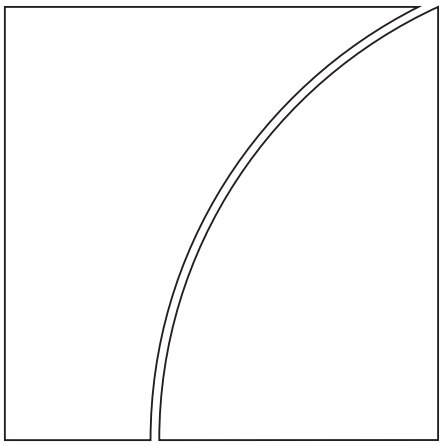
BANK FOR INTERNATIONAL SETTLEMENTS



85th Annual Report

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The economic chapters of this Report went to press on 17–19 June 2015 using data available up to 29 May 2015.

Conventions used in this Report

lhs, rhs	left-hand scale, right-hand scale
billion	thousand million
trillion	thousand billion
%pts	percentage points
...	not available
.	not applicable
–	nil or negligible
$	US dollar unless specified otherwise

Components may not sum to totals because of rounding.

The term "country" as used in this publication also covers territorial entities that are not states as understood by international law and practice but for which data are separately and independently maintained.

85th Annual Report

submitted to the Annual General Meeting
of the Bank for International Settlements
held in Basel on 28 June 2015

Ladies and Gentlemen,

It is my pleasure to submit to you the 85th Annual Report of the Bank for International Settlements for the financial year which ended on 31 March 2015.

The net profit for the year amounted to SDR 542.9 million, compared with SDR 419.3 million for the preceding year. Details of the results for the financial year 2014/15 may be found on pages 167–8 of this Report under "Financial activities and results".

The Board of Directors proposes, in application of Article 51 of the Bank's Statutes, that the present General Meeting apply the sum of SDR 125.6 million in payment of a dividend of SDR 225 per share, payable in any constituent currency of the SDR, or in Swiss francs.

The Board further recommends that SDR 20.9 million be transferred to the general reserve fund and the remainder – amounting to SDR 396.4 million – to the free reserve fund.

If these proposals are approved, the Bank's dividend for the financial year 2014/15 will be payable to shareholders on 2 July 2015.

Basel, 19 June 2015

JAIME CARUANA
General Manager

Overview of the economic chapters

Chapter I: Is the unthinkable becoming routine?

Globally, interest rates have been extraordinarily low for an exceptionally long time, in nominal and inflation-adjusted terms, against any benchmark. Such low rates are the most remarkable symptom of a broader malaise in the global economy: the economic expansion is unbalanced, debt burdens and financial risks are still too high, productivity growth too low, and the room for manoeuvre in macroeconomic policy too limited. The unthinkable risks becoming routine and being perceived as the new normal.

This malaise has proved exceedingly difficult to understand. The chapter argues that it reflects to a considerable extent the failure to come to grips with financial booms and busts that leave deep and enduring economic scars. In the long term, this runs the risk of entrenching instability and chronic weakness. There is both a domestic and an international dimension to all this. Domestic policy regimes have been too narrowly concerned with stabilising short-term output and inflation and have lost sight of slower-moving but more costly financial booms and busts. And the international monetary and financial system has spread easy monetary and financial conditions in the core economies to other economies through exchange rate and capital flow pressures, furthering the build-up of financial vulnerabilities. Short-term gain risks being bought at the cost of long-term pain.

Addressing these deficiencies requires a triple rebalancing in national and international policy frameworks: away from illusory short-term macroeconomic fine-tuning towards medium-term strategies; away from overwhelming attention to near-term output and inflation towards a more systematic response to slower-moving financial cycles; and away from a narrow own-house-in-order doctrine to one that recognises the costly interplay of domestic-focused policies. One essential element of this rebalancing will be to rely less on demand management policies and more on structural ones, so as to abandon the debt-fuelled growth model that has acted as a political and social substitute for productivity-enhancing reforms. The dividend from lower oil prices provides an opportunity that should not be missed. Monetary policy has been overburdened for far too long. It must be part of the answer but cannot be the whole answer. The unthinkable should not be allowed to become routine.

Chapter II: Global financial markets remain dependent on central banks

Accommodative monetary policies continued to lift prices in global asset markets in the past year, while diverging expectations about Federal Reserve and ECB policies sent the dollar and the euro in opposite directions. As the dollar soared, oil prices fell sharply, reflecting a mix of expected production and consumption, attitudes to risk and financing conditions. Bond yields in advanced economies continued to fall throughout much of the period under review and bond markets entered uncharted territory as nominal bond yields fell below zero in many markets. This reflected falling term premia and lower expected policy rates. The fragility of otherwise

buoyant markets was underscored by increasingly frequent bouts of volatility and signs of reduced market liquidity. Such signs were perhaps clearest in fixed income markets, where market-makers have scaled back their activities and market-making has increasingly concentrated in the most liquid bonds. As other types of players, such as asset managers, have taken their place, the risk of "liquidity illusion" has increased: market liquidity appears ample in normal times, but vanishes quickly during market stress.

Chapter III: When the financial becomes real

Plummeting oil prices and a surging US dollar shaped global activity in the year under review. These large changes in key markets caught economies at different stages of their business and financial cycles. The business cycle upswing in the advanced economies continued and growth returned to several of the crisis-hit economies in the euro area. At the same time, financial downswings are bottoming out in some of the economies hardest-hit by the Great Financial Crisis. But the resource misallocations stemming from the pre-crisis financial boom continue to hold back productivity growth. Other countries, less affected by the crisis, notably many EMEs, are experiencing different challenges. The shift in global conditions has coincided with slowing output growth and peaks in domestic financial cycles. There is the danger that slowing growth in EMEs could expose financial vulnerabilities. Better macroeconomic management and more robust financial structures, including longer debt maturities and reduced exposure to currency risk, have increased resilience. But the overall amount of debt has increased and the shift from banks to capital market funding could raise new risks.

Chapter IV: Another year of monetary policy accommodation

Monetary policy continued to be exceptionally accommodative, with many authorities easing or delaying tightening. For some central banks, the ultra-low policy rate environment was reinforced with large-scale asset purchase programmes. In the major advanced economies, central banks pursued significantly divergent policy trajectories, but all remained concerned about the dangers of inflation running well below inflation objectives. In most other economies, inflation rates deviated from targets, being surprisingly low for some and high for others. The deviation of inflation from expected levels and questions surrounding the sources of price changes underscore an incomplete understanding of the inflation process, especially regarding its medium- and long-term drivers. At the same time, signs of growing financial imbalances around the globe highlight the risks of accommodative monetary policies. The persistence of those policies since the crisis casts doubt on the suitability of current monetary policy frameworks and suggests that resolving the tension between price stability and financial stability is the key challenge. This puts a premium on accounting for financial stability concerns much more systematically in monetary policy frameworks.

Chapter V: The international monetary and financial system

The suitable design of international monetary and financial arrangements for the global economy is a long-standing issue. A key shortcoming of the existing system

is that it tends to heighten the risk of financial imbalances, leading to booms and busts in credit and asset prices with serious macroeconomic consequences. These imbalances often occur simultaneously across countries, deriving strength from international spillovers of various types. The global use of the dollar and the euro allows monetary conditions to affect borrowers well beyond the respective issuing economies. Many countries also import monetary conditions when setting policy rates to limit interest rate differentials and exchange rate movements against the major currencies. The global integration of financial markets tends to reinforce these dynamics, by allowing common factors to drive capital flows and a common price of risk to move bond and equity prices. Policies to keep one's own house in order by managing financial cycles would help to reduce such spillovers. In addition, central banks need to better internalise spillovers, not least to avoid the effects of their actions spilling back into their own economies. Moving beyond enlightened self-interest would require international cooperation on rules constraining domestic policies.

Chapter VI: Old and new risks in the financial landscape

Risks in the financial system have evolved against the backdrop of persistently low interest rates in advanced economies. Despite substantial efforts to strengthen their capital and liquidity positions, advanced economy banks still face market scepticism. As a result, they have lost some of their traditional funding advantage relative to potential customers. This adds to the challenges stemming from the gradual erosion of interest income and banks' growing exposure to interest rate risk, which could weaken their resilience in the future. By contrast, EME banks have so far benefited from market optimism amid buoyant conditions that may be masking the build-up of financial imbalances. For their part, insurance companies and pension funds have faced ballooning liabilities and muted asset returns. Asset-liability mismatches are weakening institutional investors and threaten to spill over into the real economy. As these investors offload risks onto their customers and banks retreat from traditional intermediation, asset managers are taking on an increasingly important role. Regulatory authorities are carefully monitoring the financial stability implications of the growing asset management sector.

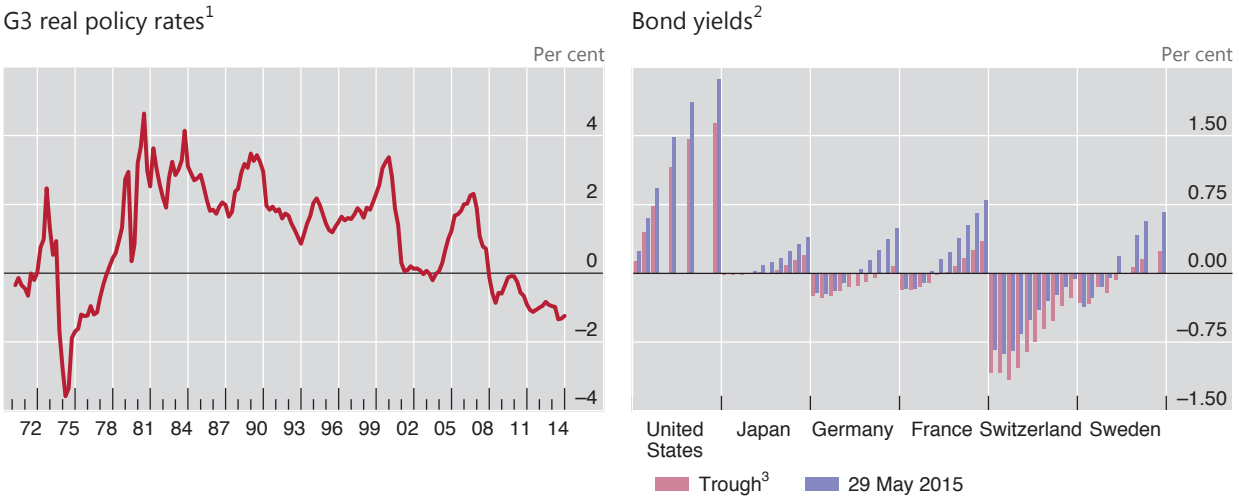
I. Is the unthinkable becoming routine?

Interest rates have never been so low for so long (Graph I.1). They are low in nominal and real (inflation-adjusted) terms and low against any benchmark. Between December 2014 and end-May 2015, on average around $2 trillion in global long-term sovereign debt, much of it issued by euro area sovereigns, was trading at *negative* yields. At their trough, French, German and Swiss sovereign yields were negative out to a respective five, nine and 15 years. Such yields are unprecedented. Policy rates are even lower than at the peak of the Great Financial Crisis in both nominal and real terms. And in real terms they have now been negative for even longer than during the Great Inflation of the 1970s. Yet, exceptional as this situation may be, many expect it to continue. There is something deeply troubling when the unthinkable threatens to become routine.

Such low rates are only the most obvious symptom of a broader malaise, despite the progress made since the crisis. Global economic growth may now be not far from historical averages but it remains unbalanced. Debt burdens are still high, and often growing, relative to output and incomes. The economies hit by a balance sheet recession are still struggling to return to healthy expansion. In several others, financial imbalances show signs of building up, in the form of strong credit and asset price increases, despite the absence of inflationary pressures. Monetary policy has taken on far too much of the burden of boosting output. And in the meantime, productivity growth has continued to decline.

This malaise has proved exceedingly hard to understand. Debates rage. Building on last year's analysis, this Annual Report offers a lens through which to interpret what is going on. The lens focuses on financial, medium-term and global

Interest rates have been exceptionally and persistently low — Graph I.1



[1] Nominal policy rate less consumer price inflation excluding food and energy. Weighted averages for the euro area (Germany), Japan and the United States based on rolling GDP and PPP exchange rates. [2] Yield per maturity; for each country, the bars represent the maturities from one to 10 years. [3] For the United States, 30 January 2015; for Japan, 19 January 2015; for Germany, 20 April 2015; for France, 15 April 2015; for Switzerland, 23 January 2015; for Sweden, 17 April 2015.

Sources: Bloomberg; national data.

factors, whereas the prevailing perspective focuses more on real, short-term and domestic factors.

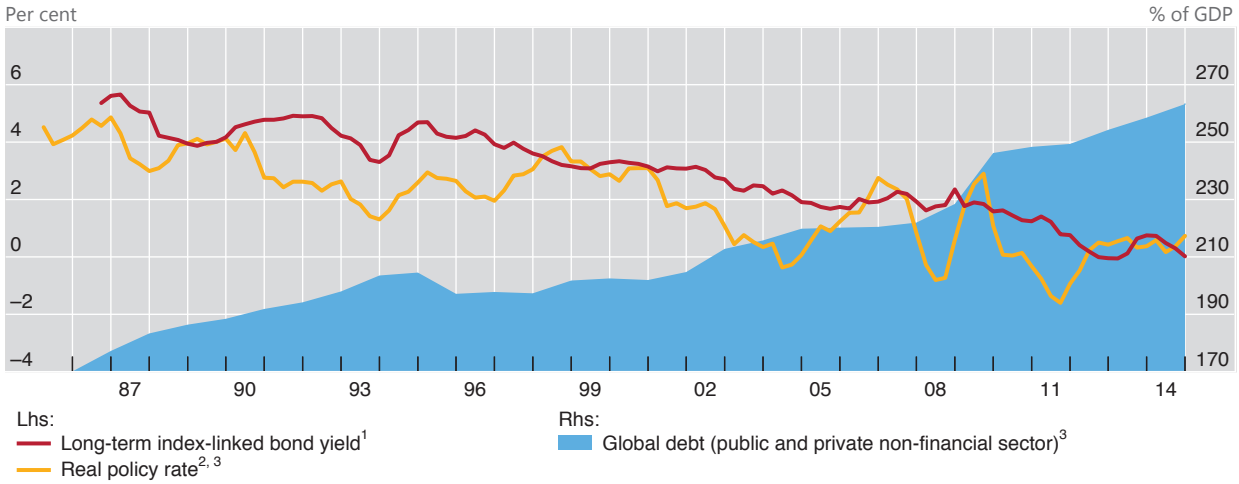
We argue that the current malaise may to a considerable extent reflect a failure to come to grips with how financial developments interact with output and inflation in a globalised economy. For some time now, policies have proved ineffective in preventing the build-up and collapse of hugely damaging financial imbalances, whether in advanced or in emerging market economies (EMEs). These have left long-lasting scars in the economic tissue, as they have sapped productivity and misallocated real resources across sectors and over time.

Our lens suggests that the very low interest rates that have prevailed for so long may not be "equilibrium" ones, which would be conducive to sustainable and balanced global expansion. Rather than just reflecting the current weakness, low rates may in part have contributed to it by fuelling costly financial booms and busts. The result is too much debt, too little growth and excessively low interest rates (Graph I.2). In short, low rates beget lower rates.

There is a domestic and an international dimension to all this. Domestic policy regimes have been too narrowly concerned with short-term output and inflation stabilisation, losing sight of slower-moving but more costly financial cycles. And the international monetary and financial system (IMFS) has exacerbated these shortcomings. This has been most evident post-crisis. As monetary policy in the core economies has pressed down hard on the accelerator but failed to get enough traction, pressures on exchange rates and capital flows have spread easy monetary and financial conditions to countries that did not need them, supporting the build-up of financial vulnerabilities. A key manifestation has been the strong expansion of US dollar credit in EMEs, mainly through capital markets. The system's bias towards easing and expansion in the short term runs the risk of a contractionary outcome in the longer term as these financial imbalances unwind.

The right response is hard to implement. The policy mix will be country-specific, but its general features are not. What is required is a triple rebalancing in national and international policy frameworks: away from illusory short-term macroeconomic

Interest rates sink as debt soars — Graph I.2



[1] From 1998, simple average of France, the United Kingdom and the United States; otherwise only the United Kingdom. [2] Nominal policy rate less consumer price inflation. [3] Aggregate based on weighted averages for G7 economies plus China based on rolling GDP and PPP exchange rates.

Sources: IMF, *World Economic Outlook*; OECD, *Economic Outlook*; national data; BIS calculations.

fine-tuning towards medium-term strategies; away from overwhelming attention to near-term output and inflation towards a more systematic response to slower-moving financial cycles; and away from a narrow own-house-in-order doctrine to one that recognises the costly interplay of domestic-focused policies.

In this rebalancing, one essential element will be to rely less on demand management policies and more on structural ones. The aim is to replace the debt-fuelled growth model that has acted as a political and social substitute for productivity-enhancing reforms. The dividend from lower oil prices provides an opportunity that should not be missed. Monetary policy, overburdened for far too long, must be part of the answer, but it cannot be the whole answer.

The rest of the chapter digs further into the problem in a quest to unearth its possible solution. The first section reviews the global economy's evolution in the past year and assesses the prospects and risks ahead. The second provides the suggested lens through which to understand the forces that have been shaping, and will continue to shape, that evolution. The third considers the policy implications.

The global economy: where it is and where it may be going

Looking back: recent evolution

Where did we leave the economy at this point in time last year? Output growth was not far away from historical averages; and advanced economies (AEs) were gaining momentum even as EMEs had lost some. Except in a few EMEs, inflation was low, in some notable cases below central bank targets. Subdued risk-taking in the real economy contrasted with aggressive risk-taking in financial markets: anaemic investment coexisted with buoyant asset prices and unusually low volatility. Market performance seemed to hinge on extraordinary monetary accommodation as stock and bond indices responded to central bankers' every word and deed. As bank balance sheets in crisis-hit economies were slowly healing, market-based finance was surging. The balance sheets of the non-financial private sector were evolving along a clear divide: in crisis-hit countries the sector was deleveraging at varying but slow speeds; elsewhere it was leveraging up, sometimes uncomfortably fast. Fiscal policy was generally under strain, with debt-to-GDP ratios continuing to rise even as several AEs consolidated their finances. As a result, global private plus public sector debt-to-GDP ratios were edging up. Monetary policy was testing what, at the time, appeared to be its outer limits.

Since then, there have been two major developments. First, the oil price has fallen sharply, with lesser declines for other commodities. The drop of around 60% from July 2014 to March 2015 was the third largest in the last half-century, after those following the Lehman default and the OPEC cartel breakdown in 1985. The price has only partially recovered since then. Second, the US dollar has appreciated strongly. Over the same period, the dollar's trade-weighted exchange rate rose by around 15% – one of the sharpest appreciations on record within a similar window. The shift has been especially large vis-à-vis the euro.

Much ink has been spilled on the oil price. But, like that of any other asset, the price of oil is driven by a combination of market expectations about future production and consumption, risk attitudes and financing conditions (Chapter II). This time, a key factor was the realisation that OPEC had become more concerned about market share and would no longer restrict production as in the past – a true game changer. This explanation better fits the timing and steepness of the price drop than do worries about weakening global demand. In addition, hedging activity by highly indebted individual producers may have played a role.

Regardless of its drivers, the oil price drop has already provided, and will continue to provide, a welcome boost to the global economy (Chapter III). A fall in the price of a key input in global production is bound to be expansionary. This will be all the more visible to the extent that it does not reflect a fall in global demand. Even so, there will be obvious gainers and losers, and the interaction of oil price trends with financial vulnerabilities bears watching (see below).

The sharp dollar appreciation has multiple causes and uncertain effects. It started when firming expectations of divergent macroeconomic conditions and central bank policies made US dollar assets relatively more attractive. It became entrenched once the ECB surprised markets with its large-scale asset purchase programme. The impact of the appreciation through trade is mainly redistributional but welcome to the extent that it has shifted growth momentum from stronger to weaker economies. But the ultimate impact will depend on its imprint on financial vulnerabilities and on how policies, not least monetary policies, in turn react to currency movements. Here, the large stock of dollar debt run up by non-US residents looms large (see below).

Together, the oil price drop and dollar appreciation help explain, and in part reflect, the further plunge of short- and long-term interest rates. They help explain it to the extent that a lower oil price has added to global disinflationary pressures. They reflect it to the extent that exceptionally easy monetary policy in some jurisdictions prompts easing elsewhere. Just think of the Swiss National Bank's or the Danish central bank's decision to test the limits of negative interest rates as the exchange rates came under huge pressure.

Where has this left the world? On the surface, perhaps, not far from where we left it last year. Global growth is little changed, and the rotation from EMEs to AEs has continued. Inflation is somewhat lower, due mainly to temporary and positive supply side factors (Chapter IV). Financial markets have shown mixed signals: volatility has normalised somewhat and risk-taking in corporate debt markets has eased, especially in EMEs. Yet equity prices have soared further and markets still seem to take their cue from central bank policies (Chapter II). US monetary policy normalisation appears closer, but the timing is still uncertain. Banks have continued to heal, although doubts remain, and this has further boosted market-based finance (Chapter VI). Private sector balance sheets have evolved further in the same direction, with some countries deleveraging and others leveraging up, but little has changed overall (Chapter III).

Beneath the surface, though, the medium-term risks and tensions have increased, inherent as they are in a faulty debt-fuelled global growth model. And it is to these risks and tensions that we now turn.

Looking ahead: risks and tensions

To understand the main medium-term risks, it is useful to divide countries into two groups: those that were badly hit by the Great Financial Crisis, and those that were not. For, almost a decade on, the long shadow of the crisis is still with us (Chapter III).

In the least affected countries, the main risk is that of peaking domestic financial cycles, often coupled with external vulnerabilities. This group includes some AEs, notably commodity exporters, and many EMEs, notably some of the largest. In these economies, prolonged domestic credit booms have taken private sector debt-to-GDP ratios to new heights, often in tandem with strong increases in property prices. And in a number of them, as in the past, external sources of credit expansion, especially in foreign currency, have played a role. For example, US dollar credit to non-banks in EMEs has almost doubled since early 2009, to exceed $3 trillion. Especially at risk are commodity exporters, buoyed by a commodity

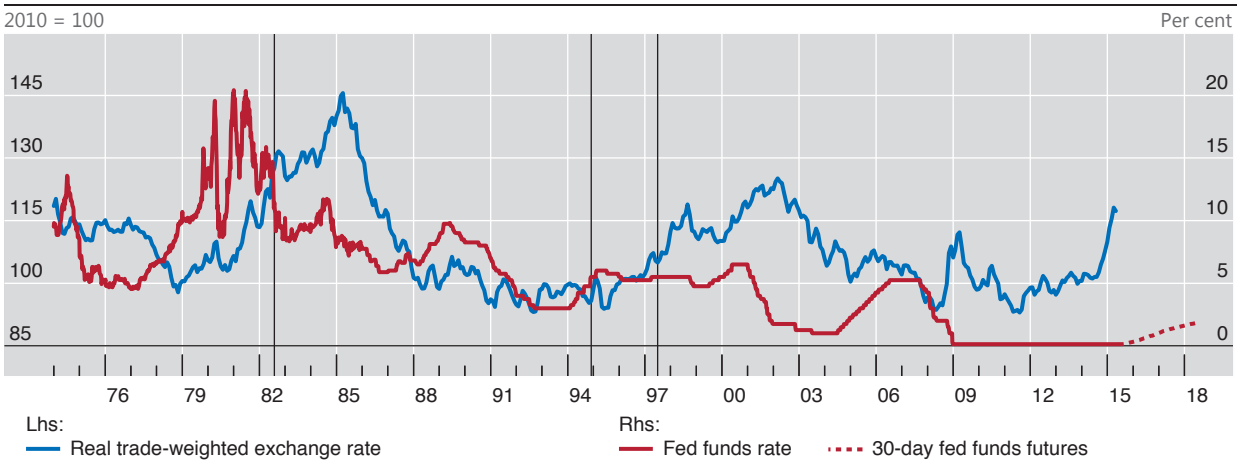
"supercycle" and turbocharged by exceptionally easy global funding conditions. No wonder that estimates for potential growth rates have already halved in Latin America. China plays a pivotal role in all this: it is a huge economy and commodity importer that has slowed considerably under the weight of its pervasive financial imbalances.

In several respects, EMEs are in better shape than in the 1980s and 1990s, when tighter monetary conditions in the United States and an appreciating dollar triggered crises (Graph I.3). Macroeconomic frameworks are stronger and exchange rates more flexible. The financial system infrastructure is more robust, and prudential regulation, not least the macroprudential setup, is tighter. For instance, despite the eye-catching US dollar figures, foreign exchange debt as a percentage of GDP is not as high as in the past. Indeed, that was the aim of developing local currency bond markets – to put an end to "original sin". And foreign exchange reserves are now much larger.

Even so, caution is called for. A seemingly solid performance in terms of growth, low inflation and fiscal probity did not insulate Asian economies in the 1990s. Foreign exchange exposures are now concentrated in the corporate sector, where currency mismatches are harder to measure. There are limits to how far official reserves can be mobilised to plug private sector funding liquidity shortfalls or to defend currencies. And it remains to be seen how the shift from banks to asset managers will influence asset price dynamics: the size asymmetry between suppliers and recipients of funds has not got any smaller, and markets could react violently if pressures became one-sided – liquidity will certainly evaporate in the heat of a rush for the exits. The 2013 "taper tantrum" was only an incomplete test: it reflected traditional balance of payments and macroeconomic concerns, but did not coincide with any more damaging unwinding of domestic financial imbalances.

One thing is for sure: gone are the days when what happened in EMEs largely stayed there. The EMEs' heft in the global economy has soared since the Asian crisis, from about one third to almost half of global GDP in purchasing power terms. And in some cases, their external financial exposures can be quite large from a global perspective, even if small in relation to the domestic economy. Take, in particular, China. At end-2014, it was the world's eighth largest borrower in terms of the $1 trillion in cross-border bank claims – double the amount outstanding just two

US monetary policy and dollar appreciation around EME financial crises — Graph I.3



The solid vertical lines indicate: the Latin American debt crisis (1982), the Tequila crisis (1994) and the Asian financial crisis (1997).

Sources: Bloomberg; national data; BIS.

years before – or the 11th largest on the more than $450 billion its nationals had borrowed in international debt securities markets by end-March 2015.

Different risks attend the countries most affected by the crisis, which are still deleveraging or starting to releverage. Three are worth highlighting.

The first relates to the medium-term costs of persistent ultra-low interest rates. These can inflict serious damage on the financial system (Chapters II and VI). Such rates sap banks' interest margins and returns from maturity transformation, potentially weakening balance sheets and the credit supply, and are a source of major one-way interest rate risk. Ultra-low rates also undermine the profitability and solvency of insurance companies and pension funds. And they can cause pervasive mispricing in financial markets: equity and some corporate debt markets, for instance, seem to be quite stretched. Such rates also raise risks for the real economy. In the shorter term, the plight of pension funds is just the most visible reminder of the need to save more for retirement, which can weaken aggregate demand. Over a longer horizon, negative rates, whether in inflation-adjusted or in nominal terms, are hardly conducive to rational investment decisions and hence sustained growth. If the unprecedented journey towards lower negative nominal interest rates continues, technical, economic, legal and even political boundaries may well be tested.

The second risk relates to the prolonged reliance on debt as a substitute for productivity-enhancing reforms. It is always tempting to postpone adjustment, even though the drag that high public debt can exert on growth has been well documented. Ageing populations compound this challenge in at least two ways. Economically, they make the debt burden much harder to bear. Politically, they heighten the temptation to boost output temporarily through demand management policies: the tyranny of headline growth figures, unadjusted for demographics, contributes to this. For example, it is not remarked often enough that, in terms of its working age population, Japan's growth has outpaced that of many of its advanced economy peers, not least the United States. On that basis, in 2000–07, Japan grew at a cumulative rate of 15%, almost twice as fast as the United States (8%) – the reverse of what headline growth rates show (10% and 18%). The difference is even bigger if the post-crisis years are also considered.

The third risk relates to the Greek crisis and its impact on the euro area. In some respects, developments in Greece, and in the euro area more generally, are akin to the broader global challenges but amplified by institutional specificities – a toxic mix of private and public debt and too little commitment to badly needed structural adjustments. As a result, monetary policy, seen as a quick fix to buy time, has borne the brunt of the burden. On strictly economic grounds, the euro area seems better placed to cope with contagion than when the crisis first broke out. Yet uncertainty lingers, and the potential for political contagion is even harder to assess.

Not included in this list is the risk of persistently low inflation or outright deflation. True, the risk depends on country-specific factors. But the current policy debate tends to overplay it (Chapter IV). First, it is sometimes not stressed enough that recent price declines largely reflect the fall in oil and other commodity prices. Their transient impact on inflation should be superseded by the longer-lasting boost to expenditure and output, especially in energy-importing countries. Second, there is a tendency to draw general conclusions from the Great Depression – a unique episode that may have had more to do with the large drop in asset prices and with banking crises than with deflation per se. In general, the longer historical record reveals that the link between deflation and growth is a weak one. Finally, the evidence also suggests that the real economic damage has so far stemmed from the interplay of debt with property prices, and not so much with goods and services prices, as the latest recession confirms. At the same time, policy responses should also take into account our still limited understanding of the inflation process.

The resulting picture is that of a world that has been returning to stronger growth but where medium-term tensions persist. The wounds left by the crisis and subsequent recession are healing, because balance sheets are being repaired and some deleveraging has taken place. Recently, the strong and unexpected boost from energy prices has helped too. In the meantime, monetary policy has done its utmost to support near-term demand. But the policy mix has relied too much on measures that, directly or indirectly, have entrenched dependence on the very debt-fuelled growth model that lay at the root of the crisis. These tensions manifest themselves most visibly in the failure of global debt burdens to adjust, the continued decline in productivity growth and, above all, the progressive loss of policy room for manoeuvre, both fiscal and monetary.

The deeper causes

Why has this happened? One possible answer lies in a blend of politics and ideas. The natural bias of political systems is to encourage policies that buy short-term gain at the cost of risking long-term pain. The reasons are well known and need no elaboration here. But, as ideas influence policy, their effect becomes all the more insidious because of that bias. Thus, the pressing question is whether prevailing economic paradigms are sufficiently good guides for policy.

Ideas and perspectives

Once the crisis broke out, there was widespread agreement that the dominant macroeconomic perspectives had failed to ward off the crisis because they ruled it out. To simplify somewhat, the presumption was that price stability was sufficient for macroeconomic stability and that either the financial system was self-stabilising or that its failure could not be very damaging.

Unfortunately, progress in tackling these shortcomings has been disappointing. Financial factors still appear to be hovering at the periphery of *macroeconomic* thinking. True, huge efforts have been made to bring them closer to the core: economists have worked hard to develop models that can accommodate them. But these efforts have not yet permeated deeply enough into the policy debate: macroeconomic stability and financial stability remain uncomfortable bedfellows.

If one strips the prevailing analytical view of all its nuances and focuses on how it is shaping *the policy debate*, its basic logic is simple. There is an excess or shortfall of final demand for domestic production (an "output gap") that determines domestic inflation, not least by underpinning inflation expectations. Aggregate demand policies are then used to eliminate that gap and so achieve full employment and stable inflation; fiscal policy affects spending directly, and monetary policy indirectly, through real (inflation-adjusted) interest rates. The exchange rate, if allowed to float, permits the authorities to set monetary policy freely in line with domestic needs and will, over time, also balance the current account. If each country adjusts its monetary and fiscal levers so as to close the output gap *period by period*, everything will be fine, domestically and globally.

Of course, to varying degrees, financial factors do make their appearance. For instance, in some cases too much debt is seen as widening the demand shortfall. In others, the possibility of financial instability is fully recognised. But then, at the end of the day, when all is said and done, the basic conclusions do not change. All demand shortfalls should be treated equally, ie through standard aggregate demand policies. And financial instability should best be addressed separately, through prudential policy, albeit with a stronger systemic (macroprudential)

orientation. Following a tidy separation principle, monetary and fiscal policies are best left free to address standard macroeconomic concerns, very much as before. From this perspective, we are back in the familiar pre-crisis world. It feels oddly like *Groundhog Day*.

Last year's Annual Report offered a different analytical lens that brought different policy conclusions into view. That lens seeks to bring financial factors back to the core of macroeconomics, and stresses the medium term over the short term and the global over the domestic. Three basic elements, developed further in this year's Report, are essential.

First, the behaviour of inflation may not be a fully reliable guide to sustainable (or potential) output. This is because financial imbalances often build up when inflation is low and stable, declining or even negative. The hallmarks of these imbalances are booming credit and asset prices, particularly property prices, and signs of aggressive risk-taking in financial markets, such as low credit spreads and falling volatility. When these financial booms finally collapse, they can cause devastating and long-lasting economic damage. This was clearly true of the Great Financial Crisis. But that episode simply replayed a recurrent historical pattern, from the pre-Great Depression financial boom in the United States – prices actually fell for part of the roaring 1920s – to the crisis in Japan in the early 1990s and those in Asia in the mid-1990s.

If financial booms have common characteristics, it should be possible to identify some of the danger signals in advance. And the evidence does indicate that proxies for such financial booms can provide useful information about the risks ahead *as events unfold* (in "real time"). Such indicators would have helped establish that output was running above its sustainable, or potential, level ahead of the most recent crisis in the United States – something that typical estimates used in policymaking, partly distorted by subdued inflation, have done only ex post, as they rewrite history based on new information (Box IV.C). This is the reason why, for the United States, knowledge of the deviations of the debt service ratio and leverage from their long-term values in the mid-2000s would have helped project the behaviour of output during the subsequent recession and recovery (Box III.A). And it explains why the behaviour of credit and property prices during the boom, or that of the debt service ratio or even that of credit growth alone, has proved a useful indicator of future banking distress and costly recessions across countries.

Why is inflation an insufficiently reliable signal of sustainability, contrary to what the prevailing paradigm suggests? There are at least two possible reasons.

One has to do with the type of credit expansion involved. Instead of financing the purchase of newly produced goods or services, which lifts expenditures and output, strong credit growth may simply be paying for existing assets, either "real" (eg housing or companies) or financial (eg simple assets or more complex forms of financial engineering). Neither of these impinges directly on inflationary pressures.

The other has to do with what explains (dis)inflation. Supply-driven disinflations tend to boost output while providing fertile ground for the build-up of financial imbalances. Examples include forces such as the globalisation of the real economy (eg the entry of former communist countries into the world trading system), technological innovation, greater competition, and falling prices for key production inputs such as oil. The difference between supply- and demand-driven disinflations may well explain the historically weak empirical link between deflation and growth.

Second, the busts that follow financial booms do much more damage, and are less amenable to traditional aggregate demand policies. Growing empirical evidence indicates that the corresponding recessions are deeper, subsequent recoveries

weaker, output potential permanently lost, and post-recession growth rates possibly lower. Indeed, the post-crisis experience has followed a similar pattern, despite the unprecedented monetary stimulus and initial fiscal expansion.

The reasons have to do with the strong undercurrents that the boom leaves in its wake. The financial sector is broken. Households and/or companies face large debt overhangs and asset quality problems. And, importantly, financial booms interact perversely with productivity growth. They can mask its secular decline, eroded by structural deficiencies, behind an illusory feel-good factor (see the *84th Annual Report*). They can also undermine it more directly, by causing long-lasting resource misallocations, in both capital and labour (Box III.B). Taking cross-country estimates at face value, the impact can be quite large, up to nearly 1 percentage point per year during the boom and much larger after a crisis breaks out.

Under these conditions, and once the acute financial crisis phase is over, aggregate demand policies are pushing on a string. Undercapitalised financial institutions restrict and misallocate credit. Overindebted borrowers pay back debt. And misallocated resources cannot respond to an indiscriminate stimulus. In other words, not all output gaps are born equal, amenable to identical remedies; and post-crisis their size may not be as large as it appears. Thus, unless the underlying problems are addressed head-on, short-term gain may be purchased at the price of long-term pain: debt does not come down sufficiently, the policy room for manoeuvre shrinks further and the seeds are sown for the next financial bust. None of this, however, means higher inflation. Paradoxically, an easing bias in the short term may end up being contractionary longer-term.

Third, when the exchange rate becomes the point of least resistance, problems can be exacerbated globally. Since after a financial bust monetary policy has only limited traction on expenditures through domestic channels, the responsiveness of inflation and output to the exchange rate is stronger. Currency depreciation has a more immediate, mechanical effect on prices. And to the extent that it diverts demand away from other countries, it can boost output. But if, as argued below, exchange rates fail to insulate countries sufficiently from external influences, the appreciations will be resisted and the end result will be competitive depreciations and a looser monetary policy stance globally. Thus, if, on balance, policies are *already* too loose for lasting financial and macroeconomic stability, because of an unbalanced policy mix, the outcome will be worse. Once more, short-term gain may result in long-term pain.

Excess financial elasticity

It is now possible to put these various pieces together and diagnose what may be wrong with the functioning of the global economy. In this view, policies have been unable to constrain the build-up and collapse of damaging financial booms, ie the global economy exhibits "excess financial elasticity" – think of an elastic band that can be stretched out further and further until, eventually, it snaps back more painfully. This reflects three shortcomings: in the interplay between financial markets and the economy; in domestic policy regimes; and in the interaction of these regimes through the IMFS. Take each in turn.

By now, there is a keen appreciation that self-equilibrating forces in the financial system are weak, and that this can amplify business fluctuations. There is a mutually reinforcing feedback between loosely anchored perceptions of risk and value, on the one hand, and weak financing constraints, on the other. For a (long) while, asset valuations soar, risk-taking increases and financing becomes easier until, at some point, the process goes into reverse. Thus, the financial system is said to be "procyclical". The crisis revealed this once more, and with a vengeance.

The degree of procyclicality, or the system's elasticity, hinges on domestic policy regimes, and their evolution has increased it. First, financial liberalisation back in the 1980s eased financing constraints and made funding easier and cheaper to obtain. Meanwhile, prudential safeguards have lagged behind. Second, the emergence of monetary policy regimes focused on near-term inflation control has meant that policy would be tightened during financial booms only if inflation increased but would then be loosened aggressively and persistently during busts. Third, fiscal policy has failed to recognise the hugely flattering effect that financial booms have on fiscal accounts and the limited effectiveness of untargeted measures during busts. Taken together, these developments have resulted in an easing bias that allows financial booms to grow bigger, last longer and collapse more violently.

Importantly, the current IMFS has further increased this excess elasticity through the interaction of monetary and financial regimes (Chapter V).

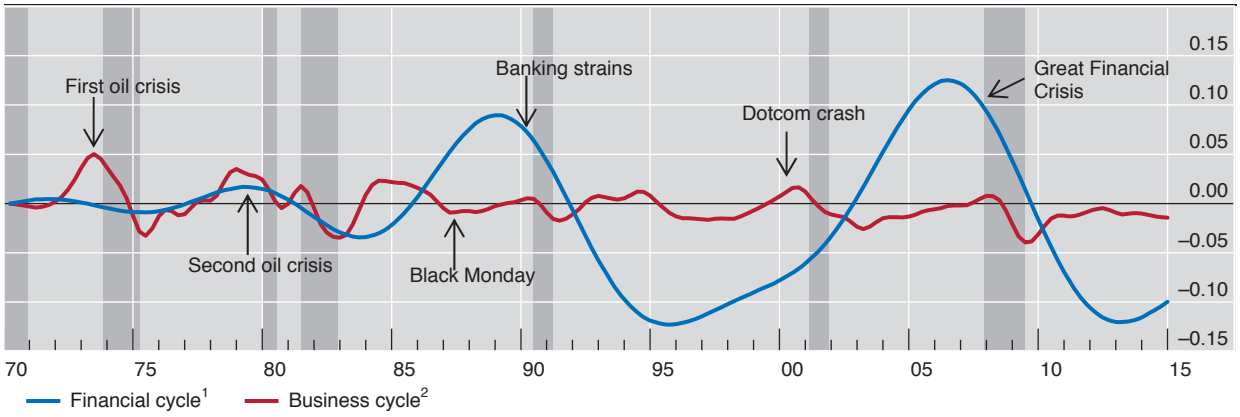
The interaction of monetary regimes has spread the easing bias from the core economies to the rest of the world. This happens directly, because key international currencies – above all, the US dollar – are extensively used outside the issuing country's borders. Thus, the core countries' monetary policies directly influence financial conditions elsewhere. More importantly, an indirect effect works through the aversion of policymakers to unwelcome exchange rate appreciation. As a result, policy rates are kept lower and, if countries resort to foreign exchange intervention, yields are further compressed once the proceeds are invested in reserve currency assets.

The interaction of financial regimes, through the free mobility of capital across currencies and borders, reinforces and channels these effects. Freely mobile capital adds a key external source of funding during domestic booms. And it makes exchange rates subject to "overshooting" for exactly the same reasons as domestic asset prices are, ie loosely anchored perceptions of values, risk-taking and ample funding. Think, for instance, of popular strategies such as momentum trading and carry trades; or of the self-reinforcing feedback between exchange rate appreciation, lower foreign currency debt burdens and risk-taking. More generally, free capital mobility generates surges in risk-taking across countries, regardless of their specific conditions, inducing strong co-movements in long-term yields, asset prices and financing flows. Again, the stronger and more long-lasting these surges are, the more violent the subsequent reversal. Global liquidity, or the ease of financing in international markets, moves in irregular but powerful waves.

The historical evidence is broadly consistent with these observations. The lens helps explain why the scale and duration of financial booms and busts (financial cycles) have increased since the early 1980s (Graph I.4) – a development also supported by the progressive globalisation of the real economy, as trade barriers have come down and new countries have joined in, boosting global growth prospects while generating disinflationary pressures. It helps explain why, globally, inflation-adjusted interest rates have trended down and appear quite low regardless of benchmarks and why foreign exchange reserves have soared. It helps explain why, post-crisis, US dollar credit has surged outside the United States, directed largely towards EMEs. And it helps explain why we have been seeing signs of the build-up of financial imbalances in EMEs as well as in some advanced economies less affected by the crisis and highly exposed to international influences.

Note that, in this story, current account imbalances do not figure prominently. Current account deficits need not coincide with the build-up of financial imbalances. In fact, some of the most damaging financial imbalances in history have occurred in surplus countries – most spectacularly in the United States before the Great Depression and Japan from the late 1980s. And strong financial booms have recently occurred, or are now taking place, in several surplus countries, including China, the Netherlands, Sweden and Switzerland. The relationship between current

Financial and business cycles in the United States Graph I.4



[1] The financial cycle as measured by frequency-based (bandpass) filters capturing medium-term cycles in real credit, the credit-to-GDP ratio and real house prices; Q1 1970 = 0. [2] The business cycle as measured by a frequency-based (bandpass) filter capturing fluctuations in real GDP over a period from one to eight years; Q1 1970 = 0.

Sources: M Drehmann, C Borio and K Tsatsaronis, "Characterising the financial cycle: don't lose sight of the medium term!", *BIS Working Papers*, no 380, June 2012; BIS calculations.

accounts and financial imbalances is more nuanced: a reduction in the surplus or increase in the deficit tends to reflect the build-up of those imbalances. This has policy implications to which we will return.

Why are interest rates so low?

All this raises the fundamental question that lies at the heart of the current policy debate: Why are market interest rates so low? And are they "equilibrium (or natural) rates", ie are they where they should be? How are the market and equilibrium rates determined? The prevailing analytical perspective and the one proposed in this Report come up with different answers.

Most holders of either view would agree that *market* interest rates are determined by the interplay of central banks' and market participants' decisions (Chapter II). Central banks set the short-term policy rate and influence long-term rates through signals about how they will set short-term rates and, increasingly, through large-scale purchases along the maturity spectrum. Market participants set deposit and loan rates and, through their portfolio choices, help determine longer-term market rates. Their decisions will reflect many factors, including risk appetite, views about profitable investments, regulatory and accounting constraints and, of course, expectations about what central banks will do (Chapter II). In turn, actual inflation determines ex post inflation-adjusted rates and expected inflation ex ante real rates.

But are the interest rates that prevail in the market actually *equilibrium* rates? Take first the short-term rate, which central banks set. When we read that central banks can have only a transitory impact on inflation-adjusted short-term rates, what is really meant is that, at some point, unless central banks set them at their "equilibrium" level, or sufficiently close to it, something "bad" will happen. Exactly what that "bad" outcome is will depend on one's view of how the economy works.

In the prevailing view – one embedded in the popular "savings glut" and "secular stagnation" hypotheses – the answer is that inflation will rise or fall, possibly even turn into deflation. Inflation provides the key signal, and its behaviour depends on the degree of economic slack. The corresponding equilibrium rate is also known

as the "Wicksellian" natural rate: it equates output with its potential, or saving and investment at full employment. To be sure, in practice policymakers also consider economic slack independently. But, in the final analysis, since slack is very hard to measure, they tend to revise its estimate based on what happens to inflation. For example, if unemployment falls below its presumed "equilibrium" level but inflation does not increase, they will infer that there is still slack in the economy.

In the view proposed here, inflation need not reliably signal that rates are at their "equilibrium" level. Rather, the key signal may be the build-up of financial imbalances. After all, pre-crisis, inflation was stable and traditional estimates of potential output proved, in retrospect, far too optimistic. If one acknowledges that low interest rates contributed to the financial boom whose collapse caused the crisis, and that, as the evidence indicates, both the boom and the subsequent crisis caused long-lasting damage to output, employment and productivity growth, it is hard to argue that rates were at their equilibrium level. This also means that interest rates are low today, at least in part, because they were too low in the past. Low rates beget still lower rates. In this sense, low rates are self-validating. Given signs of the build-up of financial imbalances in several parts of the world, there is a troubling element of déjà vu in all this.

Shifting the focus from short-term to long-term rates does not change the picture. There is no reason to presume that these long-term rates will be at their equilibrium level any more than short-term rates are. Central banks and market participants fumble in the dark, seeking either to push rates towards equilibrium or to profit from their movement. After all, long-term rates are just another asset price. And asset prices often do follow unsustainable and erratic paths, as when they are at the root of financial instability.

Policy implications

What are the policy implications of this analysis? The first is that monetary policy has been overburdened for too long, especially post-crisis. The second, more general one, is the need to rebalance policies away from aggregate demand management to initiatives that are more structural in character. True, this is politically difficult. But there is no other way to sustainably raise output and productivity growth and to shake off debt addiction. The specific blend of measures will naturally be country-specific, but it will generally involve improving the flexibility of product and labour markets, providing an environment conducive to entrepreneurship and innovation, and boosting labour force participation. This would also help relieve the huge pressure that has been placed post-crisis on fiscal and, above all, monetary policy. The oil dividend provides a tailwind for implementing such reforms and should not be wasted. The analysis is also a wake-up call for commodity exporters that may be tempted to avoid painful adjustments as their revenues fall sharply.

Beyond this, there are questions about how best to adjust policy frameworks, nationally and internationally, in order to take financial factors more systematically into account and about what to do at the current juncture.

Adjusting frameworks

As noted in last year's Annual Report, constraining the excess financial elasticity of individual economies calls for broad-based adjustments in domestic fiscal, prudential and monetary frameworks. The basic strategy would be to rein in financial booms more deliberately and to address financial busts more effectively.

Compared with current ones, the resulting policies would be less asymmetrical over financial cycles, less procyclical and less biased towards easing over successive booms and busts. Take each type of policy in turn.

The priority for fiscal policy is to ensure that it behaves countercyclically and that it preserves sufficient room for manoeuvre during busts. This means, first and foremost, ensuring long-term sustainability – a daunting challenge in many jurisdictions (Chapter III). It also means exercising extra prudence during financial booms, so as not to overestimate the underlying solidity of fiscal positions: sustainable output and growth look rosy, fiscal revenues are bloated, and the contingent liabilities needed to deal with the bust remain hidden. During a bust, that fiscal space should ideally be used to speed up private sector balance sheet repair. This applies to banks – but only if private sector backstops prove insufficient – and non-banks alike. The range of options includes recapitalisation, temporary nationalisation and, for non-banks, outright debt relief. By tackling the root problem, this would be a more efficient use of public money than untargeted expenditures or tax cuts. More fundamentally, there is a strong case for eliminating the subsidy of debt over equity, so common in tax codes.

The priority for prudential policy is to strengthen its systemic or "macroprudential" orientation, so as to tackle procyclicality head-on. Basel III indeed moves in that direction with its countercyclical capital buffer, as does the implementation of full-fledged macroprudential frameworks in national jurisdictions. These deploy a range of instruments designed to strengthen the financial system's resilience and, ideally, to constrain financial booms (Chapter IV). Examples include maximum loan-to-value or debt-to-income ratios, proactive adjustments to capital requirements and provisioning, restrictions on non-core bank funding, and macroprudential (banking system-wide) stress tests.

At the same time, two big gaps remain (Chapter VI). One is how best to address the risks raised by the rapid growth of non-bank financial intermediaries. To be sure, insurance companies have always been regulated, although not so much from a systemic perspective. And work has been under way for some time on "shadow banks" – leveraged players active in maturity transformation. But attention has only recently turned to the asset management industry. Here the concern is not so much the failure of individual firms, but the impact of their collective behaviour on systemic stability through asset prices, market liquidity and funding conditions. Even when unleveraged, these investors are quite capable of generating leverage-like behaviour. The second gap is how best to address sovereign risk, including for banks. Several regulatory provisions and supervisory practices favour sovereign exposures. But sovereigns can be quite risky and, historically, have often been at the root of bank failures. Moreover, favouring them often comes at the expense of small and medium-sized enterprises, thereby stifling productive activities and employment. The right approach needs to be systemic and comprehensive, addressing the various types of exposure. The Basel Committee on Banking Supervision has recently taken up this challenge. That work should be pursued without delay or hesitation.

The priority for monetary policy is to ensure that financial stability concerns are incorporated more symmetrically during booms and busts (Chapter IV). The frameworks should allow for scope to tighten during financial booms even if near-term inflation is low and stable, and to ease less aggressively and persistently during busts.

While a number of objections have been raised to this proposal, none of them appears to be a show-stopper. Indeed, similar objections were levelled against adopting inflation targeting frameworks, which many regarded as a step in the dark.

A first objection is that there are no reliable indicators for the build-up of financial imbalances. But considerable progress has been made in this area, and

macroprudential frameworks already actively rely on such assessments. Moreover, as noted, standard monetary policy benchmarks are unobservable and measured with great uncertainty, eg economic slack, potential output and equilibrium real interest rates. Even measuring the relevant inflation expectations is fraught with difficulties.

A second objection is that monetary policy has little impact on financial booms, and hence on credit expansion, asset prices and risk-taking. But these are key channels through which monetary stimulus influences aggregate demand. Indeed, this is the strategy that central banks have *explicitly* followed post-crisis to reanimate the economy. And, if anything, the evidence suggests that central banks have been very successful in influencing financial markets and financial risk-taking but less so in boosting risk-taking in the real economy and hence output.

The deeper question is how to reconcile such a strategy with inflation objectives. The strategy requires greater tolerance for persistent inflation deviations from target, especially when disinflation is driven by positive supply side forces. Are central banks prepared to accept them? And are the frameworks flexible enough? This will necessarily vary across central banks.

Arguably, some of the current frameworks already provide central banks with sufficient flexibility. Some arrangements, for instance, explicitly include the option to allow inflation to return to the long-run target only slowly over time, depending on the factors that drove it off track. This, of course, requires careful, and possibly quite challenging, explanation and communication. Two factors could in part explain why central banks may not have fully used this flexibility. One is their perception of the trade-offs involved. For example, they may see deflation as a kind of red line that, once crossed, triggers a self-reinforcing destabilising process. Another is the possibility of using macroprudential tools instead.

Even so, in a number of cases the frameworks and the mandates underpinning them may be seen as too restrictive. If so, adjustments could be made. These might even go as far as revisiting mandates, if necessary, such as by assigning greater weight to financial stability considerations. But, if chosen, this route would need to be travelled with great care. The revision process and final outcome could be unpredictable and might open the door to unwelcome political economy pressures.

On balance, the priority should be to use the existing room for manoeuvre to the full, and to encourage analytical perspectives that highlight the costs of failing to incorporate financial stability considerations into monetary frameworks. Building sufficient public support is critical. Mandates could then be revisited only as a last resort.

What about the IMFS? Putting one's own house in order, along the principles described, would already be a major step: it would greatly reduce the negative spillovers to the rest of the global village. But there is a need to go further (Chapter V).

This has long been recognised for the "financial" dimension of the system. The need for improvement has been the basis for increasingly tight cooperation in the development and implementation of commonly agreed prudential standards as well as in day-to-day supervision of banks. True, the journey has not been smooth, and momentum inevitably slows as the memories of a crisis fade. But the journey is continuing, particularly in the various initiatives under way under the aegis of the Basel Committee on Banking Supervision and the Financial Stability Board (see below). Progress requires unflagging commitment: the risk that national priorities and biases will gain the upper hand always lurks around the next corner.

By contrast, the recognition has been far less common for the "monetary" dimension of the system, at least since the breakdown of Bretton Woods. Here, it is

worth distinguishing between crisis management and crisis prevention. In crisis management, cooperation has been long-standing, mainly through foreign exchange swap lines; in crisis prevention, which means in routine monetary policy settings, it has been much softer.

As regards crisis management, central banks have built on the successful cooperation during the Great Financial Crisis. Among the central banks of major currency areas, foreign currency swap lines exist or could be established quickly as needed. And there may be some room to strengthen these mechanisms further, even though risk management and governance issues loom large.

But international arrangements for emergency liquidity support cannot, and should not, substitute for cooperative efforts to prevent financial crises. They cannot, because the economic and social costs of a crisis are simply too large and unpredictable. And they should not, because of moral hazard and the tendency to overburden central banks.

Two factors have severely hindered monetary policy cooperation outside crises. The first has to do with diagnosis and hence the perceived need to act. As explained above, the prevailing view is that flexible exchange rates, combined with inflation-focused domestic regimes, can foster the right global outcomes. As a result, discussions on how to promote global coordination have centred on how to deal with current account imbalances, which are less amenable to monetary policy measures. Indeed, the terms "imbalance" and "current account imbalance" have been treated as synonymous. The second factor has to do with mandates and hence the incentive to act. National mandates raise the bar: actions must clearly be seen to promote the interests of one's own country. In other words, there is no perceived need and no incentive.

Yet neither factor should halt proceedings. The excess financial elasticity perspective highlights the need for cooperation: international spillovers and spillbacks are just too damaging. Moreover, it shifts the focus onto financial imbalances – the blind spot of present arrangements. Indeed, in this view, the exclusive focus on current account imbalances has sometimes been counterproductive. It has, for example, encouraged pressure on current account surplus countries to expand domestic demand even as financial imbalances were building up, as in the case of Japan in the 1980s or China post-crisis. As regards incentives, national mandates have not prevented tight cooperation in the prudential sphere.

How far could cooperation realistically go? At a minimum, enlightened self-interest, based on a thorough exchange of information, should be feasible. This would mean taking spillovers and spillbacks more systematically into account when setting policies. Large jurisdictions that are home to international currencies have a special responsibility. Cooperation could even extend to occasional joint decisions, on both interest rates and foreign exchange intervention, beyond those seen during crises. Unfortunately, a stronger sense of urgency and shared responsibility would be needed to develop new global rules of the game that would help instil greater discipline in national policies.

What to do now?

Room for manoeuvre in macroeconomic policy has been narrowing with every passing year. In some jurisdictions, monetary policy is already testing its outer limits, to the point of stretching the boundaries of the unthinkable. In others, policy rates are still coming down. Fiscal policy, after the post-crisis expansion, has been throttled back, as sustainability concerns have mounted. And fiscal positions are deteriorating in EMEs where growth is slowing. What, then, should be done now, besides redoubling reform efforts to strengthen productivity growth?

For fiscal policy, the overriding priority is to make sure that sovereign debt is on a sustainable path, which in many cases it is not (Chapter III). This is the precondition for lasting monetary, financial and macroeconomic stability. And it is also what defines the near-term room for manoeuvre. When longer-term growth prospects are in doubt, it would be highly imprudent to push for more expansionary fiscal policies – a mistake made often enough in the past. For countries that do have fiscal space and need to use it, the challenge is how to do so most effectively. This means, first and foremost, facilitating private sector balance sheet repair, supporting reforms that boost long-term productivity growth and a greater but judicious emphasis on investment at the expense of current transfers. The quality of public spending matters more than its quantity.

For monetary policy, there is a need to fully appreciate the risks to financial and hence macroeconomic stability associated with current policies. True, there is great uncertainty about how the economy works. But precisely for this reason it seems imprudent to push the burden of tackling financial stability risks entirely onto prudential policies. As always, the correct calibration will be country-specific. But, as a general rule, a more balanced approach would mean attaching more weight than hitherto to the risks of normalising too late and too gradually. And, where easing is called for, the same should apply to the risks of easing too aggressively and persistently.

Given where we are, normalisation is bound to be bumpy. Risk-taking in financial markets has gone on for too long. And the illusion that markets will remain liquid under stress has been too pervasive (Chapter II). But the likelihood of turbulence will increase further if current extraordinary conditions are spun out. The more one stretches an elastic band, the more violently it snaps back. Restoring more normal conditions will also be essential for facing the next recession, which will no doubt materialise at some point. Of what use is a gun with no bullets left? Therefore, while having regard for country-specific conditions, monetary policy normalisation should be pursued with a firm and steady hand.

All this naturally puts a premium on strengthening prudential safeguards (Chapter VI). Macroprudential tools should be applied with vigour, but without entertaining unrealistic expectations about what they can do on their own. Where appropriate, balance sheet repair should be pursued energetically, through loss recognition and recapitalisations. And the regulatory initiatives under way should be implemented promptly and comprehensively. In particular, the recalibration of the banks' leverage ratio is critical as a means of providing a reliable backstop for the risk-weighted minimum capital requirements. Likewise, it will be essential to set a tough standard for interest rate risk in the banking book at a time when nominal interest rates have been so exceptionally low for so long.

Conclusion

The global economy is growing again at rates not far from the historical average. Lower oil prices should boost it further in the near term even as they temporarily put further downward pressure on prices. But not all is well. Debt burdens and financial risks are still too high, productivity growth too low and room for manoeuvre in macroeconomic policy too limited. Global economic expansion is unbalanced. Interest rates that have been extraordinarily low for exceptionally long are the outward sign of this malaise.

Nothing is inevitable about this. The problems we face are man-made and can be solved by the wit of man. This chapter has provided one possible diagnosis out of the many on offer: our view is that the current plight reflects, to a considerable

extent, the inability of policy frameworks to come to grips with the global economy's "excess financial elasticity" – its propensity to generate hugely damaging financial booms and busts. These leave enduring and deep wounds in the economic tissue that, unless properly treated, impede the economy's return to a healthy and sustainable expansion – one that does not set it up for the next disruptive cycle. In the long term, this risks entrenching instability and chronic weakness.

One may disagree with this diagnosis. It is harder, though, to disagree with the general principle of being prudent whenever diagnoses are uncertain. Prudence means following a treatment that allows for the possibility of error. From this perspective, current macroeconomic policy frameworks appear too one-sided. When all is said and done, they are still based on the presumption that inflation will suffice as a reliable gauge of sustainability or, if it will not, that financial stability risks can be adequately addressed through prudential policies alone. This is a familiar viewpoint: caveats aside, it harks back to the pre-crisis way of doing things.

A more balanced approach would have a number of features. It would seek to address financial booms and busts through a combination of policies – monetary, fiscal and prudential – rather than prudential policy alone. It would rebalance the mix away from demand management policies, especially monetary policy, towards structural measures. And it would not presume that, if one's own house is in order, the global village will be too.

Shifting the focus from the short to the longer term is more important than ever. Over the past decades, it is as if the emergence of slow-moving financial booms and busts has slowed down economic time relative to calendar time: the economic developments that *really* matter now take much longer to unfold. Meanwhile, the decision horizons of policymakers and market participants have shortened. Financial markets have compressed reaction times and policymakers have chased financial markets more and more closely in what has become an ever tighter, self-referential, relationship. Ultimately, it is this combination of slowing economic time and shorter decision horizons that helps explain where we are – and how, before we know it, the unthinkable can become routine. It should not be allowed to.

II. Global financial markets remain dependent on central banks

During the period under review, from mid-2014 to end-May 2015, accommodative monetary policies continued to lift prices in global asset markets. Investors' risk-taking remained strong as expectations of policy rate increases were pushed out further and additional asset purchases undertaken. As a result, bond prices climbed, equity indices repeatedly hit new highs and prices of other risky assets also rose. Moreover, global investors' exposure to riskier assets continued to increase.

As central banks remained in easing mode, bond yields in advanced economies continued to fall throughout much of the period under review. In a number of cases, bond markets entered uncharted territory as nominal bond yields fell below zero for maturities even beyond five years. This was mainly due to falling term premia, but also reflected downward revisions of expected future policy rates. Towards the end of the period, bond markets – in particular in Europe – saw sharp yield reversals as investors became increasingly uneasy about stretched valuations.

Signs of market fragility were evident more widely too. Bouts of volatility occurred with increasing frequency across markets, and signs of illiquidity in fixed income markets began to appear. As market-makers have scaled back their activities after the Great Financial Crisis, asset managers have become more important as sources of liquidity. Such shifts, in combination with increased official demand, may have reduced liquidity and reinforced liquidity illusion in certain bond markets.

Expectations of increasingly divergent monetary policies in the United States and the euro area resulted in widening interest rate differentials, and, as a result, the dollar soared and the euro plummeted. In addition to these outsize exchange rate swings, foreign exchange markets saw big rate moves more generally. These included the surge of the Swiss franc following the Swiss National Bank's discontinuation of its minimum exchange rate against the euro, and rapid depreciation of currencies for a number of energy-producing countries.

In parallel with the dollar's surge, oil prices fell sharply in the second half of 2014 before stabilising and recovering somewhat in the second quarter of 2015. Although the oil price drop was particularly severe, commodity prices declined more generally. The rapid price moves in commodity markets reflected a combination of weak demand, in particular from EMEs, and, in the case of oil, stronger supply. But they may also have reflected increased activity on the part of financial investors in commodity markets, as these markets are becoming a more integral part of global financial markets more broadly, as well as rising indebtedness in the energy sector.

The first section of this chapter describes the main developments in global financial markets between mid-2014 and end-May 2015. The second focuses on the extraordinarily low yields in government bond markets. The third section explores rising fragilities in financial markets, with emphasis on risks of liquidity illusion in fixed income markets. The final section discusses the growing linkages between commodities – in particular oil – and financial markets.

Further monetary accommodation but diverging outlook

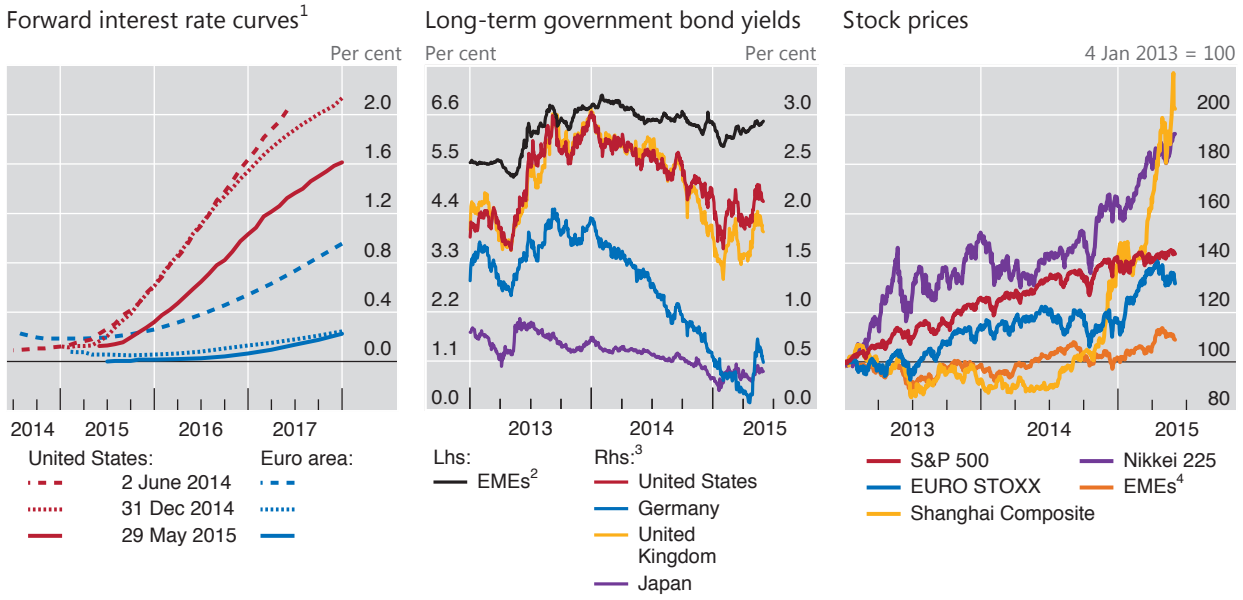
Increasing macroeconomic and monetary policy divergence during the past year set the scene for global financial markets. The United States, in particular, continued to recover while the euro area, Japan and a number of emerging market economies (EMEs) faced weakening growth prospects during much of the period under review (Chapter III). Against this backdrop, actual and expected monetary policy moves diverged. The US Federal Reserve ended its large-scale asset purchase programme and continued to take gradual steps to prepare markets for an eventual increase in the federal funds target rate. Still, as global disinflationary pressures grew, largely due to falling oil prices, the vast majority of central banks eased policy (Chapter IV). As a result, US forward interest rates diverged from forward rates elsewhere, especially vis-à-vis the euro area (Graph II.1, left-hand panel).

The renewed wave of monetary accommodation supported prices across asset classes. As near zero interest rate expectations were pushed out further and additional asset purchases undertaken, yields on government bonds fell to record lows in a number of advanced economies (Graph II.1, centre panel). Moreover, a growing share of sovereign debt traded at negative yield levels (see discussion below). The fall in euro area bond yields that had begun in 2014 accelerated in early 2015 as the ECB launched its expanded asset purchase programme. As a result, 10-year government bond yields in Germany fell to levels as low as 7.5 basis points in April 2015. Those for a number of other euro area countries, including France, Italy and Spain, also reached record lows. Even in Japan, where bond yields have been exceptionally low for many years, 10-year bond yields reached a new trough of 20 basis points in January 2015. However, a sharp global yield reversal in late April and May 2015 suggested that investors had viewed some of the previous declines as excessive.

Much of the decline in yields that took place up to April 2015 reflected falling term premia (see below). Expectations that near zero policy interest rates would

Easier monetary policies support asset prices

Graph II.1



[1] For the United States, 30-day federal funds rate futures; for the euro area, three-month Euribor futures. [2] JPMorgan GBI-EM Broad Diversified Index, yield to maturity in local currency. [3] Ten-year government bond yields. [4] MSCI Emerging Markets Index.

Sources: Bloomberg; Datastream.

remain in place for longer than previously anticipated also played a role, especially at shorter maturities. Central bank purchases of government bonds added to the downward pressure on premia and yields, as did the move by some central banks to negative policy rates. Expectations that the Federal Reserve was inching closer to its first rate hike kept the level of US bond yields somewhat higher than in several other advanced economies. But US yields nevertheless continued to fall at a moderate pace throughout the second half of 2014 and into early 2015 before the decline was halted (Graph II.1, centre panel).

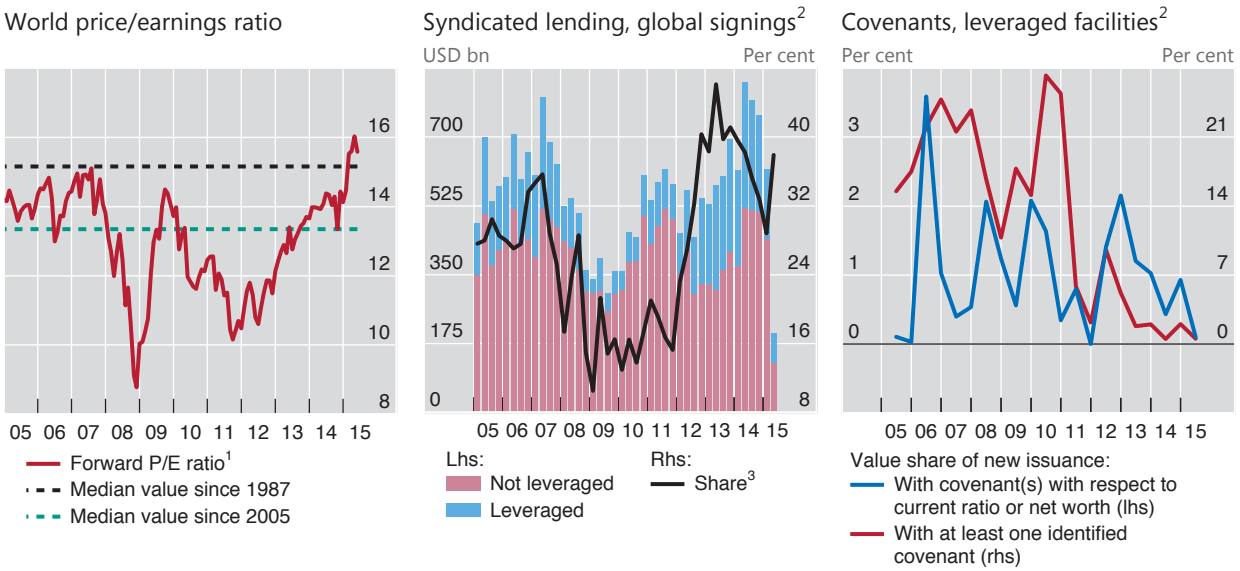
In parallel with the drop in bond yields, investors continued to exhibit a strong search for yield. As a result, equity prices rose to record highs in many markets (Graph II.1, right-hand panel), even as the macroeconomic outlook remained relatively weak (Annex Table A1). Although EME equity markets were generally less buoyant, there were exceptions: the Shanghai Composite index surged by 125% during the period under review, despite mounting reports of a slowing Chinese economy. As valuations became increasingly stretched, equity prices underwent a few sharp but brief corrections in late April and May 2015.

Signs of stronger risk-taking were evident in market prices as well as in quantity-based indicators. Global P/E ratios continued on an upward trek that had started in 2012, which brought them above the median value both for the past decade and since 1987 (Graph II.2, left-hand panel). In the syndicated loan market, the share of leveraged loans, which are granted to low-rated and highly leveraged borrowers, rose to almost 40% of new signings in April and May 2015 (Graph II.2, centre panel). And the share of those loans featuring creditor protection in the form of covenants stayed very low (Graph II.2, right-hand panel).

Global investors' increased exposure to riskier asset classes was also evident in EME corporate bond markets. Corporations in EMEs have issued growing amounts of debt in international markets at progressively longer maturities since 2010 (Graph II.3, left-hand panel). At the same time, the debt servicing capacity of EME

Signs of increased financial risk-taking

Graph II.2

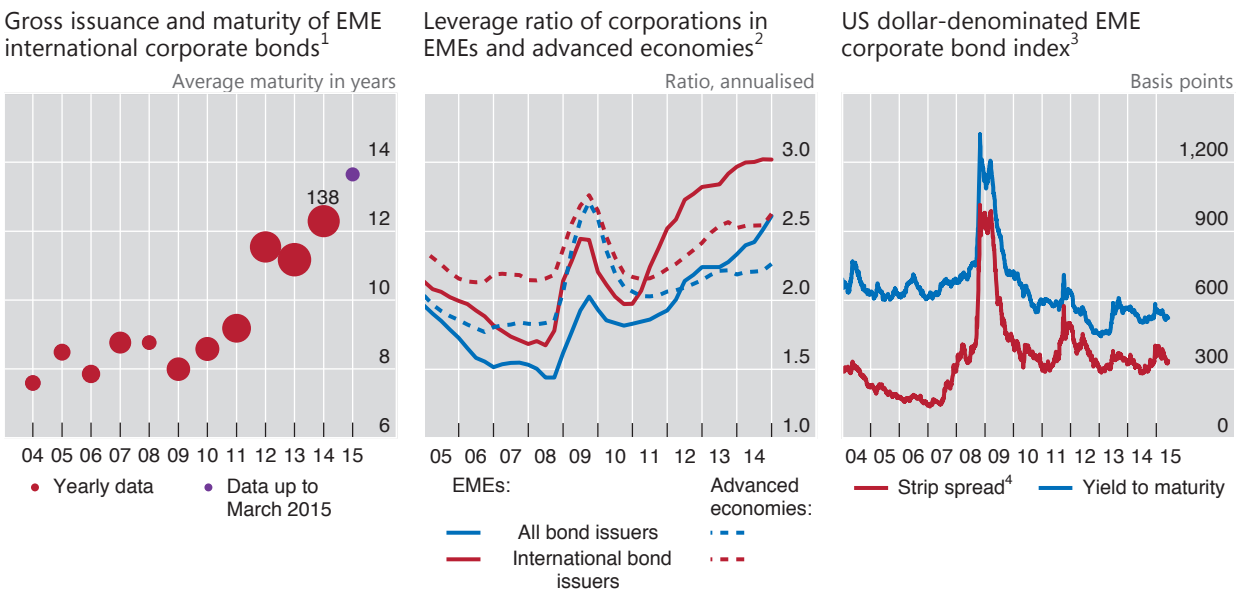


[1] Twelve-month forward price/earnings ratio of the world equity index compiled by Datastream. [2] Based on data available up to 21 May 2015; "leveraged" includes "highly leveraged". [3] Of leveraged loans in total syndicated loan signings.

Sources: Datastream; Dealogic; BIS calculations.

Increasing duration and credit risk for EME corporate bond investors

Graph II.3



[1] Sum of issuance by non-financial and non-bank financial corporations of EMEs by residence. The size of balloons reflects relative volume of gross issuance in each year. The figure next to the balloon for 2014 is the amount of gross issuance in 2014 in billions of US dollars. EMEs: Brazil, Bulgaria, Chile, China, Colombia, the Czech Republic, Estonia, Hong Kong SAR, Hungary, Iceland, India, Indonesia, Korea, Latvia, Lithuania, Malaysia, Mexico, Peru, the Philippines, Poland, Romania, Russia, Singapore, Slovenia, South Africa, Thailand, Turkey and Venezuela. [2] Leverage ratio = total debt/EBITDA, where EBITDA is earnings before interest, tax, depreciation and amortisation; calculated as a trailing four-quarter moving average; EMEs are those listed in footnote 1; advanced economies are the euro area, Japan, the United Kingdom and the United States. [3] JPMorgan CEMBI Broad Diversified index. [4] Spread over US Treasuries.

Sources: JPMorgan Chase; S&P Capital IQ; BIS international debt securities database; BIS calculations.

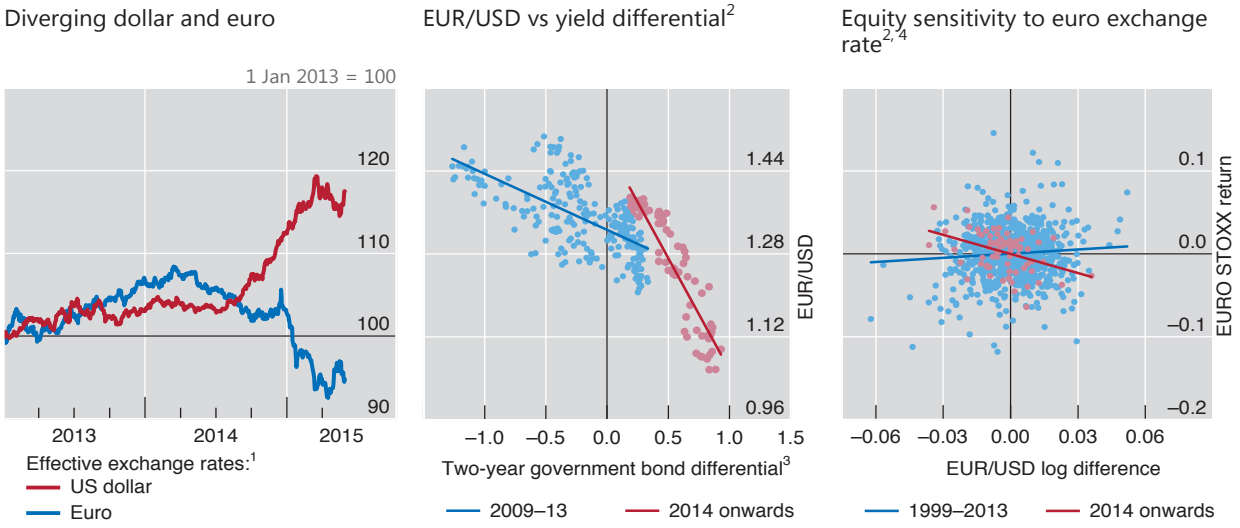
corporate bond issuers has deteriorated. In particular, the leverage ratio of EME corporations has been increasing fast to reach the highest level in a decade, exceeding that of advanced economy corporations, both for entities issuing internationally and for those financing themselves in domestic debt markets (Graph II.3, centre panel). Despite the strong issuance and increased riskiness of EME corporate bonds, investors have generally not pushed up their required risk premium (Graph II.3, right-hand panel).

Outsize exchange rate moves during the past year were a key manifestation of the substantial influence of monetary policy on financial markets. The US dollar experienced one of the largest and fastest appreciations on record, surging by around 15% in trade-weighted terms between mid-2014 and the first quarter of 2015 before stabilising (Graph II.4, left-hand panel). At the same time, the euro dropped by more than 10%. Reflecting divergent monetary policy stances, the widening interest rate differential between dollar and euro debt securities increasingly encouraged investors to move into dollar assets, seemingly playing a bigger role than in the past (Graph II.4, centre panel). This underscores the growing importance of policy rate expectations for exchange rate developments.

As exchange rates became increasingly sensitive to monetary policy expectations, equity prices became more responsive to exchange rate movements. This was particularly so in the euro area, where since 2014 a statistically significant relationship has emerged between returns on the EURO STOXX index and the euro/US dollar exchange rate. Specifically, a 1% depreciation of the euro has, on average, coincided with a rise in equity prices of around 0.8% (Graph II.4, right-hand panel). No such relationship had been apparent previously, from the introduction of the euro.

