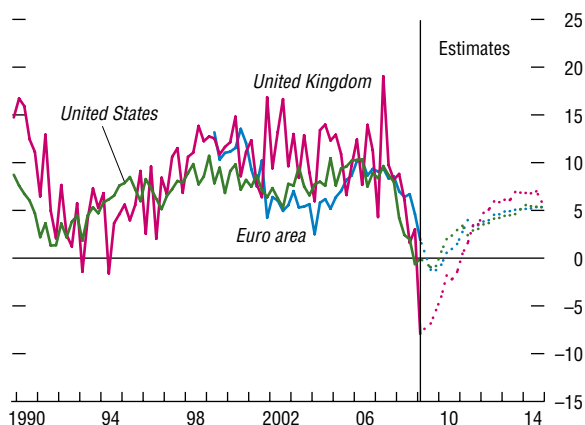
Source: IMF staff estimates.
Note: Projections are based on estimated credit demand from households and nonfinancial corporates (Table 1.5). If overall demand exceeds the credit provision capacity in the system (after meeting sovereign borrowing needs), then actual borrowing is assumed to be constrained by the available capacity, including the impact of government and central bank policies. See Table 1.7 for more details.

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.

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

---

[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

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 2002–08 period.

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

States, overall 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.

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 curves. The projections are consistent with WEO projections for the relevant macro variables.

[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.

Figure 1.29. Growth of Nonfinancial Sector Debt: History and Projected Borrowing Needs
(In percent)
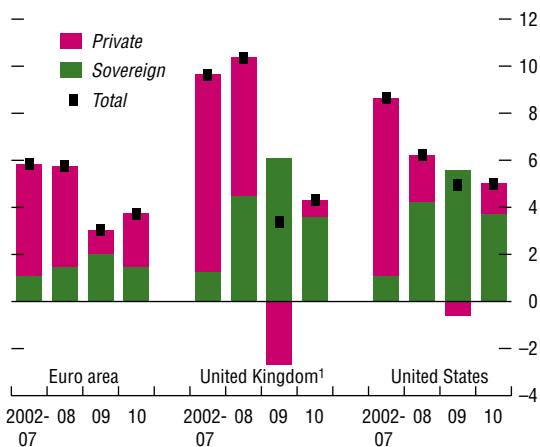
Source: IMF staff estimates.
Note: Data for 2002–07 represent average annual totals while 2009 and 2010 are projected borrowing needs. Total growth is broken down into private and sovereign contributions.
[1]There was no reliable fit for corporate credit demand in the United Kingdom, so the U.S. model was used as a proxy.

Figure 1.30. Bank Lending Capacity Growth
(In percent)
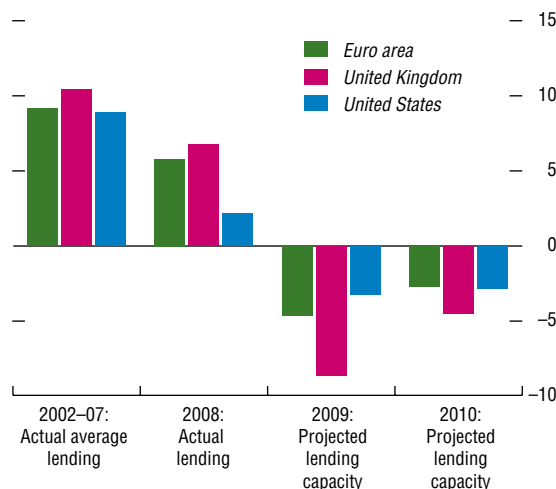
Source: IMF staff estimates.

...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 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 nonfinancial sector will grow only somewhat slower than during the 2002–07 period.

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 that 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 increas-

ing 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 non-bank credit channels.[36]

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).

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 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

Figure 1.31. Emerging Market Reserve Accumulation
(In billions of U.S. dollars)
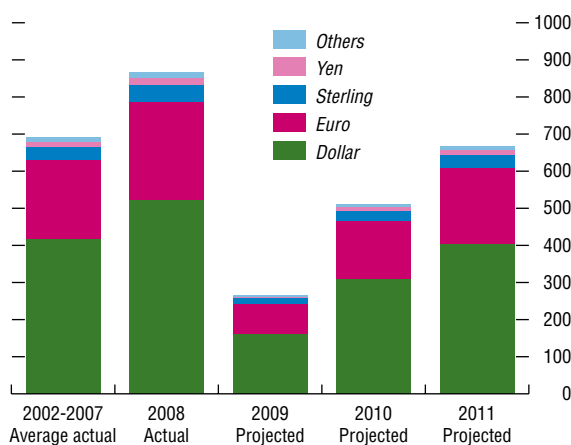
Sources: National authorities; and IMF staff estimates.
Note: The analysis projects currency mix of reserve allocation based on estimated currency allocation as currently reflected in the IMF's Currency Composition of Official Foreign Reserves database.

---

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

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.

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.

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 in 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

Facilities to Support Securitization

Region	Institution	Program	Type of Support
Euro area	European Central Bank[1]	Refinancing operations	Liquidity, accepts securitized products as collateral
United Kingdom	Bank of England	Special liquidity scheme	Liquidity, swap of securitized assets for treasury bill collateral
United Kingdom	Bank of England	Asset Purchase Facility	Outright purchase of secured commercial paper
United Kingdom	H.M. Treasury	Asset-Backed Securities Guarantee Scheme	Choice of credit or liquidity guarantee for RMBS purchase
United States	Federal Reserve	Term Securities Lending Facility	Liquidity, swap of securitized assets for treasury collateral
United States	Federal Reserve	Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility	Liquidity, loans to banks to purchase ABCP from MMMFs
United States	Federal Reserve	Commercial Paper Funding Facility	Liquidity to Fed-sponsored special purpose vehicle to purchases 3-month commercial paper
United States	Federal Reserve with $20 billion capital from U.S. Treasury	Term Asset-Backed Securities Loan Facility	Liquidity, provide loans to investors to purchase nonmortgage-backed ABS and CMBS
United States	Federal Reserve	Long-term securities purchases	Outright purchase of GSE obligations
United States	Federal Reserve	Long-term securities purchases	Outright purchase of GSE MBS
United States	U.S. Treasury	Long-term securities purchases	Outright purchase of GSE MBS
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

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.

The Credit Crunch of Lending in the Euro Area, United Kingdom, and United States, as of 2009:Q1
(In billions of U.S. dollars)
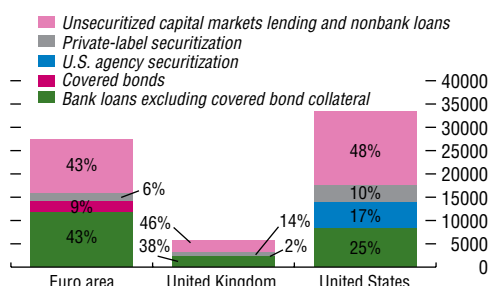
Sources: National authorities; and IMF staff estimates.

