CHAPTER 1

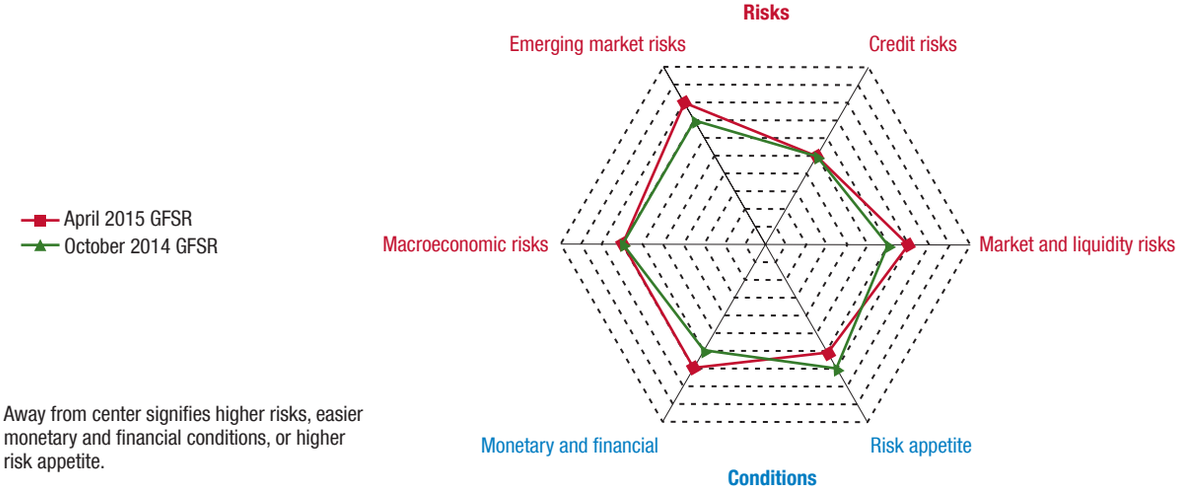
ENHANCING POLICY TRACTION AND REDUCING RISKS

Financial Stability Overview

Developments over the past six months have increased global financial stability risks. Risks have also rotated from advanced economies to emerging markets, from banks to shadow banks, and from solvency to market liquidity risks. The global financial system is being buffeted by a series of changes in financial markets, reflecting diverging growth patterns and monetary policies as global growth prospects have weakened. Disinflationary forces have strengthened as oil and commodity prices have dropped. Although the latter has benefited commodity- and oil-importing countries and increased the room to maneuver for monetary policy in countries with higher inflation, it has increased financial risks in some exporting countries and in the oil sector. As a result of these developments, inflation expectations and long-term bond yields have fallen. Bold monetary policy actions have been taken in both the euro area and Japan to arrest and reverse this disinflation pressure, while the pull of expectations for rising U.S. policy rates and the push of additional monetary stimulus by other major economies have sparked rapid appreciation of the U.S. dollar. Emerging markets are caught in these global cross-currents and face higher financial stability risks, as companies that borrowed heavily on international markets could face balance sheet strains. Additional policy measures are needed to enhance the effectiveness of monetary policies, address crisis legacies, and facilitate sustainable economic risk taking while containing financial excesses across global markets.

Financial stability risks have increased since the October 2014 *Global Financial Stability Report* and are reflected in the Global Financial Stability Map (Figure 1.1) and in its components (Figure 1.2). As discussed in the April 2015 *World Economic Outlook* (WEO), the distribution of risks to global growth is now more balanced, but still tilted to the downside. Weaker inflation and greater uncertainty are weighing on the macroeconomic outlook. But these forces are broadly offset by favorable developments in high-frequency indicators, reflecting the expected benefits of lower oil prices and additional monetary accommodation, leaving *macroeconomic risks* broadly unchanged since October.

Figure 1.1. Global Financial Stability Map: Risks and Conditions



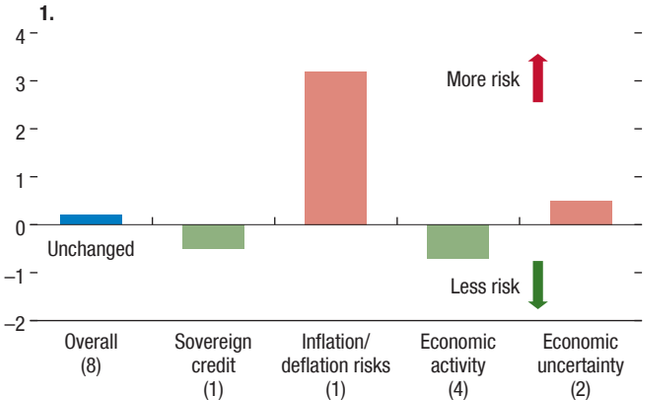
Away from center signifies higher risks, easier monetary and financial conditions, or higher risk appetite.

Source: IMF staff estimates.
Note: GFSR = *Global Financial Stability Report*.

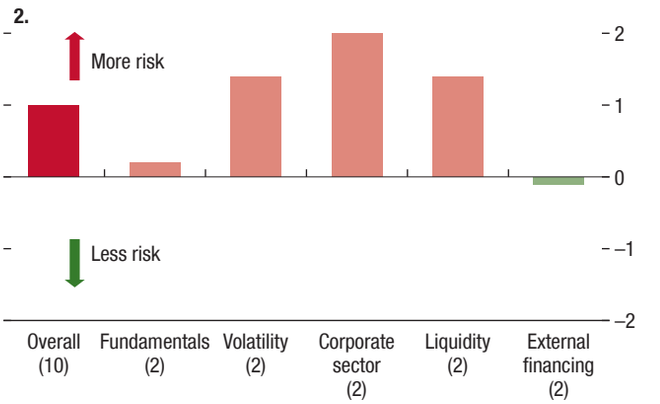
Figure 1.2. Global Financial Stability Map: Components of Risks and Conditions

(Notch changes since the October 2014 Global Financial Stability Report*)*

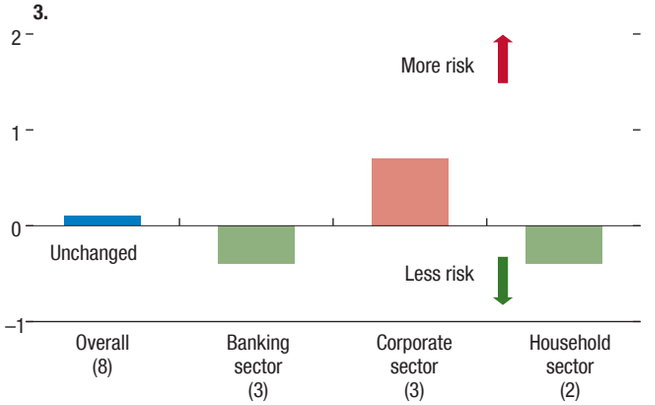
Macroeconomic risks are unchanged, as improved economic activity offsets weaker inflation and greater uncertainty.



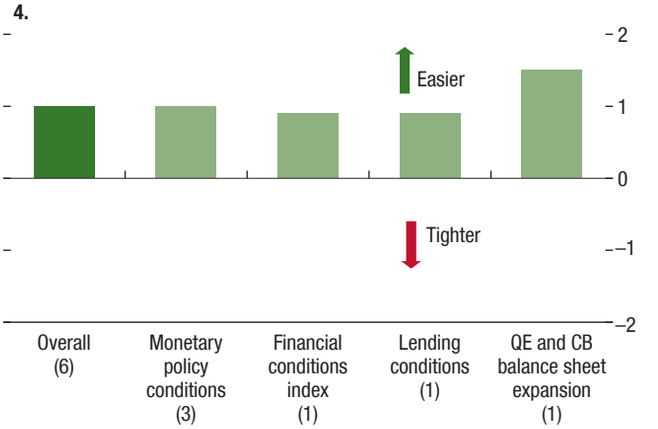
Emerging market risks have increased, driven by elevated volatility and worsening corporate sector and liquidity risks.



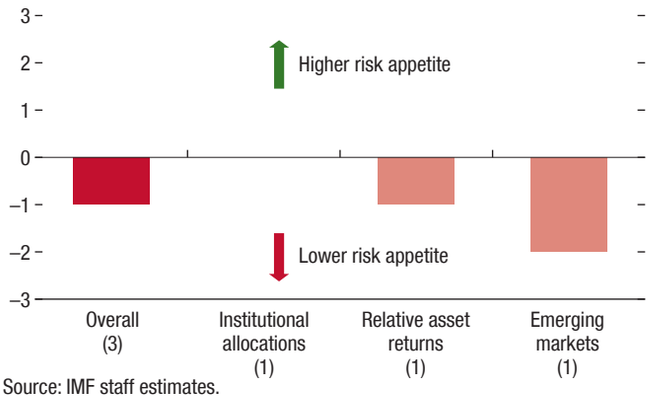
Credit risks are unchanged, as worsening in corporate sector is offset by improvements in banking and household indicators.



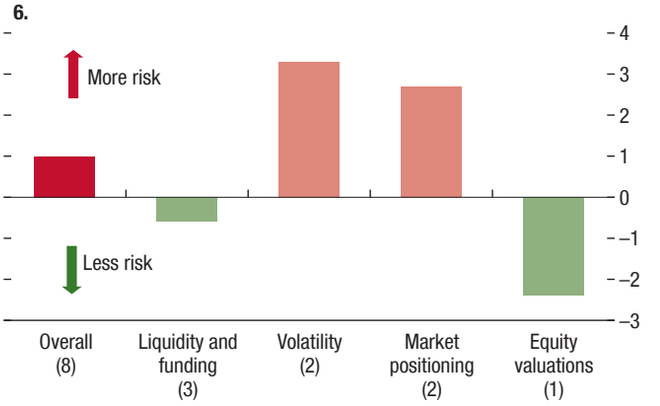
Monetary and financial conditions have been accommodative, with lending conditions easing.



Risk appetite has declined, reflecting lower relative asset returns and rapid outflows from emerging markets.



Market and liquidity risks have increased, reflecting heightened volatility and more stretched positioning indicators.



Source: IMF staff estimates.

Note: Changes in risks and conditions are based on a range of indicators, complemented with IMF staff judgment (see Annex 1.1 in the April 2010 *Global Financial Stability Report* and Dattels and others (2010) for a description of the methodology underlying the Global Financial Stability Map). Overall notch changes are the simple average of notch changes in individual indicators. The number below each legend indicates the number of individual indicators within each subcategory of risks and conditions. For lending conditions, positive values represent slower pace of tightening or faster easing. CB = central bank; QE = quantitative easing.

The U.S. economy is expanding, with rising employment and an improving investment outlook, as economic risk taking has taken hold. U.S. monetary authorities have clearly communicated that a process of monetary normalization could begin this year with an increase in policy rates. The bad news is that lower growth prospects elsewhere, relative to October 2014, and disinflationary forces have continued to exert a strong influence on the global economy. The number of countries with low or negative rates of headline inflation, and their share of global output, increased significantly through 2014 (Figure 1.3, panels 1 and 2). Falling commodity prices, particularly oil prices, amplified this disinflation pressure, and the inflation rate in many advanced economies fell below inflation objectives. More emerging market economies than advanced economies have headline inflation above their inflation goals, although many major Asian economies are at their inflation cycle lows (Figure 1.3, panels 3 and 4).

Central banks have responded to increased downward risks to price stability. Since October, the Bank of Japan (BOJ) and the European Central Bank (ECB) have announced bold new monetary measures designed to ward off deflation pressure and move their economies closer to their inflation objectives (Figure 1.3, panel 5). Other central banks have cut rates or loosened their monetary policy stances, and markets are generally pricing in lower policy rates by the end of 2015 for a number of countries (Figure 1.3, panel 6). The policy easing has offset modestly tighter real interest rates and thus loosened *monetary and financial conditions* overall. This report examines some of the financial channels through which quantitative easing (QE) works—and how to maximize its benefits while mitigating the risks to financial stability.

Emerging market financial stability risks have increased. The easing of inflation pressure is benefiting many emerging market economies, giving them monetary policy space to combat slowing growth. However, recent global shocks—including higher political risks—leave several emerging market economies more vulnerable. Oil and commodity price declines have hurt commodity exporters and sectors faced with overcapacity, while companies that borrowed heavily on international markets face balance sheet strains from revalued foreign currency liabilities. In China, the disinflationary force of property price declines could strain bank and shadow bank balance sheets and spill over more broadly. The section "Emerging Markets: Safeguarding the Financial Sector against Global Headwinds" identifies these vulnerabilities and discusses how best to safeguard emerging markets against these forces. Reflecting the challenges facing emerging markets, *risk appetite* is lower as currency volatility and adjustments have prompted a pullback of capital flows by foreign investors. Lower allocations of global funds to risky assets and lower excess returns also point to slightly lower risk appetite compared to October, although appetite remains above its historical average.

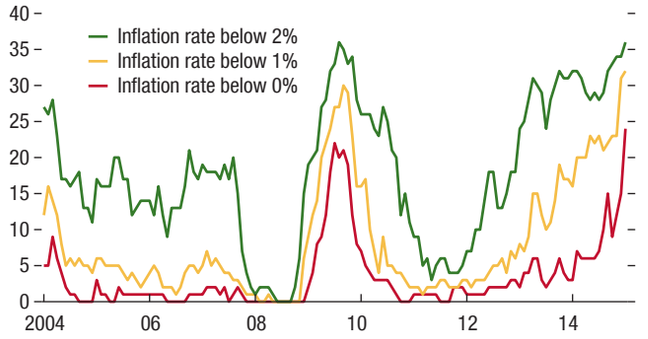
Credit risks are broadly unchanged. Although the macroeconomic benefits of lower energy prices should have a favorable impact on household balance sheets, the immediate credit impact of oil and commodity price declines on firms in the energy sector is negative. Box 1.1 and the section "Disinflationary Risks and Financial Stability" examine the energy segments of the high-yield market and highlight the potential strains and exposures to the banking system. Furthermore, the fall in nominal yields—should it be sustained—raises a serious threat to the life insurance and pension fund sectors, especially in Europe, as discussed in the "Disinflationary Risks and Financial Stability" section.

These developments have created various tensions in global financial markets, raising *market and liquidity risks*. Asynchronous monetary policies have led to a sharp increase in volatility in foreign exchange markets amid a rapid appreciation of the U.S. dollar. Despite the prospect of gradual U.S. policy rate tightening, longer-term U.S. bond yields and term premiums remain compressed as the ECB and BOJ ramp up their asset purchases. Asset valuations remain elevated relative to the past 10 years as monetary policies continue to exert downward pressure on spreads (Figure 1.4, panel 1). Market volatility (Figure 1.2, panel 6) has increased across the asset spectrum, rising from the record lows at the time of the October 2014 *Global Financial Stability Report* (Figure 1.4, panel 2). The section "When Market Liquidity Vanishes" examines the structural features that have contributed to reduced market liquidity and warns that economic and policy tensions leave global markets vulnerable to bouts of illiquidity that could prove systemic.

This report takes a closer look at recent challenges to the global economy and central banks' policy responses to these challenges. The report discusses how to maximize the effectiveness of these accommodative monetary policies while minimizing the financial stability side effects, with a particular focus on QE.

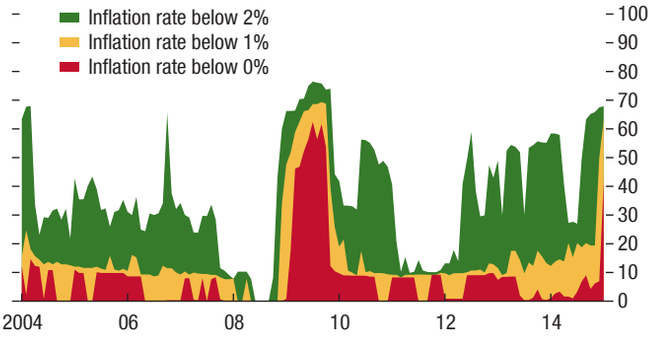
Figure 1.3. Global Disinflationary Forces

1. Number of Countries with Low Inflation Rates



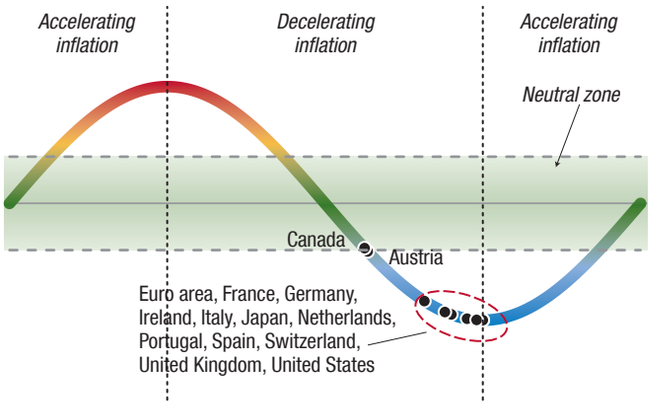
Sources: Bloomberg, L.P.; IMF, World Economic Outlook database; Haver Analytics; and IMF staff calculations.
Note: Annual percent change in consumer prices includes 33 advanced economies and 17 emerging market economies.

2. Share of Countries with Low Inflation Rates (Percent of global GDP)

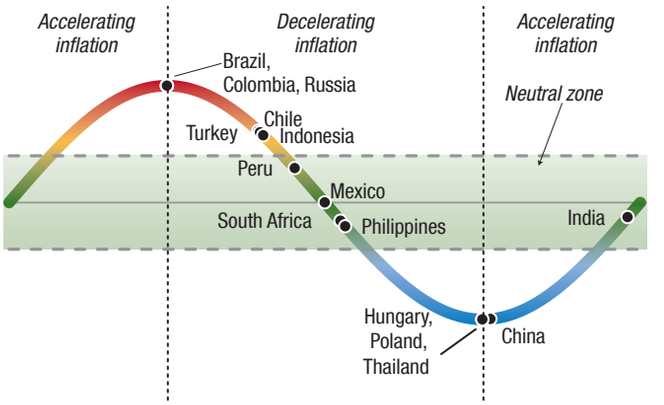


Sources: Bloomberg, L.P.; IMF, World Economic Outlook database; Haver Analytics; and IMF staff calculations.
Note: Annual percent change in consumer prices includes 33 advanced economies and 17 emerging market economies.

3. Advanced Economies Inflation Phase Curve (as of February 2015)

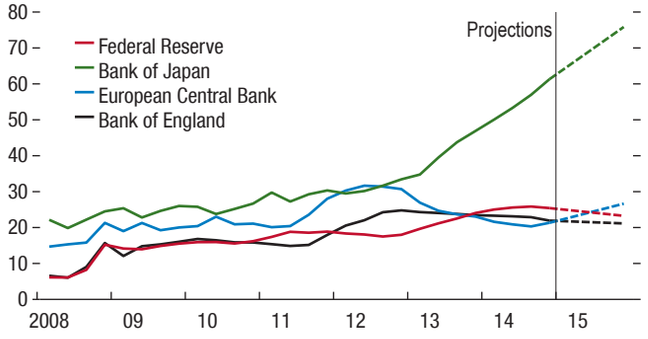


4. Emerging Markets Inflation Phase Curve (as of February 2015)



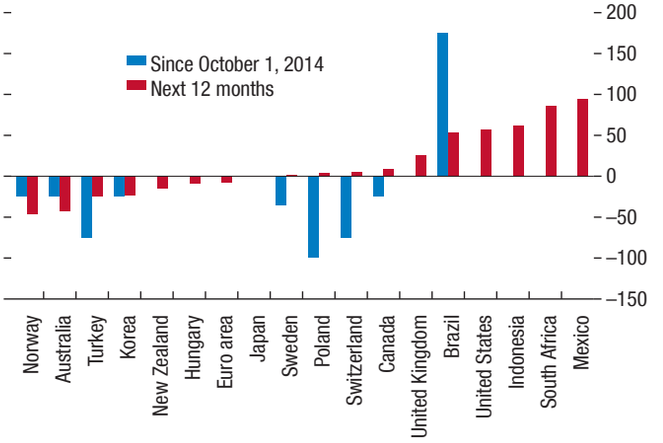
Sources: National authorities; and IMF staff estimates.
Note: In panels 3 and 4, countries are placed on the phase curve according to where their February 2015 year-over-year headline inflation print is relative to (1) central bank inflation target band (where available), (2) three-month trend, and (3) the efficacy of monetary policy (using past two years inflation targeting performance). The inflation measure used for Japan excludes tax effects. Data for Japan are as of January 2015. When inflation is in the inflation band it is placed within the dashed lines, otherwise outside, and the distance from the closest dashed line is determined by criterion 3. For advanced economies, the inflation band is taken to be 1–3 percent.

5. Central Bank Balance Sheets (Percent of GDP)



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

6. Market-Implied Interest Rate Moves (Basis points)



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

Box 1.1. The Oil Price Fallout—Spillovers and Implications for the Financial Sector

The recent steep decline in oil prices reflects to a significant extent supply factors, providing a net benefit to the global economy. Nevertheless, the speed and magnitude of the movement in oil prices raise questions about how stress can be transmitted through the financial sector. This box addresses several channels through which lower oil prices could spawn financial vulnerabilities: a self-reinforcing cycle of rising credit risk and deteriorating refinancing conditions for countries and companies, a decline in oil surplus recycling in world funding markets, and strains on the financial market infrastructure's ability to accommodate prolonged heightened energy price volatility.

Background: As one of the steepest on record (Figure 1.1.1, panel 1), the recent decline in oil prices appears to reflect supply factors, a net benefit to the global economy over the medium term.[1] Nevertheless, the speed and magnitude of the movement in oil prices may produce financial strains in selected areas as markets adjust to a new pricing environment. This box discusses three channels through which such an adjustment could potentially contribute to an increase in market volatility.

Amplification of credit risk: Countries and companies dependent on oil revenues have already been significantly repriced by investors since summer 2014, as reflected in bond spreads, equity prices, and currency movements (Figure 1.1.1, panel 2). Although risk premiums have widened, however, the impact has probably not yet fully hit in several areas. These effects include refinancing risk for energy-producing sovereigns and firms, and the reduction in bank funding lines to energy companies in response to breaches in lending covenants.

Country refinancing risk: Fiscal breakeven prices vary widely across oil-producing countries in emerging markets, from $54 a barrel for Kuwait to as much as $184 a barrel for Libya. Barring spending cuts, new sources of revenue, or tapping fiscal buffers, the loss in oil revenue will require new sources of financing. U.S. dollar–based bond spreads for emerging market oil-exporting countries have already doubled since summer 2014, which suggests that refinancing conditions are now more problematic. Local currency depreciation may also put upward pressure on inflation where domestic inflation expectations are not well anchored, further raising the risk premium on sovereign debt.

Corporate refinancing in the energy sector: Scaled-back energy sector exposure by banks and corporate bond investors could amplify strains associated with falling revenue and higher funding costs. Historically, corporate defaults in the energy sector have tended to pick up in response to falling oil prices, with a lag of about 12 months, (Fitch 2015b) likely reflecting a typical one-year hedging horizon by producers. Since the downdraft in oil prices did not begin to accelerate until September 2014 (at which point Brent and West Texas Intermediate prices were still higher than $100 a barrel), aftershocks for the corporate sector may not yet have fully filtered through.

The outstanding worldwide notional value of bank loans and corporate debt extended to the energy sector amounts to about $3 trillion,[2] $247 billion of which is attributable to the U.S. high-yield bond market alone (Fitch 2015a) (see Figure 1.16 and Table 1.4 for further discussion of energy and the U.S. high-yield sector). Global syndicated loan issuance in the oil and gas sector has risen markedly in recent years, with €450 billion in issuance in 2014 alone, almost double that of the previous cycle peak in 2007 (Figure 1.1.1, panel 3). In addition, the leveraged (that is, high-yield) share of syndicated oil and gas loan issuance has steadily increased, from 17 percent in 2006 to 45 percent in 2014. The majority of global systemically important banks have about 2 to 4 percent of their total loan book exposures devoted to the energy sector.[3] Available data suggest that there are higher exposures by selected banks in emerging markets and among some U.S. regional banks (although firm estimates are difficult to determine). A prolonged period of low oil prices will jeopardize the debt-servicing capacity of exploration and production firms that have high cost bases.[4]

Oil surpluses and global liquidity: Foreign exchange reserves accumulated by net oil-exporting countries have increased $1.1 trillion, or almost fivefold, over the past decade (Figure 1.1.1, panel 4). Accounting for about 15 percent of the cumulative rise in world foreign exchange reserves since 2004, these funds have been an important source

The authors of this box are Bradley Jones, Gabriel Presciuttini, Peter Breuer, Peter Lindner, Tsuyoshi Sasaki, and Fabio Cortes.

[1]See the April 2015 *World Economic Outlook.*

[2]Bank for International Settlements (BIS), Dealogic.

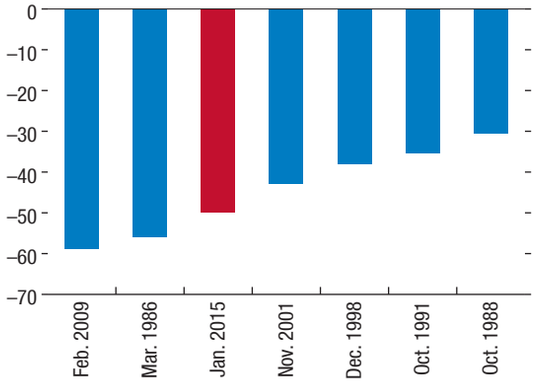
[3]Bernstein Research; Bloomberg, L.P., industry reports; and IMF staff.

[4]Among U.S. energy companies, about $380 billion is owed by firms with a ratio of debt to earnings before interest, taxes, depreciation, and amortization (EBITDA) that is negative or with a debt-to-EBITDA ratio in excess of 5, amounting to 33 percent of debt.

Box 1.1. *(continued)*

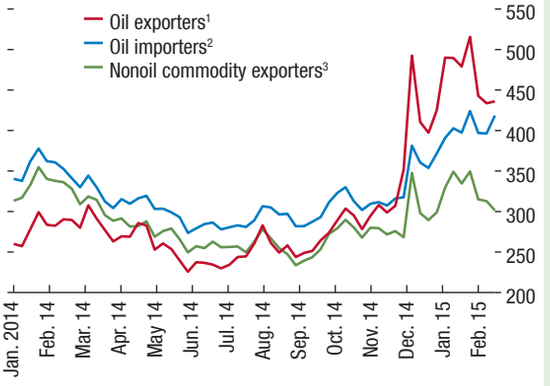
Figure 1.1.1. Developments in Oil Markets

1. Largest Annual Oil Price Declines (Percent)



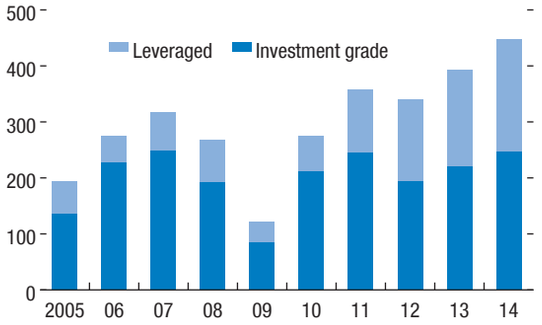
Sources: Haver Analytics; and IMF staff calculations.
Note: Based on monthly West Texas Intermediate oil price. End of rolling 12-month period on horizontal axis. Figure depicts episodes where the rolling 12-month fall in oil prices exceeded 30 percent, broadly equivalent to a one standard deviation event.

2. Emerging Markets Bond Index Global Spreads (Basis points over Treasuries)



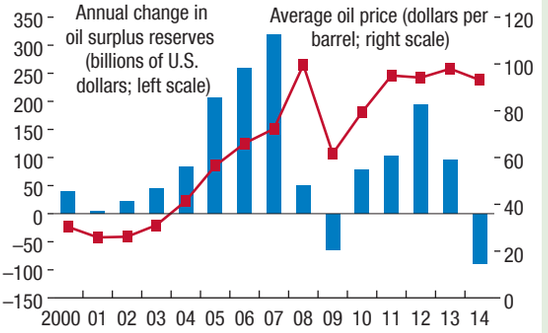
Sources: Bloomberg, L.P.; and IMF staff calculations.
[1]Colombia, Gabon, Kazakhstan, Nigeria, and Russia.
[2]Argentina, Bosnia, Brazil, Bulgaria, Chile, China, Costa Rica, Côte d'Ivoire, Croatia, the Dominican Republic, Egypt, El Salvador, Ghana, Guatemala, Hungary, Indonesia, Jamaica, Lebanon, Malaysia, Mexico, Pakistan, Panama, Peru, the Philippines, Poland, Romania, South Africa, Sri Lanka, Turkey, Ukraine, Uruguay, and Vietnam.
[3]Chile, Côte d'Ivoire, South Africa, Uruguay, and Zambia.

3. Global Syndicated Loan Issuance from the Oil and Gas Sector (Billions of euros)



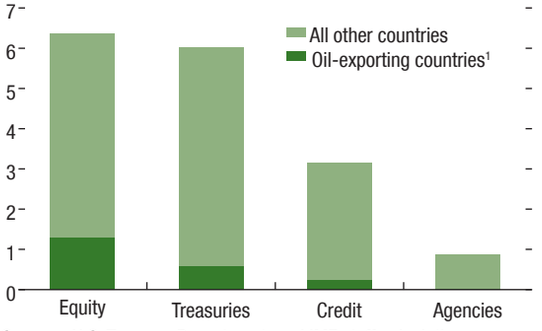
Sources: Dealogic; and IMF staff calculations.

4. Oil Surplus Reserve Growth and Oil



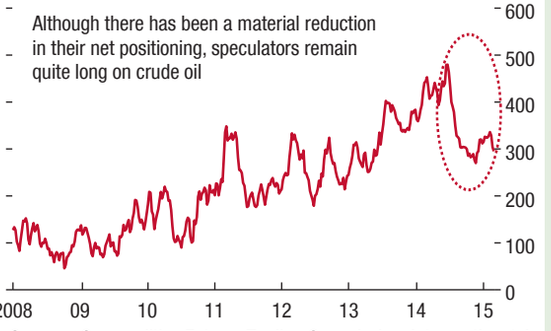
Sources: Bloomberg, L.P.; Haver Analytics; and IMF staff calculations.
Note: Oil exporter reserves include Bahrain, Canada, Colombia, Ecuador, Gabon, Kazakhstan, Kuwait, Nigeria, Norway, Qatar, Russia, Saudi Arabia, Trinidad and Tobago, United Arab Emirates, and Venezuela. Oil prices are based on the average monthly West Texas Intermediate oil price through the calendar year.

5. Foreign Holdings of U.S. Asset Classes (Trillions of U.S. dollars)



Sources: U.S. Treasury Department; and IMF staff calculations.
[1]Includes data for Algeria, Bahrain, Canada, Colombia, Ecuador, Gabon, Iran, Iraq, Kazakhstan, Kuwait, Libya, Nigeria, Norway, Oman, Qatar, Russia, Saudi Arabia, Trinidad and Tobago, United Arab Emirates, and Venezuela.