The dollar soars, the euro plunges

Graph II.4



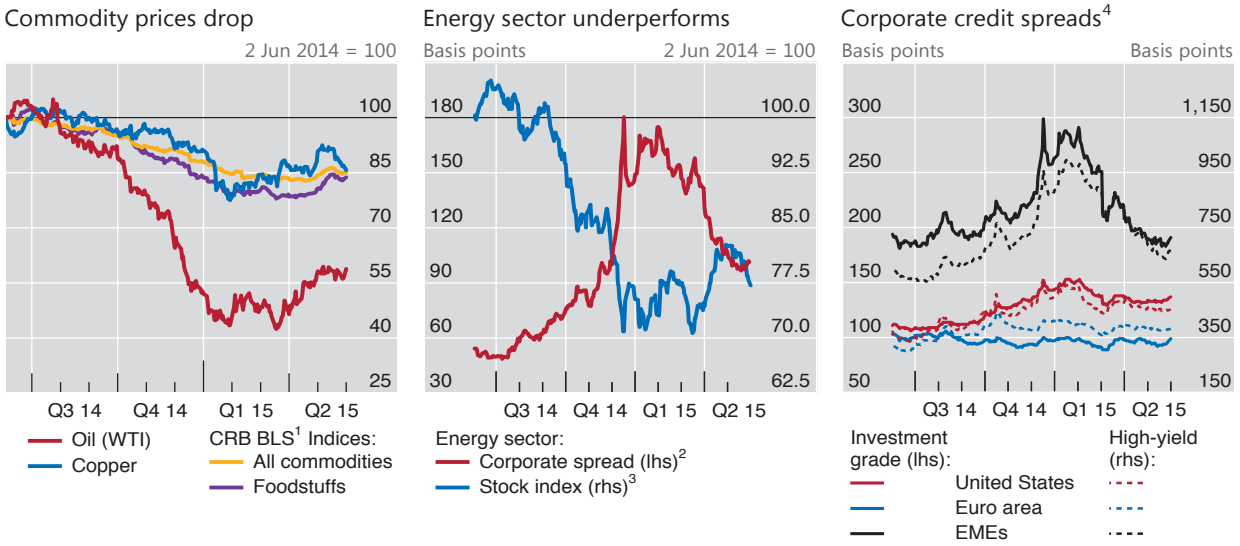
[1] BIS nominal effective exchange rate broad indices. A decline (increase) indicates a depreciation (appreciation) of the currency in trade-weighted terms. [2] End-of-week observations. [3] Two-year government bond yield differential between the United States and Germany (in percentage points). [4] A positive (negative) EUR/USD log difference corresponds to an appreciation (depreciation) of the euro vis-à-vis the dollar.

Sources: Bloomberg; BIS; BIS calculations.

Just like foreign exchange markets, commodity markets saw broad-based price swings, with oil prices falling particularly sharply. The price of West Texas Intermediate (WTI) crude oil fell from above $105 in mid-2014 to $45 per barrel in January 2015 before stabilising and partially recovering (Graph II.5, left-hand panel).

Oil plunge puts energy sector under pressure

Graph II.5



[1] Commodity Research Bureau – Bureau of Labor Statistics. [2] The difference between the option-adjusted spreads of investment grade debt of energy sector corporates and the overall corporate sector for EMEs, the euro area and the United States (computed as a simple average). The EME energy sector index consists of both investment grade and high-yield debt. [3] Simple average of energy stock prices; for the United States, S&P 500 equity index; for the euro area and EMEs, the MSCI. [4] Option-adjusted spreads over US Treasury notes.

Sources: Bank of America Merrill Lynch; Bloomberg; Datastream.

Box II.A

The oil price: financial or physical?

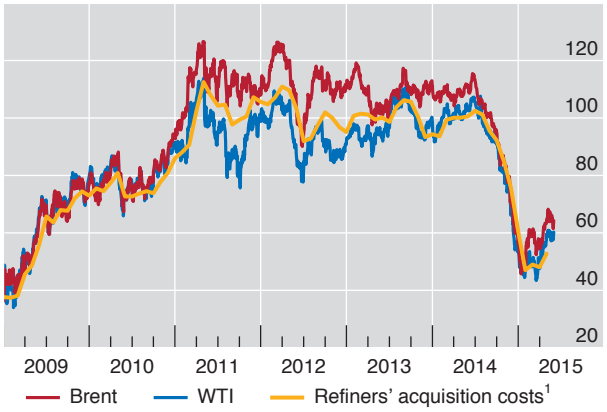
Oil and, more generally, energy are key production inputs. The oil price, therefore, is an important determinant of production decisions and also has a significant impact on inflation dynamics. This box discusses the interaction of physical and financial prices, with a specific focus on two aspects. The first is the extent to which oil is akin to conventional financial assets: price swings are driven by changes in expectations, not only by the current conditions in the physical market. The second is the relationship of the oil futures curve with the physical market: as the shape of the former is determined by current conditions of the physical market, it would be misleading to interpret it as an indicator of the expected price path.

Over the past decade, as financial activity in oil and other markets surged, many commentators started referring to commodities as an asset class. The analogy is warranted to some extent: popular oil price benchmarks such as Brent and West Texas Intermediate (WTI) are actually futures, and their price depends on players' interaction in the futures markets. However, oil is a physical asset, and the futures contracts are backed by it. So, futures and physical prices must be tied together: should a misalignment between conditions in the physical market and in the futures market materialise, players can store oil and sell it forward (or vice versa), eventually bringing prices back into line.① Consequently, while physical prices are normally less volatile, they track quite closely the futures benchmarks (Graph II.A, left-hand panel).

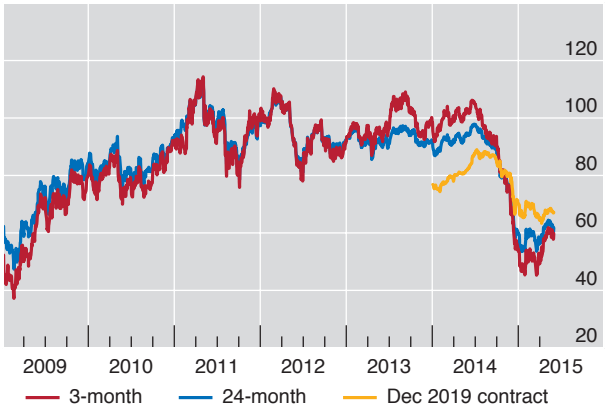
Physical and futures prices of oil co-move closely

In US dollars per barrel — Graph II.A

Price of oil and refiners' acquisition costs



WTI oil futures strips



[1] Refiners' acquisition cost of domestic and imported crude oil.

Sources: Bloomberg; Datastream.

The parallel between conventional assets and oil extends also to the futures curve. For a conventional asset, the difference between spot and futures prices (the so-called basis) is determined by the cost of carry (largely a function of interest rates), and by the stream of dividends and interest payments that the asset yields. Oil generates no cash stream, but agents attach a premium to holding it physically because of its value for production and consumption rather than on paper – the so-called convenience yield. The convenience yield is unobservable, and varies over time according to the conditions of the underlying physical market: at times of tightness, the convenience yield would be high, as agents attach a high value to holding a scarce resource. By contrast, the convenience yield could even turn negative when supply is abundant in the physical market and inventories are high: in such a situation, holding physical oil is not advantageous, as slack in the physical market would ensure easy access to the resource in case of need. So, while the oil futures curve is normally negatively sloped (backwardation) due to a positive convenience yield, its slope can turn positive (contango) at times of inventory overhang. It is therefore no surprise that the futures curve currently slopes upwards (Graph II.A, right-hand panel).

An important consequence of the presence of a convenience yield is that it would be wrong to interpret a positively (or negatively) sloped supply curve as evidence of bullish (or bearish) expectations. The price of any

futures contract will indeed include a component reflecting expectations, but this is likely to be concealed by changes in the convenience yield. As argued above, when markets are tight, the high convenience yield is likely to produce a negatively sloped futures curve in spite of expectations of continued tightness, ie high prices. By contrast, slack in the physical market will produce a positively sloped supply curve which does not signal bullish expectations, but simply abundant physical supply.

Since futures and physical prices are jointly determined, price movements are driven by changes in current and expected conditions in the physical markets. Due to the high liquidity of futures markets, such changes will be quickly processed and incorporated in observed prices. Thus, as for other assets, changes in expectations are the key driver of price movements. The recent fall in the price of oil is no exception. While prices started to decline in June 2014, the fall accelerated substantially in mid-November, when OPEC announced that it would not reduce its output. This is a significant deviation from OPEC's strategy to achieve stable prices, and is likely to have substantially changed agents' expectations of prospective supply conditions.

The overall macroeconomic environment, which largely influences expectations of demand and supply of oil over time, is therefore a key driver of oil price fluctuations.② Furthermore, prices will also reflect risk perceptions and attitudes, which will in turn depend on financing conditions. As a result, monetary policy is itself an important driver of oil prices. Loose monetary policy may boost oil prices through expectations of higher growth and inflation. Moreover, easy financing conditions will reduce the cost of holding inventories and carrying speculative positions.③

① In practice, a number of factors prevent instantaneous arbitrage of price misalignments, both real (eg access to storage) and financial (eg market liquidity or agents' indebtedness). For a detailed discussion, see M Lombardi and I van Robays, "Do financial investors destabilize the oil price?", *ECB Working Papers*, no 1346, June 2011. ② This point is developed in L Kilian, "Not all oil price shocks are alike: disentangling demand and supply shocks in the crude oil market", *American Economic Review*, vol 99, June 2009. ③ For a detailed discussion of monetary policy transmission to commodity prices, including alternative channels, see A Anzuini, M Lombardi and P Pagano, "The impact of monetary policy shocks on commodity prices", *International Journal of Central Banking*, vol 9, September 2013.

This was the largest and fastest oil price drop since the one around the time of the Lehman Brothers collapse. The fact that non-energy commodity prices also declined – albeit by much less than oil – indicated that at least part of the oil price drop reflected broader macroeconomic conditions, including weaker growth prospects in EMEs. However, the sharp decline was also due to market-specific factors (see Box II.A and the last section in this chapter). Particularly important was the November 2014 OPEC announcement that its members would not reduce their output despite falling prices.

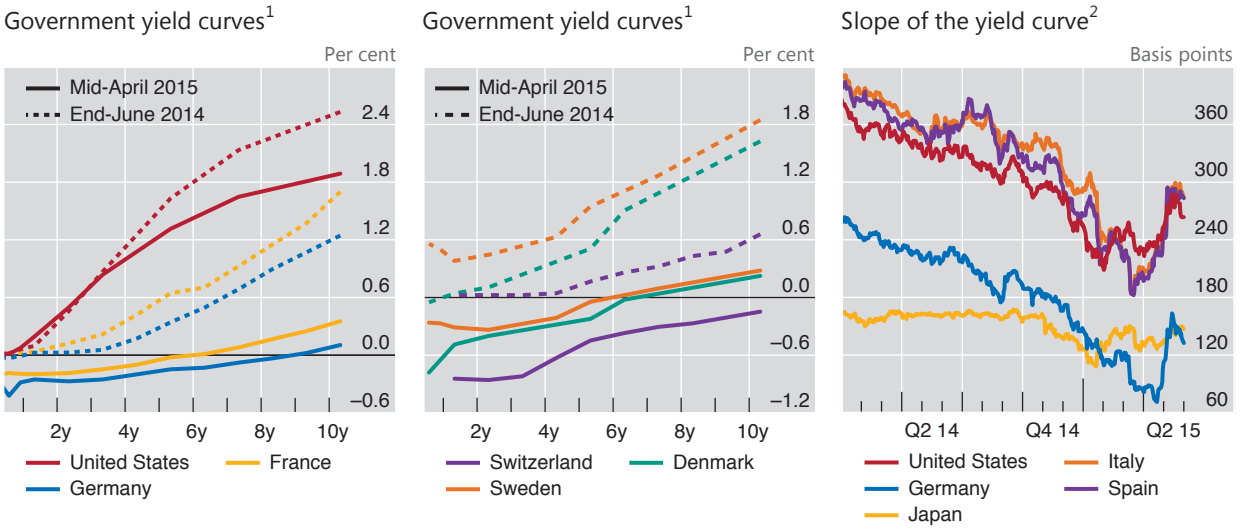
With oil and other energy commodities hit especially hard, the energy-producing sector came under intense pressure as its profit outlook plunged. As a result, energy firms' stock prices fell sharply and corporate bond yields soared compared with other sectors, before recovering as oil prices stabilised and bounced back in early 2015 (Graph II.5, centre panel). Given the rapid growth of the energy sector's share in corporate bond markets in recent years (see discussion below), the surge and subsequent fall in energy bond yields strongly influenced corporate credit spread movements more broadly (Graph II.5, right-hand panel).

Bond yields drop into negative territory

A striking development during the past year was the rapidly rising incidence of negative-yielding nominal bonds, even at long maturities. This occurred as several central banks, including the ECB, introduced negative policy rates (Chapter IV). At their lowest, around mid-April 2015, German and French government bond yields dropped below zero for maturities up to nine and five years, respectively (Graph II.6, left-hand panel). In Switzerland, where the National Bank cut its policy rate to −0.75% after discontinuing the exchange rate floor against the euro, the government yield curve sank below zero for maturities even beyond 10 years

Falling yields, flattening curves

Graph II.6



[1] The dotted lines represent observations on 30 June 2014, the solid lines those on 15 April 2015. [2] Difference between the 30-year and one-year government bond yields for each country.

Source: Bloomberg.

(Graph II.6, centre panel). In Denmark and Sweden, where policy rates were pushed below zero, the domestic yield curves became negative out to about five years. With short-term rates already at record lows in many economies, such yield movements meant a further massive flattening of yield curves up to early 2015 (Graph II.6, right-hand panel).

As the decline in yields gathered pace during late 2014 and early 2015, investors became increasingly uneasy about stretched valuations. This made bond markets ripe for a sudden reversal, which materialised at the end of April and in May 2015 (Graph II.1, centre panel). The surge in yields was particularly strong in the euro area. German 10-year bond yields, for example, rose from their record lows below 10 basis points in the second half of April to above 70 basis points in mid-May, and other euro area countries saw similar increases. Bond yields outside Europe also rose, although to a generally smaller extent.

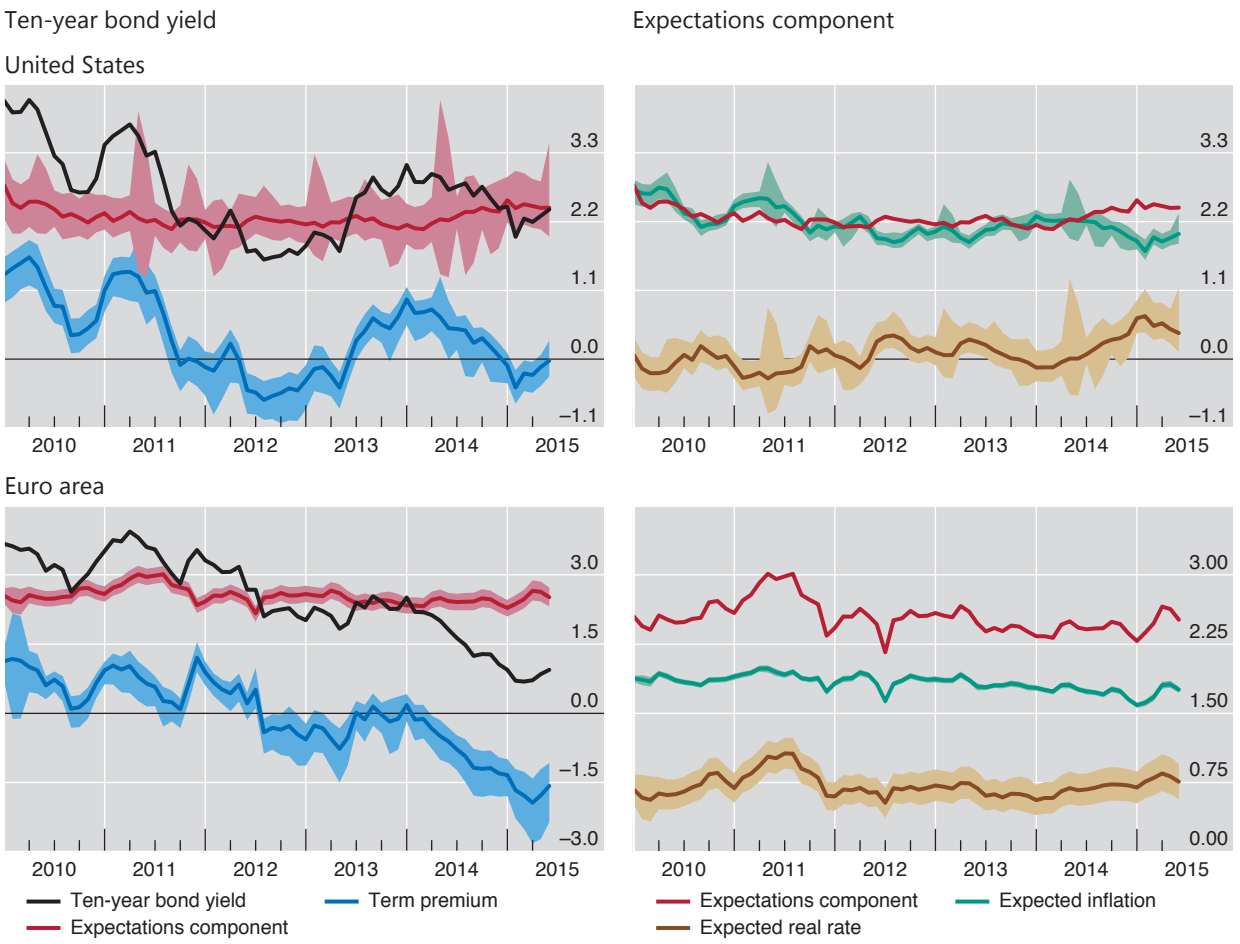
Pronounced declines in term premia played a key role in the fall in yields seen up to late April 2015. A decomposition of 10-year US and euro area bond yields into expectations of future interest rates and premia components shows that, between mid-2014 and April 2015, the estimated term premium fell by 60 basis points in the United States and by 100 basis points in the euro area (Graph II.7, left-hand panels). In the case of the United States, this was partly offset by a rise in the expectations component of about 15 basis points. This increase, in turn, was entirely due to higher expected real interest rates (plus 40 basis points), consistent with expectations of a relatively imminent lift-off of US policy rates, whereas expectations of lower inflation had a counteracting effect (minus 25 basis points; Graph II.7, top right-hand panel). As fluctuations in the expectations component in the euro area were not statistically significant, the drop in the term premium accounted for the entire fall in bond yields there (Graph II.7, bottom panels).

No doubt, central bank asset purchases played a key role in the decline of term premia and yields, reinforcing the effects of lower expected policy rates. This was especially the case in the euro area (see discussion below). Moreover, the timing of the shifts indicates that the effect of these purchases spilled over to the US bond

Falling term premia push yields lower[1]

In per cent

Graph II.7



[1] Decomposition of the 10-year nominal yield according to an estimated joint macroeconomic and term structure model; see P Hördahl and O Tristani, "Inflation risk premia in the euro area and the United States", *International Journal of Central Banking*, September 2014. Yields are expressed in zero coupon terms; for the euro area, French government bond data are used. The shaded areas represent 90% confidence bands for the estimated components, based on 100,000 draws of the model parameter vector from its distribution at the maximum likelihood estimate and the associated covariance matrix.

Sources: Bloomberg; BIS calculations.

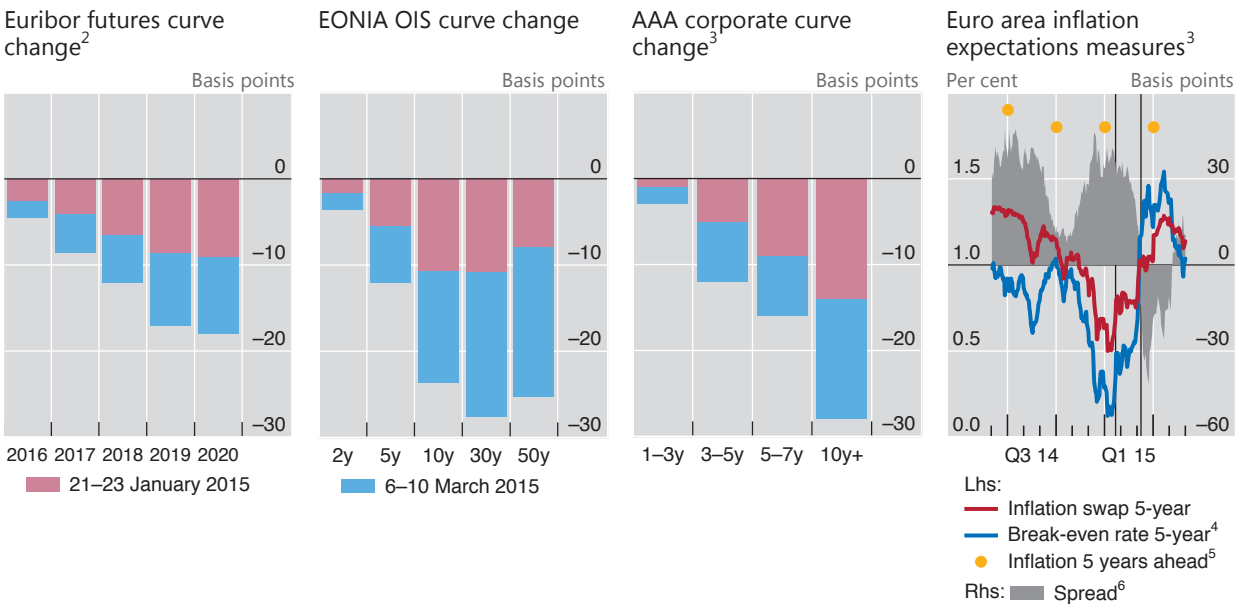
market, as investors chasing higher yields moved into US Treasuries (see also Chapter V).

The impact of the ECB's expanded asset purchase programme on euro area interest rates was clearly visible. Both the programme's announcement on 22 January 2015 and the start of the purchases on 9 March 2015 generated large price swings. The two events shifted the term structure of three-month Euribor futures downwards by up to 18 basis points, roughly corresponding to a nine-month postponement of the expected interest rate lift-off (Graph II.8, first panel). In addition, the two events pushed down 10-year German and French government bond yields by over 30 basis points.

Lower term premia influenced other long-duration assets, beyond those directly targeted by the purchases. EONIA overnight index swap (OIS) rates fell by 23 and 28 basis points for 10- and 30-year maturities, respectively (Graph II.8, second panel). Moreover, even though the ECB's expanded purchases targeted only official sector securities, yields on euro area AAA-rated corporate bonds dropped

The ECB's asset purchase programme has a strong effect on interest rates[1]

Graph II.8



[1] Changes from one day before to one day after the announcement of the asset purchase programme (22 January 2015) and the start of the purchases (9 March 2015). [2] Futures for March 2016, March 2017, March 2018, March 2019 and March 2020. [3] The vertical lines indicate the announcement of the ECB asset purchase programme on 22 January 2015 and the start of the purchases on 9 March 2015. [4] Based on French government bonds. [5] Based on the ECB Survey of Professional Forecasters. [6] Spread between five-year inflation swap rates and five-year break-even rates.

Sources: Bank of America Merrill Lynch; Bloomberg; Datastream; BIS calculations.

across the entire maturity spectrum, and more strongly for longer-duration bonds, as investors intensified their search for yield (Graph II.8, third panel).

The effects of central bank purchases were perhaps most obvious in the price reaction of euro area inflation-linked bonds. As the Eurosystem was getting closer to implementing its asset purchases, euro area break-even inflation rates rose significantly. Much of this increase was a direct consequence of the purchase programme rather than of higher inflation expectations: inflation swap rates rose much less, and survey measures of expected inflation remained stable. In fact, the spread between inflation swap rates and the corresponding break-even inflation rates can be viewed as an indicator of the liquidity premia in the two markets relative to nominal bonds. The typically positive spread between the two moved sharply lower, dropping 40 basis points into negative territory at the five-year maturity (Graph II.8, last panel). This suggests that in anticipation of the ECB purchases – which were explicitly announced to include index-linked bonds – investors sharply reduced their required liquidity premia on these securities, thereby pushing real yields down much more than nominal yields. This is in line with the US evidence on the Federal Reserve's purchases of Treasury Inflation-Protected Securities (TIPS).

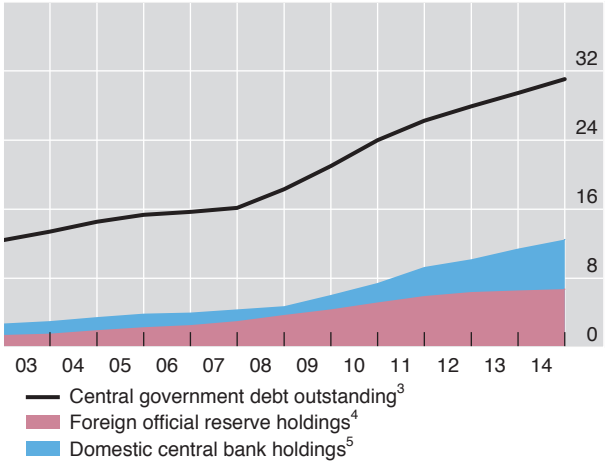
Central bank asset purchases have reinforced the growing weight of official holdings in government bond markets. Such holdings have increased considerably post-crisis in major economies' government debt markets, especially for securities denominated in reserve currencies (see also Chapter V). Domestic central banks account for the lion's share of the increase. Between 2008 and 2014, their share of the amount outstanding increased from almost 6% to more than 18%, or from $1.0 trillion to around $5.7 trillion, based on data for the United States, the euro

Official holdings of government securities grow[1]

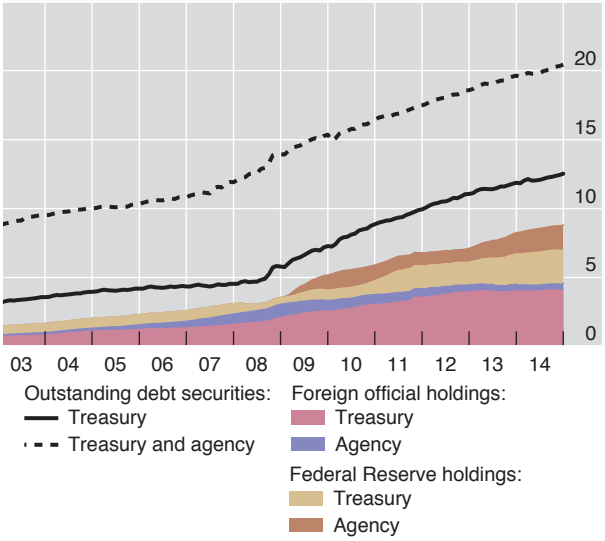
In trillions of US dollars

Graph II.9

Official holdings of government securities[2]



Official holdings of US Treasury and agency securities[6]



[1] Different valuation methods based on source availability. [2] Covers the euro area, Japan, the United Kingdom and the United States; for the euro area, Japan and the United Kingdom, converted into US dollars using end-2014 constant exchange rates. [3] For the United States, total marketable Treasury securities, excluding agency debt. [4] For euro- and yen-denominated reserves, 80% is assumed to be government debt securities; for dollar-denominated reserves, as reported by the US Treasury International Capital System; for sterling-denominated reserves, holdings by foreign central banks. [5] For the euro area, national central bank holdings of general government debt and ECB holdings under the Securities Market Programme. [6] Agency debt includes mortgage pools backed by agencies and government-sponsored enterprises (GSEs) as well as issues by GSEs; total outstanding Treasury securities are total marketable Treasury securities.

Sources: ECB; Bank of Japan flow of funds accounts; Federal Reserve flow of funds accounts; IMF, COFER; UK Debt Management Office; US Department of the Treasury; Datastream; national data; BIS calculations.

area, United Kingdom and Japan (Graph II.9, left-hand panel).[1] The share of holdings by the foreign official sector has remained more stable, increasing from just above 20% to almost 22%, but the increase in absolute amounts has been sizeable, from $3.7 trillion to $6.7 trillion. On top of their holdings of government securities, official institutions have also purchased significant amounts of other debt securities. The Federal Reserve's holdings of US agency debt securities, for example, increased by over $1.7 trillion between 2008 and 2014, while foreign official holdings declined somewhat (Graph II.9, right-hand panel).

The downward pressure on bond yields exerted by central banks and other official institutions has been reinforced by investor behaviour. In part, investors' actions have reflected a search for yield. As bond yields further out along the maturity spectrum dropped below zero in a number of economies, investors sought still-positive yields in longer-dated bonds at the expense of duration risk. In some cases, their search for safety may also have played a role: benchmark euro area yields have tended to fall whenever concerns about the situation in Greece have intensified. And, in the background, financial regulatory reforms as well as greater demand for collateral in financial transactions have generally favoured holdings of sovereign bonds.

[1] Part of these increases is due to valuation effects, as in some cases sources report market value and in others face value.

In addition, investors' hedging behaviour has been at work. Institutions such as pension funds and insurance companies have been under pressure to hedge the longer duration of their liabilities induced by the drop in yields. As they have sought to match the increased duration of their liabilities through purchases of long-term swaps, they have put additional downward pressure on yields and further intensified the demand for long-term fixed rates. Such behaviour highlights that institutional mandates could help generate self-reinforcing spirals in an environment where yields have been continuously pushed lower by a combination of central bank action and investor responses.

As yields dropped further below zero, concerns grew about the impact of negative rates on financial market functioning. Thus far, where negative policy rates have been imposed, these have been transmitted to money markets without major disruptions. Negative yields further out along the term structure in part reflect expectations that negative rates will prevail for some time. The longer the negative rate environment persists, the more likely it is that investors may change their behaviour, possibly in ways that are detrimental to financial market functioning.

Potential vulnerabilities can arise if institutional arrangements create a discontinuity at zero interest rates. There are several such examples. For instance, yields on most European constant net asset value funds turned negative in the first quarter of 2015, testing the effectiveness of new contractual provisions that prevent the funds from "breaking the buck". Moreover, in some market segments, negative interest rates can complicate hedging. Some instruments, such as certain floating rate notes, set a zero floor for interest payments, either explicitly or implicitly. Hedging such instruments, or securities that depend on their cash flows, becomes problematic as standard interest rate swaps pass through negative interest payments, thereby creating a cash flow mismatch. A similar discontinuity arises if banks are unwilling to pass on negative yields to their depositors, effectively exposing themselves to additional risk if interest rates were to move further into negative territory. Chapter VI provides a more detailed analysis of the impact of negative interest rates on financial institutions.

Rising volatility puts the spotlight on market liquidity

In the past year, volatility in global financial markets began to rise from the unusually low levels that prevailed in mid-2014 (see last year's Annual Report), spiking a few times (Graph II.10, left-hand and centre panels). The spikes, which followed years of generally declining volatility, often reflected concerns about the diverging global economic outlook, uncertainty about the monetary policy stance and fluctuations in oil prices. Investors also began to demand higher compensation for volatility risk. In particular, after narrowing until mid-2014, the gap between implied volatility and expectations of realised volatility ("volatility risk premium") in the US equity market started to widen (Graph II.10, right-hand panel).

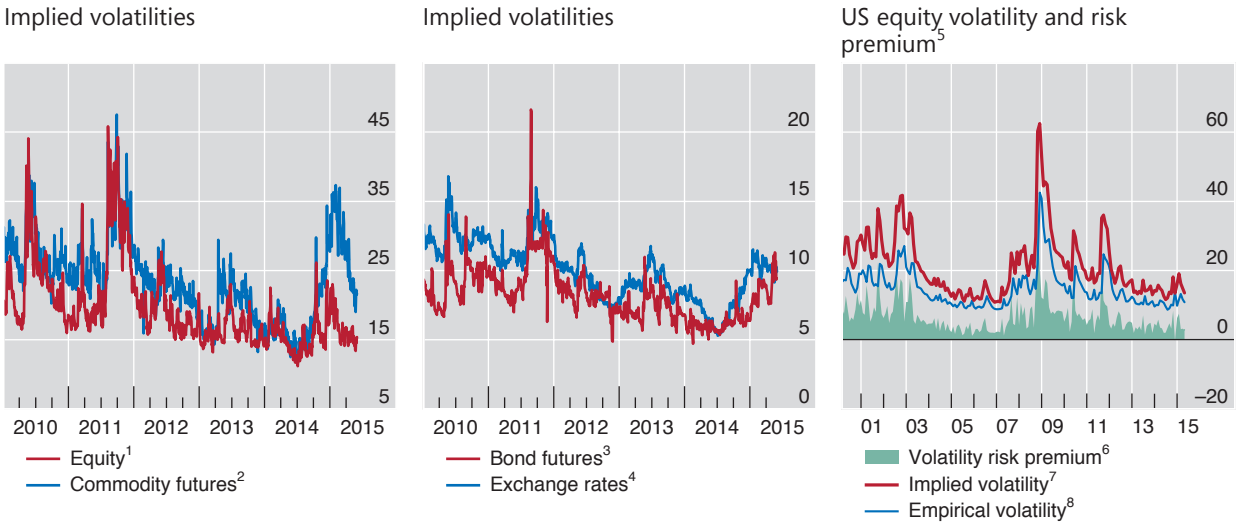
As risky assets such as equities and high-yield bonds were hit during these bouts of volatility, investors flocked to safe government bonds, sending their yields to new lows. The easing actions of central banks helped to quickly quell such spikes. Nevertheless, nervousness in financial markets seemed to return with increasing frequency, underscoring the fragility of otherwise buoyant markets.

A normalisation in volatility from exceptionally low levels is generally welcome. To some extent, it is a sign that investors' risk perceptions and attitudes are becoming more balanced. That said, volatility spikes induced by little new information about economic developments highlight the impact of changing financial market characteristics and market liquidity.

Signs of market fragility after a period of declining and unusually low volatility

In percentage points

Graph II.10



[1] Implied volatility of S&P 500, EURO STOXX 50, FTSE 100 and Nikkei 225 indices; weighted average based on market capitalisation. [2] Implied volatility of at-the-money options on commodity futures contracts on oil, gold and copper; simple average. [3] Implied volatility of at-the-money options on long-term bond futures of Germany, Japan, the United Kingdom and the United States; weighted average based on GDP and PPP exchange rates. [4] JPMorgan VXY Global index. [5] Monthly averages of daily data. [6] Estimate obtained as the difference between implied and empirical volatility. [7] VIX. [8] Forward-looking estimate of empirical (or realised) volatility obtained from a predictive regression of one-month-ahead empirical volatility on lagged empirical volatility and implied volatility.

Sources: Bloomberg; BIS calculations.

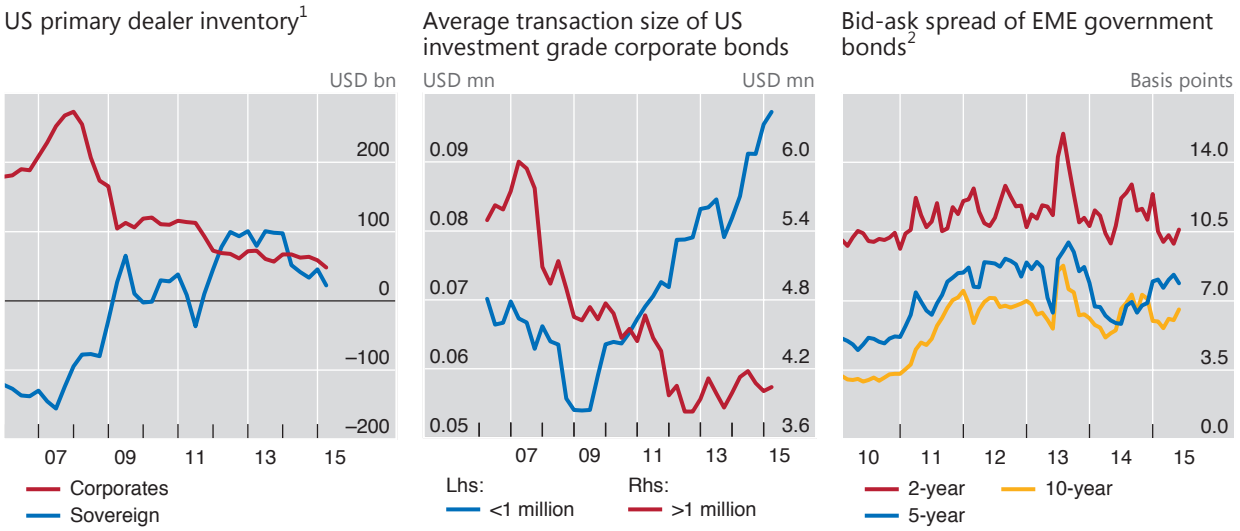
There are two aspects to market liquidity. One is structural, as determined by factors such as investors' willingness to take two-way positions and the effectiveness of order-matching mechanisms. This type of liquidity is important in quickly and efficiently dealing with *transitory* order imbalances. The other reflects one-sided, more *persistent* order imbalances, as when investors suddenly all head in the same direction. If investors persistently underestimate and underprice this second aspect, markets may appear liquid and well functioning in normal times, only to become highly illiquid once orders become one-sided, regardless of structural features.

In the wake of the financial crisis, specialised dealers, also known as market-makers, have scaled back their market-making activities, contributing to an overall reduction in the liquidity of fixed income markets. For example, the turnover ratio of US Treasuries and investment grade corporate bonds, calculated as the ratio of primary dealers' trading volume to the amount outstanding of respective securities, has been on a declining trend since 2011. Some of the drivers for this retrenchment are related to dealers' waning risk tolerance and reassessments of business models (Box VI.A). Others have to do with new regulations, which are aimed at bringing the costs of market-making and other trading-related activities more into line with the underlying risks and those they generate for the financial system. Finally, increasing official sector holdings of government securities may also have contributed to lower market liquidity.

Changes in market-makers' behaviour have had varying effects on the liquidity of different bond market segments. Market-making has concentrated in the most liquid bonds. For example, market-makers in the United States have trimmed their net holdings of relatively risky corporate bonds while increasing their net US Treasury positions (Graph II.11, left-hand panel). At the same time, they have cut

Market-making and market liquidity have become more concentrated

Graph II.11



[1] Net dealer positions; for corporate bonds, calculated as total corporates up to April 2013 and thereafter as the sum of net positions in commercial paper, investment and below-investment grade bonds, notes and debentures and net positions in private label mortgage-backed securities (residential and commercial); for sovereign bonds, calculated as the sum of net positions in T-bills, coupons and Treasury Inflation-Indexed Securities or Treasury Inflation-Protected Securities. [2] Simple average across Bulgaria, China, Chinese Taipei, Colombia, the Czech Republic, India, Indonesia, Israel, Korea, Mexico, Poland, Romania, South Africa, Thailand and Turkey; for each country, monthly data are calculated from daily data based on a simple average across observations.

Sources: Federal Reserve Bank of New York; Bloomberg; FINRA TRACE; BIS calculations.

the average size of relatively large trades of US investment grade corporate bonds (Graph II.11, centre panel). More generally, a number of market-makers have become more selective in offering services, focusing on core clients and markets.

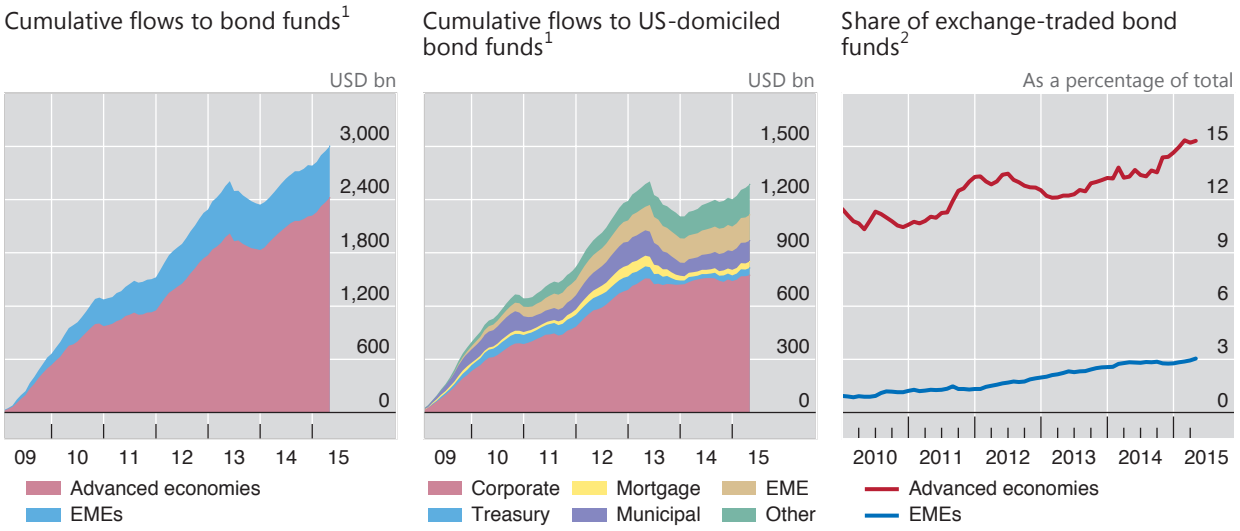
As a result, there are signs of liquidity bifurcation in bond markets. Market liquidity has increasingly concentrated in the traditionally most actively traded securities, such as the government bonds of advanced economies, at the expense of less liquid ones, such as corporate and EME bonds. For example, the bid-ask spread of EME government bonds has remained high since 2012, with a large spike during the taper tantrum (Graph II.11, right-hand panel).

Even seemingly very liquid markets, such as the US Treasury market, are not immune to extreme price moves. On 15 October 2014, the yield on 10-year US Treasury bonds fell almost 37 basis points – more than the drop on 15 September 2008 when Lehman Brothers filed for bankruptcy – only to rebound by around 20 basis points within a very short period. These sharp moves were extreme relative to any economic and policy surprises at the time. Instead, an initial shock was amplified by deteriorating liquidity when a material share of market participants, who had positioned themselves for a rise in long-term rates, tried to quickly exit their crowded positions. Automated trading strategies, especially high-frequency ones, further boosted the price swings.

Another key change in bond markets is that investors have increasingly relied on fixed income mutual funds and exchange-traded funds (ETFs) as sources of market liquidity. Bond funds have received $3 trillion of investor inflows globally since 2009, while the size of their total net assets reached $7.4 trillion at the end of April 2015 (Graph II.12, left-hand panel). Among US bond funds, more than 60% of inflows were into corporate bonds, while inflows to US Treasuries remained small (Graph II.12, centre panel). Moreover, ETFs have gained importance in both advanced economy and EME bond funds (Graph II.12, right-hand panel). ETFs

Bond funds have grown rapidly post-crisis

Graph II.12



[1] Includes mutual funds and exchange-traded funds (ETFs). [2] The ratio of cumulative flows to ETFs investing in bonds issued by advanced economies (or EMEs) to cumulative flows to both mutual funds and ETFs investing in bonds issued by advanced economies (or EMEs).

Sources: Lipper; BIS calculations.

promise intraday liquidity to investors as well as to portfolio managers who seek to meet inflows and redemptions without buying or selling bonds.

The growing size of the asset management industry may have increased the risk of liquidity illusion: market liquidity seems to be ample in normal times, but vanishes quickly during market stress. In particular, asset managers and institutional investors are less well placed to play an active market-making role at times of large order imbalances. They have little incentive to increase their liquidity buffers during good times to better reflect the liquidity risks of their bond holdings. And, precisely when order imbalances develop, asset managers may face redemptions by investors. This is especially true for bond funds investing in relatively illiquid corporate or EME bonds.[2] Therefore, when market sentiment shifts adversely, investors may find it more difficult than in the past to liquidate bond holdings.

Central banks' asset purchase programmes may also have reduced liquidity and reinforced liquidity illusion in certain bond markets. In particular, such programmes may have led to portfolio rebalancing by investors from safe government debt towards riskier bonds. This new demand can result in narrower spreads and more trading in corporate and EME bond markets, making them look more liquid. However, this liquidity may be artificial and less robust in the event of market turbulence.

A key question for policymakers is how to dispel liquidity illusion and support robust market liquidity. Market-makers, asset managers and other investors can take steps to strengthen their liquidity risk management and improve market transparency. Policymakers can also provide them with incentives to maintain robust liquidity during normal times to weather liquidity strains in bad times – for example, by encouraging regular liquidity stress tests. When designing stress tests, it is important to take into consideration that seemingly prudent individual actions

[2] See K Miyajima and I Shim, "Asset managers in emerging market economies", *BIS Quarterly Review*, September 2014, pp 19–34, and IMF, *Global Financial Stability Report*, April 2015, for empirical evidence.

may in fact exacerbate one-sided markets, and hence the evaporation of liquidity, if they imply similar positioning by a large number of market participants. Finally, it is vital that policymakers improve their understanding of liquidity amplification mechanisms and investor behaviour, especially in relatively illiquid markets.

Growing linkages between commodities and financial markets

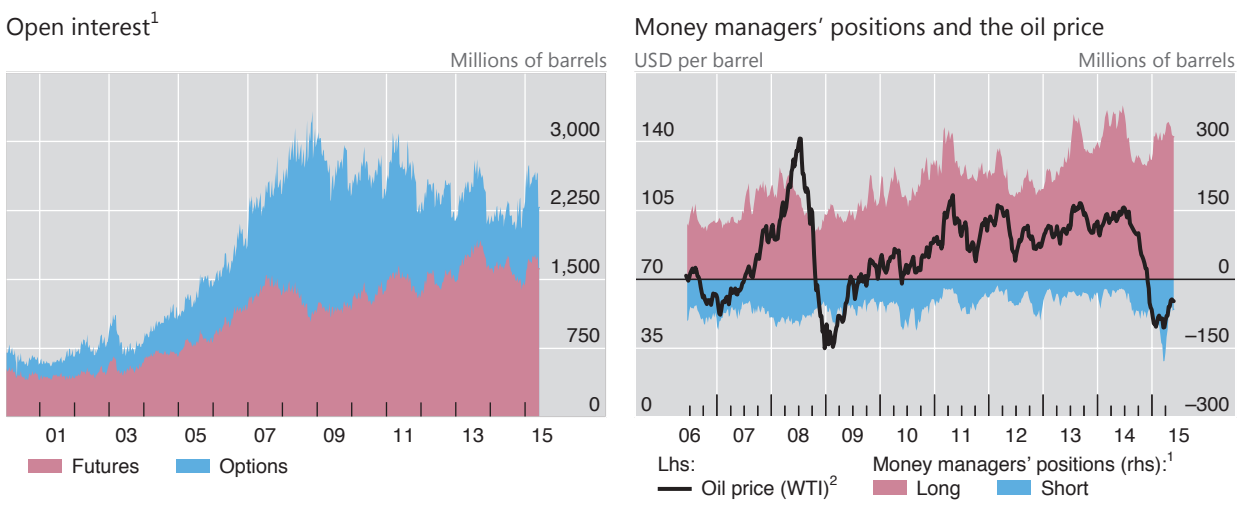
The recent episode of rapidly falling oil prices has highlighted the close linkages between commodity and financial markets. Some of these linkages have been known for some time, including financial investors' increased activity in physical commodity markets and the growth in commodity-linked derivatives markets. Others are more recent, such as commodity producers' growing indebtedness, in particular among oil producers, and the feedback effects that this may have on commodity prices and even the dollar (Box II.B).

The nature of the production process makes commodities a natural underlying asset for derivative contracts. The extraction of oil and many other commodities requires high upfront investment, and commodity producers are exposed to considerable risks – eg weather-related risks for agricultural commodities and geopolitical risks for commodities in general. Thus, commodity producers have an interest in hedging their risks by selling their future production at a given price today (via futures and forwards) or securing a floor to that price (via options). On the other side of such contracts typically are producers of final or intermediate goods who use commodities as production inputs, or investors who want to get exposure to commodities to earn a return or diversify risk.

Activity in commodity derivatives markets has surged over the past decade, in parallel with a broad-based upswing of commodity prices. Focusing on oil in particular, the number of hedged barrels of WTI oil has more than tripled since 2003 (Graph II.13, left-hand panel), while physical production has risen by only about 15%.

This increased activity in commodity derivatives is a double-edged sword. On the one hand, it should increase the range of hedging opportunities, raise market

Growing importance of investors in oil markets — Graph II.13



[1] Crude oil, light sweet, NYMEX. [2] Weekly prices based on daily price averages from Wednesday to Tuesday.

Sources: Bloomberg; Datastream.

Box II.B

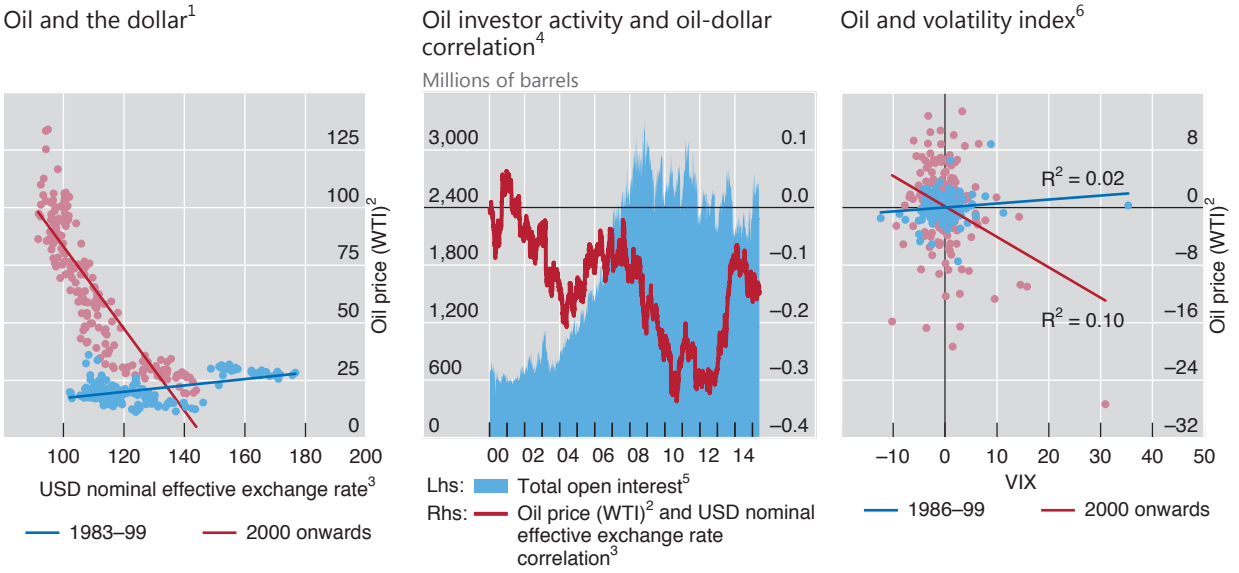
What drives co-movements in the oil price and the dollar?

The sharp appreciation of the US dollar and the rapid fall in the oil price are two of the most noteworthy market developments of the past year. As argued in this chapter, diverging monetary policies played a key role in the dollar's strength, whereas a combination of increasing supply, falling demand and market-specific factors were important in explaining the oil price drop. It is less clear, however, to what extent the two phenomena are linked. This box discusses some of the possible links.

The relationship between the trade-weighted US dollar exchange rate and the price of crude oil has changed over time (Graph II.B, left-hand panel). Evidence from before the 1990s points to a positive correlation. The reason is unclear. One argument is that oil exporters spent a large share of oil revenues on US goods, which had a tendency to improve the US trade balance, and hence to boost the dollar exchange rate, when oil became more expensive.① Accordingly, as the share of oil producers' imports from the United States declined relative to the US share in their oil exports, this channel became less potent. Another possible explanation is that a worsening economic outlook in the United States would typically result in a weaker currency and a lower demand for oil. This channel, too, would have become weaker as the US share in global output declined.

Tight links between oil, the dollar and financial markets

Graph II.B



[1] Average of values across the month. [2] In US dollars per barrel. [3] BIS nominal effective exchange rate narrow index; a decline (increase) indicates depreciation (appreciation) of the US dollar in trade-weighted terms. [4] Correlation calculated by using Engle's (2002) Dynamic Conditional Correlation GARCH model. [5] Crude oil, light sweet, NYMEX. [6] One-month differences.

Sources: Bloomberg; BIS calculations.

Since the early 2000s, a stronger US dollar exchange rate has gone hand in hand with a lower oil price, and vice versa (Graph II.B, left-hand and centre panels). The prominent role of the US dollar as invoicing currency for commodities is one possible explanation: oil producers outside the United States may adjust the dollar price of oil in order to stabilise their purchasing power. At the same time, increasing investment activity in oil futures and options may also play a role.② The monetary policy stance of the Federal Reserve or flight to safety episodes that naturally influence the US dollar exchange rate may also affect financial investors' risk-taking, prompting them to move out of oil as an asset class when the US dollar becomes a safe haven currency and into oil when they are willing to take on more risk. Consistent with this view, the right-hand panel of Graph II.B illustrates the increasingly strong negative relationship between oil prices and financial investors' risk aversion, as measured by the VIX index.

Another financial channel could reflect the attributes of oil as both the main source of income and an asset backing the liabilities of oil producers. For example, when the oil price stayed high, EME firms borrowed, sometimes heavily, to invest in oil extraction, with oil stocks acting as implicit or explicit collateral in these debt contracts. As

access to credit and collateral prices are closely linked, the fall in oil prices eroded oil producers' profits and simultaneously tightened their financing conditions. This would induce firms to hedge or cut their dollar liabilities, thereby increasing the demand for dollars. The strong negative relationship between oil prices and spreads on high-yield debt of oil producers is consistent with this view.③

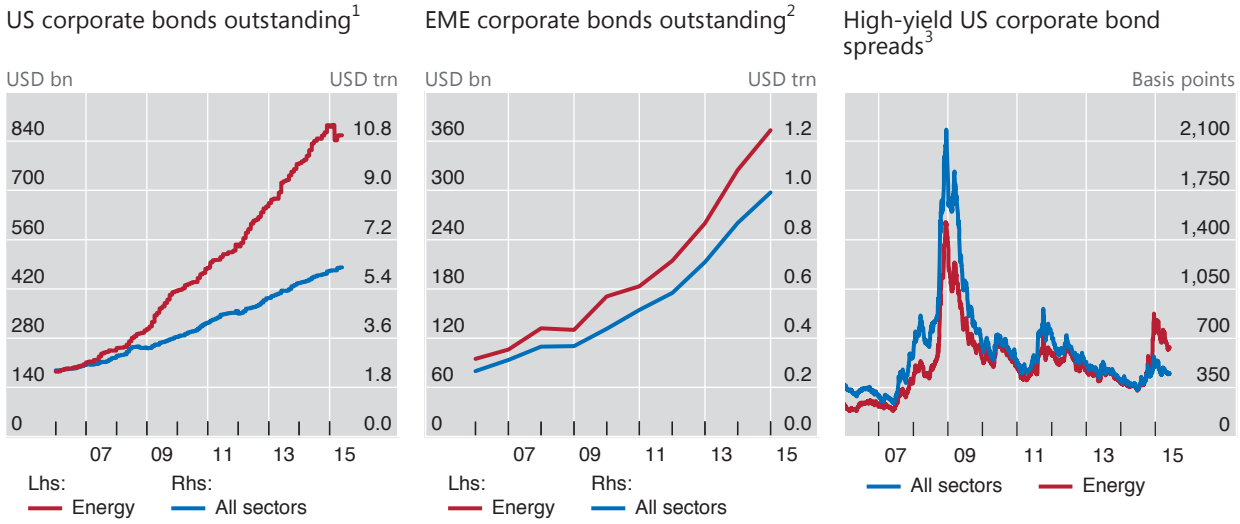
① See R Amano and S van Norden, "Oil prices and the rise and fall of the US real exchange rate", *Journal of International Money and Finance*, vol 17(2), April 1998. ② See M Fratzscher, D Schneider and I van Robays, "Oil prices, exchange rates and asset prices", *ECB Working Papers*, no 1689, July 2014. ③ See D Domanski, J Kearns, M Lombardi and H S Shin, "Oil and debt", *BIS Quarterly Review*, March 2015, pp 55–65.

liquidity, reduce price volatility, and more generally improve the price formation mechanism, at least in normal times. On the other hand, investors' decisions are subject to rapidly shifting expectations about price trends and fluctuations in risk appetite and financing constraints. This may induce them to withdraw from the market at times of losses and heightened volatility (Graph II.13, right-hand panel).

Bigger and more liquid commodity futures markets mean that commodity prices tend to react more quickly and strongly to macroeconomic news. Changes in commodity investor sentiment often seem to be largely driven by the general macroeconomic outlook, rather than by commodity-specific factors. This could also explain the recent stronger co-movements in commodity and equity prices. The extent to and speed with which arbitrage opportunities can be exploited between the physical and futures markets are critical to price formation. They influence the degree to which fluctuations in futures prices transmit to the prices commodity producers charge and, vice versa, the degree to which changes in the consumption and production of a given commodity are reflected in futures prices (Box II.A).

Rising energy sector debt and widening spreads

Graph II.14



[1] Face value of Merrill Lynch high-yield and investment grade corporate bond indices. [2] Face value; energy sector includes oil & gas and utility & energy firms; bonds issued in US dollars and other foreign currency by firms based in Brazil, Bulgaria, Chile, China, Colombia, the Czech Republic, Estonia, Hong Kong SAR, Hungary, India, Indonesia, Israel, Korea, Latvia, Lithuania, Mexico, Peru, the Philippines, Poland, Romania, Russia, Singapore, Slovenia, South Africa, Thailand, Turkey and Venezuela. [3] Option-adjusted spread over US Treasury notes.

Sources: Bank of America Merrill Lynch; Bloomberg; Dealogic.

Oil producers' easier access to financing has sharply boosted indebtedness in the sector. The persistently high prices recorded over recent years made it profitable to exploit alternative sources of oil, such as shale oil and deep-water sources. To reap hefty expected profits, oil firms boosted investment, in many cases through debt. The amount outstanding of bonds issued by US and EME energy firms, including oil and gas companies, has more or less quadrupled since 2005, growing at a much faster pace than in other sectors (Graph II.14, left-hand and centre panels).

After the recent sharp oil price fall, the oil sector's high indebtedness has exacerbated the rise in financing costs. Indeed, energy firms' bond yields soared when oil prices plummeted (Graph II.5, left-hand and centre panels). And bond yields of US energy firms in the high-yield segment, which had normally been lower than those of other sectors, rose well above them (Graph II.14, right-hand panel).

High indebtedness may, in addition, have amplified the oil price drop. As oil prices fell, energy firms' refinancing costs rose and their balance sheets weakened. Rather than cutting back production, some firms may have tried to preserve cash flows by boosting output and/or selling futures in an attempt to lock in prices. In line with this, oil production in the United States, including shale oil extraction, remained strong as oil prices fell, leading to a rapid build-up in the levels of crude oil in US storage up to the first quarter of 2015.[3]

[3] See D Domanski, J Kearns, M Lombardi and H S Shin, "Oil and debt", *BIS Quarterly Review*, March 2015, pp 55–65, for further details and evidence.

III. When the financial becomes real

Plummeting oil prices and a surging US dollar shaped the global macroeconomic environment in the year under review. These large changes in conditions in key markets caught economies at different stages of their business and financial cycles.

Supported by falling energy costs, the business cycle upswing in the advanced economies continued. The shift in exchange rates dampened US growth while aiding a return to growth in the euro area. Although financial conditions eased further in the countries hardest-hit by the crisis, the shadow of the pre-crisis financial boom lingered on. The resource misallocations linked to the past rapid credit expansion continued to hold back productivity growth. The legacy of high public debt limited governments' fiscal room for manoeuvre, while ageing societies further complicate the adjustments necessary to make fiscal positions sustainable.

In several respects, conditions were quite different in many emerging market economies (EMEs) that had been less affected by the crisis. Falling commodity export revenues and rising costs of servicing dollar debt coincided with slowing growth and peaks in domestic financial cycles. In the past, the combination of slowing growth and maturing credit booms in EMEs often ended in serious financial stress, especially when global financial conditions were tight. Better macroeconomic management and more robust financial structures, including longer debt maturities and reduced exposure to currency risk, have increased resilience. But higher overall private sector debt, both loans from the domestic banking system and capital market finance from abroad, could offset the gains from a sounder debt structure.

This chapter begins by reviewing the shifting growth patterns over the past year. It then assesses the long-lasting impact of earlier financial booms on growth in advanced economies and concludes by examining financial vulnerabilities in EMEs in the light of recent financial booms and slowing growth.

Shifting growth patterns

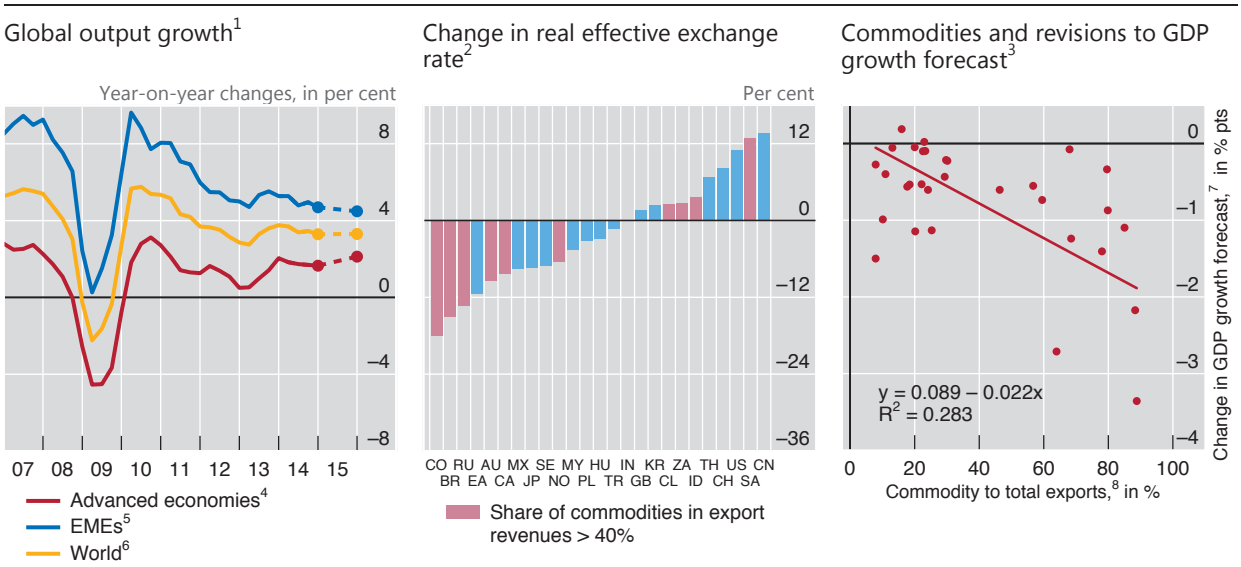
Over the past year, the global economy grew at close to its long-term average rate. World GDP expanded by 3.4% in 2014 (Annex Table A1), roughly in line with the average since 1980. However, this figure masks significant shifts in growth momentum across countries.

The upswing in the advanced economies continued (Graph III.1, left-hand panel). Further expansion in the United States and the United Kingdom contrasted with a return to modest growth in the euro area and a gradual recovery in Japan. The US economy grew by 2.4% in 2014, supported by rapidly declining unemployment. Output contracted in the first quarter of 2015, in part due to weaker exports. Output in the euro area expanded by 0.9% in 2014, and forecasters expect the recovery to gain pace in 2015. Growth returned to Spain and Portugal, and the Italian economy is expected to pick up in 2015. Japanese consumption dropped markedly after the April 2014 sales tax increase. Other advanced economies grew by an average 2.4%, albeit with widening differentials across countries.

Economic activity in EMEs lost further momentum. Growth weakened by around 0.3 percentage points to 4.9% in 2014, with the trend continuing into 2015. But again, this hides significant cross-country differences. Private demand growth in China slowed further, in part due to a softer real estate sector. This contrasted with

Shifting patterns of growth

Graph III.1



AU = Australia; BR = Brazil; CA = Canada; CH =Switzerland; CL = Chile; CN = China; CO = Colombia; EA = euro area; GB = United Kingdom; HU = Hungary; ID = Indonesia; IN = India; JP = Japan; KR = Korea; MX = Mexico; MY = Malaysia; NO = Norway; PL = Poland; RU = Russia; SA = Saudi Arabia; SE = Sweden; TH = Thailand; TR = Turkey; US = United States; ZA = South Africa.

[1] GDP-weighted averages using PPP exchange rates; forecasts are shown as dots. [2] Between July 2014 and April 2015; a positive value indicates an appreciation. [3] Countries listed in footnotes 4 and 5 excluding Hungary, India, Italy and Russia. [4] Australia, Canada, Denmark, the euro area, Japan, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the United States. [5] Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand and Turkey. [6] Countries listed in footnotes 4 and 5. [7] Change in forecast for 2015 GDP growth between July 2014 and May 2015. [8] Average share of commodities in export revenues between 2004 and 2013.

Sources: UN Comtrade database; Consensus Economics; national data; BIS calculations.

accelerating activity in India and Korea. Growth in most other Asian EMEs slowed in 2014 but is expected to pick up in 2015. The Brazilian economy contracted in the second half of 2014, even as most other Latin American economies performed better. Growth in central and eastern Europe accelerated by 2 percentage points to 3.1%.

Plummeting oil prices and the US dollar appreciation influenced growth around the world from mid-2014 onwards. In late May 2015, crude oil prices were 40% lower in dollar terms year on year (Chapter II). Between July 2014 and April 2015, the US dollar trade-weighted real exchange rate appreciated by around 10%, while the euro depreciated by a similar magnitude and the yen by 7.5% (Graph III.1, centre panel).

The macroeconomic impact of these large price swings is yet to fully play out. Lower oil prices due to increased supply should boost economic activity through lower input costs and higher real incomes. Indeed, the oil price drop boosted consumer confidence in major advanced economies and contributed to the recent increase in consumption in the euro area. By contrast, changes in exchange rates mainly redistribute growth. US export growth decreased from 4% year on year in the second quarter of 2014 to 3% in the first quarter of 2015 against the backdrop of a stronger dollar.

Many EMEs have already felt stronger effects. Economic activity in commodity-producing economies has weakened. Between July 2014 and May 2015, downward revisions to 2015 growth forecasts were larger for countries more dependent on commodity exports (Graph III.1, right-hand panel). Lower commodity prices have led to investment cuts, particularly in the oil and gas sector. Moreover, commodity exporters have lost fiscal revenues.

Where are countries in the financial cycle?[1]

Graph III.2

Real credit growth[2]

Real residential property price growth[3]

AU = Australia; BR = Brazil; CA = Canada; CH = Switzerland; CN = China; DE = Germany; ES = Spain; FR = France; GB = United Kingdom; GR = Greece; IN = India; IT = Italy; JP = Japan; KR = Korea; MX = Mexico; NL = Netherlands; PT = Portugal; TR = Turkey; US = United States; ZA = South Africa. Asia = simple average of Hong Kong SAR, Indonesia, Malaysia, the Philippines, Singapore and Thailand; central and eastern Europe (CEE) = simple average of Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Russia; Nordic = simple average of Finland, Norway and Sweden.

[1] An upswing (downswing) is identified if both indicators (real credit growth and real residential property price growth) for a country provide clear positive (negative) readings over both horizons. [2] Total credit to the private non-financial sector deflated by the GDP deflator (for Sweden, deflated using consumer prices). [3] Deflated using consumer price indices. [4] Data not available. [5] Annualised average growth rates. [6] Year-on-year change, in per cent.

Sources: OECD; Datastream; national data; BIS; BIS calculations.

In addition, commodity exporters experienced some of the largest real exchange rate depreciations. This supports exports and could eventually boost investment in export industries and help rebalance activity. The currencies of most commodity importers also fell against the US dollar, although not necessarily in trade-weighted terms. In fact, some economies, particularly in emerging Asia, saw real exchange rate appreciations, which depressed net exports.

The broad US dollar appreciation has also increased the costs of servicing dollar debt. Dollar credit outside the United States has increased markedly in recent years, to $9.5 trillion by the end of 2014 (Chapter V). While more than half of this debt is owed by borrowers resident in advanced economies, residents in EMEs have borrowed more than $3 trillion. The importance of currency mismatches in EMEs is explored in more detail in this chapter's final section.

The shift in growth patterns caught economies at different stages of the financial cycle.[1] In many of the economies that experienced a home-grown bust,

[1] While there is no consensus definition of financial cycles, they are generally measured by the co-movement of a broad set of financial variables. The most parsimonious representation is in terms of credit and property prices, but other measures of risk-taking may add further information. The

financial cycles are turning up again. Both credit and property prices rebounded in the United States (Graph III.2). In the United Kingdom, credit to the private sector continued to fall but property prices grew vigorously. Credit also continued to fall in Greece, Italy and Spain, although the decline in property prices slowed or, in the case of Spain, reversed.

Unusually accommodative global monetary and financial conditions have fuelled financial booms in many of the smaller advanced and emerging market economies that were relatively unscathed by the Great Financial Crisis (Chapter V). Some of these booms are now showing signs of peaking. Real credit growth slowed in many EMEs, including many emerging Asian economies as well as Brazil and Turkey. In addition, property prices are signalling the turning of financial cycles in several economies. This is particularly evident in China, where residential property prices declined by nearly 7% over the past year in real terms (Graph III.2, bottom panel). Residential property prices also declined in Mexico, and their growth rate has weakened substantially in Brazil – a sign that the financial booms are maturing. By contrast, weaker commodity prices have not yet dented the financial booms in Australia, Canada and Norway, which experienced strong credit and property price growth over the past four quarters.

The current configuration of business and financial cycles poses different challenges for advanced economies and many EMEs. For the former, in particular the countries at the centre of the crisis, the issue is how to ensure healthy long-term growth without a new credit boom-bust cycle. For the latter, the key is how to ensure financial and economic stability amidst weaker growth and peaking financial booms.

Growth and the financial cycle in the advanced economies

The interaction between the financial cycle, on the one hand, and aggregate demand and production, on the other, goes some way towards explaining the lacklustre recovery in many advanced economies in recent years (see also the *84th Annual Report*).

Financial cycles affect spending directly through both debt service burdens and the impact of leverage (Box III.A). During financial booms, increases in asset prices boost the value of collateral, making borrowing easier. At the same time, more debt means higher debt service burdens, especially if interest rates increase, which constrains spending. As long as asset prices keep rising, leverage-financed spending may offset this effect, but once the financial boom runs out of steam, falling asset prices raise leverage and thus make it more difficult for households and firms to borrow, compounding the drag from higher debt service burdens. After a financial bust, it takes time for spending to normalise. Even if interest rates fall quickly, as in 2008–09, high debt keeps debt service burdens up. And depressed asset prices generate credit constraints that ease only gradually. In fact, the interaction of leverage and debt service burdens explains the evolution of US spending in the aftermath of the Great Financial Crisis fairly well.

Overall, at the current stage of the financial cycle, financing constraints seem to be of minor importance for corporate investment. Instead, recent BIS research suggests that the cross-country pattern mostly reflects high uncertainty about the

interactions between these variables can have major macroeconomic consequences. For instance, banking crises or periods of considerable financial distress often follow financial-cycle peaks, as confirmed in many countries by the Great Financial Crisis. See BIS, *84th Annual Report*, Chapter IV, for further elaboration.

Box III.A

Financial cycles and the real economy

The financial cycle has shaped the evolution of many economies both before and after the Great Financial Crisis. Recent work casts further light on some of the underlying dynamics, highlighting two variables: aggregate leverage (the stock of credit relative to asset prices) and debt service burdens (interest payments plus amortisations relative to income).① While the impact of leverage has been widely explored, the role of the debt service burden has not received much attention, despite sizeable negative effects on private sector expenditure growth.

Two long-run relationships between credit, GDP, asset prices and interest rates tie down aggregate leverage and the aggregate debt service burden. First, a relationship between the credit-to-GDP ratio and real asset prices anchors aggregate leverage. This relationship works through collateral constraints: in the long run higher real asset prices support a higher credit-to-GDP ratio. A second long-run relationship exists between the credit-to-GDP ratio and interest rates. For the same amount of income, higher levels of debt can be carried when interest rates are lower. This relationship defines the sustainable level of the debt service burden.

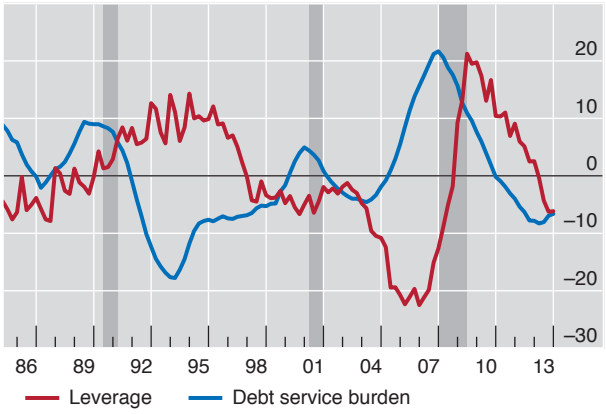
Deviations from the long-run anchors of leverage and the debt service burden influence output significantly. Developments in the United States around the Great Financial Crisis are an example. In the early 2000s, asset prices were high and interest rates were low relative to outstanding debt levels, allowing households and corporates to borrow more. Asset prices outpaced credit growth, keeping aggregate leverage well below long-run values (Graph III.A, left-hand panel). This provided ample room for more credit, which also raised expenditure. But this boost was gradually offset by a growing negative drag on disposable income from increasing debt service burdens. This explains why output in the mid-2000s grew at around average, despite rapidly expanding credit. When the financial boom ran out of steam and asset prices began to fall, aggregate leverage increased strongly, constraining the private sector's borrowing capacity. This depressed expenditure even further, leading to a severe recession. Monetary policy responded by lowering interest rates, which gradually fed into lower debt service costs, reducing the drag on demand.

The dynamics of adjustment to deviations of leverage and the debt service burden from their long-run values embedded in this simple model do a surprisingly good job of matching the evolution of economic activity in the United States during the Great Recession and after.② Even when the model is estimated only up to the fourth

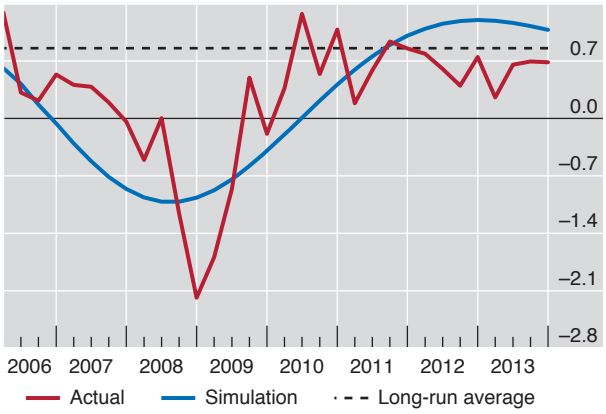
Leverage and the debt service burden are important drivers of expenditure

Graph III.A

Deviation of leverage and the debt service burden from long-run average[1]



Actual and model-implied expenditure growth in the United States[2]



The shaded areas denote recession periods as defined by NBER.

[1] Leverage: aggregate credit-to-asset price ratio relative to long-run values, measured by deviations of the credit-to-GDP ratio from the long-run relationship with real asset prices. Debt service burden: debt service payments to income relative to long-run values, measured by deviations of the credit-to-GDP ratio from the long-run relationship with nominal lending rates. [2] The simulated path is based on a cointegrated VAR model estimated on data from Q1 1985 to Q4 2004. This sample also provides the reference point for the long-run average of expenditure growth. The simulation starts from the leverage and debt service burden conditions in Q4 2005 and assumes that the other variables are initially at their average levels. It then traces out the adjustment path back to equilibrium without any further shocks.

Source: M Juselius and M Drehmann, "Leverage dynamics and the real burden of debt", *BIS Working Papers*, no 501, May 2015.

quarter of 2005, an "out of sample" forecast projects expenditure growth as falling to –1% per quarter at the end of 2009, a downturn of similar magnitude to the Great Recession. It also points to a drawn-out recession and recovery, with private sector expenditure growth returning to historical norms only in early 2012, not far from the actual outcome (Graph III.A, right-hand panel).

① See M Juselius and M Drehmann, "Leverage dynamics and the real burden of debt", *BIS Working Papers*, no 501, May 2015. The long-run relationships are estimated by a cointegrated vector auto-regression (VAR) model on US data (1985–2013) that includes the credit-to-GDP ratio, the average lending rate on the stock of credit, real residential property prices, real commercial property prices and real equity prices. The effects of leverage and the debt service burden on the economy are estimated by using an expanded VAR system that includes the growth in credit, private sector expenditure, other expenditure and asset prices, all in real terms, as well as the average lending rate on the stock of credit. ② Importantly, the model embeds the conduct of monetary policy revealed by the data up to that point.

economy's future evolution.[2] Strong debt-financed merger and acquisition activity and, in the United States, high levels of share buybacks also point to accommodative financial conditions for the corporate sector.[3] That said, firms in some countries, most notably smaller firms in the euro area, still find access to bank credit more restrictive than pre-crisis, although this constraint eased during the period under review.[4]

Credit boom-induced resource misallocations stifle productivity

More fundamentally, earlier financial booms may still weigh on long-term growth prospects through their damaging effect on productivity growth. Financial booms typically go hand in hand with significant resource misallocations (Box III.B). In particular, labour is diverted to booming sectors with relatively low future productivity growth. Preliminary estimates suggest that the misallocation during the credit boom between 2004 and 2007 reduced annual labour productivity growth by around 0.2 percentage points in the United States, 0.4 percentage points in Italy, around 0.7 percentage points in Spain and around 1 percentage point in Ireland compared with a counterfactual in which credit to GDP grew at its 1994–2004 country-specific average (Graph III.3, left-hand panel).

The impact of these misallocations became even larger in subsequent years, once the boom turned to bust. Similar estimates suggest that productivity growth in 2008–13 would have been approximately 1.8 percentage points higher in Ireland, 1.2 percentage points higher in Spain, 0.5 percentage points higher in France and 0.4 percentage points higher in the United States, had the pre-crisis credit-to-GDP ratio grown at its 1994–2004 rate (Graph III.3, right-hand panel). Thus, the fallout from credit booms may well have exacerbated the trend decline in productivity growth in advanced economies (see the *84th Annual Report*). By the same token, lower productivity growth in recent years need not be permanent.[5]

2 See R Banerjee, J Kearns and M Lombardi, "(Why) Is investment weak?", *BIS Quarterly Review*, March 2015, pp 67–82.

3 See A van Rixtel and A Villegas, "Equity issuance and share buybacks", *BIS Quarterly Review*, March 2015, pp 28–29.

4 See ECB, "Survey on the access to finance of enterprises in the euro area, October 2014 to March 2015", June 2015.

5 For a discussion of possible explanations of the low growth in advanced economies in recent years, see C Teulings and R Baldwin (eds), *Secular stagnation: facts, causes, and cures*, a VoxEU.org eBook, CEPR Press, 2014, and references therein.

Resource misallocations from credit booms hold back productivity growth

Annualised average growth rates — Graph III.3

DK = Denmark; ES = Spain; FR = France; GB = United Kingdom; IE = Ireland; IT = Italy; SE = Sweden; US = United States

[1] Loss in annual labour productivity growth relative to a counterfactual in which credit grew at the 1994–2004 country-specific average during 2004–07; in percentage points. [2] In per cent.

Sources: EU, KLEMS; OECD, STAN; GGDC 10-sector database; BIS calculations.