Share of Securitization in Select U.S. Credit Classes
(In percent)
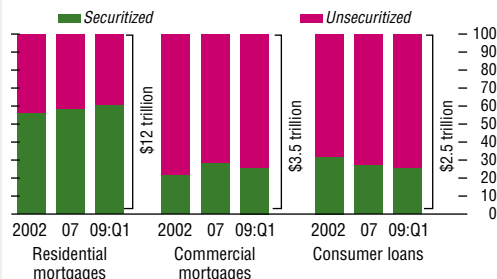
Sources: U.S. Federal Reserve, *Flow of Funds*; and IMF staff estimates.

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.

Term	Amount		Percent Complete
	Committed	Progress	
Up to 1-year loan	Unknown		
Drawdown window was closed in Jan. 2009	n.a.		n.a.
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.
Guarantee 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.
Program expires Feb. 1, 2010	n.a.	$2.7 billion[3]	n.a.
Up to 270 day loan; program expires Feb. 1, 2010	n.a.	$113 million[3]	n.a.
Program expires Feb. 1, 2010	n.a.	$58 billion[3]	n.a.
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%
Expected to be completed by year-end; unknown holding period	$200 billion	$110 billion[3]	55%
Expected to be completed by year-end; unknown holding period	$1.25 trillion	$543 billion[3]	43%
Unknown	n.a.	$158 billion[4]	n.a.
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

Table 1.6. Total Net Borrowing Needs of Nonfinancial Sectors
(In billions of local currency units rounded to the nearest 10)

	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.

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 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

[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.

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 the 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. 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 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

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.

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 midway 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]

[38]For a recent discussion, see IMF (2009b).

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 World War II. 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 perfectly 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 such Ricardian equivalence is limited. In an open economy, domestic savings can be aug-

mented 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.

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. 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 yield 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]

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,

Correlation of Government Bond Yields with Fiscal Variables
(in percent)
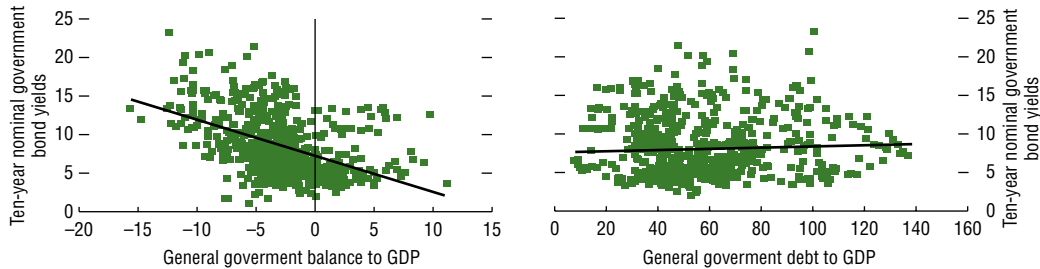
Source: IMF staff estimates.
Note: Sample of 34 countries over 1980–2007. Excludes outliers, defined as cases with an absolute distance from the mean exceeding three standard deviations. Debt data for Japan also excluded.

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 risks 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 rates, compared to nondistress times.

The above findings imply that even in the baseline scenario, given the general 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 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.

---

private sector savings rates, trade openness, global sovereign bond supply, and external capital flows were also investigated.

Figure 1.32. Net Sovereign Debt Issuance in Mature Markets
(In billions of U.S. dollars)
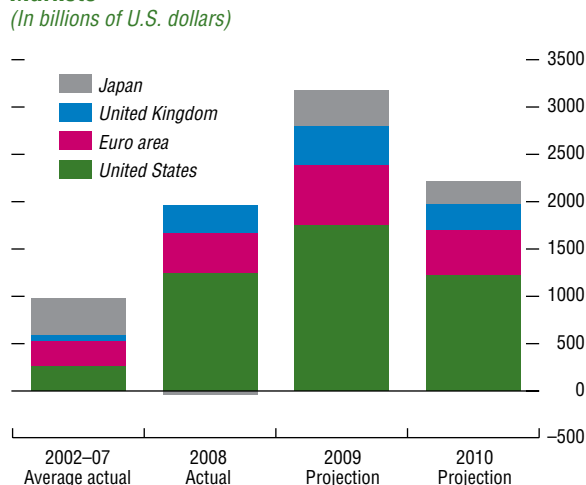
Source: IMF staff estimates.
Note: Numbers are converted to U.S. dollars at current exchange rates. Net issuance includes bonds and bills.

Figure 1.33. Emerging Market Sovereign Issuance in International Capital Markets
(In billions of U.S. dollars)
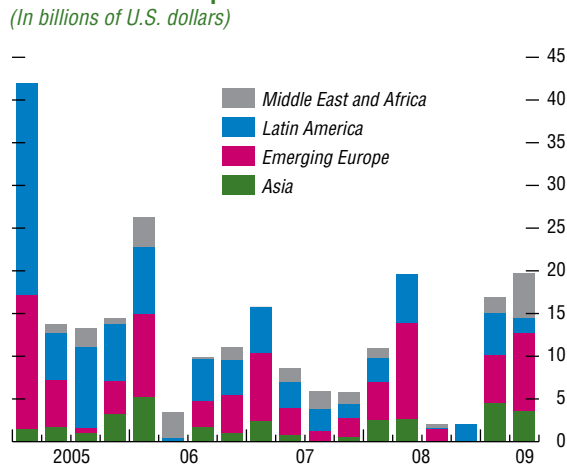
Source: Dealogic.

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 index swap.

Interestingly, a sizable part of the variation in individual countries' sovereign spreads is due to "global" risk factors as opposed to country-specific concerns particular to the countries. For example, an index of euro area banks' CDS spreads explains 75 to 85 percent of the time series variation in 10 euro area countries' spreads 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.

---

[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 swaps (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.

[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.

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 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

[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.

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 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 careful 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 areas 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, 2009; 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, prom-

---

[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.

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

Note: This box was prepared by Paul Mills.

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.

[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.

ising 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

[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.

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 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

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

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 jurisdic-

tions 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, 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.

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.

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

[50]This annex was prepared by Ken Miyajima.

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.

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. 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

[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.