6. Net Positioning of Speculators in West Texas Intermediate Oil Futures and Options (Thousands of contracts)



Sources: Commodities Futures Trading Commission; Intercontinental Exchange; and IMF staff calculations.

Box 1.1. *(continued)*

of funding for the global banking sector and capital markets more broadly. Deposits from oil-exporting countries in Bank for International Settlements–reporting banks have doubled to $972 billion since 2004, and this group of countries (private and public sector) now holds more than $2 trillion in U.S. assets (Figure 1.1.1, panel 5), spread across equities ($1.3 trillion), Treasuries ($580 billion), credit ($230 billion), and agency debt ($21 billion).[5] Following the $88 billion contraction in oil-exporter reserves in 2014, sensitivity analyses point to further significant declines in 2015 if oil prices follow the path implied by futures markets. In principle, the decline in investable oil surpluses is part of global rebalancing and ought to be counterbalanced—at least to some extent—by wealth gains on the part of oil importers. But such redistribution between agents with potentially varying savings and portfolio preferences may also have market repercussions, particularly if the pace of adjustment creates market dislocations.

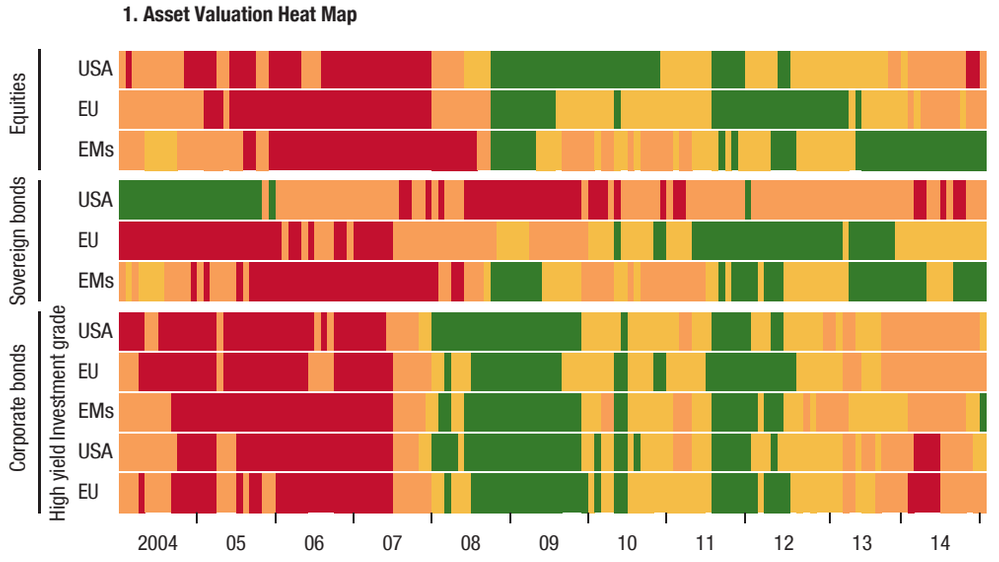
Strains on financial infrastructure: Oil and other commodity markets have attracted much greater focus from the institutional investment community over the past decade. For example, noncommercial (that is, speculative) investors held about 45 percent of West Texas Intermediate futures contracts in 2014, about triple the level held during the 1990s. Banks have also retreated from their market-making and structuring roles in energy markets, with a shift in trading activity to centrally cleared contracts (as desired by regulators) and physical commodity trading houses. With such major changes in market structure, questions have been raised as to whether an additional wave of selling pressure might destabilize markets. There has already been substantial selling—net investment exposure is nearly what it was at its peak in early 2014 (Figure 1.1.1, panel 6), and mutual fund data suggest that U.S. high-yield bond funds are already underweight in energy compared with the benchmark. Assets under management in commodity funds, combined with commodity-linked exchange-traded products, are nearly half their 2010 peak. Implied volatility (a measure of insurance value) has increased, but only to levels recorded in 2011–12 and well shy of levels reached in 2008. On balance, few indicators point to severe dislocations in oil markets. Commodity exchanges have a long history of managing counterparty risk during heightened volatility (through changes in margining requirements and circuit breakers). Nevertheless, financial intermediaries should remain on the alert for threats to efficient market functioning.

[5]We concentrate here on assets held in U.S. dollars given this is the currency in which oil revenues are denominated.

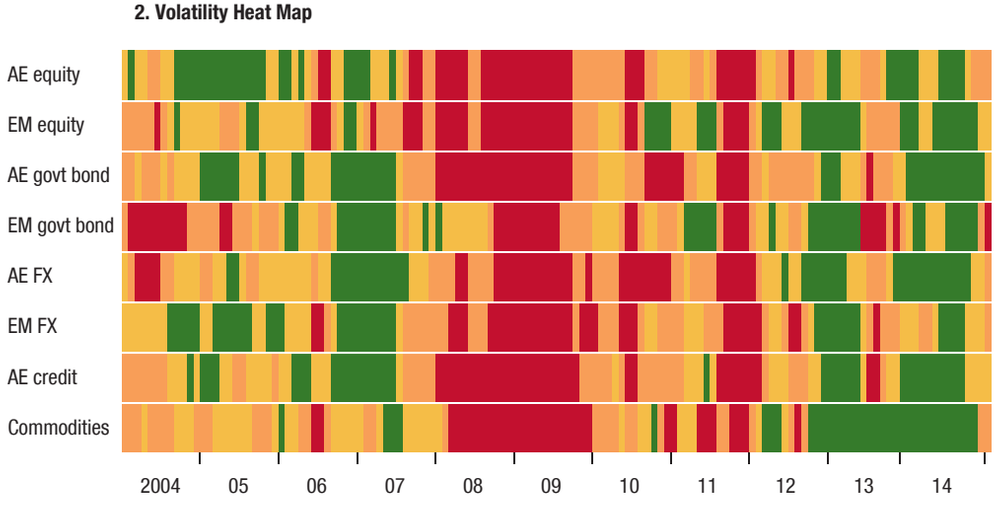
In principle, QE can durably boost inflation and growth through several key transmission channels (Figure 1.5). First, the QE program itself—and an associated commitment to a significant expansion of the central bank's balance sheet—should help raise *expectations* of higher inflation and build confidence in the economy. Second, central bank purchases of government bonds will *lower risk-free interest rates* in the economy, which has a direct impact on real interest rates and triggers various transmission channels to real activity (see also Draghi 2015 and Box 1 in ECB 2015).1 Among these transmission channels, investors selling government bonds will seek to *rebalance portfolios* toward other higher-yield assets; higher asset prices and lower risk-free rates will drive down borrowing costs in capital markets. This should, in turn, help rekindle *bank lending* as banks pass on lower funding costs by reducing interest rates on their loans. These channels, in combination, will also lead to a depreciation of the exchange rate, particularly if there is a strong rebalancing toward foreign assets, lifting inflation and boosting competitiveness. QE should then lead to greater economic risk taking, with firms investing more and households increasing their consumption. This should also help improve the financial position of households and firms as a stronger economy and increased asset values help improve balance sheet health.

QE is appropriate for addressing disinflationary pressures in the euro area and Japan, and some of the key transmission channels are already working. Financial markets have responded swiftly and positively, appreciably lowering sovereign and private borrowing costs and weakening currencies. This has helped to significantly reduce fragmentation and lift demand for loans in the euro area. Inflation expectations have improved, and strong gains in equity markets underscore further progress through portfolio rebalancing channels, laying the basis for positive wealth effects.

Figure 1.4. Asset Valuation and Volatility Heat Maps



Source: IMF staff calculations.
Note: Red, orange, yellow, and green = the four quartiles of the price (spread) distribution of equity valuations (bond spreads), with red denoting the top (bottom) quartile of the distribution over July 2004–February 2015. EM = emerging market; EU = European Union; USA = United States.

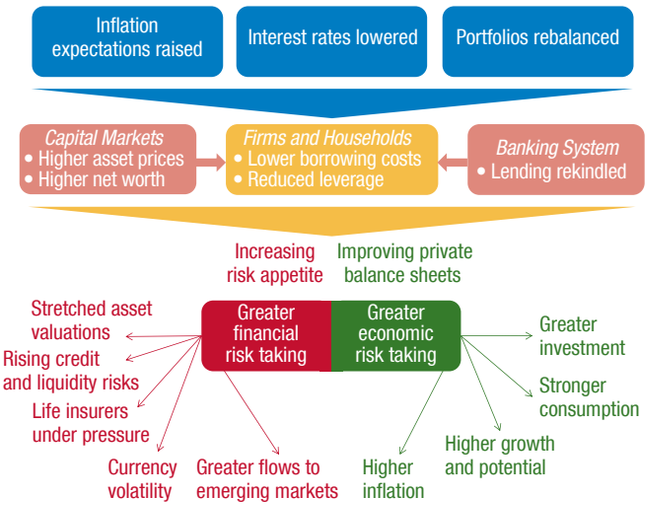


Sources: Bloomberg, L.P.; and IMF staff calculations.
Note: Red, orange, yellow, and green = the four quartiles of the volatility distribution, with red denoting the top quartile of the distribution over 2004–15. Based on percentiles of three-month realized asset volatility. AE = advanced economy; EM = emerging market; FX = foreign exchange; govt = government.

However, to maximize the benefits of QE in boosting real activity through higher credit growth, additional measures are needed to restore balance sheet health in the private sector, particularly policies aimed at comprehensively tackling the burden of nonperforming assets in the euro area.

Moreover, steps should be taken to mitigate some of the challenges that arise with QE. By design, QE encourages greater financial risk taking, yet monitoring and eventually addressing any ensuing financial excesses and other undesirable financial side effects is necessary. Although a *wealth effect* is a benefit of

Figure 1.5. Quantitative Easing Impact Channels



Source: IMF staff.

increased asset prices, there is also a risk of stretched asset prices. Lower interest rates also place strains on the profitability of financial institutions that derive interest income by exploiting the slope of the yield curve. Life insurers with guaranteed payouts on their liabilities are at particular risk in a low-interest-rate environment. Low interest rates may also lead to a search for yield by investors, prompting them to take on greater credit and liquidity risks to generate more income. A sharp depreciation of the domestic exchange rate from significant portfolio rebalancing into foreign assets could increase volatility in currency markets.

This report examines the risk landscape as the BOJ and ECB augment their expanded asset purchase programs while the Federal Reserve is expected to start gradually raising policy rates. A key message of this report is that additional policy measures are required to enhance the effectiveness of accommodative central bank policies. These measures are needed to facilitate sustainable economic risk taking, contain the resulting financial excesses, address crisis legacies, and engineer a successful exit from the global financial crisis.

Macroeconomic Versus Balance Sheet Deleveraging: What Is in the Mix?

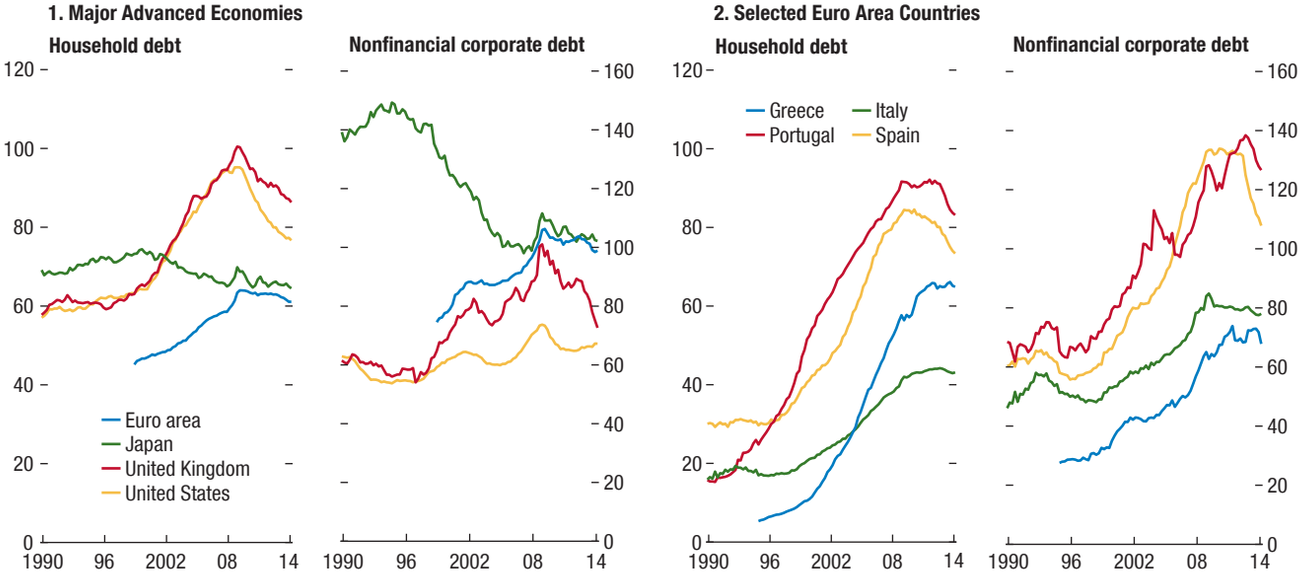
Accommodative monetary policies in advanced economies have helped reduce private nonfinancial debt ratios by supporting inflation and growth and increasing asset prices. Balance sheet deleveraging through debt repayment and write-offs has reduced debt levels in a number of euro area countries, while macroeconomic deleveraging through growth and inflation has played a larger role in the United Kingdom and the United States. But private sector leverage remains elevated in many economies. Looking forward, expected growth and inflation under existing monetary policies will likely be insufficient to reduce debt levels significantly. A more complete set of policy actions is required to complement accommodative monetary policies and address the debt overhang in the private sector.

In the years leading up to the global financial crisis, the private sector in many advanced economies, including in the euro area, the United Kingdom, and the United States, increased leverage on the strength of rising growth expectations and favorable financial conditions (Figure 1.6). The crisis exposed the fragility of this credit-driven growth model and the risks to growth associated with high debt. In particular, high private debt levels raise the sensitivity of borrowers to adverse shocks, reduce profitability, and put upward pressure on nonperforming loans and corporate bankruptcies, increasing risks to bank asset quality and broader financial stability.[1] Furthermore, when highly indebted private agents are unable to benefit from lower funding rates to increase their borrowing, high debt also undermines monetary policy transmission mechanisms. This hampers private balance sheet cleanup and economic recovery, as is discussed in the section "Disinflationary Risk and Financial Stability." In countries where private balance sheets remain overextended, debt reduction necessary to reduce financial stability risks, but debt reduction must be handled in a way that is consistent with the recovery. The pace and composition of deleveraging have important macroeconomic implications.

Major advanced economies have made mixed progress in deleveraging private nonfinancial sector balance sheets. Households—especially in the United Kingdom and the United States—have sharply reduced their gross debt as a share of GDP, but gross household debt is still high in many countries. Although lever-

[1]High debt can impede growth, which in turn can undermine financial stability. Studies have shown that high debt is generally associated with low medium-term growth, although at different debt thresholds (see references in Chen and others 2015). Other studies have shown that high private sector leverage has been detrimental to postcrisis economic performance (see Bornhorst and Ruiz Arranz 2013; ECB 2012).

Figure 1.6. Private Nonfinancial Sector Gross Debt
(Percent of GDP)



Sources: Bank for International Settlements; and IMF staff estimates.

Sources: Bank for International Settlements; and IMF staff estimates.

age among nonfinancial firms is down from its peak in many advanced economies, the corporate sector in some euro area countries is still highly leveraged, in part because resolution of impaired assets has progressed slowly. In the United States, where corporate leverage is relatively low, companies have stepped up borrowing in recent years amid favorable financing conditions and increased financial risk taking.

What factors have contributed to deleveraging?

Reductions in gross debt ratios can come from two sources: macroeconomic deleveraging (through growth and inflation) and balance sheet deleveraging (through debt repayment and write-offs). Countries that have been able to generate higher growth and inflation have been able to minimize the need for balance sheet deleveraging and the associated credit contraction (Figure 1.7). But the deleveraging process has varied substantially across countries.

Write-offs can play an important role in tackling high debt burdens where efficient debt resolution mechanisms are in place. In particular, the cleanup of impaired assets on balance sheets can contribute to private sector deleveraging as long as countries have efficient mechanisms for debt restructuring (Figure 1.8). These mechanisms may allow countries to limit the macroeconomic costs of debt restructuring and restart credit flows more rapidly. A key lesson from the crisis is that addressing weak balance sheets early on can improve the financial and economic responses to unconventional monetary policies.

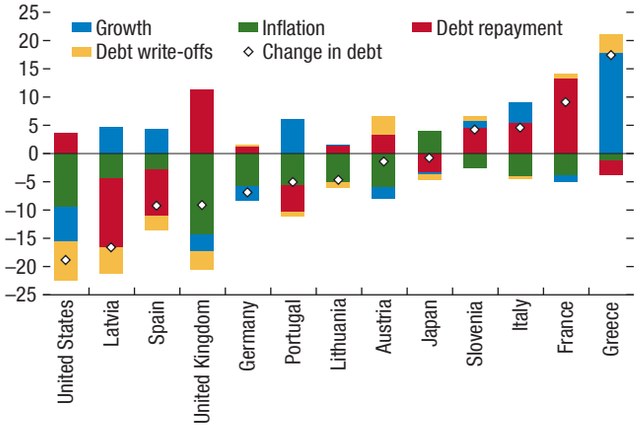
Asset price appreciation due to accommodative monetary policies (conventional and unconventional) can also contribute to deleveraging. The appreciation of household and corporate financial assets can help reduce the net financial debt of the private sector, even if gross debt remains unchanged. This is an important channel for policy, especially for countries in which central bank asset purchases have helped to lower the risk-free rate. Asset-side deleveraging has not operated much in the euro area so far, but it has played an important role in Japan, the United Kingdom, and the United States. Since 2007, the net financial debt of households and firms in these economies has declined by about 10 percentage points of GDP or more solely as a result of asset price gains (Tables 1.1 and 1.2, asset revaluation columns). In contrast, euro area countries such as France, Greece, Portugal, and Spain have not benefited as much from this channel so far.

How much more deleveraging could be achieved through unconventional monetary policies?

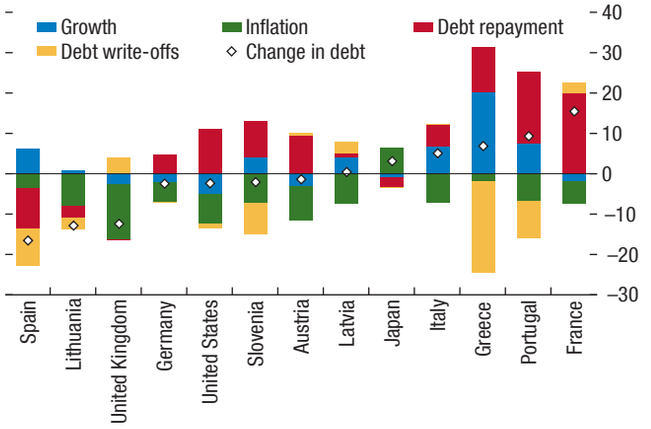
Macroeconomic deleveraging through 2020 could reduce corporate and household indebtedness, but in a number of economies it would not be sufficient to eliminate high debt loads. Although it is difficult to

Figure 1.7. Episodes of Private Sector Deleveraging in Selected Advanced Economies

1. Household Gross Debt: Contributions of Macroeconomic Factors and Balance Sheet Deleveraging since 2007 (Percent of GDP)

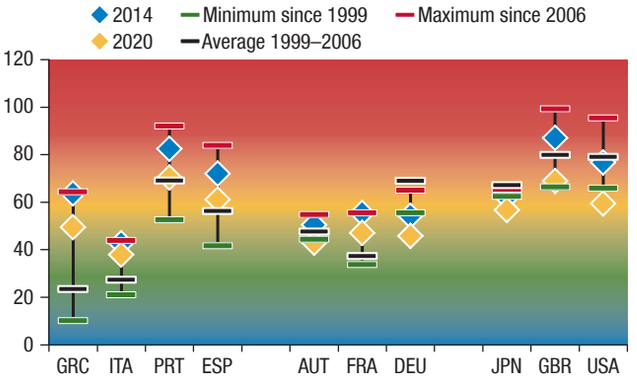


2. Nonfinancial Corporate Gross Debt: Contributions of Macroeconomic Factors and Balance Sheet Deleveraging since 2007 (Percent of GDP)



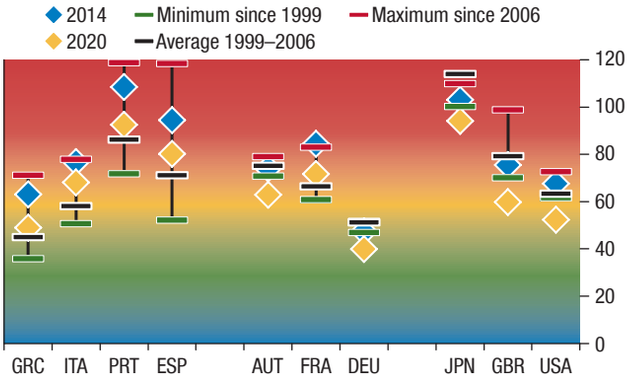
Sources: Bank of Japan; Eurostat; Federal Reserve; and IMF staff estimates.
Note: Debt write-offs reflect "other" changes in debt unexplained by flows and may also capture revaluation of marketable debt.

3. Household Gross Debt: Range and Projection of Debt Levels (Percent of GDP)



Sources: Bank of Japan; Eurostat; Federal Reserve; and IMF staff estimates.
Note: Expected deleveraging estimates are based on latest *World Economic Outlook* projections of growth and inflation. See Table 1.1 for further details.
AUT = Austria; DEU = Germany; ESP = Spain; FRA = France; GBR = United Kingdom; GRC = Greece; ITA = Italy; JPN = Japan; PRT = Portugal; USA = United States.

4. Nonfinancial Corporate Gross Debt: Range and Projection of Debt Levels (Percent of GDP)

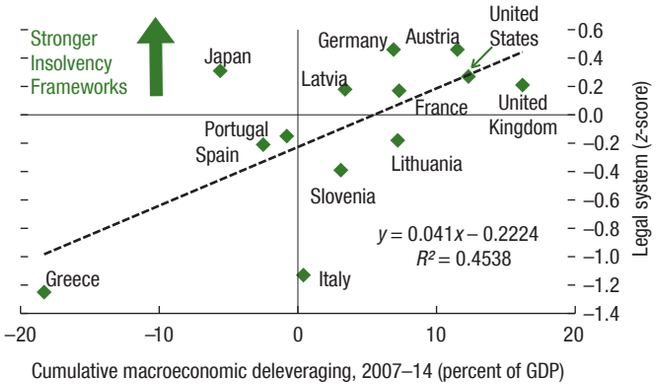


Sources: Bank of Japan; Eurostat; Federal Reserve; and IMF staff estimates.
Note: Expected deleveraging estimates are based on latest *World Economic Outlook* projections of growth and inflation. See Table 1.2 for further details.
AUT = Austria; DEU = Germany; ESP = Spain; FRA = France; GBR = United Kingdom; GRC = Greece; ITA = Italy; JPN = Japan; PRT = Portugal; USA = United States.

define a threshold for a safe level of debt, a number of major advanced economies whose debt increased sharply are still likely to have debt above their precrisis average.[2] For example, gross corporate debt in France, Italy, Portugal, and Spain would remain above or near 70 percent of GDP by 2020 under current *World Economic Outlook* projections for growth and inflation, higher than their precrisis averages and higher than those of other major advanced economies (Table 1.2; Figure 1.7, panel 4). Similarly, under current *World Economic Outlook* projections for growth and inflation, by 2020, gross household debt in Portugal and the

[2]High debt is generally associated with low medium-term growth (see Cecchetti, Mohanty, and Zampolli 2011; Kumar and Woo 2010; Baum, Checherita, and Rother 2013; Reinhart and Rogoff 2010), albeit at different thresholds (Chen and others 2015).

Figure 1.8. Insolvency Frameworks and Macroeconomic Deleveraging



Sources: National statistics offices; World Bank, Doing Business Survey (2014); IMF, Financial Soundness Indicators; and IMF staff estimates.
Note: The legal system indicator is an average of *z*-scores from seven different indicators of legal system strength from the Doing Business Survey, relating to resolving insolvency, enforcing contracts, and the strength of legal rights.

United Kingdom would remain relatively high compared with that of other major advanced economies (Table 1.1; Figure 1.7, panel 3).[3]

Policies to facilitate further private sector deleveraging

High private sector debt levels can continue to pose obstacles to growth and financial stability. Contributions may be needed from all three deleveraging sources: macro deleveraging (growth and inflation), balance sheet deleveraging (debt repayment and restructuring), and asset revaluation (for net indebtedness). A complete set of policies is necessary to return debt to safer levels:

- First, accommodative monetary policies (including QE) should help support private sector deleveraging, including by boosting asset prices and generating wealth effects. But these will likely not be sufficient if potential growth remains low. In such cases, countries need to enhance their longer-term growth potential through a comprehensive program of structural reforms.
- Second, debt restructuring and write-offs can improve the financial and economic response to unconventional monetary policies by unclogging the monetary transmission mechanism.
- Third, minimizing the negative impact of debt restructuring on the economy requires efficient legal and institutional mechanisms for the prompt cleanup of impaired assets.
- Finally, countries with high public debt must improve their fiscal frameworks, as highlighted in the April 2015 *Fiscal Monitor*. High debt and deleveraging in all three sectors (public, corporate, household) has been shown to be especially deleterious to growth (see Bornhorst and Ruiz Arranz 2013). Fiscal frameworks with better guidance on the medium-term objectives can provide more flexibility on the conduct of fiscal policy over the economic cycle.

[3]The projections for growth and inflation are based on the latest WEO forecasts and assume no new debt and no debt write-offs.

Disinflationary Risks and Financial Stability

Quantitative Easing in the Euro Area and Japan: What Are the Channels and Risks?

While the U.S. Federal Reserve is expected to start gradually raising policy rates, the euro area and Japan have recently embarked on further asset purchases (QE) to significantly strengthen their responses to persistent disinflationary pressures. Some key transmission channels of QE are already beginning to work. Financial markets have responded swiftly and positively, appreciably lowering sovereign and private borrowing costs and weakening currencies. To maximize the impact of QE, it is necessary to complement central bank actions with measures to restore balance sheet health in the private sector, including through expeditious debt write-downs and restructuring, enhance the soundness of nonbank institutional investors, and promote structural reforms. Failure to support current monetary policies will leave the economy vulnerable and risks tipping it into a downside scenario of increased deflation pressure, a still-indebted private sector, and stretched bank balance sheets. Finally, QE—by design—entails a continued low-interest-rate environment. While this should help the macro economy, it will pose severe challenges to institutional investors, particularly weak European life insurers, further weighing on their ability to rerisk their balance sheets in support of QE.

Central banks have embarked on further monetary easing in the euro area and Japan

In October 2014, amid weak demand and continuing downward price pressures, the BOJ introduced

Table 1.1. Household Debt in the Euro Area, Japan, the United Kingdom, and the United States
(Percent of GDP)

	Gross Debt		Net Financial Debt			Contributing Factors						Expected Deleveraging from Growth and Inflation by 2020	Gross Debt	
	2007	2014	2007	2014	Change from 2007 (percentage points)	Growth	Inflation	Net Debt Issuance	Debt Write-Offs	Asset Accumulation	Asset Revaluation		2020 (with growth and inflation only)	Precrisis average (1999–2006)
Euro area														
Austria	51.9	50.5	–81.6	–83.4	–1.8	–2.1	–5.9	3.3	3.3	3.9	–4.2	7.6	43.0	47.7
France	46.5	55.6	–76.3	–71.9	4.4	–1.2	–3.8	13.2	0.9	–3.0	–1.7	8.4	47.1	37.4
Germany	61.2	54.4	–55.4	–56.7	–1.3	–2.7	–5.6	1.2	0.2	0.7	4.9	8.5	45.9	69.1
Greece	46.0	63.8	–89.3	–60.7	28.6	17.9	–0.9	–2.6	3.4	–44.2	55.1	14.2	49.5	23.5
Italy	38.2	42.8	–149.4	–151.4	–2.0	3.8	–4.0	5.3	–0.5	–9.6	2.9	4.8	38.0	27.4
Latvia	43.6	26.9	–4.0	–34.7	–30.6	4.6	–4.5	–12.1	–4.7	–20.4	6.5	7.5	19.5	29.4
Lithuania	26.5	22.0	–25.2	–39.4	–14.2	0.1	–4.8	1.4	–1.2	2.3	–11.9	6.2	15.8	14.4
Portugal	86.9	82.6	–53.7	–68.3	–14.6	7.0	–5.5	–4.9	–0.9	–15.6	5.2	12.2	70.4	69.2
Slovenia	24.5	28.6	–62.1	–58.3	3.9	1.2	–2.6	4.5	1.0	–24.7	24.5	4.6	24.1	17.6
Spain	81.1	72.0	–61.6	–77.5	–15.9	4.3	–2.5	–8.3	–2.7	–12.1	5.3	10.9	61.2	56.4
Japan	63.1	62.2	–143.3	–174.1	–30.8	–0.4	3.7	–3.2	–1.0	–28.7	–1.2	5.4	56.8	67.2
United Kingdom	96.2	87.1	–23.8	–34.9	–11.1	–2.9	–14.3	11.3	–3.2	18.5	–20.5	18.1	69.0	80.0
United States	95.5	76.9	–84.5	–118.2	–33.7	–6.1	–9.3	3.7	–7.0	13.0	–28.0	17.3	59.5	79.2

Sources: Bank of Japan flow of funds; Eurostat financial accounts and consolidated debt statistics; Federal Reserve flow of funds; and IMF staff estimates.

Note: Figures for 2014 are preliminary and as of 2014:Q3. Gross debt includes securities and loans. Net financial debt is defined as gross debt minus financial assets in the forms of cash and deposits, debt security holdings, and equity and mutual fund shares. For euro area countries, debt figures are on a consolidated basis as of end-2013 (that is, netting out intrasectoral borrowing). Growth contribution is derived as $-g/(1+g+\pi+g\pi)$ times previous period debt ratio; inflation contribution is derived as $-\pi/(1+\pi)$ times previous period debt ratio in which π = growth rate of GDP deflator and g = real GDP growth rate. Net debt issuance and debt write-off contributions come from flow of funds. Debt write-offs reflect "other" changes in debt unexplained by flows and may also capture revaluation of marketable debt. Asset accumulation indicates changes in asset-to-GDP ratios, excluding asset revaluation effects, which come from flow of funds. Expected deleveraging estimates are based on latest *World Economic Outlook* projections of growth and inflation. For Latvia and Lithuania, the precrisis averages are from 2004 to 2006; for Slovenia the precrisis average is from 2001 to 2006. Color coding is based on the percentile, with factors reducing (increasing) debt shown in green (orange).