High public debt reduces growth, and ageing will make this worse

Another drag on long-term growth in most advanced economies is the level of public debt.[6] Already generally high pre-crisis, this has ballooned since 2007. The average ratio of gross public debt to GDP is expected to reach 120% in the advanced economies at the end of 2015, well above the pre-crisis average of 75% (Annex Table A3). Some countries have much higher debt ratios, for instance Japan (234%), Greece (180%) and Italy (149%). While most countries have taken steps to strengthen fiscal positions, with fiscal balances forecast to improve by around 1.6% of GDP in 2015 compared with 2012–14, this has not yet set them on a sustainable long-term path.

With much higher public debt compounded by demographic pressures, governments now have little fiscal room for manoeuvre. To illustrate, Graph III.4 (left-hand panel) presents simulations of debt-to-GDP ratios that extrapolate age-related expenditure by applying current entitlements to population projections.[7] Age-related spending will eventually put debt on an upward path. The simulations show that, under current plans, debt will initially decline in Germany and the United Kingdom and stabilise in the United States, but age-related spending will eventually reverse the trend – even at current, extraordinarily low effective interest rates. In Japan, the ratio will continue to rise, despite the modest expected increase in age-related spending. The expected debt service burden can act as a tax on private investment and labour. The result is lower investment, lower growth and, for a given tax rate, lower tax revenues.

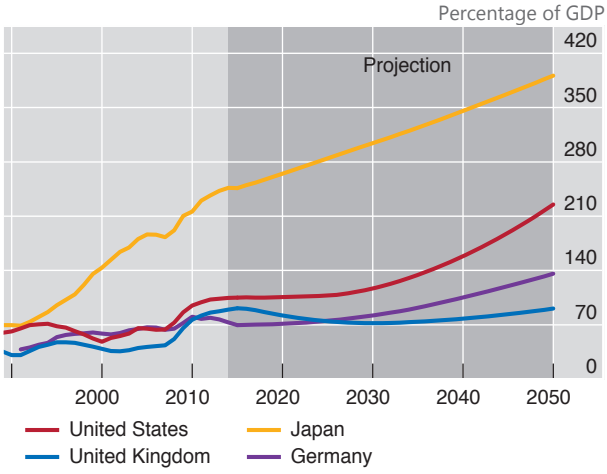
6 See S Cecchetti, M Mohanty and F Zampolli, "The real effects of debt", in Federal Reserve Board of Kansas City, *Economic Symposium 2011: achieving maximum long-run growth*, 2011, pp 145–96.

7 Based on the current forecasts for 2015 debt and assuming that the primary balance evolves in line with the national authorities' latest projections up to the last calendar year for which they are available. For subsequent years, the primary balance net of age-related spending is assumed to remain constant as a share of GDP.

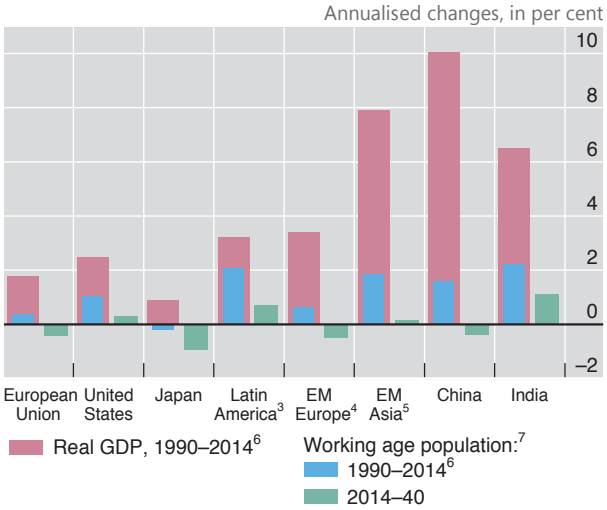
Ageing will weigh on public debt and growth

Graph III.4

General government debt projections[1]



Working age population contribution to GDP growth[2]



[1] Nominal debt values; incorporates projected increases in age-related spending. Effective interest rates on average borrowing costs are assumed to remain at their projected 2015 level between 2016 and 2050. [2] Weighted averages based on 2014 GDP and PPP exchange rates. [3] Argentina, Brazil, Chile, Colombia, Mexico and Peru. [4] Emerging Europe: Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia (FYR), Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey and Ukraine. [5] Emerging Asia: Bangladesh, China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, Myanmar, Pakistan, the Philippines, Singapore, Thailand and Vietnam. [6] For emerging Europe, 1995–2014 (for Serbia, 1997–2014). [7] Aged 20 to 64 years.

Sources: European Commission; IMF; Japanese Cabinet Office; OECD; UK Office for Budget Responsibility; United Nations; US Congressional Budget Office; BIS calculations.

Ageing is not just an issue for advanced economies, however. In an increasing number of EMEs, ageing populations will weigh on growth and public finances. Between 1990 and 2014, the rapidly expanding working age population accounted for around one third of GDP growth in the United States and European Union, and for significantly more in Latin America (Graph III.4, right-hand panel). By contrast, between 2014 and 2040 its projected decline will lower GDP growth every year, by around 1 percentage point in Japan and around 0.5 percentage points in the European Union, emerging Europe and China.

Sustaining economic growth in the face of population ageing poses formidable challenges for policymakers. A wide range of measures can mitigate the ageing-related decline in the workforce. Labour participation, especially in older age categories and among women, can still increase. Given that jobs now tend to be less physically demanding, there is room for longer careers. In addition, structural reforms that directly address the decline in trend productivity growth, ranging from lighter regulation to better education, could enhance the quality, and hence productivity, of the labour force (see the *83rd Annual Report*, Chapter III).

How strong are EMEs?

On the surface, the current configuration of credit booms, downward growth revisions and tighter dollar funding conditions looks similar to that which preceded previous episodes of serious financial stress in EMEs. However, a proper assessment of potential vulnerabilities should also take into account the important changes that have taken place in EMEs in recent years, strengthening their resilience.

While past EME financial crises were quite diverse, they shared some common elements.[8] First, they followed periods of upbeat investor sentiment that turned into gloom when a change in external conditions exposed weaknesses in underlying growth models. Second, a combination of loose financial conditions in advanced economies and insufficient exchange rate flexibility had contributed to overly accommodative domestic monetary and financial conditions and real exchange rate appreciations. This in turn had helped stoke asset price booms and a surge in credit, much of it short-term and denominated in foreign currency. Third, the interaction of disappointing growth and fragile debt structures turned what might have been a cyclical slowdown into a financial crisis, with serious economic and social costs. Exchange rates came under huge pressure. When countries devalued, high foreign currency debt magnified the burden on borrowers. At the same time, short debt maturities forced countries into large and immediate adjustments to meet debt service obligations. Questions about the private and government sectors' ability to honour their debts paralysed capital markets and economic activity. Finally, crises triggered severe contagion to other EMEs.

How does the current situation compare with that prevailing before previous episodes of stress? Developments in the real economy and financial vulnerabilities more specifically are considered in turn.

Disappointment risk

EMEs have experienced one of the longest high-growth spells on record. Since 2002, output has expanded by an average of over 6% per annum (Graph III.5, left-hand panel). The rate was close to 10% for China, around 6% for emerging Asia excluding China, and 3.5% in Latin America and central and eastern Europe. The Great Recession interrupted the growth spurt only briefly, with the notable exception of some central and eastern European countries. Growth fell to 3% in 2009 but bounced back to 9% in 2010. Since then, however, growth has declined gradually, albeit with significant cross-country variation.

Some moderation from these very high rates is probably unavoidable. But a slowdown could cast doubt on EMEs' underlying economic strength for at least three reasons. First, high commodity prices or strong capital inflows may have led to overly optimistic estimates of potential output. Second, the resource misallocations that can arise during financial booms could have weakened productivity. Third, the heavy debt service burdens from credit booms can weigh on medium-term growth.

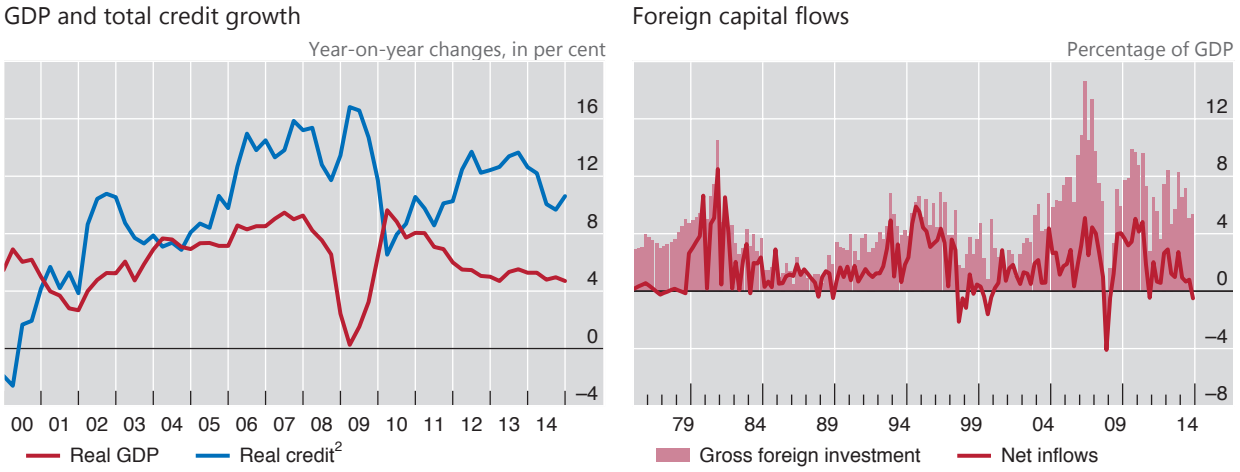
Disappointing growth was key in both the Latin American debt crisis of 1982 and the Asian financial crisis of 1997–98. Both followed a strong growth spell that came to a halt earlier than many had expected. In Mexico and Chile, as well as in most other Latin American countries, growth had relied heavily on commodity production and ran out of steam once the terms of trade dropped and interest rates rose rapidly in the early 1980s. In Asia, growth had been heavily geared towards manufactured goods exports and real estate. To some extent, the boom faltered when deteriorating terms of trade exposed the low profitability of much of the investment.

Then, as now, rapid growth coincided with financial booms, fuelled by large capital inflows and accommodative monetary policy both domestically and abroad (see also Chapter V). The past 10 years have seen the largest gross foreign

[8] See C Borio and P Lowe, "Assessing the risk of banking crises", *BIS Quarterly Review*, December 2002, pp 43–54; and P-O Gourinchas and M Obstfeld, "Stories of the twentieth century for the twenty-first", *American Economic Journal: Macroeconomics*, January 2012, pp 226–65.

GDP, credit and capital inflows in EMEs[1]

Graph III.5



[1] Aggregates are weighted averages based on GDP and PPP exchange rates of Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand and Turkey. [2] Total credit to the private non-financial sector deflated by the GDP deflator.

Sources: IMF, *Balance of Payments Statistics, International Financial Statistics* and *World Economic Outlook;* Datastream; Institute of International Finance; national data; BIS calculations.

investment as a percentage of the recipient economy's GDP in over a century, higher than those before the 1982 debt crisis or the Asian financial crisis (Graph III.5, right-hand panel). These inflows have fuelled domestic credit and asset price booms (Graph III.5, left-hand panel). Since 2004, real credit has grown by around 12% per year and real property prices have increased by around 40% on average.

Rising commodity prices and domestic financial booms have undoubtedly boosted output, but it would be unwise to treat these effects as permanent. Higher interest rates in the advanced economies, in particular in the United States, could quickly feed into higher domestic rates in EMEs and tighter domestic financial conditions, for example by reducing investors' incentives to reach for yield (see Chapter V for a discussion of international policy spillovers). And the oil price collapse has shown how quickly conditions in commodity markets can change.

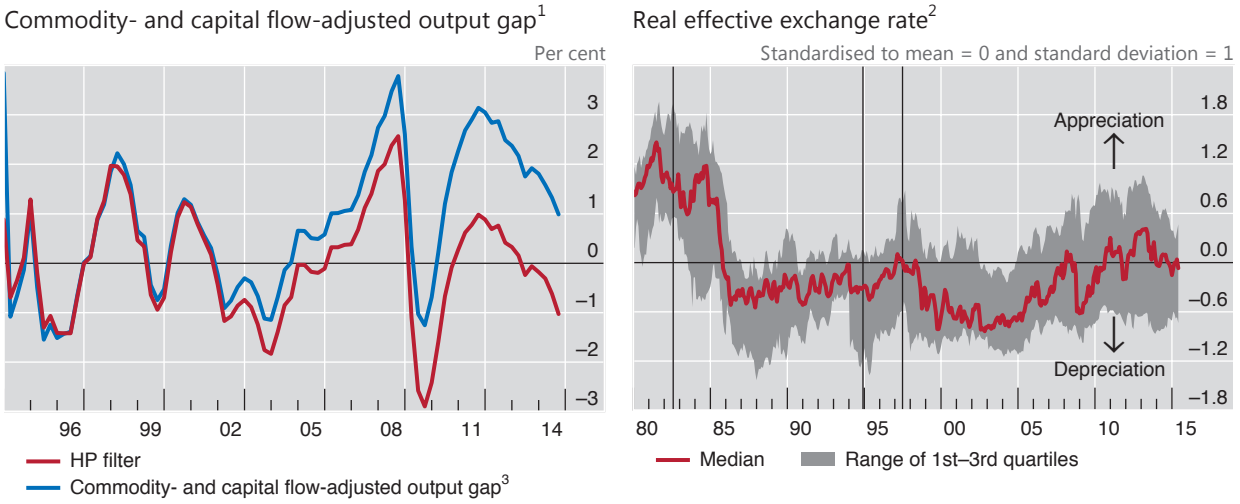
Estimates of the difference between actual and potential output ("output gaps") that correct for the cyclical effect of higher commodity prices and capital flows illustrate this point. They indicate that traditional measures could have overestimated potential output by around 2% on average across Brazil, Chile, Colombia, Mexico and Peru since 2010 (Graph III.6, left-hand panel) Therefore, reversals in these factors could well result in disappointing growth outcomes.

The financial booms of the last 10–15 years could also weigh on growth in the medium term. Historically, credit booms and real exchange rate appreciation in EMEs have coincided with resource shifts from the tradable to non-tradable sectors. For instance, during the late-1970s boom the non-commodity tradable sector grew only half as fast as GDP in Mexico and Chile. When the commodity boom ended, the non-commodity tradable sector was small and hence unable to absorb the resources shed by the contracting sectors. Such resource misallocations can substantially weaken productivity growth and require painful adjustment.

Real trade-weighted exchange rates also appreciated visibly during the recent boom, although with significant variation across countries (Graph III.6, right-hand panel). Between early 2009 and mid-2013, the median real effective exchange rate relative to historical averages in EMEs increased to its highest level in three decades.

Commodity prices and capital inflows overstate potential output and push up real exchange rates

Graph III.6



The black vertical lines in the right-hand panel indicate the beginning of a crisis: August 1982 (Mexican debt moratorium), December 1994 (Mexican devaluation) and July 1997 (floating of the Thai baht).

[1] Aggregates are weighted averages based on GDP and PPP exchange rates of Brazil, Chile, Colombia, Mexico and Peru. For Peru, data up to Q4 2013. [2] Country sample includes Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand and Turkey. [3] Computed according to the methodology of C Borio, P Disyatat and M Juselius, "A parsimonious approach to incorporating economic information in measures of potential output", *BIS Working Papers*, no 442, February 2014. The dynamic output gap equation is augmented with net inflows and country-specific commodity prices.

Sources: IMF, *Balance of Payments Statistics, International Financial Statistics* and *World Economic Outlook*; UN Comtrade database; Datastream; national data; BIS calculations.

However, it has since fallen to a level close to its long-term average. Whether this indicates that a correction has already happened or heralds further exchange rate shifts is not clear.

Financial vulnerabilities

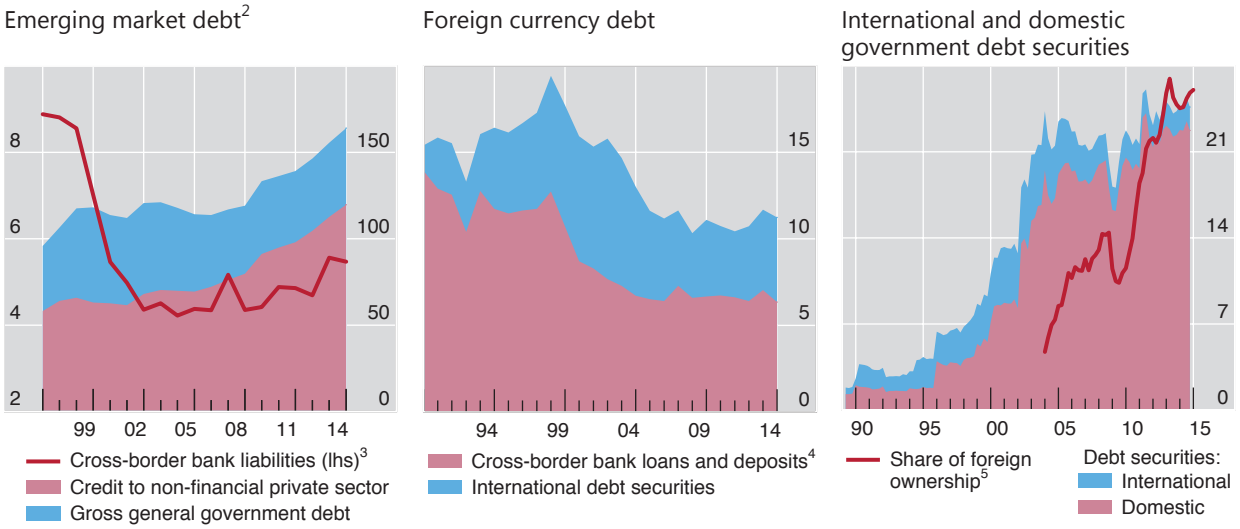
Without the amplification through financial channels, the underlying weaknesses in EMEs in Latin America in the early 1980s or Asia in the 1990s would not have resulted in severe crises. Large debts and fragile financial structures made them vulnerable to external and internal shocks. When growth slowed and global financial conditions tightened, it became increasingly difficult to refinance this debt, often exposing vulnerabilities in domestic banking sectors.

The short maturity and currency denomination of debt magnified these problems. When the countries eventually devalued, soaring debt burdens in domestic currency terms challenged the ability of the private and/or government sectors to honour their debts. The need to repay external lenders in foreign currency triggered balance of payments crises. In addition, tighter external financing conditions and a plunging exchange rate generated a domestic credit crunch, which also affected sectors without any currency mismatches.

Today, high debt has raised the vulnerability of EMEs. The combined debt of the government and non-financial private sectors is around 50% higher in relation to GDP than at the time of the Asian financial crisis in 1997 (Graph III.7, left-hand panel). Government debt has fluctuated around 45% of GDP since the mid-1990s, whereas credit to the private non-financial sector increased from around 60% of

Emerging market debt[1]

Amounts outstanding by residence, as a percentage of GDP — Graph III.7



[1] Aggregates are weighted averages based on GDP and PPP exchange rates of Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Saudi Arabia, South Africa, Thailand and Turkey. [2] Countries listed in footnote 1 excluding Hungary, Saudi Arabia and Turkey. [3] Cross-border bank loans and deposits plus international debt securities issued by banks. [4] Cross-border bank loans and deposits to bank and non-bank sectors denominated in euros, Japanese yen, Swiss francs, pounds sterling and US dollars. Prior to Q4 1995, cross-border bank claims denominated in the listed foreign currencies. [5] Simple averages of foreign investors' share in the local government debt market for the countries listed in footnote 1 excluding Argentina, Chile, China, the Philippines and Saudi Arabia.

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; www.carmenreinhart.com/data; Datastream; Institute of International Finance; national data; BIS locational banking statistics by residence and debt securities statistics by residence; BIS estimates.

GDP in 1997 to around 120% in 2014. The role of EME banks' cross-border funding in this boom has been limited, declining from around 9% of GDP before the Asian financial crisis to around 5% in 2014.

Early warning indicators of banking stress point to risks arising from strong credit growth (Annex Table A4). Credit gaps – the deviation of private sector credit from its long-term trend – are well above 10% in countries as diverse as Brazil, China, Indonesia, Singapore and Thailand. In the past, two thirds of all readings above this threshold were followed by serious banking strains in the subsequent three years.[9] True, despite rapid credit growth, low interest rates have kept debt service ratios around their long-term level in most countries, albeit with some notable exceptions. Households and firms in Brazil, China and Turkey spend significantly more on servicing their debt than in the past. But, more generally, an increase in interest rates would push up debt service ratios in other countries as well, especially in Asia.

By contrast, the risks arising from foreign currency debt appear to be somewhat lower. On average, the ratio of foreign currency cross-border bank borrowing and international debt securities to GDP has decreased relative to 1997 (Graph III.7, centre panel). This has been driven by a decline in the ratio of cross-border bank loans, from over 10% of GDP to around 6% in 2014. Excluding China, foreign currency debt is currently around 14% of GDP, compared with nearly 20% in 1997.

[9] See M Drehmann, C Borio and K Tsatsaronis, "Anchoring countercyclical capital buffers: the role of credit aggregates", *International Journal of Central Banking*, vol 7, no 4, December 2011, pp 189–240.

Financial booms and labour misallocation

Aggregate productivity growth can essentially reflect two broad factors: first, and most obviously, technical progress and more and better human and physical capital in the various industries; second, reallocations of capital and labour from poorly performing sectors to those that perform well. This box provides evidence that credit booms tend to undermine this second factor. During periods of strong credit growth, labour increasingly flows into sectors with low future productivity gains (typically sectors that are particularly credit-intensive even though they may not be very productive in the long run). This depresses productivity growth – and thus potential output – even long after credit has stopped growing.

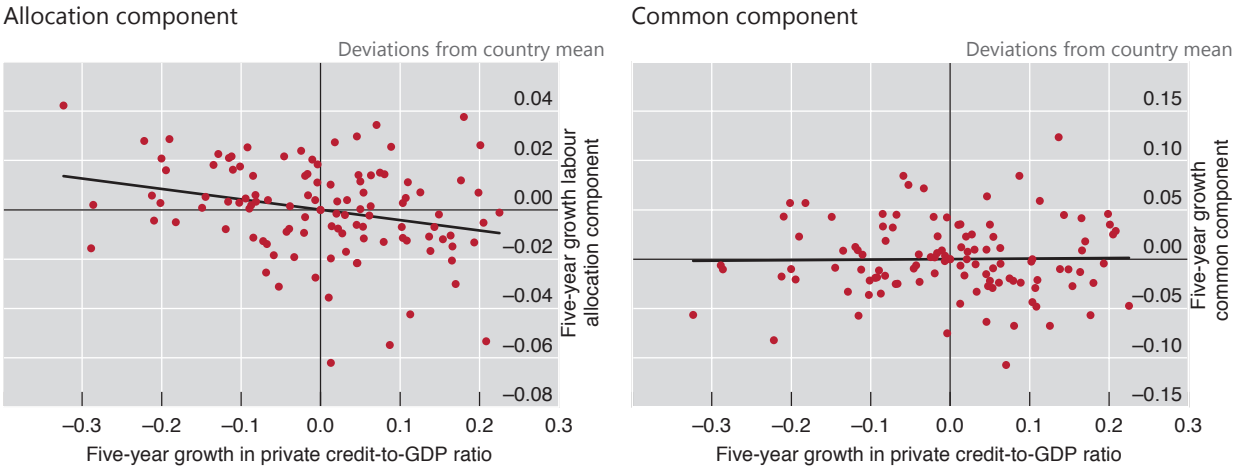
Aggregate productivity growth can be decomposed into a common component and an allocation component. The common component measures economy-wide productivity growth assuming a fixed sectoral composition, ie no labour flows across sectors. The allocation component measures the contribution of labour reallocation across sectors, ie whether labour flows into sectors with higher productivity growth.① Here, we compute this decomposition for a panel of 22 economies since 1979 and over non-overlapping five-year periods. We then analyse how each of these components relates to growth in the ratio of private credit to GDP.

Empirical estimates suggest that financial booms, as reflected in rapid growth in the private credit-to-GDP ratio, coincide with a lower allocation component. This means that labour flows into sectors with lower productivity growth (Graph III.B.1, left-hand panel). By contrast, the common component appears to be unrelated to private credit (Graph III.B.1, right-hand panel). Credit expansions may still boost output growth through higher demand and investment, but not productivity growth. To gain a sense of the economic significance, consider the US experience. Between 2004 and 2007, labour productivity grew by 1.2% per year, but labour reallocations made a negative 0.3 percentage point contribution. Over the same period, private credit to GDP grew by 4.5% per year. Taking the estimates at face value, if credit to GDP had grown by only 1.5%, the drag on productivity growth would have been eliminated.

Labour reallocations can also affect the subsequent evolution of aggregate productivity, particularly following financial crises. To illustrate this, we focus on turning points in GDP to working population and explore if the path of aggregate productivity following the turning point depends on labour reallocations prior to the turning point. Two conclusions emerge. First, past labour reallocations towards high productivity gain sectors contribute positively to subsequent aggregate productivity (solid lines vs dashed lines in Graph III.B.2). Second, labour reallocations have a

Credit booms lead to labour misallocation[1]

Graph III.B.1

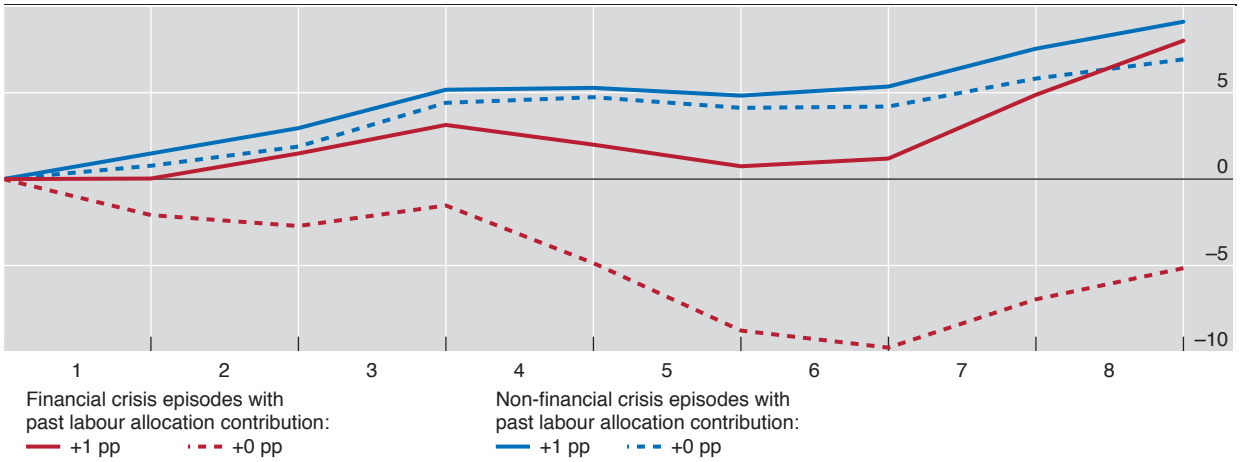


[1] The left-hand panel plots the growth rate in private credit to GDP against the allocation component of labour productivity growth, both variables being taken as deviations from country and period means. The right-hand panel plots the growth rate in private credit to GDP against the common component of labour productivity growth, both variables being taken as deviations of from country and period means. The sample includes 22 economies (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States) and six periods of five years (1979–84; 1984–89; 1989–94; 1994–99; 1999–2004; 2004–09).

Source: BIS calculations.

The effect of financial crises and labour reallocation on productivity[1]

Deviation from peak, in per cent — Graph III.B.2



[1] Simulations based on local projection regressions of the percentage deviation of labour productivity from the peak year. The independent variables include the allocation and the common components of productivity growth over the three-year period prior to the peak. Effects are shown separately for peaks associated with a financial crisis (red lines) and peaks not associated with a financial crisis (blue lines). Solid lines show the projection of labour productivity conditional on a positive allocation component contribution of 1 percentage point per year in the three years prior to the peak. Dashed lines are conditional on a zero contribution of the allocation component prior to the peak.

Source: BIS calculations.

much larger effect after a financial crisis hits the economy (solid red line vs dashed red line in Graph III.B.2). In this case, past misallocations generate a significant and long-lasting drag on aggregate productivity growth (a 10 percentage point cumulative shortfall after five years). In the US case, for instance, our estimates suggest that the labour reallocations over the period 2004–07, interacting with the following financial crisis, shaved US productivity growth by 0.45 percentage points every year between 2008 and 2013. Thus, financial booms can lead to stagnant productivity as a result of the interaction between resource misallocations and financial crises that they induce.

① For details, see C Borio, E Kharroubi, C Upper and F Zampolli, "Labour reallocation and productivity dynamics: financial causes, real consequences", mimeo, 2015.

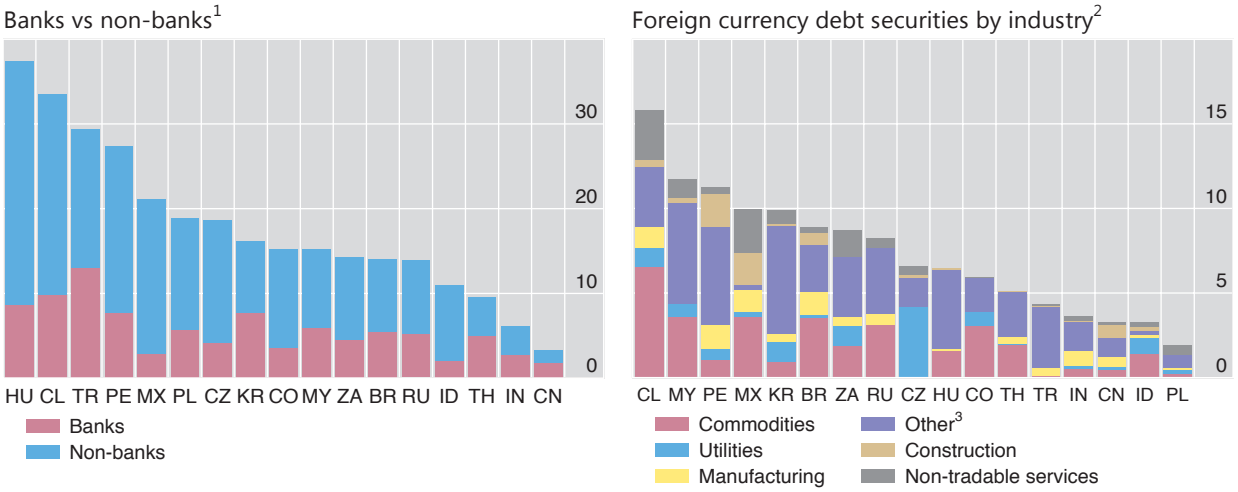
Similarly, government debt structures have become less fragile. Governments increasingly issue bonds in local markets (Graph III.7, right-hand panel). As a result, the share of international debt securities has decreased from around 40% of the total in 1997 to around 8% in 2014.

That said, this does not insulate economies from foreign influences. For one, local currency long-term interest rates in EMEs tend to co-move closely with those in the major reserve currencies (Box V.C in Chapter V). In fact, the share of domestic government debt held by foreign investors has surged from around 9% in 2005 to over 25% on average in EMEs. In Mexico, Indonesia, Poland and Peru, this share is over 35%. Large portfolio reallocations could lead to large swings in asset prices.

Moreover, risks from currency mismatch, mainly from corporate borrowing, remain in some countries despite the overall decline in EME foreign currency debt. Foreign currency debt in the form of debt securities and cross-border bank lending is in the region of 30% of GDP in Hungary, Chile and Turkey, with between a third and a quarter in banks (Graph III.8, left-hand panel), but is also relatively high in Peru, Mexico, Poland, the Czech Republic and Korea. It is unclear to what extent this

Foreign currency debt

Amounts outstanding, as a percentage of nominal GDP — Graph III.8



BR = Brazil; CL = Chile; CN = China; CO = Colombia; CZ = the Czech Republic; HU = Hungary; ID = Indonesia; IN = India; KR = Korea; MX = Mexico; MY = Malaysia; PE = Peru; PL = Poland; RU = Russia; TH = Thailand; TR = Turkey; ZA = South Africa.

[1] Cross-border bank loans and deposits (denominated in euros, Japanese yen, Swiss francs, pounds sterling and US dollars) by residence as of Q4 2014, plus foreign currency debt securities by residence as of end-March 2015. [2] By nationality of issuer, as of end-March 2015. [3] Finance, insurance, publishing and holding companies.

Sources: IMF, *World Economic Outlook*; Dealogic; BIS locational banking statistics by nationality and residence; BIS calculations.

gives rise to currency mismatches, as data on financial hedges are patchy. Much of the foreign currency debt securities issuance by EME non-financial corporations has been by firms producing tradable goods (Graph III.8, right-hand panel), which may have foreign currency revenues that provide a natural hedge for their foreign currency obligations.

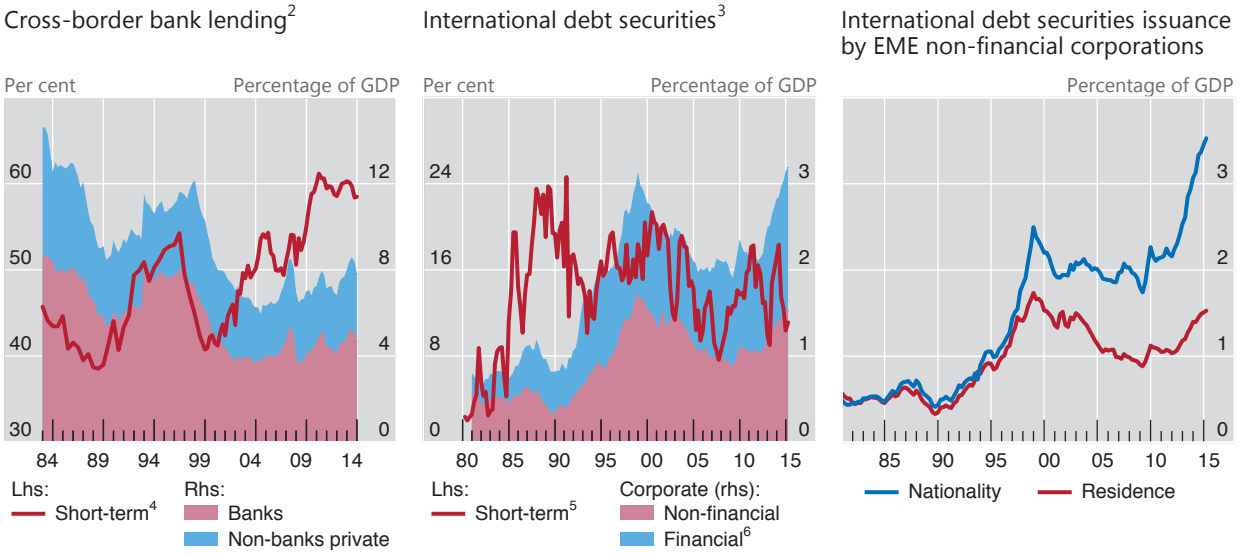
But natural hedges may not be that effective if export revenues drop when the currency of denomination strengthens, as is often the case for commodity revenues. And financial hedges may also be vulnerable at times of very large exchange rate changes. For instance, many EME corporates suffered heavy foreign exchange losses in the aftermath of the Lehman bankruptcy in 2008, partly because of the popularity of contracts that left them exposed to big currency moves.[10]

Finally, the shift of private borrowing from banks to markets has uncertain consequences. Banks still account for the bulk of domestic lending, but their share in cross-border lending has fallen significantly since the Great Financial Crisis (Graph III.9, left-hand panel). In contrast, amounts outstanding of private sector debt securities from EMEs increased to over 3% by early 2015 (Graph III.9, centre panel), although with great variation across countries. In addition, non-financial firms issued debt securities worth 2% of GDP through their offshore affiliates (Graph III.9, right-hand panel). On the one hand, this shift has reduced rollover risk. The share of debt securities with a remaining maturity of less than one year is now around 10%, compared with 60% for cross-border bank debt. The share of short-term bank debt is particularly high in China. On the other hand, the behaviour of footloose investors may amplify price dynamics under stress (see below).

[10] See M Chui, I Fender and V Sushko, "Risks related to EME corporate balance sheets: the role of leverage and currency mismatch", *BIS Quarterly Review*, September 2014, pp 35–47.

Private sector debt in EMEs[1]

Amounts outstanding — Graph III.9



[1] Aggregates are weighted averages based on GDP and PPP exchange rates of Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Saudi Arabia, South Africa, Thailand and Turkey. [2] Cross-border bank loans and deposits by residence; prior to Q4 1995, cross-border bank claims. [3] By residence. [4] Short-term (with a remaining maturity of up to one year) lending as a share of total international claims. [5] Securities with a remaining maturity of up to one year as a share of the sum of non-financial and financial corporate debt securities (excluding central banks). [6] Excluding central banks.

Sources: IMF, *World Economic Outlook*; BIS consolidated banking statistics, locational banking statistics by residence and international debt securities statistics; BIS calculations.

Lines of defence

Since the late 1990s, EMEs have worked hard to strengthen various lines of defence to limit the risk of financial stress and manage it more effectively if it arises.

A first possible line of defence against external crises is larger private sector asset holdings abroad. Foreign assets held by the private sector in EMEs increased from around 30% of GDP in the mid-1990s to around 45% by 2014 (Graph III.10, left-hand panel). However, liquidating private sector external assets in times of stress may be difficult in practice. First, assets and liabilities are usually held by different people. Second, assets may be illiquid. Finally, foreign asset holdings may be adversely affected by the very same market conditions that trigger stress.

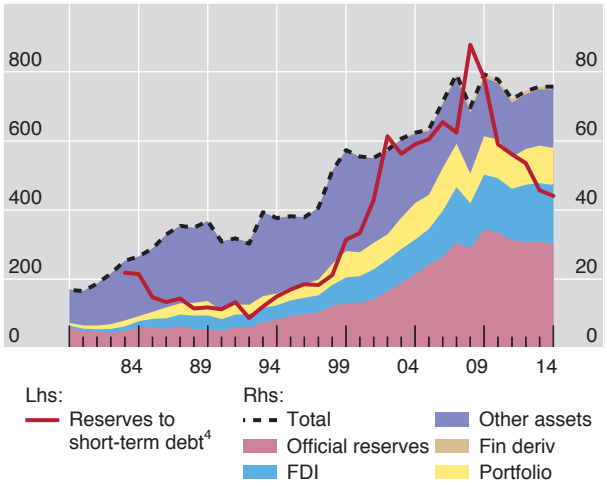
Perhaps the most visible line of defence is official foreign exchange reserves, which have risen massively. Official reserves in EMEs increased from around 10% of GDP in the mid-1990s to around 30% in 2014, although they have declined slightly more recently. To be sure, reserve holdings vary greatly across countries. For example, Saudi Arabia currently has around 100% of GDP in official reserves; China, Peru, Malaysia, Thailand and Hungary between 30 and 45%; Chile, Mexico, India, Turkey and South Africa between 10 and 20%; and Argentina around 5%. Still, reserve holdings generally exceed short-term liabilities. In addition, they have been complemented on an ad hoc basis by central bank foreign exchange swap lines and by other facilities, such as the IMF's Flexible Credit Line.

While such larger war chests no doubt provide considerably more protection than in the past, there are still questions about how effectively they can be deployed. In particular, it can be challenging to channel official reserves to the right

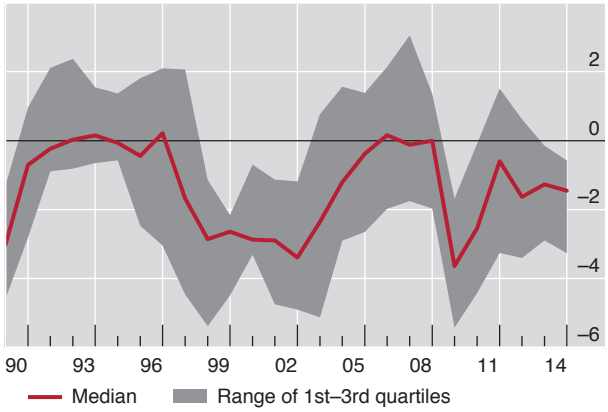
Lines of defence[1]

As a percentage of GDP — Graph III.10

Gross international assets[2]



General government overall balance[3]



[1] Country sample includes Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand and Turkey. [2] Aggregates are weighted averages based on GDP and PPP exchange rates of countries listed in footnote 1; excluding Argentina, Malaysia and South Africa for 2014. [3] General government net lending/borrowing-to-GDP ratio. [4] Official reserves as a share of debt with a remaining maturity of up to one year. Debt is defined as the sum of international debt securities by residence (all sectors) and consolidated international claims on an immediate counterparty basis (all sectors).

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; updated and extended version of dataset constructed by P Lane and G M Milesi-Ferretti in "The external wealth of nations mark II: revised and extended estimates of foreign assets and liabilities, 1970–2004", *Journal of International Economics* 73, November 2007, pp 223–50; BIS consolidated banking statistics and international debt securities statistics; BIS calculations.

places to plug liquidity gaps in the private sector. Moreover, authorities may be reluctant to intervene for a variety of reasons, including a desire to avoid setting the wrong incentives or being seen to run out of ammunition too quickly.

More fundamentally, greater macroeconomic flexibility from improvements in policy frameworks should have increased EMEs' resilience. On the monetary side, the shift from policy frameworks centred on fixed exchange rates to inflation targeting should give additional scope to better manage credit booms and associated vulnerabilities. More flexible exchange rates also increase a country's ability to adjust to changes in the economic environment. Over the past year some EMEs, especially in Latin America, have experienced very large exchange rate depreciations without this triggering a crisis.

Even so, these changes have not fully insulated countries from external developments. As discussed in Chapter V, exchange rate flexibility has only partially shielded EMEs from monetary policy spillovers in advanced economies. And the recent experiences of Brazil and Turkey, both of which raised policy rates at a time of slowing activity, illustrate the constraints on domestic monetary policy in the face of large capital outflows related to the tightening of monetary policy in advanced economies.

The capacity of fiscal policy to absorb shocks appears limited. Fiscal deficits are larger than in 2007 (Graph III.10, right-hand panel). Moreover, the median general government financial deficit of 1.5% of GDP in 2014 masks significant differences: Brazil and India have budget deficits of more than 6% of GDP. And financial booms are likely to have flattered public accounts. As discussed in more detail in last year's

Annual Report, this reflects an overestimation of potential output and growth, the revenue-rich nature of financial booms and the build-up of contingent liabilities that may need to be addressed in the bust. The experience of countries such as Spain and Ireland, whose fiscal positions looked deceptively strong ahead of the Great Financial Crisis, is a clear case in point.

Financial and real contagion

Today, EMEs are much more integrated into the global economy and financial system than before. Therefore, any serious financial strains, were they to materialise, would have larger repercussions globally than in the past.

Past financial crises in EMEs triggered widespread contagion. First, global investors withdrew from countries that shared some of the characteristics of the countries at its epicentre. For example, in 1997 the spectre of the crisis spread from Thailand to Indonesia, and then to Malaysia, the Philippines and Korea. Second, common lenders transmitted strains. For example, in the Latin American debt crisis contagion spread through the US banking system, which was heavily exposed to the region.

It is not yet clear to what extent changes in financial structure have changed the potential for contagion. The growing presence of regional banking in Asia today could have increased the likelihood of direct contagion in the region. Between 2007 and 2014, the share of banks in Asia and the Pacific in international claims on emerging Asia increased from around a third to nearly three fifths, while that of euro area banks declined to 15%, less than half its 2007 level. By contrast, there is some evidence from the "taper tantrum" that global investors in emerging markets have become more discriminating (see the *84th Annual Report*, pp 29–30). This should reduce contagion from perceived – rather than actual – similarities. However, investors might differentiate less during a broader retrenchment.

One key change is the increased importance of actions by asset managers and investors in EME bond funds. The shift from bank lending to market finance and the associated longer maturities, along with the higher share of domestic currency debt, mean that some risk has moved from debtors to creditors. There is evidence that both asset managers and the ultimate owners of the assets tend to behave in a correlated manner, buying when prices go up and selling when they fall, limiting the benefits of a more diversified investor base (Chapter VI).[11] Collective action problems with diverse investors may also make it harder for policymakers to stem large withdrawals than in the case of withdrawals by international banks.

More importantly, contagion need not be confined to other EMEs: the 1982 Latin American debt crisis led to significant problems in the US banking system. Today, borrowers from EMEs account for 20% of the foreign exposures of BIS reporting banks (on a consolidated, ultimate risk basis) and for 14% of all outstanding debt securities. Any losses on these exposures are bound to have important consequences for at least some large creditors. Similarly, EMEs make up 20% of the market capitalisation of the MSCI Global, a broad equity index.

Furthermore, the effects would not be limited to financial channels. EMEs have been the main drivers of global growth in recent years, quite unlike in previous periods. They account for approximately half of world GDP in PPP terms, compared with around one quarter at the time of the Latin American debt crisis, and a third before the Asian financial crisis in 1997. Their contribution to global growth has

[11] See K Miyajima and I Shim, "Asset managers in emerging market economies", *BIS Quarterly Review*, September 2014, pp 19–34.

increased from around 1 percentage point in the 1980s to over 2 points since the early 2000s. The collapse of global trade between 2008 and 2009 by more than 20% clearly illustrates how financial crises can affect real economic activity.

Taken together, there are a number of reasons to believe that EMEs are more resilient today than in the 1980s and 1990s: macroeconomic frameworks are sturdier; exchange rate flexibility has increased; financial system infrastructure is more robust and prudential regulation more stringent. The lines of defence are stronger, most visibly in the growth of foreign exchange reserves. And the development of local currency bond markets has reduced government overreliance on foreign currency debt.

Yet some other developments call for caution. Credit has grown very rapidly, often exceeding levels that have been followed by serious banking strains in the past. And a solid macroeconomic performance may not insulate EMEs from foreign shocks. Foreign currency debt levels are lower relative to GDP, but concentrated in the corporate sector, where currency mismatches are harder to measure. Mobilising reserves effectively to counter liquidity shortages in specific sectors or support domestic currencies may prove challenging. Finally, the shift from bank finance to foreign asset managers may have altered market dynamics in ways that are not well understood.

IV. Another year of monetary policy accommodation

Monetary policy continued to be exceptionally accommodative over the past year. Many authorities eased further or delayed tightening. Central bank balance sheets remained at unprecedentedly high levels; and they grew even larger in several jurisdictions where the ultra-low policy rate environment was reinforced with large purchases of domestic and foreign assets.

Monetary policies in the major advanced economies diverged, as the US economy strengthened relative to the euro area and Japan. But sharp declines in the prices of oil and other commodities and continued weakness in the growth of wages heightened concerns about the persistence of below-target inflation and at times even the dangers of deflation.

The differing cyclical positions of the major advanced economies and the associated exchange rate shifts complicated policy choices for other advanced economies as well as for emerging market economies. Inflation outturns were quite diverse: many central banks were combating low inflation while a smaller number faced the opposite problem. The deviation of inflation from expected levels and questions surrounding the supposed drivers of price changes underscored uncertainties about the inflation process. For some economies, the strong appreciation of their currencies against the euro and the yen reinforced growing disinflation pressures. The reduction in policy rates, in a few cases to negative levels, further raised financial vulnerabilities. The lower bound for policy rates, and financial stability considerations, limited the scope for further easing.

Another year of exceptionally expansionary monetary policy raises the question of whether existing policy frameworks are fit for their intended purpose. Historically high debt levels and signs of financial imbalances point to an increasing tension between price stability and financial stability. Against the backdrop of divergent monetary policies, the risk of competitive easing should not be underestimated (see also Chapter V).

This chapter first reviews the past year's developments in monetary policy. It then assesses what is known and what is not known about the inflation process and explores the degree to which monetary policy frameworks could be adjusted to more systematically incorporate financial stability considerations.

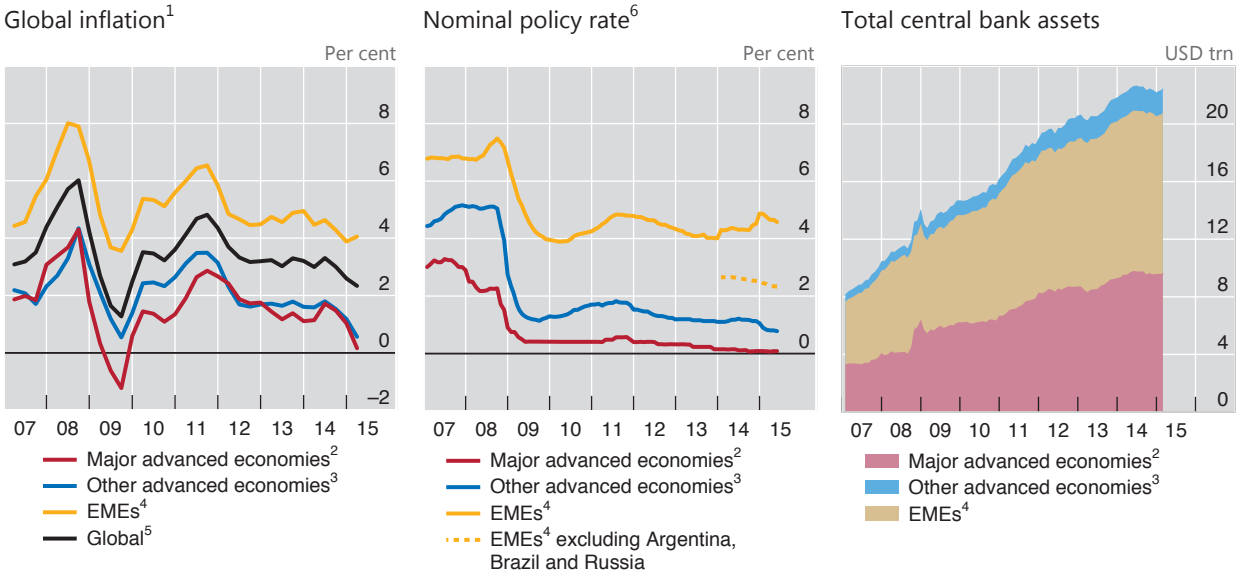
Recent monetary policy developments

Monetary policy remained exceptionally easy in most economies in the period under review. The sharp drop in oil prices, alongside smaller declines for other commodity prices, pushed down inflation (Graph IV.1, left-hand panel). Lower inflation and the slowdown in economic activity led most central banks to cut policy rates (Graph IV.1, centre panel). Central bank balance sheets in the aggregate continued to grow in domestic currency terms and were around record highs in US dollar terms despite the dollar's appreciation (Graph IV.1, right-hand panel). A small number of emerging market economies raised rates, some to fight sharp depreciation pressures on their currencies.

The divergence of policy trajectories in the major advanced economies was a prominent theme during the year. The Federal Reserve kept its policy rate

Monetary policy remains very accommodative amid disinflation

Graph IV.1



[1] Consumer price inflation. Aggregates based on rolling GDP and PPP exchange rates; year-on-year. [2] The euro area, Japan and the United States. [3] Australia, Canada, Denmark, New Zealand, Norway, Sweden, Switzerland and the United Kingdom. [4] Argentina, Brazil, Chile, China, Chinese Taipei, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand and Turkey. [5] Countries listed in footnotes 2, 3 and 4. [6] Policy rate or the closest alternative; simple averages.

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; CEIC; Datastream; national data; BIS calculations.

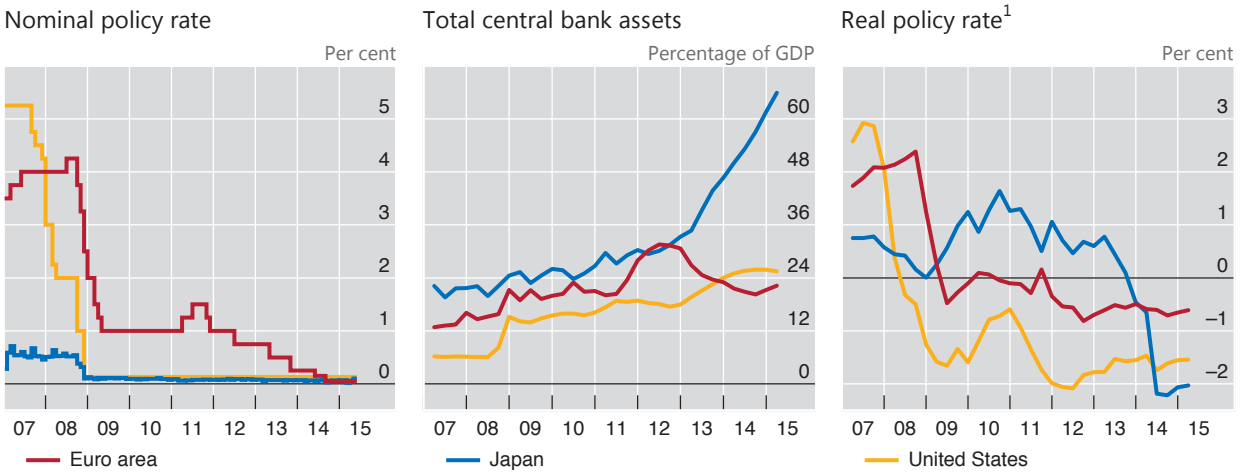
unchanged at 0–0.25% (Graph IV.2, left-hand panel) and concluded its two-year asset purchase programme in October (Graph IV.2, centre panel). The decision to end the programme after purchasing about $1.6 trillion of government bonds and mortgage-backed securities reflected a better outlook for the labour market and the economy more broadly. The Federal Reserve also indicated that it would be likely to start raising its policy rate before the end of 2015.

In contrast, the ECB eased policy further to address concerns about the risks of prolonged low inflation, including a downward drift in longer-term inflation expectations. In September 2014, the ECB cut the rate on the deposit facility further below zero (–0.2%). In early 2015, it launched a large-scale asset purchase programme. Aimed at acquiring a monthly average of €60 billion in public and private sector securities, the programme was slated to last at least until end-September 2016 and until inflation was consistent with achieving the ECB's inflation objective of less than, but close to, 2% over the medium term.

The Bank of Japan also sharply expanded its asset purchase programme, as the prospect of achieving its 2% inflation objective had become more challenging. It raised the target for the annual expansion of the money base under the quantitative and qualitative easing programme (QQE) by ¥10–20 trillion, to ¥80 trillion. It also shifted purchases to longer maturities to compress bond yields. As a result, its balance sheet grew to around 65% of GDP in early 2015, up from 35% at the programme's start in April 2013.

The extraordinary degree of monetary accommodation in the major advanced economies is highlighted by very low inflation-adjusted interest rates at short and long horizons. Real policy interest rates calculated using core inflation (headline consumer price inflation excluding food and energy) remained well below zero (Graph IV.2, right-hand panel). Long-term government bond yields were also below

Policy rates are low and central bank assets high in major advanced economies Graph IV.2



[1] Nominal policy rate less consumer price inflation excluding food and energy.

Sources: Datastream; national data; BIS calculations.

inflation in many economies. Forward curves for policy rates indicated that markets expected this highly unusual environment to persist for quite some time.

Central banks outside of the major advanced economies were left to factor these very accommodative, but increasingly divergent, monetary policies into their own policy decisions. The divergence raised the spectre of sharp shifts in exchange rates. At the same time, the drop in commodity prices lowered inflation pressures around the globe. Against this backdrop, most central banks eased policy (Graph IV.3, left-hand panel). As a result, policy rates generally continued to be well below historical norms and even negative in several economies (Graph IV.3, right-hand panel).

The reasons behind the policy decisions varied. Many central banks eased policy aggressively given concerns about very low inflation or deflation, or exchange rate developments. In particular, the central banks of Denmark, Sweden and Switzerland pushed down their policy rates well into negative territory. The negative rate in Denmark helped ease pressure on its exchange rate peg to the euro. The Swiss National Bank abandoned its exchange rate floor against the euro when its balance sheet approached 90% of GDP; the negative policy rate helped mitigate the impact of the appreciation pressures on the currency.

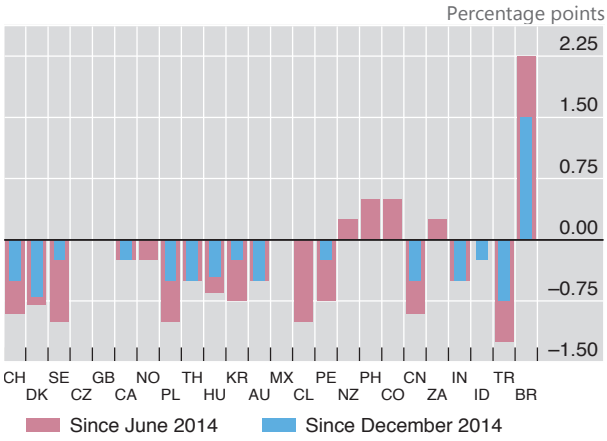
With inflation and its policy rate around zero, the Czech National Bank reiterated its commitment to an accommodative stance and to maintaining its exchange rate floor until the second half of 2016. The central banks in Hungary and Poland eased policy as they experienced deflation despite strong real economic activity. The Bank of Thailand reduced its policy rate as inflation turned negative, and the Bank of Korea cut its policy rate to a historical low as inflation fell towards zero.

Central banks in a number of commodity exporting economies also cut policy rates. Among them, the central banks in Australia, Canada and Norway eased as inflation declined along with commodity prices, even though core inflation remained close to target. They also faced the prospect of weaker economic activity as commodity-producing sectors were adversely affected, despite some offset from currency depreciation. The central banks of New Zealand and South Africa tightened policy in mid-2014 in response to higher inflation prospects; thereafter,

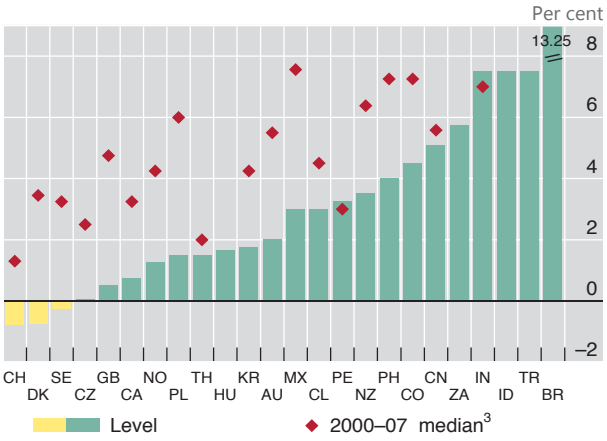
Most policy rates were cut from already low levels[1]

Graph IV.3

Change in policy rate[2]



Most policy rates are well below historical norms



AU = Australia; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; CO = Colombia; CZ = Czech Republic; DK = Denmark; GB = United Kingdom; HU = Hungary; ID = Indonesia; IN = India; KR = Korea; MX = Mexico; NO = Norway; NZ = New Zealand; PE = Peru; PH = Philippines; PL = Poland; SE = Sweden; TH = Thailand; TR = Turkey; ZA = South Africa.

[1] Nominal policy rate or the closest alternative as of end-May 2015. [2] Change in policy rate from date indicated to end-May 2015. [3] Median values not shown: for Brazil and Turkey, 17.5; for Hungary and South Africa, 9.5; for Indonesia, 11.4.

Sources: National data; BIS calculations.

they kept rates unchanged as inflation pressures eased and, in New Zealand, because of concerns about the implications of the strength of the exchange rate.

In contrast, commodity-exporting economies in Latin America faced inflation pressures (Graph IV.4, left-hand panel). In much of the region, inflation was above target in 2014 and was forecast to remain high. Even so, the central banks of Chile and Peru lowered rates in the second half of 2014 as the drop in metal and oil prices heralded weaker price pressures and slower growth. In Mexico, where inflation was running in the middle of its target range, rates were kept unchanged. The central bank of Colombia raised rates to address high inflation. In Brazil, rising inflation and concerns about the stability of capital flows caused the central bank to tighten policy significantly despite weak output.

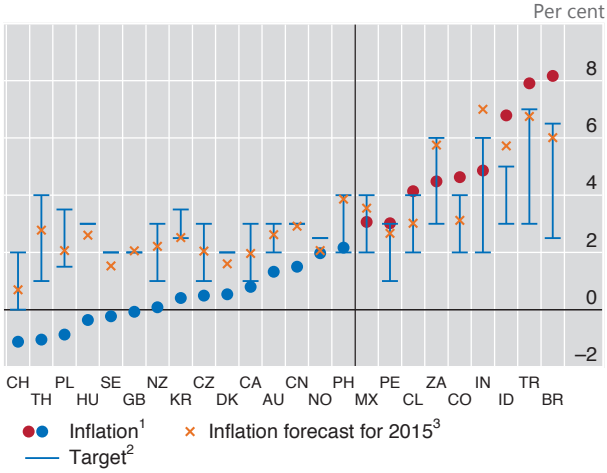
In China and India, the central banks eased, but policy rates were still close to recent historical norms. China's central bank cut interest rates and reduced required reserve ratios to counter a slowing pace of economic activity. The growth of monetary and credit aggregates had slowed modestly, in part as a result of tighter regulation of shadow banking. The easing in India came against the backdrop of a deceleration of inflation from a high single digit pace, strong economic growth, and an improved fiscal situation. The authorities in India also announced a new monetary policy framework agreement, with a 4% target for consumer price inflation from early 2016 onwards.

On balance, last year's monetary policy developments outside the major advanced economies appear to have been driven mainly by inflation and exchange rate developments (Graph IV.4, right-hand panel). Economies with inflation running well above target felt stronger currency depreciation pressures and had a tighter policy stance than would otherwise be implied by domestic inflation and output developments alone. The converse was true for those facing currency appreciation pressures.

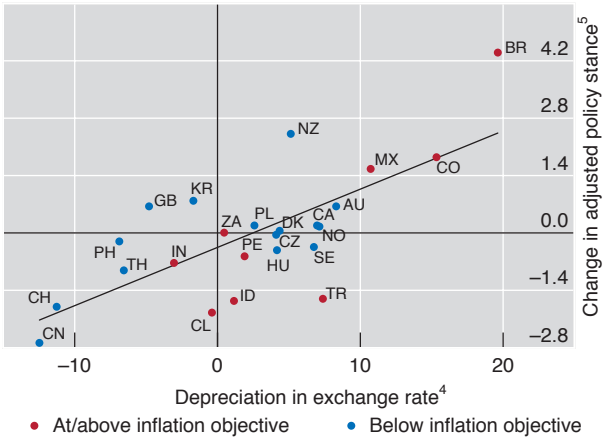
Finally, signs of financial imbalances (Chapter III) are presenting many of these economies with financial stability concerns. Since the Great Financial Crisis,

Policy stances have been influenced by inflation performance and exchange rates Graph IV.4

Inflation is below target for many, above for others



Exchange rate and policy changes are correlated



AU = Australia; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; CO = Colombia; CZ = Czech Republic; DK = Denmark; GB = United Kingdom; HU = Hungary; ID = Indonesia; IN = India; KR = Korea; MX = Mexico; NO = Norway; NZ = New Zealand; PE = Peru; PH = Philippines; PL = Poland; SE = Sweden; TH = Thailand; TR = Turkey; ZA = South Africa.

[1] Consumer price inflation as of April 2015; year-on-year. [2] As of April 2015; for Denmark, the ECB inflation target. [3] Consensus Economics forecast as of June 2014 for 2015. [4] Changes in the nominal effective exchange rate from June 2014 to May 2015. A positive (negative) number indicates depreciation (appreciation); in per cent. [5] Changes from June 2014 to May 2015 in the nominal policy rate not explained by changes in output growth and inflation adjusted for exchange rate pass-through; in percentage points.

Sources: Consensus Economics; JPMorgan Chase; national data; BIS; BIS calculations.

deleveraging has progressed in some economies, but in others, housing prices and debt remain very high and in many cases have grown further. Post-crisis developments in credit and asset prices have featured prominently in central bank communications, and many central banks have highlighted the risk that low policy rates might contribute to the build-up of financial imbalances. Overall, however, short-term macroeconomic factors have been the dominant justification for policy decisions; financial developments have been far less prominent.

What drives inflation?

In many economies, inflation fell during the past year from already low levels. These recent changes in headline inflation largely reflected volatile fluctuations in oil and food prices and exchange rates, factors that are often considered short-term (or proximate) drivers of inflation. Core inflation, which excludes food and energy prices, has been relatively low for some time, which raises important questions about the effects of other drivers of inflation, namely the medium-term (or cyclical) and long-term (or secular) drivers. Despite decades of research and experience, the inflation effects of the cyclical and secular drivers remain much less clear than those of the proximate drivers.

Proximate drivers

The short-term effect of commodity prices and exchange rates on inflation is generally well understood. Energy is given a large weight in the consumer price index (CPI) of various countries, so changes in energy prices have a strong and

immediate impact on headline inflation. The price of energy can change markedly over short periods, as it did in the past year. Changes in food prices tend to be less volatile but can still have a significant effect, especially in emerging market economies, where food accounts for a larger share of the basket of goods and services that make up the CPI.

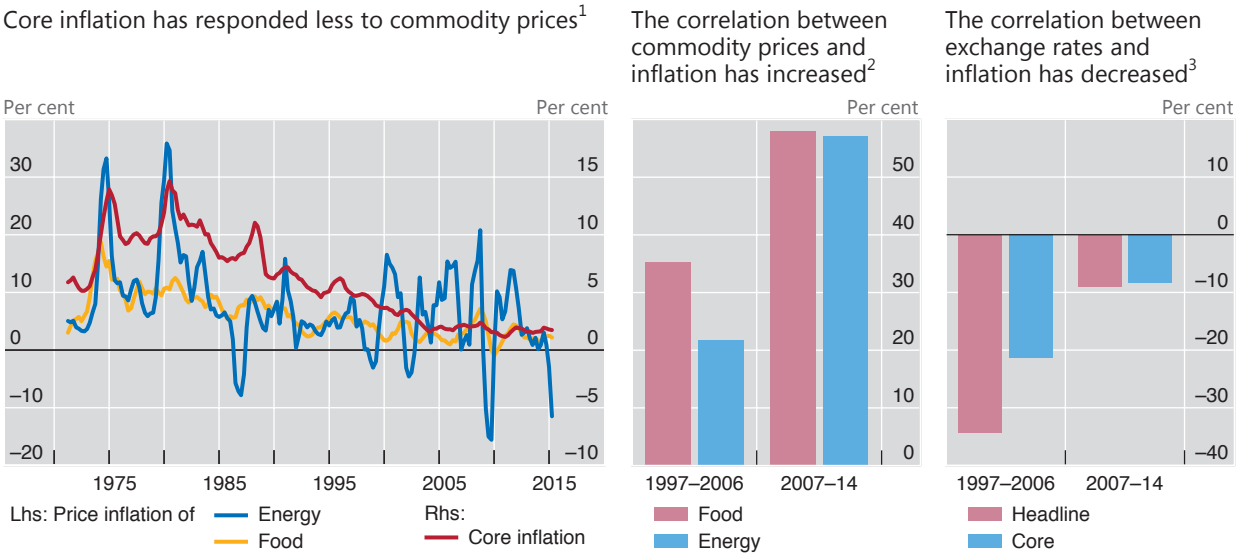
The degree to which changes in commodity prices pass through to other prices has declined over time. In the 1970s and 1980s, for example, increases in oil prices led to price increases for other goods, thereby tending to raise core inflation and inflation expectations. In the past two decades, however, these so-called "second-round" price effects on core inflation have become much more muted (Graph IV.5, left-hand panel) even as the effect of commodity prices on overall inflation has grown (Graph IV.5, centre panel).

Changes in exchange rates are also an important proximate driver of headline and core inflation. Imported items, or those that are subject to international competition, represent a large share of CPI baskets. Because the price of many of these items is set in global markets, changes in the exchange rate affect domestic costs.

Despite the increasing share of tradable items in the CPI over the past couple of decades, exchange rate pass-through to both headline and core inflation has declined (Graph IV.5, right-hand panel). Several factors appear to have contributed to this decline. One is better-anchored inflation expectations. With inflation low and stable, firms and households are less likely to expect central banks to accommodate exchange rate movements that would lead to persistent deviations of inflation from target. Evidence points to some additional factors that may be reducing the pass-

The pass-through of commodity prices and exchange rates to inflation is changing

Graph IV.5



[1] Core inflation is consumer price inflation (headline inflation) excluding food and energy; OECD country aggregates. [2] Correlation of headline inflation and first lag of commodity price inflation expressed in local currencies; based on year-on-year data. Simple averages across: Argentina, Australia, Brazil, Canada, Chile, China, Chinese Taipei, Colombia, the Czech Republic, Denmark, the euro area, Hong Kong SAR, Hungary, India, Indonesia, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Peru, the Philippines, Poland, Russia, Saudi Arabia, Singapore, South Africa, Sweden, Switzerland, Thailand, Turkey, the United Kingdom and the United States; quarterly data. [3] Correlation of headline inflation and the second lag of the change in the nominal effective exchange rate (BIS broad definition); based on year-on-year data. Simple averages across all economies listed in footnote 2 except, for core inflation, Argentina, China, Hong Kong SAR, Malaysia, Russia, Saudi Arabia and South Africa, which are excluded because of data limitations; quarterly data.

Sources: OECD, *Main Economic Indicators*; Bloomberg; CEIC; Datastream; national data; BIS; BIS calculations.

through effect of exchange rate changes: the advent of integrated supply chains, which give multinational firms a greater ability to absorb exchange rate changes; easier access to cheaper hedging; and a shift in the composition of imports towards items, such as manufactured goods, whose prices display a lower pass-through.

Cyclical drivers

The relationship between inflation and the business cycle, captured by measures of economic slack such as the unemployment gap, rests on strong theoretical foundations. However, the empirical relationship is generally far weaker and has been evolving along with changes in the global economy and financial system. For example, the post-crisis behaviour of inflation highlights the sometimes tenuous link between inflation and economic slack. Inflation was stronger than expected in 2010–11, given the severity of the crisis and the recession-induced excess capacity. Later on, even as labour markets strengthened and the global economy continued recovering, core inflation in many advanced and emerging market economies was either falling or running below central bank objectives.

The weakness of the empirical link between inflation and the business cycle has a number of explanations. First, spare capacity may be mismeasured, as it is not directly observed and must be estimated. For example, in the labour market, the unemployment rate is observable, but cyclical or structural changes in labour force participation can alter the unobserved effective amount of underutilised labour. Second, different methodologies and assumptions for estimating economic slack in the labour market or in the economy as a whole can produce quite different results. Third, many measures of spare capacity are subject to real-time errors, and so a clear picture of slack at a given time may become possible only at a much later date.

At the same time, evidence – often underappreciated – increasingly indicates that inflation now responds less to domestic cyclical activity and more to global movements than it has in the past. For example, the global output gap (Graph IV.6, left-hand panel) appears to have become more important in driving inflation. In fact, the effect of global spare capacity is now estimated to be larger than that of domestic spare capacity (see the *84th Annual Report*).[1] Similarly, the post-crisis share of cross-country inflation explained by a single common factor has increased, a development seemingly unforeseen in private sector forecasts (Graph IV.6, centre panel). In other words, global drivers of inflation are apparently becoming more important, but they are not particularly well understood.

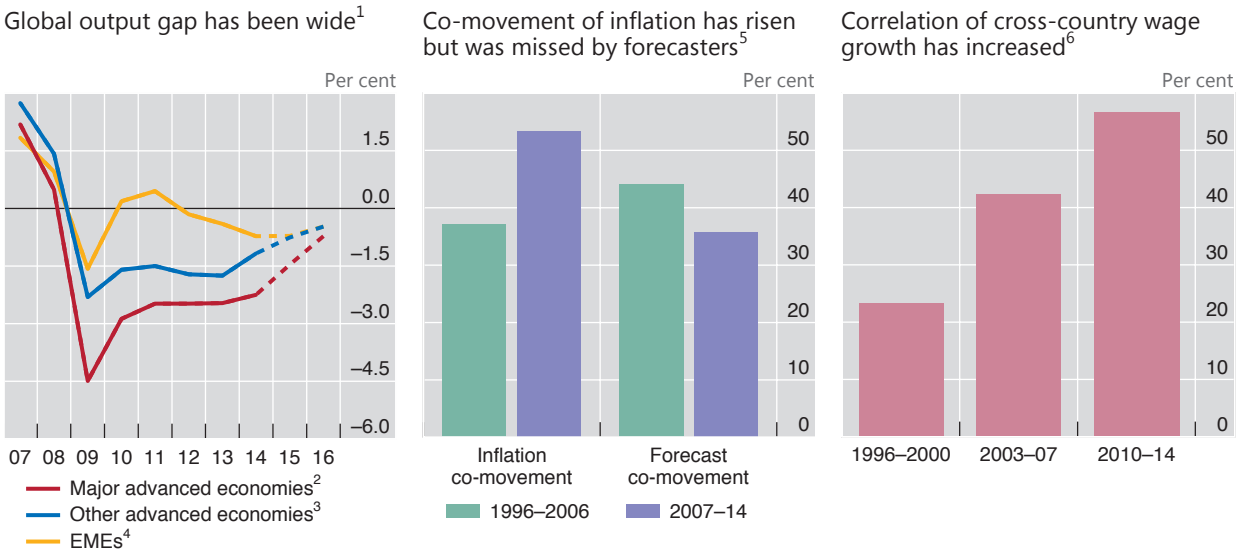
The higher responsiveness of inflation to global conditions reflects several factors, including the greater integration of product and factor markets. And since this greater integration can influence the pricing power of domestic producers and the bargaining power of workers, the effect of global conditions on inflation goes well beyond their direct impact through import prices.

The effect of common global trends is also visible in labour markets. Domestic unit labour costs have become more correlated across economies even outside of recessionary periods (Graph IV.6, right-hand panel). This development is consistent with evidence that inflation has become less sensitive to changes in spare domestic capacity or, in other words, with evidence that domestically oriented Phillips curves have become flatter.

Uncertainty about the link between inflation and domestic spare capacity suggests greater risks for monetary policymaking: central banks may miscalibrate

[1] See also C Borio and A Filardo, "Globalisation and inflation: new cross-country evidence on the global determinants of domestic inflation", *BIS Working Papers*, no 227, May 2007.

Domestic cyclical drivers of inflation matter less and global more — Graph IV.6



[1] Aggregates based on rolling GDP and PPP exchange rates; the dashed line is the IMF forecast for 2015 and 2016; output gap as a percentage of potential output. [2] The euro area, Japan and the United States. [3] Australia, Canada, Denmark, New Zealand, Norway, Sweden, Switzerland and the United Kingdom. [4] Argentina, Brazil, Chile, China, Chinese Taipei, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Singapore, South Africa, Thailand and Turkey. [5] Variance of inflation explained by first principal component; for individual economies listed in footnotes 2, 3 and 4 plus selected euro area countries: Austria, Belgium, Finland, France, Germany, Greece, Italy, the Netherlands, Portugal and Spain. [6] Correlation of growth in nominal unit labour costs (year-on-year) with the cross-country average. Simple average for economies: Australia, Canada, the Czech Republic, Denmark, the euro area, Hungary, Japan, Korea, Norway, Poland, South Africa, Sweden, Switzerland, the United Kingdom and the United States.

Sources: IMF, *World Economic Outlook*; OECD, *Economic Outlook*; Consensus Economics; national data; BIS calculations.

their policy if they place too much weight on past correlations that underestimate the role of global factors.

Secular drivers

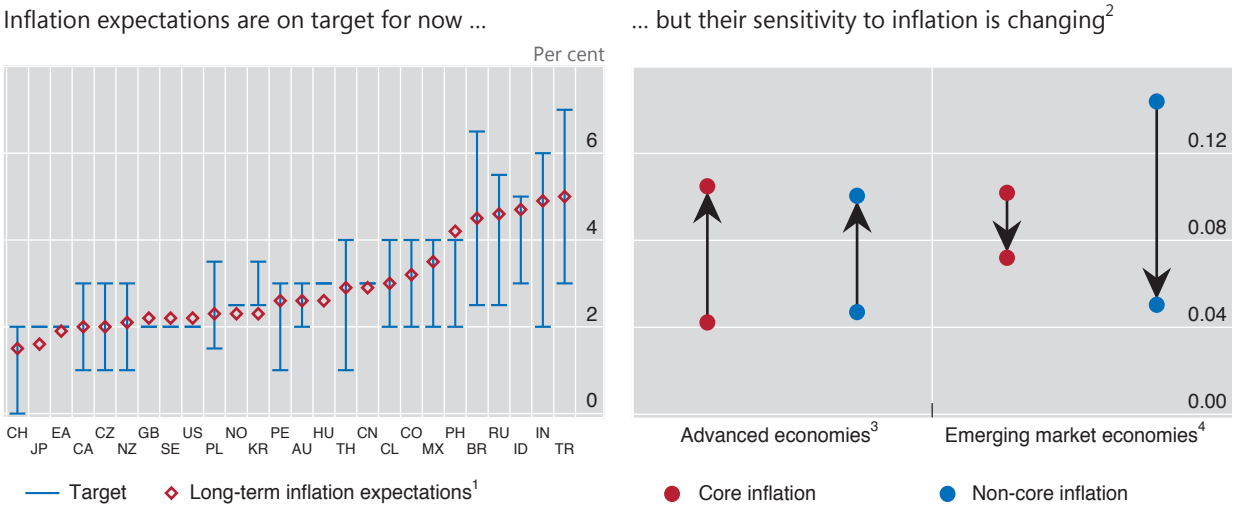
Understanding the effects of the secular (or long-term) drivers of inflation is critical to assessing inflation trends. The main secular drivers are inflation expectations, wage trends, globalisation and technology. Arguably, these drivers have generally had a disinflationary impact, although their strength has been subject to considerable debate. Each of these drivers has been influenced by a range of policy choices and structural changes.

Inflation expectations have drifted down as monetary policy regimes have successfully become more focused on inflation control. Indeed, long-term inflation expectations are now tightly aligned with central banks' explicit objectives (Graph IV.7, left-hand panel). The attainment of low, well-anchored inflation expectations has been seen as a key achievement, especially because they influence longer-run pricing decisions and contract setting.

Nonetheless, the understanding of what determines inflation expectations is still incomplete and continues to evolve. For example, a current concern is that inflation expectations may have become less well anchored, especially in economies with a policy rate near the effective lower bound, slow growth, and inflation running persistently below target. In advanced economies, inflation expectations have seemingly become more sensitive to short-term inflation (Graph IV.7, right-hand panel). This behaviour appears to be consistent with the research, which generally

Long-term inflation expectations are still anchored

Graph IV.7



AU = Australia; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; CO = Colombia; CZ = Czech Republic; EA = euro area; GB = United Kingdom; HU = Hungary; ID = Indonesia; IN = India; JP = Japan; KR = Korea; MX = Mexico; NO = Norway; NZ = New Zealand; PE = Peru; PH = Philippines; PL = Poland; RU = Russia; SE = Sweden; TH = Thailand; TR = Turkey; US = United States.