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

Figure 1.34. Global Financial Stability Map: Monetary and Financial Conditions
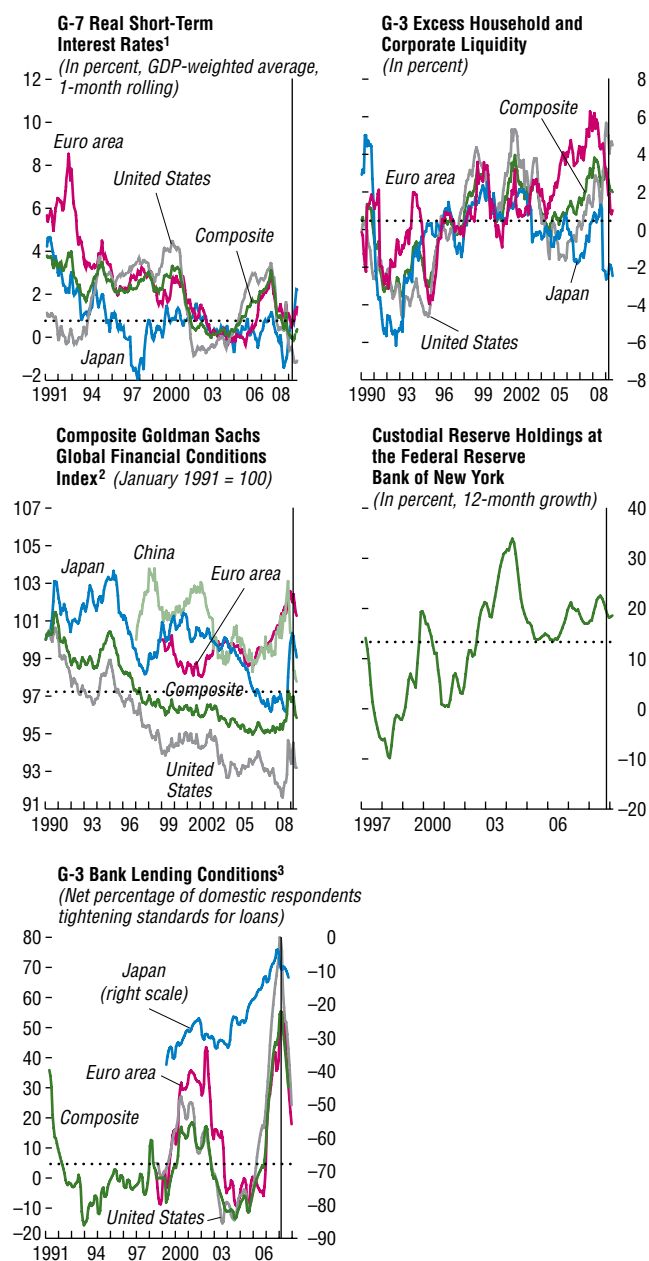
Sources: Bloomberg L.P.; Goldman Sachs; Federal Reserve Bank of New York; lending surveys for households and corporates by the Bank of Japan, European Central Bank, and the U.S. Federal Reserve; and IMF staff estimates.
Note: Dashed lines are period averages. Vertical lines represent data as of the April 2009 GFSR.
[1]Canada and the United Kingdom are included in the composite but not shown separately.
[2]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.
[3]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.

Figure 1.35. Global Financial Stability Map: Risk Appetite

Merrill Lynch Fund Manager Survey
*(Net percent of investors
reporting higher risk-taking
than benchmark, 3-month rolling)*

**State Street Investor
Confidence Index[1]**

**Total Net Inflows into Emerging
Market Bond and Equity Funds**
*(In percent of assets
under management,
13-week moving average)*
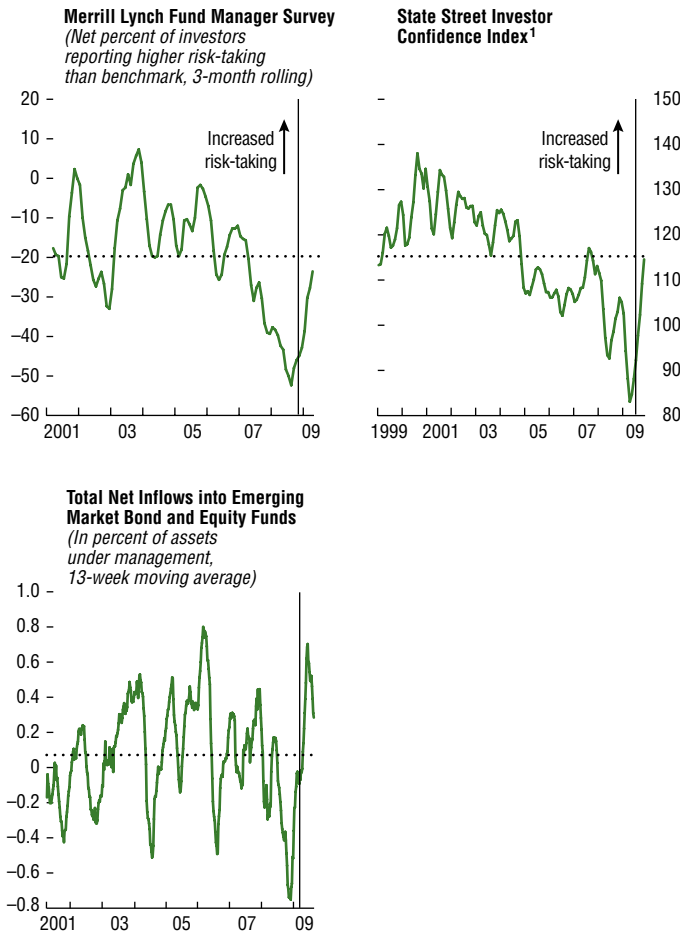
Sources: Merrill Lynch; State Street Global Markets; Emerging Portfolio Fund Research; and IMF staff estimates.

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

[1]The estimated changes in relative risk tolerance of institutional investors from Froot and O'Connell 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.

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 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

[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.

Figure 1.36. Global Financial Stability Map: Macroeconomic Risks

Global Real GDP Growth[1]
(In percent)

October 2009 update
April 2009 WEO

G-3 Confidence Indicators
(GDP-weighted average of deviations from the average, 3-month rolling)

Composite
Germany
Japan
United States

OECD Leading Indicators[2]
(Amplitude-adjusted series for the 29 OECD member countries)

Implied Global Trade Growth[3]
(In percent, year-on-year, implied by the Baltic Dry Index)

Global Break-Even Rate Index[4]
(In basis points, 1-month rolling)

Mature economies (left scale)

Emerging economies (right scale)

Credit Default Swap Spreads on Mature Market Sovereigns[5]
(In basis points)

Figure 1.37. Global Financial Stability Map: Emerging Market Risks

Adjusted EMBIG Spreads: Actual and Fundamentals Model Estimates[1]
(In basis points)

Actual adjusted spreads

Fundamentals model spreads

Emerging Market Sovereign Credit Quality: Net Credit Ratings Changes[2]
(12-month rolling sum of net ratings upgrades less downgrades)