Table 1.2. Corporate Debt in the Euro Area, Japan, the United Kingdom, and the United States

(Percent of GDP)

	Gross Debt		Net Financial Debt			Contributing Factors						Expected Deleveraging from Growth and Inflation by 2020	Gross Debt	
	2007	2014	2007	2014	Change from 2007 (percentage points)	Growth	Inflation	Net Debt Issuance	Debt Write-Offs	Asset Accumulation	Asset Revaluation		2020 (with growth and inflation only)	Precrisis average (1999–2006)
Euro area														
Austria	75.3	73.9	21.5	7.4	–14.1	–2.9	–8.6	9.4	0.8	–7.4	–5.3	11.1	62.9	75.1
France	69.1	84.4	–10.0	–3.7	6.4	–1.8	–5.6	20.0	2.7	–10.2	1.3	12.8	71.6	66.4
Germany	49.7	47.3	–20.5	–30.6	–10.1	–2.2	–4.7	4.7	–0.3	4.5	–12.1	7.4	39.9	51.2
Greece	55.9	63.0	23.3	22.5	–0.8	20.3	–1.6	11.2	–22.7	2.0	–10.0	14.1	49.0	44.9
Italy	71.5	76.7	23.2	26.0	2.7	7.0	–7.2	5.3	0.1	–7.7	5.2	8.6	68.1	58.1
Latvia	59.6	59.8	41.4	39.3	–2.1	4.2	–7.9	0.9	2.9	–5.5	3.3	16.6	43.2	53.1
Lithuania	48.1	35.5	30.4	–1.2	–31.6	0.8	–7.9	–2.9	–2.7	–4.9	–14.0	10.0	25.5	36.5
Portugal	98.2	108.5	62.7	66.0	3.3	8.7	–6.8	17.7	–9.3	–5.3	–1.7	16.0	92.5	86.2
Slovenia	71.8	69.4	46.1	50.1	4.0	4.0	–7.4	8.9	–7.8	–1.5	7.9	11.1	58.4	51.8
Spain	110.7	94.4	43.5	19.3	–24.1	6.2	–3.4	–10.0	–9.1	–7.7	–0.1	14.2	80.2	71.1
Japan	100.2	103.0	3.2	–22.9	–26.0	–0.6	6.1	–2.6	–0.1	–20.6	–8.2	9.0	94.1	113.9
United Kingdom	87.8	75.4	6.7	3.6	–3.1	–2.5	–13.7	–0.2	4.0	–1.7	10.9	15.7	59.7	79.2
United States	69.8	67.5	58.7	56.9	–1.8	–4.9	–7.2	11.1	–1.3	0.6	–0.1	15.2	52.3	63.3

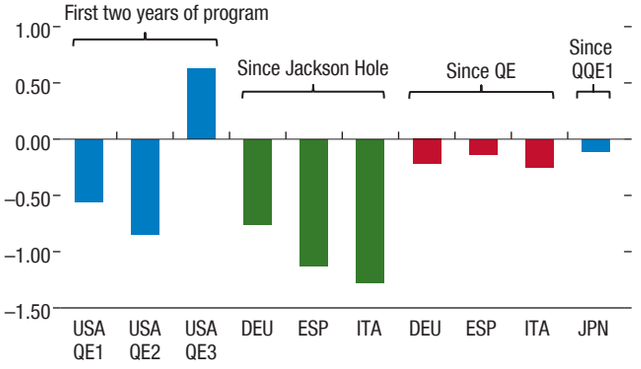
Sources: Bank of Japan flow of funds; Eurostat financial accounts and consolidated debt statistics; Federal Reserve flow of funds; and IMF staff estimates.

Note: Figures for 2014 are preliminary and as of 2014:Q3. Gross debt includes securities and loans. Net financial debt is defined as gross debt minus financial assets in the forms of cash and deposits, debt security holdings, and equity and mutual fund shares. For euro area countries, debt figures are on a consolidated basis as of end-2013 (that is, netting out intrasectoral borrowing). Growth contribution is derived as $-g/(1+g+\pi+g\pi)$ times previous period debt ratio; inflation contribution is derived as $-\pi/(1+\pi)$ times previous period debt ratio in which π = growth rate of GDP deflator and g = real GDP growth rate. Net debt issuance and debt write-off contributions come from flow of funds. Debt write-offs reflect "other" changes in debt unexplained by flows and may also capture revaluation of marketable debt. Asset accumulation indicates changes in asset-to-GDP ratios, excluding asset revaluation effects, which come from flow of funds. Expected deleveraging estimates are based on latest *World Economic Outlook* projections of growth and inflation. For Latvia and Lithuania, the precrisis averages are from 2004 to 2006; for Slovenia the precrisis average is from 2001 to 2006. Color coding is based on the percentile, with factors reducing (increasing) debt shown in green (orange).

Figure 1.9. Quantitative Easing and Financial Markets

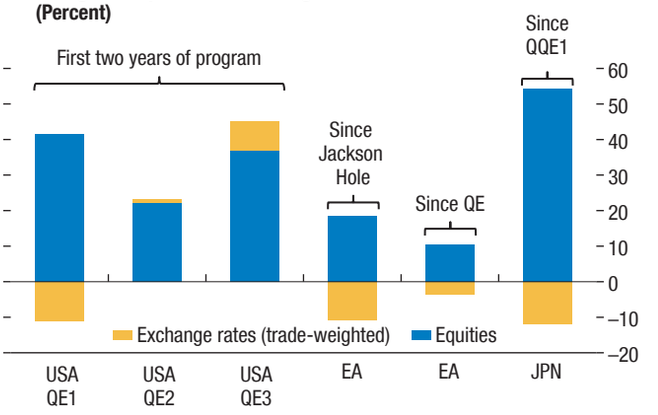
QE began working well before it was announced...

1. Changes in 10-Year Sovereign Yields (Percentage points)



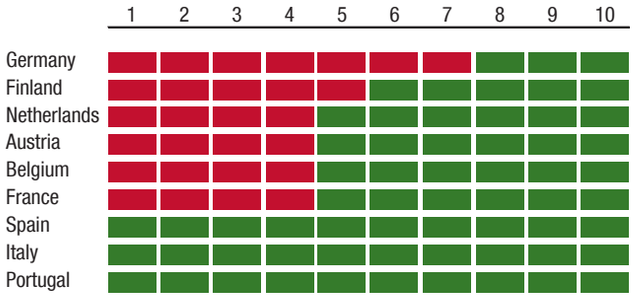
...and has delivered some price improvements.

2. Changes in Equities and Exchange Rates (Percent)



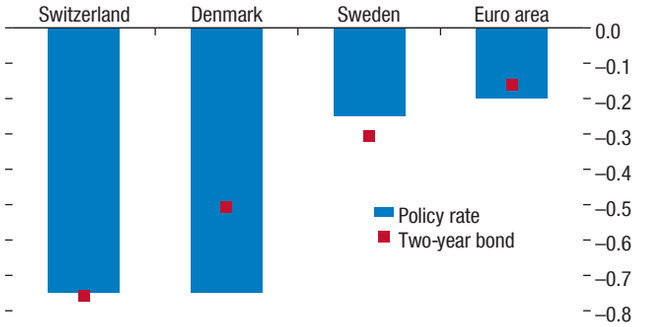
An increasing number of short- and long-term European government bonds carry a negative yield.

3. European Government Bonds with Negative Yields (Years to maturity)



Negative policy rates in some European countries have reinforced negative yield dynamics.

4. Policy Rate and Two-Year Government Bond Yields (Percent)



Sources: Bloomberg, L.P.; and IMF staff calculations.

Note: Jackson Hole refers to ECB President Draghi's speech in August 2014 at the U.S. Federal Reserve's Economic Policy Symposium in Wyoming. ECB QE was announced in January 2015. Japan's QQE1 is taken from April 2013. U.S. Fed programs QE1 November 2008; QE2 November 2010; QE3 September 2012. DEU = Germany; EA = Euro area; ESP = Spain ITA = Italy; JPN = Japan; QE = quantitative easing; QQE = quantitative and qualitative easing; USA = United States. In Figure 1.9.4, policy rates comprise the ECB deposit rate, Riksbank repo rate, Swiss National Bank Libor target, and Danmarks National Bank CD rate. The two-year bond for the euro area is a debt-weighted yield of negative yielding two-year government bonds.

an expanded program of quantitative and qualitative easing (QQE2). The BOJ announced that it was accelerating the pace of Japanese government bond purchases from an annual pace of ¥50 trillion to about ¥80 trillion, and extending the average remaining maturity of government bond purchases to about 7 to 10 years. The BOJ's balance sheet is expected to exceed 70 percent of GDP by the end of 2015.

Similarly, the ECB increased its monthly asset purchases to €60 billion, after averaging about €12 billion under the existing asset-backed securities and covered bond purchase programs, to address the risks of persistently low inflation. This will result in a total program of about €1.1 trillion by September 2016 and will largely be accommodated in sovereign markets, with a small portion also coming from European Union (EU) institutions. If fulfilled, QE will take the ECB's balance sheet from an estimated 22 percent to 31 percent of GDP, in line with the initial QE programs of the Federal Reserve and the BOJ, which each subsequently increased their programs to about 20 percent and 45 percent of respective GDP.

Although at different stages, QE programs in Japan and the euro area have already had a significant impact on financial markets. In the euro area, much of this was achieved in the wake of ECB President Draghi's speech at Jackson Hole in August 2014—a date widely taken as the trigger for QE. Ten-year sovereign yields

in Germany, Italy, and Spain, among others, declined before the implementation of QE by as much as 10-year U.S. Treasury bonds did during the first two years of the Federal Reserve's QE programs (Figure 1.9, panel 1). Positive market impacts were reinforced following the official announcement of QE in January (Figure 1.9, panel 2). As of late March 2015, more than 30 percent (or €2.4 trillion) in short- and long-term euro area government bonds had negative yields (Figure 1.9, panel 3). These improvements and associated positive ripple effects through credit markets have helped significantly to reduce fragmentation, improve credit conditions, and raise demand for loans.[4] Moreover, strong gains in equity markets in both Japan and the euro area underscore progress through the portfolio rebalancing channel, laying the basis for positive wealth effects. There has also been a positive impact on inflation expectations in the euro area, as measured by inflation swaps. In Japan, different measures of inflation expectations, which steadily rose until mid-2014, have fallen recently and converged to about 1 percent.

The ECB's QE program complements a broader set of measures to address tail risks and safeguard monetary transmission, for example, the lowering of policy rates to historic levels—including negative territory, in line with some other European countries (Figure 1.9, panel 4).[5] Although providing a credible signal of the ECB's accommodative stance, prolonged negative rates could cause disruptions to short-term funding markets, particularly money market funds.[6] Bank term funding has been ensured through a combination of expanded collateral eligibility, fixed-rate full allotment facilities, and longer-term refinancing operations. The announcement of the Outright Monetary Transactions program eliminated euro redenomination risks and lowered spreads on euro area government bonds. Progress toward banking union, including the Single Supervisory Mechanism, has helped strengthen the health of banks through enhanced and harmonized regulation and supervision. The Comprehensive Assessment, through the combined Asset Quality Review and Stress Tests, has credibly boosted the transparency of bank balance sheets, while the establishment of the European Stability Mechanism, along with the Single Resolution Mechanism and Fund, has enhanced the capacity of the euro area economies to safeguard financial stability. These actions have supported the foundations for recovery, helped reduce fragmentation, and boosted investor confidence in the euro area.

A strong portfolio rebalancing channel will be key to the transmission of QE

A strong portfolio rebalancing channel is a key transmission channel for QE. Rebalancing could occur in three central ways. First, rebalancing lowers risk-free rates, which translates into lower funding costs. Second, rebalancing from sovereign bonds into more risky assets should reduce lending spreads and thus credit costs. However, this is most likely to benefit large companies that have access to markets, with limited direct support for small and medium-sized enterprises. Third, there could be portfolio outflows from the economies engaging in QE, primarily to the United States, but also increasingly to emerging markets.

Institutional investors are key to the transmission of QE to the private sector in the euro area. In particular, substantial intra-euro-area portfolio rebalancing within credit markets would directly lower private funding costs and have similar beneficial knock-on effects for smaller entities. However, European life insurers, which hold about 20 percent of EU government bonds, may have limited incentive to sell bond portfolios to the ECB, partly because of regulatory considerations, but also as a result of their weak balance sheets (as discussed later in this chapter). Given significant duration mismatches, the cash from a bond sale would need to be reinvested into similar-duration bonds, which have less attractive yields, putting further pressure on life insurers' already weak cash flow positions. Since rerisking by taking on lower-quality credit will further eat into their fragile capital buffers, rebalancing will likely take place primarily in investment-grade sovereign and corporate bonds, particularly in U.S. bonds, given the combination of attractive yields, long duration, and low foreign currency hedging costs.

In Japan, the government bond maturity extension under QQE2 is expected to lead to more portfolio rebalancing at life insurers and pension funds. Life insurers and pension funds are now the largest holders of Japanese government bonds and are in a better position to rerisk their balance sheets, including toward

[4]See the ECB's Euro Area Bank Lending Survey for the fourth quarter of 2014.

[5]See IMF 2014a for a more complete discussion of these policies.

[6]If interest rates were to turn sharply negative and remain at those levels for a protracted period, including at the retail level, larger distortions could arise with far-reaching financial stability implications. For example, savers could stop saving, bank deposits could be turned into cash, new forms of cash management could emerge, and borrowers could be encouraged to take on excessive leverage, with long-term consequences for some asset markets, such as housing markets.

higher-yielding securities. This partly follows the reform of the Government Pension Investment Fund (GPIF), which encourages higher allocations away from government bonds, and will induce other public and private pension funds to follow the GPIF's lead. Finally, the combination of low domestic yields and low foreign exchange hedging costs should boost the incentives of insurers and pensions funds to rebalance their portfolios abroad, particularly to the United States.

One way to gauge the potential portfolio flows is to simulate the effects of alternative policy outcomes on portfolio choices through three stylized scenarios:

- **Under a "baseline" scenario,** central bank asset purchases under QE reduce risk-free rates and boost some asset prices, putting a floor under growth and inflation and supporting inflation expectations. But clogged bank balance sheets and continued private sector indebtedness limit a fuller transmission of QE to real activity. As a result, confidence and activity are slower to recover, prompting investors to rebalance a portion of their assets abroad.
- **But there is a risk that a slower recovery will leave the economy vulnerable to adverse shocks or policy slippages, leading to a "downside" scenario.** Here negative shocks leave QE (in its current form) unable to put a floor under growth and inflation, resulting in further balance sheet weakness and drifting inflation expectations. The situation is exacerbated by a lack of progress on policies to repair private balance sheets, further eroding confidence and prompting additional capital flight.
- **This underscores the need for additional structural measures to repair private balance sheets, a "QE-plus" scenario,** complementing monetary policy and helping boost growth and inflation. In this case, investors would want to increase their relative domestic exposures, resulting in fewer portfolio outflows. And although this would limit exchange rate depreciation, it would reinforce positive domestic price effects as demand for higher-yielding assets increases.

The scenarios suggest that QE in the euro area and Japan could lead to significant portfolio outflows. In the "baseline" scenario, additional gross outflows from the euro area economies amount to €1.2 trillion by the end of 2015, raising gross outflows from 50 percent to 55 percent of GDP. Similarly, insurance companies and pension funds in Japan could invest as much as ¥42 million ($350 billion), or 8 percent of GDP, in foreign assets by the end of 2017 (Annex 1.2; Figure 1.10, panels 1 and 2). Such heavy foreign rebalancing would weaken domestic currencies, underscoring the impact of QE on the exchange rate, and could pose some risks by adding to movements in global exchange rates. While these potential flows could also partly offset the risks of outflows from emerging markets as the Federal Reserve begins to exit, the potential for short-term volatility could increase.

Bank lending may take time to fully recover

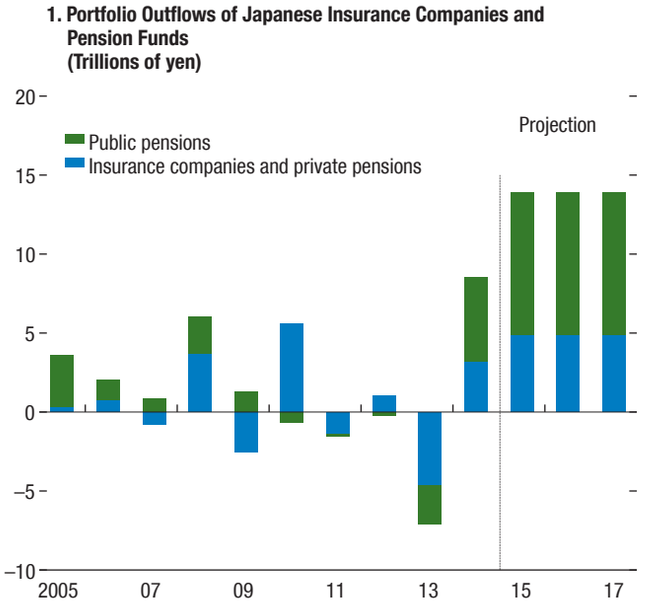
In previous episodes of QE, bank credit has taken time to fully recover. Bank lending has accelerated only modestly in Japan and the United Kingdom since the launch of their QE programs (Figure 1.11, panel 1).[7] Even in the United States, where bank credit is now growing quickly, it took at least a year after the launch of its third QE program before lending started to pick up. Although the overall economic and policy environment was different in these cases—and QE should help credit conditions as it reduces bank funding costs, which should be reflected in lower lending rates—past experience suggests that bank lending in the euro area and Japan may pick up with a lag.

Furthermore, the ability and willingness of banks to supply more credit will depend on the business environment and regulatory conditions they are facing. Before the global financial crisis, banks were primarily concerned about meeting risk-weighted capital regulations. However banks now need to operate their businesses under a multidimensional set of regulatory and economic targets that they need to meet simultaneously, including regular supervisory stress testing and the new Total Loss-Absorbing Capacity requirement for global systemically important banks (Figure 1.11, panel 2).[8] Although differences in national implementation are complicating this picture

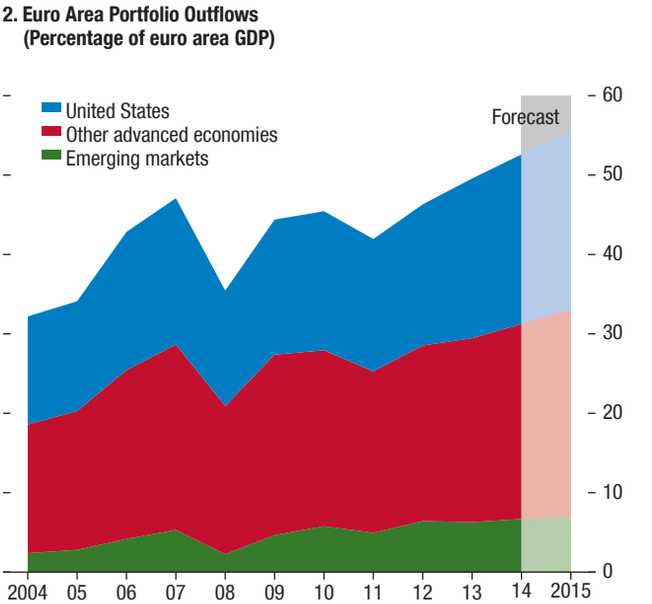
[7]This, however, does not imply that there has been no impact on bank lending from QE. For example, Saito and Hogen (2014) find that a decrease in the interest rate risk at major Japanese banks under QQE1 has been associated with higher bank lending, after controlling for loan demand, interest rate spreads, and the nonperforming loan ratio.

[8]See, for example, EBA 2015 for a discussion of the implications of regulatory measures on bank business models. The target ratios used in Figure 1.11, panel 2, are profitability (10 percent return on equity target), loss-absorbing capital (estimated total loss-absorbing capacity ratio at 18 percent of risk-weighted assets and 6 percent of total assets), leverage (minimum 3 percent but requirements higher in Switzerland, the United Kingdom, and the United States), asset quality (nonperforming loans 10 percent of gross loans), stable funding (estimated net stable funding ratio of 100), and capital (Tier 1 common capital of 7 percent, plus systemically important financial institution buffers, or plus 0.5 percent for large domestic banks). The figure is based on a sample of more than 300 advanced economy banks.

Figure 1.10. Illustrative "Baseline" QE Portfolio Rebalancing Scenarios in Japan and the Euro Area



Sources: Bank of Japan; and IMF staff projections.
Note: See Annex 1.2 for a description of the assumptions.
QE = quantitative easing.



Source: Bloomberg L.P.; Coordinated Portfolio Investment Survey (CPIS); European Central Bank; and IMF staff calculations.
Note: Foreign currency-denominated flows exclude central banks, banks and government holdings, and are determined by European insurer asset allocations as of 2013, while destinations are based on data for 2013 international portfolio flows (CPIS). Data for 2014 are IMF estimates. Emerging markets (EM) comprise Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Malaysia, Mexico, Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand, and Turkey. Other Advanced Economies (OA) comprise Australia, Canada, Denmark, Japan, New Zealand, Norway, Sweden, Switzerland, and the United Kingdom.

for global banks, the introduction of the Single Supervisory Mechanism has helped strengthen bank balance sheets and further fostered the process of supervisory and regulatory harmonization across euro area countries, as discussed in Box 2.3.

The ECB's Comprehensive Assessment has credibly boosted the transparency of bank balance sheets and fostered significant improvements in capital. This has made capital and leverage less of a constraint for most banks in both the euro area. Nonetheless, institutions may be reluctant to use current buffers to increase their lending, particularly given the challenges that historically low profitability are posing for business models, as discussed in the October 2014 *Global Financial Stability Report*. One reason for this is that banks may be reluctant to reduce capital ratios in the absence of clarity on the amount of capitalization that will be required by regulators over the medium term. A second reason is that in many countries, the average risk weight of bank assets is low relative to the past, reflecting a high share of government bond holdings. So banks may face limits on the degree to which they can reallocate sovereign bond portfolios toward riskier assets, because the average risk weight would rise, eroding bank buffers.

Even if banks have the capacity to expand their loan portfolios, there is a risk that they may reallocate their portfolios toward more profitable strategies. Table 1.3 provides some stylistic examples of possible alternative investment choices. According to these estimates, banks may have incentives to invest in higher-yielding bonds, such as U.S. and emerging market sovereign bonds.

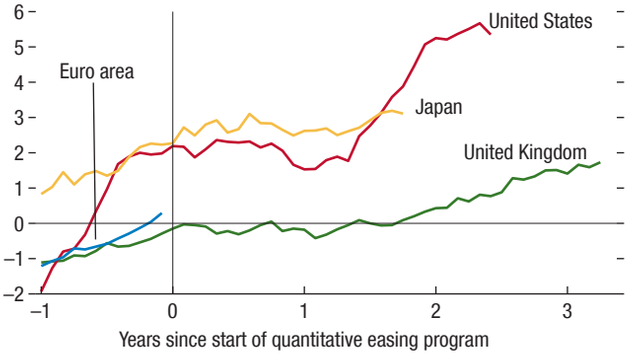
In the euro area, improving asset quality is important to boost bank lending

In the euro area, improving asset quality at some banks could further bolster bank credit. Asset quality continued to deteriorate in the euro area as a whole in 2014, although at a slowing pace, with total nonperforming loans now standing at more than €900 billion (Figure 1.12, panel 1). Furthermore, the stock of nonperforming

Figure 1.11. Bank Lending and Constraints

Bank lending growth has lagged in past QE episodes...

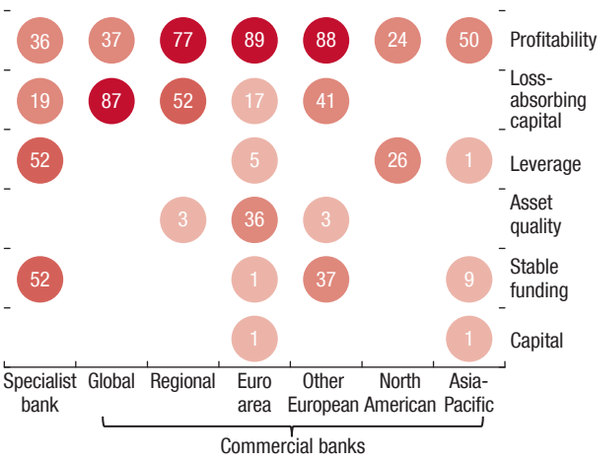
1. Bank Credit Growth to the Nonfinancial Private Sector (Percent)



Sources: Bank of England; Haver Analytics; and IMF staff calculations.
Note: Quantitative easing (QE) programs are United Kingdom (QE2, Oct. 2011); United States (QE3, Sep. 2012); Japan (QQE1, Apr. 2013); and euro area (QE, Mar. 2015). QE = quantitative easing; QQE = quantitative and qualitative easing.

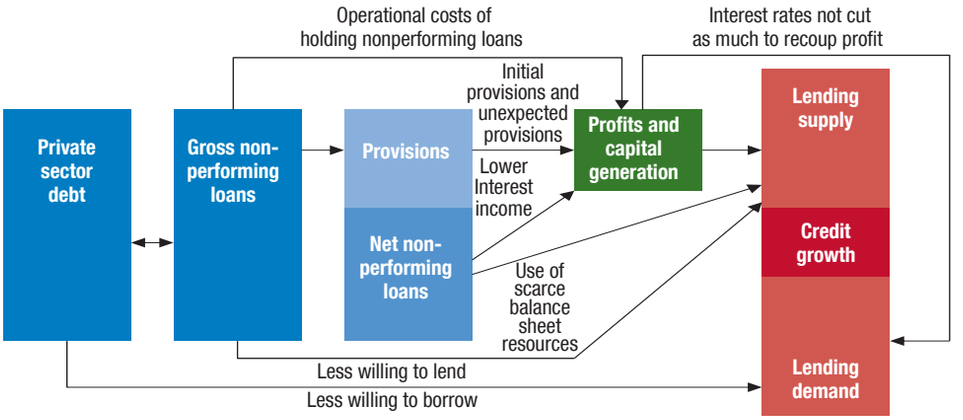
...and banks now face new constraints.

2. Proportion of Banks Missing Target Ratios (Percent of sample assets)



Sources: SNL Financial; and IMF staff calculations.
Note: See footnote 8 for a description of the targets.

3. Nonperforming Assets and Credit



Source: IMF staff.

loans in the euro area is unevenly distributed, with about two-thirds located in six euro area countries.[9] In Cyprus, Greece, Ireland, Italy, Portugal, and Slovenia, a majority, if not all, of the banks involved in the ECB's Asset Quality Review were found to have nonperforming assets of 10 percent or more of total exposure (Figure 1.12, panel 2). These bad assets are large relative to the size of the economy (Figure 1.12, panel 3), even net of provisions. Euro area banks have lagged the United States and Japan in the early 2000s in their write-offs of these bad assets, suggesting less active bad debt management and more limited improvement in corporate indebtedness.

Nonperforming assets reduce banks' willingness and ability to supply credit (Figure 1.11, panel 3) in three key ways. First, nonperforming assets are a drag on profitability because they require provisioning and generate less interest income than performing assets (Figure 1.12, panel 4).[10] There are also operating costs to holding nonperforming assets on balance sheets

[9]The stock of nonperforming loans in Cyprus, Greece, Ireland, Italy, Portugal, and Spain in total amounts to more than €600 billion.

[10]Banks with large nonperforming loan portfolios may also face higher funding costs, although banks may seek to offset this by charging a higher interest rate on new loans.

Table 1.3. Reallocating Assets: Stylized Investment Choices
(Percent)

	Sovereign Bond					Corporate Loan			SME Loan	
	DEU	ITA/ESP	JPN	USA	EM IG	DEU	ITA/ESP	JPN	DEU	ITA/ESP
Investment Return	0.4	1.4	0.4	2.1	3.9	1.0	1.7	0.9	2.4	3.7
Foreign Exchange Hedge	—	—	—	–0.3	–0.3	—	—	—	—	—
Credit Risk	—	–0.2	—	—	–0.2	–0.1	–0.3	–0.2	–0.5	–1.0
Operations	—	—	—	—	–0.1	–0.3	–0.3	–0.3	–0.4	–0.4
Pretax Return	0.4	1.2	0.4	1.9	3.3	0.6	1.1	0.4	1.5	2.3
Required Capital	3	3	3	3	5	6	6	8	10	10
Pretax Return on Required Capital	13	40	13	62	67	10	19	5	15	23

Sources: Bank of America Merrill Lynch; Bank of Japan; European Central Bank (ECB); and IMF staff estimates.

Note: Investment returns using current yields for 10-year sovereign bonds and an index of emerging market investment-grade sovereign bonds. Corporate loan rates proxied using broad bond indices for large European firms, ECB (interest rate on all new loans), and Bank of Japan (average contracted interest rate on new loans). SME loan rates are proxied using ECB data (interest rate on new loans under €1 million). The foreign exchange (FX) hedge has a one-year roll-over period; hedging costs are currently comparable for European and Japanese banks. Credit risk is based on the probability of default for an investment-grade loan rated A/BBB+ and for an SME loan rated BBB–/BB, using sovereign credit risk as a floor. Operational costs are based on usual cost-to-income ratios for corporate and SME loans. Emerging market credit risk assumed for a sovereign rated BBB–. Capital requirements are the maximum of a leverage requirement of 3 percent and a Common Equity Tier 1 target of 10 percent with risk-weighted assets of 50 percent for emerging market sovereign bonds, 60 percent for corporate loans, 100 percent for SME loans, and 80 percent for loans to Japanese firms. DEU = Germany; EM IG = emerging market investment grade; ESP = Spain; ITA = Italy; JPN = Japan; SME = small- and medium-sized enterprise; USA = United States.

(including administrative expenses, legal costs, and maintenance of repossessed property). And even if banks appear adequately provisioned at a given point in time, additional provisioning may be needed over time if economic conditions do not improve. Second, nonperforming assets—net of provisions—use scarce resources on bank balance sheets. Net nonperforming assets need to be backed by capital. They are particularly costly for risk-weighted capital because net nonperforming loans on average have a significantly higher risk weight than do performing loans. Third, banks with high levels of nonperforming loans on their balance sheets may be less willing to lend to borrowers with borderline credit quality. While many banks are chasing the same good-quality firms—often in competition with capital markets—other weaker companies are finding it more difficult to obtain loans.

As a result, banks with high levels of nonperforming assets may hamper the transmission of QE via banks. Figure 1.12, panel 4 shows that banks with a higher ratio of nonperforming loans have tended to lend less recently, even relative to average lending by banks in the same economy that have faced similar demand conditions. This negative relationship between bank lending and nonperforming loans was also illustrated in the April 2014 *Global Financial Stability Report*.