[1] April 2015 Consensus Economics forecast for six- to 10-year-ahead inflation expectations. [2] Estimated coefficients from regression of six- to 10-year-ahead inflation expectations on year-on-year consumer price inflation excluding food and energy (core inflation) and non-core inflation. The arrows indicate the change in coefficients from the 2000–07 sample to the 2010–14 sample; the change is statistically significant (at the 1% level) for core inflation in advanced economies and (at the 5% level) for non-core inflation in emerging market economies. [3] Australia, Canada, the euro area, Japan, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the United States. [4] Brazil, Chile, China, Colombia, the Czech Republic, India, Indonesia, Korea, Mexico, Poland, Russia, South Africa and Turkey.

Sources: Consensus Economics; Datastream; national data; BIS calculations.

finds that while inflation expectations are influenced by central bank objectives, they are also affected by past inflation. However, this backward-looking element of long-term inflation expectations has historically tended to respond rather slowly to changes in inflation.

The measurement of inflation expectations is also subject to considerable uncertainty. Questions remain about whether financial-market-based measures accurately reflect changing inflation expectations or whether these measures are distorted by spurious market-specific factors (Chapter II). Moreover, the inflation expectations of firms and workers are likely to be more relevant in price determination than those of professional forecasters. Unfortunately, measures for firms and workers are not always available, and when they are, they often are of questionably quality and display significant volatility.

Wage trends have also changed over recent decades. For example, the indexation of wages to inflation is much less prevalent now than it was in the 1970s, which accounts for some reduction in inflation persistence. Wage dynamics have also changed as a result of increased labour competition in advanced economies. The competition initially came from the greater integration of low-cost emerging market economies (including formerly state-controlled economies) into the global trading system. The competition spread and intensified as global integration strengthened and the range of goods and services that could be traded internationally widened, in part as a result of new technologies (eg via outsourcing). This partly explains why, for a number of advanced economies, labour's share of national income has declined steadily over the past 25 years. More generally, technological advances that have allowed the direct substitution of capital for

labour have played a similar role. Think, for instance, of computers, software and robotics automating previously manual processes.

The emergence of cheaper competitors has made labour and product markets much more contestable. Accordingly, the pricing power of the more expensive producers and the bargaining power of labour have been reduced – disinflationary forces whose effects go well beyond those suggested by the increase in global trade and integration. Thus, globalisation and technological change together have contributed to persistent, if hard to measure, disinflationary tail winds.

In sum, various inflation drivers have been shaping the inflation process in ways that at times have been difficult to fully understand. The heightened uncertainty has naturally carried over to inflation forecasting.[2] While the quantitative importance of the proximate drivers of inflation is relatively well understood, they can change unpredictably. There is considerable uncertainty about the overall impact of cyclical and secular factors, even as the relevance of global factors is rising relative to domestic ones. The uncertainties inevitably complicate policy, especially in frameworks that are tightly defined around inflation targets over short horizons.

Integrating financial stability concerns into monetary policy frameworks

The persistence of exceptionally easy monetary policy some eight years after the eruption of the financial crisis raises questions about its efficacy and, ultimately, about the suitability of current monetary policy frameworks. To be sure, price stability remains the cornerstone of monetary policy. However, the nature of the risks to price stability has been evolving. Worries over high inflation have been replaced of late with concerns about very low inflation and possibly deflation even in the context of high and rising debt and frothy asset prices. In this environment, resolving the tension between price stability and financial stability is the key challenge if economies are to avoid the problems that arose before the financial crisis. That is, can central banks preserve price stability while more systematically accounting for financial stability considerations?

One lesson from the financial crisis is that ignoring the financial cycle can be very costly. In the run-up to the crisis, credit and asset prices soared even as inflation remained low and stable. Since the crisis, similar patterns have again emerged in some economies (Graph IV.8 and Chapter III). The pre-crisis experience illustrated that financial vulnerabilities can build up even when inflation is quiescent. Low inflation can provide a false signal of overall economic stability.

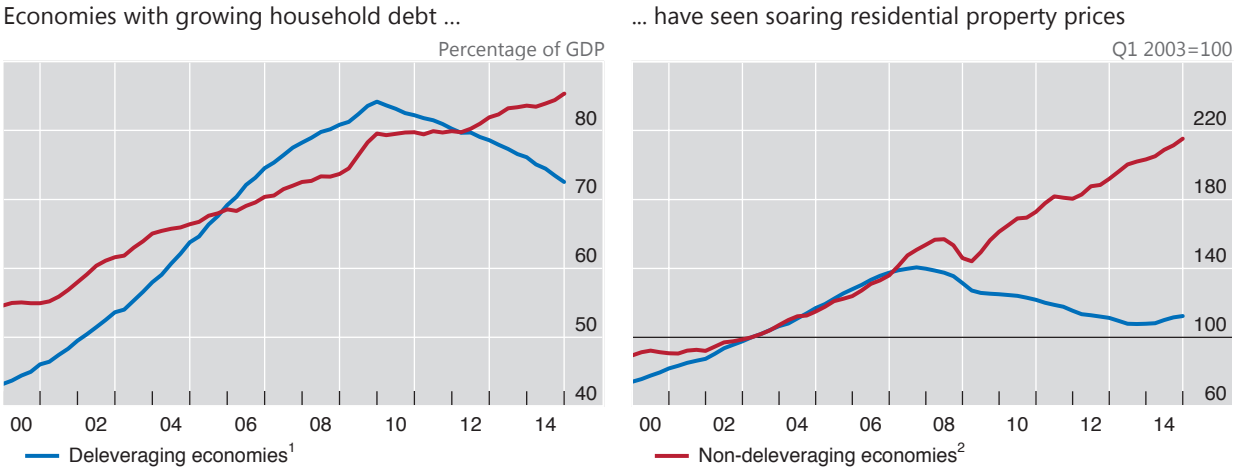
Despite the recent experience, the role of financial stability concerns in monetary policy is still subject to major disagreements. A common view is that macroprudential policies should be the first line of defence against financial imbalances; monetary policy should simply be a backstop, responding to financial stability concerns only after macroprudential policies have done all they can.

This view is supported by a sort of separation principle. Only macroprudential tools (eg loan-to-value ratios, countercyclical capital buffers, etc) are to be used against slow-moving financial booms and busts; monetary policy would then be left to focus on its traditional countercyclical role of managing inflation and business fluctuations.

[2] Many central banks publish ranges around their inflation forecasts, often derived from their historical forecast errors. These ranges generally suggest odds of only three-in-four that inflation will be within a 2 percentage point interval at a one-year horizon. At longer horizons, the uncertainty tends to be even larger.

Worrisome household debt and house price trends persist

Graph IV.8



[1] Simple average for economies with significant deleveraging of household credit since the Great Financial Crisis: Greece, Ireland, Italy, Portugal, Spain, the United Kingdom and the United States. [2] Simple average for economies without significant deleveraging of household credit since the Great Financial Crisis: Australia, Canada, Hong Kong SAR, Korea, New Zealand, Norway, Singapore and Sweden.

Sources: OECD *Economic Outlook*; national data; BIS; BIS calculations.

The separation principle is intuitively appealing and has the merit of simplifying policy assignments; but it becomes less compelling if one considers the way in which macroprudential policy and monetary policy jointly influence financial activity. Box IV.A highlights the close interrelationship between macroprudential and monetary policies as well as the similarity in their transmission mechanisms. To be sure, their reach differs markedly. But both of them fundamentally influence funding costs and risk-taking, which in turn affect credit, asset prices and the macroeconomy.

Moreover, while assessments differ, the experience with macroprudential tools is, on balance, not very supportive of the separation principle. It is not clear that targeted macroprudential tools can be as effective as policy rates in preventing excessive risk-taking in all parts of the financial system. The policy rate is the key determinant of the universal price of leverage in a given currency; it affects all financing in the economy and is not susceptible to regulatory arbitrage. In this sense, policy interest rates are more blunt but have a more pervasive effect. In light of this, the exclusive reliance on macroprudential tools to tame financial booms and busts is risky – all the more so if monetary and prudential tools are pulling in opposite directions. Experience suggests that the two sets of tools are most effective when used as complements, leveraging each other's strengths.

A recent empirical analysis indicates the potential usefulness of monetary policy in this context (Box IV.B). Policy rates appear to have a significant effect on credit and asset prices, especially property prices. And this effect seems to have been growing since the mid-1980s, following financial liberalisation. It is no coincidence that the amplitude and length of financial cycles has considerably increased since then (see the *84th Annual Report*). Moreover, the same analysis finds that, after explicitly accounting for the effect on credit and property prices, monetary policy has had a reduced effect on output. Together, these findings suggest that a monetary policy focused on managing near-term inflation and output may do so at the cost of higher fluctuations in credit and asset prices than in the past.

A common argument against using monetary policy to address financial stability concerns is the lack of good metrics with which to track the financial cycle

Box IV.A

Monetary policy and macroprudential policy: complements or substitutes?

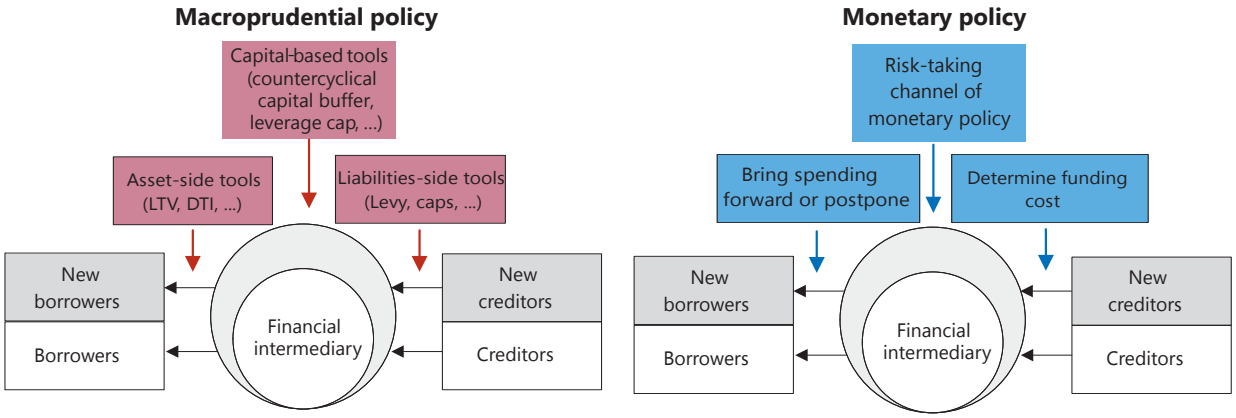
Macroprudential policies aim to (i) strengthen the resilience of the financial system and (ii) mitigate financial booms and subsequent busts. How well do macroprudential policies interact with monetary policy in addressing the second of these two concerns?①

Both monetary policy and macroprudential policy influence the financial intermediation process, operating on the assets, liabilities and leverage of intermediaries (Graph IV.A). For instance, both policies can induce a reallocation of spending over time by influencing the cost and availability of credit for consumers and firms. These policies, however, differ in scope and impact. Macroprudential policy often targets specific sectors, regions or practices (eg through loan-to-value limits and debt-service ratio rules), whereas interest rates have a more pervasive impact on private sector incentives and on the financial system.

An important policy question is whether monetary and macroprudential policies should in general pull in the same direction (ie as complements) or in opposite directions (ie as substitutes). Some recent discussions of macroprudential policies treat the two sets of policies as substitutes: while monetary policy is kept loose, macroprudential policy is invoked to mitigate the resulting financial stability implications, at least for particular sectors or types of borrowing. But when these policies are pulling in opposite directions, economic agents are simultaneously facing incentives to borrow more and to borrow less, suggesting tensions in the policy mix. Initial theoretical research points to monetary and macroprudential policies being best used mainly as complements, not substitutes, although results can vary by the nature of the adverse development.

Macroprudential tools and monetary policy are interrelated

Graph IV.A



LTV = loan-to-value; DTI = debt-to-income.

Source: H S Shin, "Macroprudential tools, their limits and their connection with monetary policy", panel remarks at the IMF Spring Meeting on "Rethinking macro policy III: progress or confusion?", Washington DC, April 2015, www.bis.org/speeches/sp150415.htm.

Indeed, experience indicates that these tools tend to be used together as complements. A recent study of Asia-Pacific economies documents that monetary policy and macroprudential policies over the past decade have been used to pull in the same direction, as indicated by the positive correlations reported in Table IV.A. Furthermore, the empirical evidence indicates that tighter macroprudential policies together with higher interest rates have been effective in reducing real credit growth. Statistical questions remain about whether and when macroprudential policies have been on average more powerful than monetary policy.

Correlation of policy changes in Asia-Pacific economies[1] Table IV.A

	Policy rate	Non-interest rate monetary policy measures	Prudential measures on housing credit	Prudential measures on banking inflows and foreign exchange exposures
Policy rate	1.00			
Non-interest rate monetary policy measures	0.22	1.00		
Prudential measures on housing credit	0.16	0.19	1.00	
Prudential measures on banking inflows and foreign exchange exposures	0.20	0.30	0.09	1.00

[1] Changes in the policy rate are actual. For changes in the other policy actions, +1 is assigned for tightening, 0 for no change and –1 for loosening. Quarterly data from 2004 to 2013 for Australia, China, Hong Kong SAR, India, Indonesia, Japan, Korea, Malaysia, New Zealand, the Philippines, Singapore and Thailand.

Source: Adapted from Table 15 of V Bruno, I Shim and H S Shin, "Comparative assessment of macroprudential policies", *BIS Working Papers*, no 502, June 2015.

① See H Hannoun, "Towards a global financial stability framework", speech at the SEACEN Governors' Conference, Siem Reap, Cambodia, 26 February 2010.

and financial stability risks more generally. The problem is indeed serious, but the past decade has seen considerable progress in devising and improving such metrics. One practical approach has been to track credit and asset price trends. More generally, the challenge is not specific to monetary policy. And the very establishment of macroprudential policy frameworks, in which central banks often play a key role, is predicated on the presumption that the need for good metrics can be tackled successfully.

At the same time, the difficulties with the more familiar yardsticks used in the pursuit of price stability should not be underestimated. Economic slack and inflation expectations are not observed directly; they have to be estimated, and the estimates are subject to considerable uncertainty and bias. In fact, recent evidence suggests that using information about the financial cycle, such as the behaviour of credit and property prices, can produce better estimates of potential output and underlying slack in real time than traditional methodologies, which often draw on the behaviour of inflation (Box IV.C). Indeed, ahead of the financial crisis, the methodologies widely used in policymaking generally failed to detect that output was above its sustainable level. Estimates that take the boom in credit and property prices into account can help to correct this bias.

By the same token, metrics informed by the state of the financial cycle may also help calibrate monetary policy, even though this will necessarily be a matter of trial and error. As outlined in Chapter I, a general strategy would call for more deliberate and persistent monetary policy tightening during financial booms, even if near-term inflation is low or declining. All else equal, Taylor rules not adjusted for the state of the financial cycle could set a sort of lower bound, as they have been calibrated with inflation, not financial imbalances, in mind (Box IV.C). During financial busts, the strategy would be to ease less aggressively and persistently. The restraint in easing would reflect the weaker influence of expansionary monetary policy when (i) the financial system is impaired, (ii) the private sector has taken on too much debt and (iii) the misallocation of resources accumulated during the boom weighs on

Monetary transmission to output, credit and asset prices

After the Great Inflation of the 1970s, economies and financial systems worldwide changed markedly. Low inflation rates became the norm in many countries, and financial liberalisation and globalisation progressed rapidly. In particular, housing finance arrangements evolved substantially and have become more integrated with capital markets through the spreading of securitisation, rising loan-to-value ratios and the advent of credit tied to home equity. Also, bond markets have deepened, facilitating firms' access to capital market funding, and financial globalisation has considerably broadened the investor base. As a result, the level of debt relative to income has risen significantly. Moreover, non-bank lenders are a much larger source of credit, and more debt is in the form of mortgages.

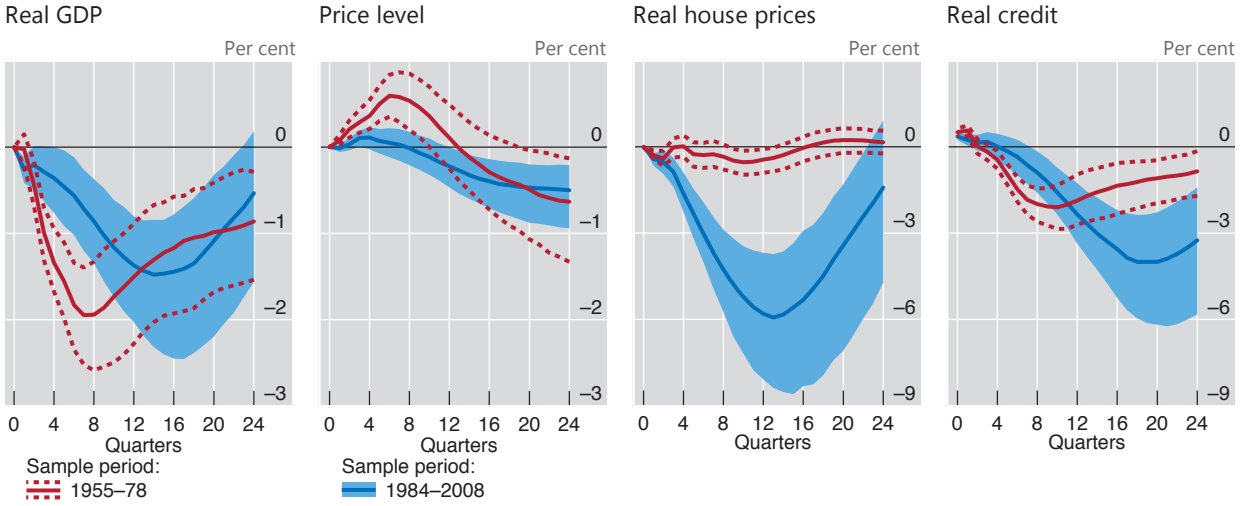
These developments could also have altered the transmission of monetary policy. Although studies for the United States suggest that the transmission has not changed much over time,① their focus has been on the transmission to the real economy, largely ignoring the interrelationship with credit and asset prices.

A standard vector autoregression model (VAR) extended to include house prices and total credit to the private non-financial sector does find evidence of significant changes in transmission in the US economy (Graph IV.B).② An unexpected increase of 100 basis points in the US policy rate is estimated to have a smaller impact on output in the recent period: a maximum impact of –2% is reached after eight quarters in the earlier period and –1.5% after 14 quarters in the later one. While the long-term impact for the price level is very similar, the reaction has become more muted. In contrast, the differential impact of monetary policy on house prices and credit across the two sample periods is substantial: for real house prices, the estimated maximum impact has soared by a factor of twelve (from –0.5% to –6%); and for total credit, it has doubled from –2% to –4%.③

These findings suggest that credit and house price booms have become more sensitive to countervailing changes in monetary policy rates. Moreover, the output costs associated with policy tightening have generally fallen, given monetary policy's more muted impact on real output. Put differently, the results indicate that smoothing short-term swings in output and inflation now comes at the cost of greater swings in credit and property prices than in the past.

The financial cycle has become increasingly sensitive to policy rates

Impulse responses to a 100-basis-point increase in the policy interest rate[1] Graph IV.B



[1] For the United States; median and the 68% probability range of the impulse responses.

Source: BIS calculations.

① See eg G Primiceri, "Time varying structural vector autoregressions and monetary policy", *Review of Economic Studies*, vol 72, 2005, pp 821–52; and J Boivin, M Kiley and F Mishkin, "How has the monetary transmission mechanism evolved over time?", in B Friedman and M Woodford (eds), *Handbook of Monetary Economics*, vol 3A, North Holland, 2011, pp 369–422. ② The VAR comprises five variables: log real GDP, log GDP deflator, log real house prices, the US policy rate (the federal funds rate) and log real credit. The monetary policy shock is identified using a Cholesky identification scheme with variables ordered as they are listed. For more details, see B Hofmann and G Peersman, "Revisiting the US monetary transmission mechanism", *BIS Working Papers*, forthcoming. ③ O Jorda, M Schularick and A Taylor, "Betting the house", *Journal of International Economics*, forthcoming, also find that loose monetary conditions lead to booms in real estate lending and house prices bubbles, especially in the postwar period.

potential output (Chapters I and III and the *84th Annual Report*). And this approach would also reflect the understanding that forceful easing with limited effectiveness produces unintended effects on the financial system and the economy, domestically and internationally (Chapters III, V and VI). Calibration issues would loom large, but – as in the pursuit of price stability, and especially until sufficient experience is accumulated – there is no alternative to gradual experimentation.

A more challenging concern is how best to balance the possible trade-offs between financial stability and macroeconomic stabilisation, ie price stability and near-term output stabilisation. To some extent, this is an issue of the relevant policy horizon. Financial vulnerabilities take considerable time to build up. And as witnessed in the aftermath of the financial crisis, a financial bust has long-lasting debilitating effects on the macroeconomy, including possibly for inflation. Hence, extending the horizon beyond the traditional two to three years helps reconcile financial stability with traditional objectives. After all, financial instability is a concern precisely because of the damage it imposes on the real economy. Given the uncertainties embedded in longer-term forecasts, the extension of the horizon should not be interpreted as extending point forecasts. Rather, it is intended as a means to examine more systematically the risks to the outlook posed by financial factors, given their longer fuse.

Even so, when it comes to tolerating deviations of inflation from objectives, the issue remains, how long is too long? The post-crisis period has shown that persistent disinflation, and even deflation, can go hand in hand with worrying booms in asset prices and credit. To be sure, this constellation is by no means unprecedented and was rather common during the era of the gold standard. Most famously, it prevailed during the 1920s, ahead of the Great Depression in the United States. But the constellation was far less common in the post-World War II, inflation-prone period and emerged again only after inflation came under tighter control.

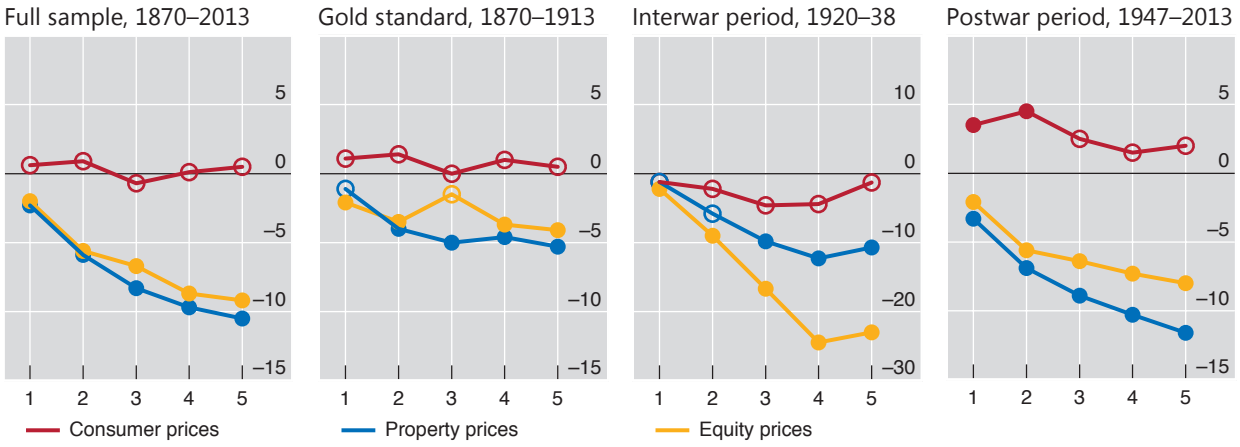
Two well founded concerns, one specific and one more general, have discouraged policymakers from tolerating persistent deviations of inflation from numerical objectives.

The specific concern is deflation risk. Much of the recent policy debate has been predicated on the assumption that all deflations are pernicious and cause great economic damage. The sense is that a drop in aggregate prices will likely trigger a deflationary spiral. Output will fall and – especially if interest rates are stuck at the zero lower bound – expectations of continued price declines will raise inflation-adjusted interest rates, further depressing aggregate demand and output.

However, the historical record on the output costs of deflation is at odds with this widespread perception. The asserted link between deflation and subpar economic activity is actually rather weak and derives largely from the unique experience of the Great Depression. In fact, the evidence suggests that output is more closely linked to asset prices, especially property prices. Once asset prices are taken into account, the link between output and price deflation in goods and services becomes even weaker. In a review of the international experience since

Output slowdowns coincide more with asset price declines than with deflations[1]

Change in growth of output per capita after price peak, in percentage points[2] Graph IV.9



[1] Cumulative change in real per capita output growth after a peak in the respective price index (ie consumer, property and equity prices); over the indicated horizon (in years). [2] The regression method isolates the marginal impact of each type of price decline on output performance; a filled circle indicates a statistically significant coefficient (at the 10% level); an empty circle indicates an insignificant coefficient.

Source: C Borio, M Erdem, A Filardo and B Hofmann "The cost of deflations: a historical perspective", *BIS Quarterly Review*, March 2015, pp 31–54.

1870, the link is evident only in the interwar years (Graph IV.9, third panel). Moreover, further analysis indicates that the really damaging interaction has not been between deflation and debt – so-called debt deflation – but between debt and declines in property prices.

This record also suggests that the costs of deflation may depend on its drivers. Deflation may indeed be a sign of sharp and persistent declines in demand, in which case it would coincide with economic weakness. But if deflation is driven by supply-side improvements, such as globalisation, greater competition or technological forces, output would tend to rise alongside real incomes, lifting living standards. And if deflation results from one-off price adjustments, such as a fall in commodity prices, it is also likely to be transitory.

This analysis indicates that the central bank's response to deflation risks needs to consider not only the sources of price pressures, but also the policy's effectiveness. Paradoxically, an aggressive response to avert a supply side-driven or temporary deflation could prove counterproductive in the longer run. It could be conducive to financial booms whose bust could seriously damage the economy as well as induce unwelcome disinflation down the road.

The more general concern about inflation deviating from target has to do with the loss of credibility and, ultimately, with mandates. Persistent deviations of inflation from the numerical objective may indeed undermine the central bank's credibility. If so, then the policy framework should explicitly provide for tolerance of such deviations when required to achieve longer-term objectives.

Much less clear, however, is whether allowing greater tolerance would require a reconsideration of mandates, which often are general enough and subject to varying interpretations. In particular, sustainable price stability, or macroeconomic stability more broadly, can be thought of as implicitly encapsulating financial stability, given the huge economic distortions and output losses associated with financial crises. But if revisiting mandates becomes necessary in some cases, it would need

Measuring potential output using information about the financial cycle

The concept of potential output refers to the level of output produced when available resources, including labour and capital, are fully and sustainably employed. Deviations of actual output from potential – the so-called output gap – gauge the degree of slack in the economy. Potential output, which cannot be observed directly, is typically estimated with econometric techniques.

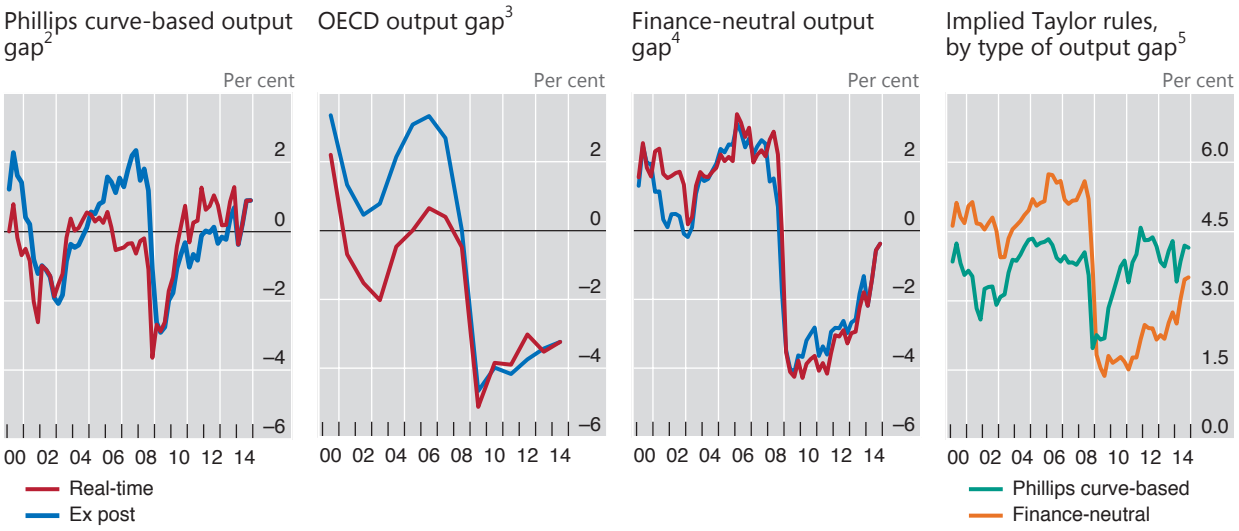
The econometric estimation techniques have traditionally relied heavily on inflation: all else equal, the level of output is seen as consistent with the full employment of labour when inflation does not have a tendency to rise or fall. Inflation is a key signal of sustainability. Even the potential output measures based on production functions, such as those calculated by the OECD or the IMF, partly rely on inflation to gauge imbalances in the labour market.

But the relationship between economic slack and inflation (the so-called Phillips curve) has weakened over recent decades (see Chapter III of the *84th Annual Report*), thereby compromising the usefulness of inflation as an indicator of potential output. Accordingly, estimates of the output gap that rely on the Phillips curve may prove to be unreliable.① That is, when the data are allowed to speak freely, the information content of inflation may indeed be quite low. In addition, traditional methods for estimating potential output are plagued by substantial uncertainty when used in real time, ie they are typically revised heavily as the future unfolds and more data become available. For example, in the mid-2000s, neither the Phillips curve approach nor the OECD's full production-function approach found that US output was at that time above potential; they reached that finding only later, when models were re-estimated with more data (Graph IV.C, first and second panels).

The pre-crisis experience suggests that measures of financial imbalances could be helpful in identifying potential output. After all, even though inflation remained generally subdued, credit and property prices grew at unusually strong rates, sowing the seeds of the subsequent crisis and recession. Indeed, BIS research has found that including information about the financial cycle can yield more reliable measures of economic overheating.② Such "finance-neutral" output gaps would, for instance, have indicated in real time that output was above potential in the

Real-time bias of output gap estimates has implications for policy benchmarks[1]

Graph IV.C



[1] For the United States; ex post estimates are based on all available data until December 2014; real-time estimates are computed by recursively estimating the models with the data available up to each point in time. [2] Obtained by augmenting a simple univariate statistical model (ie a Hodrick-Prescott filter) of the output gap with a Phillips curve. The results using a Hodrick-Prescott filter are nearly identical. For additional details, see model 1 in the publication cited in footnote ①. [3] Real-time estimate based on the June vintage in the subsequent year (eg June 2003 for 2002 estimate). [4] Based on the publication cited in footnote ②. [5] In nominal terms; for illustration purposes, the Taylor rules are computed as $\pi^* + r^* + \frac{1}{2}(y - y_p) + \frac{1}{2}(\pi - \pi^*)$, where $(y - y_p)$ is the real-time Phillips curve or the finance-neutral output gap, π is the observed inflation rate (personal consumption expenditures excluding food and energy), π^* is the inflation objective (set to 2%) and r^* is the equilibrium real interest rate consistent with output at potential and inflation at its desired level (set to 2%, roughly the historical average of the real federal funds rate).

Sources: Federal Reserve Bank of St Louis; OECD, *Economic Outlook*; BIS calculations.

mid-2000s in the United States, and such estimates would have been subject to smaller revisions as new data became available (Graph IV.C, third panel).

Reliable real-time estimates of the output gap would be useful to monetary policymakers, as economic slack plays a key role in policy setting. Consistent with its diagnosis of output being above potential, the finance-neutral output gap points to higher Taylor-implied policy rates during the run-up to the Great Financial Crisis (Graph IV.C, last panel).

① The point is further developed in C Borio, P Disyatat and M Juselius, "A parsimonious approach to incorporating economic information in measures of potential output", *BIS Working Papers*, no 442, February 2014. The analysis finds that, under various model specifications, the contribution of inflation to the output gap is low unless strong prior information is included. ② C Borio, P Disyatat and M Juselius, "Rethinking potential output: embedding information about the financial cycle", *BIS Working Papers*, no 404, February 2013.

to be done with great care, as the process could lead to political economy pressures with unwelcome results.

This suggests that the first priority should be (i) to use the existing room for manoeuvre as much as possible and (ii) to build a constituency for a more systematic incorporation along the lines described above. In time, further and more fundamental adjustments to monetary policy frameworks could be considered.

On balance, arguments against incorporating financial stability considerations more systematically into monetary policy are based on valid concerns but are not fully convincing. In particular, the arguments tend to overestimate how much is known about the inflation process and to underestimate how much has been learned about financial instability. They may also tend to put too much faith in the ability of monetary policy to influence, and even fine-tune, inflation relative to its ability to influence financial, and hence macroeconomic, stability over the medium term.

If the ultimate criterion for a successful monetary policy is to promote *sustainable* economic growth and, in the process, help avoid major macroeconomic damage, then a rebalancing of policy priorities towards greater attention to financial stability would seem justified. The rebalancing would also take monetary policy closer to its historical origin and function.[3] The challenges involved should not be underestimated. They raise tough questions. But relying exclusively on macroprudential tools to address financial instability may not be sufficiently prudent.

[3] See C Borio, "Monetary policy and financial stability: what role in prevention and recovery?", *BIS Working Papers*, no 440, January 2014.

V. The international monetary and financial system

The suitable design of international monetary and financial arrangements for the global economy is a long-standing issue in economics. Putting in place mechanisms that facilitate the achievement of sustained, non-inflationary and balanced growth has proved elusive. In the wake of the Great Financial Crisis, the issue has again gained prominence on the international policy agenda.

Just as in the past, however, there is little agreement on what the key shortcomings of the current international monetary and financial system (IMFS) are, let alone on what to do about them. A common diagnosis has been that the system is unable to prevent the build-up of unsustainable current account imbalances and that this, in turn, has induced a contractionary bias: surplus countries have no incentive to adjust, while deficit countries are forced to do so. Indeed, current account imbalances have been a focus of G20 cooperative efforts.

This chapter provides a different perspective, by arguing that the main shortcoming of existing arrangements is that they tend to compound the weaknesses of domestic monetary and financial frameworks ("regimes"). In particular, the IMFS tends to heighten the risk of financial imbalances – that is, unsustainable credit and asset price booms that overstretch balance sheets and can lead to financial crises and serious macroeconomic damage. These imbalances occur simultaneously across countries, deriving strength from global monetary ease and cross-border financing. Put differently, the system exhibits "excess financial elasticity": think of an elastic band that can be stretched out further but that, as a result, eventually snaps back all the more violently.[1]

The chapter is structured as follows. After outlining the key features of the IMFS, the first section explains and documents how the interaction of domestic monetary and financial regimes increases financial imbalances. It highlights several factors: (i) the role of monetary areas that for the key international currencies (notably the US dollar) extend well beyond national borders; (ii) the limited insulation properties of exchange rates, which induce policy responses designed to avoid large interest rate differentials vis-à-vis the main international currencies; and (iii) the powerful waves generated by freely mobile financial capital and global liquidity, which wash across currencies and borders, carrying financial conditions across the globe. The second section considers possible solutions. It highlights the need to adjust domestic policy frameworks and to strengthen international cooperation, going beyond the own-house-in-order doctrine.

The IMFS: main elements and weaknesses

Main elements

The IMFS comprises the arrangements governing transactions in goods, services and financial instruments among countries. Today, it consists of a set of domestically

[1] See C Borio, "The international monetary and financial system: its Achilles heel and what to do about it", *BIS Working Papers*, no 456, August 2014; and C Borio, H James and H S Shin, "The international monetary and financial system: a capital account historical perspective", *BIS Working Papers*, no 457, August 2014.

The international monetary and financial system, then and now Table V.1

	Bretton Woods	Current
Monetary anchor	External: ultimately gold	Internal: domestic mandates (eg price stability)
Exchange rates	Fixed but adjustable	Hybrid (floating at the centre)
Key currencies	De facto, US dollar	Dollar dominance (less exclusive)
Capital mobility	Restricted	Hybrid (unrestricted at broad centre)

oriented policies in a world of largely free capital flows. Domestic monetary regimes focus mainly on price stability, while currencies are allowed to float to varying degrees: free floating among the principal international currencies coexists with greater or lesser management of other currencies. Financial regimes generally allow funds to move freely across currencies and borders, although some countries still impose restrictions. The main restraint on financial transactions takes the form of prudential regulation and supervision, in part based on internationally agreed standards.

Current arrangements differ markedly from the previous system, Bretton Woods (1946–73). At the time, the US dollar's convertibility into gold served as an external monetary anchor, and currencies were tied together through fixed but adjustable exchange rates (Table V.1). Domestic monetary regimes in general gave less priority to price stability and more to external balance and demand growth. While the anchor ultimately did not prove that strong, the arrangements contrast with present ones, in which the aggregation of monetary policies pursued under domestic mandates acts as the only overall constraint. During the Bretton Woods era, the leading international currency was the dollar, which now shares this role to some extent with others, mainly the euro. And international capital mobility was quite limited, reflecting a myriad of restrictions on "repressed" domestic financial systems.

The performance of the two systems has differed markedly as well. Bretton Woods did not see major episodes of financial instability, but eventually proved unable to ensure lasting global monetary stability. It broke down once the United States formally abandoned gold convertibility and exchange rates were allowed to float. Current arrangements have succeeded in promoting price stability more than financial stability.

Arguably, this is no coincidence. The *84th Annual Report*, as further elaborated in other chapters of this Annual Report, explored why domestic monetary and financial regimes have so far been unable to ensure lasting financial stability. But their interaction through the IMFS has also played a role, by compounding rather than limiting the weaknesses of domestic regimes. Consider, in turn, the interaction of monetary and financial arrangements.

Interaction of domestic monetary regimes

The interaction of monetary regimes spreads easy monetary conditions from core economies to the rest of the world. The international use of reserve currencies does so directly, and the strategic conduct of monetary policy does so indirectly. Take each in turn.

The reliance on a single global currency has diminished slowly since Bretton Woods, but the US dollar continues to play a dominant role in international trade and finance, alongside the euro. As a means of exchange, the dollar is on one side

Selected indicators for the international use of key currencies

As a percentage of world total — Table V.2

	US dollar	Euro	Pound sterling	Yen	Renminbi	*Total (USD trn)*
Forex market turnover,[1] daily, April 2013	87.0	33.4	11.8	23.0	2.2	*5.3*
Foreign exchange reserves,[2] Q4 2014	62.9	22.2	3.8	4.0	1[3]	*11.6*
International bank deposits by non-banks,[4] Q4 2014	57.3	22.7	5.2	2.9	1.9[5]	*9.8*
Outstanding international debt securities,[4] Q4 2014	40.4	40.9	9.6	2.0	0.6	*21.9*
International trade invoicing/settlement, 2010–12	50.3	37.3	…	…	1.4	.

[1] The shares sum to 200% because each transaction involves two currencies. [2] Shares are based on allocated data from IMF COFER. [3] Rough BIS estimate based in part on People's Bank of China, *Report on renminbi internationalisation* (in Chinese), June 2015. [4] Broad measure, including intra-euro area outstandings. [5] Minimum share based on renminbi-denominated international bank deposits reported by a subset of BIS reporting countries.

Sources: H Ito and M Chinn, "The rise of the 'redback' and the People's Republic of China's capital account liberalization: an empirical analysis of the determinants of invoicing currencies", *ADBI Working Paper*, no 473, April 2014; IMF; BIS international banking statistics and international debt securities statistics; BIS calculations.

of no less than 87% of foreign exchange market transactions (Table V.2), with an even higher share of forward and swap transactions. Its dominance in foreign exchange markets makes the dollar the sole intervention currency outside Europe and Japan, which supports its high share in foreign exchange reserves. More than half of world trade is invoiced and settled in dollars, pointing to the greenback's pre-eminent role as a unit of account.

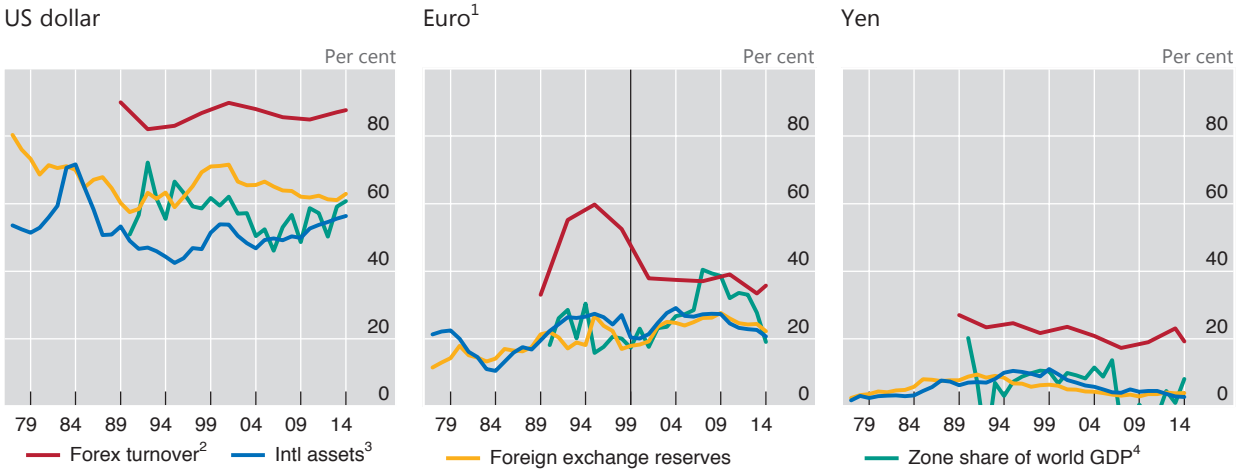
Remarkably, the advent of the euro and the dollar's trend depreciation since the 1970s have not materially challenged the dollar's role as a store of value (Graph V.1, left-hand panel). At 63%, it maintains almost three times the share of the euro in foreign exchange reserves. Its share in both official reserves and private portfolios is sustained by the scale of what can be termed the "dollar zone" of economies whose currencies move more closely with the dollar than with the euro (Box V.A). At half or more of world GDP, the dollar zone is far larger than the US economy, which is less than a quarter.

Monetary policy settings for key international currencies influence financial conditions outside these currencies' home jurisdictions directly through their impact on interest rates and the valuation of assets or liabilities denominated in these currencies but held or owed by non-residents. In particular, dollar and euro credit to non-bank borrowers outside the United States and euro area stood at $9.5 trillion and €2.3 trillion ($2.7 trillion), respectively, at end-2014. The dollar debt represents a seventh of global GDP outside the United States (Box V.B).

The large stocks of dollar- and euro-denominated credit extended to borrowers outside the United States and the euro area, respectively, mean that Federal Reserve and ECB policies are transmitted directly to other economies. The impact depends on the characteristics of the instrument in question, notably its maturity and the flexibility of the corresponding interest rate. For instance, in the case of bank loans priced off of dollar Libor or Euribor, changes in short-term policy rates pass through within weeks. Over half of dollar and euro credit to borrowers outside the United States and euro area remains in the form of bank loans.

The international roles of currencies: US dollar remains dominant

Graph V.1



[1] Before 1999, "euro" aggregates available predecessor currencies. [2] The shares sum to 200% because each transaction involves two currencies. 2014 is estimated based on CLS trading data for April. [3] Includes bank deposits of non-banks and debt securities. Bank deposits are proxied by all bank liabilities before 1995. For the euro area, bank deposits exclude deposits vis-à-vis euro area banks. Debt securities are based on BIS international debt securities statistics before 1999 and the ECB's narrow measure of euro bonds since 1999, which excludes euro area residents' euro issues. [4] Estimated as each economy's share of PPP GDP, plus the elasticity-weighted share of all other economies' PPP GDPs; see Box V.A.

Sources: ECB; IMF; CLS; Datastream; national data; BIS international debt securities statistics; BIS calculations.

The pass-through is slower for bonds, given their generally fixed rates and longer maturity, but then quantities can respond too. In particular, some stocks of dollar bonds have changed quite markedly in response to unconventional monetary policy (Chapter IV). Low yields reflecting the Federal Reserve's large-scale purchases of Treasury and agency bonds, among other factors, led US and global investors to seek yield in lower-quality bonds. The impact was especially pronounced for non-US borrowers, who between 2009 and 2014 ramped up their dollar bond issuance by $1.8 trillion (Graph V.2, left-hand panel). Investor demand for such bonds proved highly responsive to the compression of the term premium, as measured by the spread between Treasury bond yields and expected bill yields: the lower the premium, the faster the growth of dollar bonds issued by non-US borrowers (hence the negative relationship after the first quarter of 2009 seen in the right-hand panel of Graph V.2).

By the same token, the recent ECB large-scale bond purchases and compression of term premia on euro-denominated bonds raise the question of whether borrowers outside the euro area will take advantage of the funding opportunity. In fact, by the end of 2014 the stock of euro bonds issued by such borrowers was already growing as fast as its dollar counterpart.

Post-crisis, offshore dollar credit has grown fastest in those jurisdictions where it has been cheapest relative to local funding, especially emerging market economies (EMEs).[2] Authorities around the world use capital controls or macroprudential policy to raise the cost of dollar borrowing at home, but their policy reach does not extend to activities of multinational firms, which can borrow dollars (or euros) offshore to sidestep tight domestic funding conditions. This is one reason for the rapid growth in various quantitative measures of "global liquidity", which denotes the ease of financing in global financial markets (Box V.B).

[2] See R McCauley, P McGuire and V Sushko, "Global dollar credit: links to US monetary policy and leverage", *Economic Policy*, vol 30, issue 82, April 2015, pp 189–229.

Box V.A

Mapping the dollar and euro zones

This box uses simple regression methods to place currencies in three zones of influence corresponding to the main international currencies based on the currencies' degree of co-movement. The three reference currencies are the dollar, the euro (before 1999, the Deutsche mark) and the yen, consistent with their status as the three most transacted currencies in the world in the BIS Triennial Central Bank Survey. Thus defined, the dollar zone accounts for nearly 60% of world GDP, far more than the US share in world GDP, which is between 20 and 25%.

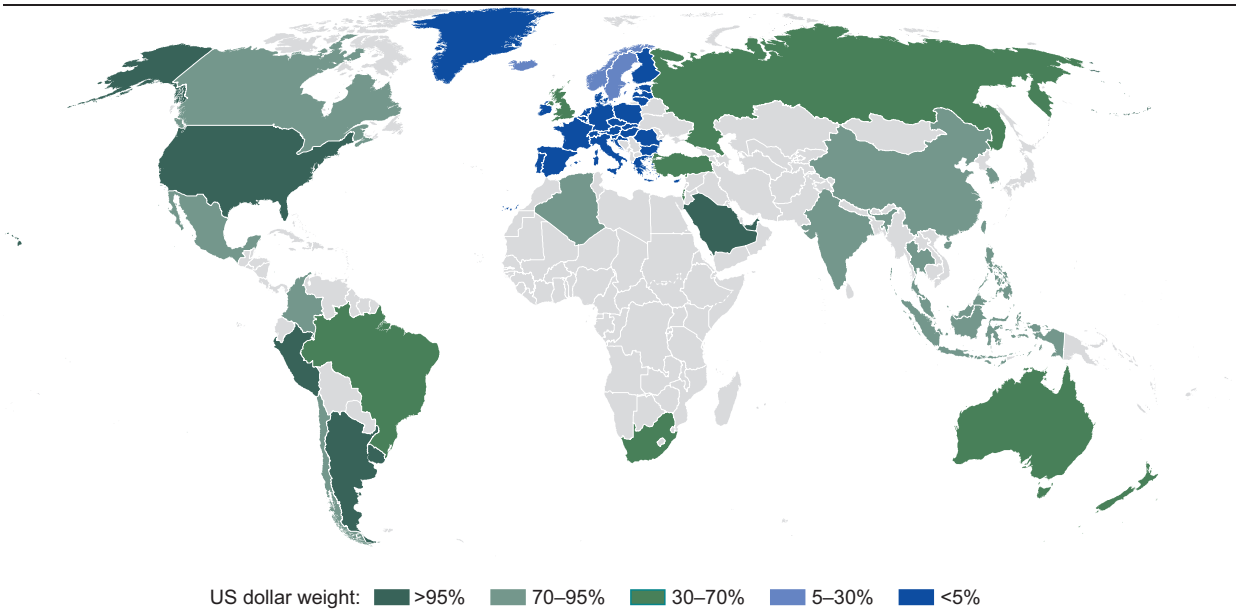
The dollar share is calculated in two steps. First, each currency is placed in or between zones. Each currency's weekly percentage change against the dollar is regressed on the weekly percentage change of the euro/dollar and yen/dollar rates. The dollar zone weight is calculated as 1 minus the corresponding regression coefficients. For example, the Hong Kong dollar is pegged to the US dollar, so the coefficients are zero and the dollar zone weight is 1. For the intermediate case of sterling, in 2013 the pound's estimated coefficient is 0.60 on the euro/dollar rate and 0.09 on the yen/dollar, making the currency's dollar weight 1 – 0.60 – 0.09, or 0.31. The results in Graph V.A show the dollar to be more global, the euro to be more regional and the yen to lack much external influence. The dollar weights can thus be read in reverse as euro weights, eg with the dark blue area representing over 95% euro weight.

Second, the dollar share is calculated across currencies using (PPP) GDP weights. The dollar zone weight for each of the 40 economies (50 before the euro) is multiplied by the respective GDP, and the product is added to the US GDP. This sum is then expressed as a share of the total GDP of the 43 major economies analysed, including those of the United States, the euro area and Japan. Graph V.1 plots these aggregate zone shares of global GDP.

There is strong cross-sectional evidence that a currency's co-movement with the dollar shapes the currency composition of its external portfolio, both official and private. For the two dozen economies that disclose the currency composition of official reserves, the dollar zone weight accounts for about two thirds of the variation in the dollar share across countries.① And in larger samples, the dollar zone weight is also strongly linked with the dollar share of cross-border bank deposits or loans and international bonds. The underlying motivation is the same for the official and private sectors: matching the portfolio weights to the co-movements of the domestic currency with major currencies serves to minimise the volatility of portfolio returns when measured in domestic currency.

Dollar zone in green larger than euro zone in blue

Graph V.A



Source: BIS calculation based on average elasticities of the national currency's dollar exchange rate with respect to euro/dollar and yen/dollar rates for 2011–14, inclusive.

① See R McCauley and T Chan, "Currency movements drive reserve composition", *BIS Quarterly Review*, December 2014, pp 23–36.

Monetary regimes also interact indirectly, through central bank responses to each other's policies. Central banks seem to set their policy rates with an eye on those of the Federal Reserve or ECB. This behaviour is sometimes explicitly noted, as in the cases of the Central Bank of Norway and the Swiss National Bank with reference to ECB policy, but appears to be widespread.

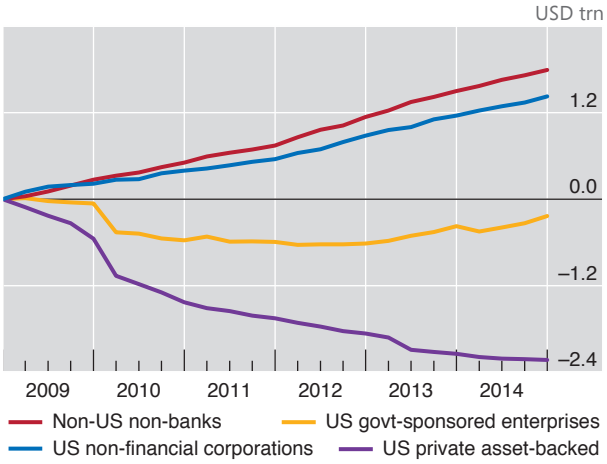
One reason is to limit exchange rate movements. Exchange rate flexibility has often been described as insulating the domestic economy from external developments, but this insulation is often overstated. In particular, appreciation can lead lenders to consider firms with debts denominated in foreign currency as better capitalised and therefore more creditworthy, reducing perceived risks associated with lending and increasing the availability of credit.[3] Through this and other mechanisms, such as carry trades and momentum trading, currencies can overshoot, shrinking the traded goods sector and leaving the economy vulnerable to a turn in the ease of global financing. Then, depreciation can lead to financial distress among firms with foreign currency debt. During the dollar's downswing from 2002 to 2011 (with an interruption in late 2008), many central banks resisted unwelcome appreciation against the dollar, in setting their own policy rates and by intervening in the currency market.

Indeed, many countries – not only EMEs but also advanced economies – appear to have kept interest rates below those that traditional domestic benchmarks would indicate, partly in response to low rates in core currencies. In the 1990s, policy rates were broadly in line with the Taylor rule, a simple interest rate rule prescribing a mechanical reaction to the output gap and the deviation of inflation from target. In

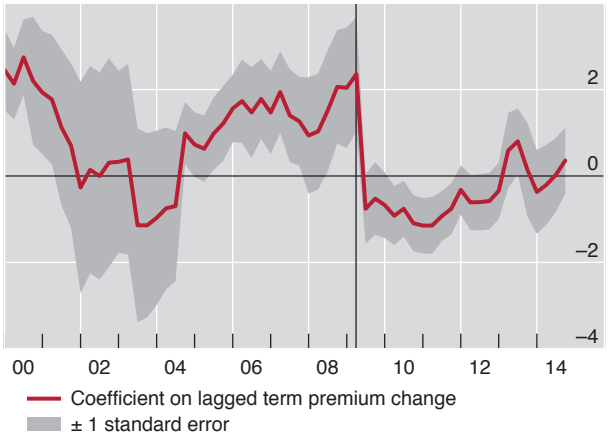
Federal Reserve spurs dollar bond issuance by non-US borrowers

Graph V.2

Change in bonds outstanding: US and non-US issuers



Offshore dollar issuance response to US term premium[1]



[1] Response of the quarterly growth in the stock of US dollar bonds issued outside the United States to the (lagged) change in the real term premium, estimated from 16-quarter rolling regressions that also include the lagged VIX to control for overall financial market conditions; see R McCauley, P McGuire and V Sushko, "Global dollar credit: links to US monetary policy and leverage", *Economic Policy*, vol 30, issue 82, April 2015, pp 189–229. The vertical line indicates end-Q1 2009. The 10-year real term premium is estimated using a joint macroeconomic and term structure model; see P Hördahl and O Tristani, "Inflation risk premia in the euro area and the United States", *International Journal of Central Banking*, September 2014, pp 1–47.

Sources: Federal Reserve; Bloomberg; BIS international debt securities statistics; BIS calculations.

[3] See V Bruno and H S Shin, "Cross-border banking and global liquidity", *Review of Economic Studies*, vol 82, issue 2, April 2015, pp 535–64.

Box V.B

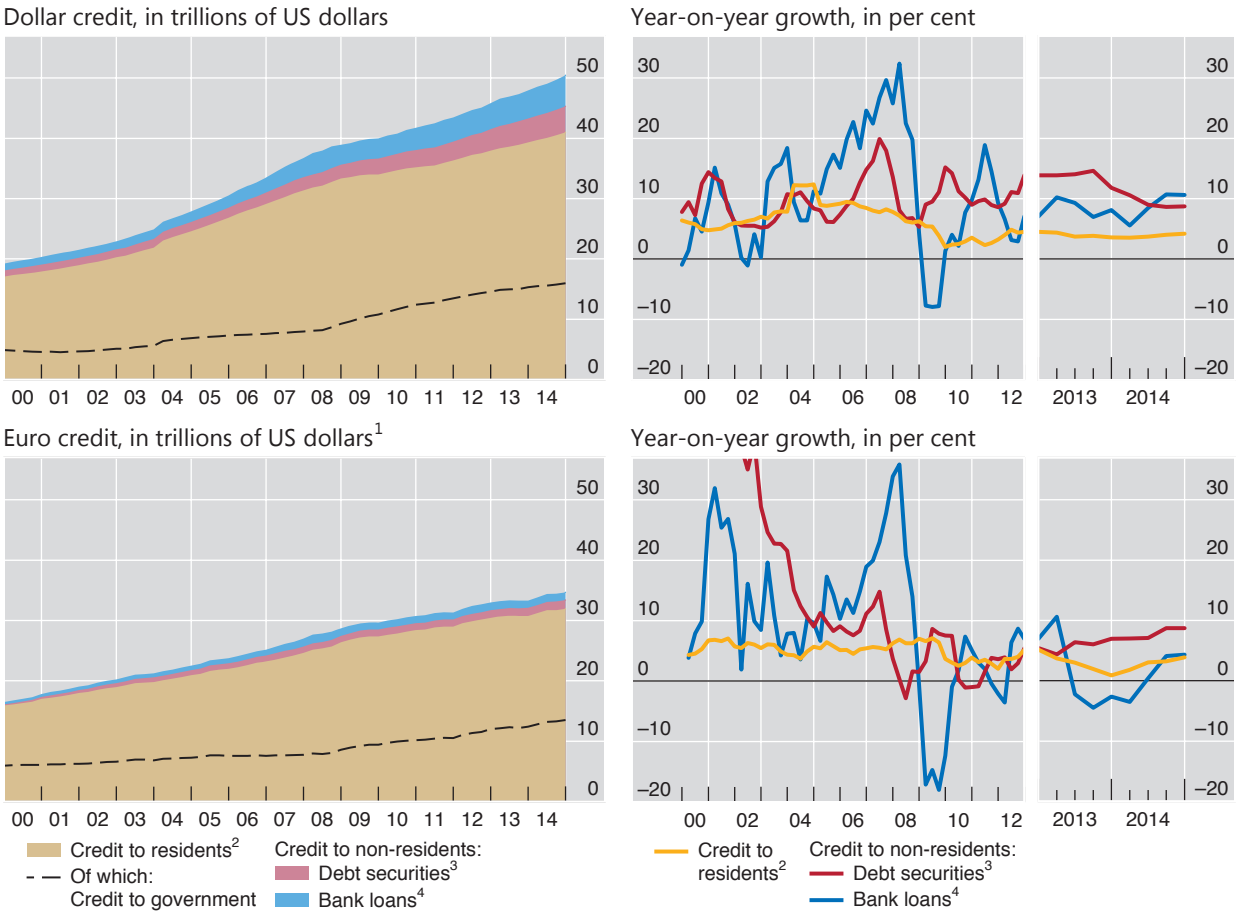
Global liquidity as global credit aggregates

Over the past several years, the BIS has developed indicators to track global liquidity conditions. The term global liquidity is used to mean the ease of financing in global financial markets. Total credit outstanding is one of its main footprints, as it shows the extent to which bond markets and banks have led to the build-up of exposures.① In covering US dollar and euro credit, this box focuses on the two largest components of global credit through which the monetary policies of the respective currency areas directly influence financial conditions in the rest of the world.

Global credit can be extended through bank loans or bonds, and each has a domestic and an international component. Graph V.B shows dollar- and euro-denominated debt, broken down by the location of the borrower. Some 80% of global non-financial dollar debt at end-2014 was incurred by US residents (top left-hand panel). Their liabilities include US public debt, US household debt and US corporate debt. But $9.5 trillion (19%) of dollar credit was extended to non-bank borrowers located *outside* the United States, and these entities are as exposed to the

Global credit in US dollars and euros extended to the non-bank sector

Graph V.B



[1] At constant end-Q4 2014 exchange rates. [2] Credit to the non-financial sector in the United States/euro area, excluding identified credit to borrowers in non-domestic currencies (ie cross-border and locally extended loans and outstanding international bonds in non-domestic currencies). [3] Outstanding debt securities issued outside the United States/euro area by non-bank issuers. [4] Cross-border and locally extended loans to non-banks outside the United States/euro area. For China, locally extended loans are derived from national data on total local lending in foreign currencies on the assumption that 80% are denominated in US dollars. For other non-BIS reporting countries, local US dollar/euro loans to non-banks are proxied by all BIS reporting banks' gross cross-border US dollar/euro loans to banks in the country, on the assumption that these funds are then extended to non-banks. See R McCauley, P McGuire and V Sushko, "Global dollar credit: links to US monetary policy and leverage", *Economic Policy*, vol 30, issue 82, April 2015, pp 189–229.

Sources: National financial accounts; Datastream; BIS international debt securities statistics and locational banking statistics.

US monetary policy stance as US residents are. At 13% of non-US GDP, the stock of offshore dollar credit exceeds its euro counterpart worth $2.7 trillion (bottom left-hand panel). Compared with borrowing in US dollars, a larger share of overall borrowing in euros takes place from inside the same currency area (92%).

The international credit component tends to be more procyclical and volatile. International bank lending in both dollars and euros outpaced domestic credit in the boom that preceded the Great Financial Crisis, and contracted once the crisis broke out (Graph V.B, right-hand panels). Bond markets partly substituted for impaired bank lending in the immediate aftermath of the crisis, and increased demand for funding went hand in hand with higher yield spreads. Since 2010, the search for yield has enabled a surge in issuance at compressed spreads that has helped to push the share of bonds in international credit to 46%. In this second phase of global liquidity, bond markets and the asset management industry have taken centre stage in shaping global liquidity conditions.

① See BIS, "Highlights of global financing flows", *BIS Quarterly Review*, March 2015, pp 13–29; and www.bis.org/statistics/gli.htm.

the early 2000s, however, actual policy rates drifted persistently below the levels implied by the Taylor rule, suggesting that monetary policy became systematically accommodative (Graph V.3). Many advanced economies apparently hesitated to raise interest rates during the boom, and have maintained them near zero since the crisis. For their part, EME authorities appear to have set policy rates low out of concern over capital flows and appreciation (Graph V.3, right-hand panel). The empirical significance of US interest rates in influencing policy rates elsewhere provides additional evidence for follow-the-leader behaviour (Box V.C). While this simple exercise has important limitations, it points to competitive easing as a way of sustaining external demand. More than 20 central banks have eased monetary policy since December 2014, some explicitly responding to external conditions (Chapter IV).

Resistance to appreciation has also taken the form of currency intervention, which itself feeds back into global monetary ease. Many central banks have intervened directly in the foreign exchange market, typically buying dollars, and then investing the proceeds in bonds issued by the major governments. Unlike major central banks' large-scale domestic bond purchases, reserve managers have not sought to lower yields in the bond markets in which they invest. Nevertheless, the secular reserve accumulation and balance sheet policies of major central banks have combined to push estimated official bond holdings to more than $12 trillion out of the $31 trillion in US, euro area, Japanese and UK government bonds (Graph II.9, left-hand panel). Such holdings account for over half of the outstanding stock of US Treasury securities and more than 40% of the combined stock of Treasury and agency securities (Graph II.9, right-hand panel).

As a result, monetary policies of advanced and emerging market economies have reinforced each other. Easy monetary conditions at the centre have led to easy monetary and financial conditions in the rest of the world: there, firms and governments have boosted dollar and euro borrowing and authorities have resisted unwelcome currency appreciation. In turn, their foreign exchange intervention has raised official investment in major bond markets, further compressing bond yields there. With central banks and reserve managers bidding for duration shoulder to shoulder with pension funds and life insurers, bond yields have declined to record lows and the term premium has turned negative (Chapter II).

Interaction of financial regimes

Financial market integration has allowed common global factors to drive capital flows and asset prices. The common factors have partly shifted between the two phases of global liquidity, pre- and post-crisis.

Box V.C

International monetary spillovers

Over recent years, interest rates in EMEs and advanced economies moved closely together with interest rates in large advanced economies, particularly the United States. This close correlation could reflect the response to common macroeconomic developments affecting all countries. But it could also reflect global interest rate spillovers from large advanced economies. Interest rate spillovers can result from explicit exchange rate policies or attempts to contain exchange rate and capital flow pressures resulting from yield differentials vis-à-vis key currencies, and from global investor arbitrage tying capital market rates together.

To shed light on this question, a panel of 30 emerging market and advanced economies over the period 2000–14 is investigated in a regression analysis.① The analysis shows a strong relationship between changes in interest rates prevailing in these economies and changes in US interest rates, even after controlling for domestic macroeconomic conditions and the global business and financial cycle. For short-term interest rates, a 100 basis point change in US rates is associated with an average 34 basis point change in emerging market and small advanced economies (Table V.C, first column). For long-term interest rates, the effect is stronger: a 100 basis point change in the US bond yield is associated with an average 59 basis point change in the yields of these economies (second column). Besides US interest rates, the degree of global investor risk aversion, as measured by the VIX, also consistently emerges as an important driver of these interest rates.

Interest rate spillovers[1]

Table V.C

	Dependent variable			
Explanatory variable	Change in 3-month rate[2]	Change in 10-year bond yield[2]	Policy rate deviation[3]	Policy rate level[4]
US rate	0.34***	0.59***	0.43***	0.70***
VIX	0.51***	0.21**	1.99***	1.54***
F-stat US output and inflation[5]	0.24	2.35*	20.80***	6.80***
F-stat domestic output and inflation[5]	17.18***	2.09	.	12.60***
R^2	0.25	0.26	0.45	0.82

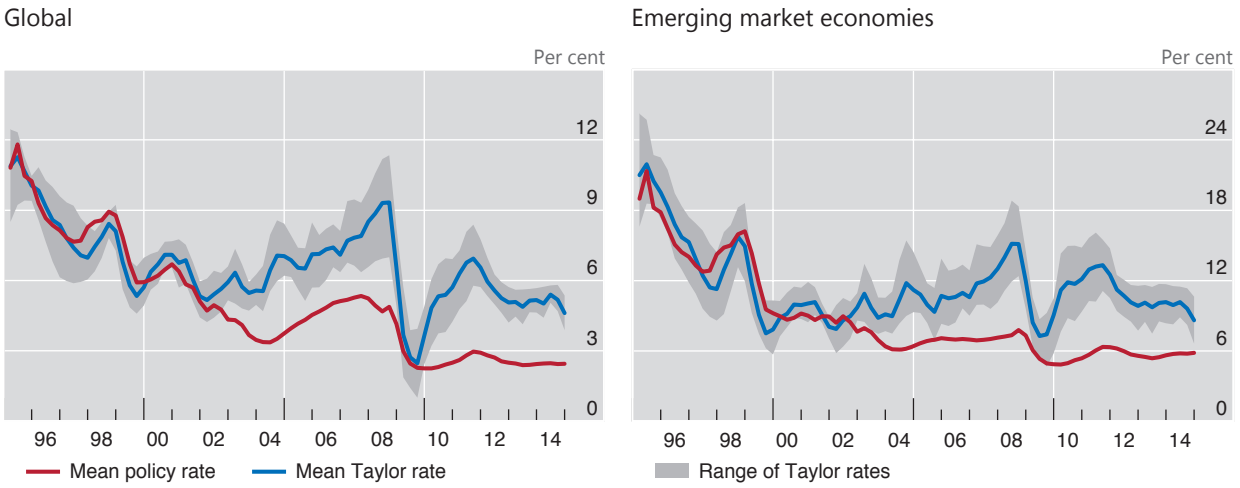
[1] Results from unbalanced fixed effects panel regressions for 30 emerging market and advanced economies (Australia, Brazil, Canada, Chile, China, Chinese Taipei, Colombia, the Czech Republic, Denmark, Hong Kong SAR, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, New Zealand, Norway, Peru, the Philippines, Poland, Russia, Singapore, South Africa, Sweden, Switzerland, Thailand, Turkey and the United Kingdom) for the sample period Q1 2000–Q4 2014. ***/**/* denotes results significant at the 1/5/10% level based on cluster-robust standard errors. [2] Panel estimation of $\Delta r_t^i = \beta_0 + \alpha_0^i + \beta_1 \Delta r_t^{us} + \beta_2 X_t^i + \varepsilon_t^i$ where Δr_t^i indicates the quarter-on-quarter change in economy i's three-month money market rate and 10-year bond yield and Δr_t^{us} is the change in the corresponding US rate; X includes the change in US real GDP growth and inflation, the log change in the VIX and the change in domestic real GDP growth and inflation. [3] Panel estimation of $i_t^i - Taylor_t^i = \beta_0 + \alpha_0^i + \beta_1 i_t^{us} + \beta_2 X_t^i + \varepsilon_t^i$, where i_t^i is the policy rate, $Taylor_t^i$ is the policy rate implied by a normative Taylor rule (calculated following B Hofmann and B Bogdanova, "Taylor rules and monetary policy: a global 'Great Deviation'?", *BIS Quarterly Review*, September 2012, pp 37–49), i_t^{us} is the federal funds rate and X includes US real GDP growth, US inflation and the (log) VIX. [4] Panel estimation of $i_t^i = \beta_0 + \alpha_0^i + \beta_1 i_t^{us} + \beta_2 X_t^i + \varepsilon_t^i$ where X includes US real GDP growth, US inflation and the (log) VIX as well as domestic inflation and the domestic output gap (calculated using a standard Hodrick-Prescott filter). [5] F-test of the null hypothesis that coefficients of the variables equal zero.

Furthermore, the persistently low global policy rates relative to Taylor rule-implied levels since the early 2000s (Graph V.3) reflect, at least in part, the effect of low policy rates prevailing in the United States over this period. Specifically, a 100 basis point cut in the US federal funds rate is found to lower EME and other advanced economy policy rates by 43 basis points relative to the levels implied by a standard normative Taylor rule (Table V.C, third column). When estimating a descriptive Taylor rule, the estimated impact of the US policy rate is even higher: some 70 basis points (fourth column). In sum, the results suggest an economically significant causal relationship from US interest rates to interest rates in emerging market and other advanced economies.

① See B Hofmann and E Takáts, "International monetary spillovers", *BIS Quarterly Review*, forthcoming.

Policy rates have been low compared with Taylor rates[1]

Graph V.3



The Taylor rates are calculated as $i = r^*+\pi^* + 1.5(\pi-\pi^*) + 0.5y$, where π is a measure of inflation, y is a measure of the output gap, π^* is the inflation target and r^* is the long-run real interest rate, here proxied by real trend output growth. The graph shows the mean and the range of the Taylor rates of different inflation/output gap combinations, obtained by combining four measures of inflation (headline, core, GDP deflator and consensus headline forecasts) with four measures of the output gap (obtained using Hodrick-Prescott (HP) filter, segmented linear trend and unobserved components techniques, and IMF estimates). π^* is set equal to the official inflation target/objective, and otherwise to the sample average or trend inflation estimated through a standard HP filter. See B Hofmann and B Bogdanova, "Taylor rules and monetary policy: a global 'Great Deviation'?", *BIS Quarterly Review*, September 2012, pp 37–49.

[1] Weighted averages based on 2005 PPP weights. "Global" comprises all economies listed here. Advanced economies: Australia, Canada, Denmark, the euro area, Japan, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the United States. EMEs: Argentina, Brazil, Chile, China, Chinese Taipei, Colombia, the Czech Republic, Hong Kong SAR, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Singapore, South Africa and Thailand.

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; Bloomberg; CEIC; Consensus Economics; Datastream; national data; BIS calculations.

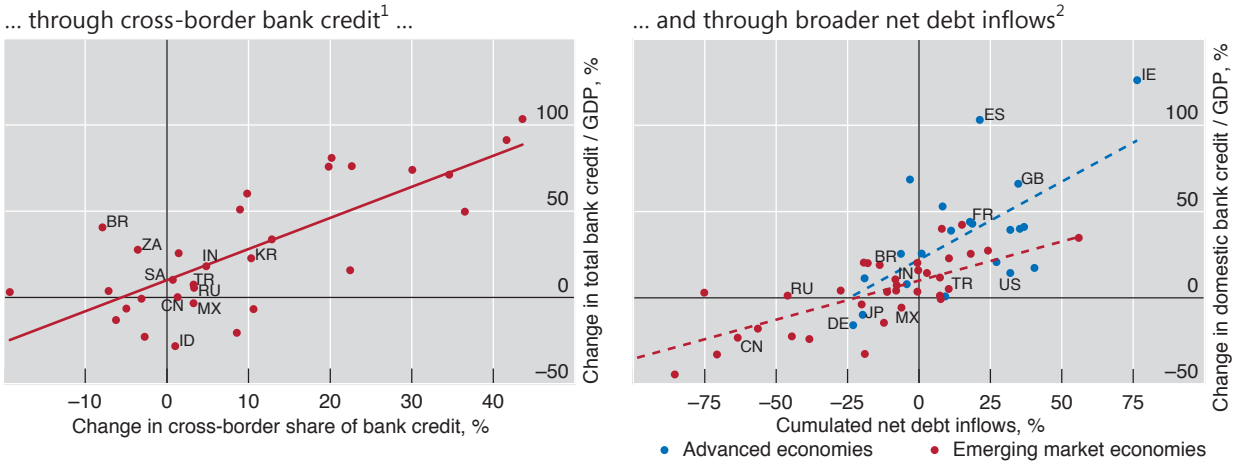
The bank flows that dominated in the first, pre-crisis, phase of global liquidity drew on easy leverage, predictable policy rates and low volatility, as proxied by the VIX.[4] These flows enabled domestic credit booms, freeing them from the constraint of the domestic funding base. In a sample of 31 EMEs between early 2002 and 2008, a rise in the share of cross-border bank funding, extended both directly to domestic non-banks and indirectly through banks, helped boost the ratio of bank credit to GDP (Graph V.4, left-hand panel). Banks found non-core liabilities abroad to fund booming credit at home.[5]

Analysis of a broader sample of 62 countries and a more inclusive measure of international capital flows points to a similar dynamic. Here, the larger the net debt inflows, including both portfolio and bank flows, the larger the increase in an economy's ratio of bank credit to GDP (Graph V.4, right-hand panel). The inclusion of Ireland, Spain and the United Kingdom shows that a domestic credit boom's reliance on external financing is not a symptom of financial underdevelopment. In

[4] See H Rey, "Dilemma not trilemma: the global financial cycle and monetary policy independence", in *Global dimensions of unconventional monetary policy*, proceedings of the Federal Reserve Bank of Kansas City Jackson Hole symposium, August 2013, pp 285–333.

[5] See J-H Hahm, H S Shin and K Shin, "Noncore bank liabilities and financial vulnerability", *Journal of Money, Credit and Banking*, vol 45, issue s1, April 2013, pp 3–36.

Capital flows contributed to domestic credit growth during the boom … Graph V.4



BR = Brazil; CN = China; DE = Germany; ES = Spain; FR = France; GB= United Kingdom; ID = Indonesia; IE = Ireland; IN = India; JP = Japan; KR = Korea; MX = Mexico; RU = Russia; SA= Saudi Arabia; TR = Turkey; US= United States; ZA = South Africa.

[1] Q1 2002–Q2 2008. "Total bank credit" adds to domestic credit (IFS line 32) the stock of cross-border bank credit to non-banks in the country (using the BIS locational banking statistics). "Cross-border share of bank credit" is the share of total bank credit to non-banks received cross-border through direct lending to non-banks and through net lending to banks in the country (if positive). Based on S Avdjiev, R McCauley and P McGuire, "Rapid credit growth and international credit: challenges for Asia", *BIS Working Papers*, no 377, April 2012. [2] Domestic credit from IFS line 32, end-2002 to end-2008. The x-axis shows balance of payments net debt inflows as a share of GDP, cumulated over 2003–08. Net debt flows are calculated by aggregating changes in net portfolio debt assets, net other investment and reserve assets, all expressed as inflows. Extends P Lane and P McQuade, "Domestic credit growth and international capital flows", *Scandinavian Journal of Economics*, vol 116(1), January 2014, pp 218–52.

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; BIS international banking statistics; BIS calculations.

fact, in the subsample of 23 advanced economies the reliance on capital inflows is greater than among EMEs, as the steeper fitted line suggests.

In the second, post-crisis, phase of global liquidity, the term premium on sovereign bonds has become a more important driver of funding conditions. Although cross-border bank credit has continued to expand strongly in EMEs, it has contracted sharply among advanced economies, while bond financing has surged across the board. Even as bond flows have gained prominence, the term premium has emerged as the salient global price of risk in integrated financial markets.

Studies of the spillovers across global bond markets around official large-scale bond purchase announcements have highlighted the strong co-movement of bond yields. If investors treat bonds denominated in different currencies as close substitutes, purchases in one market also depress yields elsewhere. Table V.3 illustrates this point, summarising several studies that estimate the basis point moves in various advanced bond markets that correspond to a 100 basis point move in the US Treasury market. In addition, local currency EME bonds have also co-moved much more closely with Treasuries than a decade ago.[6]

Heretofore, the relationship across even major bond markets appeared asymmetric, with US bond yields driving those elsewhere, but in the past year this

[6] Compare R McCauley and G Jiang, "Diversifying with Asian local currency bonds", *BIS Quarterly Review*, September 2004, pp 51–66 and the following: K Miyajima, M Mohanty and J Yetman, "Spillovers of US unconventional monetary policy to Asia: the role of long-term interest rates", *BIS Working Papers*, no 478, December 2014; Q Chen, A Filardo, D He and F Zhu, "Financial crisis, US unconventional monetary policy and international spillovers", *BIS Working Papers*, no 494, March 2015; and Box V.C.

Estimates of spillovers of US bond yields to mature bond markets

Basis points per 100 basis points on the US Treasury bond — Table V.3

Bond market	Gerlach-Kristen et al (2012): Japanese intervention, 2003–04		Neely (2015): LSAP1 events	Bauer and Neely (2014): LSAP1 events	Rogers et al (2014): intraday data	Obstfeld (2015): long-term levels, monthly data 1989–2014
	Government	Swap				
AU	…	…	67	37	…	74
CA	…	…	53	54	…	129
CH	53	45	…	…	…	88
DE	46	41	41	44	36	115
ES	50	41	…	…	…	111
FR	46	41	…	…	…	118
GB	59	45	46	…	48	137
IT	46	41	…	…	16	158
JP	44	54	19	12	20	69

AU = Australia; CA = Canada; CH = Switzerland; DE = Germany; ES = Spain; FR = France; GB = United Kingdom; IT = Italy; JP = Japan.

LSAP1 = first Federal Reserve large-scale asset (ie bond) purchase programme.

Sources: P Gerlach-Kristen, R McCauley and K Ueda, "Currency intervention and the global portfolio balance effect: Japanese lessons", *BIS Working Papers*, no 389, October 2012; C Neely, "The large-scale asset purchases had large international effects", *Journal of Banking and Finance*, vol 52, 2015, pp 101–11; M Bauer and C Neely, "International channels of the Fed's unconventional monetary policy", *Journal of International Money and Finance*, vol 44, June 2014, pp 24–46; J Rogers, C Scotti and J Wright, "Evaluating asset-market effects of unconventional monetary policy: a cross-country comparison", *Economic Policy*, vol 29, issue 80, October 2014, pp 749–99; M Obstfeld, "Trilemmas and trade-offs: living with financial globalisation", *BIS Working Papers*, no 480, January 2015; BIS calculations.