Emerging Market Private Sector Credit Growth[3]
(GDP-weighted average, in percent)

Median Volatility of Inflation Across Emerging Market Countries[4]
(In percent)

Emerging Market External Corporate Credit Excess Spreads[5]
(Corporate spreads less sovereign spreads in basis points, 1-month rolling)

Sources: The Baltic Exchange; Barclays Capital; Bloomberg L.P.; Datastream; Organization for Economic Cooperation and Development; IMF, *World Economic Outlook*; and IMF staff estimates.
Note: Dashed lines are period averages. Vertical lines represent data as of the April 2009 GFSR.
[1]2010 growth forecast labeled as *October 2009 GFSR Update* accounts for risks to the baseline forecast.
[2]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.
[3]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.
[4]Tracking GDP-weighted longer-term break-evens, 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.
[5]GDP-weighted average of France, Germany, Italy, Japan, Spain, United Kingdom, and United States.
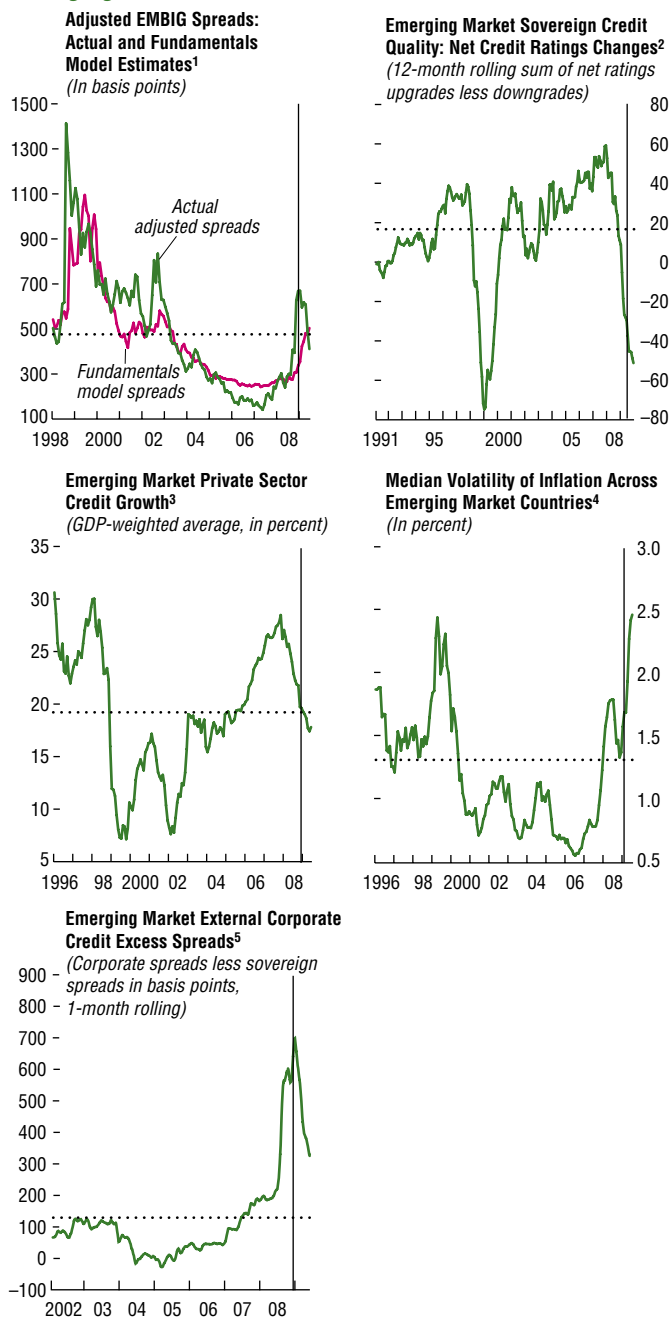
Sources: Bloomberg L.P.; JPMorgan Chase & Co.; The PRS Group; IMF, International Financial Statistics; and IMF staff estimates.
Note: Dashed lines are period averages. Vertical lines represent data as of the April 2009 GFSR.
[1]EMBIG = Emerging Markets Bond Index Global. The model excludes Argentina 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.
[2]Net actions of upgrades (+1 for each notch), downgrades (−1 for each notch), changes in outlooks (+/− 0.25), reviews and creditwatches (+/−0.5).
[3]44 countries.
[4]Average of 12-month rolling standard deviations of consumer price changes in 36 emerging markets.
[5]Unweighted average of Brazil, China, Colombia, Egypt, Kazakhstan, Mexico, Malaysia, Peru, Russia, and Ukraine.

Figure 1.38. Global Financial Stability Map: Credit Risks

Merrill Lynch Global Corporate Bond Index Spread
(In basis points)

Share of CCC or Lower-Rated Corporate Securities in Merrill Lynch Global High-Yield Index
(In percent, 1-month rolling)

Moody's Speculative Grade Default Rates: Actual and 12-Month Forecast
(In percent)

Expected Number of Bank Defaults Given at Least One Bank Default
(Among 15 selected banks)

Delinquency Rate on Consumer and Mortgage Loans[1]
(In percent)

Households Financial Obligations Ratio[2]
(In percent of personal disposable income)

Sources: Bloomberg L.P.; Merrill Lynch; Moody's; Mortgage Bankers Association; U.S. Federal Reserve; and IMF staff estimates.

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

[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.