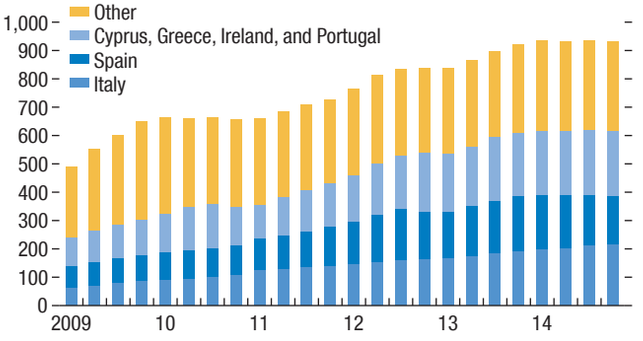
Policy actions are needed to support bank lending capacity

These observations suggest that policy actions are needed to further help bank lending in the euro area and Japan. This can be illustrated through a simulation, which is based on the assumption that necessary actions are not taken. The simulation is estimated using more than 100 banks in the euro area and about 80 banks in Japan. The capacity of these banks to supply credit is estimated for the period 2015–17. The banks are assumed to preserve their capital buffers through the simulation, so lending capacity is a function of retained earnings, which here are based on analysts' forecasts. Banks also reallocate portfolios by selling government bonds, in line with the scenarios presented earlier in this chapter. However, the overall effect is limited, because this reallocation raises the average risk weight of banks' portfolios. The results suggest that without corrective policy actions, outlined later in this chapter, median bank lending capacity could be limited to a meager 1 to 3 percent on average a year, though some individual institutions may be able to increase lending by more (Figure 1.12, panel 5). For banks that have excess capital and are willing to run down their capital buffers, bank lending growth could be higher than suggested by these simulations.

Figure 1.12. Bank Nonperforming Loans and Lending Conditions

Nonperforming loans remain at high levels...

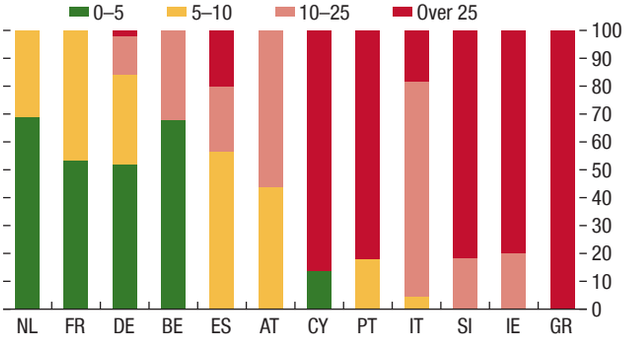
1. Nonperforming Loan Stock (Billions of euros)



Sources: National central banks; IMF Financial Soundness Indicators; and IMF staff estimates.
Note: National definitions have been adjusted according to Barisitz (2013). Other comprises Austria, Belgium, France, Germany, and the Netherlands.

...concentrated in a few economies.

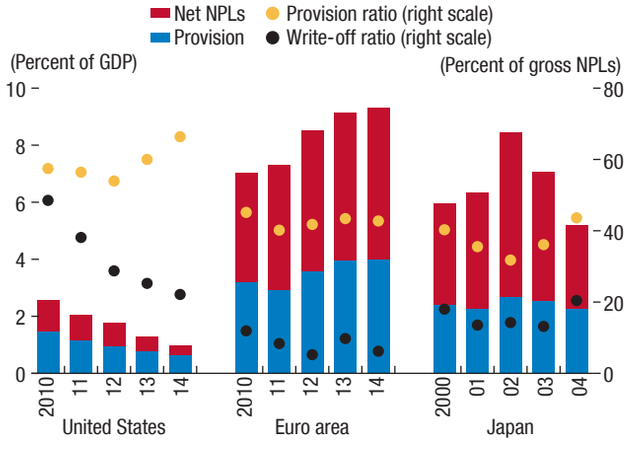
2. Nonperforming Assets: Distribution by Country (Percent of sample assets)



Sources: European Central Bank; and IMF staff calculations.
Note: Based on a sample of 106 banks from 12 of the countries that took part in the European Central Bank's Asset Quality Review (AQR). Banks are sorted by their nonperforming exposure (NPE) ratio. NPE ratio = AQR-adjusted NPE level as a percentage of total credit exposure. Data labels use International Organization for Standardization (ISO) codes.

Provisioning and write-offs have lagged...

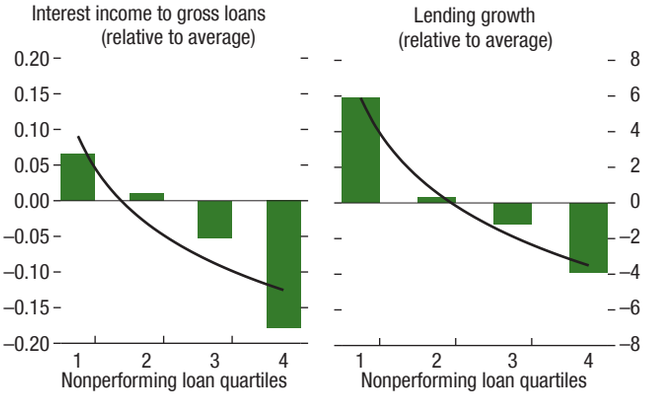
3. Nonperforming Loans, Provisions, and Write-offs



Sources: European Central Bank; Financial Services Agency; and IMF staff calculations.
Note: NPL = nonperforming loan; net NPL = gross NPL plus provisions; provision ratio = provisions as a percentage of gross NPL; write-off ratio = write-offs as a percentage of gross NPL.

...and so bank income and lending have been reduced.

4. Interest Income, Lending Growth, and Nonperforming Loans (Percentage points)



Sources: European Banking Authority; SNL Financial; and IMF staff calculations.
Note: Left chart shows annual interest income to gross loans, for over 100 euro are banks, relative to the yearly average for banks with the same nationality, calculated over the period 2009–13. The right chart shows annualized lending growth relative to average lending growth in the same economy, and uses European Banking Authority data for a sample of more than 60 banks over the period 2010–13. Outliers have been excluded, based on extreme values for lending growth, nonperforming loans and interest margins.

(continued on next page)

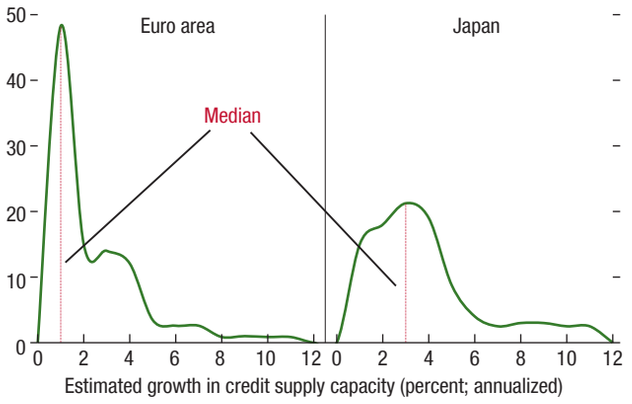
Addressing the corporate debt overhang will help support healthy credit demand

Boosting credit demand will require tackling high corporate indebtedness. In the euro area, there is a close correlation between countries with a high volume of nonperforming loans and those with high corporate debt. This is illustrated by information on the distribution of corporate interest coverage ratios, a key indicator of borrower distress (Figure 1.12, panel 6). Companies with high levels of debt are less likely to demand more credit, potentially hampering growth in bank credit. High indebtedness is also likely to reduce the sensitivity of loan demand to a change in bank lending rates, reducing the effectiveness of a further compression in yields under QE.

Figure 1.12. Bank Nonperforming Loans and Lending Conditions *(continued)*

Policy actions are needed to support bank lending.

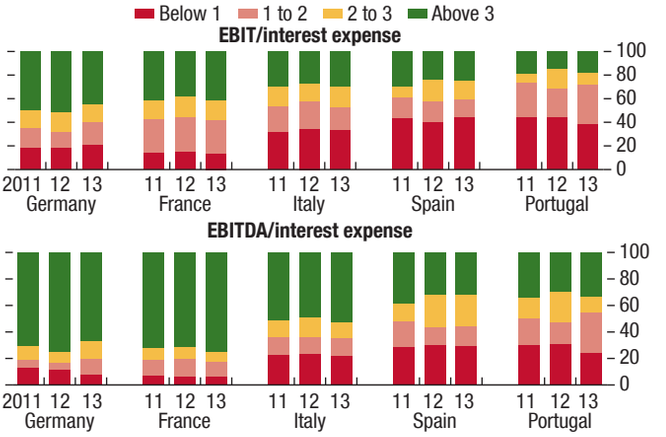
5. Simulated Bank Lending Capacity, 2015–17
(Percent of sample)



Source: IMF staff estimates.
Note: Shows the average annual bank lending capacity over the period 2015–17 for a sample of more than 100 euro area banks and around 80 Japanese banks.

Corporate debt-servicing capacity remains weak.

6. Corporate Interest Coverage Ratios
(Percent of debt)



Sources: Amadeus database; national central banks; and IMF staff estimates.
Note: French data for 2012–13 are estimated using central bank data for a smaller number of firms. EBIT = earnings before interest and taxes. EBITDA = earnings before interest, taxes, depreciation, and amortization.

In Japan, corporate leverage may also limit credit demand for some smaller firms. Companies now have significant cash holdings, amounting to 50 percent of GDP, up from 37 percent at the end of 2007. Firms with large cash holdings are likely to demand less credit from banks. At the same time, firm-level data and sectoral balance sheets show that some small and medium-sized enterprises face the structural challenges of high leverage and low profitability. Again, these indebted firms are likely to be less willing to take on more credit.

European life insurance: An unsustainable business model in a low-interest-rate environment

In the past three years, European life insurers' equities have paid one of the most attractive dividends, outperforming on the back of waning euro area fragmentation risk, high capital gains on bond holdings, and the release of excess capital due to lower claims inflation. This trend, however, is likely to slow in response to rising vulnerabilities, particularly in countries exhibiting large duration mismatches.

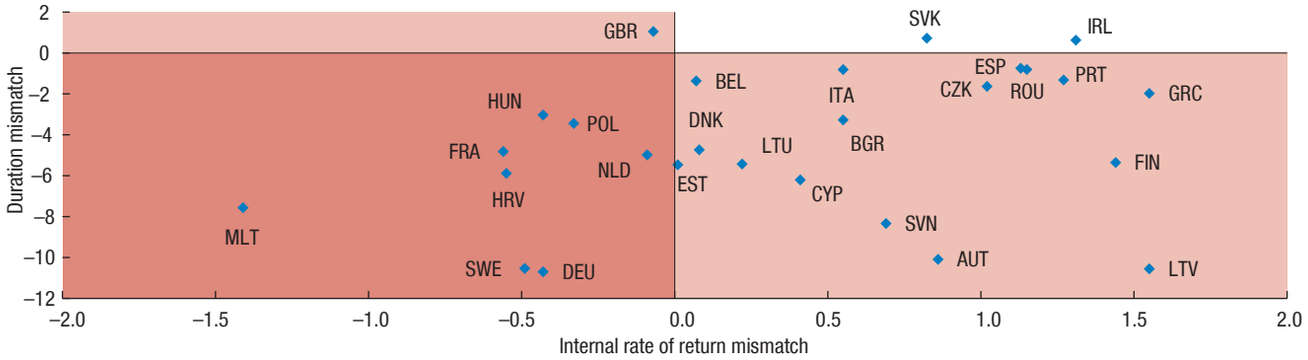
The current low-interest-rate environment, which QE will further exacerbate, poses severe challenges to the EU life insurance industry. The industry's practice of writing long-term policies, sometimes of more than 30 years, without assets of a correspondingly long duration has resulted in undesirable negative duration gaps. Moreover, many policies contain generous return guarantees, which are unsustainable in today's low-interest-rate environment. According to the European Insurance and Occupational Pensions Authority (EIOPA), more than half of European life insurers are guaranteeing an investment return to policyholders that exceeds the yield on the local 10-year government bond, thereby incurring undesirable negative investment spreads (EIOPA, 2013).[11]

Countries that suffer from both large duration mismatches and negative investment spreads are particularly vulnerable to a prolonged low-interest-rate environment. According to EIOPA, Germany and Sweden, which together accounted for about 20 percent of gross written premiums at the end of 2013, suffer from both duration mismatches of more than 10 years and negative investment spreads (Figure 1.13, panel 1). In contrast, countries with positive duration gaps (reflecting a higher share of saving- and unit-linked products), such as Ireland and the United Kingdom, are less sensitive to the risks arising from low or falling interest rates. They may, however, face

[11]In Germany, for example, despite a recent reduction in the guaranteed policy rate on new products to 1.25 percent, the guaranteed return on total policies is about 3.2 percent, whereas the 10-year bond yield is about 0.3 percent. For more information on the health and challenges of German life insurers, see Elekdag and others 2014.

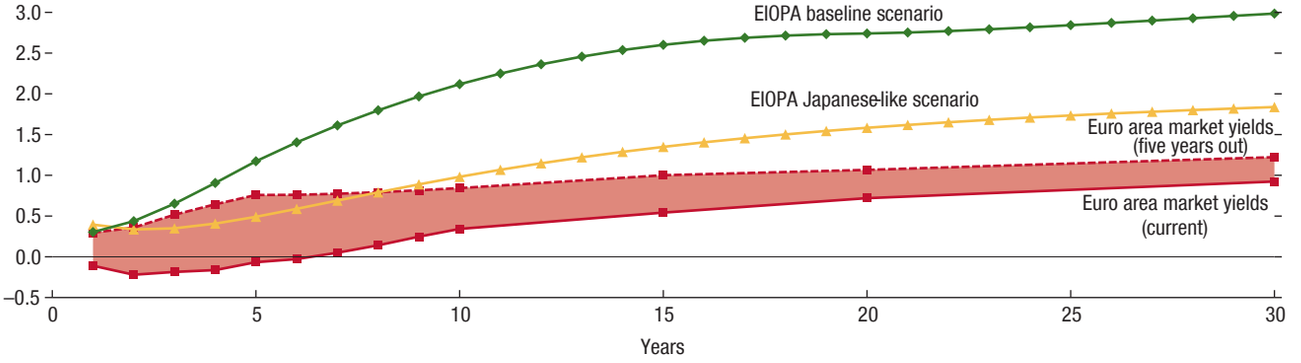
Figure 1.13. Life Insurance Industry Characteristics

1. Duration Mismatches and Negative Investment Spreads (Baseline; percent)



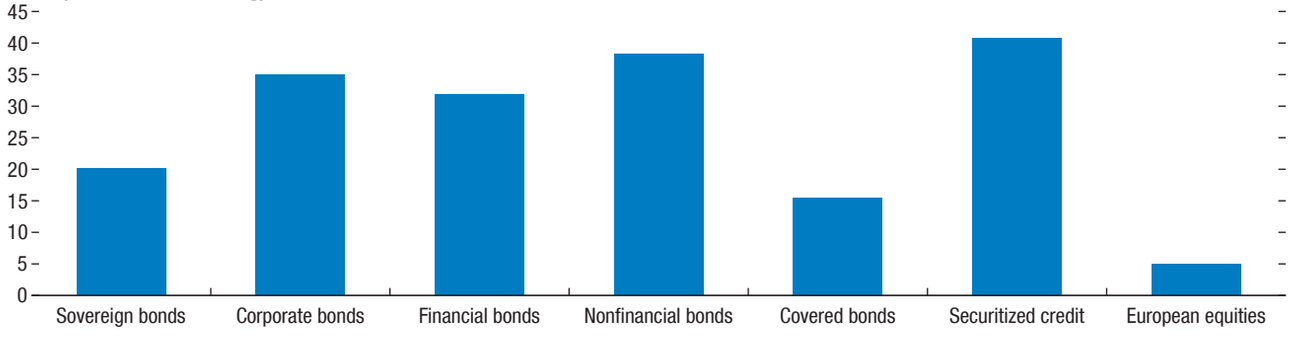
Source: European Insurance and Occupational Pensions Authority.
Note: AUT = Austria; BEL = Belgium; BGR = Bulgaria; CYP = Cyprus; CZK = Czech Republic; DEU = Germany; DNK = Denmark; ESP = Spain; EST = Estonia; FIN = Finland; FRA = France; GBR = United Kingdom; GRC = Greece; HRV = Croatia; HUN = Hungary; IRL = Ireland; ITA = Italy; LTU = Lithuania; LTV = Latvia; MLT = Malta; NLD = Netherlands; POL = Poland; PRT = Portugal; ROU = Romania; SVK = Slovak Republic; SVN = Slovenia; SWE = Sweden.

2. EIOPA Interest Rate Assumptions Relative to Current Euro Area Yield Curve (Percent)



Sources: Bloomberg, L.P.; European Insurance and Occupational Pensions Authority (EIOPA).

3. Share of European Asset Classes Held by Insurers (Percent of outstanding)



Sources: Morgan Stanley; and IMF staff estimates.

other vulnerabilities, including high volatility in equity markets. In the United States, life insurance companies also appear less sensitive to the risks associated with low interest rates, reflecting their product mix, which is similar to that of U.K. insurers, and the more favorable U.S. economic outlook.[12]

A low interest rate scenario is materializing in Europe

The results of the 2014 stress tests conducted by EIOPA indicate the urgency and size of the insurance industry problem. The stress tests show that 24 percent of insurers were not able to meet their 100 percent Solvency Capital Ratio requirement under a "Japanese-like scenario."[13] Although the industry was expected to have about 8 to 11 years before running into serious cash-flow pressures, even these results seem optimistic, as interest rates are now significantly lower than in the stress test scenarios (Figure 1.13, panel 2).

Solvency II adjustments (the "Long-Term Guarantee" measures) help to mitigate the impact of stress but may not be realistic under industry-wide stress.[14] Under the Japanese-like scenario, these Solvency II adjustments eradicated the impact of the scenario on insurers' cash profiles by allowing the value of insurers' assets to grow faster than that of their liabilities, which is counterintuitive in a prolonged low-interest-rate environment.[15] It seems reasonable for Solvency II adjustments to help an individual life insurer overcome temporary capital shortfalls, particularly in light of the long-term nature of its liabilities. But vulnerabilities become difficult to mitigate, even with regulatory adjustments, once an insurer hits negative cash flows or the source of the vulnerabilities are industry wide and likely to affect many insurers simultaneously.

European life insurers are vulnerable to distress

Midsize insurers in Europe face a high and rising risk of distress. The failure of one or more midsize insurers could trigger an industry-wide loss of confidence if the failure is believed to reflect a generalized problem. The absence of a policyholder protection scheme or set of common minimum standards for the entire EU—arrangements similar to those in Japan and the United States—magnifies the risk of market disruptions.

The high and rising interconnectedness of the insurance industry and the wider EU financial system is another source of potential spillovers. The industry has a portfolio of €4.4 trillion in EU credit. Furthermore, insurers are traditionally closely linked to banks through liquidity swaps and bank bond holdings, a trend that could increase with the new Total Loss-Absorbing Capacity requirements. A large mark-to-market shock could force life insurers into asset reallocations and sales that could engulf the financial system (Figure 1.13, panel 3).

Policies needed to maximize the effectiveness of QE in the euro area

QE provides a strong framework for addressing deflation risks, and some key transmission channels are already beginning to work. But given the potential limits to bank credit growth, further steps to repair private balance sheets are needed for the full potential benefits of QE to materialize:

- First, regulators need to provide clarity about regulatory standards—and thus certainty for banks adapting business models—by promptly finalizing the calibration of recent requirements, including the leverage ratio, net stable funding ratio, and Total Loss-Absorbing Capacity requirements.
- Second, a number of actions are needed to comprehensively tackle the burden of nonperforming loans. Supervisors must continue to provide strong incentives for banks to maintain adequate provisioning levels and help reduce the current gap between bank and market valuation of nonperforming loans. This includes encouraging banks to develop and use specialized internal and external capacity for handling the stock of nonperforming assets, actively manage their provisions, and write off their nonperforming assets (see Bergthaler et al, 2015).
- Third, authorities should also ensure that legal frameworks for bankruptcy of firms and individuals continue to be reviewed and reformed, where necessary, and that institutional frameworks (judiciary and insolvency practitioners) and out-of-court procedures—possibly combined with corporate equity financing—are adequately resourced and supported to deal with large volumes of distressed debt. Regulatory measures should also be taken to encourage the speedy disposal of problem loans by banks. In

[12]Further analysis of U.S. insurers can be found in the forthcoming 2015 U.S. Financial Sector Assessment Program.

[13]"Japanese-like scenario" is used in EIOPA 2014a to test the resiliency of the insurance sector by assuming a persistent low-interest-rate environment. See also EIOPA 2014b.

[14]The measures include both transitional arrangements and permanent adjustments to eliminate the economic loss from negative investment spreads.

[15]For example, Solvency II requires insurers to recognize valuation gains on the asset side fully and immediately, whereas losses on long-term liabilities can be smoothed over a 16-year transitional period, adjusting for short-term credit spread volatility and other sources of volatility.

addition, an active market for nonperforming loans should be encouraged (for sample, Jassaud and Kang 2015).
- Fourth, the resilience of the financial system should be strengthened by diversifying the sources of funding from banks to capital markets. A deeper and broader capital market would improve access to finance, particularly for smaller firms, and make financial markets more efficient. In the euro area, this would require harmonization of company law, corporate governance, insolvency regimes, and taxation, in line with the latest Capital Markets Union proposal by the European Commission.

The challenges facing life insurers should also be tackled promptly to ensure these institutions can play an active role in the portfolio rebalancing channel. Regulators need to reassess the viability of guarantee-based products and promptly bring minimum return guarantees offered to policyholders in line with any secular trend in policy rates. At the same time, they must improve the sector's asset-liability matching and hedging capabilities. Prompt regulatory and supervisory actions are needed to mitigate damaging spillovers from a failure of a medium-sized insurer. Introducing a nationally harmonized policy holder protection scheme would further increase the resilience of the industry by enhancing confidence. Partnerships combining the credit risk expertise of banks with the balance sheet capacity of insurers could also help promote growth.

Finally, regulators should continue to improve transparency and public disclosure of life insurers. Despite EU regulators' significant efforts to strengthen transparency, including through the publication of comprehensive stress test results, it remains difficult to assess insurers' true solvency positions. This situation could undermine public confidence and exacerbate industry pressures if vulnerabilities start materializing in smaller firms.

The effectiveness of QQE in Japan depends on supporting policies

Steadfast implementation of fiscal and structural reforms is essential to boosting growth and making QQE more effective. If these reforms are incomplete, efforts at pulling the economy out of deflation are less likely to succeed, hampering the effectiveness of QQE. The BOJ should consider strengthening the portfolio rebalancing effects of its asset purchases by increasing the share of private assets in purchases and extending the program to longer-maturity government bonds, as necessary to achieve its 2 percent inflation target. A more forecast-oriented monetary policy communication would increase the transparency of the BOJ's assessment of inflation prospects and also signal commitment to its inflation target, mainly through the discussion of envisaged policy changes if inflation is not on track. To further stimulate bank lending to the private sector, authorities should expand the special lending facilities; jump-start the securitization market for bank loans to small and medium-sized enterprises and mortgages; and enhance risk capital provision, including by encouraging more asset-based lending and removing barriers to entry and exit of small and medium-sized enterprises.

United States

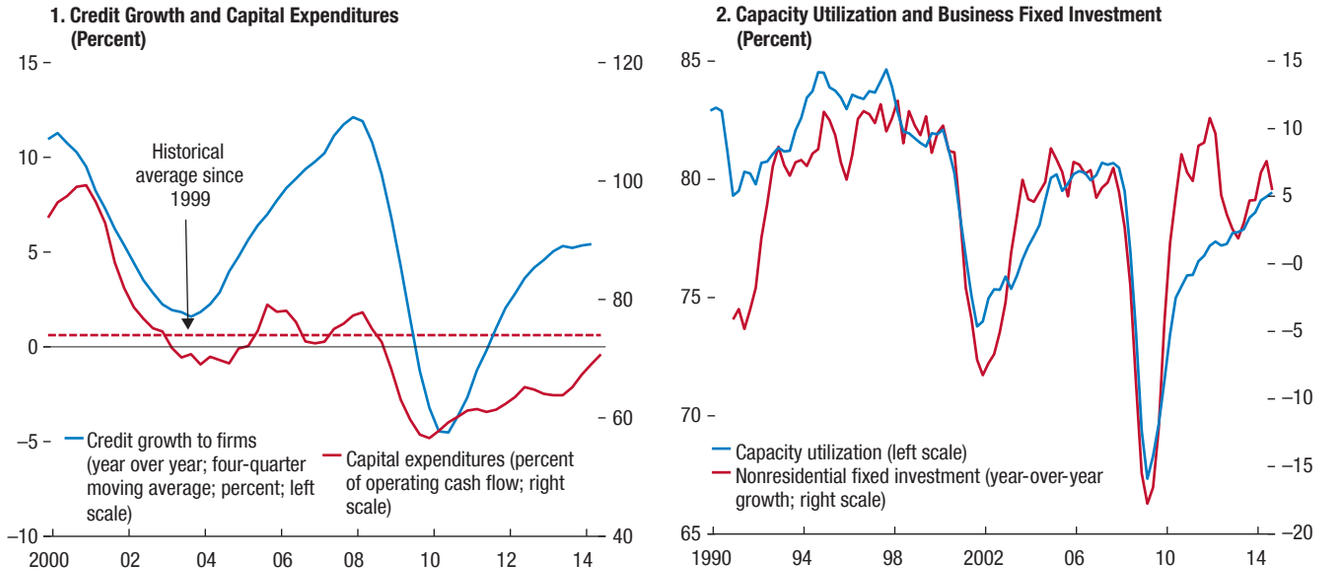
Despite the much-anticipated start of the process for monetary policy normalization in the United States, long rates have been lower than expected as concerns over global growth and disinflation feed back into U.S. markets. Plummeting crude oil prices have raised concerns regarding the recent flurry of high-yield debt issued by speculative-grade energy companies. Divergence between the expectations of financial market participants and those of policymakers regarding the pace of U.S. monetary tightening reflects the challenge of normalizing monetary policy in a world still addressing legacy problems and trying to encourage economic risk taking.

U.S. recovery solidifies as economic risk taking takes hold

The fundamentals of the U.S. economy continue to strengthen. The April 2015 *World Economic Outlook* projects growth of 3.5 percent in 2015 amid low interest rates, dissipating fiscal headwinds, and lower energy prices. More people are returning to the workforce, and wage growth is widely expected to start picking up. The *World Economic Outlook* projects three-year average growth at an annual rate of about 3 percent, the fastest annual pace since 2005.

Other indicators support the view that U.S. growth is successfully making the transition from dependence on asset appreciation and financial risk taking to an economy led by economic risk taking. Capacity utilization is returning to precrisis levels, and business fixed investment is rising, although at a slower pace than in previous cycles (Figure 1.14, panels 1 and 2). Growth in credit extended to nonfinancial firms is on the rise, in contrast to growth

Figure 1.14. United States: Nonfinancial Corporations



Sources: Federal Reserve; and IMF staff calculations.

in the euro area, where the trend is still negative. Funds raised through corporate debt issuance are increasingly devoted to capital expenditure rather than to equity buybacks and other forms of financial engineering. The tepid recovery of housing activity, however, remains a concern.

These developments are setting the stage for a normalization of U.S. monetary policy. U.S. authorities are preparing markets for a shift toward monetary policy tightening in 2015. Even though much anticipated, such an exit remains challenging, as discussed in the next section.

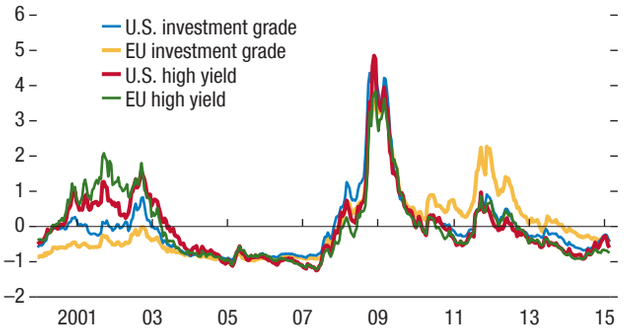
Financial risk taking continues at a strong pace in U.S. markets

Alongside positive developments in economic fundamentals, the search for yield has continued in U.S. credit markets. Signs of excesses in credit markets include the following: (1) underwriting standards continue to deteriorate, with covenant-light loans now accounting for two-thirds of new issuance of leveraged loans; (2) issuance of other types of lower-standard loans, such as second-lien loans, is at near-record rates; (3) there is an ongoing rise in leveraged buyouts and heightened activity in mergers and acquisitions. Although the leveraged loan market is still a relatively small part of the U.S. credit market and does not pose an immediate systemic threat, the sector is growing rapidly, and weak underwriting standards could pose problems down the road, as highlighted by U.S. supervisors in their annual shared national credit review program. These developments are also indicative of broader trends toward weaker underwriting standards. Relatively easy financing conditions and slower earnings growth could encourage higher leverage in future deals. Reflecting the search for yield, credit spreads remain below historical averages (Figure 1.15, panel 1), and—despite recent improvement—default cushions are thin in lower-rated segments of high-yield corporate bonds (Figure 1.15, panel 2).

U.S. companies generally continue to add leverage, as indicated by rising ratios of net debt to assets. However, measuring leverage through net debt to earnings shows a widening disparity between large-capitalization and small-capitalization firms (the latter with equity value between $100 million and $1 billion). The median small-cap firm has pushed leverage far higher than the median large-cap firm, to levels above those preceding the global financial crisis (Figure 1.15, panel 3). Smaller corporations are more vulnerable than the largest U.S. companies, which have the highest credit ratings among U.S. corporations and the easiest access to both the capital markets and banks. An examination of the "weak tail" of corporations with the lowest debt repayment capacity, reveals a stark picture (Figure 1.15, panel 4). The weakest quartile of small-cap corporations are operating with relatively low interest-coverage ratios, leaving them more dependent on cash reserves and the continued ability to roll over debt to service interest.

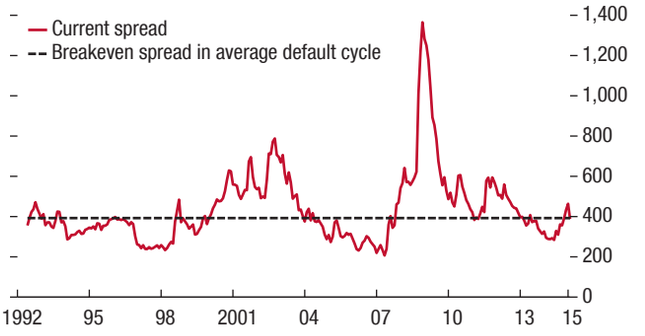
Figure 1.15. U.S. Credit Spreads, Firm Leverage, and Interest Coverage

1. Investment-Grade and High-Yield Credit Spreads
(*Z*-score vis-à-vis the respective historical distribution)



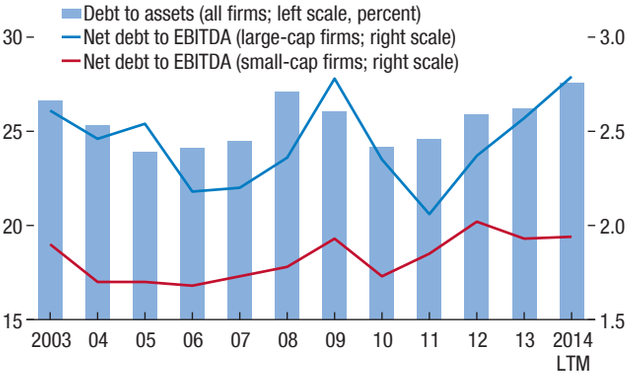
Sources: Bank of America Merrill Lynch; and Bloomberg, L.P.
Note: *Z*-scores relative to the respective historical distribution of option-adjusted spreads.