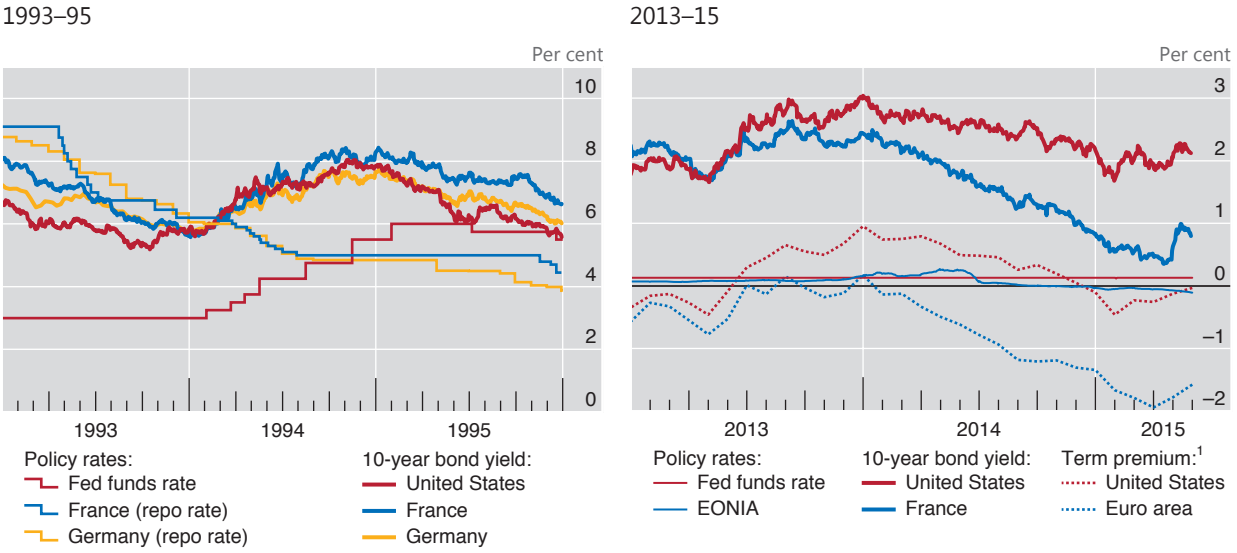
seems to have changed. In particular, there are signs that the euro area bond market has been moving its US counterpart. Anticipation of ECB large-scale bond purchases put downward pressure on French and German bond yields and, through co-movement of term premia, on US bond yields as well, despite the expected divergence in policy rates (Graph V.5, right-hand panel). This contrasts with the experience in early 1994, which epitomises previous patterns. At the time, the Federal Reserve was raising the policy rate while the Bank of France and the Deutsche Bundesbank were reducing theirs, but the backup in US bond yields was transmitted to Europe (Graph V.5, left-hand panel).[7]

Current concerns

To summarise, the workings of the IMFS post-crisis have spread easy monetary and financial conditions from the reserve currency areas to the rest of the world, just as they did pre-crisis. Global financial conditions have consequently loosened to an extent that may not prove consistent with lasting financial and macroeconomic stability. Credit booms in EMEs and some advanced economies less affected by the crisis have built up tell-tale financial imbalances. In the short run, the IMFS has tilted conditions towards expansion. But in the longer run, financial busts, were they to materialise, would tilt them towards contraction.

[7] See C Borio and R McCauley, "The economics of recent bond yield volatility", *BIS Economic Papers*, no 45, July 1996.

Transatlantic waves: from policy rates to bond yields — Graph V.5



[1] Decomposition of the 10-year nominal yield according to an estimated joint macroeconomic and term structure model; see P Hördahl and O Tristani, "Inflation risk premia in the euro area and the United States", *International Journal of Central Banking*, September 2014, pp 1–47. Yields are expressed in zero coupon terms; for the euro area, French government bond data are used.

Sources: Bloomberg; national data; BIS calculations.

Monetary policy divergence across key currencies and renewed dollar appreciation pose risks. Ease in the euro area might prolong global ease, if firms and governments around the world can substitute euro funding for dollar funding. However, the large stock of dollar debt outstanding means that a tightening of dollar credit is likely to prove consequential. Thus, renewed dollar strength could expose vulnerabilities (Chapter III), especially in those firms that have collectively borrowed trillions of dollars. Admittedly, it is well known that the US economy has a short position in the dollar that funds a long position in other currencies. And by the same token, the rest of the world must hold more dollar assets than dollar liabilities and thus enjoy valuation gains in aggregate when the dollar appreciates. But even in a country with a long dollar position, the distribution of currency positions across sectors matters greatly for the outcome. For example, in many EMEs the official sector has a long dollar position whereas the corporate sector carries a short one (Box V.D). Absent transfers from the (gaining) official sector to the (losing) corporate sector, the economy may well be hurt by dollar strength.

Dollar strength, monetary policy divergence and heavy official holdings in the global bond market could lead to volatility. Were EMEs to draw down reserves substantially, their selling bonds in the key currencies could create unprecedented cross-currents in global bond markets. ECB and Bank of Japan bond purchases, EME selling and, eventually, the Federal Reserve's not rolling over maturing bonds could confront the remaining private investors with a difficult and shifting problem of bond pricing.

Limits and prospects in international policy coordination

Policies to address the issues raised in this chapter require more than each country managing its inflation and business cycle. A broader notion of keeping one's house

Box V.D

Valuation effects of dollar appreciation

This box uses the example of Korea to illustrate that dollar appreciation can deliver wealth gains to non-US residents as a whole, while still representing a tightening of financial conditions for non-US firms that have funded themselves in the dollar. The Korean official sector can gain from dollar appreciation but need not adjust its spending, while the Korean corporate sector can lose net worth and face tighter credit.

It is by now well known that dollar appreciation boosts US net international liabilities.① This is because US residents have dollar-denominated liabilities to the rest of the world that exceed their corresponding assets to the tune of 39% of GDP. With the appreciation of the dollar in 2014, the US net international investment position declined from –$5.4 trillion to –$6.9 trillion, as US assets stopped growing in dollar terms despite rising local currency valuations. This $1.5 trillion difference was more than three times the current account of $410 billion. Accordingly, the rest of the world's wealth increased.

Typical of the rest of the world, Korea's net international investment position as a whole gained from dollar appreciation. Still, Korean firms that have borrowed dollars can still see their net worth fall. Overall, the country's modestly positive ($82 billion in Table V.D) external position shows net foreign currency assets of $719 billion, with over half held by the official sector (official reserve assets of $364 billion) and substantial holdings by institutional investors (portfolio assets of $204 billion). A substantial fraction of portfolio and other foreign currency liabilities ($348 billion), and $65 billion of foreign currency loans booked by banks in Korea, are owed by the corporate sector. Moreover, BIS data show an additional $7 billion of mostly dollar bonds issued by offshore affiliates of Korean non-financial firms, and there is also offshore bank credit. Dollar appreciation leads to official gains that are not conveyed to firms that lose net worth.

Much analysis of international balance sheets, in general, and the insurance afforded by foreign exchange reserve holdings, in particular, implicitly suffers from a fallacy of division, according to which what is true of the whole is true of the parts. In the absence of transfers made when the domestic currency depreciates – which would themselves be fraught with moral hazard – the gains in the public sector do not offset corporate losses. Firms need to adjust their spending and hiring. And if the authorities eventually deploy international reserves to provide dollar liquidity to banks and firms, the intervention may follow disruptions that have already exacted a price.

Korea's external assets and liabilities, end-2014[1]

Table V.D

	Assets	Liabilities	Net assets
Domestic currency	13	650	–637
Direct investment	.	182	–182
Portfolio	2	441	–439
Other[1]	10	27	–17
Foreign currency	1,068	348	719
Direct investment	259	.	259
Portfolio	204	149	55
Other[1]	242	199	42
Official reserve assets	364	.	364
Total	1,080	998	82

[1] Includes financial derivatives.

Source: Bank of Korea.

① See C Tille, "The impact of exchange rate movements on US foreign debt", Federal Reserve Bank of New York, *Current Issues in Economics and Finance*, vol 9, no 1, January 2003.

in order suggests policymakers deploy monetary, prudential and fiscal policies to manage financial cycles to ensure lasting monetary, financial and macroeconomic stability (Chapters I and IV). The resulting reduction in the frequency and depth of credit booms and busts would greatly reduce negative cross-country spillovers.

In addition, policymakers could give more weight to international interactions, including shared exposures, spillovers and feedbacks, with a view to keeping the global village in order. Policies could either seek to prevent crises, through measures to restrain the build-up of financial imbalances, or to strengthen crisis management, including through safety nets. An ounce of crisis prevention is worth a pound of crisis management: there are clear welfare benefits from reducing the incidence and severity of crises and clear limits of foresight and moral hazard in designing effective safety nets.

International policy coordination can occur at various depths. Enlightened self-interest takes international spillovers into account to the extent that they spill back on one's own economy. However, even if countries did their best individually, this would still fall short of the mark if there were significant international spillovers, as in today's era of global liquidity. Moving towards a more efficient outcome would require greater cooperation, including ad hoc joint action, and possibly even agreement on rules of the game that constrain domestic policies.

Obstacles present themselves in terms of both analysis and cooperation. There is the difficulty of agreeing on a diagnosis of what ails the IMFS. And even if a common understanding of international spillovers and their causes emerged, it would remain challenging to forge and to maintain a common approach among multiple actors of varying sizes subject to differing domestic constraints.

Such possibilities and obstacles are evident in the discussion concerning crisis management. During the Great Financial Crisis, central banks proved able to make swift joint adjustments to their policy stances and to coordinate closely in extending foreign exchange swaps to each other. Funding extended under dollar swaps reached almost $600 billion (and, under euro swaps, €6 billion). The dollar swap lines supported financial stability by allowing the funding of foreign banks with limited access to Federal Reserve facilities. In turn, they also restored the monetary transmission mechanism after banks had been bidding up dollar Libor relative to the federal funds rate.

Today, proposals to modify and extend safety nets face obstacles. One reason is deep analytical disagreement. Is reserve accumulation a by-product of exchange rate management, or a form of self-insurance against domestic and external crises? Should international liquidity facilities, including currency swap lines between central banks, be broadened, and what is their best design? Would enhanced safety nets lead to smaller foreign exchange reserves? And, even if agreement were reached, many aspects of international risk-sharing would remain problematic. Despite the room for improvement, the status quo may well persist.

All this reinforces the case for crisis prevention. Here, central banks could seek to internalise the effects of their own policies. An improved exchange of information would help authorities to reach a better understanding of international spillovers and spillbacks. For instance, if the major central banks' monetary policies have indeed induced competitive easing among EMEs, the resulting financial imbalances may ultimately hurt the advanced economies. What is more, such spillbacks may be stronger than in the past, in line with EMEs' growing weight in the world economy (Chapter III). Similarly, the outsize official role in major bond markets points to the need for policymakers to pay attention to global effects. However, while global reserve managers might collectively benefit from taking into account the effect of their investment behaviour on global bond yields, their individual incentive is to ignore international spillovers.

Box V.E

Consolidating the US external balance sheet

Much of international macroeconomics assumes that national borders delimit currency zones and decision-making units. Just as the national accounts do, it assumes that those borders define the relevant economic territory: different currencies do not compete within a given country and firms operate exclusively within national borders. In reality, neither is the case. Not only does the domain of major currencies extend outside their country of issue (Boxes V.A and V.B), but multinational firms, be they financial or non-financial, operate across borders. Management focuses on group-wide profits and risks, and balance sheets span national boundaries. A consolidated perspective better reflects the reach of multinational firms and the extent of global integration.

This box uses the US example to illustrate how such a consolidated view of foreign assets and liabilities differs from the official international investment position (IIP) recorded on a residence basis – the defining criterion of the national accounts and balance of payment statistics. These are denoted "locational" in the first two columns of Table V.E. The process of consolidation aligns balance sheets with the nationality of ownership rather than with the location where the assets and liabilities are booked. This amounts to redrawing the US border to include the foreign balance sheets of US-owned firms, and to exclude the US balance sheets of foreign firms. This consolidation is performed here for the banking sector and the non-bank business sector (multinational companies).

US international investment position: from locational to consolidated

In billions of dollars at end-2012 Table V.E

	Locational		Consolidated	
	Assets	Liabilities	Assets	Liabilities
Bank-reported				
Cross-border positions	3,898	3,633	.	.
Consolidated US banks[1]	.	.	3,330	2,958
Foreign banks[2]	.	.	2,465	3,150
Direct investment				
Cross-border positions	5,078	3,057	.	.
US multinational companies[3]	.	.	20,250	15,173
Foreign multinationals[4]	.	.	6,863	9,920
Portfolio investment	7,531	8,446	7,531	8,446
Non-bank reported[5]	845	657	1,491	782
US currency	.	454	.	454
Official assets and liabilities	666	5,692	666	5,692
Total[6]	18,018	21,940	42,596	46,575
Memo: Sum of assets and liabilities	*39,957*		*89,171*	

[1] US banks' foreign claims are from the BIS consolidated banking statistics on an ultimate risk basis (Table 9D); their foreign liabilities are estimated as the sum of US banks' local liabilities in all currencies booked outside the United States, and their cross-border liabilities to unaffiliated parties, excluding those to US residents, and excluding liabilities to official monetary institutions booked in the US (which are already included in "official liabilities"). [2] The local liabilities of foreign-owned banks operating in the United States appear on the asset side, being owed to US residents. Conversely, their claims on US residents are US liabilities. Thus, consolidated US assets are foreign banks' local liabilities in local currency to US residents. And consolidated US liabilities are foreign banks' local claims in local currency on US residents. [3] Total assets of US foreign affiliates abroad, all industries excluding banking. Imputed liabilities equal total assets less direct investment position. [4] Total assets of foreign-owned US affiliates, all industries excluding banking. Imputed liabilities equal total assets less direct investment position. The affiliates' assets appear as a US foreign liability, and vice versa. [5] Financial assets and liabilities reported by non-banks, including trade credit. "Consolidated" columns also contain assets and liabilities banks in the United States hold in custody for domestic non-bank entities. [6] Excludes financial derivatives.

Sources: US Bureau of Economic Analysis; BIS international banking statistics; BIS calculations.

The first step replaces the banks' external positions with consolidated BIS data (three rows under "bank-reported" in Table V.E). This removes all cross-border claims of, say, BNP Paribas New York on the rest of the world (these being French assets), and adds JPMorgan's consolidated foreign claims, yielding a total of $3.330 trillion for reporting US banks combined. Similarly, on the liabilities side, out goes any cross-border liability of BNP Paribas New York, and in comes JPMorgan's global foreign liabilities, to give an estimated $2.958 trillion for US banks. Moreover, foreign banks' local operations in the United States, which are not part of the US external position, further add to US consolidated assets and liabilities, respectively, to the extent that US residents provide funding ($2.465 trillion) to, or receive credit ($3.150 trillion) from, the US offices of foreign banks. Consolidating banks raises the sum of US foreign assets and liabilities from $40 trillion (IIP) to $45 trillion.

The second step consolidates foreign-owned multinational companies (excluding banks) in an analogous, though coarser, way (owing to data limitations). The cross-border direct investment positions of non-banks, assets and liabilities, are replaced by the (larger) total assets of US multinationals outside the United States and by those of foreign multinationals in the United States, respectively (rows under "direct investment" in Table V.E). Out goes General Electric's equity position in its French subsidiary, and in comes that subsidiary's total assets, resulting in $20,250 billion for all US-owned multinationals combined. These assets exceed the corresponding ownership claims (consisting of $5,078 billion worth of equity and equity-like inter-affiliate debt in the IIP) because US multinationals also borrow abroad; these liabilities (an estimated $15,173 billion) in turn add to US foreign liabilities. As for foreign multinationals, French firm Total's stake in its US subsidiary is removed, and its US assets are added – yielding $9,920 billion for foreign multinationals. Foreign multinationals' liabilities ($6,863 billion) count as a US foreign asset. This step sextuples directly held corporate assets and liabilities, but leaves US net assets unchanged.

Together, consolidating banks and multinational companies more than doubles the gross foreign position of the United States. US external assets and liabilities combined jump from $40 trillion on a residence basis (IIP) to an estimated $89 trillion when measured on a consolidated basis. The example reveals that the US economy is more open, and its foreign balance sheet larger, than is apparent from the external position derived from the balance of payments. The calculation of the US current account, on the other hand, should not be affected by consolidation, since foreign earnings are included in net investment income whether they are repatriated or not.

It may be difficult to go beyond enlightened self-interest and to revisit rules of the game more broadly.[8] Many reject a global perspective in the realm of monetary policy. Accordingly, domestic mandates ask major reserve-issuing central banks to set policy for a smaller economic domain than that occupied by their currencies.

This interpretation of domestic mandates contrasts sharply with successful international cooperation in the realm of financial regulation and supervision. There, national mandates have not precluded extensive international cooperation and the development of global rules.

A better understanding of the shortcomings of the current IMFS would already be a big step forward. A widely held view is that the main problem is the IMFS's apparent inability to prevent large current account imbalances. This view of imbalances is the prevailing one in international forums and implies specific adjustment policies, such as those associated with the G20 Mutual Assessment Process.[9]

[8] The case for change has been put forward by R Rajan, "Competitive monetary easing: is it yesterday once more?", remarks at the Brookings Institution, 10 April 2014. For more sceptical views on policy coordination, see eg S Fischer, "The Federal Reserve and the global economy", Per Jacobsson Foundation Lecture at the IMF/World Bank Annual Meetings, 11 October 2014; and B Cœuré, "Domestic and cross-border spillovers of unconventional monetary policies", remarks at the Swiss National Bank-IMF conference "Monetary policy challenges in a changing world", 12 May 2015. See also J Caruana, "The international monetary and financial system: eliminating the blind spot", remarks at the IMF conference "Rethinking macro policy III: progress or confusion?", 16 April 2015; and W Dudley, "US monetary policy and emerging market economies", remarks at the Federal Reserve Bank of New York roundtable discussion "Three decades of crises: what have we learned?", 27 March 2014.

[9] The European Commission's Macroeconomic Imbalance Procedure goes further in complementing its surveillance of external imbalances with indicators on internal financial imbalances.

The focus on current accounts and the corresponding net resource flows, however, arguably glosses over the IMFS's fundamental weakness. The aim of rebalancing global demand reduces the notion of imbalances to net flows in goods and services between countries, and neglects the greater risk of *financial* imbalances building up within and across countries. To be sure, large current account deficits often point to underlying problems, but financial booms and busts can and do develop in surplus countries as well. An aggregate surplus position may well conceal such vulnerabilities. Financial imbalances are more closely linked to domestic and international gross positions, and need not leave a mark on cross-border net flows – what current accounts represent.[10] Indeed, financial imbalances may not show up in a country's balance of payments at all if multinationals issue debt offshore for their use abroad, for instance. This, in turn, raises the question of the appropriate unit of analysis in international finance, with consequences for how one should measure the risks (Box V.E). Making progress on the design of the IMFS thus calls for a new diagnosis that accounts for financial imbalances as a basis for broad adjustments to domestic policy regimes and their international interaction.

[10] See C Borio and P Disyatat, "Global imbalances and the global crisis: link or no link?", *BIS Working Papers*, no 346, May 2011.

VI. Old and new risks in the financial landscape

Changes to risk perceptions, new regulatory frameworks and persistently low interest rates in advanced economies have shaped the post-crisis behaviour and business models of financial institutions. Banks are still adapting to new regulation and striving to regain market confidence, while institutional investors shed traditional exposures. In parallel, the growing influence of asset managers is altering the contours of systemic risk.

Advanced economy banks are still underperforming their emerging market economy (EME) peers. Banks have ploughed a good part of their profits into regulatory capital, which bodes well for the future. But, despite these improvements, markets remain sceptical about firms operating in a difficult environment amid low interest rates and subdued economic activity. If they persist, these conditions will erode profits and further increase banks' exposure to interest rate risk, calling their resilience into question. By contrast, EME banks still enjoy market confidence, as buoyant domestic conditions continue to mask growing financial imbalances (Chapter III).

The prolonged period of low interest rates has been particularly challenging for institutional investors. In the face of ballooning liability values and muted asset returns, insurance companies have explored new investment strategies and have increasingly offloaded risks onto their customers. Even though these measures have paid off so far, they may not be enough to counter future headwinds stemming from plateauing equity valuations and the erosion of fixed income returns. Confronted by similar difficulties, pension funds are posting large and widening deficits that could take a toll on the real economy.

Market-based intermediation has filled the gap left by strained banks. In particular, the asset management sector has grown rapidly, supporting economic activity but also raising new risks. Even when asset managers operate with low leverage, their investment mandates can give rise to leverage-like behaviour that amplifies and propagates financial stress. In recent years, asset managers have catered to the needs of yield-hungry investors by directing funds to emerging market economies. This has added fuel to financial booms there, possibly exacerbating vulnerabilities. More generally, the potential impact of asset managers on financial stability has placed them on regulators' radar screen.

This chapter is organised as follows. After reviewing banks' recent performance and progress in building up their resilience, the first section discusses their medium-term challenges. The following two sections perform a similar analysis, focusing on insurance companies and pension funds. The last section outlines new types of risk raised by the asset management sector and discusses possible policy responses.

Banks: market perceptions drive or mask challenges

Divergent conditions have determined banks' performance in advanced and emerging market economies. Even as subdued economic growth, low interest rates and substantial litigation costs were sapping their profits, advanced economy banks responded to the regulatory overhaul by strengthening their balance sheets. However, persistent market scepticism undermined these institutions' funding cost advantage – the very basis for their intermediation function. By contrast, EME

institutions retained market confidence and benefited from domestic financial booms, some of which are now in their late stages.

Recent performance and efforts to rebuild financial strength

The banking sector has posted mixed results over the past six years. While the profits of US banks have been high and robust, those of many European institutions were much lower in 2014 than immediately after the crisis (Table VI.1). In the background, net interest income – banks' main source of revenue – has declined slightly on both sides of the Atlantic (Graph VI.1, left-hand and centre panels). As these banks did not counter subdued revenues by cutting operating expenses, cost-to-income ratios rose steadily between 2009 and 2014 (blue lines). By contrast, EME banks have posted falling cost-to-income ratios and – with the exception of Russian institutions – have kept their profits high.

Profits have been the main driver of steady improvements in the regulatory capital positions of both advanced economy and EME banks. Retained earnings underpinned the bulk of the 45% increase in large banks' Core Equity Tier 1 (CET1) capital between mid-2011 and mid-2014 (Graph VI.2, red line). On the back of slightly declining risk-weighted assets, the corresponding CET1 regulatory ratios rose from roughly 7% to 11% over the same period. For this to represent an unequivocal improvement in banks' resilience, the decline in average risk weights – indicated by the widening gap between the blue and yellow lines – should reflect a conservative approach that favours less risky borrowers.

Profitability of major banks

As a percentage of total assets — Table VI.1

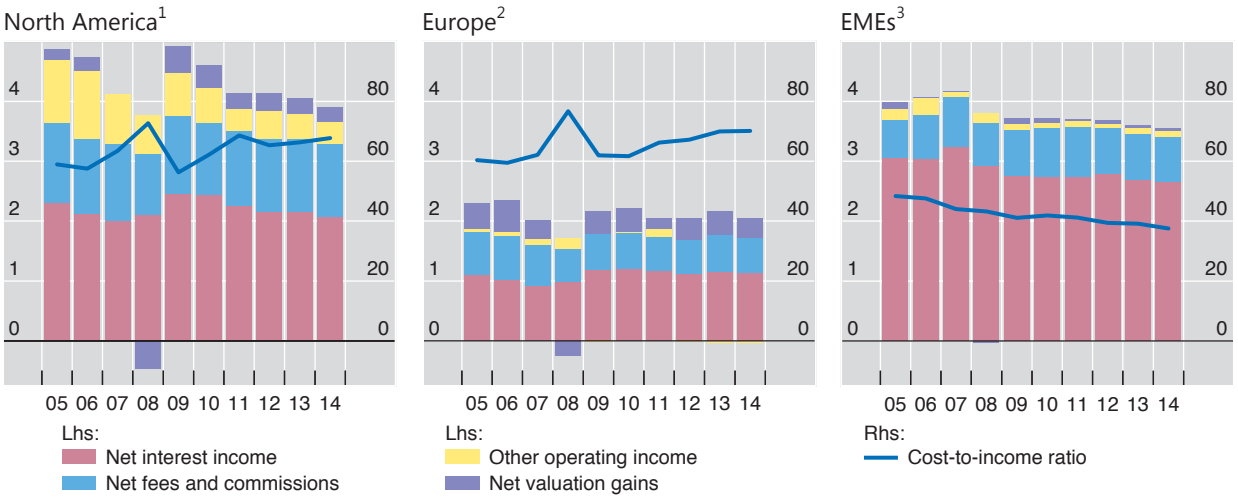
	Pre-tax profits				Net interest margin				Loan loss provisions			
	2009–10	2011–12	2013	2014	2009–10	2011–12	2013	2014	2009–10	2011–12	2013	2014
Australia (4)	1.04	1.18	1.27	1.28	1.89	1.82	1.78	1.75	0.43	0.20	0.17	0.11
Canada (6)	0.84	1.05	1.05	1.06	1.63	1.63	1.65	1.60	0.34	0.20	0.17	0.16
France (4)	0.31	0.23	0.32	0.22	1.02	0.98	0.89	0.82	0.30	0.21	0.20	0.15
Germany (4)	0.11	0.14	0.10	0.18	0.85	0.87	0.99	0.91	0.22	0.13	0.17	0.10
Italy (3)	0.36	–0.61	–1.32	–0.06	1.84	1.71	1.59	1.57	0.70	0.79	1.48	1.06
Japan (5)	0.14	0.55	0.59	0.70	1.01	0.89	0.83	0.81	0.37	0.10	0.08	0.02
Spain (3)	1.00	0.35	0.47	0.73	2.44	2.36	2.32	2.29	0.92	1.15	0.96	0.80
Sweden (4)	0.48	0.64	0.74	0.75	0.96	0.87	0.95	0.88	0.29	0.06	0.07	0.06
Switzerland (3)	0.41	0.18	0.38	0.29	0.55	0.57	0.73	0.78	0.05	0.01	0.01	0.01
United Kingdom (6)	0.27	0.26	0.22	0.39	1.15	1.10	1.08	1.14	0.74	0.38	0.35	0.11
United States (9)	0.58	0.95	1.24	1.11	2.69	2.41	2.32	2.23	1.52	0.47	0.21	0.20
Brazil (3)	2.29	1.66	1.38	1.66	5.37	4.51	3.84	3.76	1.54	1.29	1.20	0.98
China (4)	1.51	1.78	1.86	1.83	2.12	2.37	2.38	2.45	0.26	0.27	0.25	0.33
India (3)	1.37	1.41	1.41	1.15	2.28	2.78	2.82	2.81	0.46	0.60	0.57	0.68
Russia (3)	1.22	2.60	2.04	0.96	5.12	4.16	4.15	3.49	2.98	0.28	0.79	1.58

Values in multi-year columns are simple averages; in parentheses, number of banks included.

Sources: Bankscope; BIS calculations.

Subdued revenues in the banking sector

In per cent — Graph VI.1



For the number of banks in each group, see Table VI.1. Revenues reported relative to total assets.

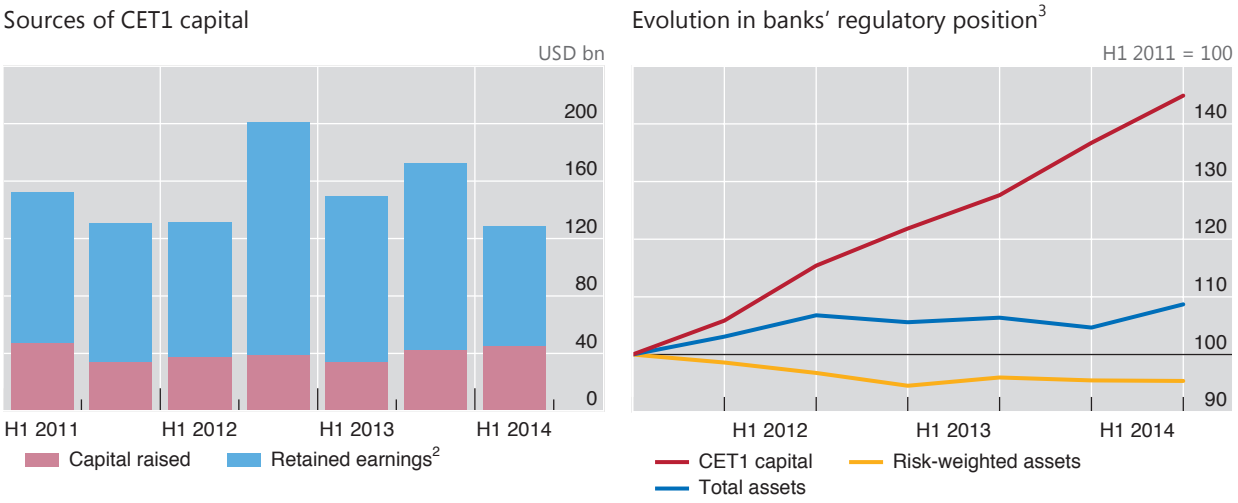
[1] Canada and the United States. [2] France, Germany, Italy, Spain, Sweden, Switzerland and the United Kingdom. [3] Brazil, China, India and Russia.

Sources: Bankscope; BIS calculations.

Certain strategic choices do reveal banks' increased conservatism. For instance, post-crisis reassessments of cost and benefit trade-offs have induced many banks to scale down or to announce a downsizing of their investment banking units. This recalibration of business models has contributed to a cutback in market-making activities (Box VI.A). Likewise, lessons from the crisis and a recent regulatory

Banks build capital buffers[1]

Graph VI.2

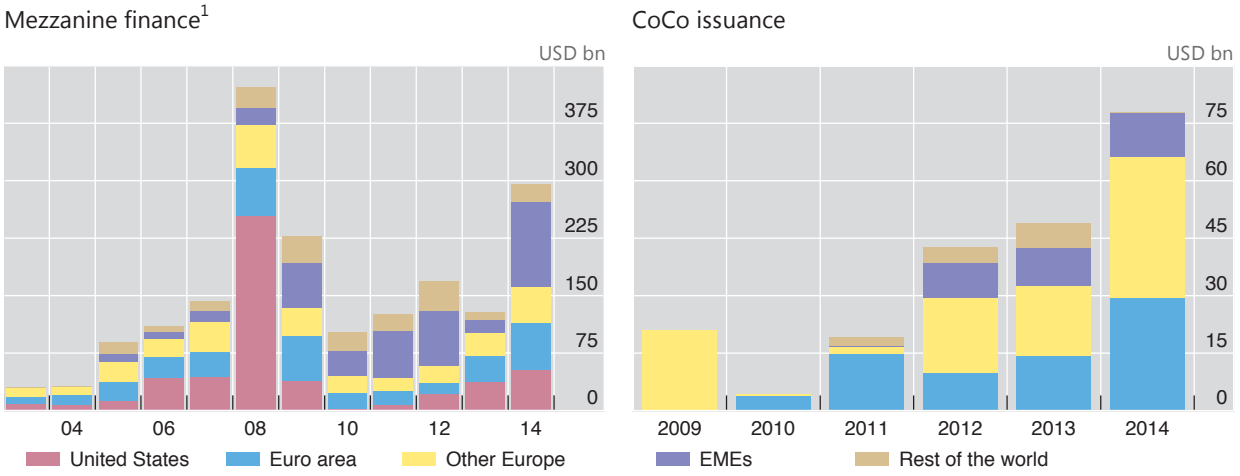


[1] Internationally active banks with Tier 1 capital of more than €3 billion; CET1 = Core Equity Tier 1. [2] Profits after tax minus common share dividends. [3] Reflects Basel III definitions.

Sources: Basel Committee on Banking Supervision, *Basel III Monitoring Report*, March 2015; BIS calculations.

Banks build loss-absorbing capacity

Graph VI.3



[1] Includes investment grade bonds and preferred shares.

Sources: Bloomberg; Dealogic; BIS calculations.

overhaul have led banks to tread carefully in securitisation markets (see also Box VI.B).

That said, concerns remain that the general decline in risk weights is partly the result of opportunistic reporting. To economise on equity capital, banks have an incentive to bias their risk estimates downwards. To reassure investors and observers that banks do not succumb to this incentive, supervisors need to be in a position to regularly, transparently and convincingly validate risk estimates.

On the liabilities side, banks have taken advantage of low interest rates to issue securities that are in the middle of the capital structure and can thus absorb losses (Graph VI.3, left-hand panel). Net issuance of subordinated debt and preferred shares – or mezzanine finance instruments – spiked in 2008, largely due to US government-sponsored recapitalisations. Subsequently, the bulk of net issuance stemmed from European and EME banks, with a temporary drop in 2013 reflecting the anticipation of new regulatory standards in China. Part of the global activity in mezzanine finance is in contingent convertible bonds (CoCos) that could qualify as regulatory capital (Graph VI.3, right-hand panel). So far, CoCo issuance has been limited to a small number of banks in specific countries.

Even though much of banks' mezzanine funding will not count towards regulatory capital, the recent increase in issuance is in line with new policy initiatives to streamline the resolution of failing banks. A Financial Stability Board consultative document outlines ways in which global systemically important banks (G-SIBs) should build their loss-absorbing capacity for resolution. These proposals aim to secure self-contained bank restructurings that reduce the system-wide repercussions of failures as well as the burden on taxpayers (Box VI.C).

Challenges and risks ahead

The sustained low interest rate environment in advanced economies clouds banks' outlook. Since the cost of deposits and other funding quickly hits a lower bound in such an environment, declining returns on newly acquired securities, compressed term premia, and falling lending rates in competitive loan markets steadily erode net interest income (Box VI.D). The resulting squeeze on profitability

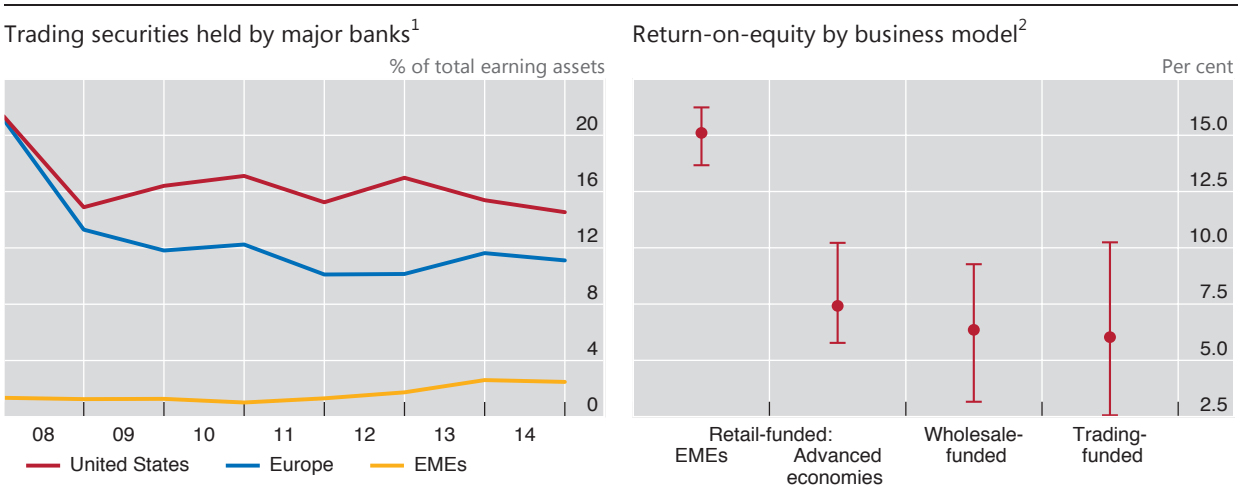
Market-making in retreat: drivers and implications

Recent indications of reduced market liquidity (Chapter II) have drawn policymakers' and analysts' attention to important providers of such liquidity: specialised dealers, also known as *market-makers*. There are various drivers of market-makers' perceived retrenchment. Some relate to dealers reassessing their own risk-taking behaviour and the viability of their business models post-crisis. Others have to do with new regulations, which aim to bring the costs of market-making and other trading-related activities more closely in line with the underlying risks and with the risks that these activities generate for the financial system. Attaining this policy goal would ensure a transition to an environment with possibly lower, but more robust, market liquidity.

Market-makers are important providers of liquidity services. By committing their own balance sheets, they stand ready to act as buyers or sellers to complete client-initiated trades in the presence of transitory supply-demand imbalances. It is generally acknowledged that underpriced market-making activities contributed pre-crisis to "liquidity illusion", ie the misleading impression that liquidity would always be abundantly available. After the subsequent bust, market liquidity was eroded by the decline in banks' inventories of corporate bonds and other trading securities (Graph VI.A, left-hand panel; see also Graph II.11, left-hand panel). Understanding the drivers of this recent development is necessary for assessing the robustness of market liquidity going forward.

Dealer inventories evolve as trading model stutters

Graph VI.A



[1] Sample of 18 European banks, seven US banks and eight EME banks. [2] Range of yearly returns-on-equity from 2008 to 2013 (dashes) and the corresponding mean (dot). See R Roengpitya, N Tarashev and K Tsatsaronis, "Bank business models", *BIS Quarterly Review*, December 2014, pp 55–65.

Sources: Bankscope; BIS calculations.

For one, market-making lost steam post-crisis partly as a result of dealers' waning tolerance for the valuation and funding risks of warehoused assets.① In many jurisdictions, dealers have raised the risk premia they demand and have overhauled their risk management to better account for the cost-benefit trade-offs of alternative business lines. This has increased the price of market-making services – especially in less liquid markets, such as those for corporate bonds – although to varying degrees across countries and client types.

In addition, post-crisis strains have pushed banks to reassess their business models. The findings of such assessments do not flatter market-makers. In recent years, institutions engaging mostly in commercial banking activities have been more efficient and have produced generally higher and less volatile profits than those employing a trading- and investment banking-based strategy – the business model most closely associated with market-making services (Graph VI.A, right-hand panel).② In response, some banks have abandoned or significantly scaled back their trading activities, while others – recently, German and UK institutions – have announced major restructurings of their investment banking units.

According to a recent survey, major dealers see regulatory reforms as another driver of market-making activities.③ In particular, they point to the restraining effect that leverage and capital requirements have on low-

margin and balance sheet-intensive businesses, such as repo-funded trading activities. They also refer to the increasing cost of warehousing fixed income inventories.

However, the net impact on market liquidity depends on a number of additional factors. One is the capacity of market-makers to reap the cost-saving benefits of new trading technologies. Another is the ability of other market participants to fill any gap left by traditional market-makers. This also determines to what extent increased market-making costs are passed through to clients and, ultimately, to the broader investor community.

From a policy perspective, a key question is whether the trends under way in market-making will help avert liquidity crises. For this to be the case, these trends should align the price of market-making services in normal times with the high costs of evaporating liquidity in bad times. Admittedly, price realignments are unlikely to prevent an exceptionally large shock from bringing financial markets to a halt. But they should discourage financial behaviour that takes market liquidity for granted and naively rules out an eventual price collapse, even as excesses are building up. By reducing market participants' vulnerability to ordinary liquidity shocks, this would make it less likely that such shocks could feed on themselves and undermine system-wide liquidity.

① See Committee on the Global Financial System, "Market-making and proprietary trading: industry trends, drivers and policy implications", *CGFS Papers*, no 52, November 2014. ② See R Roengpitya, N Tarashev and K Tsatsaronis, "Bank business models", *BIS Quarterly Review*, December 2014, pp 55–65. ③ See Appendix 4 of the publication cited in footnote ①.

would weaken the main source of capital, ie retained earnings, and hence banks' resilience.

Persistently low interest rates also increase banks' exposure to the risk of interest rate increases. Just as falling yields have supported asset valuation gains in recent years, an eventual normalisation would generate losses. Banks' equity capital would shrink, as the value of their short-duration liabilities is largely insensitive to interest rate changes. This stands in contrast with the benefits of interest rate rises for life insurers and pension funds, whose assets are typically of much shorter duration than their liabilities (see below). It also underscores the importance of policy initiatives to build regulatory safeguards against interest rate risk in the banking book.

Recent loan losses suggest that the challenges of some advanced economy banks extend beyond profit margins and interest rate risk. In particular, large Italian and Spanish banks have repeatedly posted loan losses well above those of their peers (Table VI.1). Industry analysis has attributed the 2014 losses only partly to the balance sheet clean-up triggered by the ECB's asset quality review, emphasising instead that the losses may need to rise further before declining.

Price-based indicators suggest that markets have a less favourable view of advanced economy banks than of their EME counterparts. Against the background of general optimism, evident in high price-to-book ratios in the non-financial sector (Graph VI.4, left-hand panel), equity investors appear lukewarm about US, Swiss and Nordic banks and rather pessimistic about UK and euro area banks (right-hand panel). Rating agencies take a similar view: stand-alone ratings – which measure resilience in the absence of external support – deteriorated markedly during the subprime and sovereign crises for both European and US banks and have not rebounded since (Graph VI.5, left-hand panel). By contrast, EME institutions boast on average high price-to-book ratios and improving stand-alone ratings. It remains to be seen, however, whether this vote of confidence will persist should local conditions weaken (Chapter III).

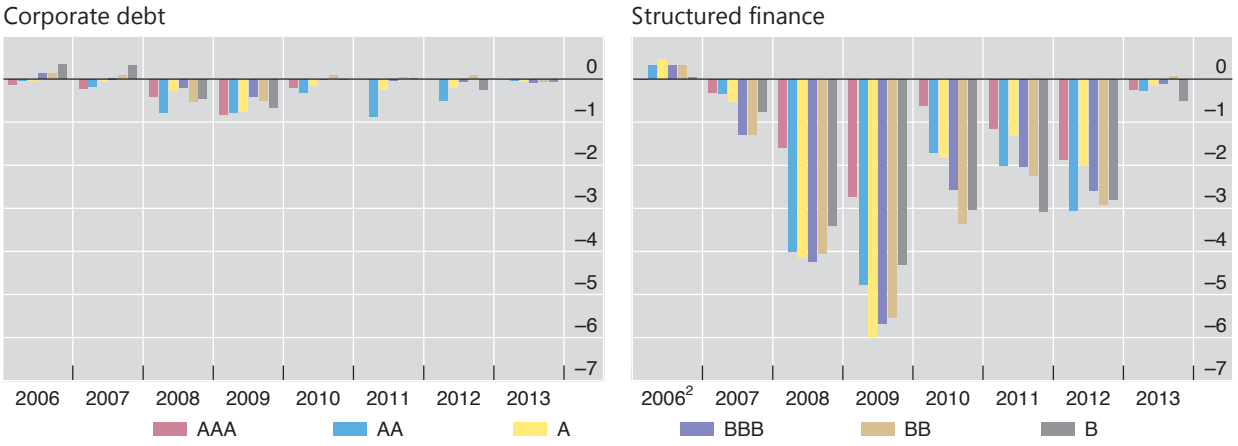
By failing to reassure markets in recent years, advanced economy banks have lost much of their funding advantage, so crucial for their success. Two self-reinforcing drivers are responsible for this loss of ground. First, greater uncertainty about advanced economy banks both during the financial crisis and post-crisis led credit market participants to charge them substantially more than similarly rated non-financial corporates (NFCs) up to 2012 (Graph VI.5, centre panel). This markup

The risks of structured finance: regulatory responses

The crisis exposed serious flaws in the securitisation market. Abrupt downgrades of fixed income securities in 2008–09 forced banks to quickly raise capital to cover unshed exposures. While corporate bonds were marked down by less than one notch on average, the corresponding downward revision for similarly rated securitisation tranches was as high as three to six notches (Graph VI.B). And while downgrades for corporate bonds slowed after 2009, they extended into 2012 for securitisation tranches. This disparity revealed that faulty risk models had inflated the ratings of certain senior tranches, thus artificially reducing regulatory risk weights. Furthermore, the unwarranted assumption that risks could be estimated with a high degree of precision raised the likelihood that tranches in the middle of securitisations' capital structure were severely undercapitalised.

Swings in credit risk assessments[1]

Average one-year rating migrations, in rating notches — Graph VI.B



[1] Based on Fitch's entire rating universe. A bar's colour corresponds to the rating at the start of the year, and its height to the average migration over the year. A positive (negative) number indicates an upgrade (downgrade). [2] US instruments only.

Sources: Fitch Ratings; BIS calculations.

Recent revisions to the securitisation framework take these lessons into account.① The new framework includes "comply or explain" provisions to incentivise banks to reduce their reliance on external ratings. It also limits the number of available approaches to computing bank regulatory capital and simplifies their hierarchy. Importantly, the revised framework introduces regulatory safeguards against undercapitalisation while maintaining risk sensitivity, ie while requiring higher capital for riskier securitisation exposures.

Consistent with the spirit of risk-sensitive regulation, less complex and more transparent securitisations should be subject to lower capital requirements. Accordingly, the Basel Committee on Banking Supervision and the International Organization of Securities Commissions have jointly proposed a list of criteria to help develop simple and transparent asset pools.②

That said, risk assessments for such pools will still be surrounded by considerable uncertainty. Ignoring this would materially raise the likelihood that tranches are severely undercapitalised.

What makes securitisation tranches special is that they can concentrate uncertainty. Focusing on simple and transparent securitisations, Antoniades and Tarashev show that irreducible uncertainty about the true default probabilities in the underlying asset pool would surface predominantly in tranches of intermediate seniority, the so-called mezzanine tranches.③ Ignoring this, the Basel II framework gave rise to cliff effects, whereby small estimation errors led to disproportionately large swings in the capital requirements for these tranches. This opened the door to severe undercapitalisation and mispricing of risks. The introduction of capital safeguards for mezzanine

tranches in the revised framework is thus a welcome step towards addressing an important source of fragility in the financial system.

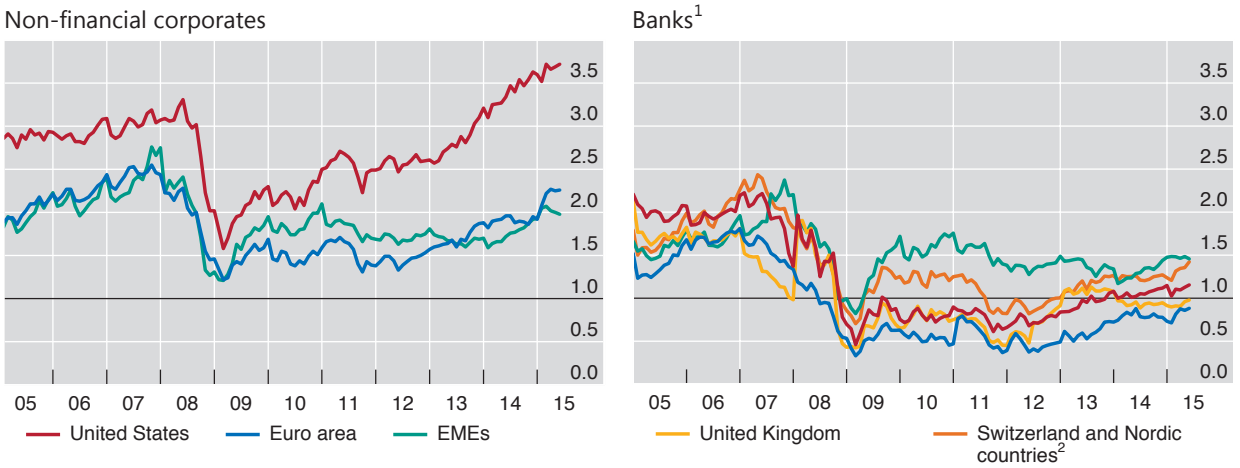
① Basel Committee on Banking Supervision, *Basel III: Revisions to the securitisation framework*, December 2014. ② Basel Committee on Banking Supervision and Board of the International Organization of Securities Commissions, *Criteria for identifying simple, transparent and comparable securitisations*, consultative document, December 2014. ③ A Antoniades and N Tarashev, "Securitisations: tranching concentrates uncertainty", *BIS Quarterly Review*, December 2014, pp 37–53.

narrowed subsequently, but it still affects euro area and, especially, UK banks. Second, while NFC ratings have remained largely stable since the crisis, banks have seen a sustained deterioration of their all-in ratings, which capture both inherent financial strength and external support (Graph VI.5, right-hand panel). The resulting loss of funding advantage could partly explain the decline in banks' traditional intermediation activities and the concurrent ascent of market-based funding sources (see below).

The recent sovereign debt crisis – together with national authorities' treatment of sovereign exposures – has contributed to a decline in European banks' corporate lending.[1] Against the basic philosophy of global regulatory standards, home authorities have permitted requirements on banks' sovereign exposures to be less stringent than on corporate exposures with similar risk characteristics (Box VI.E). Thus, when risk premia on government bonds shot up during the sovereign debt crisis, the associated capital and liquidity charges barely moved. Euro area banks in particular took advantage of the resulting profit opportunities and substituted sovereign bonds for corporate lending. Entities without access to market-based

Equity markets reflect scepticism about banks

Price-to-book ratios — Graph VI.4



[1] Aggregates are calculated as the total market capitalisation across institutions domiciled in a particular region, divided by the corresponding total book value of liabilities. [2] Denmark, Norway and Sweden.

Sources: Bank of America Merrill Lynch; Datastream; BIS calculations.

[1] See B Becker and V Ivashina, "Financial repression in the European sovereign debt crisis", Swedish House of Finance, *Research Paper*, no 14-13, 2014.

Box VI.C

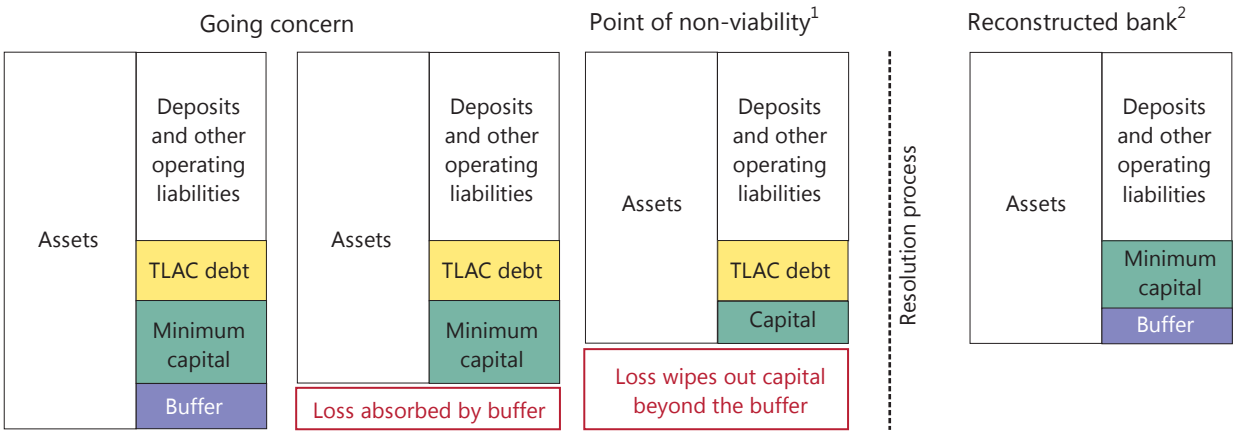
Loss-absorbing capacity for banks in resolution

Post-crisis regulatory reforms seek to reduce the economy's exposure to financial system strains. They have two complementary objectives: ensuring minimum standards of resilience, so that financial firms are less likely to fail, and diminishing the impact on the system and the economy in case they do fail. The first objective is embedded in the more stringent Basel III capital and liquidity standards for going-concern banks; the second in measures to improve the efficiency of resolution when a bank reaches the point of non-viability. In the light of the second objective, the Financial Stability Board has issued a list of key principles for efficient resolution and has proposed new standards on the adequacy of the loss-absorbing capacity of global systemically important banks (G-SIBs) in resolution: Total Loss-Absorbing Capacity (TLAC).①

The TLAC requirements would supplement the loss-absorbing capacity of Basel III regulatory capital. In general terms, a normally functioning bank would have enough capital to meet its regulatory minimum and buffer requirements and sufficient TLAC liabilities (Graph VI.C, first panel). Capital buffers are the bank's first line of defence: they absorb initial losses and allow the institution to provide uninterrupted intermediation services (second panel). A going-concern bank meets its minimum capital requirements and is judged able to respond to adverse shocks by replenishing its capital buffers – for instance, through retained earnings. However, large and persistent losses can cause the bank to breach its minimum requirements, at which point it is likely to be judged unable to recover and hence non-viable (third panel). A non-viable bank would enter the process of resolution, during which TLAC debt is "bailed in", ie converted into equity or written down. This allows authorities to recapitalise the troubled institution – or a successor entity that assumes its operations – in a manner that commands market confidence and provides key services (fourth panel). Ultimately, TLAC is a prefunded source of capital, available to facilitate a non-disruptive resolution process.

Role of TLAC in resolution: an illustrative example

Graph VI.C



Segment heights are chosen with the graph's readability in mind. They need not refer to any real-world bank or to the relative sizes of different liabilities under Basel III rules and the TLAC proposal.

[1] Non-TLAC liabilities are also exposed to loss in resolution, in accordance with the applicable creditor hierarchy under the applicable resolution regime. [2] A bank in resolution or its successor entity would have one to two years to comply with the minimum TLAC requirements (if it is still a G-SIB).

The TLAC proposal specifies how banks should build this additional loss-absorbing capacity. While resources eligible for Tier 1 or Tier 2 regulatory capital would help meet the TLAC requirement for resolution, there is an expectation that at least one third of the requirement would be met with debt liabilities. To be readily bailed in, these liabilities should satisfy a number of criteria. Key among them is that legal arrangements clearly specify the subordinated status of TLAC debt to other liabilities of a more operational nature – such as deposits and derivative and other trading exposures of counterparties. This would reduce the risk of legal challenge or compensation claims. Other criteria state that TLAC debt should be unsecured and have a remaining maturity of more than one year in order to ensure that sufficient amounts remain available as the bank approaches the point of non-viability. The goal

of the TLAC proposal is that a failing bank's resolution does not draw on taxpayer funds and is smooth, whether it takes the form of a recapitalisation and restructuring or of an orderly wind-down.

The level of TLAC requirements would be determined with reference to existing regulatory metrics. TLAC securities would need to be at least equal to the greater of (i) 16–20% of the bank's risk-weighted assets;② and (ii) twice the level of capital that satisfies the bank's Basel III leverage ratio requirement. The amount would be a minimum, with national authorities free to impose additional requirements on institutions in their jurisdiction. The implementation date for TLAC requirements is not yet fixed and will not be before January 2019.

Critically, the effectiveness of TLAC depends on it being complementary to other elements of the prudential framework and resolution regime. The proposed design is compatible with Basel III rules. It preserves the integrity of capital and liquidity standards and supports their objective of boosting the resilience of banks as going concerns. TLAC resources will be used after the firm has crossed the point of non-viability and will help resolution authorities restore Basel III buffers in a restructured institution. In addition, TLAC will need to work well with existing and emerging resolution regimes as well as with various organisational structures. As the rules are finalised and target quantities calibrated, it will be important to maintain sufficient flexibility in the framework to accommodate resolution regimes and strategies that differ across jurisdictions and firms.

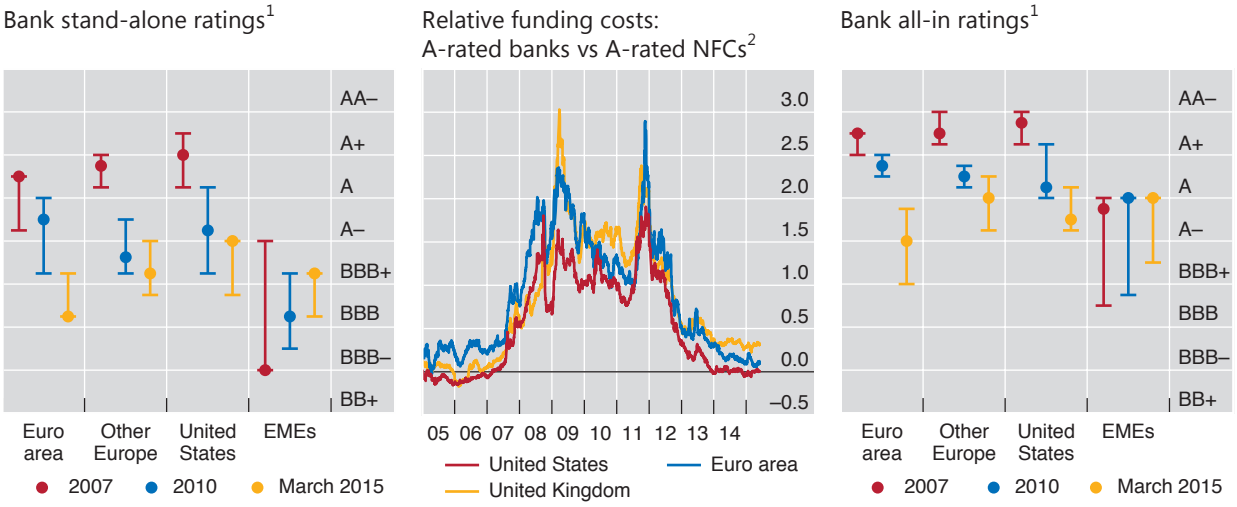
① Financial Stability Board, *Adequacy of loss-absorbing capacity of global systemically important banks in resolution*, consultative document, November 2014. ② The final rules will specify an exact number in this range.

funding, such as small and medium-sized enterprises, have borne the brunt of this credit displacement.

Insurance companies: tackling low interest rate headwinds

While the impact of low interest rates has not played out fully in the banking sector, it has already generated important headwinds for insurance companies. For one, the persistence of low rates has taken a toll on companies' profitability by depressing

Weak ratings erode banks' funding advantage — Graph VI.5



[1] The dashes represent the 20th and 80th asset-weighted percentile, respectively; the dot represents the asset-weighted median. Based on Moody's bank financial strength ratings (left-hand panel) and long-term issuer ratings (right-hand panel). [2] Option-adjusted spread on a bank sub-index minus that on a non-financial corporate sub-index, divided by the spread on the non-financial corporate sub-index. Sub-indices comprise local currency assets.

Sources: Bank of America Merrill Lynch; Fitch Ratings; Moody's; BIS calculations.

Box VI.D

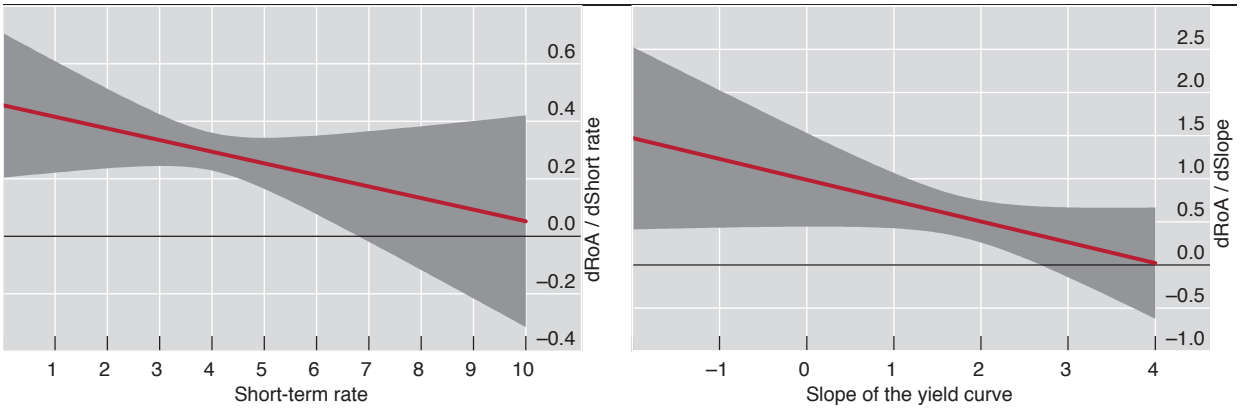
Monetary policy and bank profitability

Prolonged monetary accommodation may harm bank profitability. This is because lower short-term interest rates and a flatter yield curve squeeze net interest income, as they respectively sap banks' margins and returns from maturity transformation. And this is not offset by the beneficial effect of lower interest rates on loan loss provisions, through lower debt service costs and default probabilities. Nor is it offset by increased non-interest income, stemming from lower rates' positive impact on securities valuations. Indeed, Demirgüç-Kunt and Huizinga,① using aggregate banking sector data from 80 industrial and developing countries, find that a reduction in interest rates generally reduces bank profitability. Alessandri and Nelson obtain similar results for UK banks.②

Using data for 109 large international banks headquartered in 14 major advanced economies, recent BIS research has confirmed this result.③ However, the BIS study also finds that the effect on bank profitability of changes in the interest rate structure – ie the short-term rate and the slope of the yield curve – becomes stronger as interest rates fall and yield curves flatten. For the short-term rate, this non-linear effect reflects, among other things, a reduction of the "deposit endowment effect" on bank profitability at low interest rates: as the deposit rate cannot fall below zero, at least to any significant extent, the mark-down (the difference between the market rate and the deposit rate) is compressed at very low policy rates. For the slope of the yield curve, the non-linearity may stem from the demand for long-term loans and bank services, and from provisions. Graph VI.D shows that the lower the short-term interest rate and slope of the yield curve, the greater their effect on the return-on-assets (RoA). For example, a cut in the short-term policy rate from 1% to 0% is estimated to cause the RoA to fall by 0.4 percentage points over one year, twice the reduction associated with a decrease in the short-term rate from 7% to 6% (left-hand panel). Similarly, a reduction in the slope of the yield curve from –1 to –2 percentage points erodes the RoA by 1.2 percentage points over one year, while the effect is only half that size if the slope goes from 2 percentage points to 1 percentage point (right-hand panel).

Effects of changes in the interest rate structure on banks' return-on-assets (RoA)

Graph VI.D



RoA = profit before taxes divided by total assets; short-term rate = three-month interbank rate, in per cent; slope of the yield curve = spread between the 10-year government bond and three-month interbank rate, in percentage points. The vertical axis reports the derivative of RoA with respect to the short-term rate (left-hand panel) and the slope of the yield curve (right-hand panel), in percentage points. The shaded area indicates 95% confidence bands.

Source: BIS calculations.

According to these estimates, the negative effect on bank profitability caused by the decrease in the short-term rate was more than compensated for by the increase in the slope of the yield curve in the first two years after the outbreak of the Great Financial Crisis (2009–10). Overall, these changes, other things equal, contributed to an increase in the RoA of 0.3 percentage points on average for the 109 banks in the sample. In the next four years (2011–14), the further fall in short-term rates and the flattening of the yield curve contributed to a cumulative reduction in the RoA of 0.6 percentage points. These results hold after controlling for different business

cycle conditions and bank-specific characteristics such as size, liquidity, capitalisation and incidence of market funding.

① A Demirgüç-Kunt and H Huizinga, "Determinants of commercial bank interest margins and profitability: some international evidence", *World Bank Economic Review*, no 13(2), 1999, pp 379–408. ② P Alessandri and B Nelson, "Simple banking: profitability and the yield curve", *Journal of Money Credit and Banking*, no 47(1), 2015, pp 143–75. ③ C Borio, L Gambacorta and B Hofmann, "The influence of monetary policy on bank profitability", *BIS Working Papers*, 2015 (forthcoming).

the yield on new investments. In parallel, new accounting rules for the discounting of future obligations have replaced the higher interest rates of the past – prevailing when contracts were signed – with the lower current rates, thus boosting the value of liabilities. Against this backdrop and despite favourable investor sentiment in equity markets, credit ratings signal concerns about insurers.

Property-and-casualty firms' subdued performance in 2014 was the outcome of opposing forces. For instance, strong premium growth supported profitability in a number of countries (Table VI.2). Between mid-2013 and mid-2014, it contributed to a slight drop – to 94% – of European non-life insurers' combined ratio, ie the sum of underwriting losses, expenses and policyholders' dividends divided by premium income. However, elevated expenses and catastrophe losses at US companies wiped out much of their gains from premium growth, leading to a 99% combined ratio. Meanwhile, steady and widespread declines in investment returns have depressed non-life insurers' profitability in nearly all major centres.

Despite challenges stemming from their heavy reliance on investment income, life insurers have reported improving performance. Cost-cutting and a greater contribution from new business lines, notably the sale of asset management products, have been instrumental. According to industry estimates, the sector's return-on-equity has risen, from below 10% in 2012 to roughly 12% in 2014.

Some trends in the life insurance sector have been consistent with more conservative risk management. For instance, the growing share of asset management

Profitability of the insurance sector

In per cent — Table VI.2

	Non-life						*Life*					
	Premium growth			Investment return			Premium growth			Investment return		
	2010–11	2012–13	2014	2010–11	2012–13	2014	2010–11	2012–13	2014	2010–11	2012–13	2014
Australia	3.4	8.0	1.6	7.2	6.2	6.0	5.8	4.9	29.7	…	…	…
France	3.9	0.9	1.7	2.4	2.1	1.7	–5.4	–1.0	…	3.2	4.9	…
Germany	–0.4	3.8	4.0	3.4	3.3	3.0	1.3	2.5	…	4.0	5.0	…
Japan	1.0	4.7	3.7	1.5	1.8	1.2	5.3	0.2	6.3	…	…	…
Netherlands	3.4	0.2	…	2.0	2.0	…	1.1	–8.4	–12.1	5.4	4.8	…
United Kingdom	2.3	3.5	3.9	3.6	3.6	2.7	–0.8	–0.2	2.0	…	…	…
United States	1.5	3.1	5.9	3.7	3.4	2.9	10.3	–3.1	11.0	4.8	4.6	4.6

Values in multi-year columns are simple averages.

Sources: Swiss Re, sigma database; national supervisory authorities.

Box VI.E

Regulatory treatment of sovereign exposures: towards greater risk sensitivity

The Basel framework calls for minimum regulatory requirements commensurate with the underlying risks.① This is the basic philosophy of the framework. That said, a number of national jurisdictions implement preferential treatment of sovereign exposures, notably in relation to non-financial corporate exposures. This weakens the risk sensitivity of regulatory requirements.② As the resulting distortions can undermine financial stability, they have prompted policy initiatives to reassess the approach to sovereign exposures in bank regulation.

In its clearest form, the preferential treatment applies to exposures that are in the borrowing sovereign's domestic currency and are funded by the bank in the same currency. National authorities have the option – but not the obligation – to allow for much lower risk weights on such exposures than on exposures to private corporations with similar risk characteristics. Often, and regardless of the sovereign's rating, the reduced risk weight is zero. This is currently the case under the standardised approach to credit risk in the banking book, as well as under both the current and proposed approaches to specific risk in the trading book.③

When it comes to the treatment of liquidity risk, sovereigns are and are likely to remain attractive investments. One example relates to the regulatory approach to zero-risk-weight sovereign exposures: they qualify without limitations as high-quality liquid assets for banks' liquidity requirements. Or, take the proposed trading book rules, which require banks to evaluate the risk of their exposures over specific horizons. While the estimated risk increases mechanically with the evaluation horizon, this horizon is lower for more liquid securities that are easier to sell at times of stress. Given the high historical liquidity of sovereign securities, the associated evaluation horizons are proposed to be two to three times shorter than those required for equally rated corporate securities.

In addition, sovereign exposures have been exempt from concentration limits in regulatory rules on large exposures. It is thus hardly surprising that they have played an important role in banks' balance sheets. In a worldwide sample of 30 large banks, the share of sovereign exposures in the banking book expanded from roughly 12% in 2004 to 20% at end-2013.④ And in the euro area's geographical periphery, banks' holdings of their own sovereign's debt have increased steadily as a share of total assets: from 3% in 2008 to above 8% at end-2014.⑤

This has strengthened the interdependence of banks and sovereigns. For decades, banks have relied on implicit and explicit sovereign support to improve their ratings and lower their funding costs. More recently, the preferential regulatory treatment of sovereign exposures has allowed banks that were themselves under strain to extend lifelines to troubled governments. The destabilising effect of the two-way links came to the fore during the 2010–11 sovereign debt crisis, which took financial distress to new heights.

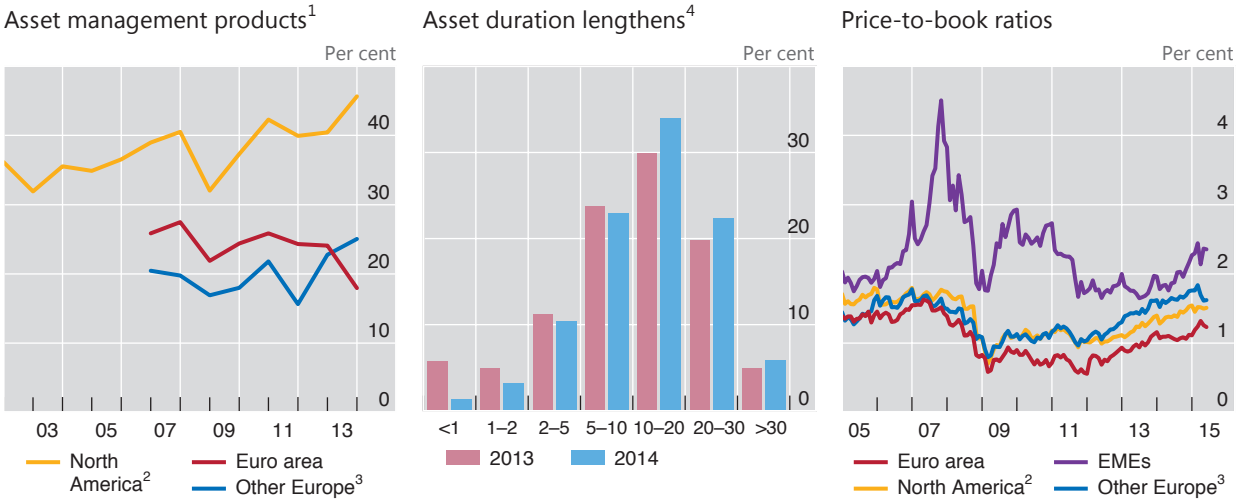
Such experiences have prompted a reassessment of the regulatory treatment of sovereigns. Initial steps in this direction relate to the treatment of sovereign support for banks in the standardised approach to credit risk. Proposed changes to this approach would not allow a lending bank to reduce the risk weight on its interbank exposure by referring to the rating of the borrowing bank's sovereign. If implemented, these changes would align the lending bank's capital charge – and ultimately the lending rate – more closely with the borrowing bank's riskiness.⑥ In addition, forthcoming leverage ratio requirements will provide, inter alia, a backstop for the size of sovereign exposures for a given level of bank capital. But further work is needed on the regulatory treatment of sovereign exposures themselves.

It is important to recognise that sovereigns' preferential status rests on a misleading argument. The argument hinges on central banks standing ready to monetise domestic currency sovereign debt in order to prevent defaults on this debt. As recent events in the euro area show, however, such a solution cannot apply in a currency zone subject to macroeconomic conditions that do not happen to be aligned with the needs of a particular sovereign under stress. The argument is also weakened by a number of historical defaults on local currency sovereign debt, mostly in emerging market economies. And, even when monetisation does prevent a sovereign default, it undermines central bank independence and market confidence in the domestic currency. This, in turn, could lead to high inflation and a currency crisis, which would also adversely affect the banking system. All these considerations underscore the merits of seeking a closer alignment between regulatory requirements for sovereign exposures and the likelihood of sovereign distress.

① Basel Committee on Banking Supervision, *Basel II: International convergence of capital measurement and capital standards: A revised framework – Comprehensive version*, June 2006. ② See Bank for International Settlements, "Treatment of sovereign risk in the Basel capital framework", *BIS Quarterly Review*, December 2013, p 10. ③ Basel Committee on Banking Supervision, *Fundamental review of the trading book: outstanding issues*, consultative document, December 2014. ④ Based on BCBS data. ⑤ See European Systemic Risk Board, *Report on the regulatory treatment of sovereign exposures*, 2015. ⑥ Basel Committee on Banking Supervision, *Revisions to the standardised approach for credit risk*, consultative document, December 2014.

Insurance companies: evolving market perceptions and business models

Graph VI.6



[1] As a share of life and health liabilities. Asset management products refer to separate account liabilities (US companies) or unit-linked liabilities (European companies). [2] Canada and the United States. [3] Switzerland and the United Kingdom. [4] Book value of holdings of OECD government bonds by German insurance companies, shares in total, by maturity bucket.

Sources: Deutsche Bundesbank; Datastream; SNL; BIS calculations.

products in the liabilities of North American, Swiss and UK life insurers (Graph VI.6, left-hand panel) indicates offloading of financial risk to customers. On the assets side, European companies have been increasing the duration of their bond portfolios (centre panel), thus narrowing duration gap estimates.[2] While such estimates suggest an improvement in balance sheet strength, they should be interpreted with caution given their sensitivity to assumptions about discount rates and policyholder behaviour.

At the same time, the risk profile of insurance companies' assets has deteriorated in recent years, albeit from a conservative starting point. Pressed by regulation and institutional mandates to hold predominantly investment grade securities, insurance companies have seen their asset distribution shift from the best to the worst ratings in this range (Graph VI.7). The shift could be partly due to a slide in the credit quality of outstanding securities. But it is also consistent with active search for yield. And while US firms have operated mainly in the corporate and mortgage markets, their European peers have searched for yield in sovereign bonds. National authorities have in fact encouraged this behaviour to the extent that they have allowed insurance companies – as they have banks – to apply zero risk weights even to sovereigns with low and deteriorating ratings.

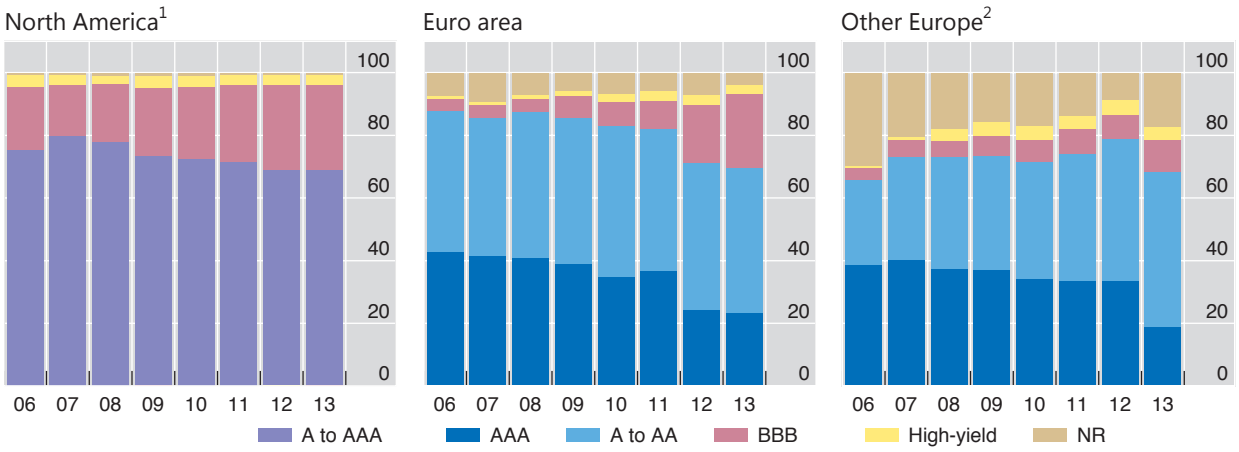
Equity markets and rating agencies point to different perceptions of the insurance sector. Price-to-book ratios have been on the rise in major advanced economies since 2011 and have increased from an already high level in EMEs since mid-2014 (Graph VI.6, right-hand panel). This could reflect improving financial strength but also general market euphoria (Chapter II). By contrast, insurers' ratings deteriorated substantially during the financial crisis and have hardly recovered since. A likely driver is a concern that the growth of fees and premia – quite important in supporting insurers' recent profits – will eventually run its course.

[2] See European Insurance and Occupational Pensions Authority, *Financial Stability Report*, December 2014, p 37.

Insurance companies move towards lower-rated investments

As percentages of securities bearing credit risk

Graph VI.7



[1] Canada and the United States. [2] Denmark, Norway, Switzerland and the United Kingdom.

Sources: SNL; BIS calculations.

Pension funds: growing deficits

Financial market conditions, added to demographic changes, have put a heavy strain on pension funds. Central to the funds' woes are persistently low interest rates, which depress both investment returns and discount rates. Lower discount rates, in turn, raise the present value of funds' liabilities more sharply than that of their assets, which are typically of much shorter duration. This widens pension fund deficits and may ultimately affect the economy at large.

Discount rates vary substantially across countries. According to industry reports on company-sponsored pension funds in advanced economies, they ranged from 4% in North America to 1.5% in Japan in 2013. This reflects differences in local market conditions and in accounting standards. Most accounting approaches pin the discount rate to either the expected long-term return on the fund's assets or the prevailing market yields on low-risk securities, such as highly rated bonds. Either way, the discount rate typically drops with bond yields but to an extent that varies across jurisdictions and between sectors in the same jurisdiction.

US funds provide a good example of the impact of accounting standards. For instance, according to national sources, the average return-based discount rate of US public pension funds can be 300 basis points higher than the rate reported by some of their private sector counterparts. To put this in perspective, a 400 basis point reduction in the discount rate would increase the value of the liabilities of a typical US pension fund by more than 80%. That said, recent and pending changes to US accounting standards are expected to narrow the gap.

In the face of ultra-low interest rates, policy measures have offered temporary relief. For instance, regulators allowed discount rate increases in 2012, partly in response to industry concerns that the prevailing rates had decoupled reported funding ratios from pension plans' intrinsic funding conditions. This measure was either direct – eg discount rate floors in Sweden and higher long-term discount rates in Denmark – or indirect – eg the use of longer, 25-year horizons for the computation of rate corridors in the United States. Likewise, US regulatory

amendments in 2012 made it advantageous for funds to offload contracts to insurance companies and to make lump sum payments to plan participants.

Such shifts in contractual obligations are part of a long-standing risk management strategy in the sector. In a trend seen in most major markets, defined contribution (DC) plans, under which members bear the investment risks, have grown more than defined benefit (DB) plans, which guarantee a certain income to members. Concretely, DC plans saw their share in aggregate pension fund liabilities increase from an estimated 39% in 2004 to 47% in 2014. This trend is likely to continue as pension funds address increases in life expectancy estimates that raise the present value of their obligations.