[2]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.
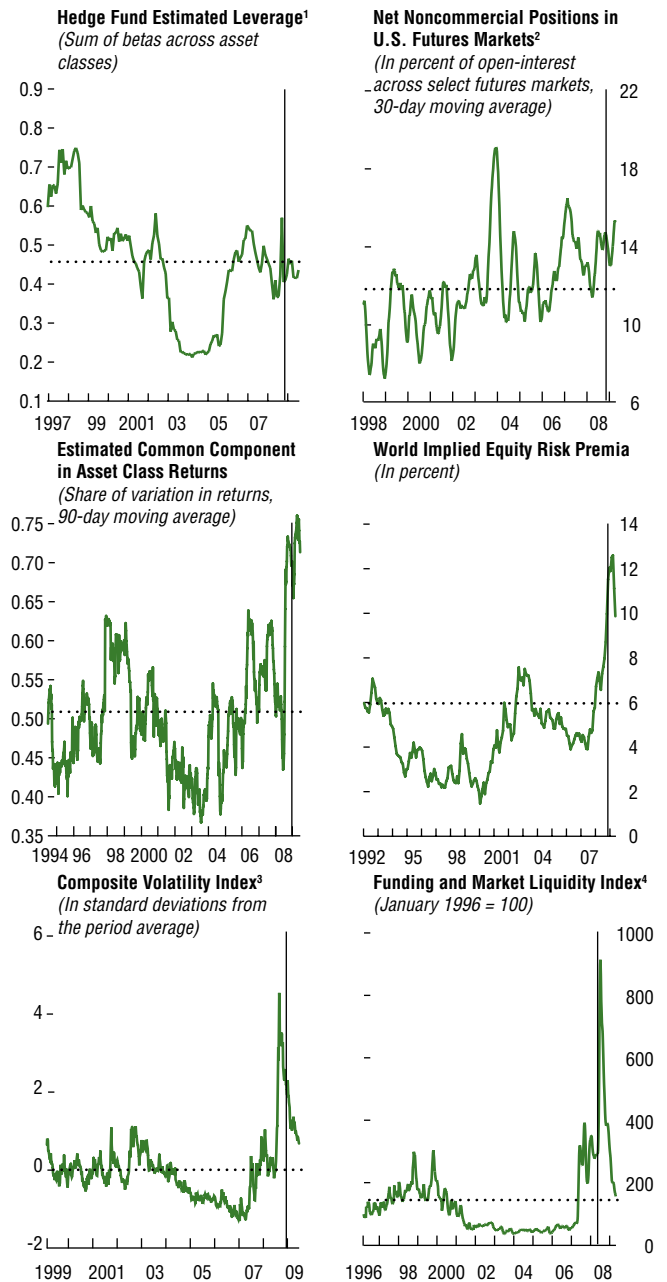
Figure 1.39. Global Financial Stability Map: Market and Liquidity Risks

Hedge Fund Estimated Leverage[1]
(Sum of betas across asset classes)

Net Noncommercial Positions in U.S. Futures Markets[2]
(In percent of open-interest across select futures markets, 30-day moving average)

Estimated Common Component in Asset Class Returns
(Share of variation in returns, 90-day moving average)

World Implied Equity Risk Premia
(In percent)

Composite Volatility Index[3]
(In standard deviations from the period average)

Funding and Market Liquidity Index[4]
(January 1996 = 100)

Sources: Bloomberg L.P.; Credit Suisse Tremont Index LLC; IBES; JPMorgan Chase & Co; Morgan Stanley Capital International; and IMF staff estimates.

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

[1]36-month rolling regressions of hedge fund performance versus real asset returns.

[2]Data represent the absolute number of contracts of the net positions taken by noncommercial traders in 17 selected U.S. futures markets. Higher volume is indicative of heavy speculative positioning across markets, either net-long or net-short.

[3]Represents 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 are available). Values of +/–1 indicate average implied volatility is one standard deviation above or below the period average.

[4]Based on 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.

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 and funding 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 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.

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

---

[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.

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

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

Table 1.11. OECD Database: Coverage and Degree of Consolidation

| | | Degree of Consolidation | | | |
| | | Domestic banks | | Foreign banks | |
	Coverage	Foreign branches	Foreign subsidiaries	Domestic branches	Domestic subsidiaries
Austria	Banks, builiding and loan associations	Yes	Yes	Yes	Yes
Belgium	Credit institutions, excluding money market funds	Yes	No	Yes	Yes
Germany	Banks	Yes	No	No	Yes
Ireland	Banks and 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.

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.* These are publicly available data on loan loss provisions for the euro area as a whole on a consolidated basis, and are 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.* These are 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.

Measures of bank loan losses

We used loan loss provisions instead of write-downs 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.

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).

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 impair-

Figure 1.40. Provisions for Loan Losses
(In percent of total loans)
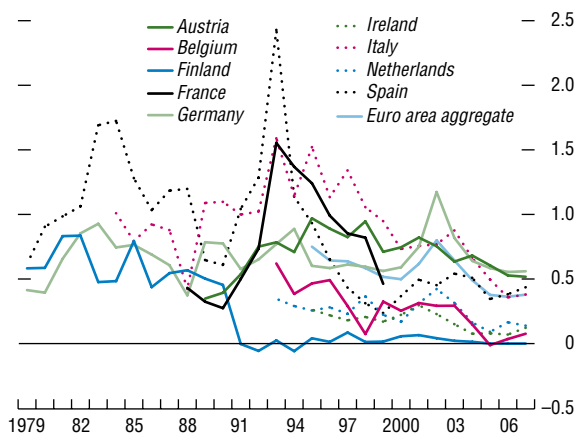
Sources: Organization for Economic Cooperation and Development; and IMF staff estimates.

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

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.

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	1.0	4.0	3.1	1.7	6.3
2009–10	2.1	0.7	2.8	2.2	1.2	4.3

Source: IMF staff estimates.

ments 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).

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).

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

Figure 1.41. Estimated Share of Euro Area Bank Loans, 2007–10
(In percent)
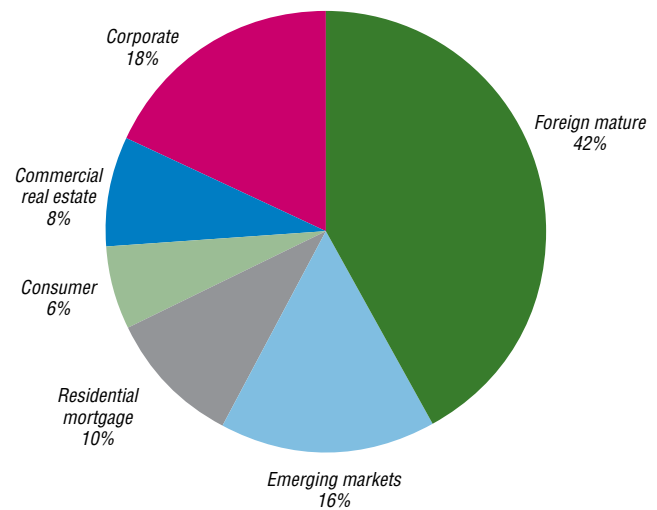
Sources: National authorities; and IMF staff estimates.

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.

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

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. These are publicly available data on MFI writedowns by loan type, on a borrower's domicile basis, quarterly, from 1993/1996.

---

[58]Based on data from national authorities.

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 FSA's BSD03 form data. These are 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. These are 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. These are 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.

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

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 types according to the FSA015 form provision rates and the MLAR provision rate for residential mortgages.

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	7.4	5.1	1.6
Domestic sectors:	9.4	1.7	5.5	. . .	. . .
Mortgages	7.7	1.0	2.9	. . .	. . .
Consumer	17.5	4.0	15.7	. . .	. . .
Commercial real estate	9.0	3.1	11.2	. . .	. . .
Corporate	6.6	1.7	4.5	. . .	. . .
Foreign sector	3.3	6.3	10.4	. . .	. . .

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 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 the residential mortgage-backed securities (RMBS) market in the euro area, we used indices compiled by the European Securitisation Forum for mortgage securities deals originated in France, Germany, Italy, the 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 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).