2. U.S. B Rated Corporate Bonds: Breakeven Spreads
(Basis points)



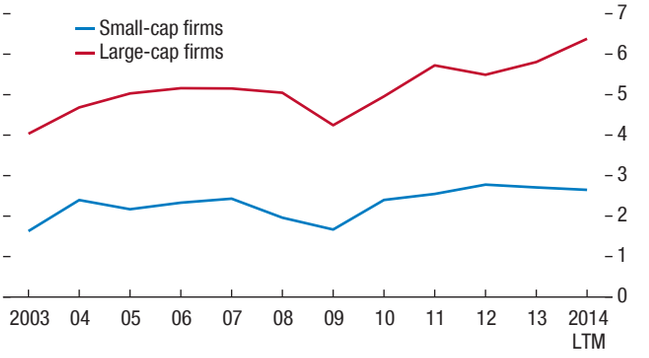
Sources: Bank of America Merrill Lynch; Moody's; and IMF staff estimates.

3. Nonfinancial Corporate Leverage
(Median)



Source: Standard & Poor's Capital IQ.
Note: Small-cap and large-cap firms are defined as having market capitalizations of $100 million to $1 billion, and greater than $5 billion, respectively. The sample is a balanced panel of 1,695 firms. Standard & Poor's Capital IQ classifies duty taxes related to exploration and production in the energy sector as operating expenses. EBITDA = earnings before interest, taxes, depreciation, and amortization; LTM = last 12 months.

4. Nonfinancial Interest Coverage Ratio
(Times; weak tail)



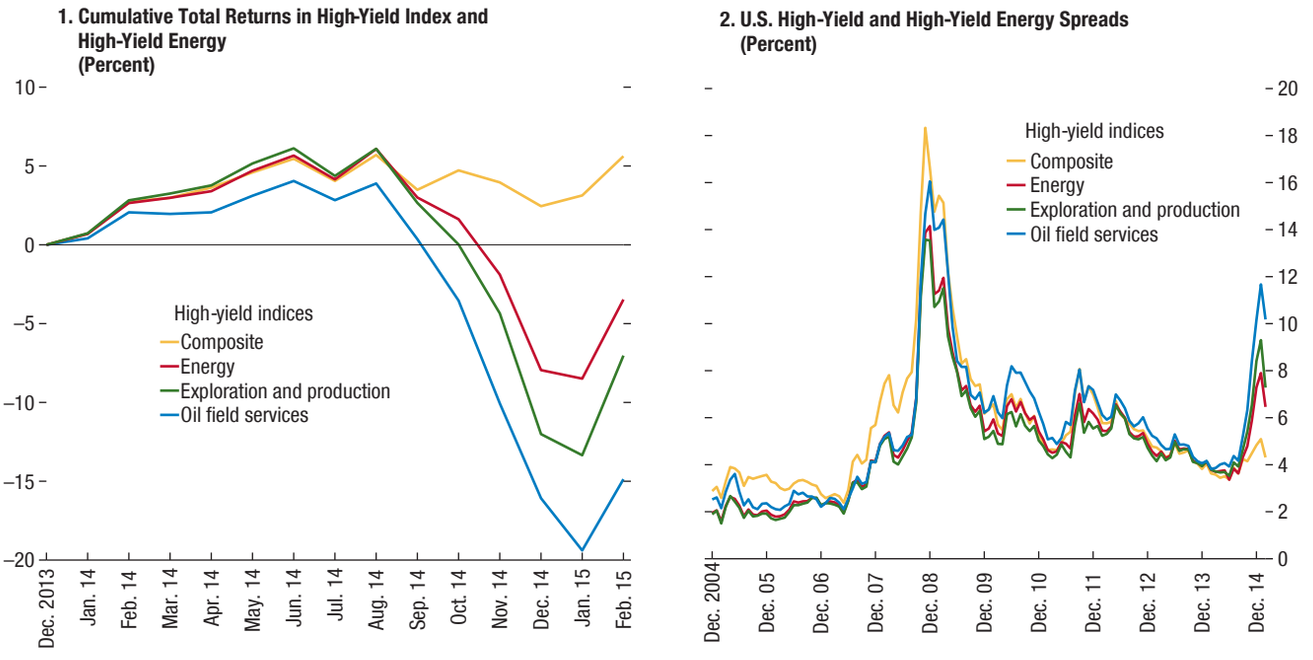
Source: Standard & Poor's Capital IQ.
Note: The weak tail is defined as the 25th percentile of the distribution of the interest coverage ratio within the sample. Small-cap and large-cap firms are defined as having market capitalizations of $100 million to $1 billion, and greater than $5 billion, respectively. The sample is a balanced panel of 1,695 firms. S&P Capital IQ classifies duty taxes related to exploration and production in the energy sector as operating expenses. LTM = last 12 months.

Leverage is being increasingly employed by equity market participants. Although there are some recent signs of stabilization, margin debt as a percentage of market capitalization remains higher than it was during the late-1990s stock market bubble. The increasing use of margin debt is occurring in an environment of declining liquidity. Average weekly trading volumes continue to decline, and although the 52-week moving average of turnover has improved somewhat over recent lows, it remains below its historical long-term average. Lower market liquidity and higher market leverage in the U.S. system increase the risk of minor shocks being propagated and amplified into sharp price corrections.

Declining oil prices could undermine credit quality in high-yield debt markets

In the wake of the sharp drop in oil prices, market participants have grown concerned about exposed credit in the high-yield sector. Since oil prices started to decline in June 2014, the cumulative decline in total returns on energy-related issues in the Barclays High-Yield Index peaked at 13 percent in January of this year, but a recov-

Figure 1.16. U.S. High-Yield Energy Markets



Sources: Barclays; and IMF staff estimates.

Sources: Barclays; and IMF staff estimates.

ery in February on the back of rising oil prices limited the cumulative decline to 9 percent (Figure 1.16, panel 1). Accordingly, the divergence between the spreads of the energy subcomponents of the Barclays High Yield Index and the broader index was in January at the widest it has been in the past 10 years (Figure 1.16, panel 2).

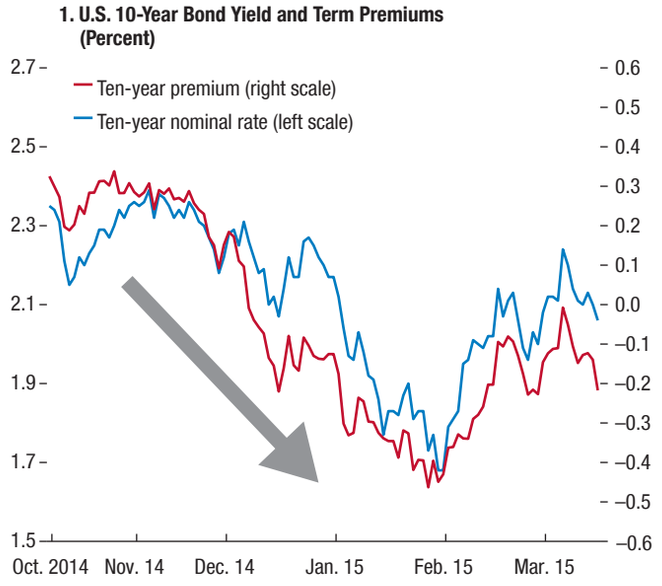
Oil-related issues comprise a significant portion of the U.S. high-yield bond market. The share has tripled during the past 10 years, largely because of the U.S. shale oil boom. Combining the high-grade and high-yield markets, energy-related bonds account for 56 percent of the bonds trading at distressed levels, and virtually all were issued by firms engaged in extraction and production and oil field servicing (Table 1.4). A positive point in this regard is that U.S. high-yield mutual funds have relatively limited exposure to the energy sector, and accordingly they have only a limited ability to amplify volatility in any potential sell-off in the high-yield energy sector. Also, thus far the contagion to the rest of the high-yield bond market has been limited.

Table 1.4. Energy's Impact on Two Barclays Corporate Credit Indices

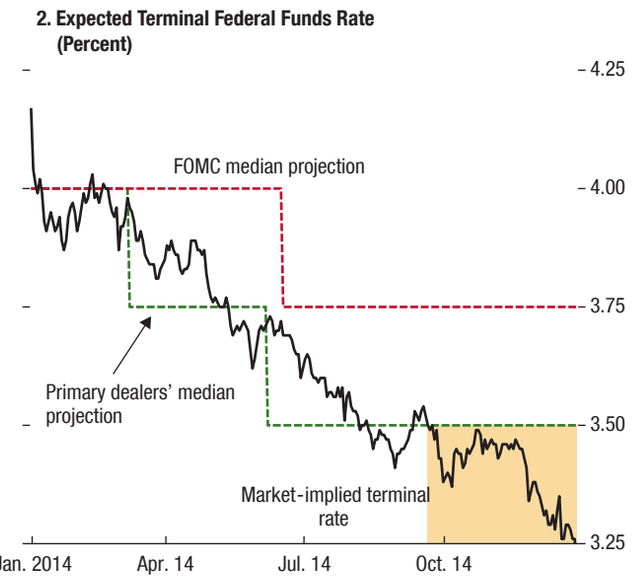
	U.S. High-Grade Index	U.S. High-Yield Index
Number of Issues in Distress, January 30, 2015[1]		
Total Index	16	182
Energy	5	101
Exploration and Production	0	67
Servicers	5	33
Number of all Issues in Index	6,039	2,238
Index Amount (US$ trillion)		
December 31, 2008	2.5	0.4
January 30, 2015	5.3	1.3

Sources: Barclays; and IMF staff calculations.
[1]Distress is defined as a bond trading below $80 per $100 par; this is a rule of thumb often used by market participants.

Figure 1.17. U.S. Interest Rates and Term Premiums



Sources: Haver Analytics; and IMF staff estimates.



Sources: Bloomberg, L.P.; Kim and Wright (K&W) (2005, updated); and IMF staff estimates.
Note: The market-implied terminal rate is derived from the 10-year Treasury rate, the 10-year term premium (Kim and Wright 2005), and the expected months to liftoff in the federal funds rate. The pace of rate hikes is assumed to be 100 basis points per year until the terminal rate is reached. FOMC = Federal Open Market Committee.

Markets remain concerned that global disinflationary forces and downside risks may yet delay the U.S. recovery

Global developments are exercising strong influence on U.S. Treasury markets. The strengthening of the dollar and lower yields in the euro area and Japan have made U.S. Treasury bonds more attractive on a relative value basis, because buyers can benefit from both the favorable yield differential and potential exchange rate gains. As a result, 10-year Treasury yields declined by 80 basis points between October 2014 and the end of January 2015, before rebounding by 50 basis points by mid-March. A large part of this movement can be attributed to a recompression of the term premium. Indeed, the term premium on U.S. Treasuries briefly declined into negative territory, pulling down U.S. long rates, even as the expected terminal federal funds rate remained steady at about 3.25 to 3.50 percent (Figure 1.17), and expected short-term rates remained stable.

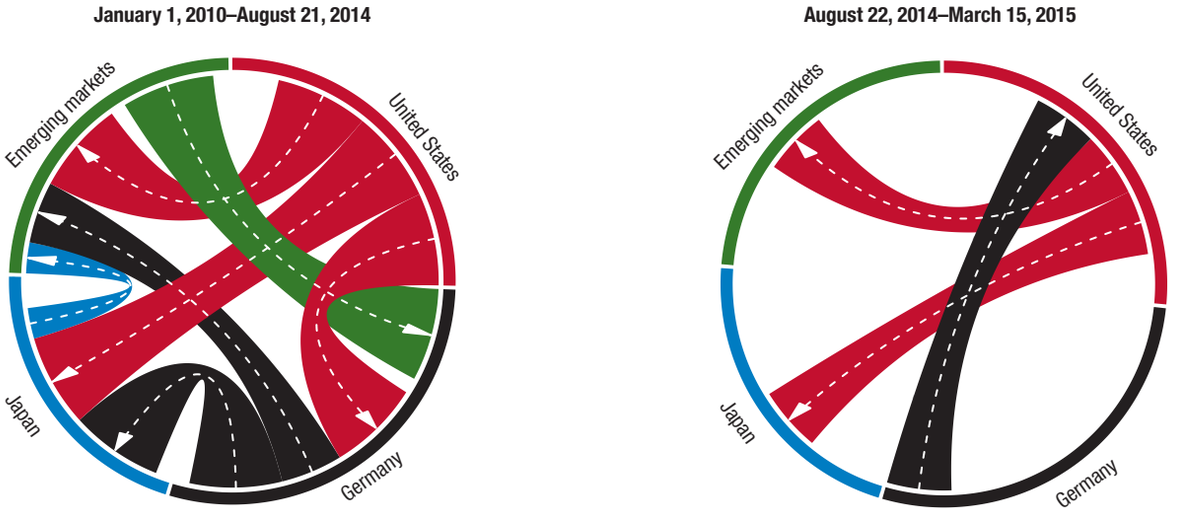
Monetary developments in the euro area have had a particularly strong effect on U.S. interest rates. At the Jackson Hole Conference in August 2014, the ECB president indicated a willingness to consider additional unconventional policy measures. Statistical analysis indicates that, before this event, changes in the 10-year Treasury rate were more likely to precede (Granger cause) changes in the 10-year German bund rate; after Jackson Hole, changes in bund yields were likely to precede (Granger cause) changes in Treasury yields (Figure 1.18, panel 1).

Recent developments in global asset markets also reflect dissonance between financial market concerns over global disinflationary pressures and the Federal Reserve's signaling of the path of U.S. monetary policy. Both market-based and survey-based expectations continue to point to mid- to late 2015 for the first hike in the U.S. policy rate. But market-based expectations for the future path of policy rates remain notably below the forecasts of most of the participants in the Federal Open Market Committee's "dot" forecasts (Figure 1.18, panel 2).[16] These influences have persisted despite the continuing improvements in the

[16]Some market analysts' forecasts for the first U.S. rate hike extend to early 2016, citing the absence of price pressure and an expectation for a U.S. recovery slowed by a strong dollar and weak foreign growth. Rates implied by futures contracts are also affected by risk premiums, and declines in those premiums can lower the implied path of the policy rate.

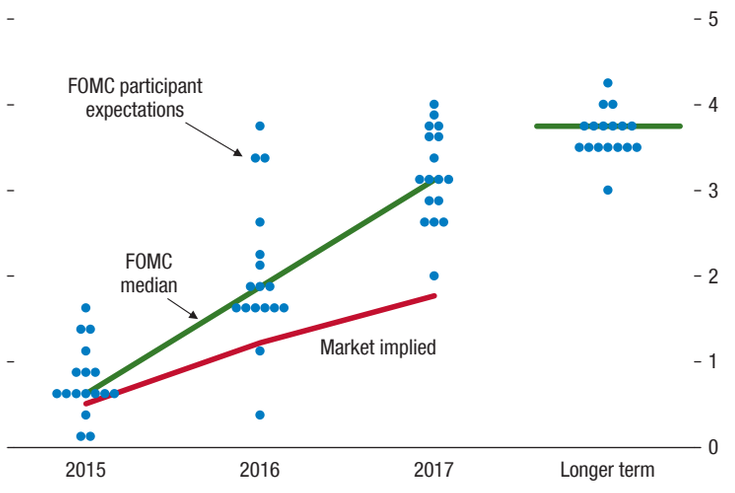
Figure 1.18. Global Interest-Rate Developments

1. Granger Causality Tests for Precedence in 10-Year Bond Yields



Sources: Bloomberg, L.P.; and IMF staff estimates.
Note: The Jackson Hole Economic Policy Symposium was held on August 22, 2014. The arrows indicate the direction of the Granger Causality. The width of bands indicates the significance of the chi-squared statistic from the Granger causality test. The widest band represents significance at the 1 percent level, the medium band at the 5 percent level, and the narrowest at the 10 percent level.

2. U.S. Policy Expectations (Percent)



Sources: Bloomberg, L.P.; and IMF staff estimates.
Note: Data is as of March 2015. Federal Open Market Committee (FOMC) meeting.

U.S. economic outlook and consistent signals from the committee on the likely trajectory for policy rates.

Financial markets are effectively signaling a significant risk that policy will not normalize as soon as the central bank is forecasting, because disinflationary forces at work in the global economy will keep inflation contained below target. Inflation swap markets are signaling a lower level of expected inflation for both the United States and the euro area, suggesting that markets are taking a more benign view of inflation prospects. If this view is correct, it is possible that the Federal Reserve may act more slowly than currently anticipated.

On the other hand, as the Federal Reserve approaches exit and rate hikes appear more imminent, Treasury yields could spike. This risk is not currently a major focus for market participants. However, as was

seen in May–June 2013, a sudden rise of 100 basis points in the 10-year Treasury yield is quite conceivable, even in a generally disinflationary context and even when central banks work to communicate their intentions in advance. Shifts of this magnitude can generate negative shocks globally, especially in emerging market economies. The anticipation of an imminent policy move could temporarily overwhelm global disinflation concerns and cause rapid decompression in the term premium. Reduced structural liquidity could exacerbate the volatility of yield adjustments.

Policies need to support economic risk taking, avert financial excesses, and enhance financial resilience

The impact of international market forces requires appropriately balanced policies, including strong macroprudential policies. In particular, regulators must continue their efforts to understand the less closely regulated corners of the financial sector that could cause problems for the banking system. Existing regulatory frameworks may need to be reassessed to enable authorities to better identify and measure the activities of nonbank entities. Policymakers should support further economic risk taking, such as tax reforms that could encourage firms to build capacity and increase employment.

Given the risks and uncertainties surrounding the normalization of U.S. monetary policy, central bank officials must continue to follow a transparent and carefully calibrated communications strategy to manage the policy-tightening process that is expected to commence this year. The potential impact of increased volatility and portfolio adjustments that could accompany the move toward policy rate normalization makes this task especially crucial. The section titled "When Market Liquidity Vanishes" examines some of the potential risks from decreased market liquidity and changing patterns of correlation in key financial markets.

When Market Liquidity Vanishes

As U.S. monetary policy normalizes, the temporary boost to market liquidity provided by monetary accommodation will ebb, revealing a changed capital market landscape. Without the buoyant liquidity provided by the Federal Reserve, the liquidity-inhibiting impact of regulatory changes, industry consolidation, and other secular factors will likely become more pronounced. Markets could be increasingly susceptible to episodes in which liquidity suddenly vanishes and volatility spikes.

Two recent price disruptions—the October 15, 2014, volatility in U.S. Treasuries and the January 15, 2015, surge in the Swiss franc—involved an initial shock that was likely amplified by market makers' withdrawal of liquidity support. Many of the factors responsible for lower market liquidity also appear to be exacerbating risk-on/risk-off market dynamics and increasing cross-asset correlations during times of market stress. These phenomena suggest that low market liquidity may act as a powerful amplifier of financial stability risks.

Rising market liquidity risks

As discussed in the October 2014 *Global Financial Stability Report,* capital markets are now more important providers of credit than they were in the past, with a growing share of fixed-income instruments held by mutual funds. Inflows into mutual funds have provided an illusion of liquidity in credit markets, but changes in market structure may exacerbate illiquidity in times of stress.[17] Banks have reduced their market-making activities, and more investors are now following benchmarks. A combination of lower dealer inventories, elevated asset valuations, flight-prone investors, and vulnerable liquidity structures have increased the sensitivity of key fixed-income markets to increasing market and liquidity risks.

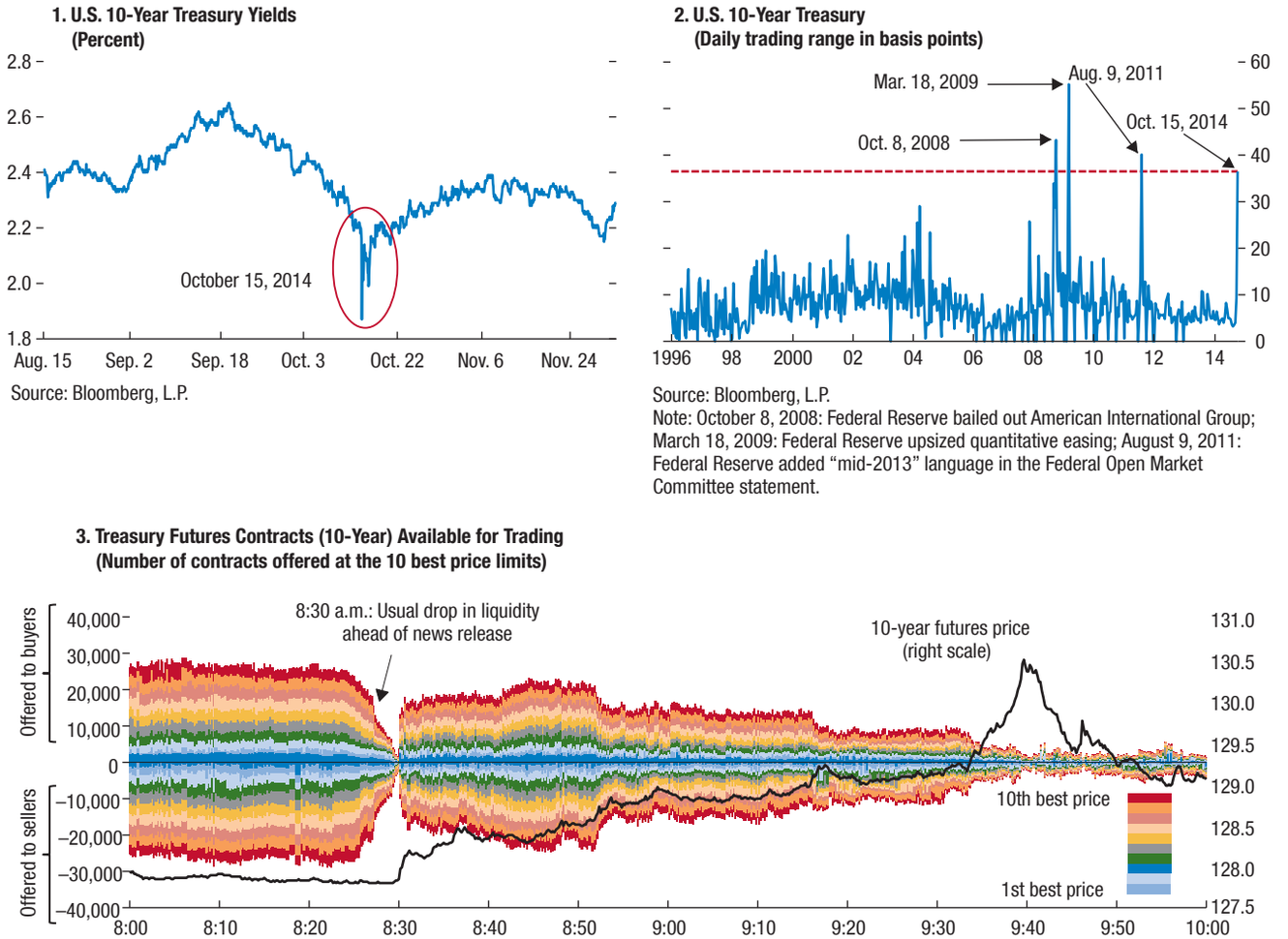
Economic and policy tensions leave global markets vulnerable to bouts of illiquidity that could prove systemic

Asynchronous monetary policies and divergent economic prospects have led to a sharp increase in volatility in foreign exchange markets. Global disinflationary pressures and accompanying policy responses have compressed longer-term U.S. bond yields. A sudden shift in market views that unwinds compressed premiums and sends yields higher could trigger a market liquidity shock. Asset valuations remain elevated relative to the past 10 years as monetary policies continue to exert downward pressure on spreads, but could widen on U.S. exit from monetary accommodation. This could reverse recent causality channels discussed elsewhere in this chapter, sending shock waves through global markets.

Policy tensions led the central bank of Switzerland to unexpectedly abandon its support for a ceiling on the value of the franc against the euro on January

[17]Financial stability risks related to mutual funds are also discussed in Chapter 3.

Figure 1.19. The October 15 Flash Rally in U.S. Treasuries



Source: Bloomberg, L.P.

Source: Bloomberg, L.P.
Note: October 8, 2008: Federal Reserve bailed out American International Group; March 18, 2009: Federal Reserve upsized quantitative easing; August 9, 2011: Federal Reserve added "mid-2013" language in the Federal Open Market Committee statement.

Sources: CME DataMine; and IMF staff estimates.
Note: Liquidity is measured by the number of contracts offered to buyers and sellers at the top 10 best price limits.

15, 2015. The franc immediately surged by as much as 41 percent against the euro, and not surprisingly, some participants widened bid-ask spreads or refused to quote in the currency. Foreign exchange liquidity overall collapsed and became less available than it was during the 2011–12 euro crisis or the 2013 "taper tantrum" concerning prospective U.S. monetary policy.

On October 15, 2014, U.S. Treasuries and related markets experienced one of their largest intraday changes in yields in the past 25 years.[18] Yields on 10-year bonds fell by 37 basis points from the previous day before rebounding quickly (Figure 1.19, panel 1), and volatility spread to closely related asset classes (U.S. dollar swaps) and to equities (with a lag). To put this event in perspective, the decline in yields was larger than that on September 15, 2008, when Lehman Brothers filed for bankruptcy. When compared with recent trading, the massive intraday price change on October 15 was an extremely rare occurrence (Figure 1.19, panel 2).

The rally in Treasuries on October 15 was reportedly initiated by a variety of poor data releases and one-sided positioning, but was likely amplified by the retreat of traditional market makers from their customary role of warehousing risk. As the number of Treasury futures contracts available for purchase or sale declined, individual trades had a larger effect on the market

[18]See Bouveret and others, forthcoming, for a detailed analysis of the events of October 15.

price than they would normally have had (Figure 1.19, panel 3). Although the rising price and vanishing liquidity allowed the "flash dynamic" to take off more than an hour into the ongoing market reaction to the data releases, both were just as quickly reversed. The event remains under investigation by U.S. authorities, but a number of factors are likely to have contributed to it.

Why have market shocks become more amplified?

Market shocks are easily propagated when liquidity is low. As highlighted elsewhere in this chapter, technological change, regulation, and the shifting composition of market participants have altered the microstructure of the Treasury market and fixed-income markets more broadly. As a result, participants cannot always rely on dealers to provide sufficient liquidity in volatile markets, making them more vulnerable to liquidity shocks. Moreover, market safeguards may no longer be appropriately calibrated to changing market conditions. More specifically,

- *Automation and the rise of high-frequency trading*—Treasury bonds and Treasury futures trade almost exclusively on electronic platforms, which allow algorithmic and high-frequency traders to capture an expanding market share. High-frequency trading is estimated to account for at least 50 percent of cash market volumes and 60 to 70 percent of futures trading activity (Jiang, Lo, and Valente 2014; Tabb 2012; and Chicago Mercantile Exchange 2010). Responding to competition from these sources, even traditional market makers have increasingly adopted algorithmic trading strategies. Market participants report that liquidity provision has become more dependent on programmed reaction functions and less on client-based relationships. In a more anonymous, short-term, profit-oriented trading environment, fewer participants make their pools of liquidity available in risky conditions to help stabilize the market.
- *Reduction in market making by traditional dealers*—Banks claim that their ability to make markets and therefore provide liquidity has diminished with the tightening of regulation in recent years.[19] Similarly, pension funds and insurance companies are less able to play a countercyclical role in financial markets because of tighter requirements to minimize asset-liability mismatches.
- *Inadequate market safeguards*—Existing safeguards can fail to limit abnormal price movements in markets dominated by automated trading. On October 15, 2014, circuit breakers were not triggered on futures markets because trades continued to take place as the market moved through successive price levels without gaps. But because the number of contracts available at each price level was small, prices rose rapidly with each successive execution, giving market participants no real opportunity to liquidate significant positions at the market price.
- *Emergence of less-regulated nonbank market intermediaries*—Access of leveraged retail investors to foreign currency brokers allowing bets against the Swiss franc exacerbated the price surge. In many cases, heavily leveraged positions involved little coordination or oversight by authorities. Many retail investors were either unaware of the risks or had explicit or implicit guarantees from their foreign exchange brokers that they could not lose more than their deposits. However, when the franc suddenly and sharply moved against their positions, their high degree of leverage generated losses far greater than their account equity. Two firms were driven into insolvency, and a retail broker reported losses of nearly $225 million.
- *Benchmarking*—More market participants are using benchmarks by investing in indices or in underlying baskets of securities.[20] Several factors are driving this trend, including restricted access to leverage from prime brokers and demands from investors for tighter risk management and greater transparency. As more asset managers focus on benchmarks, assets not in the benchmark index suffer a decline in liquidity.
- *Use of derivatives and exchange-traded funds*—The increasing trading of index-based instruments such as derivatives and exchange-traded funds may amplify the effects of benchmarking in limiting liquidity. When dealers use the cash market to hedge their exposure to a client's derivatives contract on an equity index, they need to replicate a simultaneous opposing order for each stock in the index.[21] This

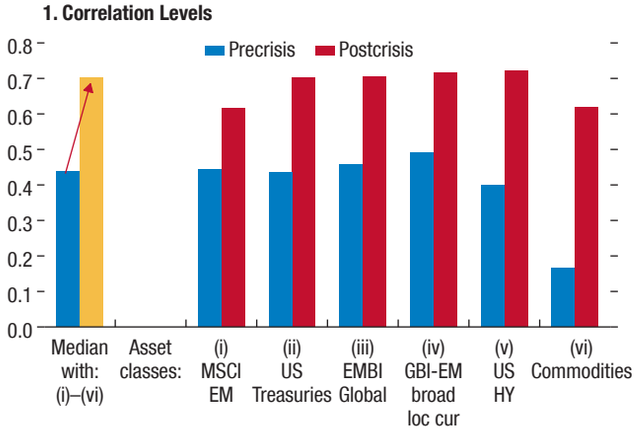
[19]To a degree this may be related to restrictions on proprietary trading and to more demanding capital requirements, which may have limited the capacity of banks to hold inventories and conduct repurchase agreement operations (see Powell 2015).