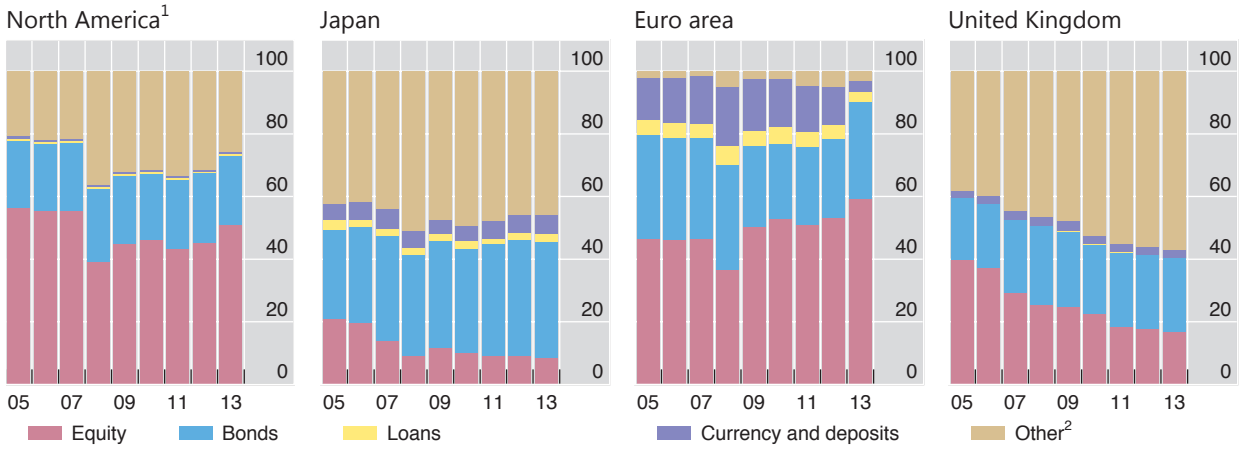
In parallel, pension funds have responded to declining asset returns by shedding their exposure to traditional risks and loading up on so-called alternative investments. These include real estate, hedge funds, private equity and commodities. Industry estimates reveal that the share of such investments in pension fund asset portfolios has risen – from 5% in 2001 to 15% in 2007 and 25% in 2014 – mirrored by a 20 percentage point drop in the equity share. UK pension funds are important drivers of this shift (Graph VI.8, right-hand panel), as are US funds, whose disposal of equities has reportedly been masked by strong valuation gains.

Despite official support and their own efforts, pension funds are facing growing problems. For instance, funding ratios at end-2014 were below pre-crisis levels in both the United States and Europe. And the situation is set to worsen if low interest rates persist, further depressing both asset returns and the discount rates applied to liability valuations. For the US sector, industry research has found that a 35 followed by a 60 basis point decline in the discount rate and correspondingly low asset returns would lower the average funding ratio by roughly 10 percentage points, to about 70%, in two years.

Funding strains at pension funds could have broader repercussions. In the case of DB plans, the fund's liabilities are a contractual obligation of the fund's sponsor, eg a manufacturing corporation or a services firm. Thus, since unsustainable deficits translate sooner or later into expenses for the sponsor, they would hurt companies' profits and possibly undermine their solvency. For their part, DC plans can have

Pension funds show signs of shifting away from equities

As percentages of total financial assets — Graph VI.8



[1] Canada and the United States. [2] Includes investment in mutual funds.

Sources: OECD; BIS calculations.

similar effects but through different channels. A drop in the value of a DC plan's assets means a decline in the future income stream of its members. If such an outcome is widespread, it would lead to an increase in the saving rate and hence a decline in aggregate demand.

Risks morph post-crisis in the financial system

The financial landscape has evolved substantially post-crisis. While banks have lost ground as intermediaries, asset managers – which run mutual, private equity and hedge funds, among others – have increasingly catered to the needs of yield-hungry investors. As a result, new types of risk have gained prominence.

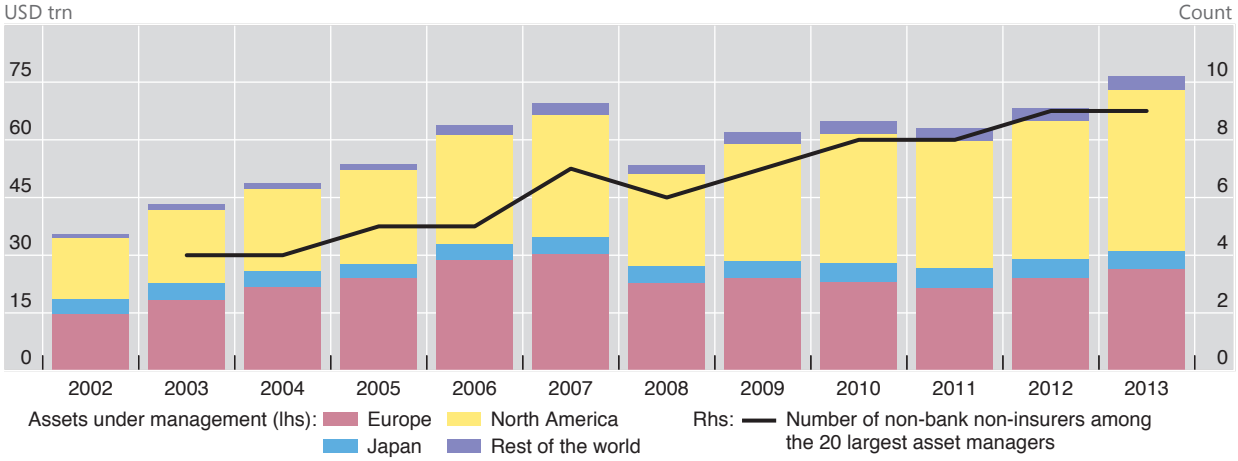
The asset management sector has grown considerably over the past decade. Despite a mid-crisis hiatus, which mirrored mainly valuation losses, global assets under management (AUM) rose from roughly $35 trillion in 2002 to $75 trillion in 2013 (Graph VI.9). The sector remains highly concentrated, with the top 20 managers accounting for 40% of total assets.

The sector's composition has changed over time. By region, North American asset managers have increased their market share by 11 percentage points over the last decade. They now account for more than half of total AUM and approximately two thirds of the assets managed by the top 20 managers. By type, independent managers have been rapidly displacing bank- and insurer-owned managers at the top (Graph VI.9, black line).

As risk-taking migrates away from the banking sector, asset managers have played a pivotal role together with their customers and these customers' investment consultants. In their recommendations, investment consultants reportedly attribute substantial weight to assets' latest performance. Thus, as the returns on EME assets were higher than those on advanced economy assets in the crisis aftermath, investment consultants' recommendations are likely to have contributed to the strong flows into EME funds in recent years (Chapter II).

Abundant bond financing has substantially reduced EME companies' capitalisation ratio, ie market capitalisation divided by the sum of market capitalisation and the book value of liabilities. Despite buoyant equity markets, massive borrowing by EME banks and non-financial corporates between 2010 and 2014 lowered significantly

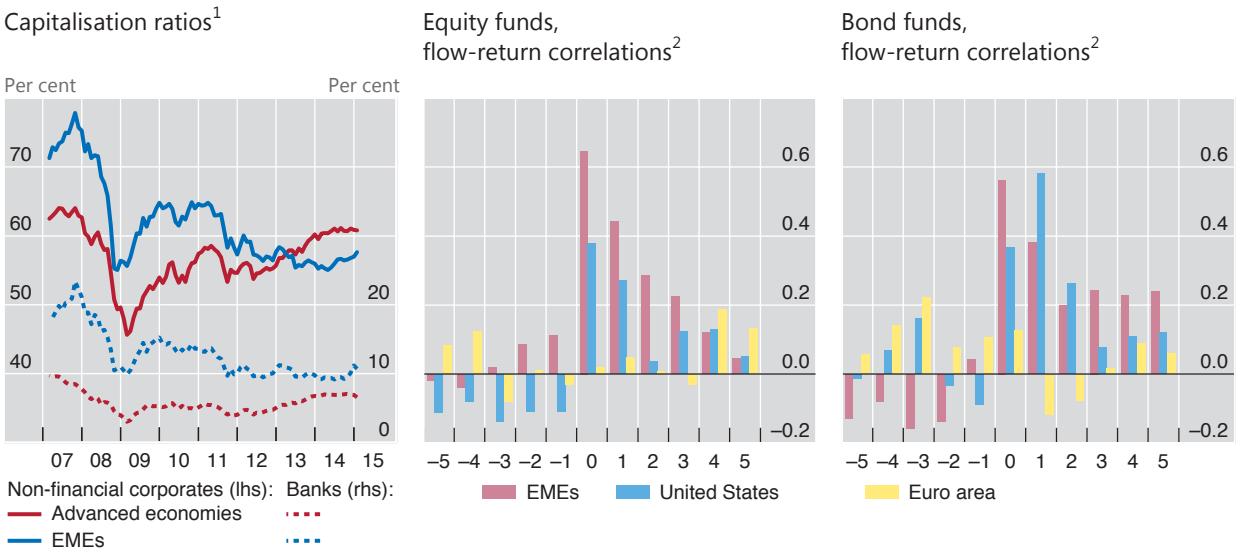
New types of asset managers drive the sector's growth — Graph VI.9



Sources: Towers Watson, *The World's 500 Largest Asset Managers*, 2014; BIS calculations.

EMEs' growing vulnerability to volatile fund flows

Graph VI.10



[1] Region-wide market capitalisation divided by the sum of region-wide market capitalisation and region-wide book value of liabilities; averages over the previous three months; based on the Moody's KMV sample of listed entities. [2] Correlation between fund flows and returns on a broad index between January 1998 (euro area equity) / mid-2000 (US and EME equity) / mid-2003 (US and EME bonds) / January 2009 (euro area bonds) and January 2015. The labelling of the horizontal axis indicates by how many months flows lead (negative numbers) or lag (positive numbers) returns for the calculation of correlations.

Sources: Bank of America Merrill Lynch; Bloomberg; EPFR; Moody's; BIS calculations.

their capitalisation ratios to levels last seen at end-2008, in the midst of the global financial turmoil (Graph VI.10, left-hand panel). Even though this trend reversed partly at the start of 2015, it has undermined firms' loss-absorbing capacity, leaving EMEs vulnerable to funding reversals.

This vulnerability has evolved alongside the growing reliance of EMEs on market-based financing channelled through internationally active asset managers (Chapter III). In general, asset managers' business models – eg benchmarking to market indices and attributing great importance to relative performance – and the investment structures that they offer – eg collective investment vehicles – incentivise short-sighted behaviour that can be destabilising in the face of adverse shocks. In the case of managers investing in EME assets, this issue is all the more pronounced.[3] EME funds rely on significantly fewer and more correlated benchmarks than their advanced economy counterparts. As a result, financial shocks are more likely to simultaneously affect a wide range of investors in EME funds, leading to concerted in- and outflows.

Fund flows that amplify price swings would be destabilising. The potential for such dynamics transpires from the historical relationship between returns on broad indices and fund flows (Graph VI.10, centre and right-hand panels). In the case of US and EME funds, inflows follow in the footsteps of high returns (bars to the right of zero) and are likely to strengthen the rise in contemporaneous returns (bars at zero). In such a scenario, fund inflows support persistent equity or bond booms. However, this mechanism would work in the opposite direction as well. In a downturn, outflows would exacerbate sub-par returns and persistently depress markets.

[3] See K Miyajima and I Shim, "Asset managers in emerging market economies", *BIS Quarterly Review*, September 2014, pp 19–34.

Looking forward, the fundamental question is whether asset managers can take over intermediation functions that banks have shed. Financial institutions' success in performing such functions depends on their capacity to take temporary losses in their stride. But this capacity has recently declined in the asset management sector, where retail investors have been replacing institutional investors as the ultimate risk bearers. Retail investors have smaller balance sheets, shorter investment horizons and lower risk tolerance, and hence a smaller loss-absorbing capacity. The investment behaviour of UK households during the recent financial crisis is consistent with this.[4]

These issues become more important as the assets managed by an individual company grow in size. The decisions taken by a single large asset manager can potentially trigger fund flows with significant system-wide repercussions. To delve into this issue, the Financial Stability Board and the International Organization of Securities Commissions have published a proposal on how to identify non-bank non-insurer global systemically important financial institutions.[5]

More recently, the policy debate has considered asset management companies (AMCs) as a distinctive group that gives rise to new financial risks. AMCs' incentive structures have received particular attention, as they can generate concerted behaviour and thus amplify financial market fluctuations. Restrictions on investment portfolio shifts could limit incentive-driven swings and, by effectively lengthening asset managers' investment horizons, could stabilise their behaviour in the face of temporary adverse shocks. Similarly, caps on leverage could contain the amplification of shocks. Furthermore, redemption risk can be addressed by liquidity buffers and – in the spirit of recent amendments to US money market fund rules – by restrictions on rapid redemptions from managed funds. This could insulate asset managers from hasty swings in retail investor sentiment, thus boosting the sector's loss-absorbing capacity.

A complementary policy response would aim to restore the vibrancy of institutions that were successful intermediaries in the past. Banks are the prime example. Regulatory initiatives under way that aim to increase banks' resilience and transparency would improve their intermediation capacity, not least by helping them regain market confidence. And as resilience depends critically on the ability to generate sustainable profits, it would be supported by growth-enhancing reforms and a timely normalisation of monetary policy in advanced economies as well as by further initiatives to restrain financial imbalances in emerging market economies.

[4] See A Haldane, "The age of asset management?", speech given at the London Business School, April 2014.

[5] Financial Stability Board and International Organization of Securities Commissions, *Assessment methodologies for identifying non-bank non-insurer global systemically important financial institutions*, consultative document, March 2015.

Statistical Annex

Output growth, inflation and current account balances[1]

Table A1

	Real GDP				Consumer prices				Current account balance[2]		
	Annual percentage changes				Annual percentage changes				Percentage of GDP		
	2013	2014	2015	1996–2006	2013	2014	2015	1996–2006	2013	2014	2015
World	**3.4**	**3.4**	**3.3**	**3.8**	**3.1**	**3.1**	**2.3**	**4.5**	**0.0**	**0.6**	**0.7**
Advanced economies	**1.2**	**1.7**	**1.9**	**2.7**	**1.3**	**1.4**	**0.3**	**1.9**	**–0.3**	**0.4**	**0.2**
United States	2.2	2.4	2.5	3.4	1.5	1.6	0.2	2.6	–2.4	–2.4	–2.4
Euro area[3]	–0.4	0.9	1.5	2.2	1.4	0.4	0.1	1.9	2.2	2.3	2.1
France	*0.7*	*0.2*	*1.1*	*2.3*	*0.9*	*0.5*	*0.2*	*1.6*	*–1.4*	*–1.0*	*–0.7*
Germany	*0.2*	*1.6*	*2.0*	*1.5*	*1.5*	*0.9*	*0.4*	*1.4*	*6.7*	*7.6*	*7.4*
Italy	*–1.7*	*–0.4*	*0.6*	*1.5*	*1.2*	*0.2*	*0.1*	*2.4*	*1.0*	*1.8*	*2.3*
Spain	*–1.2*	*1.4*	*2.8*	*3.8*	*1.4*	*–0.1*	*–0.4*	*3.0*	*1.4*	*0.8*	*0.6*
Japan	1.6	–0.1	0.9	1.1	0.4	2.7	0.6	0.0	0.7	0.5	2.6
United Kingdom	1.7	2.8	2.5	3.0	2.6	1.5	0.3	1.6	–4.5	5.5	4.3
Other western Europe[4]	1.1	2.0	1.6	2.6	0.5	0.5	0.3	1.4	9.1	7.0	6.4
Canada	2.0	2.4	1.9	3.2	0.9	1.9	1.1	2.0	–3.0	–2.2	–3.1
Australia	2.1	2.7	2.5	3.7	2.4	2.5	1.8	2.6	–3.3	–2.8	–3.0
EMEs	**5.2**	**4.9**	**4.5**	**5.5**	**4.7**	**4.6**	**4.1**	**5.6**	**0.5**	**1.0**	**1.5**
Asia	6.5	6.5	6.4	6.8	4.4	3.2	2.5	3.1	2.2	2.5	3.0
China	*7.7*	*7.4*	*6.9*	*9.2*	*2.6*	*2.0*	*1.4*	*1.4*	*1.9*	*2.1*	*2.7*
India[5]	*6.7*	*7.2*	*7.8*	*6.7*	*9.9*	*6.0*	*5.3*	*4.5*	*–1.7*	*–1.4*	*–1.0*
Korea	*2.9*	*3.3*	*3.1*	*5.2*	*1.3*	*1.3*	*0.9*	*3.2*	*6.2*	*6.3*	*7.3*
Other Asia[6]	*4.5*	*4.2*	*4.4*	*4.0*	*3.7*	*3.9*	*3.0*	*4.6*	*3.6*	*4.6*	*4.8*
Latin America[7]	2.9	1.3	0.9	3.1	5.4	7.4	7.1	6.5	–2.9	–3.3	–3.3
Brazil	*2.7*	*0.2*	*–1.2*	*2.7*	*5.9*	*6.4*	*8.0*	*7.7*	*–3.4*	*–4.4*	*–4.4*
Mexico	*1.7*	*2.1*	*2.8*	*3.5*	*4.0*	*4.1*	*3.0*	*4.4*	*–2.4*	*–2.1*	*–2.3*
Central Europe[8]	1.1	3.1	3.2	4.0	1.3	0.1	–0.2	3.1	–0.3	–0.1	0.1
Poland	*1.6*	*3.3*	*3.5*	*4.4*	*1.2*	*0.2*	*–0.5*	*2.5*	*–1.3*	*–1.4*	*–1.1*
Russia	1.3	0.6	–3.6	4.3	6.5	11.4	12.3	12.9	1.6	3.2	4.5
Turkey	4.2	2.9	3.1	4.7	7.5	8.9	7.1	24.6	–7.9	–5.7	–4.8
Saudi Arabia	2.7	3.5	1.3	3.9	3.5	2.7	2.5	0.5	17.8	12.9	–3.1
South Africa	2.2	1.5	2.1	3.5	5.8	6.1	4.7	4.2	–5.8	–5.4	–5.2

[1] Based on May 2015 consensus forecasts. For the aggregates, weighted averages based on GDP and PPP exchange rates. 1996–2006 values refer to average annual growth and inflation (for EMEs, inflation calculated over 2001–06). [2] For the aggregates, sum of the countries and regions shown or cited; world figures do not sum to zero because of incomplete country coverage and statistical discrepancies. [3] Current account based on the aggregation of extra-euro area transactions. [4] Denmark, Norway, Sweden and Switzerland. [5] Fiscal years (starting in April). [6] Chinese Taipei, Hong Kong SAR, Indonesia, Malaysia, the Philippines, Singapore and Thailand. [7] Argentina, Brazil, Chile, Colombia, Mexico and Peru. For Argentina, consumer price data are based on official estimates, which contain a methodological break in December 2013. [8] The Czech Republic, Hungary and Poland.

Sources: IMF, *World Economic Outlook*; Consensus Economics; national data; BIS calculations.

Residential property prices

Annual averages, year-on-year changes; in per cent

Table A2

	Nominal				Real			
	2012	2013	2014	2007–11 Average	2012	2013	2014	2007–11 Average
United States	4.8	11.3	6.8	–6.8	2.7	9.7	5.1	–8.8
Euro area	–1.7	–2.0	0.2	1.0	–4.1	–3.3	–0.3	–1.0
Austria	*12.4*	*4.7*	*3.4*	*4.0*	*9.6*	*2.7*	*1.7*	*1.8*
Belgium	*2.2*	*1.2*	*–0.5*	*3.8*	*–0.6*	*0.1*	*–0.8*	*1.4*
France	*–0.5*	*–1.9*	*–1.5*	*2.4*	*–2.4*	*–2.7*	*–2.0*	*0.7*
Germany	*3.0*	*3.2*	*3.1*	*1.1*	*1.0*	*1.7*	*2.2*	*–0.6*
Greece	*–11.7*	*–10.8*	*–7.5*	*–1.2*	*–13.0*	*–10.0*	*–6.2*	*–4.3*
Ireland	*–11.4*	*2.1*	*13.0*	*–8.9*	*–12.9*	*1.6*	*12.8*	*–10.2*
Italy	*–2.8*	*–5.7*	*–4.2*	*1.3*	*–5.7*	*–6.9*	*–4.4*	*–0.8*
Netherlands	*–6.7*	*–6.0*	*0.8*	*–0.2*	*–8.9*	*–8.3*	*–0.2*	*–2.0*
Portugal	*–7.1*	*–1.9*	*4.3*	*–1.7*	*–9.6*	*–2.2*	*4.5*	*–3.0*
Spain	*–13.7*	*–10.6*	*0.3*	*–4.4*	*–15.8*	*–11.8*	*0.4*	*–6.4*
Japan	–0.9	1.6	1.6	–1.0	–0.8	1.3	–1.1	–0.8
United Kingdom	1.7	3.5	10.0	1.7	–1.5	0.5	7.4	–1.8
Canada	0.2	5.6	6.7	5.6	–1.3	4.6	4.7	3.6
Sweden	1.2	5.5	9.4	5.4	0.3	5.5	9.6	3.5
Australia	–0.3	6.6	9.1	5.6	–2.0	4.1	6.5	2.6
Asia								
China	*–0.7*	*5.9*	*2.6*	*5.4*	*–3.2*	*3.2*	*0.6*	*1.7*
Hong Kong SAR	*13.3*	*17.5*	*6.0*	*14.8*	*8.9*	*12.6*	*1.5*	*11.5*
India	*24.2*	*14.6*	*12.8*	*20.6*	*13.3*	*4.1*	*5.2*	*9.2*
Indonesia	*4.6*	*12.0*	*7.0*	*2.8*	*0.6*	*5.3*	*0.6*	*–3.1*
Korea	*2.9*	*–0.4*	*1.5*	*4.2*	*0.7*	*–1.7*	*0.2*	*0.8*
Malaysia	*11.8*	*10.9*	*8.2*	*5.5*	*10.0*	*8.6*	*4.9*	*2.9*
Philippines	*9.4*	*11.3*	*8.9*	*1.8*	*6.0*	*8.2*	*4.5*	*–2.3*
Singapore	*2.3*	*3.2*	*–2.9*	*11.3*	*–2.1*	*0.8*	*–3.9*	*7.5*
Thailand	*1.2*	*5.5*	*4.9*	*2.8*	*–1.8*	*3.2*	*2.9*	*0.8*
Latin America								
Brazil	*11.8*	*9.3*	*7.9*	*21.6*	*6.0*	*2.9*	*1.4*	*15.7*
Chile	*7.4*	*9.8*		*4.6*	*4.3*	*7.5*		*1.0*
Colombia	*11.2*	*10.1*	*9.6*	*12.1*	*7.8*	*7.9*	*6.5*	*7.2*
Mexico	*4.8*	*3.8*	*4.4*	*5.1*	*0.7*	*0.0*	*0.4*	*0.7*
Peru	*21.8*	*16.9*	*12.7*	*15.4*	*17.5*	*13.7*	*9.2*	*11.9*
Central Europe								
Czech Republic	*–1.4*	*0.0*	*2.6*	*–1.9*	*–4.6*	*–1.4*	*2.2*	*–3.3*
Hungary	*–3.8*	*–2.6*	*4.0*	*–2.2*	*–8.9*	*–4.2*	*4.2*	*–6.6*
Poland	*–4.4*	*–5.5*	*2.0*	*–0.7*	*–7.8*	*–6.6*	*1.8*	*–4.3*
Russia	15.0	3.8	1.4	11.2	9.5	–2.8	–6.0	1.0
South Africa	0.6	10.0	9.4	5.5	–4.8	4.0	3.1	–0.9
Turkey	11.8	12.7	14.4	10.1	2.7	4.9	5.1	3.5

Sources: BIS database on property price statistics; CEIC; national data; BIS calculations.

Fiscal positions[1]

Table A3

	Overall balance[2]			Underlying government primary balance[3]			Gross debt[2]		
	2012–14 Average	2015	Change	2012–14 Average	2015	Change	2007	2015	Change
Advanced economies									
Austria	–2.3	–2.2	0.0	0.8	1.1	0.2	78	102	24.8
Belgium	–3.3	–2.1	1.1	0.6	1.3	0.7	94	119	25.9
Canada	–2.6	–1.8	0.8	–2.0	–1.9	0.1	70	94	24.0
France	–4.5	–4.3	0.1	–1.6	–1.1	0.5	76	117	41.8
Germany	0.2	0.0	–0.2	1.6	1.1	–0.5	64	76	11.9
Greece	–7.3	–0.5	6.8	5.7	7.7	2.0	114	180	65.6
Ireland	–5.8	–2.9	2.9	–0.3	1.0	1.2	28	115	87.4
Italy	–2.9	–2.8	0.1	4.1	4.4	0.3	112	149	37.5
Japan	–8.7	–7.3	1.4	–7.0	–5.7	1.3	162	234	71.4
Netherlands	–2.9	–2.3	0.6	–0.9	0.1	1.0	49	78	29.7
Portugal	–5.1	–2.9	2.2	1.5	3.3	1.8	78	143	65.3
Spain	–7.6	–4.4	3.1	–1.0	0.6	1.6	47	134	86.7
Sweden	–1.3	–1.3	0.0	–0.3	–0.5	–0.2	46	47	1.1
United Kingdom	–5.7	–4.4	1.3	–4.0	–2.3	1.7	45	98	52.3
United States	–6.6	–4.3	2.3	–2.7	–1.0	1.6	64	110	45.8
EMEs									
Brazil	–4.0	–5.3	–1.3	1.0	1.6	0.7	64	66	2.4
China	–0.7	–1.9	–1.2	0.1	–1.1	–1.2	35	43	8.6
India	–7.3	–7.2	0.1	–2.7	–2.1	0.5	74	64	–9.6
Indonesia	–1.9	–2.3	–0.3	–0.7	–1.0	–0.2	32	26	–6.4
Korea	0.0	–1.0	–1.0	–0.3	–1.3	–1.0	27	38	11.3
Malaysia	–4.0	–3.5	0.5	–2.2	–1.9	0.2	41	57	15.4
Mexico	–4.0	–4.1	–0.1	–1.4	–1.3	0.2	38	51	13.9
South Africa	–4.1	–4.2	–0.1	–0.9	–0.5	0.3	27	48	20.4
Thailand	–1.3	–1.9	–0.7	0.0	–0.6	–0.6	38	48	9.2

[1] For the general government. [2] As a percentage of GDP. OECD estimates for advanced economies and Korea, otherwise IMF. [3] As a percentage of potential GDP; excluding net interest payments. OECD estimates for advanced economies and Korea, otherwise IMF. OECD estimates are adjusted for the cycle and for one-off transactions, and IMF estimates are adjusted for the cycle.

Sources: IMF; OECD.

Early warning indicators of domestic banking crisis[1]

Table A4

		Credit-to-GDP gap[2]	Property price gap[3]	Debt service ratio[4]	Debt service ratio if interest rates rise by 250 bp[4, 5]
Upswing	Asia[6]	17.8	9.8	4.1	6.3
	Australia	–2.3	0.9	0.5	3.9
	Brazil	14.3	–1.9	4.6	6.0
	Canada	3.8	4.6	2.6	6.1
	Korea	3.8	4.2	2.6	5.9
	India	–3.0		2.7	3.7
	Nordic countries[7]	0.3	5.7	2.8	6.8
	South Africa	–3.4	–6.3	–0.7	0.4
	Switzerland	9.5	11.6	1.4	4.4
	Turkey	14.2		5.4	6.7
	United States	–13.4	–1.6	–1.9	0.4
Mixed signals	Central and eastern Europe[8]	–11.0	4.6	1.5	2.9
	China	25.1	0.5	9.7	12.6
	France	4.0	–11.4	0.9	3.9
	Germany	–6.4	9.7	–2.2	–0.4
	Japan	6.1	10.1	–2.6	0.1
	Mexico	5.2	–4.0	0.8	1.3
	Netherlands	–19.4	–19.2	1.8	6.5
	Portugal	–26.8	6.7	–3.3	0.0
	Spain	–37.9	–28.4	–3.4	–0.4
	United Kingdom	–29.6	–3.1	–1.4	1.5
Downswing	Greece	–6.3	4.8		
	Italy	–9.5	–16.8	–0.1	1.9
Legend		*Credit/GDP gap>10*	*Property gap>10*	*DSR>6*	*DSR>6*
		2≤Credit/GDP gap≤10		*4≤DSR≤6*	*4≤DSR≤6*

[1] Thresholds for red cells are chosen by minimising false alarms conditional on capturing at least two thirds of the crises over a cumulative three-year horizon. A signal is correct if a crisis occurs in any of the three years ahead. The noise is measured by the wrong predictions outside this horizon. Beige cells for the credit-to-GDP gap are based on guidelines for countercyclical capital buffers under Basel III. Beige cells for the debt service ratio (DSR) are based on critical thresholds if a two-year forecast horizon is used. For a derivation of critical thresholds for credit-to-GDP gaps and property price gaps, see M Drehmann, C Borio and K Tsatsaronis, "Anchoring countercyclical capital buffers: the role of credit aggregates", *International Journal of Central Banking*, vol, 7, no 4, December 2011, pp 189–240. For the DSR methodology, see M Drehmann and M Juselius, "Do debt service costs affect macroeconomic and financial stability?", *BIS Quarterly Review*, September 2012, pp 21–35. Country aggregates are simple averages. [2] Difference of the credit-to-GDP ratio from its long-run, real-time trend calculated with a one-sided HP filter using a smoothing factor of 400,000, in percentage points. [3] Deviations of real residential property prices from their long-run trend calculated with a one-sided HP filter using a smoothing factor of 400,000, in per cent. [4] Difference of DSRs from country-specific long-run averages since 1999 or later depending on data availability and when five-year average inflation fell below 10%, in percentage points. [5] Assuming that all other components of the DSR stay fixed. [6] Hong Kong SAR, Indonesia, Malaysia, the Philippines, Singapore and Thailand; excluding the Philippines and Singapore for the DSR and its forecast. [7] Finland, Norway and Sweden. [8] Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Russia; excluding the Czech Republic and Romania for the real property price gap; excluding Bulgaria, Estonia, Latvia, Lithuania and Romania for the DSR and its forecast.

Sources: National data; BIS; BIS calculations.

Annual changes in foreign exchange reserves

In billions of US dollars

Table A5

	At current exchange rates					At constant 2013 exchange rates[1] (forward positions[2])		*Memo: Amounts outstanding (forward positions[2])*	
	2010	2011	2012	2013	2014	2014		*December 2014*	
World	**1,100**	**941**	**747**	**730**	**–92**	**394**	.	***11,591***	.
Advanced economies[3]	194	269	195	55	7	105	.	*2,294*	.
United States	2	0	–2	–2	–6	0	.	*42*	.
Euro area	13	1	12	1	7	…	.	*228*	.
Japan	39	185	–28	9	–3	…	.	*1,200*	.
Switzerland	126	54	197	21	10	51	.	*499*	.
EMEs[4]	824	624	484	601	–84	241	…	*8,114*	…
Asia	651	424	239	529	52	237	…	*5,932*	…
China	448	334	130	510	22	…	…	*3,843*	…
Chinese Taipei	34	4	18	14	2	…	…	*419*	…
Hong Kong SAR	13	17	32	–6	17	17	(0)	*328*	*(0)*
India	9	–5	–1	6	28	…	(39)	*296*	*(33)*
Indonesia	29	14	2	–12	13	…	(1)	*106*	*(–8)*
Korea	22	11	19	19	18	33	(13)	*354*	*(63)*
Malaysia	9	27	6	–4	–19	…	(–3)	*112*	*(1)*
Philippines	16	12	6	2	–4	–2	(1)	*70*	*(1)*
Singapore	38	12	21	14	–16	…	(–27)	*255*	*(42)*
Thailand	32	0	6	–12	–10	…	(0)	*149*	*(23)*
Latin America[5]	81	97	51	–6	24	50	…	*710*	…
Argentina	4	–7	–3	–12	1	…	(0)	*26*	*(0)*
Brazil	49	63	19	–13	6	13	(–32)	*355*	*(–107)*
Chile	2	14	0	0	0	1	(0)	*39*	*(0)*
Mexico	21	23	16	15	17	…	(0)	*185*	*(0)*
Venezuela	–8	–3	0	–4	…	…	…	…	…
CEE[6]	15	7	14	19	–18	1	…	*268*	…
Middle East[7]	50	88	148	76	–13	…	…	*877*	…
Russia	27	8	32	–17	–129	–107	(8)	*328*	*(–1)*
Memo: Net oil exporters[8]	117	141	209	77	–136	…	…	*1,676*	…

[1] Data from IMF COFER. [2] Aggregate positions in forwards and futures vis-à-vis the domestic currency; IMF SDDS data except for Brazil (data on so-called swaps, which are non-deliverable forward contracts settled in domestic currency). [3] Countries shown plus Australia, Canada, Denmark, Iceland, New Zealand, Sweden and the United Kingdom. [4] Sum of the countries and regions shown or listed. [5] Countries shown plus Colombia and Peru. [6] Central and eastern Europe: Bulgaria, Croatia, the Czech Republic, Hungary, Lithuania, Poland and Romania. [7] Kuwait, Libya, Qatar and Saudi Arabia. [8] Algeria, Angola, Kazakhstan, Mexico, Nigeria, Norway, Russia, Venezuela and the Middle East.

Sources: IMF, COFER and *International Financial Statistics*; Datastream; national data; BIS calculations.

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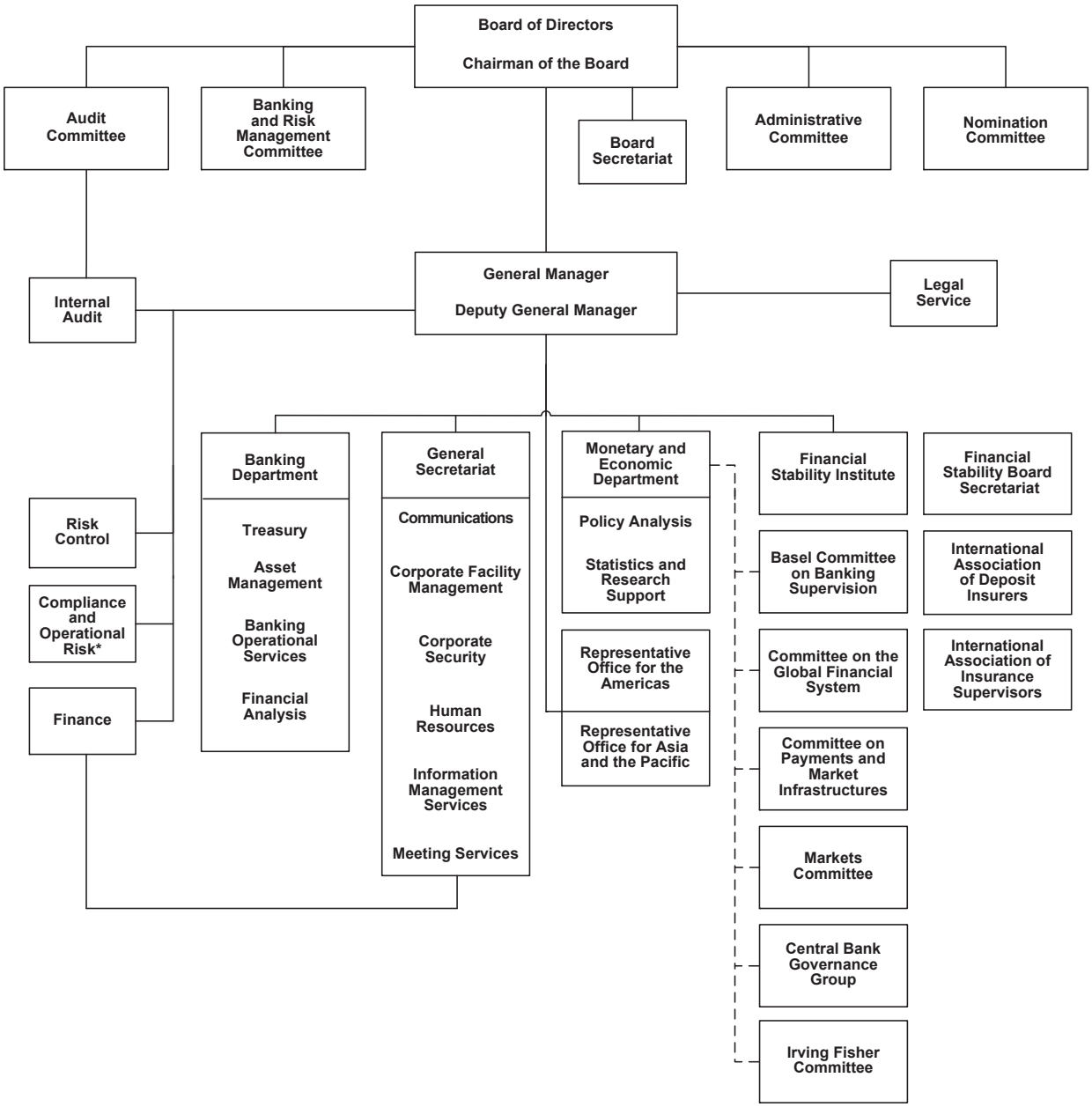


* Direct access to the Audit Committee on compliance matters.

The BIS: mission, activities, governance and financial results

The Bank for International Settlements (BIS) serves central banks in their pursuit of monetary and financial stability, fosters international cooperation in those areas and acts as a bank for central banks. In outline, the BIS pursues this mission by:

- facilitating dialogue and collaboration among central banks and other authorities that are responsible for promoting financial stability;
- conducting research on policy issues confronting central banks and financial supervisory authorities;
- acting as a prime counterparty for central banks in their financial transactions; and
- serving as an agent or trustee in connection with international financial operations.

The BIS has its head office in Basel, Switzerland, and representative offices in the Hong Kong Special Administrative Region of the People's Republic of China (Hong Kong SAR) and in Mexico City.

In the light of the aims outlined above, this chapter reviews the activities of the BIS, and of the groups it hosts, for the financial year 2014/15; describes the institutional framework that supports the work of those groups; and presents the year's financial results.

The meetings programmes and the Basel Process

The BIS promotes international cooperation among monetary authorities and financial supervisory officials through its meetings programmes and through the Basel Process – hosting international groups pursuing global financial stability (such as the Basel Committee on Banking Supervision and the Financial Stability Board) and facilitating their interaction.

Bimonthly meetings and other regular consultations

At bimonthly meetings, normally held in Basel, Governors and other senior officials of BIS member central banks discuss current developments and the outlook for the world economy and financial markets. They also exchange views and experiences on issues of interest to central banks.

The two principal bimonthly meetings are the Global Economy Meeting and the All Governors' Meeting.

Global Economy Meeting

The Global Economy Meeting (GEM) comprises the Governors of 30 BIS member central banks in major advanced and emerging market economies that account for about four fifths of global GDP. The Governors of another 19 central banks

attend the GEM as observers.[1] The GEM has two main roles: (i) monitoring and assessing developments, risks and opportunities in the world economy and the global financial system; and (ii) providing guidance to three BIS-based central bank committees – the Committee on the Global Financial System, the Committee on Payments and Market Infrastructures and the Markets Committee.

The GEM's economic discussions focus on current macroeconomic and financial developments in major advanced and emerging market economies. Specific topics discussed by the GEM over the past year included: the implications of unusually low financial market volatility; the current role of macroprudential policies; risk-taking in the real and financial sectors; the impact of lower oil prices; the implications of negative interest rates; and external adjustments against the backdrop of large movements in exchange rates.

As the Global Economy Meeting is quite large, it is supported by an informal group known as the Economic Consultative Committee (ECC). Limited to 18 participants, the ECC includes all Governors participating in the BIS Board meeting and the BIS General Manager. The ECC assembles proposals for consideration by the GEM. In addition, the ECC Chairman initiates recommendations to the GEM on the appointment of Chairs of the three central bank committees mentioned above and on the composition and organisation of those committees.

All Governors' Meeting

The All Governors' Meeting comprises the Governors of the 60 BIS member central banks and is chaired by the BIS Chairman. It convenes to discuss selected topics of general interest to its members. In 2014/15, the topics discussed were: Bitcoin and other virtual currencies – implications for central banks; central bank profitability – trends and policy relevance; global demographic change – issues for central banks; financial markets and central banks; the rise of regional banking in Asia and the Pacific; and inequality and monetary policy.

By agreement with the GEM and the BIS Board, the All Governors' Meeting is responsible for overseeing the work of two other groups that have a broader network or membership than the GEM. These are the Central Bank Governance Group, which also meets during the bimonthly meetings, and the Irving Fisher Committee on Central Bank Statistics.

Central Bank Governors and Heads of Supervision

The Group of Central Bank Governors and Heads of Supervision (GHOS) is a high-level forum responsible for international collaboration on banking supervision. It decides on global banking regulations and oversees the work of the Basel Committee on Banking Supervision (see page 136).

[1] The members of the GEM are the central bank Governors of Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong SAR, India, Indonesia, Italy, Japan, Korea, Malaysia, Mexico, the Netherlands, Poland, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, the United Kingdom and the United States and also the President of the European Central Bank and the President of the Federal Reserve Bank of New York. The Governors attending as observers are from Algeria, Austria, Chile, Colombia, the Czech Republic, Denmark, Finland, Greece, Hungary, Ireland, Israel, Luxembourg, New Zealand, Norway, Peru, the Philippines, Portugal, Romania and the United Arab Emirates.

Other meetings of Governors

The central bank Governors of major emerging market economies (EMEs) meet three times a year – during the January, May and September bimonthly meetings – to discuss issues of special importance to their economies. The topics discussed in 2014/15 included: global asset management companies and emerging market asset classes; international currencies and the international monetary system; and the implications for EMEs of exchange rate and commodity price developments.

Regular meetings were also held for the Governors of central banks in small open economies.

Other consultations

In addition, the Bank regularly organises various meetings that bring together not only central bank officials but also representatives from other financial authorities, the private financial sector and the academic community to discuss topics of shared interest.

These events include:

- the annual meetings of the working parties on monetary policy, held in Basel but also hosted at a regional level by a number of central banks in Asia, central and eastern Europe, and Latin America;
- the meeting of Deputy Governors of emerging market economies; and
- the high-level meetings organised by the Financial Stability Institute in various regions of the world for Governors and Deputy Governors and heads of supervisory authorities.

Other meetings in the past year included:

- a roundtable meeting of Governors from African central banks, in June 2014; and
- a meeting for central bank Governors on macroprudential policies, jointly organised by the Central Bank of the Republic of Turkey and the BIS in February 2015, following a joint workshop in December 2014.

The Basel Process

The Basel Process refers to the BIS's role in hosting and supporting the work of international groups – six committees and three associations – engaged in standard setting and the pursuit of financial stability.

The hosted committees, whose agendas are guided by various sets of central banks and supervisory authorities, are as follows:

- the Basel Committee on Banking Supervision (BCBS): develops global regulatory standards for banks and seeks to strengthen micro- and macroprudential supervision;
- the Committee on the Global Financial System (CGFS): monitors and analyses issues relating to financial markets and systems;
- the Committee on Payments and Market Infrastructures (CPMI): analyses and sets standards for payment, clearing and settlement infrastructures;
- the Markets Committee: monitors developments in financial markets and their implications for central bank operations;
- the Central Bank Governance Group: examines issues related to the design and operation of central banks; and
- the Irving Fisher Committee on Central Bank Statistics (IFC): addresses statistical issues relating to economic, monetary and financial stability.

The hosted associations are as follows:

- the Financial Stability Board (FSB): an association including finance ministries, central banks and other financial authorities in 24 countries; coordinates at the international level the work of national authorities and international standard setters and develops policies to enhance financial stability;
- the International Association of Deposit Insurers (IADI): sets global standards for deposit insurance systems and promotes cooperation on deposit insurance and bank resolution arrangements; and
- the International Association of Insurance Supervisors (IAIS): sets standards for the insurance sector to promote globally consistent supervision.

The Bank's own Financial Stability Institute (FSI) facilitates the dissemination of the standard-setting bodies' work to central banks and financial sector supervisory and regulatory agencies through its extensive programme of meetings, seminars and online tutorials.

The Basel Process is based on three key features: synergies of co-location; flexibility and openness in the exchange of information; and support from the BIS's expertise in economics, banking and regulation.

Synergies

The physical proximity of the nine committees and associations at the BIS creates synergies that produce a broad and fruitful exchange of ideas. In addition, by reducing each group's costs of operation through economies of scale, the Basel Process supports a more efficient use of public funds.

Flexibility

The limited size of these groups is conducive to flexibility and openness in the exchange of information, thereby facilitating coordination and preventing overlaps and gaps in their work programmes. At the same time, their output is much larger than their limited size would suggest, as they are able to leverage the expertise of the international community of central bankers, financial regulators and supervisors, and other international and national public authorities.

Support from the BIS's economic expertise and banking experience

The work of the Basel-based committees is informed by the BIS's economic research and, where appropriate, by the practical experience it gains from the implementation of regulatory standards and financial controls in its banking activities.

Activities of BIS-hosted committees and the FSI

This section reviews the year's principal activities of the six committees hosted by the BIS and of the Financial Stability Institute.

Basel Committee on Banking Supervision

The Basel Committee on Banking Supervision (BCBS) seeks to enhance supervisory cooperation and improve the quality of banking supervision worldwide. Its mandate is to strengthen the regulation, supervision and practices of banks for the purpose of enhancing financial stability. The Committee supports supervisors by providing a forum for exchanging information on national supervisory arrangements, improving

the effectiveness of techniques for supervising international banks, and setting minimum supervisory and regulatory standards.

The Committee consists of senior representatives of banking supervisory authorities and central banks responsible for banking supervision or financial stability issues in the Committee's member countries. It is chaired by Stefan Ingves, Governor of Sveriges Riksbank, and generally meets four times a year. The Committee's governing body is the Group of Governors and Heads of Supervision (GHOS) from member countries. The Committee seeks the endorsement of GHOS for its major decisions and its work programme.

Current work programme

At its January 2015 meeting, the GHOS reviewed and endorsed the Committee's strategic priorities:

- *Policy development*. The Committee continues to pursue its post-crisis reform agenda, with a focus on improving confidence in capital ratios by, for example, revising methods for measuring risk-weighted assets (RWA). During the year, the Committee released for consultation proposed revisions to the standardised approaches for credit and operational risk (see below). The Committee introduced an initiative to assess the interaction, coherence and overall calibration of the reform policies. The Committee has also begun a review of the regulatory treatment of sovereign risk.
- *Balancing simplicity, comparability and risk sensitivity*. For the effectiveness of the Basel capital standards, the Committee considers it essential to simplify them where possible and to improve the comparability of their outcomes. To that end, it is focusing on ways to improve the balance between comparability and complexity in the Basel capital framework. The Committee is also working to improve the presentation of its online documents, including the consolidation of the Basel framework into a single volume.
- *Monitoring and assessing implementation*. The Committee regularly evaluates member jurisdictions' adoption of its standards by means of the Regulatory Consistency Assessment Programme (RCAP). The RCAP will be expanded to cover Basel liquidity standards and the frameworks for global and domestic systemically important banks.
- *Improving the effectiveness of supervision*. Continuing its work on improving supervisory effectiveness, the Committee will focus on practices related to stress testing, valuation practices and the role of Pillar 2 in the capital framework.

During the year, the Committee finalised or published for consultation a range of standards related to policy reform as well as reports on policy implementation and supervision.

Policy reform

The Committee developed a number of global standards for banks during the year.

Capital requirements for bank exposures to central counterparties. In April 2014, the Committee published a revised standard on the capital treatment of bank exposures to central counterparties. The standard is the result of a collaborative effort between the BCBS, the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) to improve the interim capital requirements published in July 2012. The BCBS, CPMI and IOSCO sought to simplify the interim policy framework and support broader policy efforts,

particularly those relating to central clearing of standardised over-the-counter (OTC) derivative contracts. The revised standard will take effect on 1 January 2017.

Supervisory framework for measuring and controlling large exposures. In April 2014, the Committee finalised a supervisory framework for measuring and controlling large credit exposures to contain the maximum loss a bank could face in the event of a sudden counterparty failure. The standard includes limits on large exposures. The large exposure limit is 25% of a bank's Tier 1 capital; exposures between global systemically important banks (G-SIBs) are limited to 15% of Tier 1 capital. The standard will take effect from 1 January 2019.

Operational risk – revisions to the simpler approaches. In October 2014, the Committee published for consultation its proposed revisions to the standardised approach for measuring operational risk capital. Aiming to address weaknesses identified in the existing standardised approaches (ie the non-model-based approaches), a revised standardised approach will replace the three current standardised approaches. The Committee expects to finalise the new approach around the end of 2015.

Pillar 3 disclosure requirements. In January 2015, the Committee published its revisions to the Pillar 3 disclosure standard. This followed the release of a consultative paper in June 2014. The revised standard promotes greater consistency in the way banks disclose information about risks as well as their risk measurement and management. The revisions aim to enable market participants to compare banks' disclosures of the capital ratio's denominator (ie RWA) and to assess more effectively a bank's overall capital adequacy. The disclosures also respond to concerns about the opacity of internal model-based approaches to determining RWA. The revised requirements will take effect from end-2016.

Net Stable Funding Ratio and disclosure standards. In October 2014, after extensive consultation, the Committee finalised the standard for the Net Stable Funding Ratio (NSFR). A key element of the Basel III liquidity framework, the NSFR will limit overreliance on short-term wholesale funding, encourage better assessment of funding risk across on- and off-balance sheet items, and promote funding stability. In addition, in December 2014 the Committee published for consultation disclosure requirements for the NSFR to improve the transparency of regulatory funding requirements, reinforce its principles for sound liquidity risk management and supervision, strengthen market discipline, and reduce uncertainty in the markets as the NSFR is implemented. The NSFR will become a minimum standard by 1 January 2018.

Fundamental review of the trading book. In December 2014, the Committee conducted a third round of consultation on outstanding issues relating to the fundamental review of the trading book. The goal of the review is to improve trading book capital requirements and promote consistent implementation of the standard. The latest consultation focused on certain implementation aspects of the proposed framework, including a simpler method for incorporating liquidity horizons into the internal models approach and a revised standardised approach that uses as inputs changes in the value of a trading position based on sensitivity to underlying risk factors.

Revisions to the standardised approach for credit risk. In December 2014, the Committee proposed revisions to the standardised approach for credit risk. These

seek to strengthen the existing regulatory capital standard by reducing reliance on external credit ratings; enhancing granularity and risk sensitivity; improving comparability with the internal ratings-based (IRB) approach with respect to the definition and treatment of similar exposures; and clarifying the application of the standard.

One specific aspect of the proposed revisions is to replace references to external ratings with a limited number of risk drivers. Given the challenges associated with identifying risk drivers that can be applied globally but which also reflect the local nature of some exposures – such as retail credit and mortgages – the Committee recognised that the proposals are still at an early stage of development.

Introduction of a capital floor based on the standardised approaches. In December 2014, the Committee released for consultation a proposal for a capital floor based on standardised, non-internally modelled approaches. The proposed floor, which would replace the existing transitional capital floor from the Basel I framework, will be based on the standardised approaches for credit, market and operational risk, revisions of which are currently under consideration. The floor is meant to mitigate model risk and measurement error stemming from internally modelled approaches, enhance the comparability of capital outcomes across banks, and also ensure that capital across the banking system does not fall below a certain level. The Committee will consider the calibration of the floor alongside its work on finalising the revised standardised approaches.

Revisions to the securitisation framework. In December 2014, the Committee published its revisions to the securitisation framework after two rounds of consultation and quantitative impact assessment. In revising the framework, the Committee aims to strike an appropriate balance between risk sensitivity, simplicity and comparability, and to address a number of shortcomings in the existing framework, including mechanistic reliance on external ratings, lack of risk sensitivity, cliff effects and insufficient capital for certain exposures. The revised framework will come into effect in January 2018.

Criteria for identifying simple, transparent and comparable securitisations. In December 2014, the Committee and IOSCO released for consultation criteria for identifying – and assisting the financial industry's development of – simple, transparent and comparable securitisation structures. The criteria will also help parties involved in a securitisation transaction evaluate the risks of a particular securitisation as part of their due diligence. The criteria may be supplemented or expanded based on specific needs and applications, such as investor mandates, regulatory applications or central bank collateral frameworks.

Policy implementation

Implementation of the Basel III framework is a key priority for the Committee. As noted above, the Basel Committee has adopted a Regulatory Consistency Assessment Programme (RCAP) to monitor its member jurisdictions' progress on implementation and assess the consistency and completeness of the adopted standards. The RCAP also facilitates dialogue among Committee members and aids the Committee in developing standards.

During the year, the RCAP conducted jurisdictional assessments for Canada, the European Union, Hong Kong SAR, Mexico and the United States. The Committee has now completed assessments for all countries that are home to G-SIBs. By end-2015, it will have completed or initiated detailed peer reviews of the capital

regulations of all 27 member jurisdictions of the Basel Committee, which together account for more than 90% of global banking assets.

In addition, the Committee published several other reports relating to the implementation of the Basel framework.

Progress reports. In April and October 2014, the Committee issued reports providing a high-level view of Committee members' progress in adopting the Basel framework (including reforms made after the financial crisis). The reports focus on the status of domestic rule-making processes to ensure that the Committee's standards are transformed into national law or regulation according to the internationally agreed time frames. The Committee believes that disclosure will provide an additional incentive for members to fully comply with the international agreements.

Reports to the G20. In November 2014, the Committee reported to the G20 Leaders on BCBS members' progress in adopting the Basel III standards and banks' progress in bolstering their capital and liquidity positions. The report also highlighted specific implementation-related challenges.

In November 2014, the Committee also reported to the G20 Leaders on the steps it is taking to improve consistency and comparability in bank capital ratios and to strengthen confidence in RWA. These measures include proposals to revise the standardised approaches for calculating regulatory capital ratios – which will also provide the basis for a capital floor – and to constrain modelling choices when using models to determine capital. The report also discusses the role of disclosure, implementation monitoring and additional analytical and policy work in progress.

Basel III monitoring reports. Published twice a year, the Committee's Basel III monitoring report covers the implications of Basel III for financial markets. The results of the monitoring exercise assume that the final Basel III package has been fully implemented. Thus, they do not take account of the transitional arrangements set out in the Basel III framework, such as the gradual phase-in of deductions from regulatory capital.

The latest report was released in March 2015 and summarises data as of 30 June 2014. The report shows that all large internationally active banks now meet the Basel III risk-based capital minimum requirements. As for the liquidity requirements, 80% of the banks in the sample reported a Liquidity Coverage Ratio (LCR) that met or exceeded 100% (the standard for 2019), while 96% reported an LCR at or above 60% (the initial standard set when the LCR came into effect on 1 January 2015). A longer-term structural liquidity standard, the Net Stable Funding Ratio (NSFR), was finalised in October 2014. Based on the January 2014 consultative document, a sample collected at end-June 2014, and thus obtained prior to the release of the revised standard, reported that 80% of the banks met or exceeded 100%, while 92% of the banks reported an NSFR at or above 90%.

The G-SIB assessment methodology – score calculation. In November 2014, the Committee published technical information related to the Financial Stability Board's publication of an updated list of G-SIBs. The list is based on the assessment methodology for G-SIBs published by the Committee in July 2013, which uses an indicator-based approach comprising five categories: size; interconnectedness; lack of readily available substitutes or financial institution infrastructure; global (cross-jurisdictional) activity; and complexity. The information published by the Committee included a technical summary, which further explains the methodology and the denominators used to calculate the scores for banks as well as the cutoff score that was used to identify the updated list of G-SIBs. Also provided were the thresholds used to allocate G-SIBs to buckets for the purposes of calculating the specific

capital surcharge for each institution as well as links to the disclosures of the G-SIBs designated in 2014.

National discretions. The Basel framework includes a number of national discretions that allow countries to adapt the international standards to reflect differences in the structure and development of financial systems. Use of national discretions can impair comparability across jurisdictions and has been found to be a driver of RWA variability. In November 2014, the Committee published information about each member's use of national discretions allowed within the Basel capital framework. Publishing this information serves to provide greater transparency to market participants to help improve comparability across jurisdictions. As national discretions have been found to be a driver of RWA variability, the Committee is reviewing their use with a view to removing a number of them.

Principles for the sound management of operational risk. The Committee published in October 2014 a review of banks' implementation of the 2011 *Principles for the sound management of operational risk*, which embody the lessons from the financial crisis and set out the Committee's expectations for the management of operational risk. The review covered 60 systemically important banks (SIBs) in 20 jurisdictions by means of a questionnaire against which banks self-assessed the extent and quality of their implementation. Progress in implementing the principles varies significantly across banks and, overall, more work is needed to achieve full implementation. The principles that were identified as among the least thoroughly implemented were: (i) operational risk identification and assessment; (ii) change management; (iii) operational risk appetite and tolerance; and (iv) disclosure.

Supervision

Rigorous supervision is crucial for the functioning of the policy framework. During the year, the Committee published several documents to aid supervisors in undertaking effective supervision of regulated banks.

Supervisory colleges. In June 2014, the Committee issued final principles for effective supervisory colleges. The principles update the original document published in October 2010 and are intended to promote and strengthen the operation of colleges, which play a crucial role in the effective supervision of international banking groups. The revisions underscore the importance of continuous collaboration and information-sharing outside the formal college meetings and the development of a shared agenda for addressing risks and vulnerabilities. They also incorporate recent developments, such as the formation of crisis management groups and greater focus on macroprudential considerations.

Supervisory guidelines for identifying and dealing with weak banks. In mid-2015, the Committee expects to publish final guidelines for supervisors to help identify and deal with weak banks. The guidelines, which replace the original guidance first published in 2002, will provide a toolkit for supervisors and international financial institutions advising supervisors. They will offer practical information relating to problem identification, corrective action, resolution techniques and exit strategies and highlight, in particular, the importance of early identification and preparation, and close international cooperation.

Corporate governance principles. In October 2014, the Committee released proposals for further enhancing its principles on corporate governance at banks.

Effective corporate governance is critical to the proper functioning of the banking sector and the economy as a whole. The Committee's revised principles provide a framework for robust and transparent risk management and decision-making at banks. The revised principles strengthen the guidance on risk governance and the importance of a sound risk culture; expand the guidance on the role of the board of directors; and provide guidance for supervisors in evaluating the processes used by banks to select board members and senior management. The Committee expects to finalise the principles in mid-2015.

Guidance on accounting for expected credit losses. This consultative document, published in February 2015, outlines supervisory expectations for implementing and applying an expected credit loss (ECL) accounting framework at banks. This guidance will replace the Committee's June 2006 supervisory guidance on *Sound credit risk assessment and valuation for loans*, which was based on the incurred-loss model of accounting. The proposed guidance is consistent with the applicable accounting standards established by the International Accounting Standards Board (IASB) and other standard setters.

BCBS: www.bis.org/bcbs

Committee on the Global Financial System

The Committee on the Global Financial System (CGFS) monitors financial market developments for the Governors of the BIS Global Economy Meeting and analyses the implications of these developments for financial stability and central bank policy. The CGFS is chaired by William C Dudley, President of the Federal Reserve Bank of New York. The Committee's members are Deputy Governors and other senior officials from 23 central banks of major advanced and emerging market economies as well as the BIS's Head of Monetary and Economic Department and its Economic Adviser.

Among the topics discussed by the Committee during the past year were the challenges posed by the increasing divergence of macroeconomic conditions among the major advanced economies, which implies that different countries will need to adjust their monetary policy to different degrees and at different times. The Committee paid particular attention to the possible financial market effects that this process of asynchronous monetary policy normalisation might have in both advanced and emerging market economies. The Committee also reviewed the macroprudential measures taken by various country authorities to address vulnerabilities arising from the current macro-financial environment and found that the effectiveness of these policies remained uncertain. Another key topic was the existence of "pockets of risk" in particular sectors, including among emerging market corporates such as property developers, given their rising leverage and foreign currency exposures. Also discussed were the possible implications of market disturbances (such as mid-October's "flash rally" in US Treasury securities), lessons from the ECB's asset quality review and stress test, and the financial stability implications of falling commodity prices.

In addition, a number of in-depth analyses were commissioned from groups of central bank experts. Two of these groups produced public reports during the year.

Market-making and proprietary trading in fixed income markets. This report, issued in November 2014, identified signs of increased fragility in fixed income markets, together with liquidity bifurcation as market-making activity was concentrated in

the most liquid instruments and weakened in the less liquid ones. The underlying causes were seen as both conjunctural and structural, and it was difficult to provide a definitive overall assessment of their impact on market liquidity. Given signs that liquidity risks were broadly underpriced in the run-up to the financial crisis, it seemed desirable that the compressed pricing of market-making services seen in the past would give way to liquidity premia that are more consistent with actual market-making capacity and costs. On this basis, the report outlined a number of policy options that, if pursued, would make this outcome more likely.

Central bank operating frameworks and collateral markets. Produced jointly with the Markets Committee for publication in March 2015, the report examined how far central bank operational frameworks influence private collateral markets, including collateral availability, pricing, related market practices, and market performance under stress. After reviewing the evidence for the effects of different central bank choices on collateral markets and their scope, the report suggested a number of metrics and other tools that could aid central banks in their assessments of how their operational choices may affect these markets.

CGFS: www.bis.org/cgfs

Committee on Payments and Market Infrastructures

The Committee on Payments and Market Infrastructures[2] (CPMI) promotes the safety and efficiency of payment, clearing, settlement and reporting systems and arrangements, thereby supporting financial stability and the wider economy. Comprising senior officials from 25 central banks, the CPMI is a global standard setter that aims to strengthen regulation, policy and practices in this field worldwide. It also serves as a forum for central banks to monitor and analyse developments concerning payment, clearing, settlement and reporting within and across jurisdictions and to cooperate in related oversight, policy and operational matters, including the provision of central bank services. The Committee Chair is Benoît Cœuré, a member of the Executive Board of the European Central Bank.

Monitoring implementation of standards for financial market infrastructures

The CPMI-IOSCO *Principles for financial market infrastructures* (PFMI), published in April 2012, set out international standards for systemically important FMIs and specify the responsibilities for the authorities that oversee or regulate them.

Monitoring the implementation of the PFMI is a high priority for the CPMI and involves three phases: Level 1, on the PFMI's adoption in domestic regulatory frameworks; Level 2, on the completeness and consistency of these regulatory frameworks; and Level 3, on the consistency in the outcomes of the PFMI's implementation across jurisdictions.

In May 2014, the CPMI and IOSCO published a progress update on Level 1 of the implementation monitoring, which showed that the 28 participating jurisdictions are making significant progress, even if that progress continues to vary depending on the type of FMI. In 2014, the CPMI and IOSCO initiated Level 2 assessments for central counterparties (CCPs) and trade repositories in the European Union, Japan and the United States. The associated reports were published in February 2015 and showed an overall high level of consistency for these jurisdictions, especially for CCPs. Further Level 2 assessments will be conducted in subsequent rounds. In

[2] The Committee on Payment and Settlement Systems (CPSS) changed its name to the Committee on Payments and Market Infrastructures (CPMI) on 1 September 2014.

addition, in late 2014 the CPMI and IOSCO started an assessment of the observance of responsibilities by authorities.

The following additional guidance is related to the PFMI:

- *Recovery of financial market infrastructures*. In October 2014, the CPMI and IOSCO published the final report on *Recovery of financial market infrastructures*. The report gives guidance to financial market infrastructures such as CCPs on developing plans to enable them to recover from threats to their viability and financial strength that might prevent them from continuing to provide critical services.
- *Critical service providers*. The CPMI published in December 2014 the final version of the *Assessment methodology for the oversight expectations applicable to critical service providers*. The document provides guidance that will help competent authorities assess FMIs' critical service providers against the oversight expectations included in Annex F of the PFMI.
- *Quantitative disclosure*. In February 2015, the CPMI and IOSCO published guidance on the quantitative data that should be regularly disclosed by CCPs. The PFMI state that an FMI should make relevant information publicly available so that the risks related to the CCPs can be properly understood. This new guidance complements the *Disclosure framework* issued in December 2012, which primarily covers qualitative data.

Collateral management services

The report on *Developments in collateral management services*, published by the CPMI in September 2014, describes how such services are changing to address increased collateral demand. It shows how service providers are aiming to give their customers improved tools for monitoring their securities holdings and deploying those securities more efficiently. The report highlights the benefits of these innovations as well as the associated increases in complexity and operational risk.

Harmonisation of OTC derivatives data

In November 2014, the CPMI and IOSCO set up a working group to develop guidance on the harmonisation of key OTC derivatives data, including uniform transaction and product identifiers. Initial consultations will be held in 2015.

Retail payments

The CPMI's report on *Non-banks in retail payments*, published in September 2014, analyses the growing importance of non-banks in retail payments, the possible risks and the differing regulatory approaches of CPMI jurisdictions. The Committee continues to study the impact of a variety of retail payment developments such as faster payment services and the interplay of these services with mobile and internet payments. It is also monitoring developments in decentralised virtual currency schemes.

Cyber resilience in FMIs

The CPMI's report on *Cyber resilience in financial market infrastructures*, published in November 2014, notes the importance of an integrated and comprehensive approach to the cyber resilience of FMIs and the need for international cooperation in this area. The publication aims to raise awareness of the systemic implications of cyber attacks on FMIs. Building on this work, the CPMI and IOSCO have started

jointly investigating whether FMIs would benefit from further guidance on cyber resilience.

Red Book statistics

The CPMI published in December 2014 its annual update of the *Statistics on payment, clearing and settlement systems in the CPMI countries*.

CPMI: www.bis.org/cpmi

Markets Committee

The Markets Committee is a forum where senior central bank officials jointly monitor developments in financial markets and assess their implications for market functioning and central bank operations. With a membership comprising 21 central banks, the Committee is chaired by Guy Debelle, Assistant Governor of the Reserve Bank of Australia.

The Committee's discussions during the year were shaped by the divergent monetary policy prospects of the major central banks as well as by falling commodity prices. Among the topics discussed were the drivers of asset price volatility, central bank purchase programmes for private and public sector assets, changes to monetary policy implementation in China, liquidity issues in the Japanese government bond markets, market expectations of prospective policy rate normalisation in the United States, and the aftermath of the discontinuation of the minimum exchange rate of the euro against the Swiss franc in mid-January, including the fallout in the retail FX sector. The impact of these developments on emerging market economies was closely studied.

In addition to monitoring near-term market developments, the Committee also considered longer-term structural market issues such as the international efforts to make reform recommendations for benchmarks in FX markets, the UK Fair and Effective Markets Review, and money market functioning in a negative rate environment. In January 2015, the Committee held a workshop with private sector participants on electronic trading in fixed income markets.

Jointly with the CGFS, the Committee produced a report on *Central bank operating frameworks and collateral markets* (see CGFS section above for details) and reviewed the design of the BIS Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity in preparation for the next version in 2016.

Markets Committee: www.bis.org/markets

Central Bank Governance Group

The Central Bank Governance Group comprises nine central bank Governors and is chaired by Zeti Akhtar Aziz, Governor of the Central Bank of Malaysia. It serves as a venue for information exchange on the design and operation of central banks as public policy institutions. The Group also suggests priorities for BIS work carried out on these topics through the almost 50 central banks that make up the Central Bank Governance Network. Central bank officials have access to the results of numerous surveys on governance topics conducted among Network central banks as well as other governance research, and selected material is published.

The Governance Group convened during several BIS bimonthly meetings to study the evolving circumstances of central banks. The Group discussed the auditing

and review arrangements for central banks and their reporting obligations, and the governance arrangements for decisions on emergency lending by central banks. The information and insights provided help central banks assess the effectiveness of their own arrangements as well as the alternatives available.

Central Bank Governance Group: www.bis.org/cbgov

Irving Fisher Committee on Central Bank Statistics

The Irving Fisher Committee on Central Bank Statistics (IFC) is a forum for central bank economists and statisticians to address statistical topics related to monetary and financial stability. Governed by the international central banking community, it is hosted by the BIS and associated with the International Statistical Institute (ISI). The IFC has 83 institutional members, including almost all BIS shareholder central banks, and is currently chaired by Turalay Kenç, Deputy Governor of the Central Bank of the Republic of Turkey.

The IFC organised several activities in 2014 with the support of its member central banks and a number of international organisations. One notable project was the production of a report on data-sharing between statistical and supervisory authorities, which outlines a range of good practice and guidance to foster cooperation in this area. In addition, the Committee set up a Global Network of Balance of Payments (BoP) Compilers, which will facilitate the stocktaking of central banks' practices and the sharing of experience in BoP issues. The IFC also supported international initiatives on the development of sectoral financial accounts, potentially a key component of financial stability analyses. Lastly, it furthered its work on the measurement of financial inclusion and related challenges, in close liaison with financial standard-setting bodies.

In terms of meetings, a key event was the seventh biennial IFC conference held in September 2014 to review the statistical implications of the evolving functions and objectives of modern central banks. The IFC also participated in the 2014 Asian Regional Statistics Conference organised by the ISI, which reviewed the challenges posed by increasing household debt in Asia. Finally, it organised with the ECB a virtual seminar on big data, which represent a new source of financial and economic information that could be mobilised by central banks to take timely policy measures and assess the impact of their actions.

IFC: www.bis.org/ifc

Financial Stability Institute

Jointly created by the BIS and the BCBS, the Financial Stability Institute (FSI) assists supervisory authorities and central banks worldwide in strengthening their financial systems. The FSI pursues this mandate by fostering a solid understanding of international financial standards through a range of activities, including high-level meetings; seminars and conferences; FSI Connect, the BIS's online information and learning tool; and monitoring of the implementation of Basel standards in non-BCBS member jurisdictions.

High-level meetings

Aimed at the Deputy Governors of central banks and heads of supervisory authorities, high-level meetings are a key part of the FSI programme of activities. Jointly organised with the BCBS, they have taken place annually for more than a

decade in Africa, Asia, Latin America and the Middle East and, occasionally, in central and eastern Europe. They focus on policy discussions relating to global banking standards, emerging financial developments and regional implementation issues.

In 2014, the key themes discussed at these meetings included the impact of Basel III on banks' business models; the trade-offs between risk sensitivity, simplicity and comparability in the international banking standards; the coexistence of the risk-based capital standards for banks with the leverage ratio; and requirements for global and domestic systemically important banks and their cross-border implications.

Seminars and conferences

The 2014 FSI programme comprised 50 events that were attended by about 1,800 central bankers and financial sector supervisors. They included 38 banking events, of which 10 took place in Switzerland and 28 in other jurisdictions. The events in other jurisdictions were organised in cooperation with 15 regional supervisory groups.[3] The main topics covered included the Basel III requirements for liquidity risk; the regulation and supervision of systemically important banks; and the implementation of macroprudential policies and stress-testing methodologies.

Also during 2014, the FSI held nine insurance seminars in collaboration with the International Association of Insurance Supervisors (IAIS) and its regional network. One of these events was a virtual seminar for 119 insurance supervisors from 36 jurisdictions, using a series of five webinars and selected FSI Connect tutorials. This was the first time that the FSI had delivered a virtual seminar.

The remaining three FSI events were directed at supervisory authorities across financial sectors. One was a conference sponsored by the G20's Global Partnership for Financial Inclusion and focused on recent financial standards and their impact on technology-driven approaches to financial inclusion. The other two events were co-organised with the International Association of Deposit Insurers (IADI) and the International Organization of Securities Commissions (IOSCO) dealing with the latest work of these standard setters.

FSI Connect

With more than 10,000 subscribers from over 300 central banks and banking or insurance authorities, FSI Connect offers more than 250 tutorials covering a wide range of regulatory policy and supervisory topics. The 16 tutorials released during 2014 covered key supervisory topics, including the international response to the too-big-to-fail problem; reforms to the over-the-counter derivatives market; policy measures for global systemically important insurers; and the supervisory implications of the recognition, classification and measurement of financial instruments under IFRS 9.

[3] Africa: Committee of Bank Supervisors of West and Central Africa (BSWCA); and Southern African Development Community (SADC). Americas: Association of Supervisors of Banks of the Americas (ASBA); Center for Latin American Monetary Studies (CEMLA); and Caribbean Group of Banking Supervisors (CGBS). Asia and the Pacific: Executives' Meeting of East Asia-Pacific Central Banks (EMEAP) Working Group on Banking Supervision; South East Asian Central Banks (SEACEN); and Central Banks of South East Asia, New Zealand and Australia (SEANZA) Forum of Banking Supervisors. Europe: European Banking Authority (EBA); and Group of Banking Supervisors from Central and Eastern Europe (BSCEE). Middle East: Arab Monetary Fund (AMF); and Gulf Cooperation Council (GCC) Committee of Banking Supervisors. Other: Group of French-Speaking Banking Supervisors (GSBF); and Group of International Finance Centre Supervisors (GIFCS).

Monitoring implementation of Basel standards in non-BCBS members

The FSI annually surveys non-BCBS members on their implementation of the Basel III framework. The results of this survey are part of the annual BCBS report to the G20 Leaders. In 2014, 116 countries worldwide, including BCBS member jurisdictions, had implemented or were in the process of implementing Basel III.

FSI: www.bis.org/fsi

Activities of BIS-hosted associations

This section reviews the year's principal activities of the three associations hosted by the BIS in Basel.

Financial Stability Board

The Financial Stability Board (FSB) coordinates at the international level the financial stability work of national authorities and international standard-setting bodies, and develops and promotes financial sector policies to enhance global financial stability. Its constitution, membership and framework of committees and management are set out in the FSB's Annual Report. The FSB is chaired by Mark Carney, Governor of the Bank of England.

The FSB was active in a wide range of areas during the year, and several of its policy initiatives were endorsed at the November 2014 Brisbane Summit of the G20 Leaders.

Reducing the moral hazard posed by systemically important financial institutions

The FSB's framework to address the systemic risks and moral hazard associated with systemically important financial institutions (SIFIs) contains three key elements:

- a resolution framework to ensure that all financial institutions can be quickly resolved without destabilising the financial system and exposing the taxpayer to risk of loss;
- higher loss absorbency to reflect the greater risks; and
- more intense supervisory oversight.

Resolution of SIFIs. The FSB in October 2014 reissued the *Key attributes of effective resolution regimes for financial institutions* ("the Key Attributes") to incorporate guidance on their application to non-bank financial institutions and on arrangements for information-sharing that support the effective resolution of cross-border financial institutions. The FSB also published consultative documents on:

- cross-border recognition of resolution action (September 2014);
- recovery and resolution planning for systemically important insurers and identification of critical functions and critical shared services (October 2014); and
- cooperation and information-sharing with host authorities of jurisdictions not represented in crisis management groups where a G-SIFI has a systemic presence (October 2014).

In November 2014, the FSB published a report to the G20 on progress in the reform of resolution regimes and resolution planning for G-SIFIs. This sets out

further actions to implement the Key Attributes fully in substance and in scope. It also describes the initial results of the Resolvability Assessment Process, which assesses the resolvability of G-SIFIs at the level of senior officials of the firm's home and key host authorities. The FSB will continue monitoring implementation of the Key Attributes to support implementation across all financial sectors.

The FSB also published proposals on the loss-absorbing and recapitalisation capacity of global systemically important banks (G-SIBs). These were developed in consultation with the BCBS and are intended to form a new minimum standard for Total Loss-Absorbing Capacity (TLAC). These proposals should demonstrate that G-SIBs have sufficient capacity to absorb losses as part of a resolution strategy that minimises the impact on financial stability and ensures the continuity of critical economic functions. The FSB is working with the BCBS and the BIS to undertake comprehensive impact assessment studies to inform the calibration of the Pillar 1 element of the TLAC requirement for all G-SIBs.

Higher loss absorbency. In November 2014, the FSB published the updated list of 30 G-SIBs using end-2013 data and the updated assessment methodology published by the BCBS in July 2013. In addition, the FSB, following consultation with the IAIS and national authorities, identified for 2014 the nine global systemically important insurers (G-SIIs) identified in 2013 and postponed a decision on the G-SII status of reinsurers, pending the IAIS's work to develop the methodology.

More intense supervisory oversight. In April 2014, the FSB published a progress report on enhanced supervision, which describes the changes in supervisory practices since the financial crisis and identifies areas where more work is needed, and *Guidance on supervisory interaction with financial institutions on risk culture*, which sets out a framework to assist supervisors in their assessment of risk culture at firms.

Extending the framework. The FSB and standard-setting bodies are extending the SIFI framework to additional types of financial institutions, and work continues on the *Assessment methodologies for identifying non-bank non-insurer global systemically important financial institutions* that was published for consultation in January 2014.

Improving the OTC derivatives markets

The FSB published further progress reports on implementation of OTC derivatives market reforms in April and November, and in October a report on member jurisdictions' ability to defer to others' regulatory regimes. The FSB in September 2014 published a feasibility study on the aggregation of OTC derivatives trade repository data and has also launched a peer review of trade reporting, with a final report expected around mid-2015.

Transforming shadow banking into resilient market-based finance

In November 2014, the FSB released its fourth annual monitoring report on the global trends and risks of the shadow banking system (credit intermediation involving entities and activities outside the regulated banking system), including innovations and changes that could lead to growing systemic risks and regulatory arbitrage. This presents data as of end-2013 from 25 jurisdictions and the euro area as a whole, covering about 80% of global GDP and 90% of global financial system assets.

In October 2014, the FSB published the *Regulatory framework for haircuts on non-centrally cleared securities financing transactions*, including proposals on numerical haircut floors for non-bank-to-non-bank transactions to ensure that shadow banking activities are fully covered, reduce the risk of regulatory arbitrage and maintain a level playing field. This work should be completed by end-June 2015, with implementation by the end of 2017.

In cooperation with market participants, the FSB also developed for public consultation *Standards and processes for global securities financing data collection and aggregation*, which aim to enhance reporting and transparency of data relevant for financial stability monitoring and policy responses.

Reducing reliance on credit rating agency ratings

The FSB published in May 2014 the final peer review report on national authorities' implementation of the FSB *Principles for reducing reliance on CRA ratings*. This showed uneven progress towards the removal of references to credit rating agency (CRA) ratings from standards, laws and regulations across jurisdictions and the financial sector. The key challenge is to develop alternative standards of creditworthiness and processes so that CRA ratings are not the sole input to credit risk assessment.

Financial benchmarks

An Official Sector Steering Group (OSSG) of regulators and central banks published a report in July 2014 which set out proposals, plans and timelines for the reform and strengthening of existing major interest rate benchmarks and for additional work on the development and introduction of alternative benchmarks. The OSSG will continue to monitor and oversee the implementation of the reforms set out in the report.

In September 2014, the FSB published a report on foreign exchange rate benchmarks, setting out recommendations for reform in the FX markets and in the benchmark rates that have been identified as the most important by market participants.

Addressing data gaps

The FSB has developed a common data template for G-SIBs to analyse their exposures and funding dependencies by counterparty, and concentration by country, sector, currency, maturity and instrument. An initial set of these data has been collected since 2013 by an international data hub hosted by the BIS, with the initiative planned for completion in 2016. In September 2014, the FSB and IMF published their *Fifth progress report on the implementation of the G-20 data gaps initiative,* reporting enhancements on data available for policy work, surveillance, financial stability and debt analysis.

Advancing transparency through the legal entity identifier

The objective of the global legal entity identifier (LEI) system is to provide unique identification of parties to financial transactions across the globe. The Global LEI Foundation was officially established by the FSB in June 2014 as a not-for-profit foundation under Swiss law to act as the operational arm of the LEI system under the oversight of the LEI Regulatory Oversight Committee.