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

---

[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 (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 1.16. 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 and credit cards
Corporate debt and CLOs	Barclays U.S. Corporate: Investment-grade and high-yield
Municipal	Markit MCDX

United Kingdom
Residential mortgage	ESF/Markit U.K. 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.

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

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.

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 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.

---

[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.

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.

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 United Kingdom, 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.

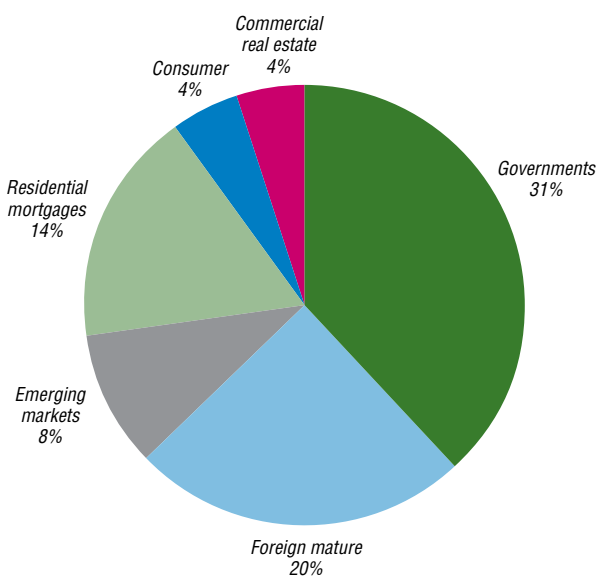### Significant Changes in Bank Writedown Estimation since the April 2009 GFSR

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.

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

---

[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.

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 (PPNR) 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, we used a simple equation of the form:

PPNR = $C + \beta_1$ credit_growth + $\beta_2$2_10steepness + β_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

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

Sources: National authorities; and IMF staff estimates.

---

[64]This annex was prepared by Chris Morris.

Sample: 2000:Q1 2009:Q1
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			

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, and other components. As expected, for the net interest margin, yield curve steepness was even more important. The particular measure of the steepness of the yield curve (between two-year and 10-year, three-month and five-year, and three-month and 10-year) 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 five-year steepness measure (_3MO_5STEEPNESS) performed better than the two-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 United Kingdom[65]

This annex describes our methodology for estimating nonfinancial sector credit demand

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

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 lagged mortgage credit—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.

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 provisions not yet recognized are assumed to

---

[66]In effect, credit capacity exceeded demand and some capacity was unutilized.

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

[68]We recognize that house prices have an impact on both credit demand and supply. Since housing represents a sizable share of total household assets, changes in house 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 household collateral (and thus 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 Results: Demand for Nonfinancial Private and Public Sector Credit

Euro Area

Sovereign sector	Consistent with World Economic Outlook (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 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 =	Used U.S. corporate profit regression coefficients to forecast				

United States

Sovereign sector	Consistent with 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.

be recognized by end-2010. Banks are assumed 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 retain. Third, the new U.S. accounting rule FAS 140 is assumed to take effect starting in early 2010, and to lead to bringing on to 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 fac-

tors 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 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 loan sources, 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 yielded 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 of a quarterly, or in some cases, 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.

Annex 1.5. The Impact of the Financial Crisis on the Savings Complex— Insurance and Pension 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.

---

[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 loan sources using quarter-on-quarter changes. Instead, we used a first-order auto-correlation process 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.
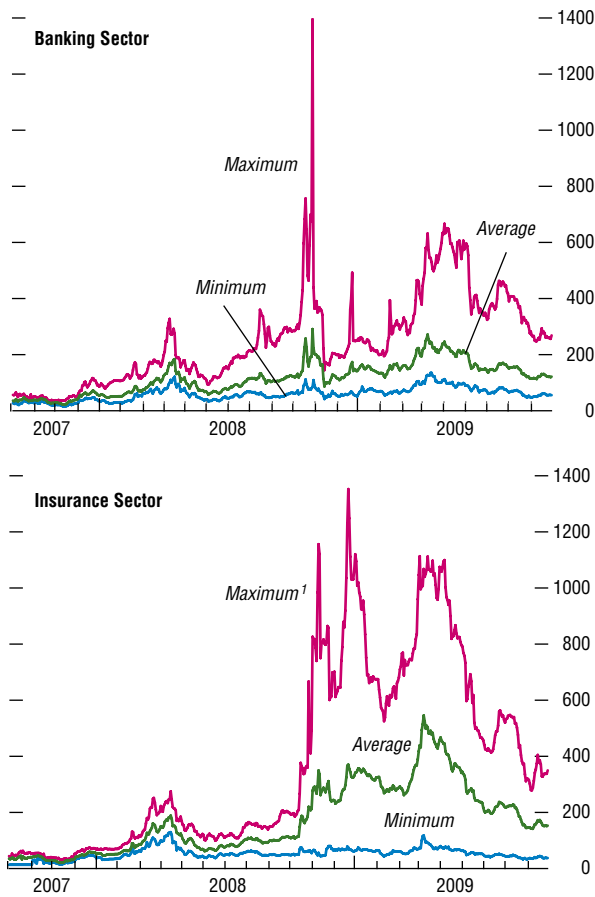
[72]This annex was prepared by Ian Tower and Gregorio Impavido.