[20]Mutual funds own a rising share of risky assets, particularly in the less liquid credit markets, and hedge funds are increasingly behaving in a more benchmark-centric manner (see the October 2014 *Global Financial Stability Report*).

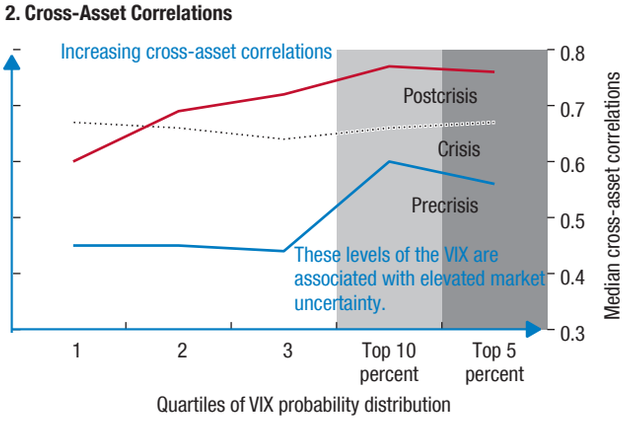
[21]Similar dynamics apply to broad-index exchange-traded funds. Although buying a future does not directly lead to the purchase of the

Figure 1.20. Asset Comovements and Correlation Spillovers

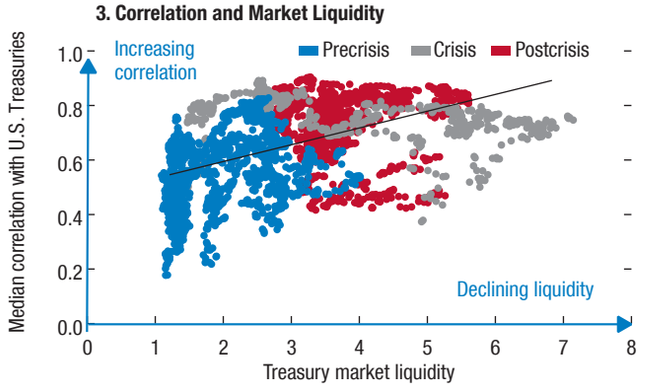
Correlations among major asset classes have risen markedly since 2010.



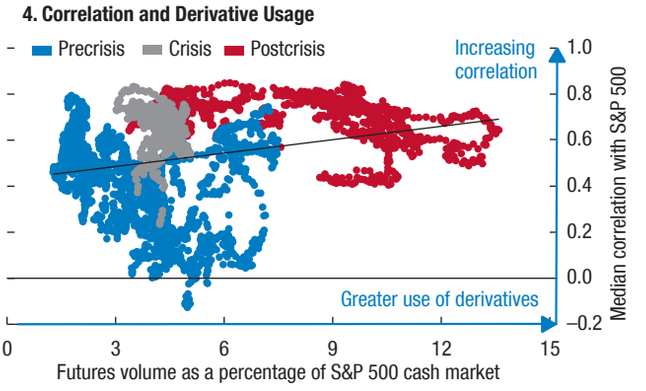
Cross-asset correlations increase with higher market volatility (VIX).



Declining liquidity is driving correlations.



Greater use of derivatives is also driving correlations higher.



Sources: Bank of America Merrill Lynch; Bloomberg, L.P.; Federal Reserve; JPMorgan Chase and Co.; and IMF staff calculations.
Note: Precrisis period denotes January 1, 1997, to June 30, 2007; crisis period July 1, 2007, to December 31, 2009; and postcrisis period January 1, 2010, to December 31, 2014. Cross-asset correlation is measured as the median of the absolute values of pair-wise correlations over a 60-day window between the daily Sharpe ratios of the asset classes listed in panel 1. Market liquidity is measured as the ratio of returns on the U.S. Treasury–wide index to the turnover of the U.S. Treasury market. The higher the ratio the lower the liquidity, because large amounts cannot be traded without a significant impact on prices. The median correlations in panels 3 and 4 are of the U.S. Treasury 7–10-year index and the S&P 500 index against all six other asset classes as shown in panel 1. MSCI EM = MSCI Emerging Markets Equity Index; U.S. Treasuries = 7–10-year U.S. Treasury Index; EMBI Global = JPMorgan Emerging Markets Bond Index Global; GBI-EM broad loc cur = JPMorgan Government Bond Index-Emerging Markets in local currency; US HY = U.S. High-Yield Index; Commodities = Credit Suisse Index; VIX = Chicago Board Options Exchange Market Volatility Index.

leads to further differentiation in liquidity between securities included and excluded from indices.

Illiquidity events can spill over to other asset classes and emerging markets

These structural shifts in markets may have also contributed to higher asset price correlations. With lower liquidity, less market making, and more benchmarking, asset prices are more likely to be driven by common shocks, particularly at higher frequencies, than by their respective idiosyncratic fundamentals. Both the decline in market liquidity and the increasing use of derivatives are associated with higher asset price correlations over the past five years (Figure 1.20, panels 3 and 4).[22] This is particularly evident during periods of stress, when flow liquidity reverses and volatility increases.[23]

constituents in the index, it will have an impact on the underlying securities through the actions of index arbitrageurs such as hedge funds.

[22]The replication impact on the securities that make up an index when derivatives are traded naturally pushes up intra-asset correlations. Increasing trading of derivatives also drives up cross-asset correlations. For example, it is not uncommon for credit investors to hedge their portfolios with liquid futures and options on equity indices.

[23]Flow liquidity, or the capacity to trade assets cheaply during normal market conditions, has been enhanced by the rise in flows

A rise in correlations during periods of stress is often seen as one of the main attributes of contagion (see, for example, Pericoli and Sbracia 2004).

Correlations among risk-adjusted returns of major asset classes have increased markedly since 2010 (Figure 1.20, panel 1).[24] The correlation of the S&P 500 with U.S. high-yield indices has shown a steep increase, and the correlation with commodities has increased fourfold. The substantial rise in correlations between asset markets in advanced and emerging market economies points to an increased possibility of contagion or spillovers in periods of stress.

Asset price comovement has become stronger during periods of high market volatility. Correlations normally increase during periods of market turbulence. However, over the past five years, correlations have been rising to much higher levels, often to 0.7 or beyond, in periods of high volatility (Figure 1.20, panel 2).

The increase in correlations during stress periods suggests greater risks of contagion across asset classes or borders. It also points to the importance of liquidity as an amplifier of other risk factors. Consequently, policies that address the sources of low liquidity should be seen as part of a comprehensive financial stability framework.

What can policymakers do to address illiquidity and stability spillovers?

Policymakers should seek to address the liquidity mismatch in the asset management sector. As discussed in the October 2014 *Global Financial Stability Report,* a major concern is the market liquidity risk arising from the mismatch between the liquidity promised to mutual fund owners in good times and the cost of illiquidity when meeting redemptions in times of stress, particularly in the less liquid corporate and emerging market bond markets. Policymakers should seek to address this mismatch by adopting policies that remove incentives of asset owners to run by aligning redemption terms of funds with the underlying liquidity in the assets in which they are invested. They could also adopt policies that enhance the accuracy of net asset values, increase liquidity cash buffers in mutual funds, and improve the liquidity and transparency of secondary markets, specifically for longer-term debt markets.

Chapter 3 finds that the asset management industry needs stronger oversight that combines better microprudential supervision of risks with the adoption of a macroprudential orientation. These findings suggest that securities regulators should shift to a more hands-on supervisory model, supported by global standards on supervision and better data and risk indicators. The roles and adequacy of existing risk management tools should be reexamined, taking into account the industry's role in systemic risk and the diversity of its products.

Policies are also needed to strengthen market structures, including in the more liquid fixed-income markets such as government bond markets. Authorities could consider encouraging market participants in government bond markets to provide liquidity in normal trading conditions, thereby forestalling the deterioration of trading liquidity. Drawing on examples from other advanced markets, authorities could consider either rewarding primary dealers with incentives and/or obligating them to maintain their willingness to trade passively (by providing quotes) or to participate actively. Importantly, these approaches should not necessarily require dealers to maintain a market presence during unusual bouts of extreme volatility. Reporting requirements could reinforce these approaches, typically on an ex-post basis.

Futures exchanges for U.S. Treasury markets could consider introducing designated market makers.[25] Unlike some equity markets, futures markets for Treasuries do not have designated market makers who provide liquidity. By providing fee rebates and other incentives, exchanges could effectively charge market participants for the provision of risky market-making services. Authorities could also consider best-practice guidelines for market makers.

Market safeguards can help stop panics in periods of heightened volatility. In the U.S. Treasury futures markets, current market safeguards should be recalibrated to prevent a market dislocation of the scale observed on October 15, 2014, and periodically reviewed to ensure that they are up to date and relevant. The authorities could consider introducing similar market safeguards in the U.S. Treasury cash market. Adequate coordination of such safeguards across cash and related derivatives markets would help prevent liquidity arbitrage across platforms.

into mutual funds and exchange-traded funds. The effect may be masking the negative impact of declining market making on other measures of market liquidity, such as depth and breadth (see the October 2014 *Global Financial Stability Report.*

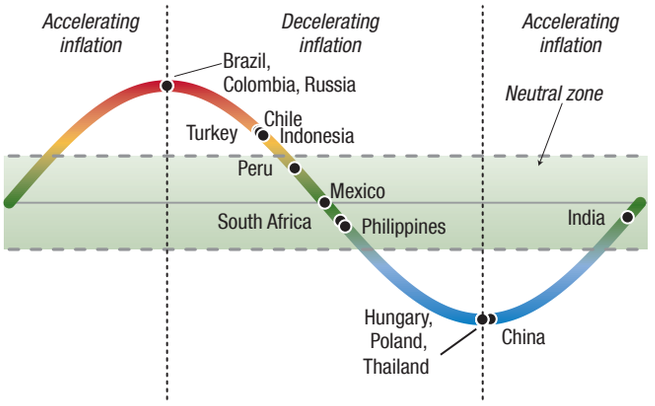
[24]The median correlation of the risk-adjusted returns between the S&P 500 and the six major asset classes in the figure has almost doubled from 0.44 in 1998–2007 to 0.70 in the past five years. Sharpe ratios are used to calculate risk-adjusted returns to control for differing risk characteristics across asset classes.

[25]For a discussion of how designated market makers with well-designed obligations can support liquidity and price efficiency in order-driven markets, see Bank of England 2012.

Figure 1.21. Wide Range in the Inflation Outlook of Emerging Market Economies

Inflationary pressures in emerging market economies are broad...

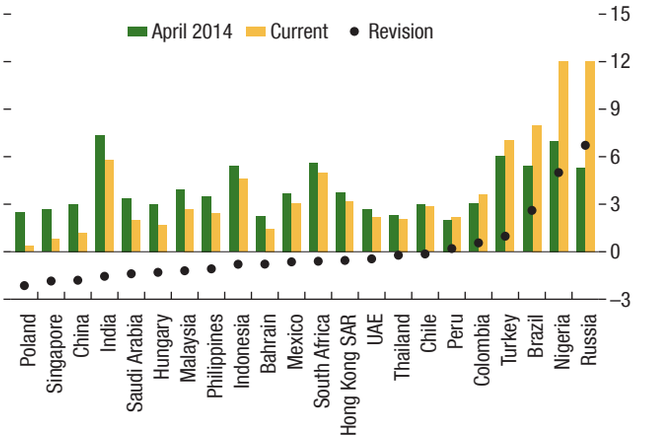
1. Headline Inflation Phase Curve (February 2015)



Sources: National authorities; and IMF staff calculations.
Note: Countries are placed on the phase curve according to where their February 2015 year-over-year headline inflation print is relative to (1) central bank inflation target band (where available), (2) three-month trend, and (3) efficacy of monetary policy (using inflation targeting performance in previous two years). When inflation is in the central bank band, it is placed within the dotted lines, otherwise outside, and the distance from the closest dotted line is determined by criterion 3, because inflation expectations are not considered. Future inflation prints may not follow the arc trajectory.

… but inflation is expected to decelerate in most countries in 2015, with a few exceptions.

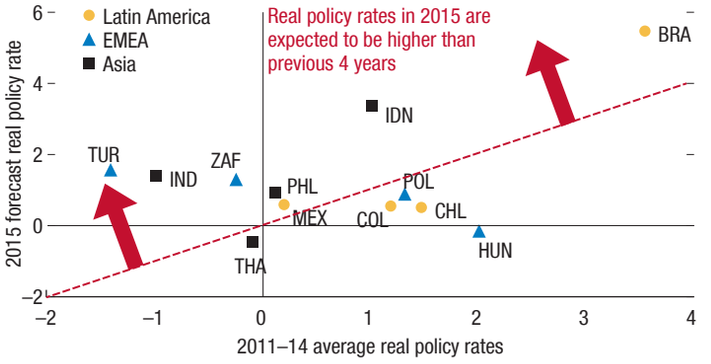
2. 2015 Forecast Headline Inflation (Year over year, percent)



Source: IMF, World Economic Outlook database.
Note: UAE = United Arab Emirates.

Real rates are expected to remain high in 2015, and higher than in the previous four years for many emerging markets.

3. Real Policy Rates in Major Emerging Markets (Ex post, percent)



Sources: Bloomberg, L.P.; IMF, World Economic Outlook database; and IMF staff calculations.
Note: The 2015 forecast real policy rate is calculated using the end-2015 policy rate as implied by the market (using forward-rate agreements or interest rate swaps) and the *World Economic Outlook* end-2015 headline inflation forecast. BRA = Brazil; CHL = Chile; COL = Colombia; EMEA = Europe, Middle East, Africa; HUN = Hungary; IDN = Indonesia; IND = India; MEX = Mexico; PHL = Philippines; POL = Poland; THA = Thailand; TUR = Turkey; ZAF = South Africa.

Risk management at trading firms should be reinforced, including from a macroprudential perspective. Supervisors should provide coordinated guidance to trading firms, allowing them to set consistent and appropriate risk limits on individual retail investors, or at the level of the exchanges (circuit breakers and limits on trading firms' positions), or at the level of the clearing firms. Supervisors should also investigate whether retail platforms are adequately capitalized to honor guarantees on loss limits for leveraged retail investors under stressed conditions. Retail firms need to improve their ability to monitor the aggregate risk of their

clients in real time while, as discussed in Chapter 3, regulators should enhance the microprudential supervision of risks from individual institutions that builds on their own risk analysis and stress testing. Regulators and monetary authorities should take the dynamics of asset correlations and volatility into account when evaluating systemic risks in financial markets.[26]

Emerging Markets: Safeguarding the Financial Sector against Global Headwinds

Commodity price declines are exacerbating ongoing corporate balance sheet strains in some emerging market economies, adding to headwinds from overcapacity, real estate sector adjustments, and property price declines (particularly in China). This is despite the benefits of additional monetary policy space provided by lower commodity prices and lower inflationary pressures. Elevated volatility and the rapid depreciation of local currencies for some economies jeopardize financial stability of firms that have borrowed heavily in foreign currencies. These developments outweigh the financial stability benefits from improved competitiveness provided by depreciating currencies. Overall, these shocks have increased financial stability risks in emerging market economies, given the increased leverage in the public and private sectors, and authorities need to enhance surveillance of vulnerable sectors.

Inflation dynamics vary across emerging market economies, and some of those economies are gaining monetary policy space to support growth

IInflation dynamics in emerging market economies are diverse (Figure 1.21, panel 1). Most of South American economies and Russia continue to experience accelerating inflation pressure or above-target inflation, while Hungary, Poland, and many Asian economies have seen falling or low inflation (Figure 1.21, panel 2). Some economies are benefiting substantially from the impact of lower oil prices and increased monetary policy space. India and South Africa, for example, are expected to have inflation decelerate to their target bands by the end of 2015.[27] As net commodity-importing economies, India, and to a lesser extent Turkey, are expected to reduce their external imbalances and have a chance to improve their resilience by enabling necessary reforms.

Easing inflation pressure provides a welcome increase in monetary policy space for countries in which growth is expected to decelerate. Markets expect real policy rates to decline relative to recent years in economies with large inflation gaps, such as Hungary, Poland, and Thailand (Figure 1.21, panel 3), which in turn can help strengthen financial stability by reducing the debt burden of domestic currency debt. Elsewhere, central banks may have only limited ability, or willingness, to significantly cut rates. For Brazil, India, Indonesia, and Turkey, the expected increase in real policy rates in 2015 relative to the previous four years may boost the cost of debt service in the private sector, where credit has grown strongly in recent years.

The following challenges confront some emerging market economies to varying degrees:

- Retrenchment of overinvested industries, real estate sector adjustments, and property price declines, particularly in China, which could spill over to emerging markets more broadly.
- Price declines in oil and other commodities, which hurt commodity-exporting countries and related corporate sectors.
- Ongoing dollar appreciation and the resulting upward revaluation of foreign currency liabilities, which creates balance sheet strains for indebted emerging market firms and sovereigns.

Disinflationary pressures in China may complicate the transition to slower but safer growth, while real estate sector adjustments and overcapacity in leveraged industries are key financial stability risks

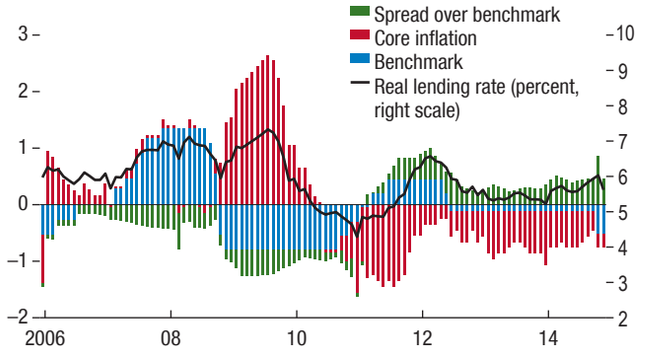
In addition to food and energy prices, China's disinflation pressure may reflect more durable forces, including debt-financed supply-demand imbalances that have built up since 2008. Overcapacity in some heavy industries and excess supply in the real estate market are likely contributing to downward pressure on inflation. Disinflationary pressures are keeping real interest rates high (even when calculated using less volatile core infla-

[26]Other initiatives, such as the G20 Financial Stability Board's recent proposal (issued jointly with the International Organization of Securities Commissions) on the supervision of global systemically important financial institutions to cover traditional funds and their managers (rather than just the funds), also merit attention.

[27]Hong Kong SAR and Singapore are categorized as advanced economies, but they are included in this section because as international financial centers that cater primarily to emerging market economies, their banking and corporate sectors are influenced by the forces analyzed here.

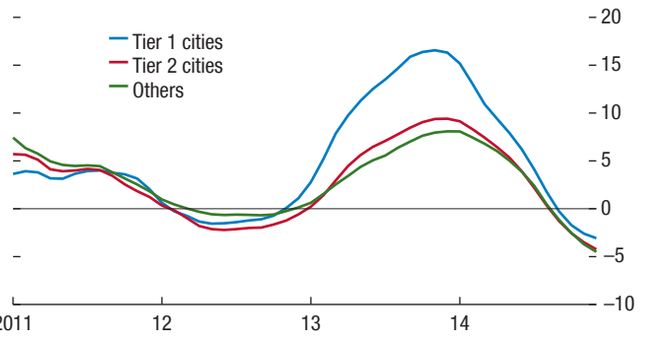
Figure 1.22. China: Real Estate and Interest Rate Developments

1. Effective Real Bank Lending Interest Rate
(Contribution to deviation from average; percentage points)



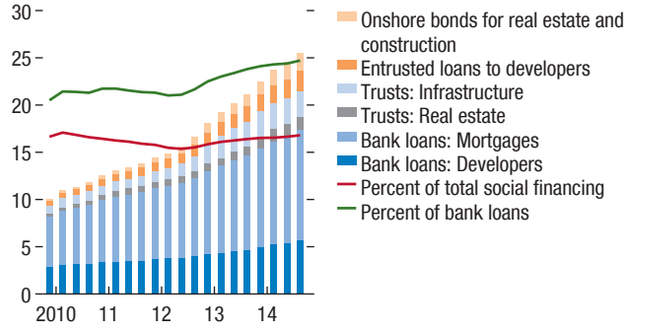
Sources: CEIC; and IMF staff calculations.
Note: Percentage point contribution to deviation of weighted average lending rate from the 2005–15 average. Weighted average interpolated from quarterly data and estimated from a linear model using benchmark rates and new loan relative pricing before 2009.

2. New Home Price Growth
(Percent, year over year)



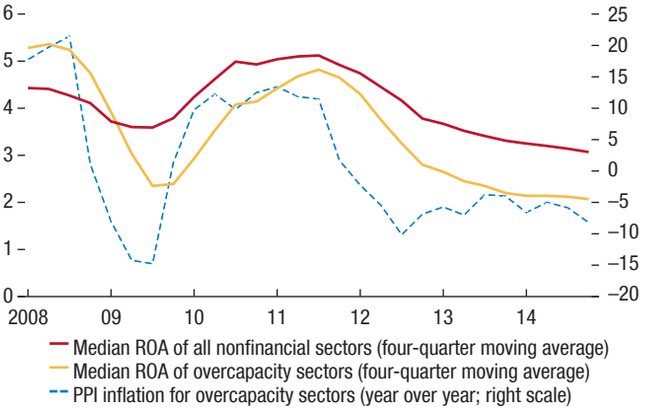
Sources: CEIC; National Bureau of Statistics (NBS); and IMF staff calculations.
Note: New home price growth is the simple average of year-over-year change of NBS-compiled property price indices for newly constructed residential buildings in 70 medium and large cities grouped by different tiers. Tier 1 cities include Beijing, Guangzhou, Shanghai, Shenzhen, and Tianjin.

3. Lending to Real Estate Sector
(Trillions of renminbi, unless otherwise noted)



Sources: CEIC; China Trust Association; People's Bank of China; and IMF staff calculations.
Note: Assumed 20 percent of entrusted loans are to the real estate sector. The entrusted loans to developers and onshore bonds for real estate and construction are captured by the total social financing (TSF).

4. Listed Firms' ROA and Inflation
(Percent)



Sources: CEIC; WIND Information Co.; and IMF staff calculations.
Note: Overcapacity sectors include building materials, chemicals, and mining. PPI = producer price index; ROA = return on assets.

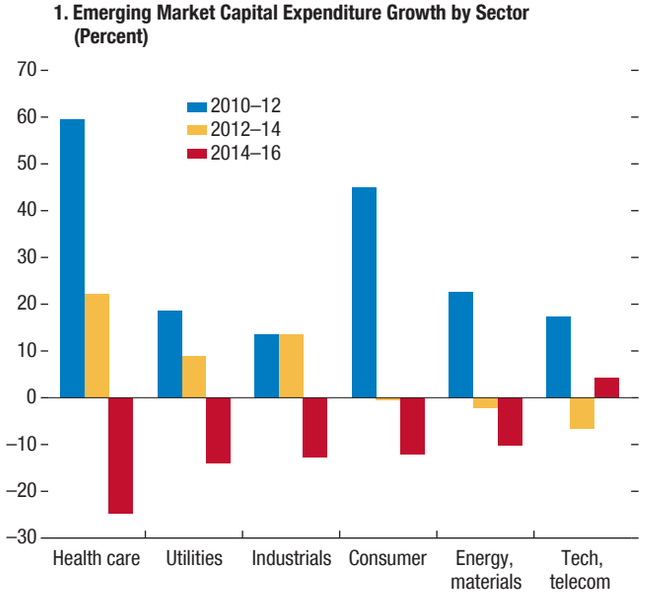
tion) and contributing to tighter real financial conditions, notwithstanding slowing growth (Figure 1.22, panel 1). If these trends intensify, they could engender a disinflationary feedback loop in which further declines in inflation raise the real cost of debt service for highly leveraged firms in weaker sectors, leading to potentially abrupt and disorderly deleveraging, a further slowdown in activity, and more downward pressure on prices.

Lower real estate prices are necessary in China for an improved supply-demand balance, but they could lead to higher-than-expected losses in the financial sector (Figure 1.22, panel 2). Currently, levels of nonperforming property loans reported by banks remain subdued. Credit exposures to real estate, excluding mortgages, stood at about 12 trillion yuan ($1.9 trillion, or 19 percent of GDP) at the end of 2014 (Figure 1.22, panel 3).[28] Moreover, financial stress among real estate firms

[28]Assuming most trust real estate and infrastructure assets (often related to property development) are in the form of loans. However, the true total may be higher if lenders and borrowers found ways to overcome tighter restrictions placed in 2010 on lending for property development, such as by classifying loans for other purposes.

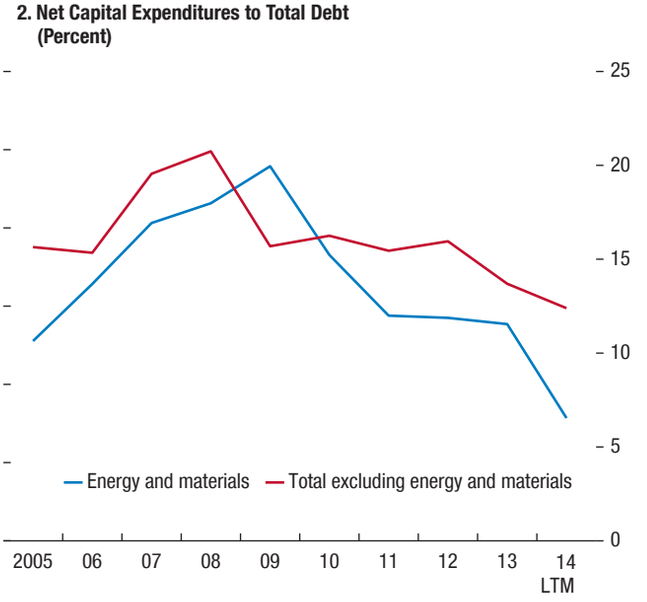
Figure 1.23. Emerging Market Nonfinancial Corporate Investment Continues to Shrink

Emerging market firms are expected to continue reducing capital spending across most sectors...



Sources: S&P Capital IQ; and IMF staff calculations.
Note: Calculated on a balanced panel of 2,075 firms from 20 major emerging market economies. Estimates for 2014–16 from S&P Capital IQ.

...and stripping out maintenance reveals reduced investment, particularly among commodity firms.



Sources: S&P Capital IQ; and IMF staff calculations.
Note: Net capital expenditures = capital expenditures – depreciation. Calculated on a balanced panel of 1,274 firms from 20 major emerging market economies. LTM = last 12 months.

could lead to direct cross-border spillovers, given gross issuance of about $130 billion in external bonds since 2010. An instance of such a spillover was a missed payment by the developer Kaisa in January 2015, which contributed to sharply curtailed issuance and wider spreads across Asia's high-yield bond market. Uncertainties related to the seniority of external creditors and their access to borrower collateral could rise sharply.

Falling output prices are eroding the profitability of sectors with overcapacity and worsening their debt-service capacity (Figure 1.22, panel 4). These sectors, which include building materials, chemicals, and mining, have also borrowed heavily since 2009. As with the property sector, falling output prices are welcome if they result in the exit of unprofitable firms and a return to financially sustainable growth. Such an adjustment, however, could mean potentially substantial losses for creditors. For banks, on-balance-sheet exposures to these sectors look manageable. But their off-balance-sheet exposures, which some may have used to evade macroprudential edicts against lending to these sectors, may be much higher. As banks recognize these contingent liabilities, the losses could quickly erode their seemingly ample capital buffers.

China's case is instructive for some sectors of other emerging market economies where excess capacity and overinvestment could create additional disinflationary pressures. Emerging market firms, which have been reducing their capital investment since 2011 (see the April 2015 *World Economic Outlook,* Box 4.1, for a broader exposition), have more recently been cutting back across all sectors on the investment plans (Figure 1.23, panel 1) that were funded by big debt increases. The share of net capital expenditures to total debt over the past two years has declined, and is more pronounced among commodity firms, which also account for nearly half of capital expenditures of nonfinancial firms (Figure 1.23, panel 2). As with China, these developments pose the risk of a disinflationary feedback loop.

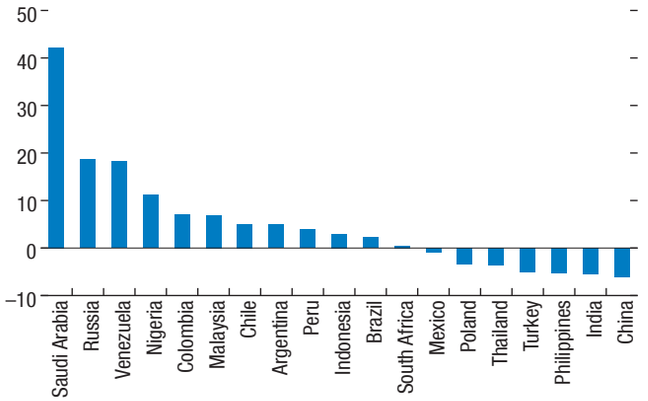
Commodity price declines are exacerbating balance sheet strains in some emerging market economies

In most emerging market economies, lower commodity prices are boosting consumption, helping to offset lost output from general trade shocks and providing greater monetary policy space. However, they may also give rise to financial stability concerns. For others, the decline in commodity prices during the past nine months has led

Figure 1.24. Dependence of Emerging Market Sovereigns on Commodities, and Market Reaction

Emerging market economies that rely heavily on commodity exports...

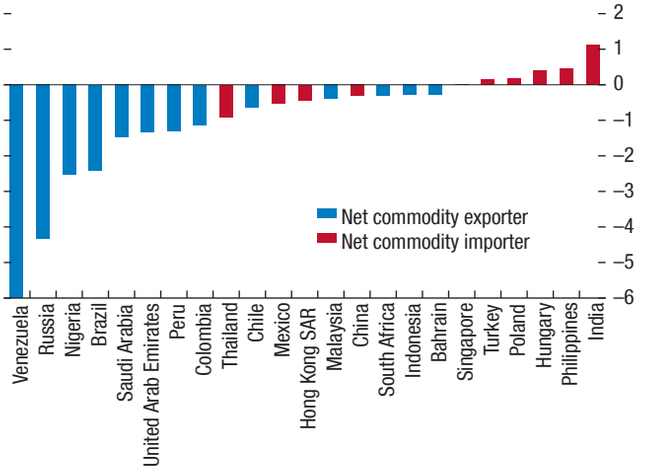
1. Net Exports of Commodities (Share of 2014 forecast GDP, percent)



Sources: IMF, World Economic Outlook database; UN Comtrade; and IMF staff calculations.
Note: The UN Comtrade commodity net exports for 2013 comprise commodity codes 0 through 4, using Standard International Trade Classification Revision 3.