Strengthening accounting standards

The G20 and FSB support the development of a single set of high-quality global accounting standards. The International Accounting Standards Board and the Financial Accounting Standards Board are developing new standards that introduce forward-looking expected loss provisions for loan losses, and the FSB has encouraged them to monitor consistent implementation of their standards and continue to seek opportunities for further convergence. The FSB held a roundtable of key stakeholders to discuss these issues in April 2015.

Enhanced Disclosure Task Force

The Enhanced Disclosure Task Force (EDTF) is a private sector initiative to enhance the risk disclosure practices of major banks. It issued principles and recommendations for such disclosures in October 2012, and published two surveys (in 2013 and 2014) of the level and quality of implementation in the major banks' annual reports. The FSB has asked the EDTF to undertake another survey in 2015.

Monitoring implementation and strengthening adherence to international standards

The FSB's Coordination Framework for Implementation Monitoring mandates that implementation of reforms in priority areas (those deemed by the FSB to be particularly important for global financial stability) should be subject to more intensive monitoring and detailed reporting. The current list of priority areas comprises the Basel III framework; OTC derivatives market reforms; compensation practices; policy measures for G-SIFIs; resolution frameworks; and shadow banking. Detailed reporting of implementation progress in all of these areas, conducted in cooperation with relevant standard-setting bodies, is continuing.

The FSB's most intensive monitoring mechanism is the peer review programme, which evaluates member jurisdictions' adoption of international financial standards and FSB policies. In addition to thematic peer reviews, the FSB completed in 2014 the country peer reviews of Indonesia, Germany and the Netherlands.

In December 2014, the FSB published its fourth annual update on global adherence to regulatory and supervisory standards on international cooperation and information exchange. This provides information on all jurisdictions evaluated under the initiative.

Impact of regulatory reforms on emerging market and developing economies

As requested by the G20, the FSB reports on the significant unintended consequences in emerging market and developing economies of internationally agreed reforms and on measures taken to address them. In November 2014, the FSB published an update of monitoring developments, drawing upon discussions in FSB workstreams and Regional Consultative Groups as well as input by standard-setting bodies and international financial institutions from their own monitoring and assessment processes.

Financial regulatory factors affecting the availability of long-term finance and other reforms

In August 2013, the FSB updated the G20 Finance Ministers and Central Bank Governors on financial regulatory factors affecting the supply of long-term

investment finance. The FSB's monitoring of this issue will continue as part of a broader study of long-term finance being undertaken for the G20 by international organisations.

In October 2014, the FSB, working with the IMF and OECD and in response to a request from the G20, published a report on potential cross-border financial stability implications related to national structural banking reforms. The FSB will monitor developments related to these reforms and has undertaken to report again to the G20 in 2016.

FSB: www.financialstabilityboard.org

International Association of Deposit Insurers

The International Association of Deposit Insurers (IADI) is the global standard-setting body for deposit insurance systems. It contributes to the stability of financial systems by advancing standards and guidance for effective deposit insurance and promoting international cooperation among deposit insurers, bank resolution authorities and other safety net organisations.

The number of organisations affiliated with IADI stands at 99, comprising 79 deposit insurers as members, seven central banks and bank supervisors as associates, and 13 institutional partners. The membership has grown by one fifth in the past two years, thanks to the outreach within the IADI regions. Almost 70% of all jurisdictions with explicit deposit insurance systems are represented within IADI's membership.

Jerzy Pruski, President of the Management Board of Poland's Bank Guarantee Fund, serves as the President of IADI and the Chair of its Executive Council.

During the year, IADI continued to focus on the strategic priorities established in 2013.

Core principles for effective deposit insurance systems

IADI guidance on establishing and enhancing deposit insurance schemes is outlined in the *Core principles for effective deposit insurance systems*. In October 2014, IADI and its international partners completed their update of the Core Principles, drawing on lessons learned from the financial crisis of 2007–09, which demonstrated the importance of maintaining depositor confidence in the financial system and the key role that depositor protection plays in preserving that confidence.

The revised Core Principles strengthen the current standards in several areas, including speed of reimbursement, deposit insurance coverage, funding and governance, adding more guidance on the roles deposit insurers should play in crisis preparedness, crisis management and resolution regimes. The revised Core Principles seek to strike an appropriate balance between improving the effectiveness of deposit insurance systems and maintaining the flexibility required for an internationally applicable standard.

As a component of the FSB Compendium of 12 Key Standards for Sound Financial Systems, the IADI Core Principles are used by the IMF and World Bank in the context of the Financial Sector Assessment Program reviews as well as by individual jurisdictions to assess the effectiveness of their deposit insurance systems and practices.

IADI's International Conference and events

The Revised Core Principles were the focus of IADI's 14th Annual General Meeting and International Conference, held in October 2014 in Port of Spain, Trinidad and

Tobago. The conference outlined the challenges in advancing the understanding of and compliance with the revised Core Principles as well as their applicability to a diverse range of deposit insurance mandates, settings and structures.

In September 2014, IADI and the FSI held their fourth annual joint seminar on bank resolution, crisis management and deposit insurance issues. Since 2008, IADI, in cooperation with the FSI, has produced eight online tutorials on deposit insurance systems.

IADI also hosted global and regional seminars on various topics, including: deposit insurance funding; bail-in and deposit insurance; cross-border cooperation and implementation of effective recovery resolution planning; cross-border cooperation for capacity-building; effective delivery of deposit insurance services; and global trends and effective practices on deposit insurance and bank resolution. These topics inform IADI's research agenda to better reflect the role of deposit insurance in financial stability.

Enhancement of IADI's research framework

IADI made further progress with research projects on enhanced guidance for ex ante funding and multiple deposit insurance systems, the role of deposit insurers in bail-in mechanisms, and the evolution of integrated protection schemes, and it released two research papers on Islamic deposit insurance systems. IADI has also begun research initiatives on trends and guidance for establishing a deposit insurance fund target ratio, a bank resolution tool for purchasing assets and assuming deposit liabilities, and the unique characteristics of a resolution strategy for failing credit unions.

Furthermore, the IADI Secretariat has been enhanced by the establishment of a small research unit. The unit supports IADI's membership in the FSB Resolution Steering Group, including IADI's contribution to the workstream on funding resolution conducted under the FSB's cross-border crisis management committee.

IADI has enhanced its database of global deposit insurance systems through updates from research surveys, including its own annual online survey on deposit insurance, the latest of which received a record number of respondents.

IADI: www.iadi.org

International Association of Insurance Supervisors

The International Association of Insurance Supervisors (IAIS) is the global standard-setting body for the insurance sector. Its purpose is to promote effective and globally consistent supervision and contribute to global financial stability so that policyholders benefit from fair, safe and stable insurance markets. Felix Hufeld, President of the German Federal Financial Supervisory Authority (BaFin), chairs the IAIS Executive Committee.

New five-year strategic plan, organisational reforms

In October 2014, the general meeting approved the last phase of a comprehensive multi-year strategic, structural and procedural reform initiative. The *Strategic plan and financial outlook 2015–19* stresses the IAIS's role as the thought leader for global insurance. The IAIS also improved its governance structure by discontinuing the right to private sector observership, and it adopted new policies and procedures to increase transparency and promote efficiency in its engagement with stakeholders.

Macroprudential surveillance

In December 2014, the IAIS released an internet-based toolkit to assist its members in designing and conducting macroprudential surveillance. The toolkit includes basic and advanced macroprudential indicators and allows a member to input data from its own jurisdiction for benchmarking against regional and worldwide data. The IAIS will continue to refine and supplement the toolkit.

Supporting material

In October 2014, the IAIS adopted issues papers on combating bribery and corruption and on approaches to group corporate governance, focused on the impact for control functions. It also adopted application papers on approaches to conduct of business supervision and on supervisory colleges.

ComFrame

In order to address the complexity and operational scope of internationally active insurance groups (IAIGs), the IAIS has since 2011 been designing ComFrame – a Common Framework for the Supervision of IAIGs. ComFrame is a set of international supervisory requirements focusing on the effective group-wide supervision of IAIGs (qualitative, quantitative and supervisory processes), building upon and expanding the high-level requirements currently set out in the IAIS Insurance Core Principles (ICPs). ComFrame is designed to assist supervisors in collectively addressing group-wide activities and risks, identifying and avoiding regulatory gaps, and coordinating supervisory actions under the remit of a group-wide supervisor. Field testing of ComFrame began in 2014 in conjunction with more than 30 large international firms. This phase will continue until 2018, when ComFrame is scheduled for formal adoption. Members are to begin implementation of ComFrame in 2019.

Global insurance capital standards

In October 2014, the IAIS finalised the first ever global insurance capital standard, the Basic Capital Requirements (BCR) for global systemically important insurers (G-SIIs). The BCR represents the first step of a long-term project to develop risk-based, group-wide global insurance capital standards. The second step is the development of higher loss absorbency requirements for G-SIIs, due to be completed by end-2015. The final step will be a risk-based group-wide global insurance capital standard (ICS) within ComFrame, applying to IAIGs and due to be developed by the end of 2016. It will be further refined and tested before being applied to IAIGs from 2019.

Multilateral Memorandum of Understanding

Insurance supervisors that are signatories to the IAIS Multilateral Memorandum of Understanding (MMoU) participate in a global framework for cooperation and information exchange. The memorandum sets minimum standards to which signatories must adhere, and all applicants are subject to review and approval by an independent team of IAIS members. By participating in the MMoU, supervisors are better able to promote the financial stability of cross-border insurance operations for the benefit of consumers. Six new signatories joined the MMoU during the year, bringing the total number of signatory authorities to 45 jurisdictions representing more than 62% of worldwide premium volume.

Coordinated Implementation Framework

The Coordinated Implementation Framework (CIF), adopted in October 2013, brings together the IAIS approach to implementing its supervisory material. The CIF sets forth key principles that provide guidance to the work programme, which encompasses various initiatives to assess and identify its members' observance of IAIS ICPs. This information is then used to inform the programme of supervisory development, which is executed through regional outreach and the development of regional implementation plans.

Central to the CIF is leveraging the work of partners such as the Financial Stability Institute, the World Bank and the Asian Development Bank. Another key partner is the Access to Insurance Initiative (A2ii), which advances capacity-building in inclusive insurance markets, a key focus for standard-setting bodies under the G20's Global Partnership for Financial Inclusion.

Self-assessment and peer reviews

As part of a comprehensive programme covering all the ICPs, in October the IAIS released its aggregate report containing the findings from a self-assessment and peer review conducted on ICP 4 (Licensing), ICP 5 (Suitability of Persons), ICP 7 (Corporate Governance) and ICP 8 (Risk Management and Internal Controls). The IAIS aims to review all ICPs by the end of 2016. The outcome of these assessments will help identify areas in which the ICPs may need to be revised; the results also feed into IAIS education activities.

IAIS: www.iaisweb.org

Economic analysis, research and statistics

The BIS's in-depth economic analysis and research on monetary and financial stability policy issues is conducted by its Monetary and Economic Department (MED). Researchers are located at the head office in Basel and at the BIS Representative Offices in Hong Kong SAR and Mexico City. The BIS also compiles and disseminates international statistics on financial institutions and markets. Through its economic analysis, research and statistics, the BIS helps to meet the needs of monetary and supervisory authorities for policy insight and data.

Analysis and research in the Basel Process

Analysis and research at the BIS are the cornerstone of its background notes for meetings, analytical support for the Basel-based Committees, and the Bank's own publications. Research seeks to strike a balance between responsiveness to short-term issues and proactiveness in identifying what will become key themes in future.

Collaborative efforts with central bank and academic researchers stimulate broad dialogue on the policy questions that merit deeper study. To promote such engagements, the BIS set up in 2014 a Central Bank Research Fellowship (CBRF) Programme, which complements the visiting fellows programme for academic researchers. And, as a broader forum for interactions between researchers from academia and central banks, a BIS Research Network (BISRN) was launched at a conference in September 2014. The BISRN is intended as an informal grouping of active researchers from academia and central banks who meet at regular conferences to share research findings on monetary and financial stability.

The BIS also organises conferences and workshops to bring together participants from policy, research and business. The flagship event for central bank Governors is the BIS Annual Conference. In June 2014, the 13th BIS Annual Conference focused on rising debt in the financial system, the economics of credit booms, and the resulting policy challenges.

Most BIS analysis and research is published on the Bank's website, and in the *Annual Report*, the *BIS Quarterly Review*, *BIS Papers* and *BIS Working Papers*. BIS economists also publish in professional journals and other external publications.

BIS research: www.bis.org/forum/research.htm

Research topics

Reflecting the Bank's mission, BIS research centres on monetary and financial stability. Special attention is given to changes in financial intermediation; new frameworks for monetary and financial stability policy; and the global economy and spillovers. Under these headings, the specific topics taken up in the year included financial risk-taking versus risk-taking in the real economy; the interaction of monetary policy and macroprudential policies; pre- and post-boom resource misallocations; macroeconomic and financial implications of falling oil prices; and channels of cross-border monetary spillovers and sovereign credit risk.

The research on financial intermediation aims at understanding the interaction between institutions and financial markets. Analysing the way different intermediaries operate and markets function is an important foundation for this work. The perspectives gained help policymakers evaluate changes in the regulatory environment for financial stability and monetary policies, nationally and internationally. They underpin the monitoring of financial vulnerabilities and cross-border spillovers, and they inform the design of regulation and supervision, crisis management tools and resolution techniques as well as various aspects of monetary policy frameworks, including strategy, tactics and day-to-day implementation.

Over the past year, work in this area has included research on the risks associated with increased market-based intermediation, rapidly rising debt issuance by emerging market corporates, post-crisis changes in bank business models, and banks' adjustments to new capital regulation.

Research on post-crisis monetary and financial stability policy frameworks aims to strengthen the analytical foundations of central bank policy. The gap between the theory and practice of central bank policy has widened as central banks have adopted increasingly unconventional measures, and the lines between policies targeting financial, macroeconomic and price stability have become increasingly blurred.

Specific projects in this area have studied the cost of deflations during the past 140 years; the effectiveness of unconventional central bank policies and the associated exit challenges; and the links between liquidity regulation and central banks' role as lender of last resort.

Research on the global economy and spillovers focuses on how monetary and financial stability is affected by the tight real and financial integration of the global economy. The importance of such spillovers is reflected in the increasingly popular notion of "global liquidity", in both academic and policy circles.

Research in this area during the year took up the strengths and weaknesses in the international monetary and financial system; the global role of the dollar; the mechanisms that drive global credit growth; the spillovers from unconventional

monetary policies; and drivers for lending and borrowing decisions at internationally active banks. The BIS international banking statistics provide key information for these studies.

International statistical initiatives

The BIS's unique set of international banking and financial statistics underpins the Basel Process by supporting the analysis of global financial stability. This involves close cooperation with other financial international organisations, especially through the BIS's participation in the Inter-Agency Group on Economic and Financial Statistics (IAG). This is the body tasked with closing the data gaps revealed by the financial crisis, in accord with the FSB and IMF recommendations to the G20.[4]

To close such gaps, the CGFS approved in 2011–12 enhancements to a key set of BIS data, the international banking statistics reported by central banks under the guidance of the CGFS. Completed in early 2015, these enhancements extend the coverage of the locational and consolidated banking statistics from banks' international activities to their domestic positions, and provide more information on banks' counterparties, specifically on their location and sector.

The BIS also publishes a variety of other statistics on its website, including indicators on derivatives, debt securities, effective exchange rates, foreign exchange markets, payment systems, property prices, credit to the private sector and global liquidity. This statistical work focuses on long-term financial stability indicators to support the BIS's own research agenda as well as the initiatives of the Basel Process and the G20. It relies extensively on the Data Bank, which contains, in particular, key economic indicators shared among BIS member central banks. These data are being expanded, and new tables and charts introduced, as part of further revisions to the BIS's statistical publications that will be implemented in September 2015.

Finally, the BIS hosts the International Data Hub, where information about systemically important financial institutions is stored and analysed on behalf of a limited number of participating supervisory authorities. The analysis is meant to help participating supervisors engage with G-SIBs and to enrich the dialogue between supervisors across jurisdictions. The first phase of this initiative, covering firms' credit exposures, was completed in 2013. The second phase, now under way, will assemble data covering these firms' funding dependencies.

BIS statistics: www.bis.org/statistics

Cooperation with other central bank initiatives

The BIS contributes to the activities of central banks and regional central bank organisations. During the past year, it cooperated with these groups on the topics outlined below:

- CEMLA (Center for Latin American Monetary Studies) – foreign exchange intervention, payment and settlement systems, and regional banking integration;
- FLAR (Latin American Reserve Fund) – reserves management;

[4] The IAG comprises the BIS, the ECB, Eurostat, the IMF, the OECD, the United Nations and the World Bank (www.principalglobalindicators.org). These organisations also sponsor the Statistical Data and Metadata Exchange (SDMX), whose standards the BIS uses for its collection, processing and dissemination of statistics (www.sdmx.org).

- MEFMI (Macroeconomic and Financial Management Institute of Eastern and Southern Africa) – payment and settlement systems, and reserves management;
- SEACEN (South East Asian Central Banks) Research and Training Centre – central bank governance, regional banking integration, macroeconomic and monetary policy challenges, and payment and settlement systems; and
- World Bank – governance and oversight of central bank reserves management.

Financial services

Through its Banking Department, the BIS offers a wide range of financial services designed to support the reserves management activities of central banks and other official monetary authorities, and to foster international cooperation in this area. Some 140 institutions, as well as a number of international organisations, make use of these services.

Safety and liquidity are the key features of BIS credit intermediation, which is supported by rigorous internal risk management. Independent control units reporting directly to the BIS Deputy General Manager monitor and control the related risks. A compliance and operational risk unit monitors operational risk, while financial risks – ie credit, liquidity and market risks – are overseen by a risk control unit that is also responsible for ensuring an integrated approach to risk management.

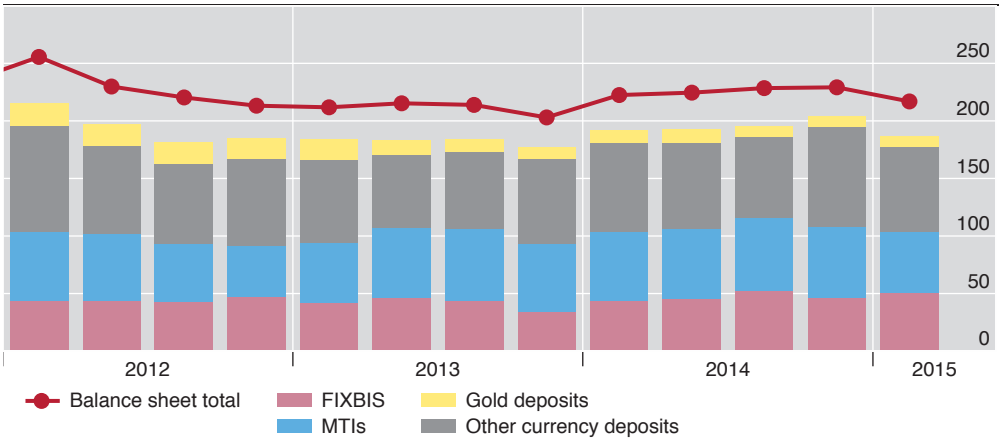
BIS financial services are provided from two linked trading rooms: one in Basel, at the Bank's head office; and one in Hong Kong SAR, at its Representative Office for Asia and the Pacific.

Scope of services

As an institution owned and governed by central banks, the BIS is well placed to understand the needs of reserves managers – their primary focus on safety and liquidity as well as their evolving need to diversify the exposures arising from growing foreign exchange reserves. To meet those needs, the BIS offers investments that vary by currency, maturity and liquidity. In addition, the Bank provides short-term liquidity facilities and extends credit to central banks, usually on a collateralised

Balance sheet total and deposits by product

End-quarter figures, in billions of SDR



The sum of the bars indicates total deposits.

basis. Moreover, the Bank can act as trustee and collateral agent in connection with international financial operations.

Tradable instruments are available, in maturities ranging from one week to five years, in the form of Fixed-Rate Investments at the BIS (FIXBIS), Medium-Term Instruments (MTIs) and products with embedded optionality (Callable MTIs). These instruments can be bought or sold throughout the Bank's dealing hours. Also offered are money market placements, such as sight/notice accounts and fixed-term deposits.

On 31 March 2015, total deposits stood at SDR 186.7 billion; about 95% of those deposits are denominated in currencies and the remainder in gold (see graph).

The Bank transacts foreign exchange and gold on behalf of its customers, thereby providing access to a large liquidity base in the context of the rebalancing of central banks' reserve portfolios. The Bank's foreign exchange services encompass spot transactions in major currencies and Special Drawing Rights (SDR) as well as swaps, outright forwards, options and dual currency deposits (DCDs). In addition, the Bank provides gold services that include buying and selling, sight accounts, fixed-term deposits, earmarked accounts, quality upgrading, refining and location exchanges.

The BIS provides asset management products. The products, which consist predominantly of sovereign securities and high-grade fixed income instruments in major reserve currencies, are available as (i) dedicated portfolio mandates tailored to each customer's preferences; or (ii) BIS Investment Pools (BISIPs), which are open-end fund structures that allow customers to invest in a common pool of assets. The BISIP structure is also used for the Asian Bond Fund (ABF) initiative sponsored by EMEAP (the Executives' Meeting of East Asia-Pacific Central Banks) to foster the development of local currency bond markets. Further initiatives developed with a group of advising central banks have also been based on the BISIP structure. These include the BISIP ILF1 (a US inflation-protected government securities fund) and the BISIP CNY (a domestic Chinese sovereign fixed income fund).

The BIS Banking Department hosts global and regional meetings, as well as seminars and workshops on reserves management issues. These gatherings facilitate the exchange of knowledge and experience among reserves managers and promote the development of investment and risk management capabilities in central banks and international organisations. The Department also supports central banks in reviewing and assessing their reserves management practices.

Representative Offices

The BIS has a Representative Office for Asia and the Pacific (the Asian Office), located in Hong Kong SAR, and a Representative Office for the Americas (the Americas Office), located in Mexico City. The Representative Offices promote cooperation and foster the exchange of information and data within each region by organising meetings, supporting regional institutions and Basel-based committees, and conducting research. The Asian Office also provides banking services to the region's monetary authorities. It is also through the office in Hong Kong that the Financial Stability Institute delivers a programme of meetings and seminars in the region that are closely tailored to local priorities.

As part of the overall BIS research programme, economists in the Representative Offices work with academics from around the world. In addition, both offices have recently developed secondment programmes to deepen research collaboration with member central banks in their respective regions. Papers based on research carried out in the Representative Offices, and published in BIS reports or external journals, have been used to inform policy discussions in various central bank meetings.

The Asian Office

The Asian Office's research activities are guided by the Asian Consultative Council (ACC), comprising the Governors of the 12 BIS member central banks in the Asia-Pacific region.[5] In April 2014, Governor Amando Tetangco of Bangko Sentral ng Pilipinas succeeded Governor Choongsoo Kim of the Bank of Korea as Chair of the Council.

Economists in the Asian Office carried out research on two themes endorsed by the ACC. On the monetary policy side, the theme was the expanding boundaries of monetary policy in Asia and the Pacific. The related policy issues were discussed at a research workshop held in Hong Kong in July 2014. On the financial stability side, the theme was cross-border financial linkages, which were the subject of a research conference hosted by the Reserve Bank of New Zealand in October 2014 in Wellington.

In the Asian Consultative Council's meeting in February 2015 in Manila, the Governors endorsed a new theme, "Financial systems and the real economy", to guide policy research in the Asian Office over the next two years.

The Asian Office organised 10 high-level BIS policy meetings, most held jointly with a central bank or with either the Executives' Meeting of East Asia-Pacific Central Banks (EMEAP) or the South East Asian Central Banks (SEACEN).

The ACC Governors meet with others from around the world in a Special Governors' Meeting, which in February 2015 was held in Manila with Bangko Sentral ng Pilipinas as host. For the fifth consecutive year, the event included a roundtable with the chief executive officers of large financial institutions in the region. The discussions covered issues related to financial market volatility and liquidity.

Other policy discussions organised by the Asian Office were the 17th meeting of the Working Party on Monetary Policy in Asia, hosted by the Central Bank of Malaysia in May in Kuala Lumpur; the BIS-SEACEN Exco Seminar, hosted by the Central Bank of Nepal in September in Kathmandu; and the 11th Asia-Pacific High-Level Meeting on Banking Supervision, co-organised with the EMEAP Working Group on Banking Supervision and the Basel Committee and hosted by Bangko Sentral ng Pilipinas in February in Manila.

The Americas Office

The Americas Office develops its activities under the guidance of the Consultative Council for the Americas (CCA). Comprising the Governors of eight BIS member central banks in the region, the CCA is chaired by José Darío Uribe, Governor of the Bank of the Republic, Colombia.[6] The work of the Americas Office centres on three main areas: research, central bank operations and financial stability.

Research is organised mainly through networks, under the direction of a Scientific Committee. The research network on "The introduction of financial stability considerations into central bank policy models" presented its findings in January 2015 at a conference hosted by the Americas Office. A newly established research network focuses on the commodity cycle and its macroeconomic and financial stability implications. In May 2014, the Bank of the Republic, Colombia,

[5] The 12 central banks are those of Australia, China, Hong Kong SAR, India, Indonesia, Japan, Korea, Malaysia, New Zealand, the Philippines, Singapore and Thailand.

[6] The eight central banks are those of Argentina, Brazil, Canada, Chile, Colombia, Mexico, Peru and the United States.

hosted the Fifth Annual CCA research conference in Bogotá on the "Challenges from changing international financial conditions".

Work relating to central bank operations is led by the Consultative Group of Directors of Operations (CGDO), a forum for central bank officials who typically oversee open market and foreign exchange operations as well as reserves management. Group members held regular teleconferences to monitor and exchange views on financial market developments and central bank operations. Their study group's report on "Currency carry trades in Latin America" was published as *BIS Papers*, no 81.

A second annual meeting of the Consultative Group of Directors of Financial Stability (CGDFS) was held in November 2014 in Panama. Group members reviewed the main topics analysed by their home institutions' financial stability departments and discussed their implications. A working group was set up to study the effectiveness of macroprudential policies based on detailed data obtained from credit registries.

Another notable event was the first roundtable of the CCA Governors and the chief executive officers of large financial institutions active in the region held in April 2014 in São Paulo. The topics discussed included the regional impact of tighter global monetary conditions; the region's financial infrastructure; bank regulation and supervision; and regional banking integration.

In August 2014, the Americas Office also co-organised with CEMLA a roundtable in Montevideo on monetary policy spillovers. Furthermore, it contributed to FSB regional consultative group meetings and regional conferences, and supported the 18th BIS Working Party for Monetary Policy in Latin America, hosted by the Bank of Mexico in September 2014.

Governance and management of the BIS

The governance and management of the Bank are conducted at three principal levels: the General Meeting of BIS member central banks; the BIS Board of Directors; and BIS Management.

BIS member central banks

Bank of Algeria
Central Bank of Argentina
Reserve Bank of Australia
Central Bank of the Republic of Austria
National Bank of Belgium
Central Bank of Bosnia and Herzegovina
Central Bank of Brazil
Bulgarian National Bank
Bank of Canada
Central Bank of Chile
People's Bank of China
Bank of the Republic (Colombia)
Croatian National Bank
Czech National Bank
National Bank of Denmark
Bank of Estonia
European Central Bank
Bank of Finland
Bank of France
Deutsche Bundesbank (Germany)
Bank of Greece
Hong Kong Monetary Authority
Magyar Nemzeti Bank (Hungary)
Central Bank of Iceland
Reserve Bank of India
Bank Indonesia
Central Bank of Ireland
Bank of Israel
Bank of Italy
Bank of Japan
Bank of Korea
Bank of Latvia
Bank of Lithuania
Central Bank of Luxembourg
National Bank of the Republic of Macedonia
Central Bank of Malaysia
Bank of Mexico
Netherlands Bank
Reserve Bank of New Zealand
Central Bank of Norway
Central Reserve Bank of Peru
Bangko Sentral ng Pilipinas (Philippines)
National Bank of Poland
Bank of Portugal
National Bank of Romania
Central Bank of the Russian Federation
Saudi Arabian Monetary Agency
National Bank of Serbia
Monetary Authority of Singapore
National Bank of Slovakia
Bank of Slovenia
South African Reserve Bank
Bank of Spain
Sveriges Riksbank (Sweden)
Swiss National Bank
Bank of Thailand
Central Bank of the Republic of Turkey
Central Bank of the United Arab Emirates
Bank of England
Board of Governors of the Federal Reserve System (United States)

The General Meeting of BIS member central banks

Sixty central banks and monetary authorities are currently members of the BIS and have rights of voting and representation at General Meetings. The Annual General Meeting (AGM) is held no later than four months after 31 March, the end of the BIS financial year. The AGM approves the annual report and the accounts of the Bank and decides on the distribution of a dividend, makes adjustments in the allowances paid to Board members and elects the Bank's auditor.

The BIS Board of Directors

The Board is responsible for determining the strategic and policy direction of the BIS, supervising Management and fulfilling the specific tasks given to it by the Bank's Statutes. The Board meets at least six times a year.

The Board may have up to 21 members, including six ex officio Directors comprising the central bank Governors of Belgium, France, Germany, Italy, the United Kingdom and the United States. Each ex officio member may appoint another member of the same nationality. Nine Governors of other member central banks may be elected to the Board.

In addition, one member of the Economic Consultative Committee (see page 134) serves as observer to BIS Board meetings on a rotating basis. The observer participates in the Board's discussions and may be a member of one or more of the Board's four advisory committees, described below.

The Board elects a Chairman from among its members for a three-year term and may elect a Vice-Chairman.

Four advisory committees, established pursuant to Article 43 of the Bank's Statutes, assist the Board in its work:

- The Administrative Committee reviews key areas of the Bank's administration, such as budget and expenditures, human resources policies and information technology. The Committee meets at least four times a year. Its Chairman is Jens Weidmann.
- The Audit Committee meets with internal and external auditors, as well as with the compliance unit. Among its duties is the examination of matters related to the Bank's internal control systems and financial reporting. The Committee meets at least four times a year and is chaired by Stephen S Poloz.
- The Banking and Risk Management Committee reviews and assesses the Bank's financial objectives, the business model for BIS banking operations and the risk management frameworks of the BIS. The Committee meets at least once a year. Its Chairman is Stefan Ingves.
- The Nomination Committee deals with the appointment of members of the BIS Executive Committee and meets on an ad hoc basis. It is chaired by the Board's Chairman, Christian Noyer.

Board of Directors[7]

Chairman: Christian Noyer, Paris
Mark Carney, London
Agustín Carstens, Mexico City
Jon Cunliffe, London

[7] As at 1 June 2015. The list includes the rotating observer mentioned above.

Andreas Dombret, Frankfurt am Main
Mario Draghi, Frankfurt am Main
William C Dudley, New York
Stefan Ingves, Stockholm
Thomas Jordan, Zurich
Klaas Knot, Amsterdam
Haruhiko Kuroda, Tokyo
Anne Le Lorier, Paris
Fabio Panetta, Rome
Stephen S Poloz, Ottawa
Raghuram G Rajan, Mumbai
Jan Smets, Brussels
Alexandre A Tombini, Brasília
Ignazio Visco, Rome
Jens Weidmann, Frankfurt am Main
Janet L Yellen, Washington
Zhou Xiaochuan, Beijing

Alternates

Stanley Fischer, Washington
Paul Fisher, London
Jean Hilgers, Brussels
Joachim Nagel, Frankfurt am Main
Marc-Olivier Strauss-Kahn, Paris
Emerico Zautzik, Rome

In memoriam

It was with great sadness that the Bank learned of the death of Karl Otto Pöhl on 9 December 2014 at the age of 85. A former President of the Deutsche Bundesbank, Mr Pöhl was a member of the BIS Board of Directors from 1980 to 1991.

BIS Management

BIS Management is under the overall direction of the General Manager, who is responsible to the Board of Directors for the conduct of the Bank. The General Manager is assisted by the Deputy General Manager and advised by the Executive Committee of the BIS. The Executive Committee, chaired by the General Manager, further comprises the Deputy General Manager; the Heads of the three BIS departments – the General Secretariat, the Banking Department and the Monetary and Economic Department; the Economic Adviser and Head of Research; and the General Counsel. Other senior officials are the Deputy Heads of the departments and the Chairman of the Financial Stability Institute.

General Manager	Jaime Caruana
Deputy General Manager	Hervé Hannoun
Secretary General and Head of General Secretariat	Peter Dittus
Head of Banking Department	Peter Zöllner

Head of Monetary and Economic Department	Claudio Borio
Economic Adviser and Head of Research	Hyun Song Shin
General Counsel	Diego Devos
Deputy Head of Monetary and Economic Department	Philip Turner
Deputy Secretary General	Monica Ellis
Deputy Head of Banking Department	Jean-François Rigaudy
Chairman, Financial Stability Institute	Josef Tošovský

In memoriam

It was with deep regret that the Bank learned of the death of Baron Alexandre Lamfalussy on 9 May 2015 at the age of 86. Mr Lamfalussy was General Manager of the BIS between May 1985 and December 1993. He joined the Bank in 1976 as Economic Adviser and Head of the Monetary and Economic Department and became Deputy General Manager in 1981. Many significant events in the Bank's history occurred under Mr Lamfalussy's leadership, reflecting his desire for the BIS to make a tangible contribution to international monetary and financial stability. These included the signing of the Basel Capital Accord, the establishment of the Group of Payment System Experts (now the Committee on Payments and Market Infrastructures), and the expansion of the BIS international banking statistics, now a major reference source for economists and other researchers.

BIS budget policy

Management begins preparing the annual BIS expenditure budget by establishing an overall business plan and financial framework. Within that context, business areas specify their detailed plans and resource requirements. The process of reconciling detailed business plans, objectives and overall resources culminates in a draft budget, which must be approved by the Board before the start of the financial year.

The budget distinguishes between administrative and capital expenditures. In 2014/15, these expenditures collectively amounted to CHF 296.8 million. The Bank's overall administrative expense amounted to CHF 277.9 million.[8] Management and staff expense – including remuneration, pensions, and health and accident insurance – amounts to around 70% of administrative expenditure, comparable to the ratio seen in organisations similar to the BIS. New staff positions were added during the year in accordance with the Bank's business plan, which emphasised economic research, the Basel regulatory process and BIS banking activities.

[8] The financial statements report a total administrative expense of CHF 356.2 million. That figure consists of the CHF 277.9 million actual administrative expense reported here plus CHF 78.3 million of financial accounting adjustments for post-employment benefit obligations. This additional expense is not included in the budget for the coming financial year because it depends on actuarial valuations as at 31 March, which in turn are not finalised until April, after the budget has been set by the Board.

The other major categories of administrative spending are information technology (IT), buildings and equipment, and general operational costs, each accounting for about 10%.

Capital spending, relating mainly to buildings and IT investment, can vary significantly from year to year depending on projects in progress. For 2014/15, capital expenditure amounted to CHF 18.9 million.

BIS remuneration policy

At the end of the 2014/15 financial year, the BIS employed 623 staff members[9] from 57 countries. The jobs performed by BIS staff members are classified into job grades associated with a structure of salary ranges. The salaries of individual staff members move within the ranges of the salary structure on the basis of performance.

Every three years, a comprehensive survey benchmarks BIS salaries against compensation in comparable institutions and market segments, with adjustments taking place as of 1 July in the following year. In benchmarking, the Bank focuses on the upper half of market compensation in order to attract highly qualified staff. The analysis takes into account the differing rates of taxation on compensation at the surveyed institutions.

In years between comprehensive salary surveys, the salary structure is adjusted as of 1 July on the basis of Switzerland's inflation rate and the weighted average real wage development in industrial countries. As of 1 July 2014, this adjustment produced a decrease of 0.3% in the salary structure.

The salaries of senior officials are also regularly benchmarked against compensation in comparable institutions and market segments. As of 1 July 2014, the annual remuneration of senior officials, before expatriation allowances, is based on the salary structure of CHF 754,730 for the General Manager;[10] CHF 638,620 for the Deputy General Manager; and CHF 580,560 for Heads of Department.

BIS staff members have access to a contributory health insurance plan and a contributory defined benefit pension plan. At the Bank's headquarters, non-Swiss staff members recruited from abroad, including senior officials, are entitled to an expatriation allowance. The allowance currently amounts to 14% of annual salary for unmarried staff members and 18% for married staff members, subject to a ceiling. Expatriate staff members are also entitled to receive an education allowance for their children, subject to certain conditions.

The Annual General Meeting approves the remuneration of members of the Board of Directors, with adjustments taking place at regular intervals. The total fixed annual remuneration paid to the Board of Directors was CHF 1,111,068 as of 1 April 2015. In addition, Board members receive an attendance fee for each Board meeting in which they participate. Assuming the full Board is represented in all Board meetings, the annual total of these attendance fees amounts to CHF 1,058,160.

[9] This corresponds to 600.1 full-time equivalent positions. At the end of the 2013/14 financial year, the Bank employed 617 staff members, corresponding to 595.8 full-time equivalent positions. Including positions related to hosted organisations and not funded by the Bank, the number of staff was 656 last financial year and 668 this financial year.

[10] In addition to the basic salary, the General Manager receives an annual representation allowance and enhanced pension rights.

Financial activities and results

The Bank's balance sheet

The Bank's balance sheet decreased by SDR 5.7 billion over the year, following an increase of SDR 10.6 billion in 2013/14. The balance sheet total on 31 March 2015 was SDR 216.8 billion.

Deposits, primarily from central banks, constitute the largest share of the Bank's liabilities. About 95% of the deposits are denominated in currencies, with the remainder in gold. On 31 March 2015, total deposits amounted to SDR 186.7 billion, compared with SDR 191.8 billion at the end of March 2014.

Currency deposits at 31 March 2015 stood at SDR 176 billion, which was SDR 4 billion less than at the previous year-end. Notwithstanding this decline, average deposits held during 2014/15 were SDR 14 billion higher than in the previous year. The currency composition of deposits remained stable, with deposits in US dollars at 74%, in euros at 13% and in sterling at 6%. Gold deposits stood at SDR 9.9 billion on 31 March 2015, a decline of SDR 1.4 billion over the financial year.

Funds received from deposit liabilities are invested in assets that are managed in a conservative manner. At 31 March 2015, 53% of total assets comprised government and other securities or treasury bills. Reverse repurchase agreements (primarily with commercial banks and with sovereign bonds as collateral) made up a further 23%, with unsecured commercial bank assets and gold accounting for 8% and 7%, respectively. The gold balances include 108 tonnes in the Bank's own investment portfolio.

Financial performance

Operating profit

The BIS's financial results for 2014/15 were shaped by continuing low interest rates together with relative stability in most financial markets. This environment led to lower interest income on the Bank's own fund investment assets. Net income on the customer banking business improved, reflecting both a higher intermediation margin and the higher average level of deposits. As a result, overall net interest and valuation movements increased by 11% to SDR 655.3 million.

The Bank recorded a foreign exchange gain of SDR 38.8 million, compared with a loss in the previous financial year of SDR 33.3 million. The gain arose mostly from the appreciation of non-SDR currency assets held in the investment portfolio. The Bank's administrative expense, which is denominated mainly in Swiss francs, amounted to CHF 356.2 million, 1.3% less than in the previous year. In SDR terms, however, the expenditure was the same as in the previous year, at SDR 258.6 million, owing to the Swiss franc's appreciation. Depreciation was SDR 16.2 million, bringing the total operating expense to SDR 274.6 million.

As a result of these developments, the operating profit, at SDR 425.3 million, was 48% higher than last year.

Net profit and total comprehensive income

Net profit comprises operating profit plus the realised gains, or losses, from sales of gold and securities held in the Bank's own fund portfolios. During the year, the Bank sold 3 tonnes of its own gold, realising a gain of SDR 65.6 million. In addition,

the Bank's own funds securities portfolio produced realised gains of SDR 52.0 million when securities were sold as part of the regular rebalancing to benchmarks. As a result, net profit for 2014/15 was SDR 542.9 million (2013/14: SDR 419.3 million), representing a return of 3.0% on average equity (2013/14: 2.4%).

Other comprehensive income includes unrealised valuation movements on the Bank's own gold and investment securities as well as re-measurements of the actuarial liabilities for post-employment benefit obligations. The valuation of the Bank's own gold increased by SDR 29.9 million on a 3.3% increase in the SDR gold price. In addition, the Bank recorded a revaluation gain of SDR 102.5 million on its investment securities, in part reflecting marginally lower interest rates. These effects were partly offset by a loss on the re-measurement of defined benefit obligations of SDR 10.1 million. As a result, other comprehensive income for the year was SDR 122.3 million. Total comprehensive income, which combines net profit and other comprehensive income, was SDR 665.2 million. Total return on equity was 3.6%.

Allocation and distribution of profit

Proposed dividend

Consistent with the BIS's dividend policy, it is proposed to declare a dividend of SDR 225 per share for the financial year 2014/15. The dividend is payable on 558,125 shares, and will result in a total payment of SDR 125.6 million. After payment of the dividend, SDR 417.3 million would be available for allocation to reserves.

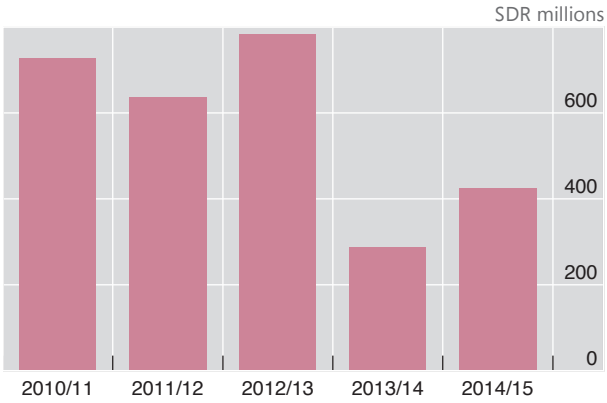
Proposed allocation of net profit for 2014/15

In accordance with Article 51 of the BIS Statutes, the Board of Directors recommends that the General Meeting allocate the 2014/15 net profit of SDR 542.9 million in the following manner:

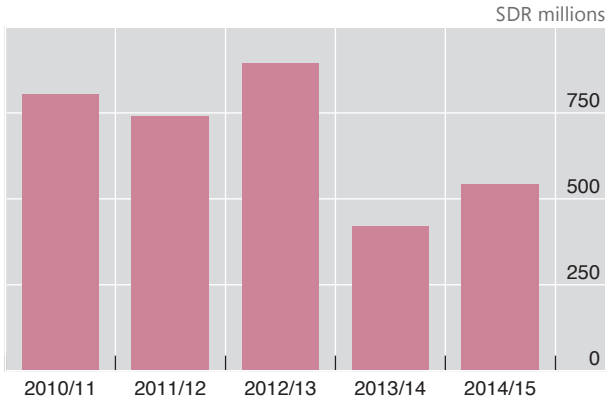
(a) SDR 125.6 million to be paid as a dividend of SDR 225 per share;
(b) SDR 20.9 million to be transferred to the general reserve fund; and
(c) SDR 396.4 million, representing the remainder of the available profit, to be transferred to the free reserve fund.

Five-year graphical summary

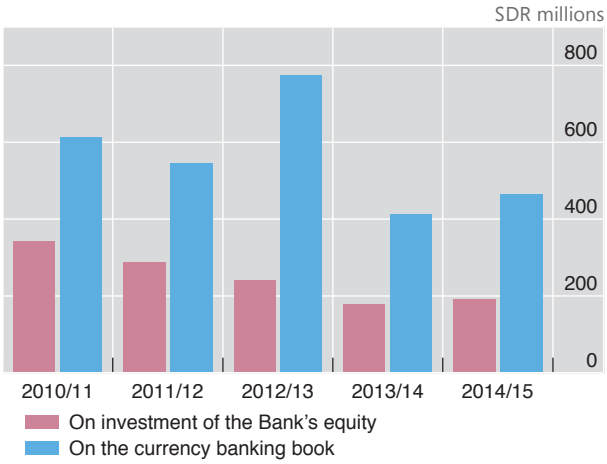
Operating profit



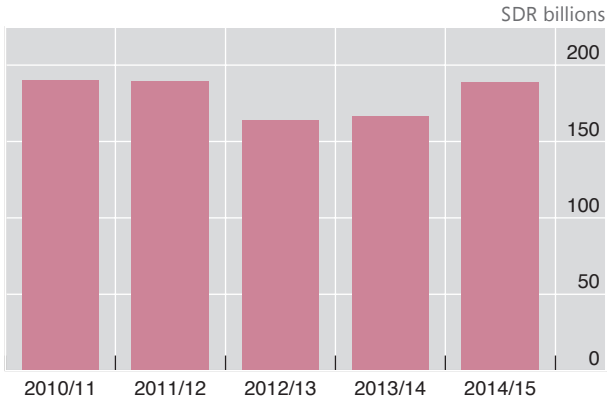
Net profit



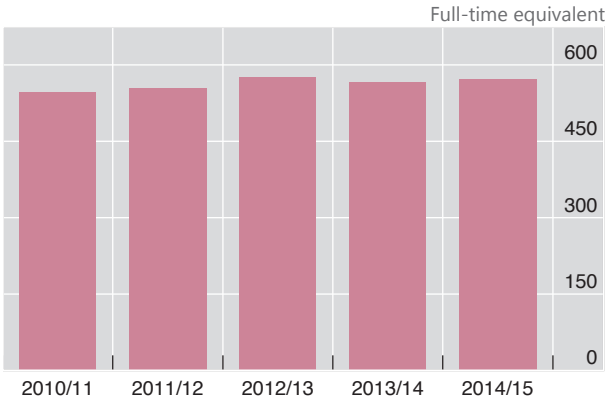
Net interest and valuation income



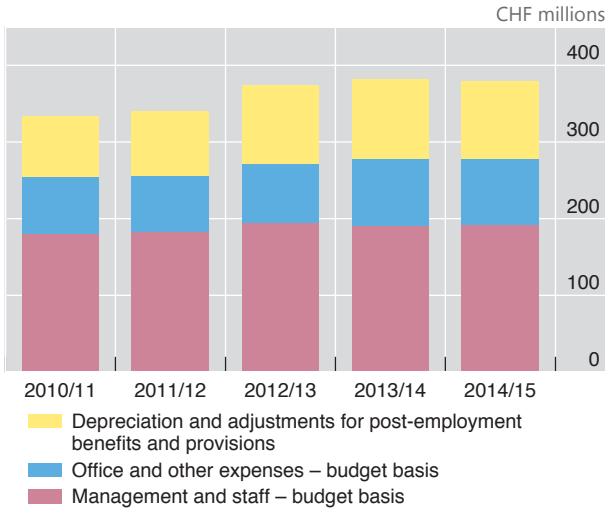
Average currency deposits (settlement date basis)



Average number of employees



Operating expense



Independent auditor

Election of the auditor

In accordance with Article 46 of the BIS Statutes, the Annual General Meeting is invited to elect an independent auditor for the ensuing year and to fix the auditor's remuneration. The Board policy is to rotate the auditor on a regular basis. The financial year ended 31 March 2015 was the third consecutive year of Ernst & Young's term as auditor.

Report of the auditor

The BIS financial statements for the year ended 31 March 2015 have been audited by Ernst & Young, who confirm that they give a true and fair view of the Bank's financial position and of its financial performance and its cash flows for the year then ended. The Ernst & Young report can be found on page 244.

Financial statements

as at 31 March 2015

The financial statements on pages 173–243 for the financial year ended 31 March 2015 were approved on 11 May 2015 for presentation to the Annual General Meeting on 28 June 2015. They are presented in a form approved by the Board of Directors pursuant to Article 49 of the Bank's Statutes and are subject to approval by the shareholders at the Annual General Meeting.

Jaime Caruana
General Manager

Hervé Hannoun
Deputy General Manager

Balance sheet

As at 31 March

SDR millions	Note	**2015**	2014
Assets			
Cash and sight accounts with banks	3	11,375.3	11,211.5
Gold and gold loans	4	14,155.5	20,596.4
Treasury bills	5	33,926.0	44,530.8
Securities purchased under resale agreements	5	49,003.6	50,554.4
Loans and advances	5	17,966.2	19,600.3
Government and other securities	5	80,910.2	70,041.1
Derivative financial instruments	6	6,958.7	3,002.2
Accounts receivable and other assets	7	2,345.4	2,777.4
Land, buildings and equipment	8	194.1	196.2
Total assets		**216,835.0**	222,510.3
Liabilities			
Currency deposits	9	176,842.0	180,472.2
Gold deposits	10	9,857.3	11,297.5
Securities sold under repurchase agreements	11	773.3	1,169.3
Derivative financial instruments	6	2,162.2	2,632.9
Accounts payable	12	8,049.9	8,411.5
Other liabilities	13	877.2	799.0
Total liabilities		**198,561.9**	204,782.4
Shareholders' equity			
Share capital	14	698.9	698.9
Statutory reserves	15	14,579.7	14,280.4
Profit and loss account		542.9	419.3
Less: shares held in treasury	16	(1.7)	(1.7)
Other equity accounts	17	2,453.3	2,331.0
Total equity		**18,273.1**	17,727.9
Total liabilities and equity		**216,835.0**	222,510.3

Profit and loss account

For the financial year ended 31 March

SDR millions	Note	**2015**	2014
Interest income	19	1,526.5	1,599.8
Interest expense	20	(773.4)	(830.3)
Net interest income		**753.1**	769.5
Net valuation movement	21	(97.8)	(179.6)
Net interest and valuation income		**655.3**	589.9
Net fee and commission income	22	5.8	5.0
Net foreign exchange gain / (loss)	23	38.8	(33.3)
Total operating income		**699.9**	561.6
Operating expense	24	(274.6)	(273.9)
Operating profit		**425.3**	287.7
Net gain on sales of securities available for sale	25	52.0	40.5
Net gain on sales of gold investment assets	26	65.6	91.1
Net profit		**542.9**	419.3

Statement of comprehensive income

For the financial year ended 31 March

SDR millions	Note	**2015**	2014
Net profit		**542.9**	419.3
Other comprehensive income			
Items either reclassified to profit and loss during the year, or that will be reclassified subsequently when specific conditions are met			
Net movement on revaluation of available for sale securities	17A	102.5	(229.9)
Net movement on revaluation of gold investment assets	17B	29.9	(942.9)
Items that will not be reclassified subsequently to profit and loss			
Re-measurement of defined benefit obligations	17C	(10.1)	183.1
		122.3	(989.7)
Total comprehensive income		**665.2**	(570.4)

Statement of cash flows

For the financial year ended 31 March

SDR millions	Note	**2015**	2014
Cash flow from / (used in) operating activities			
Interest and similar income received		2,178.3	2,183.3
Interest and similar expenses paid		(595.9)	(668.0)
Net fee and commission income	22	5.8	5.0
Net foreign exchange transaction gain	23	7.1	1.6
Operating expenses	24	(258.4)	(258.6)
Non-cash flow items included in operating profit			
Valuation movements on operating assets and liabilities	21	(97.8)	(179.6)
Net foreign exchange translation gain / (loss)	23	31.7	(34.9)
Change in accruals and amortisation		(829.3)	(745.8)
Change in operating assets and liabilities			
Currency deposit liabilities held at fair value through profit and loss		(7,234.7)	10,617.5
Currency banking assets		3,980.9	(21,947.9)
Sight and notice deposit account liabilities		2,987.1	6,014.4
Gold deposit liabilities		(1,440.2)	(6,283.4)
Gold and gold loan banking assets		6,457.3	13,807.7
Accounts receivable		0.8	1.2
Accounts payable and other liabilities		(162.5)	216.9
Net derivative financial instruments		(4,427.2)	2,084.1
Net cash flow from operating activities		**603.0**	4,813.5
Cash flow from / (used in) investment activities			
Net change in currency investment assets available for sale	5B	(365.8)	(1,682.4)
Net change in currency investment assets held at fair value through profit and loss		–	677.5
Securities sold under repurchase agreements		177.4	595.9
Net change in gold investment assets	4B	79.0	111.3
Net purchase of land, buildings and equipment	8	(14.1)	(21.1)
Net cash flow used in investment activities		**(123.5)**	(318.8)

SDR millions	Note	**2015**	2014
Cash flow from / (used in) financing activities			
Dividends paid		(120.0)	(175.8)
Net cash flow used in financing activities		**(120.0)**	(175.8)
Total net cash flow		**359.5**	4,318.9
Net effect of exchange rate changes on cash and cash equivalents		(136.5)	282.3
Net movement in cash and cash equivalents		496.0	4,036.6
Net change in cash and cash equivalents		**359.5**	4,318.9
Cash and cash equivalents, beginning of year	28	**11,544.5**	7,225.6
Cash and cash equivalents, end of year	28	**11,904.0**	11,544.5

Movements in the Bank's equity

For the financial year ended 31 March

SDR millions	Note	Share capital	Statutory reserves	Profit and loss	Shares held in treasury	Other equity accounts: Defined benefit obligations	Other equity accounts: Gold and securities revaluation	Movement in total equity
At 31 March 2013		**698.9**	**13,647.7**	**898.2**	**(1.7)**	**–**	**3,742.7**	**18,985.8**
Change in accounting policy for post-employment benefit obligations		–	(86.9)	(2.8)	–	(422.0)	–	(511.7)
At 31 March 2013 – restated		**698.9**	**13,560.8**	**895.4**	**(1.7)**	**(422.0)**	**3,742.7**	**18,474.1**
Payment of 2012/13 dividend		–	–	(175.8)	–	–	–	(175.8)
Allocation of 2012/13 profit		–	719.6	(719.6)	–	–	–	–
Total comprehensive income	17	–	–	419.3	–	183.1	(1,172.8)	(570.4)
At 31 March 2014		**698.9**	**14,280.4**	**419.3**	**(1.7)**	**(238.9)**	**2,569.9**	**17,727.9**
Payment of 2013/14 dividend		–	–	(120.0)	–	–	–	(120.0)
Allocation of 2013/14 profit		–	299.3	(299.3)	–	–	–	–
Total comprehensive income	17	–	–	542.9	–	(10.1)	132.4	665.2
At 31 March 2015		**698.9**	**14,579.7**	**542.9**	**(1.7)**	**(249.0)**	**2,702.3**	**18,273.1**

Accounting policies

The accounting policies set out below have been applied to both of the financial years presented unless otherwise stated.

1. Scope of the financial statements

These financial statements recognise all assets and liabilities that are controlled by the Bank and in respect of which the economic benefits, as well as the rights and obligations, lie with the Bank.

To provide services to central bank customers, the Bank operates investment entities which do not have separate legal personality from the Bank. The Bank also manages investment mandates from customers. The Bank undertakes transactions in its own name with commercial counterparties for the benefit of these investment entities and mandates. Where these are derivative transactions, they are recognised in these financial statements along with an offsetting amount owed to, or from, the investment entity or mandate. Non-derivative assets and liabilities held in the Bank's name, but for the economic benefit of investment entities or mandates, are not recognised in these financial statements. Further information on off-balance sheet assets and liabilities is provided in note 30.

The Bank also operates a pension fund in respect of staff pension arrangements. The pension fund does not have a separate legal personality from the Bank. Derivatives undertaken in the Bank's name with commercial counterparties but for the benefit of the pension fund are recognised in these financial statements along with the offsetting amount owed to, or from, the pension fund. The pension fund's net assets are included in these financial statements in accordance with the accounting policy for post-employment benefit obligations. Note 18 provides information on these obligations and associated arrangements.

2. Functional and presentation currency

The functional and presentation currency of the Bank is the Special Drawing Right (SDR) as defined by the International Monetary Fund (IMF).

The SDR is calculated from a basket of major trading currencies according to Rule O–1 as adopted by the Executive Board of the IMF on 30 December 2010 and effective 1 January 2011. As currently calculated, one SDR is equivalent to the sum of USD 0.660, EUR 0.423, JPY 12.1 and GBP 0.111. The composition of the SDR currency basket is subject to review every five years by the IMF; the next review is due to be undertaken in December 2015.

All figures in these financial statements are presented in SDR millions unless otherwise stated.

3. Currency translation

Monetary assets and liabilities are translated into SDR at the exchange rates ruling at the balance sheet date. Other assets and liabilities are recorded in SDR at the exchange rates ruling at the date of the transaction. Profits and losses are translated into SDR at an average rate. Exchange differences arising from the retranslation of monetary assets and liabilities and from the settlement of transactions are included as net foreign exchange gains or losses in the profit and loss account.

4. Accounting designation of financial instruments

Upon initial recognition the Bank designates each financial instrument under one of the following accounting categories:

- Loans and receivables
- Financial assets and financial liabilities held at fair value through profit and loss
- Available for sale financial assets
- Financial liabilities measured at amortised cost

The designation under these categories is dependent on the nature of the financial instrument and the purpose for which it was entered into, as described in Section 5 below.

The resulting designation of each financial instrument determines the accounting methodology that is applied, as described in the accounting policies below. Where the financial instrument is designated as held at fair value through profit and loss, the Bank does not subsequently change this designation.

5. Asset and liability structure

Assets and liabilities are organised into two sets of portfolios:

A. Banking portfolios

These comprise currency and gold deposit liabilities and related banking assets and derivatives.

The Bank operates a banking business in currency and gold on behalf of its customers. In this business the Bank is exposed to credit and market risks. The extent of these exposures is limited by the Bank's risk management approach.

The Bank designates all currency financial instruments in its banking portfolios (other than cash and sight and notice accounts with banks, and sight and notice deposit account liabilities) as held at fair value through profit and loss. The use of fair values in the currency banking portfolios is described in Section 9 below.

All gold financial assets in these portfolios are designated as loans and receivables and all gold financial liabilities are designated as financial liabilities measured at amortised cost.

B. Investment portfolios

These comprise assets, liabilities and derivatives relating principally to the investment of the Bank's equity.

The Bank holds most of its equity in financial instruments denominated in the constituent currencies of the SDR, which are managed by comparison to a fixed duration benchmark of bonds.

Currency assets in investment portfolios, with the exception of cash and notice accounts (Sections 6 and 7 below) and those in more actively traded portfolios, are designated as available for sale.

The currency investment assets maintained in more actively traded portfolios are trading assets and as such are designated as held at fair value through profit and loss.

The remainder of the Bank's equity is held in gold. The Bank's own gold holdings are designated as available for sale.

6. Cash and sight accounts with banks

Cash and sight accounts with banks are included in the balance sheet at their principal value plus accrued interest where applicable.

7. Notice accounts

Notice accounts are short-term monetary assets, including balances at futures clearing brokers. These typically have notice periods of three days or less and are included under the balance sheet heading "Loans and advances". They are considered to be cash equivalents for the purposes of the statement of cash flows.

Due to their short-term nature, these financial instruments are designated as loans and receivables. They are included in the balance sheet at their principal value plus accrued interest. Interest is included in interest income on an accruals basis.

8. Sight and notice deposit account liabilities

Sight and notice deposit accounts are short-term monetary liabilities. They typically have notice periods of three days or less and are included under the balance sheet heading "Currency deposits".

Due to their short-term nature, these financial instruments are designated as financial liabilities measured at amortised cost. They are included in the balance sheet at their principal value plus accrued interest. Interest is included in interest expense on an accruals basis.

9. Use of fair values in the currency banking portfolios

In operating its currency banking business, the Bank acts as a market-maker in certain of its currency deposit liabilities. As a result of this activity the Bank incurs realised profits and losses on these liabilities.

In accordance with the Bank's risk management policies, the market risk inherent in this activity is managed on an overall fair value basis, combining all the relevant assets, liabilities and derivatives in its currency banking portfolios. The realised and unrealised profits or losses on currency deposit liabilities are thus largely offset by realised and unrealised losses or profits on the related currency banking assets and derivatives, or on other currency deposit liabilities.

To reduce the accounting inconsistency that would otherwise arise from recognising realised and unrealised gains and losses on different bases, the Bank designates the relevant assets, liabilities and derivatives in its currency banking portfolios as held at fair value through profit and loss.

10. Securities purchased under resale agreements

Securities purchased under resale agreements ("reverse repurchase agreements") are recognised as collateralised loan transactions by which the Bank lends cash and receives an irrevocable commitment from the counterparty to return the cash, plus interest, at a specified date in the future. As part of these agreements, the Bank receives collateral in the form of securities to which it has full legal title, but must return equivalent securities to the counterparty at the end of the agreement, subject to the counterparty's repayment of the cash. Because the Bank does not acquire the risks or rewards associated with ownership of these collateral securities, they are not recognised as assets in the Bank's balance sheet.

The collateralised loans relating to securities purchased under resale agreements are currency assets. The accounting treatment is determined by whether the transaction involves currency assets held at fair value through profit and loss (Section 11 below) or currency investment assets available for sale (Section 13 below).

11. Currency assets held at fair value through profit and loss

Currency assets include treasury bills, securities purchased under resale agreements, loans and advances, and government and other securities.

As described in Section 9 above, the Bank designates all of the relevant assets in its currency banking portfolios as held at fair value through profit and loss. These currency assets are initially included in the balance sheet on a trade date basis. The accrual of interest and amortisation of premiums paid and discounts received are included in the profit and loss account under "Interest income" on an effective interest rate basis. After initial measurement, the currency assets are revalued to fair value, with all realised and unrealised movements in fair value included under "Net valuation movement".

12. Currency deposit liabilities held at fair value through profit and loss

All currency deposit liabilities, with the exception of sight and notice deposit account liabilities, are designated as held at fair value through profit and loss.

These currency deposit liabilities are initially included in the balance sheet on a trade date basis. The accrual of interest to be paid and amortisation of premiums received and discounts paid are included under the profit and loss account heading "Interest expense" on an effective interest rate basis.

After initial measurement, the currency deposit liabilities are revalued to fair value, with all realised and unrealised movements in fair value included under "Net valuation movement".

13. Currency investment assets available for sale

Currency assets include treasury bills, securities purchased under resale agreements, loans and advances, and government and other securities.

As described in Section 12 above, the Bank designates as available for sale all of the relevant assets in its currency investment portfolios.

Available for sale investment assets are initially included in the balance sheet on a trade date basis. The accrual of interest and amortisation of premiums paid and discounts received are included in the profit and loss account under "Interest income" on an effective interest rate basis.

After trade date, the currency investment assets are revalued to fair value, with unrealised gains or losses included in the securities revaluation account, which is reported under the balance sheet heading "Other equity accounts". The movement in fair value is included in the statement of comprehensive income under the heading "Net movement on revaluation of available for sale securities". Realised profits on disposal are included in the profit and loss account under "Net gain on sales of securities available for sale".

14. Short positions in currency assets

Short positions in currency assets are included in the balance sheet under the heading "Other liabilities" at fair value on a trade date basis.

15. Gold

Gold comprises gold bar assets held in custody at central banks and sight accounts denominated in gold. Gold is considered by the Bank to be a financial instrument.

Gold is included in the balance sheet at its weight in gold (translated at the gold market price and USD exchange rate into SDR). Purchases and sales of gold are accounted for on a settlement date basis. Forward purchases or sales of gold are treated as derivatives prior to the settlement date.

The treatment of realised and unrealised gains or losses on gold is described in Section 18 below.

16. Gold loans

Gold loans comprise fixed-term gold loans. Gold loans are included in the balance sheet on a trade date basis at their weight in gold (translated at the gold market price and USD exchange rate into SDR) plus accrued interest.

Accrued interest on gold loans is included in the profit and loss account under "Interest income" on an effective interest rate basis.

17. Gold deposits

Gold deposits comprise unallocated sight and fixed-term deposits of gold from central banks.

Unallocated gold deposits provide customers with a general claim on the Bank for delivery of gold of the same weight and quality as that delivered by the customer to the Bank, but do not provide the right to specific gold bars. Unallocated gold deposits are included in the balance sheet on a trade date basis at their weight in gold (translated at the gold market price and USD exchange rate into SDR) plus accrued interest. Accrued interest on gold deposits is included in the profit and loss account under "Interest expense" on an effective interest rate basis.

Allocated (or "earmarked") gold deposits provide depositors with a claim for delivery of the specific gold bars deposited by the customer with the Bank on a custody basis. Beneficial ownership and risk remain with the customer. As such, allocated gold deposit liabilities and the related gold bar assets are not included on the Bank's balance sheet. They are disclosed as off-balance sheet items (see note 30).

18. Realised and unrealised gains or losses on gold

The treatment of realised and unrealised gains or losses on gold depends on the designation as described below:

A. Banking portfolios, comprising gold deposits and related gold banking assets

The Bank designates gold loans in its banking portfolios as loans and receivables and gold deposits as financial liabilities measured at amortised cost. The gold derivatives included in the portfolios are designated as held at fair value through profit and loss.

Gains or losses on derivative transactions in gold are included in the profit and loss account under "Net foreign exchange gain / (loss)" as net transaction gains or losses.

Gains or losses on the retranslation of the net position in gold in the banking portfolios are included under "Net foreign exchange gain / (loss)" as net translation gains or losses.

B. Investment portfolios, comprising gold investment assets

The Bank's own holdings of gold are designated and accounted for as available for sale assets.

Unrealised gains or losses on the Bank's gold investment assets over their deemed cost are taken to the gold revaluation account in equity, which is reported under the balance sheet heading "Other equity accounts". The movement in fair value is included in the statement of comprehensive income under the heading "Net movement on revaluation of gold investment assets".

For gold investment assets held on 31 March 2003 (when the Bank changed its functional and presentation currency from the gold franc to the SDR) the deemed cost is approximately SDR 151 per ounce, based on the value of USD 208 that was applied from 1979 to 2003 following a decision by the Bank's Board of Directors, translated at the 31 March 2003 exchange rate.

Realised gains or losses on disposal of gold investment assets are included in the profit and loss account as "Net gain on sales of gold investment assets".

19. Securities sold under repurchase agreements

Securities sold under repurchase agreements ("repurchase agreements") are recognised as collateralised deposit transactions by which the Bank receives cash and provides an irrevocable commitment to return the cash, plus interest, at a specified date in the future. As part of these agreements, the Bank transfers legal title of collateral securities to the counterparty. At the end of the contract the counterparty must return equivalent securities to the Bank, subject to the Bank's repayment of the cash. Because the Bank retains the risks and rewards associated with ownership of these securities, they continue to be recognised as assets in the Bank's balance sheet.

Where the repurchase agreement is associated with currency assets available for sale, the collateralised deposit transaction is designated as a financial liability measured at amortised cost.

Where the repurchase agreement is associated with the management of currency assets held at fair value through profit and loss, the collateralised deposit transaction is designated as a financial instrument held at fair value through profit and loss.

The collateralised deposits relating to securities sold under repurchase agreements are initially included in the balance sheet on a trade date basis. The accrual of interest is included in the profit and loss account under "Interest expense" on an effective interest rate basis. After initial measurement, the transactions designated as held at fair value through profit and loss are revalued to fair value with all unrealised movements in fair value included under "Net valuation movement".

20. Derivatives

Derivatives are used either to manage the Bank's market risk or for trading purposes. They are designated as financial instruments held at fair value through profit and loss.

Derivatives are initially included in the balance sheet on a trade date basis. Where applicable, the accrual of interest and amortisation of premiums and discounts are included in the profit and loss account under "Interest income" on an effective interest rate basis.

After trade date, derivatives are revalued to fair value, with all realised and unrealised movements in value included under "Net valuation movement".

Derivatives are included as either assets or liabilities, depending on whether the contract has a positive or a negative fair value for the Bank.

Where a derivative contract is embedded within a host contract which is not accounted for as held at fair value through profit and loss, it is separated from the host contract for accounting purposes and treated as though it were a standalone derivative as described above.

21. Valuation policy

The Bank's valuation policy defines how financial instruments are designated, which determines their valuation basis and accounting treatment. This policy is supplemented with detailed valuation procedures.

The majority of the financial instruments on the balance sheet are included at fair value. The Bank defines fair value as the exit price of an orderly transaction between market participants on the measurement date.

The use of fair values ensures that the financial reporting to the Board and shareholders reflects the way in which the banking business is managed and is consistent with the risk management and economic performance figures reported to Management.

The Bank considers published price quotations in active markets as the best evidence of fair value. Where no published price quotations exist, the Bank determines fair values using a valuation technique appropriate to the particular financial instrument. Such valuation techniques may involve using market prices of recent arm's length market transactions in similar instruments or may make use of financial models. Where financial models are used, the Bank aims at making maximum use of observable market inputs as appropriate, and relies as little as possible on its own estimates. Such valuation models comprise discounted cash flow analyses and option pricing models.

Where valuation techniques are used to determine fair values, the valuation models are subject to initial approval and periodic review in line with the requirements of the Bank's model validation policy.

The Bank has an independent valuation control function which periodically reviews the value of its financial instruments, taking into account both the accuracy of the valuations and the valuation methodologies used. Other valuation controls include the review and analysis of daily profit and loss.

The Bank values its positions at their exit price, so that assets are valued at the bid price and liabilities at the offer price. Derivative financial instruments are valued on a bid-offer basis, with valuation reserves, where necessary, included in derivative financial liabilities. Financial assets and liabilities that are not valued at fair value are included in the balance sheet at amortised cost.

22. Impairment of financial assets

Financial assets, other than those designated as held at fair value through profit and loss, are assessed for indications of impairment at each balance sheet date. A financial asset is impaired when there is objective evidence that the estimated future cash flows of the asset have been reduced as a result of one or more events that occurred after the initial recognition of the asset. Evidence of impairment could include significant financial difficulty, default, or probable bankruptcy / financial reorganisation of the counterparty or issuer.

Impairment losses are recognised to the extent that a decline in fair value below amortised cost is considered significant or prolonged. Impairment of currency assets is included in the profit and loss account under "Net valuation movement", with impairment of gold loans included under "Interest income". If the amount of the impairment loss decreases in a subsequent period, the previously recognised impairment loss is reversed through profit and loss to the extent that the carrying amount of the investment does not exceed that which it would have been had the impairment not been recognised.

23. Accounts receivable and accounts payable

Accounts receivable and accounts payable are principally very short-term amounts relating to the settlement of financial transactions. They are initially recognised at fair value and subsequently included in the balance sheet at amortised cost.

24. Land, buildings and equipment

The cost of the Bank's buildings and equipment is capitalised and depreciated on a straight line basis over the estimated useful lives of the assets concerned, as follows:

- Buildings – 50 years
- Building installations and machinery – 15 years
- Information technology equipment – up to 4 years
- Other equipment – 4 to 10 years

The Bank's land is not depreciated. The Bank undertakes an annual review of impairment of land, buildings and equipment. Where the carrying amount of an asset is greater than its estimated recoverable amount, the asset is written down to a lower value.

25. Provisions

Provisions are recognised when the Bank has a present legal or constructive obligation as a result of events arising before the balance sheet date and it is probable that economic resources will be required to settle the obligation, provided that a reliable estimate can be made of the amount of the obligation. Best estimates and assumptions are used when determining the amount to be recognised as a provision.

26. Taxation

The Bank's special legal status in Switzerland is set out principally in its Headquarters Agreement with the Swiss Federal Council. Under the terms of this document the Bank is exempted from virtually all direct and indirect taxes at both federal and local government level in Switzerland.

Similar agreements exist with the government of the People's Republic of China for the Asian Office in Hong Kong SAR and with the Mexican government for the Americas Office in Mexico City.

However, some income and gains received by the Bank are subject to tax in certain jurisdictions. In such cases, income and gains are recognised on a gross basis with the corresponding tax recognised as an expense.

27. Post-employment benefit obligations

The Bank operates three post-employment benefit arrangements, respectively, for staff pensions, Directors' pensions, and health and accident insurance for current and former staff members. An independent actuarial valuation is performed annually for each arrangement.

A. Staff pensions

The Bank provides a final salary defined benefit pension arrangement for its staff, based on a fund without a separate legal personality from the BIS, out of which benefits are paid. The fund assets are administered by the Bank for the sole benefit of current and former members of staff who participate in the arrangement. The Bank remains ultimately liable for all benefits due under the arrangement.

The liability in respect of the staff pension fund is based on the present value of the defined benefit obligation less the fair value of the fund assets, both at the balance sheet date. The defined benefit obligation is calculated using the projected unit credit method. The present value of the defined benefit obligation is determined from the estimated future cash outflows. The rate used to discount the cash flows is determined by the Bank based on the market yield of highly rated corporate debt securities in Swiss francs which have terms to maturity approximating the terms of the related liability.

The amount charged to the profit and loss account represents the sum of the current service cost of the benefits accruing for the year under the scheme, and interest at the discount rate on the net of the defined benefit obligation less the fair value of the fund assets. Past service costs from plan amendments are immediately recognised through profit or loss. Gains and losses arising from re-measurement of the obligations, such as experience adjustments (where the actual outcome is different from the actuarial assumptions previously made) and changes in actuarial assumptions are charged to other comprehensive income in the year in which the re-measurement is applied. They are not subsequently included in profit and loss in future years.

B. Directors' pensions

The Bank provides an unfunded defined benefit arrangement for Directors' pensions. The liability, defined benefit obligation and amount charged to the profit and loss account in respect of the Directors' pension arrangement are calculated on a similar basis to that used for the staff pension fund.

C. Post-employment health and accident benefits

The Bank provides an unfunded post-employment health and accident benefit arrangement for its staff. The liability, benefit obligation and amount charged to the profit and loss account in respect of the health and accident benefit arrangement are calculated on a similar basis to that used for the staff pension fund.

28. Statement of cash flows

The Bank's statement of cash flows is prepared using an indirect method. It is based on the movements in the Bank's balance sheet, adjusted for changes in financial transactions awaiting settlement.

Cash and cash equivalents consist of cash and sight and notice accounts with banks, which are very short-term financial assets that typically have notice periods of three days or less.

Notes to the financial statements

1. Introduction

The Bank for International Settlements (BIS, "the Bank") is an international financial institution which was established pursuant to the Hague Agreements of 20 January 1930, the Bank's Constituent Charter and its Statutes. The headquarters of the Bank are at Centralbahnplatz 2, 4002 Basel, Switzerland. The Bank maintains representative offices in Hong Kong, Special Administrative Region of the People's Republic of China (for Asia and the Pacific), and in Mexico City, Mexico (for the Americas).

The objectives of the BIS, as laid down in Article 3 of its Statutes, are to promote cooperation among central banks, to provide additional facilities for international financial operations and to act as trustee or agent for international financial settlements. Sixty central banks are currently members of the Bank. The governance and management of the BIS are discussed in "The BIS: mission, activities, governance and financial results" in this Annual Report.

2. Use of estimates

The preparation of the financial statements requires the Bank's Management to make assumptions and estimates in arriving at the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of income and expenses during the financial year. To arrive at reasonable estimates, Management exercises judgment based on the latest reliable information.

The main estimates used relate to the valuation of assets and liabilities, the assessment of post-employment benefit obligations and the assessment of provisions and contingent liabilities. Subsequent actual results could differ significantly from these estimates.

Key judgments include the selection and application of the Bank's accounting policies, in particular for the valuation and accounting designation of financial instruments.

A. The valuation of financial assets and liabilities

Certain of the Bank's financial assets and financial liabilities are valued using valuation techniques which require estimation of appropriate valuation parameters. Changes in estimates of these parameters could significantly affect the reported fair values. The valuation impact of a 1 basis point change in spread assumptions of key financial instruments is shown in the table below:

For the financial year ended 31 March

SDR millions	**2015**	2014
Treasury bills	1.0	1.1
Securities purchased under resale agreements	0.3	0.3
Loans and advances	0.2	0.2
Government and other securities	12.2	11.0
Currency deposits	12.4	13.3
Derivative financial instruments	3.0	4.1

B. Impairment provision on financial assets

The Bank conducts an annual review for impairment at the date of each balance sheet. The Bank did not have any financial assets that were considered to be impaired at 31 March 2015 (2014: nil).

C. Actuarial assumptions

The valuation of the Bank's post-employment benefit obligations relies on actuarial assumptions which include, among others, expectations of inflation, interest rates, medical cost inflation, and retirement age and life expectancy of participants. Any changes to actuarial assumptions would have an impact on the valuation of these obligations and the amounts recognised in the financial statements.

3. Cash and sight accounts with banks

Cash and sight accounts with banks consist of cash balances with central banks and commercial banks that are available to the Bank on demand.

4. Gold and gold loans

A. Total gold holdings

The composition of the Bank's total gold holdings was as follows:

As at 31 March

SDR millions	**2015**	2014
Gold	12,639.9	20,374.5
Gold loans	1,515.6	221.9
Total gold and gold loan assets	**14,155.5**	20,596.4
Comprising:		
Gold investment assets	2,998.3	2,981.8
Gold and gold loan banking assets	11,157.2	17,614.6

Included in "Gold" is SDR 1,295.7 million (47 tonnes) of gold (2014: SDR 6,311.2 million; 236 tonnes) that the Bank holds in connection with its gold swap contracts. Under such contracts the Bank receives physical gold in exchange for currencies, and has an obligation to return the gold at the end of the contract. See note 6 for more details on gold swap transactions.

B. Gold investment assets

The Bank's gold investment assets are included in the balance sheet at their weight in gold (translated at the gold market price and USD exchange rate into SDR) plus accrued interest. The excess of this value over the deemed cost value is included in the gold revaluation account, which is reported under the balance sheet heading "Other equity accounts"; the movement in this value is included in the statement of comprehensive income under the heading "Net movement on revaluation of gold investment assets". Realised gains or losses on the disposal of gold investment assets are recognised in the profit and loss account under the heading "Net gain on sales of gold investment assets".

Note 17B provides further analysis of the gold revaluation account. Note 26 provides further analysis of the net gain on sales of gold investment assets.

The table below analyses the movements in the Bank's gold investment assets:

For the financial year ended 31 March

SDR millions	**2015**	2014
Balance at beginning of year	2,981.8	3,944.9
Net change in gold investment assets		
Disposals of gold	(80.1)	(110.5)
Maturities, sight account and other net movements	1.1	(0.8)
	(79.0)	(111.3)
Gold price movement	95.5	(851.8)
Balance at end of year	**2,998.3**	2,981.8

At 31 March 2015 the Bank's gold investment assets amounted to 108 tonnes of gold (2014: 111 tonnes).

5. Currency assets

A. Total holdings

Currency assets comprise treasury bills, securities purchased under resale agreements, fixed-term loans and advances, and government and other securities.

Treasury bills are short-term debt securities issued by governments on a discount basis.

Securities purchased under resale agreements ("reverse repurchase agreements") are recognised as collateralised loan transactions. Interest receivable on the transaction is fixed at the start of the agreement. During the term of the agreement the Bank monitors the fair value of the loan and related collateral securities, and may call for additional collateral (or be required to return collateral) based on movements in market value.

Loans and advances comprise fixed-term loans to commercial banks, advances and notice accounts. Advances relate to committed and uncommitted standby facilities which the Bank provides for its customers. Notice accounts are very short-term financial assets, typically having a notice period of three days or less. Fixed-term loans and advances are designated as held at fair value through profit and loss. Notice accounts are designated as loans and receivables and are included in the balance sheet at their principal value plus accrued interest.