Figure 1.43. Growth of Nonbank Fixed-Income Assets Under Management
(In percent; quarter-on-quarter)
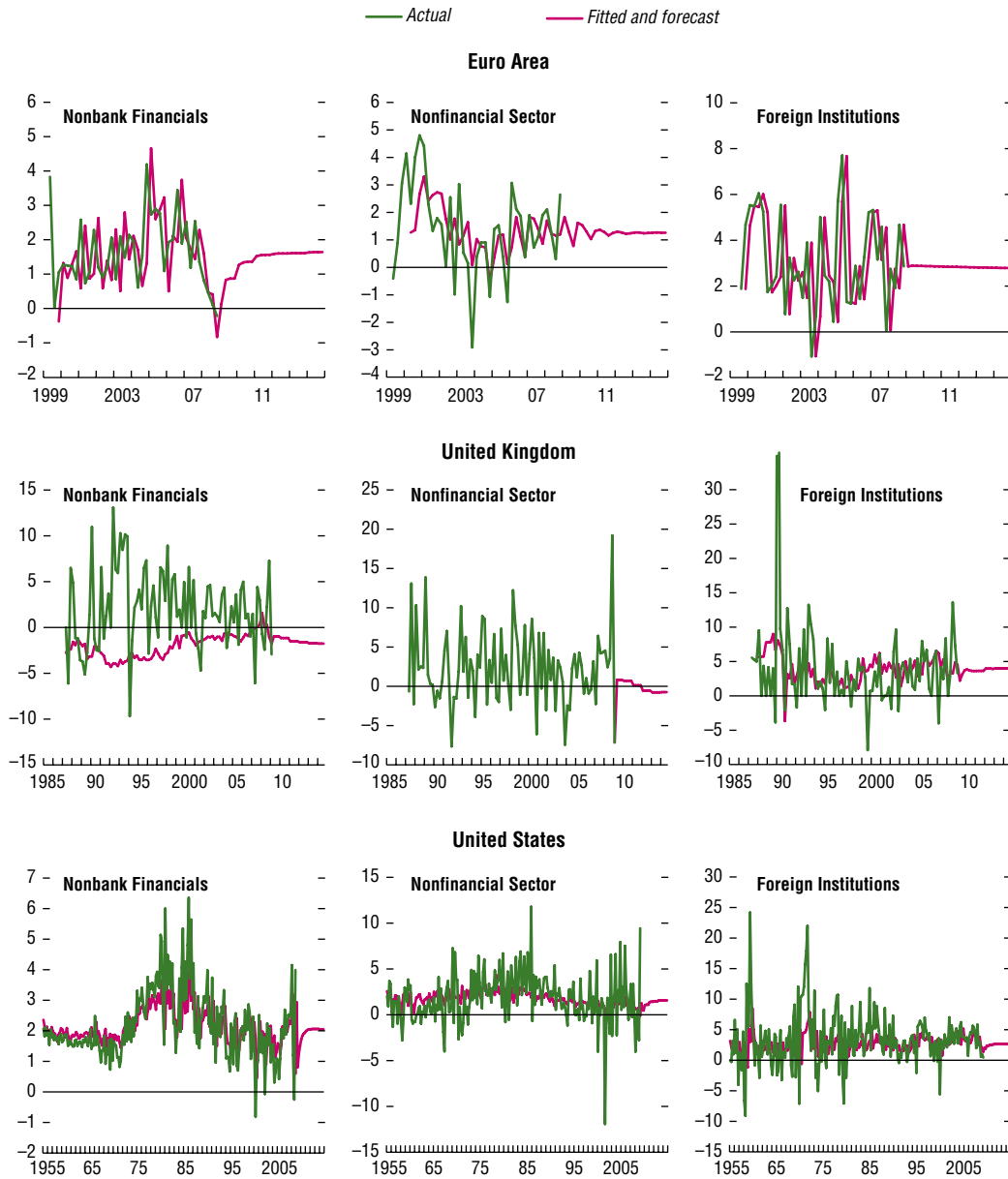
——— *Actual*   ——— *Fitted and forecast*

Source: IMF staff estimates.

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).

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 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

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

Source: Bloomberg L.P.
[1]Excludes AIG.

---

[73]Global capital adequacy data comparable to those for banks are not available.

[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.

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.

[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.

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

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

Source: IMF staff estimates from company filings.
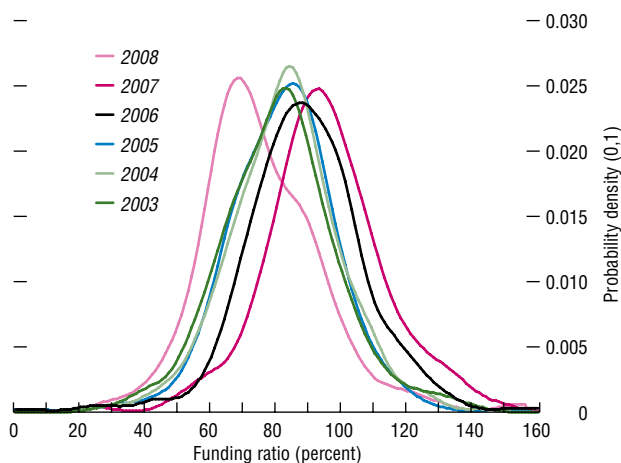
Defined-Benefit Plans—United States

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.

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 1.21), particularly affecting countries

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.

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

Source: IMF staff estimates from company filings.
Note: A shift to the left of the density distribution implies a lower average funding ratio.

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 1.22).

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 activi-

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.

ties and regulatory actions aimed at introducing countercyclical adjustments to funding rules. Regarding surveillance, the Swedish and German supervisory authorities increased the frequency of stress tests, while Portugal and Slovak Republic 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 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).

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.

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

Table 1.23. Real Performance of Mandatory Defined-Contribution Systems, Selected Countries
(In percent)

Country	Dec. 2006–07	June 2007–08	Dec. 2007–08	March 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.

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.

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.

References

Acharya, Viral, Lasse Pedersen, Thomas Philippon, and Matthew Richardson, 2009, "Regulating Systemic Risk," in *Restoring Financial Stability: How to Repair a Failed System*, ed. by Viral Acharya and Matthew Richardson (New York: John Wiley & Sons).

Andritzky, Jochen, John Kiff, Laura Kodres, Pamela Madrid, Andrea Maechler, Aditya Narain, Noel Sacasa, and Jodi Scarlata, 2009, "Policies to Mitigate Procyclicality," IMF Staff Position Note No. 09/09 (Washington: International Monetary Fund).

Baldacci, Emanuele, Sanjeev Gupta, and Amine Mati, 2008, "Is it (Still) Mostly Fiscal? Determinants of Sovereign Spreads in Emerging Markets," IMF Working Paper No. 08/259 (Washington: International Monetary Fund).

Bank for International Settlements (BIS), 2009, *79th Annual Report 2008–09* (Basel: Bank for International Settlements).

Barro, Robert, 1974, "Are Government Bonds Net Wealth?" *Journal of Political Economy*, Vol. 82, No. 6, pp. 1095–117.

Basel Committee on Banking Supervision (BCBS), 2009, "Comprehensive Response to the Global Banking Crisis," press release, Bank for International Settlements, Basel, September 7.

_____, and International Association of Deposit Insurers (IADI), 2009, *Core Principles for Effective Deposit Insurance Systems* (Basel: Bank for International Settlements).

Berger, Allen N., and David B. Humphrey, 1994, "Bank Scale Economies, Mergers, Concentration, and Efficiency: The U.S. Experience," Center for Financial Institutions Working Paper 94-25 (Wharton School Center for Financial Institutions, University of Pennsylvania).

Bernanke, Ben, and Mark Gertler, 1995, "Inside the Black Box: The Credit Channel of Monetary Policy Transmission," *Journal of Economic Perspectives*, Vol. 9, No. 4, pp. 27–48.

Bernheim, B. Douglas, 1989, "A Neoclassical Perspective on Budget Deficits," *Journal of Economic Perspectives*, Vol. 3, No. 2, pp. 55–72.