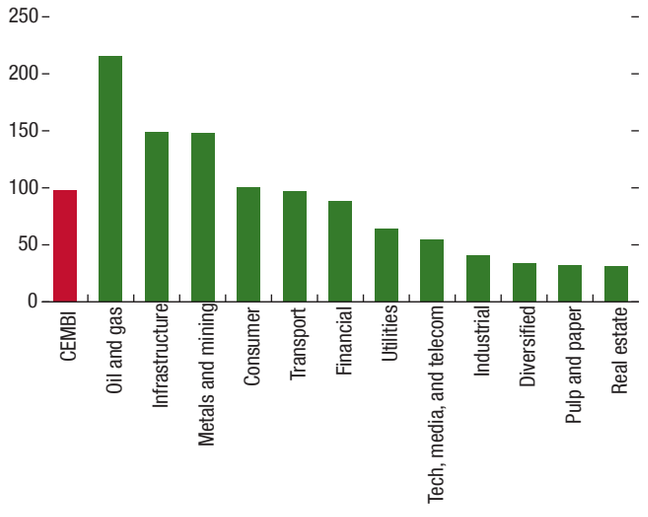
...generally had the greatest growth revisions.

2. 2015 Forecast Real GDP Growth Revision from October 2014 (Percentage points)

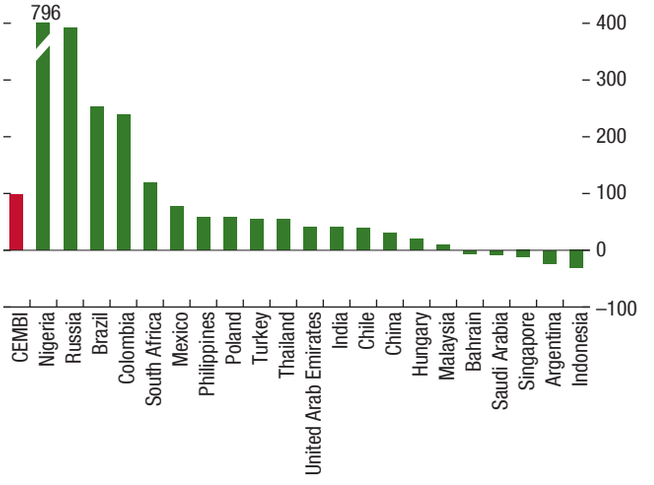


Sources: IMF, World Economic Outlook database; UN Comtrade.
Note: See Figure 1.24, panel 1 for categorization of commodity exports.

3. Change in the CEMBI Index Spread (June 30, 2014, to March 18, 2015, by sector, basis points)



4. Change in the CEMBI Index Spread (June 30, 2014, to March 18, 2015, by country, basis points)



Source: JPMorgan Chase & Co.
Note: CEMBI = Corporate Emerging Markets Bond Index.

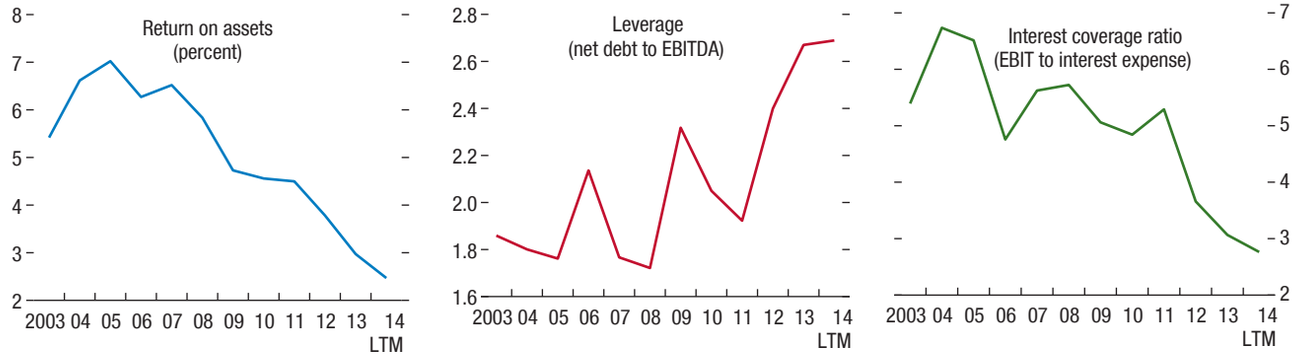
to sizable downward revisions of economic activity for some major commodity-exporting countries (Figure 1.24, panels 1 and 2). Commodity price shocks have become systemic for the oil and gas sector in Nigeria, Russia, and Venezuela, and markets have reflected that fact (Figure 1.24, panel 4). Lower revenue and higher public indebtedness in Nigeria and Venezuela, for example, have limited the ability of those countries to react to the growth downturn (see the April 2015 *Fiscal Monitor*).

Since 2007, energy firms have issued one-third of all hard-currency nonfinancial emerging market corporate bonds as they took advantage of accommodative financial conditions to borrow heavily in international bond and syndicated loan markets to expand their operations

Figure 1.25. Energy Corporate Sector Metrics

The balance sheet deterioration for the emerging market energy sector started even before the oil price decline...

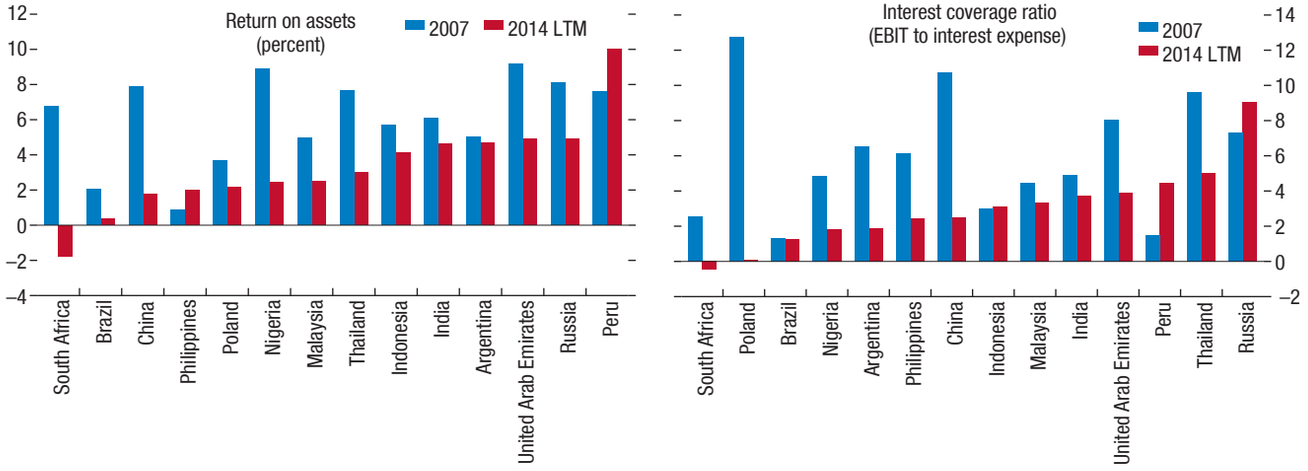
1. Balance Sheet Metrics for the Energy Sector in Emerging Markets (Medians)



Source: S&P Capital IQ.

...and is notable in Argentina, Brazil, Nigeria, and South Africa, among others.

2. Energy Sector Balance Sheet Metrics (Medians)



Sources: S&P Capital IQ; and IMF staff calculations.
Note: S&P Capital IQ classifies duty taxes related to exploration and production as operating expenses. EBIT = earnings before interest and taxes; EBITDA = earnings before interest, taxes, depreciation, and amortization; LTM = last 12 months.

and finance investment. Given expectations of lower energy prices, firms in the oil and gas and materials sectors are significantly cutting back their capital expenditure plans. Because these sectors account for, on average, half of investment in the major emerging market economies, this may affect long-term growth for other sectors as well (Figure 1.23, panel 2).[29]

On average, the deterioration of balance sheets for many oil and gas firms preceded the energy price decline of 2014. Profitability (for example, return on assets), leverage, and debt-servicing capacity are now at their worst levels since 2003 (Figure 1.25, panel 1). Price declines have cut into the profitability of energy firms, particularly in China, Nigeria, and South Africa (Figure 1.25, panel 2). Strains in the debt-repayment capacity of the oil and gas sector may become more evident in Argentina, Brazil, Nigeria, and South Africa, given their low interest-coverage ratios in 2014 (on a last-12-month basis; Figure 1.25, panel 2).[30]

Dollar appreciation could test firms and countries that have accumulated dollar debt

From October 2014 through February 2015 the U.S. dollar appreciated by 14 percent in nominal terms and

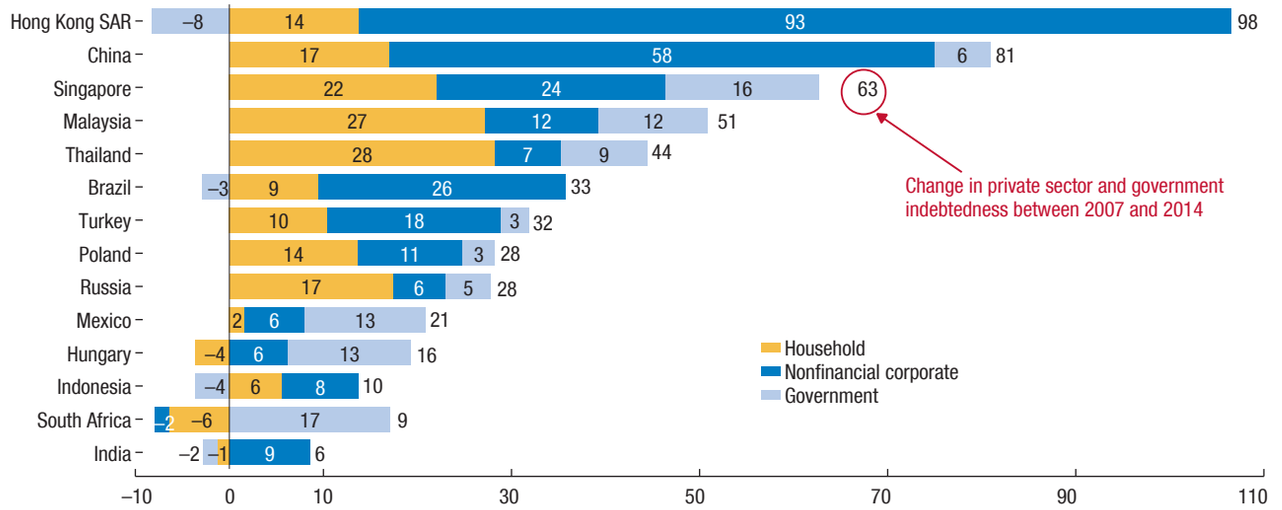
[29]For emerging market energy firms with available data, capital expenditures in fiscal year 2015 will decline by 31 percent from the previous year, and earnings before interest, taxes, depreciation, and amortization will decline by 20 percent.

[30]In Brazil, Petrobras's corporate governance concerns have resulted in credit rating downgrades and pushed its borrowing costs to their highest level in more than 10 years.

Figure 1.26. Large Increase in Emerging Market Debt

Indebtedness increased strongly across most major emerging markets.

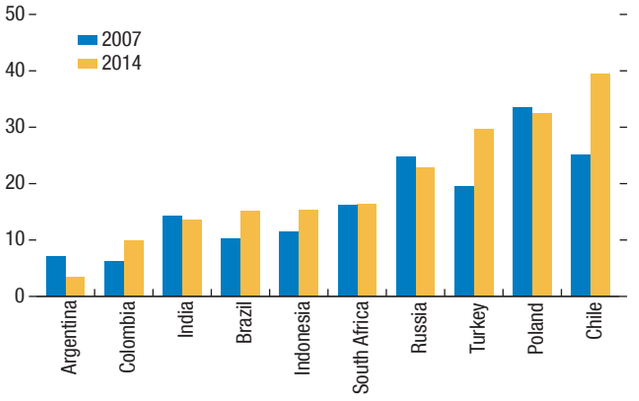
1. Change in Private Sector and Government Indebtedness between 2007 and 2014 (As a share of GDP; percentage points)



Sources: Bank for International Settlements; Morgan Stanley; national authorities; IMF, World Economic Outlook database; and IMF staff calculations.
Note: Data for Malaysia are from Bank Negara Malaysia, and the change in debt is between 2008 and 2014.

The private sector in many economies increased its foreign currency debt since the crisis or kept it high.

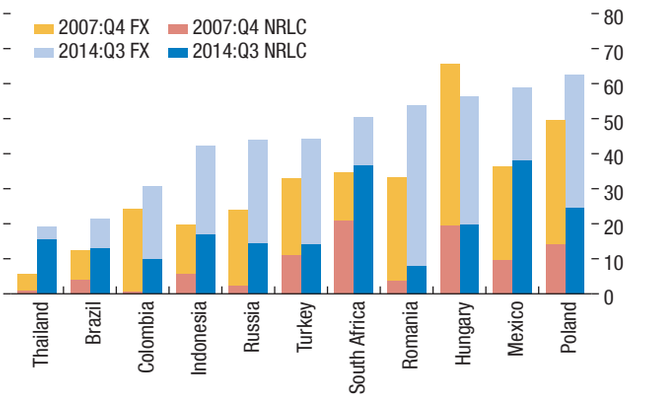
2. Foreign Currency Debt of Nonfinancial Firms and Households (Percent of GDP)



Sources: Bank for International Settlements; IMF, Financial Soundness Indicators; and IMF staff calculations.
Note: Foreign currency debt comprises domestic loans, international loans, and international bonds.

Most emerging market economies increased their foreign currency debt and exposure to foreign investors despite issuing relatively less in foreign currencies.

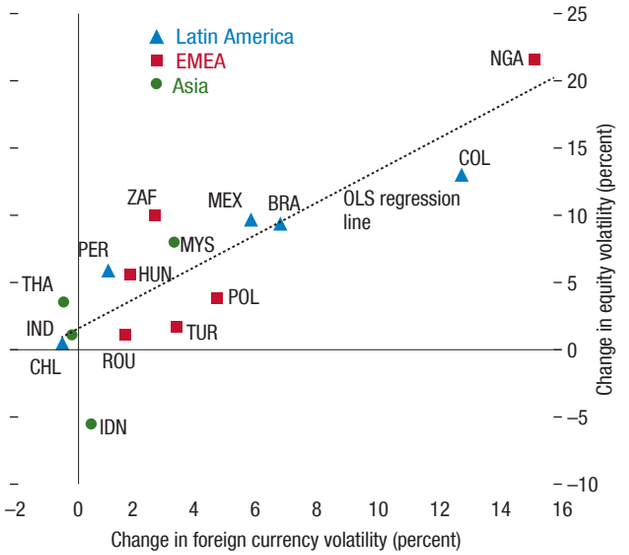
3. Government Debt Breakdown in Foreign Currency and Nonresident Holdings of Local Currency (Percent of total)



Sources: Bank for International Settlements; Haver Analytics; national authorities; and IMF staff calculations.
Note: FX is the share of foreign currency government debt; NRLC is the share of nonresident holdings of local currency government debt. The date for the left-hand bar for Colombia is January 2010, for Romania is December 2010, for South Africa is January 2011, and Russia is December 2011.

by 11 percent in real effective terms. This dramatic movement in the exchange rate over a period of five months has major implications for emerging market economies that have high debt levels denominated in foreign currencies. From 2007 to 2014, debt grew faster than GDP in all major emerging market economies and in the international financial centers of Hong Kong SAR and Singapore, which lend to many emerging market economies in Asia. Most of the growth in debt was in the nonfinancial private sector (firms and

Figure 1.27. Firms in Countries with Large Currency Selloffs Also Had High Equity Volatility
(Percent)



Sources: Bloomberg, L.P; and IMF staff calculations.
Note: Changes calculated over June 30, 2014–March 9, 2015. Volatilities are three-month realized. Currencies are quoted against the U.S. dollar, except in Hungary, Poland, and Romania, where they are quoted against the euro. Volatility in Russia (not shown) increased 44 points for the ruble and 39 points for equities. BRA = Brazil; CHL = Chile; COL = Colombia; EMEA = Europe, Middle East, and Africa; HUN = Hungary; IDN = Indonesia; IND = India; MEX = Mexico; MYS = Malaysia; NGA = Nigeria; OLS = ordinary least squares; PER = Peru; POL = Poland; ROU = Romania; THA = Thailand; TUR = Turkey; ZAF = South Africa.

households; Figure 1.26, panel 1), and a significant portion is in foreign currencies, especially in Chile, Poland, and Turkey (Figure 1.26, panel 2), although in Chile foreign currency mismatches of corporate balance sheets appear limited, and households do not have debt in foreign currencies.[31]

Rapid depreciation of the domestic currency can lead foreign investors to abruptly reduce their holdings of local currency debt and thus create a debt-rollover challenge to the public sector. Since 2007 the share of foreign currency and nonresident holdings of local currency general government debt in total general government debt has risen in a number of countries, such as Indonesia, Mexico, Poland, Romania, and South Africa, or remains elevated, such as in Hungary (Figure 1.26, panel 3). This development is critical where the ability of the local investor base to absorb new debt may be insufficient, such as in Hungary, Indonesia, Mexico, and Poland.[32] Even though foreign currency exposure may not have increased for many emerging market economies, the increased role of foreign investors in local bond markets creates an implicit debt-rollover risk, which can be loosely described as "original sin 2.0."

The dramatic moves in commodity prices and the exchange rates of many emerging market economies over the past six months have already had a significant impact on market valuations for emerging market corporations (Figure 1.24, panel 3). For some central and eastern European countries, such as Poland, the high share of foreign-currency-denominated or -linked debt built up during the precrisis period also makes them vulnerable to depreciation against other currencies, such as the Swiss franc. Since the end of June 2014, financial markets have reassessed equity valuations for firms in Brazil, Colombia, Malaysia, Mexico, Nigeria, Peru, Russia, and South Africa with the increase in the volatility of their currencies (Figure 1.27). For emerging markets more generally, higher volatility and loss of market confidence can cause a sharp reduction in secondary market liquidity of emerging market assets and fast depreciation of local currencies, similar to what has been observed in Russia since the introduction of economic and financial sanctions (Box 1.2).

Banks have large exposures to the corporate sector in countries with significant corporate debt at risk

A significant share of debt in Argentina, Brazil, China, India, Nigeria, and Turkey is owed by firms with relatively constrained repayment capacity in terms of interest-coverage ratios[33] (Figure 1.28, panel 1), and in Turkey a significant share of this debt is in foreign currencies (Figure 1.26, panel 2). The exposure of banks to the nonfinancial corporate sector is particularly high in some emerging market economies. In 11 of the 21 emerging market banking systems analyzed here, more than half of the bank loan books consist of loans to firms, rendering them more exposed to corporate weakness, particularly in Nigeria, Peru, Turkey, and Ukraine (Figure 1.28, panel 2). Although it is difficult to match the precise exposure of banks to firms, the higher the overlap of these two metrics, the more

[31]The existence of foreign currency hedges, financial (via financial derivatives) or natural (via offshore revenues), are significant offsetting factors to foreign currency risks of emerging market firms. Nevertheless, disclosures and data availability for such hedges are difficult to obtain or estimate.

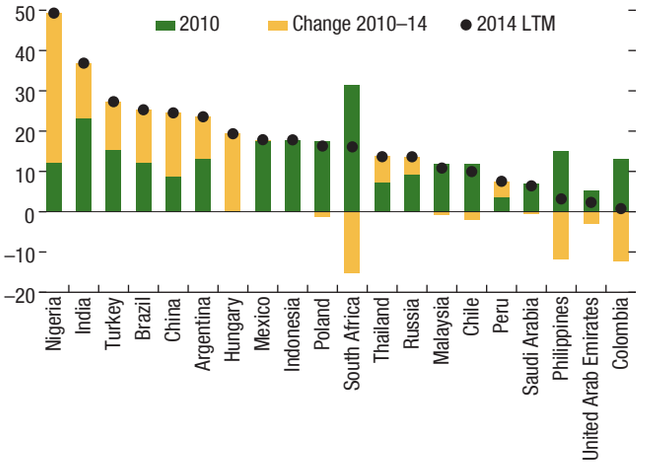
[32]See the October 2012 *Global Financial Stability Report*, Chapter 1, for an analysis of the absorptive capacity of banks and asset managers in emerging market economies.

[33]Defined as the ratio of earnings before interest, taxes, depreciation, and amortization to interest expenses.

Figure 1.28. Financial Stability of Emerging Market Banks

Nigeria, India, Turkey, and Brazil among others have a large share of corporate debt-at-risk.

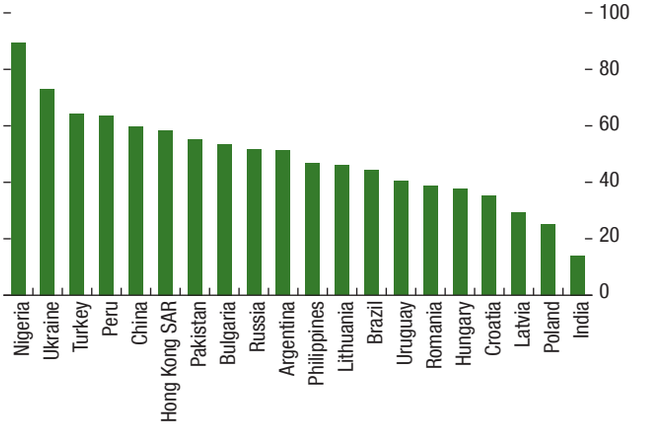
1. Corporate Debt-at-Risk (Percent)



Sources: S&P Capital IQ; and IMF staff calculations.
Note: Debt-at-risk is the share of corporate debt held by the "weak firms" or those with interest coverage ratios (EBITDA divided by interest expense) less than two. A sample of more than 10,000 firms was used. EBITDA = earnings before interest, taxes, depreciation, and amortization; LTM = last 12 months.

Banks in Nigeria, Ukraine, Turkey, and Peru are highly exposed to nonfinancial firms.

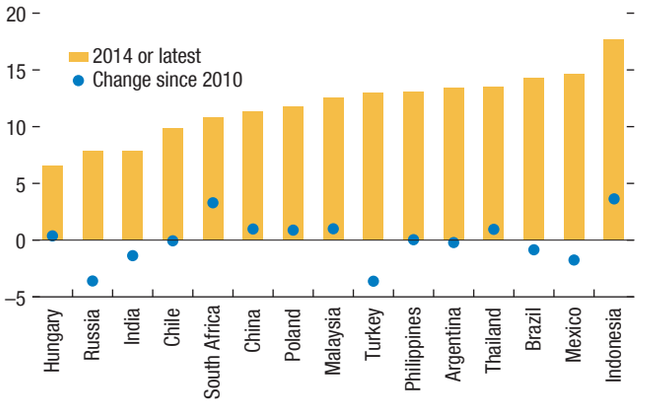
2. Bank Loans to Nonfinancial Corporations (Share of total loans; percent)



Sources: IMF, Financial Soundness Indicators; and IMF staff calculations.

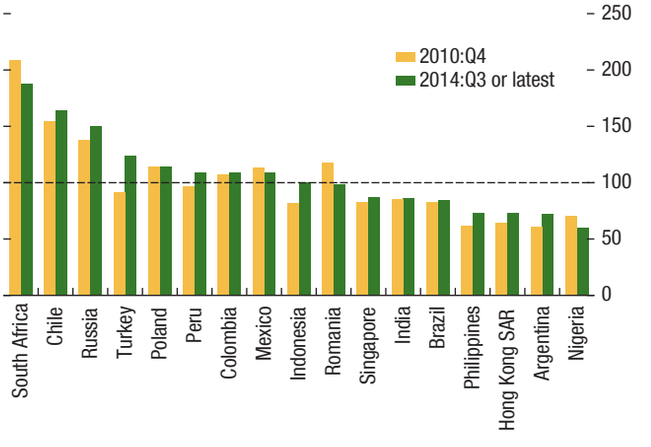
Banking buffers vary considerably among emerging market economies, and loan-to-deposit ratios have increased in places.

3. Loss-Absorbing Buffers (Share of risk-weighted assets; percent)



Sources: IMF, Financial Soundness Indicators; and IMF staff calculations.
Note: Loss-absorbing buffers = (Tier 1 capital + loan loss reserves – NPL)/(risk weighted assets). Data are for 2014 or latest available (2013 for China, Poland, and Thailand). NPL = nonperforming loan.

4. Banking System Loan-to-Customer-Deposit Ratio (Percent)



Source: IMF, Financial Soundness Indicators.
Note: Does not include interbank loans. Dashed line corresponds to 100 percent level.

significant the risks of bank asset deterioration from weaknesses in the corporate sector.

The broader impact of a sudden deterioration in corporate health depends on the capacity of banks to absorb losses and continue providing liquidity, given that domestic banks still play the primary financing role in emerging market economies. An assessment of different measures of bank health is provided in Table 1.5. Bank balance sheets appear healthy in most emerging market economies, but some vulnerabilities are still

Table 1.5. Summary of Sovereign, Corporate, and Banking Indicators

		Macroeconomy				Commodity Exposure				Corporate Sector			
		CPI (Percent year-over-year, 2015 forecast)	Deviation of CPI from Central Bank's Inflation Target/ Middle of Band (Percentage points)	Policy Rate (Percent)	2015 Growth Forecast (Percent)	Commodity Exports/ Total Exports (Percent)[1]	Oil Exports/ Total Exports (Percent)[1]	Commodity-Related Share of Corporate Sector (Percent)[2]	Oil-Related Share of Corporate Sector (Percent)[2]	Share of Debt at Risk (Percent)[3]	Share of Debt at Risk after Shock (Percent)[3]	Private Nonfinancial Sector FX Debt/GDP (Percent)	Nonfinancial Corporate Total Debt/ GDP (Percent)
Latin America	Brazil	8.0	3.5	12.75	–1.0	52	7	25	20	25.3	37.0	15.1	46.9
	Chile	2.9	–0.1	3.00	2.7	47	1	26	6	10.0	22.4	39.4	—
	Colombia	3.6	0.6	4.50	3.4	69	47	45	33	0.8	2.5	9.9	—
	Mexico	3.1	0.1	3.00	3.0	20	12	39	30	17.9	19.4	—	20.9
Asia	China	1.2	–2.3	2.50	6.8	4	1	29	17	24.5	31.2	—	149.9
	India	5.8	–0.2	7.50	7.5	25	14	23	13	36.9	49.9	13.6	47.5
	Indonesia	4.6	0.6	7.50	5.2	54	7	36	18	17.8	45.7	15.3	21.7
	Malaysia	2.7	—	3.25	4.8	32	12	33	28	10.8	24.2	—	96.9
	Philippines	2.4	–0.6	4.00	6.7	15	2	9	5	3.2	31.5	—	—
	Singapore	0.8	—	—	3.0	—	—	—	—	—	—	—	80.7
	Thailand	2.1	–0.4	1.75	3.7	20	5	47	31	13.7	17.5	—	53.7
Europe, Middle East, Africa	Bahrain	1.5	—	0.50	2.7	82	68	37	—	2.1	2.1	—	—
	Hungary	1.7	–1.3	1.95	2.7	13	2	—	—	—	—	—	85.2
	Nigeria	12.0	—	13.00	4.8	91	81	60	35	49.3	51.9	—	—
	Poland	0.4	–2.1	1.50	3.5	16	2	32	18	16.3	23.9	32.5	44.2
	Russia	12.0	7.5	14.00	–3.8	68	48	53	46	13.6	16.0	22.9	49.2
	Saudi Arabia	2.0	—	2.00	3.0	83	81	50	5	6.4	6.4	—	13.0
	South Africa	5.0	0.5	5.75	2.0	34	3	28	6	16.1	20.2	16.4	32.6
	Turkey	7.0	2.0	7.50	3.1	13	3	12	7	27.3	31.0	29.6	50.8
	United Arab Emirates	2.2	—	1.00	3.2	32	29	11	8	2.3	4.0	—	—

(continued)

Table 1.5. Summary of Sovereign, Corporate, and Banking Indicators *(continued)*

		External Vulnerabilities						Banking Sector		
		Current Account (Percent of GDP, 2015 forecast)	Reserves/ Short-Term External Financing Requirements[4]	Nonresident Holdings of Domestic Government Debt (Percent of all domestic government debt)	Change in Currency since June 30 (Percent)[5]	Weight in EMBIG (Percent)[5]	Sovereign Credit Default Swap Spreads (Basis points)[5]	Nonperforming Loans (Percent)[6]	Loan-to-Deposit Ratio (Percent)[6]	Loss-Absorbing Buffers (Percent)[6]
Latin America	Brazil	–3.7	1.9	20.1	–32.5	6.7	250	2.9	84.3	14.3
	Chile	–1.2	1.2	—	–12.7	2.6	89	2.2	163.7	10.0
	Colombia	–5.8	1.1	14.6	–32.0	3.2	151	2.8	109.1	—
	Mexico	–2.2	1.2	38.5	–17.8	12.9	115	2.9	108.9	14.7
Asia	China	3.2	6.2	—	–1.0	5.0	84	1.1	56.5	11.3
	India	–1.3	2.0	—	–3.2	0.4	—	4.0	86.1	7.9
	Indonesia	–3.0	1.2	38.1	–8.9	7.8	145	2.1	100.2	16.6
	Malaysia	2.1	1.0	47.3	–12.8	1.3	138	1.8	82.0	12.5
	Philippines	5.5	7.8	—	–1.0	4.6	85	2.4	73.4	13.1
	Singapore	20.7	—	—	–10.0	0.0	—	0.9	—	—
	Thailand	4.4	2.3	18.6	–0.4	0.0	98	2.2	109.4	13.5
Europe, Middle East, Africa	Bahrain	–2.1	7.9	—	0.0	0.0	278	4.6	46.0	—
	Hungary	4.8	2.1	34.1	–22.0	2.8	115	16.6	—	—
	Nigeria	0.7	—	—	–20.5	0.2	—	3.2	59.9	—
	Poland	–1.8	0.7	40.0	–22.6	2.1	59	4.9	114.1	11.8
	Russia	5.4	6.7	24.3	–57.6	8.1	454	6.5	149.9	7.8
	Saudi Arabia	–1.0	18.6	—	0.0	0.0	73	1.3	78.1	16.8
	South Africa	–4.6	0.9	36.0	–12.4	2.5	203	3.4	187.7	10.8
	Turkey	–4.2	0.6	21.8	–21.4	7.4	218	2.7	124.0	13.0
	United Arab Emirates	5.3	—	—	0.0	0.0	—	7.3	97.0	—

Sources: Bank for International Settlements; Bloomberg, L.P.; JPMorgan Chase & Co; S&P Capital IQ; UN Comtrade; IMF, World Economic Outlook database; IMF, Financial Soundness Indicators, and IMF staff calculations.

Note: CPI = consumer price index; EBITDA = earnings before interest, taxes, depreciation, and amortization; EMBIG = Emerging Markets Bond Index Global; FX = foreign currency; NPL = nonperforming loan.

[1] 2013 COMTRADE data. Commodity exports using codes 0–4 from Standard International Trade Classification, Revision 3. Oil exports using code 33.

[2]According to available firms from S&P Capital IQ, weighted by assets.