Brunnermeier, Markus, Andrew Crockett, Charles Goodhart, Avinash D. Persaud, and Hyun Shin, 2009, "The Fundamental Principles of Financial Regulation," *Geneva Reports on the World Economy 11, Preliminary Conference Draft* (Geneva: International Center for Monetary and Banking Studies).

Carvajal, Ana, Randall Dodd, Michael Moore, Erlend Nier, Ian Tower, and Luisa Zanforlin, 2009, "The Perimeter of Financial Regulation," IMF Staff Position Note No. 09/07 (Washington: International Monetary Fund).

Dudley, William, C., 2009, "Lessons Learned from the Financial Crisis," remarks at the Eighth Annual Bank for International Settlements Conference, Basel, June 26.

European Commission, 2004, *Public Finances in EMU* (Brussels: European Commission).

Financial Services Authority, 2009, *The Turner Review: A Regulatory Response to the Global Banking Crisis* (London: Financial Services Authority).

Financial Stability Board, 2009, "FSF Principles for Sound Compensation Practices" (London, Financial Stability Board, April).

Flannery, Mark J., 2005, "No Pain, No Gain? Effecting Market Discipline via 'Reverse Convertible Debentures'," in *Capital Adequacy beyond Basel: Banking, Securities, and Insurance*, ed. by Hal S. Scott (Oxford, United Kingdom: Oxford University Press).

Froot, Kenneth, and Paul G.J. O'Connell, 2003, "The Risk Tolerance of International Investors," NBER Working Paper No. 10157 (Cambridge, Massachusetts: National Bureau of Economic Research).

Gale, William G., and Peter R. Orszag, 2003, "Economic Effects of Sustained Fiscal Deficits," *National Tax Journal*, Vol. 56, No. 3, pp. 463–85.

Giavazzi, F., T. Jappelli, and M. Pagano, 2000, "Searching for Non-Linear Effects of Fiscal Policy: Evidence from Industrial and Developing Countries," NBER Working Paper No. 7460 (Cambridge, Massachusetts: National Bureau of Economic Research).

Haldane, Andrew, 2009, "Credit Is Trust," speech to the Association of Corporate Treasurers, Leeds, Bank of England, September 14.

Hart, Oliver D., and Luigi Zingales, 2009, "A New Capital Regulation for Large Financial Institutions," CEPR Discussion Paper No. 7298 (London: Centre for Economic Policy Research).

Hauner, David, and Manmohan Kumar, 2006, "Fiscal Policy and Interest Rates: How Sustainable Is the New Economy?" IMF Working Paper No. 06/112 (Washington: International Monetary Fund).

International Accounting Standards Board (IASB), 2008, "Preliminary Views on Amendments to IAS 19 Employee Benefits," IASB Discussion Paper (March).

International Monetary Fund, 2008, *Global Financial Stability Report*, World Economic and Financial Surveys, October (Washington: International Monetary Fund).

_____, 2009a, *Global Financial Stability Report*, World Economic and Financial Surveys (Washington: International Monetary Fund, April).

_____, 2009b, "The State of Public Finances: A Cross-Country Fiscal Monitor," IMF Fiscal Affairs Department (Washington: International Monetary Fund, July).

_____, 2009c, *World Economic Outlook*, World Economic and Financial Surveys (Washington: International Monetary Fund, October).

Kashyap, Anil, Owen Lamont, and Jeremy Stein, 1994, "Credit Conditions and the Cyclical Behavior of Inventories," *The Quarterly Journal of Economics*, Vol. 109, No. 3, pp. 565–92.

Kashyap, Anil, Raghuram Rajan, and Jeremy Stein, 2008, "Rethinking Capital Regulation," paper prepared for the Federal Reserve Bank of Kansas City's symposium on "Maintaining Stability in a Changing Financial System," Jackson Hole, Wyoming, August 21–23.

Kashyap, Anil, and Jeremy Stein, 2000, "What Do a Million Observations on Banks Say about the Transmission of Monetary Policy," *The American Economic Review*, Vol. 90, No. 3, pp. 407–28.

Keefe, Bruyette, and Woods Ltd (KBW), 2009a, "Credit Strains and Stresses: Who Is Left Standing?" *European Bank Equity Research*, March 30.

_____, 2009b, "Overweight…and Sustainably So," European Bank Equity Research, June 8.

Laubach, Thomas, 2009, "New Evidence on the Interest Rate Effects of Budget Deficits and Debt," *Journal of European Economic Association*, Vol. 7, No. 4, pp. 858–85.

Lunn, D.J., A. Thomas, N. Best, and D. Spiegelhalter, 2000, "WinBUGS—A Bayesian Modeling Framework: Concepts, Structure, and Extensibility," *Statistics and Computing*, Vol. 10, No. 4, pp. 325–37.

Modigliani, Franco, and Tullio Jappelli, 1988, "The Determinants of Interest Rates in the Italian Economy," *Review of Economic Conditions in Italy*, No. 1, pp. 9–34.

Mody, Ashoka, 2009, "From Bear Stearns to Anglo Irish: How Eurozone Sovereign Spreads Related to Financial Sector Vulnerability," IMF Working Paper No. 09/108 (Washington: International Monetary Fund).

Oliner, Stephen, and Glenn Rudebusch, 1996, "Monetary Policy and Credit Conditions: Evidence from the Composition of External Finance: Comment," *The American Economic Review*, Vol. 86, No. 1, pp. 300–09.

Organization of Economic Cooperation and Development (OECD), 2001, *G10 Report on Consolidation in the Financial Sector* (Paris: OECD).

Paesani, Paolo, Rolf Strauch, and Manfred Kremer, 2006, "Public Debt and Long-Term Interest Rates: The Case of Germany, Italy and the USA," ECB Working Paper No. 656 (Frankfurt: European Central Bank).

Peek, Joe, and Eric Rosengren, 2000, "Collateral Damage: Effects of the Japanese Bank Crisis on Real Activity in the United States," *The American Economic Review*, Vol. 90, No. 1, pp. 30–45.

Segoviano, Miguel, and Charles Goodhart, 2009, "Banking Stability Measures," IMF Working Paper No. 09/04 (Washington: International Monetary Fund).

Singh, Manmohan, and James Aitken, 2009, "Counterparty Risk, Impact on Collateral Flows and Role for Central Counterparties," IMF Working Paper No. 09/173 (Washington: International Monetary Fund).

Smithers, Andrew, 2009, *Wall Street Revalued–Imperfect Markets and Inept Central Bankers* (New York: John Wiley & Sons).

Thomson, James B., 2009, "On Systemically Important Financial Institutions and Progressive Systemic Mitigation," Federal Reserve Bank of Cleveland Policy Discussion Paper No. 27 (August).

Tucker, Paul, 2009, "Restoring Confidence–Moving Forward," speech to the British Bankers' Association Annual International Banking Conference, London, June 30.