[3]Percentage of firms with interest coverage (EBITDA/interest expense) ratio below 2. The shock is composed of a 25 percent increase in borrowing costs, 20 percent appreciation of the U.S. dollar, and 25 percent reduction in earnings of energy firms.

[4]Short-term external financing requirement is defined as short-term debt maturities plus current account deficit.

[5]Market data is as of March 6.

[6]As of 2014:Q3 or latest available data. Loss-absorbing buffers is (Tier 1 capital + loan loss reserves – NPL)/(risk-weighted assets). 2014 data, except for China, Poland, and Thailand (2013).

Box 1.2. Russia's Financial Risks and Potential Spillovers

Russia's economic outlook has deteriorated significantly under the combined shocks of sanctions and the sharp drop in the price of oil—interest rates are higher, the ruble has depreciated, and the government has lost its investment-grade credit rating. These developments threaten a further deterioration in asset quality and possible financial spillovers.

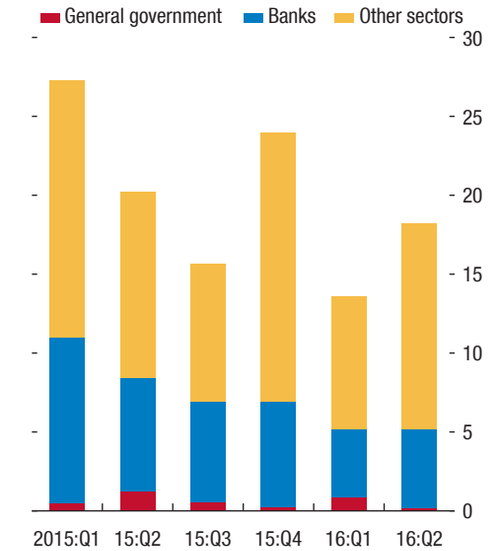
Foreign portfolio outflows amounted to $21 billion in the first nine months of 2014 ($13 billion of which was in equities), taking the stock of total foreign portfolio investment down to $225 billion. In the same period, Russians increased their portfolio investments abroad by $10 billion, to $63 billion.

External debt is not insignificant (at $599 billion as of December 2014). But the short-term repayment burden—$74 billion is due April-December 2015 (Figure 1.2.1), of which 61 percent is due to the corporate sector and 36 percent to banks— represents only one fifth of foreign exchange reserves ($352 billion as of the end of March). And the public and private sectors hold significant assets abroad (including $61 billion in portfolio assets, $184 billion in currency and deposits, and $32 billion in short-term loans at the end of December) that can be liquidated as needed. Nevertheless, as a consequence of the escalation of geopolitical tensions, lower oil prices, and sanctions, Russia's sovereign and corporate spreads have risen sharply, reflecting the market's perception of increased credit risk.

From a financial stability perspective, the Russian banking sector deserves close attention. Solvency risks in the sector appear contained overall, but some pressure is evident: nonperforming loans increased steadily through 2014 (to 6.7 percent as of the end of December) and profitability declined (Figure 1.2.2). Liquidity risk also appears relatively contained to date—overall deposits grew through 2014, with central bank funding representing 12 percent of liabilities as of the end of 2014; however, this may prove more challenging in the future. With a loan-to-deposit ratio of 150 percent, the sector is heavily dependent on wholesale market financing, and rolling over in external markets the foreign financing that comes due in 2015 ($37 billion) will not be possible for the seven sanctioned banks that account for about 75 percent

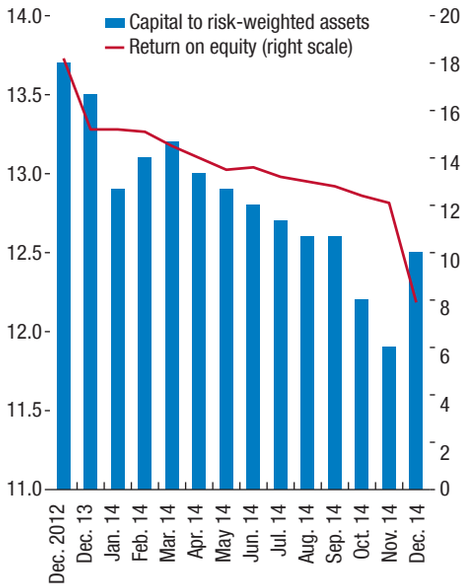
The authors of this box are Allison Holland and Luigi Ruggerone.

Figure 1.2.1. Russian External Debt Amortization Schedule
(Billions of U.S. dollars)



Source: Central Bank of Russia.

Figure 1.2.2. Russian Banking System Key Financial Soundness Indicators
(Percent)



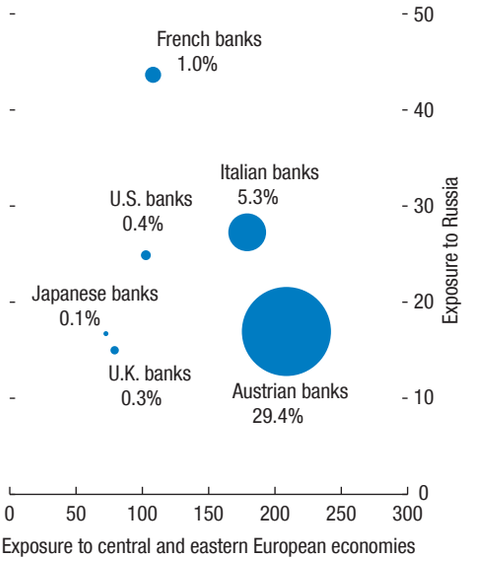
Source: Central Bank of Russia.

Box 1.2. *(continued)*

of Russian bank assetsAlthough the Russian banking sector weathered the crisis of 2009 (when conditions were arguably tougher), and official sector support can be expected to continue, a significant deterioration in asset quality or earnings or a liquidity shock at a large bank could signal a more systemic problem.

Direct financial linkages between Russia and the rest of the world are fairly limited, but the indirect connections with neighboring countries raise more serious global financial stability concerns. Foreign bank exposures to Russia have been reduced. But the stability of the European banking system could become significantly stressed should geopolitical concerns boost investors' risk aversion, which would lead to a stronger dollar and higher rates. This could cause Russia's intensified difficulties to spill over to central and eastern European countries, to which some large European banking systems are highly exposed (Figure 1.2.3).

Figure 1.2.3. Foreign Bank Exposures
(Billions of U.S. dollars)



Sources: Bank for International Settlements (BIS); Bank of Japan; European Central Bank; and IMF staff estimates.
Note: Size of bubbles is exposure (BIS Table 9D) to central and eastern European economies as a percentage of total assets.

present. Loss-absorbing buffers appear particularly low in Chile, Hungary, India, and Russia (between 5 and 10 percent of risk-weighted assets; Figure 1.28, panel 3), and deterioration in loan quality could threaten capital levels. Furthermore, in India, Russia, and Turkey loss-absorbing buffers have deteriorated quite substantially in recent years. System-wide Tier 1 ratios for most emerging market economies are above 10 percent. However, the countries with the lowest ratios are China, India, and Russia, which account for about 70 percent of the aggregate banking system assets in this sample of banks. Buffers are still fairly low in some commodity-sensitive economies (such as Russia), while some banking systems are also sensitive to dollar funding and tighter liquidity conditions. This sensitivity could in turn put pressure on banks' funding channels, with many countries exhibiting high levels of loan-to-deposit ratios, including Chile, Russia, South Africa, and Turkey (Figure 1.28, panel 4). Finally, although regulatory caps mean that banks' direct currency exposures are generally limited, vulnerabilities could yet arise via increasing nonperforming loans in places where firms have a high proportion of foreign currency debt.

Policies to mitigate risks

Emerging markets generally should aim to cushion the impact of global headwinds and disinflationary forces where possible, for example, by allowing exchange rate adjustment if it does not jeopardize smooth market functioning, or if the currency is already significantly undervalued, by boosting reserves, or by applying policies to increase macroeconomic policy space and buffers. Furthermore, countries ought to safeguard the resilience of the financial system through enhanced surveillance of vulnerable sectors.

In China, the overall priority must be to allow an orderly correction of excesses. This will require policies to play a dual and finely balanced role. Policies should contribute to a financial rebalancing, curtailing the riskiest parts of shadow banking. Policies should also

facilitate corporate deleveraging and the transparent recognition of costs arising from the exit of nonviable firms. Authorities should discourage the financing of nonviable borrowers, which will require tolerating more defaults, including in public bond markets. Orderly deleveraging requires comprehensive policies that allow a gradual slowdown in credit growth and, where necessary, provides mechanisms for orderly debt restructuring. Given China's outsized level of gross corporate debt and its importance to the global economy, managing this process smoothly will be critical in order to minimize the macroeconomic headwinds it could create.

Across emerging markets more generally, the large portion of debt denominated in foreign currencies as well as in specific sectors, such as energy firms, means that micro- and macroprudential measures have an important role to play in limiting the risks from shocks, and authorities need to enhance supervision of these sectors. The relevant macroprudential tools include higher risk weights (capital requirements) for corporate foreign currency exposures as well as caps on the share of such exposures on banks' balance sheets. In the likely case of leakage, consideration should also be given to changes in the tax code that remove fiscal incentives in favor of debt or that penalize foreign currency debt (see also IMF 2014b). To avoid these measures from becoming procyclical, they should be introduced cautiously and with sufficient phase-in periods. At the microprudential level, regulators need to conduct bank stress tests related to foreign currency risks and regularly monitor corporate foreign currency exposures, including derivatives positions. The hedges employed by corporations to limit their exposure risks may be compromised when most needed, so regulators should assess them conservatively. These macroprudential and microprudential measures can be usefully complemented by flexible exchange rates. Flexible exchange rates can aid the adjustment to shocks and facilitate an independent monetary response to credit booms. They can also discourage banks and corporations from building up large foreign exchange exposures in the first place. Renewed efforts by authorities globally to collect and provide better information on foreign currency corporate indebtedness and offsetting factors (such as hedges) is also desirable.

To ensure properly functioning markets, authorities need to adopt and enforce policies that protect against lapses of liquidity in local bond markets. This calls for country authorities to potentially use cash balances when needed or to lower the supply of long-term debt to the market to help curtail bond spread increases. Policymakers can also adopt crisis management tools that allow the smooth functioning of markets, by using bilateral and multilateral swap line agreements to help reduce excess volatility in currency markets and provide foreign currency funding in times of stress. Multilateral resources, such as IMF facilities, could also provide additional buffers. Overall, keeping emerging market economies resilient calls for authorities to maintain a strong focus on domestic vulnerabilities, as noted in previous *Global Financial Stability Report* issues.

The authors of this chapter are Peter Dattels and Matthew Jones (Team Leaders), Ali Al-Eyd, Serkan Arslanalp, Magally Bernal, Antoine Bouveret, Peter Breuer, Yingyuan Chen, Martin Čihák, Fabio Cortes, Reinout De Bock, Martin Edmonds, Jennifer Elliott, Michaela Erbenova, Tryggvi Gudmundsson, Sanjay Hazarika, Geoffrey Heenan, Allison Holland, Eija Holttinen, Bradley Jones, David Jones, William Kerry, Daniel Law, Andrea Maechler, Alejandro Lopez Mejia, Peter Lindner, Daniela Mendoza, Evan Papageorgiou, Vladimir Pillonca, Alvaro Piris Chavarri, Jean Portier, Gabriel Presciuttini, Juan Rigat, Shaun Roache, Luigi Ruggerone, Luca Sanfilippo, Tsuyoshi Sasaki, Katharine Seal, Nobuyasu Sugimoto, Narayan Suryakumar, Shamir Tanna, Chris Walker, and Jeffrey Williams.

Annex 1.1. Progress on the Financial Regulatory Reform Agenda

The main elements of the Financial Regulatory Reform Agenda—capital, leverage, and liquidity—have been substantially agreed to. This accomplishment achieves a key postcrisis goal of strengthening the regulatory framework for banks.[34] Progress on the implementation of the agenda, however, is uneven: several areas require significant movement forward. Further, the stakeholders need to devote more resources to monitoring implementation.

The last important element of the liquidity framework for banks—the net stable funding ratio (NSFR)—was finalized in late 2014. It requires banks to maintain a stable funding profile in relation to their on- and off-balance sheet activities to address a vulnerability that fueled the systemic stress in the global financial crisis. The NSFR complements the liquidity coverage ratio (LCR), which targets short-term liquidity risks and came into force on January 1, 2015. The Basel Committee for Banking Supervision (BCBS) reports significant progress in meeting both of these standards well ahead of implementation dates.

The BCBS is now able to direct its attention to outstanding regulatory concerns, such as restoring the credibility of risk-weighted assets. Aligned with the Group of 20 (G20) objectives, the recently published proposals on the standardized approach to credit risk would reduce reliance on external credit ratings. Once finalized, amendments to the calibration of the risk weights should help enhance risk sensitivity and comparability with the internal ratings-based (models-based) approach to credit risk. Importantly, the BCBS wishes to ensure the standardized approach is suitable for a wider range of jurisdictions and banks, not just the main financial centers and internationally active institutions.

The BCBS has finalized revisions to the securitization framework that enhance risk sensitivity and reduce the mechanistic reliance of capital requirements on external ratings. Work is also progressing on criteria for identifying simple, transparent, and comparable securitizations, which should help support a sustainable securitization market.

The reform agenda has taken steps to address the too-big-to-fail problem. First, once finalized, international agreement on total loss-absorbing capacity (TLAC) should support orderly resolution of global systemically important banks (G-SIBs) without recourse to public funds, by setting minimum standards on the amounts and characteristics of capital and "bail-inable" debt that banks must issue. Second, 18 G-SIBs recently signed the new International Swaps and Derivatives Association Resolution Stay Protocol that suspends early termination and cross-default rights in over-the-counter (OTC) derivatives contracts during resolution. Nonetheless, resolution reforms remain a work in progress. Further action is needed in many jurisdictions to (1) make large, complex firms more resolvable and agree to "living wills"; (2) align legal frameworks with international best practice in resolution; (3) reduce legal and practical impediments to effective cross-border resolution; and (4) develop policies for the recovery and resolution of key nonbank intermediaries such as central counterparties.

Although the nonbank financial sector has seen some progress from the reform agenda, movement forward continues to lag in other areas. The International Association of Insurance Supervisors has finalized the Basic Capital Requirement for global systemically important insurers, and the insurance capital and higher loss-absorption capacity requirements are under development. The Financial Stability Board (FSB) released a second public consultation draft on methodologies to identify nonbank and noninsurer global systemically important financial institutions in March 2015. The FSB is continuing to finalize minimum haircut requirements on securities lending and repurchase agreements after the end of the consultation period in December 2014.

The reform agenda has seen some progress on the application of new OTC derivatives rules across borders, partly by deferring to home country regulatory regimes. In October 2014, the European Commission deemed that central counterparty (CCP) regimes in four jurisdictions are equivalent to European Union requirements. In December, the U.S. Commodity Futures Trading Commission extended the deadlines for requiring certain foreign CCPs to register in the United States until late 2015. However, agreement on important decisions, in particular between the United States and the European Union, remains elusive and perpetuates regulatory uncertainty for industry players.

Annex prepared by Katharine Seal, Michaela Erbenova, Alvaro Piris, Nobuyasu Sugimoto, and Eija Holttinen.

[34]This was the conclusion of the Financial Stability Board (FSB), as reported to the Leaders of the Group of 20 (G20) at the Brisbane Summit.

Annex 1.2. External Portfolio Rebalancing under Quantitative Easing in the Euro Area and Japan

This annex considers portfolio rebalancing for the euro area and Japan for three scenarios. This exercise is partial and does not incorporate exchange rate effects.

Euro area

Under the "baseline," euro area nonbank investors could allocate nearly €1.2 trillion abroad by the end of 2015 (Table 1.2.1). This figure could rise or fall, depending on the attractiveness of euro-denominated assets. A negative shock in the absence of additional policy action to strengthen bank balance sheets ("downside") could be expected to increase outflows to nearly €1.3 trillion (an additional 10 percent), whereas additional policy measures ("QE-Plus") could be expected to lower outflows to about €1.1 trillion (a symmetric decline of 10 percent).

Here, it is assumed that, at a minimum, the nonbank investor portion of the €2.4 trillion in negative yielding European government bonds (EGBs) will be rebalanced into alternative assets (Figure 1.2.1). Based on the European Central Bank's (ECB's) government bond holding statistics, nonbank investors hold about €1.8 trillion (70 percent) of these negative yielding bonds, while banks—and national central banks (NCBs)—hold the remaining €600 billion. From an asset-liability management point of view, there is little reason to expect institutional investors to maintain a negative carry on these assets. Similarly, it is assumed that the other domestic nonbank and foreign investors will also forego holding negative yielding assets. However, banks are assumed to either sell their EGBs to the ECB, or hold on to them for regulatory reasons.

The international allocation of assets by institutional investors is based on current domestic and foreign currency investment allocations, implying that under the "baseline" about one-third (€630 billion) will be rebalanced into euro-denominated assets (namely high-yield corporate bonds) and the rest (€1.2 trillion) will be rebalanced into foreign assets. Based on data on international investment positions, about €420 billion of this could end up in U.S. dollar assets, €480 billion in other advanced economies, and €130 billion in emerging market economies.

Annex Table 1.2.1. Potential Portfolio Outflows by Euro Area Investors, 2015
(Billions of euros)

	Baseline	QE-Plus	Downside
Total	1,177	1,059	1,294
held by			
Foreign	819	737	901
Pension and Insurance	233	210	256
Firms	125	112	137
Destination			
United States	421	379	463
Other Advanced Economies	482	434	530
Emerging Markets	131	118	144
Other	142	128	157

Sources: Bloomberg, L.P.; European Central Bank; IMF, Consolidated Portfolio Investment Survey (CPIS); and IMF staff estimates.

Note: The downside scenario assumes an additional 10 percent in portfolio outflows, which is consistent with a return to the euro's share of international reserves holdings (based on IMF Composition of Foreign Exchange Reserves data) at the onset of Economic and Monetary Union from the peak reached in 2009 (namely from 27 to 17 percent). For simplicity, a symmetric 10 percent is assumed for the QE-Plus scenario. As in Figure 1.10, foreign-currency-denominated flows are determined by European insurer asset allocations as of 2013, while destinations are based on data for 2013 international portfolio flows (CPIS). Emerging markets comprise Argentina, Brazil, Chile, China, Colombia, Hong Kong SAR, Hungary, India, Indonesia, Malaysia, Mexico, Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand, and Turkey. Other advanced economies comprise Australia, Canada, Denmark, Japan, New Zealand, Norway, Sweden, Switzerland, and the United Kingdom. QE = quantitative easing.

Japan

Calculations indicate that Japanese financial institutions could shed ¥165 trillion of Japanese government bonds (JGBs) by the end of 2017, given the pace of the central bank's purchases under the second round of quantitative and qualitative easing (QQE2) and additional debt issuance by the government. In particular, Japanese insurance companies and pension funds could shed ¥55 trillion of government bonds, while banks could sell another ¥110 trillion by the end of 2017, which would bring their sovereign exposure closer to international levels (Table 1.2.2).

This "baseline" scenario considers three types of investors—domestic banks, insurance companies, and pension funds—which own nearly 80 percent of JGBs in private hands, and makes the following assumptions:

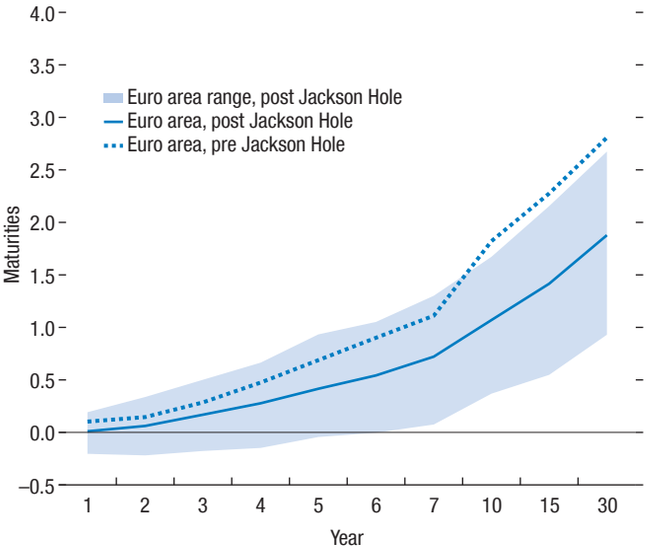
- Domestic banks are assumed to reduce their JGB holdings to 5 percent of assets by 2017, in line with bank sovereign exposures in other Group of Seven (G7) economies (excluding Italy). Japan Post Bank reduces its domestic bond holdings to 35 percent of assets, in line with the Government Pension Investment Fund's (GPIFs) new allocation to domestic bonds.
- Insurance companies broadly follow the GPIF as a benchmark and reduce their exposure to government bonds to 35 percent of total assets, a drop of ¥40 trillion.

The authors of this annex are Ali Al-Eyd and Serkan Arslanalp.

Annex Figure 1.2.1. Euro Area Negative-Yielding European Government Bonds and Baseline Portfolio Rebalancing

Expectations of quantitative easing drove some core yields negative.

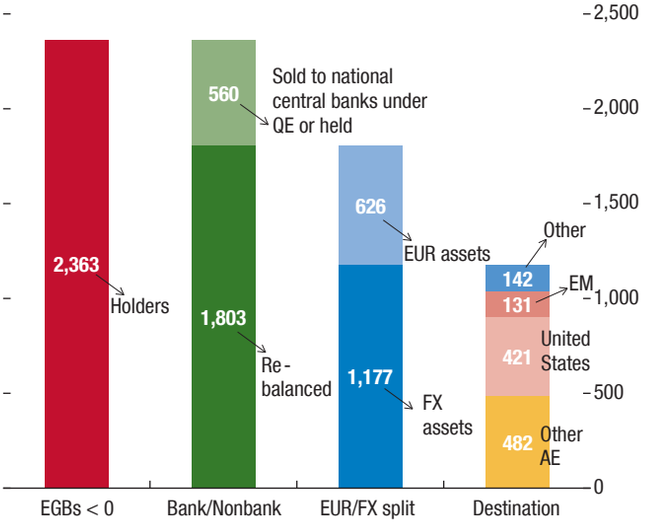
1. Sovereign Yields: Euro Debt–Weighted Yield Curve (Percent)



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

Rebalancing under the baseline scenario.

2. Potential Flows into Foreign-Exchange-Denominated Assets (Billions of euros)



Sources: Bloomberg, L.P.; and IMF staff calculations.
Note: AE = advanced economies; EGB = European government bond; EM = emerging markets; EUR = euro area; FX = foreign exchange; QE = quantitative easing. See Figure 1.10 panel 2 for country groupings.

- Pension funds are assumed to follow the GPIF's lead, reducing their domestic bond holdings to 35 percent of assets through a reduction of JGB holdings.
- The outstanding stock of JGBs rises in line with the latest *World Economic Outlook* fiscal projection and the BOJ buys ¥80 trillion of JGBs every year, as announced under QQE2.

As a result of this portfolio rebalancing, insurance companies and pension funds could invest as much as ¥42 trillion ($350 billion), or 8 percent of GDP, in foreign assets (Table 1.2.3). This scenario is in line with the pace of their portfolio rebalancing abroad over the last year and the GPIF's new target allocation announced in late 2014. If the insurance companies and pension funds maintain present international allocation ratios,

Annex Table 1.2.2. Japan: A Potential Portfolio Rebalancing Scenario under QQE2, 2015–17

(Trillions of yen)

	End-2014	End-2017	Change
Bank of Japan's JGB Holdings	207	447	240
Other Financial Institutions' JGB Holdings	505	340	–165
Pension Funds (public and private)	92	78	–14
Insurance Companies	199	159	–40
Domestic Banks (major and regional)	105	50	–55
Japan Post Bank	110	53	–57
Memo Items:			
Outstanding Stock of JGBs	828	903	75

Sources: Bank of Japan (BOJ); Japan Post Bank; Ministry of Finance; and IMF staff projections.
Note: Pension fund holdings of domestic bonds decline to 35 percent of assets by a reduction in JGB holdings in line with the GPIF's new target allocation. Similarly, insurance company holdings of JGBs and Japan Post Bank holdings of domestic bonds decline to 35 percent of total assets. Domestic bank holdings of JGBs decline to 5 percent of total assets (benchmark: other advanced economies). The BOJ buys 80 trillion yen of JGBs on a net basis every year, as announced under QQE2. Outstanding stock of JGBs rises in line with *World Economic Outlook* fiscal projections. GPIF = Government Pensions Investment Fund; JGB = Japanese government bond; QQE = quantitative and qualitative easing.

Annex Table 1.2.3. Potential Portfolio Outflows by Japanese Institutional Investors, 2015–17
(Billions of U.S. dollars)

	Baseline	QE-plus (complete policies)	Downside
Insurance Companies	100	275	0
Private Pensions	25	58	0
Public Pensions	225	225	225
Total	**350**	**559**	**225**

Source: IMF staff projections.
Note: All figures are expressed at end-2014 exchange rates. Under the baseline scenario, insurance companies and pension funds continue their portfolio rebalancing abroad at the same pace as since 2012:Q3. Under the complete policies/QE-plus scenario, insurance and private pension funds accelerate their portfolio rebalancing abroad at twice the pace as baseline. Under the downside scenario, they stop their portfolio rebalancing abroad. QE = quantitative easing.

80 percent of the outflow would go into bonds of other advanced economies, 14 percent into emerging market bonds, and 6 percent into global equities.

This baseline scenario assumes a significant but partial implementation of the other two arrows of Abenomics (fiscal and structural reforms). If announced policies are fully implemented and work to their fullest extent across the three reform arrows (the "QE-plus" scenario, also referred to as the "complete policies" scenario), portfolio outflows could be as much as $550 billion, as insurance and private pension funds accelerate their portfolio rebalancing abroad (Table 1.2.3). Alternatively, if the other two reform arrows are not effectively deployed and efforts at pulling the economy out of deflation are not successful ("downside" scenario), portfolio outflow could be less than anticipated, as private financial institutions continue to demand JGBs as a hedge against deflation. This would imply a partial return to the status quo before Abenomics when home bias of Japanese institutional investors was strong and portfolio outflows were limited. In this case, portfolio outflows could be limited to $225 billion by end-2017.

References

Bank of England. 2012. "The Role of Designated Market Makers in the New Trading Landscape." *Quarterly Bulletin* Q4: 343–53.

Barisitz, Stephan. 2013. "Nonperforming Loans in Western Europe—A Selective Comparison of Countries and National Definitions." *Focus on European Economic Integration* (1): 28–47.

Baum, Anja, Cristina Checherita, and Philipp Rother. 2013. "Debt and Growth: New Evidence from the Euro Area." *Journal of International Money and Finance* 32: 809–21.

Bergthaler, Wolfgang, Kenneth Kang, Yan Liu, and Dermot Monaghan. 2015. "Tackling Small and Medium Sized Enterprise Problem Loans in Europe." Staff Discussion Note 15/04, International Monetary Fund, Washington.

Bornhorst, Fabian, and Marta Ruiz Arranz. 2013. "Indebtedness and Deleveraging in the Euro Area." Country Report 13/232, International Monetary Fund, Washington.

Bouveret, Antoine, Peter Breuer, Yingyuan Chen, David A. Jones, and Tsuyoshi Sasaki. Forthcoming. "Fragilities in U.S. Treasury Markets and Lessons from the Flash Rally of October 15, 2014." IMF Working Paper, International Monetary Fund, Washington.

Cecchetti, Stephen G., Madhusudan S. Mohanty, and Fabrizio Zampolli. 2011. "The Real Effects of Debt." Working Paper 352, Bank for International Settlements, Basel.

Chen, Sally, Minsuk Kim, Marijn Otte, Kevin Wiseman, and Aleksandra Zdzienicka. 2015. "Private Sector Deleveraging and Growth Following Busts." Working Paper 15/35, International Monetary Fund, Washington.

Chicago Mercantile Exchange. (2010). "Algorithmic Trading and Market Dynamics." Chicago Mercantile Exchange Group. July 15.

Dattels, Peter, Rebecca McCaughrin, Ken Miyajima, and Jaume Puig. (2010). "Can You Map Global Financial Stability?" IMF Working Paper No. 10/145 (Washington: International Monetary Fund).

Draghi, M. 2015. *"Speech at The ECB and its Watchers XVI Conference."* Frankfurt, March 11.

EIOPA, 2014a. "EIOPA Insurance stress test 2014." EIOPA-BOS-14-203, November 28.

EIOPA, 2014b. "Low interest rate environment stock taking exercise 2014." EIOPA-BoS-14/103, 28 November 2014.

Elekdag, Selim, Faezeh Raei, Jérôme, Vandenbussche, and Vanessa Le Leslé. 2014. "Selected Issues: Germany." Country Report 14/217, International Monetary Fund, Washington.

European Banking Authority (EBA). 2015. "Overview of the Potential Implications of Regulatory Measures for Banks' Business Models." London.

European Central Bank (ECB). 2012. "Corporate Indebtedness in the Euro Area." *Monthly Bulletin* (February): 87–103.

———. 2015. "Box 1: The Governing Council's expanded asset purchase programe." *Economic Bulletin,* January 2015.

European Insurance and Occupational Pensions Authority (EIOPA). 2013. "Financial Stability Report," Second Half-Year Report, Autumn.

Hüttl, Pia, and Guntram B. Wolff. 2014. "What is Behind the Reduction of Private Sector Debt? Comparing Spain and the UK." Bruegel (blog).

International Monetary Fund (IMF). 2014a. Euro Area Article IV Consultation14/198, Washington.

———. 2014b. "Staff Guidance Note on Macroprudential Policy." Washington.

Jassaud, Nadège, and Kang, Kenneth. 2015. "A Strategy for Developing a Market for Nonperforming Loans in Italy." Working Paper 15/24, International Monetary Fund, Washington.

Kim, D. H., and J. H. Wright. 2005. "An Arbitrage-Free Three-Factor Term Structure Model and the Recent Behavior of Long-Term Yields and Distant-Horizon Forward Rates," Finance and Economics Discussion Series (FEDS): 2005–33 (Washington: Federal Reserve Board).

Kumar, M., and J. Woo. 2010. "Public Debt and Growth." Working Paper 10/174, International Monetary Fund, Washington.

Pericoli, Marcello, and Sbracia Massimo. 2004. "A Primer on Financial Contagion." *Journal of Economic Surveys* 17 (4): 571–608.

Reinhart, Carmen M., and Kenneth S. Rogoff. 2010. "Growth in a Time of Debt." *American Economic Review* 100 (2): 573–78.

Satio, Masashi and Yoshihiko Hogen. 2014. "Portfolio Rebalancing Following the Bank of Japan's Government Bond Purchases: Empirical Analysis Using Data on Bank Loans and Investment Flows." BOJ Reports & Research Papers, June.

Tabb, L. (2012). "Written Testimony to the United States Senate Committee on Banking, Housing, and Urban Affairs," CEO, TABB Group." September 20.