Government and other securities are debt securities issued by governments, international institutions, other public sector institutions, commercial banks and corporates. They include commercial paper, certificates of deposit, fixed and floating rate bonds, covered bonds and asset-backed securities.

The tables below analyse the Bank's holdings of currency assets:

As at 31 March 2015

SDR millions	Fair value through profit and loss	Available for sale	Amortised cost	**Total**
Treasury bills	**33,926.0**	**–**	**–**	**33,926.0**
Securities purchased under resale agreements	**48,230.3**	**773.3**	**–**	**49,003.6**
Loans and advances	**17,437.5**	**–**	**528.7**	**17,966.2**
Government and other securities				
Government	39,065.7	14,959.8	–	54,025.5
Financial institutions	13,641.2	197.3	–	13,838.5
Other	13,009.9	36.3	–	13,046.2
	65,716.8	**15,193.4**	**–**	**80,910.2**
Total currency assets	**165,310.6**	**15,966.7**	**528.7**	**181,806.0**

As at 31 March 2014

SDR millions	Fair value through profit and loss	Available for sale	Amortised cost	Total
Treasury bills	44,530.8	–	–	44,530.8
Securities purchased under resale agreements	49,708.6	845.8	–	50,554.4
Loans and advances	19,267.3	–	333.0	19,600.3
Government and other securities				
Government	29,176.5	14,658.7	–	43,835.2
Financial institutions	13,281.2	142.2	–	13,423.4
Other	12,779.3	3.2	–	12,782.5
	55,237.0	14,804.1	–	70,041.1
Total currency assets	168,743.7	15,649.9	333.0	184,726.6

B. Currency investment assets available for sale

The Bank's currency investment assets largely represent the investment of its equity. They are designated as available for sale unless they are part of an actively traded portfolio (in which case they are designated as held at fair value through profit and loss). Note 25 provides further analysis of the net gain on sales of securities available for sale.

The table below analyses the movements in the Bank's currency investment assets available for sale:

For the financial year ended 31 March

SDR millions	**2015**	2014
Balance at beginning of year	15,649.9	13,913.2
Net change in currency investment assets available for sale		
Additions	15,905.3	9,981.6
Disposals	(6,248.5)	(5,679.3)
Other net movements	(9,291.0)	(2,619.9)
	365.8	1,682.4
Net change in transactions awaiting settlement	(203.5)	243.7
Fair value and other movements	154.5	(189.4)
Balance at end of year	**15,966.7**	15,649.9

6. Derivative financial instruments

The main types of derivative instruments used by the Bank for economic hedging and trading purposes are:

Interest rate and bond futures are contractual agreements to receive or pay a net amount based on changes in interest rates or bond prices at a future date. Futures contracts are settled daily with the exchange. Associated margin payments are settled by cash or marketable securities.

Currency and gold options are contractual agreements under which the seller grants the purchaser the right, but not the obligation, to either buy (call option) or sell (put option), by or on a set date, a specific amount of a currency or gold at a predetermined price. In consideration, the seller receives a premium from the purchaser.

Currency and gold swaps, cross-currency swaps and interest rate swaps are bilateral contractual agreements to exchange cash flows related to currencies, gold or interest rates (for example, fixed rate for floating rate). Cross-currency interest rate swaps involve the exchange of cash flows related to a combination of interest rates and foreign exchange rates. Except for certain currency and gold swaps and cross-currency interest rate swaps, no exchange of principal takes place.

Currency and gold forwards are bilateral contractual agreements involving the exchange of foreign currencies or gold at a future date. This includes undelivered spot transactions.

Forward rate agreements are bilateral interest rate forward contracts that result in cash settlement at a future date for the difference between a contracted rate of interest and the prevailing market rate.

Swaptions are bilateral options under which the seller grants the purchaser the right, but not the obligation, to enter into a currency or interest rate swap at a predetermined price by or on a set date. In consideration, the seller receives a premium from the purchaser.

In addition, the Bank sells products to its customers which contain embedded derivatives (see note 9). The gold currency options embedded in gold dual currency deposits are included within derivatives as currency and gold options.

The table below analyses the fair value of derivative financial instruments:

As at 31 March	**2015**			2014		
	Notional amounts	Fair values		Notional amounts	Fair values	
SDR millions		Assets	Liabilities		Assets	Liabilities
Bond futures	2,910.7	1.5	(1.6)	1,404.9	0.7	(0.2)
Cross-currency swaps	583.5	56.8	–	1,025.1	–	(145.0)
Currency and gold forwards	1,486.5	6.7	(8.6)	627.1	3.0	(0.6)
Currency and gold options	1,247.1	0.1	(0.7)	2,643.1	7.3	(7.7)
Currency and gold swaps	126,527.1	5,228.8	(802.4)	96,534.1	803.6	(640.1)
Forward rate agreements	25,078.0	7.1	(4.4)	10,574.2	0.7	(1.7)
Interest rate futures	9,511.6	0.5	(0.2)	3,508.7	–	(0.1)
Interest rate swaps	269,846.2	1,657.2	(1,344.3)	282,991.9	2,186.9	(1,828.2)
Swaptions	–	–	–	1,488.4	–	(9.3)
Total derivative financial instruments	**437,190.7**	**6,958.7**	**(2,162.2)**	400,797.5	3,002.2	(2,632.9)
Net derivative financial instruments		**4,796.5**			369.3	

7. Accounts receivable

As at 31 March

SDR millions	**2015**	2014
Financial transactions awaiting settlement	2,335.5	2,766.7
Other assets	9.9	10.7
Total accounts receivable	**2,345.4**	2,777.4

"Financial transactions awaiting settlement" relates to short-term receivables, typically due in three business days or less, where transactions have been effected but cash has not yet been received.

8. Land, buildings and equipment

For the financial year ended 31 March				**2015**	2014
SDR millions	Land	Buildings	IT and other equipment	Total	Total
Historical cost					
Balance at beginning of year	**46.4**	**270.4**	**95.8**	**412.6**	408.7
Capital expenditure	–	5.5	8.6	14.1	21.1
Disposals and retirements	–	(0.4)	(40.0)	(40.4)	(17.2)
Balance at end of year	**46.4**	**275.5**	**64.4**	**386.3**	412.6
Depreciation					
Balance at beginning of year	**–**	**147.2**	**69.2**	**216.4**	218.1
Depreciation	–	8.5	7.7	16.2	15.3
Disposals and retirements	–	(0.4)	(40.0)	(40.4)	(17.0)
Balance at end of year	**–**	**155.3**	**36.9**	**192.2**	216.4
Net book value at end of year	**46.4**	**120.2**	**27.5**	**194.1**	196.2

The net book value of IT and other equipment at 31 March 2015 includes intangible assets, comprising computer software, of SDR 18.6 million (2014: SDR 16.7 million). The depreciation charge for the financial year ended 31 March 2015 includes no additional charge for impairment (2014: SDR 0.1 million). During the financial year ended 31 March 2015 the Bank adopted the practice of retiring assets when their age reaches twice their estimated useful life. As a result, SDR 39.6 million has been removed from the historical cost and accumulated depreciation in the above table.

9. Currency deposits

Currency deposits are book entry claims on the Bank. The currency deposit instruments are analysed in the table below:

As at 31 March

SDR millions	**2015**	2014
Deposit instruments repayable at one to two days' notice		
Medium-Term Instruments (MTIs)	51,052.9	57,196.1
Callable MTIs	1,814.2	2,832.7
Fixed-Rate Investments at the BIS (FIXBIS)	50,534.3	43,327.0
	103,401.4	103,355.8
Other currency deposits		
Floating Rate Investments of the BIS (FRIBIS)	181.2	58.3
Fixed-term deposits	50,913.8	57,832.9
Dual Currency Deposits (DCDs)	390.6	257.3
Sight and notice deposit accounts	21,955.0	18,967.9
	73,440.6	77,116.4
Total currency deposits	**176,842.0**	180,472.2
Comprising:		
Designated as held at fair value through profit and loss	154,887.0	161,504.3
Designated as financial liabilities measured at amortised cost	21,955.0	18,967.9

Medium-Term Instruments (MTIs) are fixed rate investments at the Bank issued with initial quarterly maturities of between one and 10 years.

Callable MTIs are MTIs that are callable at the option of the Bank at an exercise price of par. At 31 March 2015 all options on outstanding callable MTIs had expired (in 2014 the callable MTIs had call dates between June and December 2014). The balance sheet total for callable MTIs includes the fair value of the embedded interest rate option.

FIXBIS are fixed rate investments at the Bank for any maturities between one week and one year.

FRIBIS are floating rate investments at the Bank with maturities of one year or longer for which the interest rate is reset in line with prevailing market conditions.

Fixed-term deposits are fixed rate investments at the Bank, typically with an initial maturity of less than one year.

Dual Currency Deposits (DCDs) are fixed-term deposits that are repayable on the maturity date either in the original currency or at a fixed amount in a different currency at the option of the Bank. The balance sheet total for DCDs includes the fair value of the embedded foreign exchange option. These deposits all mature between April 2015 and June 2015 (2014: in April and May 2014).

Sight and notice deposit accounts are very short-term financial liabilities, typically having a notice period of three days or less.

The Bank acts as the sole market-maker in certain of its currency deposit liabilities and has undertaken to repay some of these financial instruments at fair value, in whole or in part, at one to two business days' notice.

A. Valuation of currency deposits

Currency deposits (other than sight and notice deposit accounts) are included in the balance sheet at fair value. The amount the Bank is contractually obliged to pay at maturity in respect of its total currency deposits including interest accrued to 31 March 2015 is SDR 176,649.4 million (2014: SDR 180,373.0 million).

The Bank uses valuation techniques to estimate the fair value of its currency deposits. These valuation techniques comprise discounted cash flow models and option pricing models. The discounted cash flow models value the expected cash flows of financial instruments using discount factors that are partly derived from quoted interest rates (eg Libor and swap rates) and partly based on assumptions about spreads at which each product is offered to and repurchased from customers.

The option pricing models include estimates of volatilities that are derived from market quotes.

B. Impact of changes in the Bank's creditworthiness

The fair value of the Bank's liabilities should be affected by any change in its creditworthiness. If the Bank's creditworthiness deteriorated, the value of its liabilities should decrease, and the change in value would be reflected as a valuation movement in the profit and loss account. The Bank regularly assesses its creditworthiness as part of its risk management processes. The Bank's assessment of its creditworthiness did not indicate a change which could have had an impact on the fair value of the Bank's liabilities during the period under review.

10. Gold deposits

Gold deposit liabilities placed with the Bank originate entirely from central banks. They are all designated as financial liabilities measured at amortised cost.

11. Securities sold under repurchase agreements

Securities sold under repurchase agreements ("repurchase agreements"), and related collateral provided by the Bank, are analysed in the table below:

As at 31 March

SDR millions	**2015**	2014
Held at amortised cost	773.3	845.8
Held at fair value through profit and loss	–	323.5
Total securities under repurchase agreements (settled)	**773.3**	1,169.3
Transactions awaiting settlement	–	(249.9)
Total securities sold under repurchase agreements	**773.3**	919.4
Collateral provided under repurchase agreements comprises:		
Treasury bills	–	323.5
Government securities	773.1	596.3
Total collateral provided	**773.1**	919.8

Further information on collateral is provided in note 3C of the "Risk management" section.

12. Accounts payable

Accounts payable consist of financial transactions awaiting settlement, relating to short-term payables, typically payable within three business days or less, where transactions have been effected but cash has not yet been transferred.

13. Other liabilities

The Bank's other liabilities consist of:

As at 31 March

SDR millions	**2015**	2014
Post-employment benefit obligations (see note 18)		
Staff pensions	347.6	336.5
Directors' pensions	10.2	8.8
Health and accident benefits	498.7	431.4
Payable to former shareholders	0.4	0.6
Other	20.3	21.7
Total other liabilities	**877.2**	799.0

14. Share capital

The Bank's share capital consists of:

As at 31 March

SDR millions	**2015**	2014
Authorised capital: 600,000 shares, each of SDR 5,000 par value, of which SDR 1,250 is paid up	3,000.0	3,000.0
Issued capital: 559,125 shares	2,795.6	2,795.6
Paid-up capital (25%)	**698.9**	698.9

The number of shares eligible for dividend is:

As at 31 March	**2015**	2014
Issued shares	559,125	559,125
Shares held in treasury	(1,000)	(1,000)
Outstanding shares eligible for dividend	**558,125**	558,125

15. Statutory reserves

The Bank's Statutes provide for application of the Bank's annual net profit by the Annual General Meeting on the proposal of the Board of Directors to three specific reserve funds: the legal reserve fund, the general reserve fund and the special dividend reserve fund; the remainder of the net profit after payment of any dividend is generally allocated to the free reserve fund.

Legal reserve fund. This fund is currently fully funded at 10% of the Bank's paid-up capital.

General reserve fund. After payment of any dividend, 5% of the remainder of the Bank's annual net profit currently must be allocated to the general reserve fund.

Special dividend reserve fund. A portion of the remainder of the annual net profit may be allocated to the special dividend reserve fund, which shall be available, in case of need, for paying the whole or any part of a declared dividend. Dividends are normally paid out of the Bank's net profit.

Free reserve fund. After the above allocations have been made, any remaining unallocated net profit is generally transferred to the free reserve fund.

Receipts from the subscription of the Bank's shares are allocated to the legal reserve fund as necessary to keep it fully funded, with the remainder being credited to the general reserve fund.

The free reserve fund, general reserve fund and legal reserve fund are available, in that order, to meet any losses incurred by the Bank. In the event of liquidation of the Bank, the balances of the reserve funds (after the discharge of the liabilities of the Bank and the costs of liquidation) would be divided among the Bank's shareholders.

The table below analyses the movements in the Bank's statutory reserves over the last two years:

SDR millions	Legal reserve fund	General reserve fund	Special dividend reserve fund	Free reserve fund	Total statutory reserves
Balance at 31 March 2013 – restated	**69.8**	**3,569.9**	**178.0**	**9,743.1**	**13,560.8**
Allocation of 2012/13 profit – restated	–	36.1	6.0	677.5	719.6
Balance at 31 March 2014	**69.8**	**3,606.0**	**184.0**	**10,420.6**	**14,280.4**
Allocation of 2013/14 profit	–	15.0	–	284.3	299.3
Balance at 31 March 2015	**69.8**	**3,621.0**	**184.0**	**10,704.9**	**14,579.7**

At 31 March 2015 statutory reserves included share premiums of SDR 1,059.6 million (2014: SDR 1,059.6 million). The reported numbers for prior financial periods were restated in 2014 following a change in accounting policy relating to post-employment benefit obligations.

In accordance with Article 51 of the Bank's Statutes, the following profit allocation will be proposed at the Bank's Annual General Meeting:

SDR millions	**2015**
Net profit	**542.9**
Transfer to legal reserve fund	–
Proposed dividend:	
SDR 225 per share on 558,125 shares	(125.6)
Profit available for allocation	**417.3**
Proposed transfers to reserves:	
General reserve fund	(20.9)
Free reserve fund	(396.4)
Balance after allocation to reserves	–

16. Shares held in treasury

Shares held in treasury consist of 1,000 shares of the Albanian issue which were suspended in 1977.

17. Other equity accounts

Other equity accounts comprise the revaluation accounts for available for sale assets (gold investment and currency investment assets) as well as the re-measurement gains or losses on defined benefit obligations.

As at 31 March

SDR millions	**2015**	2014
Securities revaluation account	234.9	132.4
Gold revaluation account	2,467.4	2,437.5
Re-measurement of defined benefit obligations	(249.0)	(238.9)
Total other equity accounts	**2,453.3**	**2,331.0**

A. Securities revaluation account

This account contains the difference between the fair value and the amortised cost of the Bank's currency investment assets. The movements in the securities revaluation account were as follows:

For the financial year ended 31 March

SDR millions	**2015**	2014
Balance at beginning of year	132.4	362.3
Net gain on sales	(52.0)	(40.5)
Fair value and other movements	154.5	(189.4)
Net movement on revaluation of currency investment assets	**102.5**	(229.9)
Balance at end of year	**234.9**	132.4

The table below analyses the balance in the securities revaluation account, which relates to government and other securities:

SDR millions	Fair value of assets	Historical cost	Securities revaluation account	Gross gains	Gross losses
As at 31 March 2015	15,966.7	15,731.8	**234.9**	237.2	(2.3)
As at 31 March 2014	15,649.9	15,517.5	132.4	173.1	(40.7)

B. Gold revaluation account

This account contains the difference between the book value and the deemed cost of the Bank's gold investment assets. For gold investment assets held on 31 March 2003 (when the Bank changed its functional and presentation currency from the gold franc to the SDR) the deemed cost is approximately SDR 151 per ounce, based on the value of USD 208 per ounce that was applied from 1979 to 2003 in accordance with a decision by the Bank's Board of Directors and translated at the 31 March 2003 exchange rate.

The movements in the gold revaluation account were as follows:

For the financial year ended 31 March

SDR millions	**2015**	2014
Balance at beginning of year	2,437.5	3,380.4
Net gain on sales	(65.6)	(91.1)
Gold price movement	95.5	(851.8)
Net movement on revaluation of gold investment assets	**29.9**	(942.9)
Balance at end of year	**2,467.4**	2,437.5

C. Re-measurement of defined benefit obligations

This account contains the gains and losses from re-measurement of the Bank's post-employment benefit obligations.

For the financial year ended 31 March

SDR millions	**2015**	2014
Balance at beginning of year	(238.9)	(422.0)
Staff pension	33.3	98.5
Post-employment health and accident insurance	(42.4)	0.5
Directors' pension	(1.0)	84.1
Net movement on the re-measurement of defined benefit obligations	**(10.1)**	183.1
Balance at end of year	**(249.0)**	(238.9)

Note 18D provides further analysis of the re-measurement of the Bank's post-employment benefit obligations.

18. Post-employment benefit obligations

The Bank operates three post-employment arrangements:

1. A defined benefit pension arrangement for its staff in the event of retirement, disability or death. Benefits accrue under this arrangement according to years of participation and pensionable remuneration. Benefits are paid out of a fund without separate legal personality. The fund assets are administered by the Bank for the sole benefit of current and former members of staff, and their dependents, who participate in the arrangement. Contributions are made to this fund by the Bank and by staff. The fund also receives the return on the assets the Bank holds in the fund. The Bank remains ultimately liable for all benefits due under the arrangement.

2. An unfunded defined benefit arrangement for its Directors, whose entitlement is based on a minimum service period of four years.

3. An unfunded post-employment health and accident benefit arrangement for its staff and their dependents. Employees who leave the Bank after becoming eligible for early retirement benefits from the pension arrangement are eligible for post-employment health and accident benefits.

All three arrangements operate in Swiss francs and are valued annually by an independent actuary. During 2015/16, the Bank expects to make contributions of SDR 33.3 million to its post-employment arrangements.

In January 2014, the Board endorsed a number of changes to the staff pension arrangement. Changes included the discontinuation of the right to purchase additional pension benefits, an increase in the compulsory retirement age, a reduction in early retirement benefits and an amendment to the pensionable remuneration basis from final salary to average salary of the last three years of service. Some of these changes became effective immediately; others became effective on 1 October 2014 when new pension fund regulations came into force.

A. Amounts recognised in the balance sheet

As at 31 March	Staff pensions			Directors' pensions			Post-employment health and accident benefits		
SDR millions	**2015**	2014	2013 restated	**2015**	2014	2013 restated	**2015**	2014	2013 restated
Present value of obligations	(1,468.7)	(1,398.6)	(1,370.7)	(10.2)	(8.8)	(8.9)	(498.7)	(431.4)	(478.9)
Fair value of fund assets	1,121.1	1,062.1	978.2	–	–	–	–	–	–
Liability at end of year	**(347.6)**	(336.5)	(392.5)	**(10.2)**	(8.8)	(8.9)	**(498.7)**	(431.4)	(478.9)

B. Present value of defined benefit obligations

The reconciliation of the opening and closing amounts of the present value of the benefit obligations is as follows:

As at 31 March	Staff pensions			Directors' pensions			Post-employment health and accident benefits		
SDR millions	**2015**	2014	2013 restated	**2015**	2014	2013 restated	**2015**	2014	2013 restated
Present value of obligations at beginning of year	(1,398.6)	(1,370.7)	(1,264.5)	(8.8)	(8.9)	(8.6)	(431.4)	(478.9)	(434.3)
Employee contributions	(6.6)	(6.5)	(6.2)	–	–	–	–	–	–
Benefit payments	49.4	35.8	28.5	0.4	0.5	0.5	2.9	2.9	2.7
Net current service cost	(61.5)	(63.6)	(53.5)	(0.4)	(0.5)	(0.4)	(12.1)	(18.2)	(15.6)
Interest cost on obligation at opening discount rate	(27.3)	(24.1)	(24.3)	(0.2)	(0.1)	(0.2)	(8.5)	(8.5)	(8.4)
Actuarial gain / (loss) arising from experience adjustments	30.3	21.3	(5.0)	–	0.4	–	(41.2)	41.0	–
Actuarial gain / (loss) arising from changes in demographic assumptions	19.5	(5.6)	(5.1)	(0.2)	–	–	30.9	26.1	(3.1)
Actuarial gain / (loss) arising from changes in financial assumptions	(45.0)	65.1	(60.8)	(0.8)	0.3	(0.3)	(30.3)	24.3	(27.0)
Past service costs	–	7.0	–	–	–	–	–	–	–
Exchange differences	(28.9)	(57.3)	20.2	(0.2)	(0.5)	0.1	(9.0)	(20.1)	6.8
Present value of obligations at end of year	**(1,468.7)**	(1,398.6)	(1,370.7)	**(10.2)**	(8.8)	(8.9)	**(498.7)**	(431.4)	(478.9)

The following table shows the weighted average duration of the defined benefit obligations for the Bank's three post-employment benefit arrangements:

As at 31 March	Staff pensions			Directors' pensions			Post-employment health and accident benefits		
Years	**2015**	2014	2013	**2015**	2014	2013	**2015**	2014	2013
Weighted average duration	**18.2**	18.4	18.9	**13.0**	12.3	12.4	**23.7**	22.1	24.1

C. Amounts recognised in the profit and loss account

For the financial year ended 31 March	Staff pensions			Directors' pensions			Post-employment health and accident benefits		
SDR millions	**2015**	2014	2013 restated	**2015**	2014	2013 restated	**2015**	2014	2013 restated
Net current service cost	(61.5)	(63.6)	(53.5)	(0.4)	(0.5)	(0.4)	(12.1)	(18.2)	(15.6)
Reduction in past service cost	–	7.0	–	–	–	–	–	–	–
Interest cost on net liability	(6.3)	(6.7)	(6.2)	(0.2)	(0.1)	(0.2)	(8.5)	(8.5)	(8.4)
Total included in operating expense	**(67.8)**	(63.3)	(59.7)	**(0.6)**	(0.6)	(0.6)	**(20.6)**	(26.7)	(24.0)

D. Re-measurement of defined benefit obligations recognised in other comprehensive income

For the financial year ended 31 March	Staff pensions			Directors' pensions			Post-employment health and accident benefits		
SDR millions	**2015**	2014	2013 restated	**2015**	2014	2013 restated	**2015**	2014	2013 restated
Return on plan assets in excess of opening discount rate	30.5	26.9	42.1	–	–	–	–	–	–
Actuarial gain / (loss) arising from experience adjustments	30.3	21.3	(5.0)	–	0.4	–	(41.2)	41.0	–
Actuarial gain / (loss) arising from changes in demographic assumptions	19.5	(5.6)	(5.1)	(0.2)	–	–	30.9	26.1	(3.1)
Actuarial gain / (loss) arising from changes in financial assumptions	(45.0)	65.1	(60.8)	(0.8)	0.3	(0.3)	(30.3)	24.3	(27.0)
Foreign exchange gain / (loss) on items in other comprehensive income	(2.0)	(9.2)	3.1	–	(0.2)	–	(1.8)	(7.3)	2.2
Amounts recognised in other comprehensive income	**33.3**	98.5	(25.7)	**(1.0)**	0.5	(0.3)	**(42.4)**	84.1	(27.9)

E. Analysis of movement on fair value of fund assets for staff pensions

The reconciliation of the opening and closing amounts of the fair value of fund assets for the staff pension arrangement is as follows:

For the financial year ended 31 March			
SDR millions	**2015**	2014	2013
Fair value of fund assets at beginning of year	1,062.1	978.2	929.2
Employer contributions	28.2	27.8	26.5
Employee contributions	6.6	6.5	6.2
Benefit payments	(49.4)	(35.8)	(28.5)
Interest income on plan assets calculated on opening discount rate	21.0	17.4	18.0
Return on plan assets in excess of opening discount rate	30.5	26.9	42.1
Exchange differences	22.1	41.1	(15.3)
Fair value of fund assets at end of year	**1,121.1**	1,062.1	978.2

F. Composition and fair value of assets for the pension fund

The table below analyses the assets of the pension fund and the extent to which the fair values of those assets have been calculated using quoted prices in active markets. A price is considered to be quoted if it is both readily available from an exchange, dealer or similar source and indicates the price at which transactions can be executed. A market is considered to be active if willing buyers and sellers can normally be found. The pension fund does not invest in financial instruments issued by the Bank.

As at 31 March

SDR millions	**2015**			2014		
	Quoted in active market	Unquoted	Total	Quoted in active market	Unquoted	Total
Cash (including margin accounts)	14.9	–	14.9	19.5	–	19.5
Debt securities	325.0	–	325.0	361.2	–	361.2
Fixed income funds	212.5	–	212.5	124.6	–	124.6
Equity funds	452.2	36.5	488.7	436.4	29.3	465.7
Real estate funds	17.4	8.0	25.4	25.8	8.0	33.8
Commodity-linked notes	–	54.2	54.2	–	52.9	52.9
Derivative instruments	(0.2)	0.6	0.4	0.1	4.3	4.4
Total	**1,021.8**	**99.3**	**1,121.1**	967.6	94.5	1,062.1

G. Principal actuarial assumptions used in these financial statements

As at 31 March	**2015**	2014
Applicable to all three post-employment benefit arrangements		
Discount rate – market rate of highly rated Swiss corporate bonds	0.80%	2.00%
Applicable to staff and Directors' pension arrangements		
Assumed increase in pensions payable	0.80%	1.50%
Applicable to staff pension arrangement only		
Assumed salary increase rate	2.80%	4.10%
Applicable to Directors' pension arrangement only		
Assumed Directors' pensionable remuneration increase rate	0.80%	1.50%
Applicable to post-employment health and accident benefit arrangement only		
Long-term medical cost inflation assumption	4.00%	5.00%

The assumed increases in staff salaries, Directors' pensionable remuneration and pensions payable incorporate an inflation assumption of 0.8% at 31 March 2015 (2014: 1.5%).

H. Life expectancies

The life expectancies, at age 65, used in the actuarial calculations for the staff pension arrangement are:

As at 31 March

Years	**2015**	2014
Current life expectancy of members aged 65		
Male	20.0	19.9
Female	22.3	22.2
Life expectancy of members aged 65 projected forward in 10 years' time		
Male	21.0	20.3
Female	23.2	22.6

I. Sensitivity analysis of significant actuarial assumptions

The Bank is exposed to risks from these obligations and arrangements including investment risk, interest rate risk, foreign exchange risk, longevity risk and salary risk.

Investment risk is the risk that plan assets will not generate returns at the expected level.

Interest rate risk is the exposure of the post-employment benefit obligations to adverse movements in interest rates including credit spreads. A decrease in interest rates will increase the present value of these obligations. However, in the case of the staff pension arrangement this may be offset, either fully or partly, by an increase in value of the interest bearing securities held by the fund.

Foreign exchange risk is the exposure of the post-employment benefit obligations to adverse movements in exchange rates between the Swiss franc, which is the operating currency of the post-employment benefit arrangements, and the SDR, which is the functional currency of the Bank.

Longevity risk is the risk that actual outcomes differ from actuarial estimates of life expectancy.

Salary risk is the risk that higher than expected salary rises increase the cost of providing a salary-related pension.

The table below shows the estimated impact on the defined benefit obligation resulting from a change in key actuarial assumptions (see tables 18G and 18H):

As at 31 March	Staff pensions	
SDR millions	**2015**	2014
Discount rate – increase by 0.5%	(123.4)	(117.5)
Rate of salary increase – increase by 0.5%	39.7	42.0
Rate of pension payable increase – increase by 0.5%	95.5	86.7
Life expectancy – increase by 1 year	55.8	51.7

As at 31 March	Directors' pensions	
SDR millions	**2015**	2014
Discount rate – increase by 0.5%	(0.6)	(0.5)
Rate of pension payable increase – increase by 0.5%	0.6	0.5
Life expectancy – increase by 1 year	0.6	0.4

As at 31 March	Post-employment health and accident benefits	
SDR millions	**2015**	2014
Discount rate – increase by 0.5%	(53.9)	(43.1)
Medical cost inflation rate – increase by 1.0%	124.5	100.7
Life expectancy – increase by 1 year	30.9	27.2

The above estimates were arrived at by changing each assumption individually, holding other variables constant. They do not include any correlation effects that may exist between variables.

19. Interest income

For the financial year ended 31 March

SDR millions	**2015**	2014
Currency assets available for sale		
Securities purchased under resale agreements	1.6	0.2
Government and other securities	177.2	181.7
	178.8	181.9
Currency assets held at fair value through profit and loss		
Treasury bills	91.9	97.4
Securities purchased under resale agreements	68.5	64.0
Loans and advances	111.2	125.8
Government and other securities	660.9	627.6
	932.5	914.8
Assets designated as loans and receivables		
Sight and notice accounts	(10.6)	0.5
Gold investment assets	1.6	–
Gold banking assets	0.7	1.0
	(8.3)	1.5
Derivative financial instruments held at fair value through profit and loss	**423.5**	501.6
Total interest income	**1,526.5**	1,599.8

Total interest income is net of "negative" interest income of SDR 32.6 million (2014: SDR 6.5 million).

20. Interest expense

For the financial year ended 31 March

SDR millions	**2015**	2014
Liabilities held at fair value through profit and loss		
Currency deposits	739.7	798.5
Liabilities designated as financial liabilities measured at amortised cost		
Sight and notice deposit accounts	32.2	31.0
Gold deposits	0.6	0.8
Securities sold under repurchase agreements	0.9	–
	33.7	31.8
Total interest expense	**773.4**	830.3

Total interest expense is net of "negative" interest expense of SDR 8.0 million (2014: SDR 0.4 million).

21. Net valuation movement

The net valuation movement arises entirely on financial instruments designated as held at fair value through profit and loss. There were no credit losses due to restructuring or default in the financial years ended 31 March 2015 and 2014.

For the financial year ended 31 March

SDR millions	**2015**	2014
Currency assets held at fair value through profit and loss		
Unrealised valuation movements on currency assets	32.5	(384.6)
Realised gains on currency assets	56.2	67.3
	88.7	(317.3)
Currency liabilities held at fair value through profit and loss		
Unrealised valuation movements on financial liabilities	(62.1)	820.8
Realised losses on financial liabilities	(53.5)	(369.7)
	(115.6)	451.1
Valuation movements on derivative financial instruments	**(70.9)**	(313.4)
Net valuation movement	**(97.8)**	(179.6)

22. Net fee and commission income

For the financial year ended 31 March

SDR millions	**2015**	2014
Net third-party asset management fee income	9.9	8.2
Other fee income	3.8	3.8
Other fee and commission expense	(7.9)	(7.0)
Net fee and commission income	**5.8**	5.0

Asset management fees relate to net fees earned by the Bank on trust and fiduciary activities in which the Bank holds or invests assets on behalf of its customers.

23. Net foreign exchange gain / (loss)

For the financial year ended 31 March

SDR millions	**2015**	2014
Net transaction gain	7.1	1.6
Net translation gain / (loss)	31.7	(34.9)
Net foreign exchange gain / (loss)	**38.8**	(33.3)

24. Operating expense

The following table analyses the Bank's operating expense in Swiss francs (CHF), the currency in which most expenditure is incurred:

For the financial year ended 31 March

CHF millions	**2015**	2014
Board of Directors		
Directors' fees	2.1	2.1
Pensions to former Directors	0.9	0.9
Travel, external Board meetings and other costs	1.2	1.6
	4.2	4.6
Management and staff		
Remuneration	128.7	129.9
Pensions	93.8	89.0
Other personnel-related expense	46.9	54.9
	269.4	273.8
Office and other expense	**70.8**	71.4
BIS administrative expense	**344.4**	349.8
Direct contributions to hosted organisations	11.8	11.1
Total administrative expenses	**356.2**	360.9
Administrative expense in SDR millions	258.4	258.6
Depreciation in SDR millions	16.2	15.3
Operating expense in SDR millions	**274.6**	273.9

The average number of full-time equivalent employees during the financial year ended 31 March 2015 was 572 (2014: 566). In addition, at 31 March 2015 the Bank employed 61 staff members (2014: 60) on behalf of the Financial Stability Board (FSB), the International Association of Deposit Insurers (IADI) and the International Association of Insurance Supervisors (IAIS).

The Bank makes direct contributions, which include salary and post-employment costs and other related expenses, towards the operational costs of the FSB, IADI and IAIS, and these amounts are shown under "Direct contributions to hosted organisations". The Bank also provides logistical, administrative and staffing-related support for these organisations, the cost of which is included within the Bank's regular operating expense categories.

25. Net gain on sales of securities available for sale

For the financial year ended 31 March

SDR millions	**2015**	2014
Disposal proceeds	6,367.4	5,679.4
Amortised cost	(6,315.4)	(5,638.9)
Net gain on sales of securities available for sale	**52.0**	40.5
Comprising:		
Gross realised gains	55.7	55.2
Gross realised losses	(3.7)	(14.7)

26. Net gain on sales of gold investment assets

For the financial year ended 31 March

SDR millions	**2015**	2014
Disposal proceeds	80.1	110.5
Deemed cost (see note 17B)	(14.5)	(19.4)
Net gain on sales of gold investment assets	**65.6**	91.1

27. Dividends per share

For the financial year ended 31 March	**2015**	2014
Net profit for the financial year (SDR millions)	542.9	419.3
Weighted average number of shares entitled to dividend	558,125	558,125
Dividend per share (SDR per share)	225.0	215.0
Total dividend (SDR millions)	**125.6**	120.0

The Bank's dividend policy requires that the dividend be set at a sustainable level which should vary over time in a predictable fashion. The policy also requires that the dividend reflect the Bank's capital needs and its prevailing financial circumstances, with a payout ratio of between 20 and 30% in most years.

The proposed dividend for 2015 represents a payout ratio of 23% of net profit (2014: 29%).

28. Cash and cash equivalents

The cash and cash equivalents in the statement of cash flows comprise:

As at 31 March

SDR millions	**2015**	2014
Cash and sight accounts with banks	11,375.3	11,211.5
Notice accounts	528.7	333.0
Total cash and cash equivalents	**11,904.0**	11,544.5

29. Exchange rates

The following table shows the principal exchange rates and prices used to translate balances in foreign currency and gold into SDR:

	Spot rate as at 31 March		Average rate for the financial year	
	2015	2014	**2015**	2014
USD	**0.725**	0.647	**0.674**	0.656
EUR	**0.778**	0.892	**0.852**	0.879
JPY	**0.00604**	0.00629	**0.00614**	0.00655
GBP	**1.076**	1.079	**1.085**	1.043
CHF	**0.747**	0.732	**0.725**	0.715
Gold (in ounces)	**860.7**	833.3	**839.8**	871.0

30. Off-balance sheet items

The following items are not included in the Bank's balance sheet:

As at 31 March

SDR millions	**2015**	2014
Gold bars held under earmark	12,256.4	10,417.4
Nominal value of securities:		
Securities held under safe custody arrangements	4,733.0	5,295.9
Securities held under collateral pledge agreements	38.9	34.8
Net asset value of portfolio management mandates:		
BISIPs	9,618.0	9,162.4
Dedicated mandates	4,019.7	2,969.3

Gold bars held under earmark comprise specific gold bars which have been deposited with the Bank on a custody basis. They are included at their weight in gold (translated at the gold market price and the USD exchange rate into SDR). At 31 March 2015 gold bars held under earmark amounted to 443 tonnes of gold (2014: 389 tonnes).

Portfolio management mandates include BIS Investment Pools (BISIPs) and dedicated mandates.

The BISIPs are a range of open-ended investment funds created by the Bank and managed using entities that do not have a separate legal personality from the Bank. The Bank has an agency relationship with the BISIPs, such that the assets of the BISIPs are held in the name of the BIS, but the economic benefit lies with central bank customers. The Bank does not invest for its own account in the BISIPs.

Dedicated mandates are portfolios which are managed by the Bank in accordance with investment guidelines set by the customer. They are held for the financial benefit of the central bank customer.

For both the BISIPs and the dedicated mandates, the Bank is remunerated by a management fee which is included within net fee and commission income in the profit and loss account.

31. Commitments

The Bank provides a number of committed standby facilities for its customers on a collateralised or uncollateralised basis. At 31 March 2015 all of the outstanding commitments were collateralised and amounted to SDR 3,096.5 million. At 31 March 2014 the outstanding commitments to extend credit under these committed standby facilities amounted to SDR 2,922.9 million, of which SDR 194.1 million was uncollateralised.

The Bank is committed to supporting the operations of the Financial Stability Board (FSB), the International Association of Deposit Insurers (IADI) and the International Association of Insurance Supervisors (IAIS) and in each case has a separate agreement specifying the terms of support and commitment. The Bank is the legal employer of IADI and IAIS staff, with the regular ongoing staff costs borne by each association. The commitment by the BIS to IADI and the IAIS is subject to an annual budgetary decision of the Board.

On 28 January 2013 the BIS and the FSB entered into an agreement which governs the Bank's support of the FSB. The agreement is for an initial term of five years. Under the terms of the agreement, the BIS is the legal employer of FSB staff. The Bank provides a contribution to cover FSB staff costs, and also provides premises, administrative infrastructure and equipment.

32. Fair value hierarchy

The Bank categorises its financial instrument fair value measurements using a hierarchy that reflects the observability of inputs used in measuring that value. A valuation level is assigned according to the least observable input that is significant to the fair value measurement in its entirety. The fair value hierarchy used by the Bank comprises the following levels:

Level 1 – Instruments valued using unadjusted quoted prices in active markets for identical financial instruments.

Level 2 – Instruments valued with valuation techniques using inputs which are observable for the financial instrument either directly (ie as a price) or indirectly (ie derived from prices for similar financial instruments). This includes observable interest rates, spreads and volatilities.

Level 3 – Instruments valued using valuation techniques where the inputs are not observable in financial markets.

At 31 March 2015 the Bank had no financial instruments categorised as level 3 (2014: nil).

As at 31 March 2015

SDR millions	Level 1	Level 2	Total
Financial assets held at fair value through profit and loss			
Treasury bills	26,869.2	7,056.8	33,926.0
Securities purchased under resale agreements	–	48,230.3	48,230.3
Fixed-term loans	–	17,437.5	17,437.5
Government and other securities	48,124.3	17,592.5	65,716.8
Derivative financial instruments	3.2	6,955.5	6,958.7
Financial assets designated as available for sale			
Government and other securities	14,937.4	256.0	15,193.4
Securities purchased under resale agreements	–	773.3	773.3
Total financial assets accounted for at fair value	**89,934.1**	**98,301.9**	**188,236.0**
Financial liabilities held at fair value through profit and loss			
Currency deposits	–	(154,887.0)	(154,887.0)
Derivative financial instruments	(3.0)	(2,159.2)	(2,162.2)
Total financial liabilities accounted for at fair value	**(3.0)**	**(157,046.2)**	**(157,049.2)**

As at 31 March 2014

SDR millions	Level 1	Level 2	Total
Financial assets held at fair value through profit and loss			
Treasury bills	40,162.5	4,368.3	44,530.8
Securities purchased under resale agreements	–	49,708.6	49,708.6
Fixed-term loans	–	19,267.3	19,267.3
Government and other securities	38,207.1	17,029.9	55,237.0
Derivative financial instruments	1.0	3,001.2	3,002.2
Financial assets designated as available for sale			
Government and other securities	14,730.2	73.9	14,804.1
Securities purchased under resale agreements	–	845.8	845.8
Total financial assets accounted for at fair value	93,100.8	94,295.0	187,395.8
Financial liabilities held at fair value through profit and loss			
Currency deposits	–	(161,504.3)	(161,504.3)
Securities sold under repurchase agreements	–	(323.5)	(323.5)
Derivative financial instruments	(0.7)	(2,632.20)	(2,632.9)
Total financial liabilities accounted for at fair value	(0.7)	(164,460.0)	(164,460.7)

A. Transfers between levels in the fair value hierarchy

Of the assets categorised as level 1 at 31 March 2015, SDR 1,778.5 million related to assets that had been held at 31 March 2014 and valued as level 2 at that date. Of the assets categorised as level 2 at 31 March 2015, SDR 687.4 million related to assets that had been held at 31 March 2014 and categorised as level 1 as at that date. The transfer of assets between levels 1 and 2 reflected specific market conditions existing at the reporting dates that affected the observability of the market prices as defined above. No liability valuations were transferred between fair value hierarchy levels.

No assets were transferred to or from the level 3 category during the year.

B. Assets and liabilities measured at fair value level 3

During the financial years ended 31 March 2015 and 2014 the Bank did not classify any assets or liabilities as level 3 in the fair value hierarchy.

C. Financial instruments not measured at fair value

The Bank accounts for certain financial instruments at amortised cost. These comprise financial assets of "Cash and sight accounts", "Gold and gold loans" and "Notice accounts". Financial liabilities held at amortised cost comprise "Gold deposits", "Sight and notice deposit accounts"' and those "Securities sold under repurchase agreements" that are associated with currency assets available for sale. If these instruments were included in the fair value hierarchy, the valuation of "Gold loans" and "Securities sold under repurchase agreements" would be considered level 2. All other amortised cost financial instruments would be considered level 1.

Using the same valuation techniques for amortised cost financial instruments as are applied to fair valued financial instruments, the Bank estimates that their fair values would be materially the same as the carrying values shown in these financial statements for both 31 March 2015 and 31 March 2014.

33. Geographical analysis

A. Total liabilities

As at 31 March

SDR millions	**2015**	2014
Africa and Europe	73,071.4	63,200.4
Asia-Pacific	89,360.3	95,746.5
Americas	21,801.2	31,602.1
International organisations	14,329.0	14,233.4
Total	**198,561.9**	204,782.4

B. Off-balance sheet items

As at 31 March

SDR millions	**2015**			2014		
	Gold bars held under earmark	Nominal value of securities	Net asset value of portfolio management mandates	Gold bars held under earmark	Nominal value of securities	Net asset value of portfolio management mandates
Africa and Europe	4,495.1	–	2,843.1	4,138.6	–	3,588.5
Asia-Pacific	4,637.4	4,733.0	8,981.7	2,866.3	5,295.9	7,059.7
Americas	3,123.9	38.9	1,812.9	3,412.5	34.8	1,483.5
Total	**12,256.4**	**4,771.9**	**13,637.7**	10,417.4	5,330.7	12,131.7

C. Credit commitments

As at 31 March

SDR millions	**2015**	2014
Africa and Europe	233.5	267.5
Asia-Pacific	2,863.0	2,655.4
Total	**3,096.5**	2,922.9

A geographical analysis of the Bank's assets by default risk is provided in the "Risk management" section in note 3B under "Default risk by geographical region".

34. Related parties

The Bank considers the following to be its related parties:

- the members of the Board of Directors;
- the senior officials of the Bank;
- close family members of the above individuals;
- the Bank's post-employment benefit arrangements; and
- central banks whose Governor is a member of the Board of Directors and institutions that are connected with these central banks.

A listing of the members of the Board of Directors and senior officials is shown in the sections of the Annual Report entitled "Board of Directors" and "BIS Management". Note 18 provides details of the Bank's post-employment benefit arrangements.

A. Related party individuals

Note 24 provides details of the total compensation of the Board of Directors.

The total compensation of the senior officials recognised in the profit and loss account amounted to:

For the financial year ended 31 March

CHF millions	**2015**	2014
Salaries, allowances and medical cover	7.5	7.7
Post-employment benefits	2.2	2.0
Total compensation	**9.7**	9.7
SDR equivalent	7.0	6.9

The Bank offers personal deposit accounts for all staff members and its Directors. The accounts bear interest at a rate determined by the Bank based on the rate offered by the Swiss National Bank on staff accounts. The movements and total balance on personal deposit accounts relating to members of the Board of Directors and the senior officials of the Bank were as follows:

For the financial year ended 31 March

CHF millions	**2015**	2014
Balance at beginning of year	18.3	27.2
Deposits taken and other inflows	3.9	5.5
Withdrawals and other outflows	(3.3)	(14.4)
Balance at end of year	**18.9**	18.3
SDR equivalent	14.1	13.4
Interest expense on deposits in CHF millions	**0.4**	0.3
SDR equivalent	0.3	0.2

Balances related to individuals who are appointed as members of the Board of Directors or as senior officials of the Bank during the financial year are included in the table above as other inflows. Balances related to individuals who cease to be members of the Board of Directors or senior officials of the Bank during the financial year are included in the table above as other outflows.

In addition, the Bank operates a blocked personal deposit account for certain staff members who were previously members of the Bank's savings fund, which closed on 1 April 2003. The terms of these blocked accounts are such that staff members cannot make further deposits or withdrawals and the balances are paid out when they leave the Bank. The accounts bear interest at a rate determined by the Bank based on the rate offered by the Swiss National Bank on staff accounts plus 1%. The total balance of blocked accounts at 31 March 2015 was SDR 14.4 million (2014: SDR 17.0 million). They are reported under the balance sheet heading "Currency deposits".

B. Related party central banks and connected institutions

The BIS provides banking services to its customers, which are predominantly central banks, monetary authorities and international financial institutions. In fulfilling this role, the Bank in the normal course of business enters into transactions with related party central banks and connected institutions. These transactions include making advances, and taking currency and gold deposits. It is the Bank's policy to enter into transactions with related party central banks and connected institutions on similar terms and conditions to transactions with other, non-related party customers.

Currency deposits from related party central banks and connected institutions

For the financial year ended 31 March

SDR millions	**2015**	2014
Balance at beginning of year	65,417.0	36,727.9
Deposits taken	151,060.6	146,205.7
Maturities, repayments and valuation movements	(145,983.8)	(123,938.5)
Net movement on notice accounts	6,247.8	6,421.9
Balance at end of year	**76,741.6**	65,417.0
Total currency deposits at end of year	176,842.0	180,472.2
Currency deposits from related parties as a percentage of total currency deposits at end of year	43.4%	36.2%

Gold deposits from related central banks and connected institutions

For the financial year ended 31 March

SDR millions	**2015**	2014
Balance at beginning of year	7,187.0	10,849.7
Net movement on gold sight accounts	165.5	(3,662.7)
Balance at end of year	**7,352.5**	7,187.0
Total gold deposits at end of year	9,857.3	11,297.5
Gold deposits from related parties as a percentage of total gold deposits at end of year	74.6%	63.6%

Gold and gold loans with related central banks and connected institutions

For the financial year ended 31 March

SDR millions	**2015**	2014
Balance at beginning of year	20,292.9	35,074.5
Gold loans placed	1,330.3	–
Gold price movement and accrued interest on gold and gold loans	47.6	–
Net movement on gold sight accounts (including gold price movement)	(7,696.9)	(14,781.6)
Balance at end of year	**13,973.9**	20,292.9
Total gold and gold loans at end of year	14,155.5	20,596.4
Gold and gold loans with related parties as a percentage of total gold and gold loans at end of year	98.7%	98.5%

Debt securities issued by related central banks and connected institutions

For the financial year ended 31 March

SDR millions	**2015**	2014
Balance at beginning of year	271.2	81.2
Purchases of debt securities issued by related parties	36.1	361.2
Maturities and sales of debt securities issued by related parties	(143.6)	(171.2)
Balance at end of year	**163.7**	271.2
Total government and other securities and treasury bills at end of year	114,836.2	114,571.9
Debt securities issued by related parties as a percentage of total government and other securities and treasury bills at end of year	0.1%	0.2%

Securities purchased under resale agreements with related party central banks and connected institutions

For the financial year ended 31 March

SDR millions	**2015**	2014
Balance at beginning of year	1,357.7	3,994.3
Collateralised deposits placed	1,076,269.1	1,038,178.0
Maturities and valuation movements	(1,074,113.8)	(1,040,814.6)
Balance at end of year	**3,513.0**	1,357.7
Total securities purchased under resale agreements	49,003.6	50,554.4
Securities purchased under resale agreements with related parties as a percentage of total securities purchased under resale agreements at end of year	7.2%	2.7%

Derivative transactions with related party central banks and connected institutions

The Bank enters into derivative transactions with related party central banks and connected institutions, including foreign exchange deals and interest rate swaps. The total nominal value of these transactions with related party central banks and connected institutions during the year ended 31 March 2015 was SDR 23,476.1 million (2014: SDR 18,430.1 million).

Other balances and transactions with related party central banks and connected institutions

The Bank maintains sight accounts in currencies with related party central banks and connected institutions with a total balance of SDR 11,330.3 million at 31 March 2015 (2014: SDR 11,202.1 million).

During the financial year, the Bank purchased third-party securities from central banks and connected institutions amounting to SDR 2,291.1 million (2014: SDR 1,688.6 million).

The Bank provides committed standby facilities for customers; at 31 March 2015 the Bank had outstanding commitments to extend credit under facilities to related parties of SDR 315.6 million (2014: SDR 271.1 million).

35. Contingent liabilities

In the opinion of the Bank's Management there were no significant contingent liabilities at 31 March 2015 (2014: nil).

Capital adequacy

1. Capital adequacy frameworks

As an international financial institution that is overseen by a Board composed of Governors of major central banks and that has no national supervisor, the Bank is committed to maintaining its superior credit quality and financial strength, in particular in situations of financial stress.

The Bank continuously assesses its capital adequacy based on an annual capital planning process that focuses on two elements: an economic capital framework and a financial leverage framework. The disclosures in this section related to credit, market, operational and liquidity risk are based on the Bank's own assessment of capital adequacy derived in accordance with these two BIS frameworks.

Regulatory capital ratios are not used as indicators of BIS capital adequacy because key aspects of the business model for the BIS banking activities are not adequately captured. In the main, these relate to the high level of solvency targeted by the Bank as well as the way regulatory capital ratios reflect portfolio concentrations and interest rate risk in the banking book.

To facilitate comparability, the Bank has implemented a framework that is consistent with the revised *International Convergence of Capital Measurement and Capital Standards* (Basel II framework) issued by the Basel Committee on Banking Supervision in June 2006. Following that framework, the Bank discloses a Tier 1 capital ratio (Pillar 1), risk-weighted assets and more detailed related information. In addition, the Bank calculates for reference a Common Equity Tier 1 capital ratio as defined in Basel III.

The Bank maintains a capital position substantially in excess of the regulatory minimum requirement in order to ensure its superior credit quality.

2. Economic capital

The Bank's economic capital methodology relates its risk-taking capacity to the amount of economic capital needed to absorb potential losses arising from its exposures. The risk-taking capacity is defined as allocatable economic capital that is derived following a prudent assessment of the components of the Bank's equity, which are set out in the table below:

As at 31 March

SDR millions	**2015**	2014
Share capital	698.9	698.9
Statutory reserves per balance sheet	14,579.7	14,280.4
Less: shares held in treasury	(1.7)	(1.7)
Share capital and reserves	**15,276.9**	14,977.6
Securities revaluation account	234.9	132.4
Gold revaluation account	2,467.4	2,437.5
Re-measurement of defined benefit obligations	(249.0)	(238.9)
Other equity accounts	**2,453.3**	2,331.0
Profit and loss account	**542.9**	419.3
Total equity	**18,273.1**	17,727.9

Allocatable economic capital is determined following a prudent evaluation of the Bank's equity components for their loss absorption capacity and sustainability. The components of capital with long-term risk-bearing capacity are the Bank's Tier 1 capital and the sustainable portion of the securities and gold revaluation reserves ("sustainable supplementary capital"). Only this "allocatable capital" is available for allocation to the various categories of risk. The portion of revaluation reserves that is considered more transitory in nature is assigned to the "capital filter" together with the profit accrued during the financial year.

As at 31 March

SDR millions	**2015**	2014
Share capital and reserves	15,276.9	14,977.6
Re-measurement of defined benefit obligations	(249.0)	(238.9)
Tier 1 capital	**15,027.9**	14,738.7
Sustainable supplementary capital	1,772.1	1,661.3
Allocatable capital	**16,800.0**	16,400.0
Capital filter	1,473.1	1,327.9
Total equity	**18,273.1**	17,727.9

As part of the annual capital planning process, Management allocates economic capital to risk categories within the amount of allocatable capital. As a first step, capital is assigned to an "economic capital cushion" that provides an additional margin of safety and is sufficient to sustain a potential material loss without the need to reduce the capital allocation to individual risk categories or to liquidate any holdings of assets. The level of the economic capital cushion is determined based on stress tests that explore extreme but still plausible default events. Allocations are then made to each category of financial risk (ie credit, market and "other risks") as well as operational risk. "Other risks" are risks that have been identified but that are not taken into account in the economic capital utilisation calculations, and include model risk and residual basis risk. Reflecting the high level of solvency targeted by the Bank, the economic capital framework measures economic capital to a 99.995% confidence level assuming a one-year horizon, except for settlement risk (included in the utilisation for credit risk) and other risks. The amount of economic capital set aside for settlement risk and other risks is based on an assessment by Management. The Bank's economic capital framework is subject to regular review and calibration.

With effect from 1 July 2014, the Bank calculates the economic capital utilisation for market risk on the basis of a stressed market data set. The reported economic capital utilisation figures for market risk for the prior reporting period have been restated for comparative purposes. The restatement resulted in an increase in the economic capital for market risk of SDR 931.9 million as at 31 March 2014. The following table summarises the Bank's economic capital allocation and utilisation for credit risk, market risk, operational risk and other risks:

As at 31 March

	2015		2014	
SDR millions	Allocation	Utilisation	Allocation	Utilisation
Insolvency and transfer risk	8,800.0	8,102.7	8,200.0	7,474.1
FX settlement risk	300.0	300.0	300.0	300.0
Credit risk	9,100.0	8,402.7	8,500.0	7,774.1
Market risk – restated	3,900.0	3,434.7	4,100.0	3,110.3
Operational risk	1,200.0	1,200.0	1,200.0	1,200.0
Other risks	300.0	300.0	300.0	300.0
Economic capital cushion	2,300.0	2,300.0	2,300.0	2,300.0
Total economic capital	**16,800.0**	**15,637.4**	16,400.0	14,684.4

3. Financial leverage

The Bank complements its capital adequacy assessment with a prudent financial leverage framework. As from 1 July 2014, the Bank monitors its financial leverage using a ratio that takes account of regulatory guidance issued by the Basel Committee on Banking Supervision related to the leverage ratio. The Bank thereby uses a leverage ratio that compares the Bank's adjusted common equity with its total exposure. However, to reflect the scope and nature of its banking activities, the Bank's definition of adjusted common equity limits the recognition of revaluation reserves to the proportion of the gold and securities revaluation reserves that is considered sustainable ("sustainable supplementary capital"). Further, the exposure measure is supplemented by the inclusion of committed and uncommitted facilities, and pension fund assets.

The table below shows the calculation of the Bank's financial leverage ratio under the methodology in effect since 1 July 2014. This table does not include comparative data as at 31 March 2014 because the methodology was not in use on that date.

As at 31 March

SDR millions	**2015**
Adjusted common equity	
Share capital and reserves	**15,276.9**
Sustainable supplementary capital	**1,772.1**
Prudential adjustments	**(267.6)**
Re-measurement losses on defined benefit obligations	(249.0)
Intangible assets	(18.6)
Total adjusted common equity (A)	**16,781.4**
Exposure	
Total balance sheet assets	**216,835.0**
Exposure adjustments:	**4,828.1**
Derivatives	(609.3)
Securities purchased under resale agreements	20.9
Committed and uncommitted facilities	4,295.4
Pension fund assets	1,121.1
Total exposure (B)	**221,663.1**
BIS leverage ratio (A) / (B)	**7.6%**

The Basel III leverage ratio differs from the above in using Common Equity Tier 1 as its capital measure instead of adjusted common equity (item A in the table above). The Basel III leverage ratio was 8.0% as at 31 March 2015.

Before 1 July 2014, the Bank monitored its financial leverage using a leverage ratio that compared the Bank's Tier 1 capital with its total balance sheet assets. Total balance sheet assets include derivative assets and securities purchased under repurchase agreements ("reverse repurchase agreements") on a gross basis in accordance with the Bank's accounting policies. The table below shows the calculation of the Bank's financial leverage ratio under the previous methodology:

As at 31 March

SDR millions	2014
Tier 1 capital (A)	14,738.7
Total balance sheet assets (B)	222,510.3
Financial leverage ratio (A) / (B)	6.6%

4. Capital ratios

The economic capital framework and the financial leverage framework described above are the main tools used for assessing the Bank's capital adequacy. Risk-weighted assets, minimum capital requirements and capital ratios are disclosed to facilitate comparability. Guidance issued by the Basel Committee on Banking Supervision includes several approaches for calculating risk-weighted assets and the corresponding minimum capital requirements. In principle, the minimum capital requirements are determined by taking 8% of the risk-weighted assets.

For credit risk, the Bank has adopted the advanced internal ratings-based approach for the majority of its exposures. Under this approach, the risk weighting for a transaction is determined by the relevant risk weight function using the Bank's own estimates for key inputs. For securitisation exposures and relevant other assets, the Bank has adopted the standardised approach. Under this approach, risk weightings are mapped to exposure types.

Risk-weighted assets for market risk are derived following an internal models approach. For operational risk, the advanced measurement approach is used. Both these approaches rely on value-at-risk (VaR) methodologies.

More details on the assumptions underlying the calculations are provided in notes 3, 4 and 5 of the "Risk management" section.

A. Tier 1 capital ratio

The following table summarises the relevant exposure types as well as the risk-weighted assets and related minimum capital requirements for credit risk, market risk and operational risk under the Basel II framework:

As at 31 March		**2015**			2014		
SDR millions	Approach used	Amount of exposure	Risk-weighted assets (A)	Minimum capital requirement (B)	Amount of exposure	Risk-weighted assets (A)	Minimum capital requirement (B)
Credit risk							
Exposure to sovereigns, banks and corporates	Advanced internal ratings-based approach, where (B) is derived as (A) x 8%	148,838.8	11,531.8	922.5	144,885.9	10,152.5	812.2
Securitisation exposures and other assets	Standardised approach, where (B) is derived as (A) x 8%	1,023.5	371.3	29.7	1,078.6	386.2	30.9
Market risk							
Exposure to foreign exchange risk and gold price risk	Internal models approach, where (A) is derived as (B) / 8%	–	9,894.5	791.6	–	11,244.9	899.6
Operational risk	Advanced measurement approach, where (A) is derived as (B) / 8%	–	10,396.6	831.7	–	10,154.1	812.3
Total			**32,194.2**	**2,575.5**		31,937.7	2,555.0

The capital ratio measures capital adequacy by comparing the Bank's Tier 1 capital with its risk-weighted assets. The Tier 1 capital ratio, consistent with the Basel II framework, is provided in the table below:

As at 31 March

SDR millions	**2015**	2014
Share capital and reserves	15,276.9	14,977.6
Re-measurement losses on defined benefit obligations	(249.0)	(238.9)
Tier 1 capital	**15,027.9**	14,738.7
Expected loss	(22.2)	(19.9)
Tier 1 capital net of expected loss (A)	**15,005.7**	14,718.8
Total risk-weighted assets (B)	32,194.2	31,937.7
Tier 1 capital ratio (A) / (B)	**46.6%**	46.1%

Expected loss is calculated for credit risk exposures subject to the advanced internal ratings-based approach. The expected loss is calculated at the balance sheet date taking into account any impairment provision which is reflected in the Bank's financial statements. The Bank had no impaired financial assets at 31 March 2015 (2014: nil). In accordance with the requirements of the Basel II framework, any expected loss is compared with the impairment provision and any shortfall is deducted from the Bank's Tier 1 capital.

B. Common Equity Tier 1 capital ratio

To facilitate comparability, information on risk-weighted assets and related minimum capital requirements calculated under the Basel III framework is provided in the following table. Relating to market risk, Basel III risk-weighted assets are calculated as the sum of risk-weighted assets based on a stressed VaR and the Basel II market risk-weighted assets (presented in the previous section). Credit risk-weighted assets also differ, mainly due to the asset value correlation multiplier for large financial institutions.

As at 31 March		2015			2014		
SDR millions	Approach used	Amount of exposure	Risk-weighted assets (A)	Minimum capital requirement (B)	Amount of exposure	Risk-weighted assets (A)	Minimum capital requirement (B)
Credit risk							
Exposure to sovereigns, banks and corporates	Advanced internal ratings-based approach, where (B) is derived as (A) x 8%	148,838.8	12,831.8	1,026.6	144,885.9	11,782.8	942.6
Securitisation exposures and other assets	Standardised approach, where (B) is derived as (A) x 8%	1,023.5	371.3	29.7	1,078.6	386.2	30.9
Market risk							
Exposure to foreign exchange risk and gold price risk	Internal models approach, where (A) is derived as (B) / 8%	–	27,867.9	2,229.4	–	29,065.1	2,325.2
Operational risk	Advanced measurement approach, where (A) is derived as (B) / 8%	–	10,396.6	831.7	–	10,154.1	812.3
Total			**51,467.6**	**4,117.4**		51,388.2	4,111.0

The Common Equity Tier 1 capital ratio calculated under the Basel III framework is set out in the table below:

As at 31 March		
SDR millions	**2015**	2014
Share capital and reserves	15,276.9	14,977.6
Revaluation reserves	2,702.3	2,569.9
Prudential adjustments	(289.8)	(275.5)
Re-measurement losses on defined benefit obligations	(249.0)	(238.9)
Expected loss	(22.2)	(19.9)
Intangible assets	(18.6)	(16.7)
Common Equity Tier 1 capital (A)	**17,689.4**	17,272.0
Total risk-weighted assets (B)	**51,467.6**	51,388.2
Common Equity Tier 1 capital ratio (A) / (B)	**34.4%**	33.6%

Risk management

1. Risks faced by the Bank

The Bank supports its customers, predominantly central banks, monetary authorities and international financial institutions, in the management of their reserves and related financial activities.

Banking activities form an essential element of meeting the Bank's objectives and ensure its financial strength and independence. The BIS engages in banking activities that are customer-related as well as activities that are related to the investment of its equity, each of which may give rise to financial risk comprising credit risk, market risk and liquidity risk. The Bank is also exposed to operational risk.

Within the risk frameworks defined by the Board of Directors, the Management of the Bank has established risk management policies designed to ensure that risks are identified, appropriately measured and controlled as well as monitored and reported.

2. Risk management approach and organisation

The Bank maintains superior credit quality and adopts a prudent approach to financial risk-taking, by:

- maintaining an exceptionally strong capital position;
- investing its assets predominantly in high credit quality financial instruments;
- seeking to diversify its assets across a range of sectors;
- adopting a conservative approach to its tactical market risk-taking and carefully managing market risk associated with the Bank's strategic positions, which include its gold holdings; and
- maintaining a high level of liquidity.

A. Organisation

Under Article 39 of the Bank's Statutes, the General Manager is responsible to the Board for the management of the Bank, and is assisted by the Deputy General Manager. The Deputy General Manager is responsible for the Bank's independent risk control and compliance functions. The General Manager and the Deputy General Manager are supported by senior management advisory committees.

The key advisory committees are the Executive Committee, the Finance Committee and the Compliance and Operational Risk Committee. The first two committees are chaired by the General Manager and the third by the Deputy General Manager, and all include other senior members of the Bank's Management. The Executive Committee advises the General Manager primarily on the Bank's strategic planning and the allocation of resources, as well as on decisions related to the broad financial objectives for the banking activities and operational risk management. The Finance Committee advises the General Manager on the financial management and policy issues related to the banking business, including the allocation of economic capital to risk categories. The Compliance and Operational Risk Committee acts as an advisory committee to the Deputy General Manager and ensures the coordination of compliance matters and operational risk management throughout the Bank.

The independent risk control function for financial risks is performed by the Risk Control unit. The independent operational risk control function is shared between Risk Control, which maintains the operational risk quantification, and the Compliance and Operational Risk Unit. Both units report directly to the Deputy General Manager.

The Bank's compliance function is performed by the Compliance and Operational Risk Unit. The objective of this function is to provide reasonable assurance that the activities of the Bank and its staff conform to applicable laws and regulations, the BIS Statutes, the Bank's Code of Conduct and other internal rules, policies and relevant standards of sound practice.

The Compliance and Operational Risk Unit identifies and assesses compliance risks and guides and educates staff on compliance issues. The Head of the Compliance and Operational Risk Unit also has a direct reporting line to the Audit Committee, which is an advisory committee to the Board of Directors.

The Finance unit and the Legal Service complement the Bank's risk management. The Finance unit operates an independent valuation control function, produces the Bank's financial statements and controls the Bank's expenditure by setting and monitoring the annual budget. The objective of the independent valuation control function is to ensure that the Bank's valuations comply with its valuation policy and procedures, and that the processes and procedures which influence the Bank's valuations conform to best practice guidelines. The Finance unit reports to the Deputy General Manager and the Secretary General.

The Legal Service provides legal advice and support covering a wide range of issues relating to the Bank's activities. The Legal Service has a direct reporting line to the General Manager.

The Internal Audit function reviews internal control procedures and reports on how they comply with internal standards and industry best practices. The scope of internal audit work includes the review of risk management procedures, internal control systems, information systems and governance processes. Internal Audit has reporting lines to the General Manager and the Deputy General Manager, and to the Audit Committee.

B. Risk monitoring and reporting

The Bank's financial and operational risk profile, position and performance are monitored on an ongoing basis by the relevant units. Financial risk and compliance reports aimed at various management levels are provided regularly to enable Management to adequately assess the Bank's risk profile and financial condition.

Management reports financial and risk information to the Board of Directors on a monthly and a quarterly basis. Furthermore, the Audit Committee receives regular reports from Internal Audit, the Compliance and Operational Risk Unit and the Finance unit. The Banking and Risk Management Committee, another advisory committee to the Board, receives regular reports from the Risk Control unit. The preparation of reports is subject to comprehensive policies and procedures, thus ensuring strong controls.

C. Risk methodologies

The Bank revalues virtually all of its financial instruments to fair value on a daily basis and reviews its valuations monthly, taking into account necessary adjustments for impairment. It uses a comprehensive range of quantitative methodologies for valuing financial instruments and for measuring risk to its net profit and equity. The Bank reassesses its quantitative methodologies in the light of its changing risk environment and evolving best practice.

The Bank's model validation policy defines the roles and responsibilities and processes related to the implementation of new or materially changed risk models.

A key methodology used by the Bank to measure and manage risk is the calculation of economic capital based on value-at-risk (VaR) techniques. VaR expresses the statistical estimate of the maximum potential loss on the current positions of the Bank measured to a specified level of confidence and a specified time horizon. VaR models depend on statistical assumptions and the quality of available market data and, while forward-looking, they extrapolate from past events. VaR models may underestimate potential losses if changes in risk factors fail to align with the distribution assumptions. VaR figures do not provide any information on losses that may occur beyond the assumed confidence level.

The Bank's economic capital framework covers credit risk, market risk, operational risk and other risks. As part of the annual capital planning process, the Bank allocates economic capital to the above risk categories commensurate with principles set by the Board and taking account of the business strategy. Reflecting the high solvency level targeted by the Bank, the economic capital framework measures economic capital to a 99.995% confidence level assuming a one-year holding period. An additional amount of economic capital is set aside for "other risks" based on Management's assessment of risks which are not reflected in the economic capital calculations. Moreover, capital is also allocated to an "economic capital cushion" that is based on stress tests that explore extreme but still plausible default events. The economic capital cushion provides an additional margin of safety to sustain a potential material loss without the need to reduce the capital allocated to individual risk categories or to liquidate any holdings of assets.

The management of the Bank's capital adequacy is complemented by a comprehensive stress testing framework, and a prudent financial leverage framework. The stress testing framework supplements the Bank's risk assessment including its VaR and economic capital calculations for financial risk. The Bank's key market risk factors and credit exposures are stress-tested. The stress testing includes the analysis of severe historical and adverse hypothetical macroeconomic scenarios, as well as sensitivity tests of extreme but still plausible movements of the key risk factors identified. The Bank also performs stress tests related to liquidity risk. The financial leverage framework focuses on a ratio that sets the Bank's adjusted common equity in relation to its total balance sheet exposure.

3. Credit risk

Credit risk arises because a counterparty may fail to meet its obligations in accordance with the agreed contractual terms and conditions. A financial asset is considered past due when a counterparty fails to make a payment on the contractual due date.

The Bank manages credit risk within a framework and policies set by the Board of Directors and Management. These are complemented by more detailed guidelines and procedures at the level of the independent risk control function.

A. Credit risk assessment

Credit risk is continuously controlled at both a counterparty and an aggregated level. As part of the independent risk control function, individual counterparty credit assessments are performed subject to a well defined internal rating process, involving 18 rating grades. As part of this process, counterparty financial statements and market information are analysed. The rating methodologies depend on the nature of the counterparty. Based on the internal rating and specific counterparty features, the Bank sets a series of credit limits covering individual counterparties and countries. Internal ratings are assigned to all counterparties. In principle, the ratings and related limits are reviewed at least annually. The main assessment criterion in these reviews is the ability of the counterparties to meet interest and principal repayment obligations in a timely manner.

Credit risk limits at the counterparty level are approved by the Bank's Management and fit within a framework set by the Board of Directors.

On an aggregated level, credit risk, including default and country transfer risk, is measured, monitored and controlled based on the Bank's economic capital calculation for credit risk. To calculate economic capital for credit risk, the Bank uses a portfolio VaR model. Management limits the Bank's overall exposure to credit risk by allocating an amount of economic capital to credit risk.

B. Default risk

The following tables show the exposure of the Bank to default risk, without taking into account any collateral held or other credit enhancements available to the Bank. Credit risk is mitigated through the use of collateral and legally enforceable netting or setoff agreements. The corresponding assets and liabilities are not offset on the balance sheet.

The exposures set out in the tables below are based on the carrying value of the assets on the balance sheet as categorised by sector, geographical region and credit quality. The carrying value is the fair value of the financial instruments, including derivatives, except in the case of very short-term financial instruments (sight and notice accounts) and gold, which are shown at amortised cost net of any impairment charge. Commitments are reported at their notional amounts. Gold and gold loans exclude gold bar assets held in custody, and accounts receivable do not include unsettled liability issues, because these items do not represent credit exposures of the Bank.

The vast majority of the Bank's assets are invested in securities issued by governments and financial institutions rated A– or above by at least one of the major external credit assessment institutions. Limitations on the number of high-quality counterparties in these sectors mean that the Bank is exposed to single-name concentration risk.

The Bank conducts an annual review for impairment at the date of each balance sheet. At 31 March 2015 the Bank did not have any financial assets that were considered to be impaired (2014: nil). At 31 March 2015 no financial assets were considered past due (2014: nil). No credit loss was recognised in the current period.

Default risk by asset class and issuer type

The following tables show the exposure of the Bank to default risk by asset class and issuer type, without taking into account any collateral held or other credit enhancements available to the Bank. "Public sector" includes international and other public sector institutions.

As at 31 March 2015

SDR millions	Sovereign and central banks	Public sector	Banks	Corporate	Securitisation	Total
On-balance sheet exposures						
Cash and sight accounts with banks	11,333.9	–	41.4	–	–	11,375.3
Gold and gold loans	–	–	181.6	–	–	181.6
Treasury bills	33,439.4	486.6	–	–	–	33,926.0
Securities purchased under resale agreements	3,513.0	–	39,012.0	6,478.6	–	49,003.6
Loans and advances	1,407.8	819.2	15,739.2	–	–	17,966.2
Government and other securities	54,025.6	11,883.6	6,381.3	7,797.8	821.9	80,910.2
Derivative financial instruments	293.7	124.7	6,539.3	1.0	–	6,958.7
Accounts receivable	2.9	–	0.2	6.8	–	9.9
Total on-balance sheet exposure	**104,016.3**	**13,314.1**	**67,895.0**	**14,284.2**	**821.9**	**200,331.5**
Commitments						
Undrawn secured facilities	3,096.5	–	–	–	–	3,096.5
Total commitments	**3,096.5**	**–**	**–**	**–**	**–**	**3,096.5**
Total exposure	**107,112.8**	**13,314.1**	**67,895.0**	**14,284.2**	**821.9**	**203,428.0**

As at 31 March 2014

SDR millions	Sovereign and central banks	Public sector	Banks	Corporate	Securitisation	Total
On-balance sheet exposures						
Cash and sight accounts with banks	11,206.0	–	5.5	–	–	11,211.5
Gold and gold loans	–	–	236.8	–	–	236.8
Treasury bills	43,982.9	547.9	–	–	–	44,530.8
Securities purchased under resale agreements	1,357.7	–	47,347.0	1,849.7	–	50,554.4
Loans and advances	647.1	493.9	18,459.3	–	–	19,600.3
Government and other securities	43,835.2	12,606.5	5,608.8	7,053.1	937.5	70,041.1
Derivative financial instruments	13.7	43.3	2,944.5	0.7	–	3,002.2
Accounts receivable	2.8	–	0.2	7.8	–	10.8
Total on-balance sheet exposure	101,045.4	13,691.6	74,602.1	8,911.3	937.5	199,187.9
Commitments						
Undrawn unsecured facilities	194.1	–	–	–	–	194.1
Undrawn secured facilities	2,728.8	–	–	–	–	2,728.8
Total commitments	2,922.9	–	–	–	–	2,922.9
Total exposure	103,968.3	13,691.6	74,602.1	8,911.3	937.5	202,110.8

Default risk by geographical region

The following tables represent the exposure of the Bank to default risk by asset class and geographical region, without taking into account any collateral held or other credit enhancements available to the Bank. The Bank has allocated exposures to regions based on the country of incorporation of each legal entity to which the Bank has exposures.

As at 31 March 2015

SDR millions	Africa and Europe	Asia-Pacific	Americas	International institutions	Total
On-balance sheet exposures					
Cash and sight accounts with banks	8,313.0	3,057.0	5.3	–	11,375.3
Gold and gold loans	181.6	–	–	–	181.6
Treasury bills	10,061.8	19,776.0	3,601.6	486.6	33,926.0
Securities purchased under resale agreements	45,490.6	–	3,513.0	–	49,003.6
Loans and advances	11,418.7	4,552.4	1,489.6	505.5	17,966.2
Government and other securities	43,798.6	8,814.3	20,840.2	7,457.1	80,910.2
Derivative financial instruments	5,124.6	655.4	1,178.7	–	6,958.7
Accounts receivable	8.8	0.9	0.2	–	9.9
Total on-balance sheet exposure	**124,397.7**	**36,856.0**	**30,628.6**	**8,449.2**	**200,331.5**
Commitments					
Undrawn secured facilities	233.5	2,863.0	–	–	3,096.5
Total commitments	**233.5**	**2,863.0**	**–**	**–**	**3,096.5**
Total exposure	**124,631.2**	**39,719.0**	**30,628.6**	**8,449.2**	**203,428.0**

As at 31 March 2014

SDR millions	Africa and Europe	Asia-Pacific	Americas	International institutions	Total
On-balance sheet exposures					
Cash and sight accounts with banks	6,199.6	5,001.6	10.3	–	11,211.5
Gold and gold loans	98.2	–	138.6	–	236.8
Treasury bills	7,806.6	32,030.6	4,145.7	547.9	44,530.8
Securities purchased under resale agreements	42,240.1	–	8,314.3	–	50,554.4
Loans and advances	11,792.1	6,411.2	1,097.3	299.7	19,600.3
Government and other securities	31,805.7	5,081.3	25,339.4	7,814.7	70,041.1
Derivative financial instruments	2,318.2	86.6	597.4	–	3,002.2
Accounts receivable	9.7	0.9	0.2	–	10.8
Total on-balance sheet exposure	102,270.2	48,612.2	39,643.2	8,662.3	199,187.9
Commitments					
Undrawn unsecured facilities	–	194.1	–	–	194.1
Undrawn secured facilities	267.5	2,461.3	–	–	2,728.8
Total commitments	267.5	2,655.4	–	–	2,922.9
Total exposure	102,537.7	51,267.6	39,643.2	8,662.3	202,110.8

Default risk by counterparty / issuer rating

The following tables show the exposure of the Bank to default risk by class of financial asset and counterparty / issuer rating, without taking into account any collateral held or other credit enhancements available to the Bank. The ratings shown reflect the Bank's internal ratings expressed as equivalent external ratings.

As at 31 March 2015

SDR millions	AAA	AA	A	BBB	BB and below	Unrated	Total
On-balance sheet exposures							
Cash and sight accounts with banks	8,268.1	48.1	3,057.8	1.0	0.3	–	11,375.3
Gold and gold loans	–	–	181.6	–	–	–	181.6
Treasury bills	3,746.7	7,001.1	19,314.5	3,863.7	–	–	33,926.0
Securities purchased under resale agreements	–	9,991.6	30,334.2	8,677.8	–	–	49,003.6
Loans and advances	813.9	–	16,363.3	426.6	362.4	–	17,966.2
Government and other securities	22,906.1	40,599.6	15,796.9	1,607.6	–	–	80,910.2
Derivative financial instruments	111.5	129.6	6,385.9	320.4	1.6	9.7	6,958.7
Accounts receivable	–	0.2	0.2	0.4	0.7	8.4	9.9
Total on-balance sheet exposure	**35,846.3**	**57,770.2**	**91,434.4**	**14,897.5**	**365.0**	**18.1**	**200,331.5**
Commitments							
Undrawn secured facilities	–	925.7	946.9	990.3	233.6	–	3,096.5
Total commitments	**–**	**925.7**	**946.9**	**990.3**	**233.6**	**–**	**3,096.5**
Total exposure	**35,846.3**	**58,695.9**	**92,381.3**	**15,887.8**	**598.6**	**18.1**	**203,428.0**

As at 31 March 2014

SDR millions	AAA	AA	A	BBB	BB and below	Unrated	Total
On-balance sheet exposures							
Cash and sight accounts with banks	6,120.1	88.2	5,001.9	1.0	0.3	–	11,211.5
Gold and gold loans	–	–	236.8	–	–	–	236.8
Treasury bills	2,144.9	7,725.7	31,042.6	3,617.6	–	–	44,530.8
Securities purchased under resale agreements	–	3,207.4	35,215.4	12,131.6	–	–	50,554.4
Loans and advances	1,141.1	1,188.9	16,213.4	1,056.9	–	–	19,600.3
Government and other securities	13,159.1	44,218.0	11,118.9	1,532.5	12.6	–	70,041.1
Derivative financial instruments	16.2	71.5	2,845.8	67.7	0.4	0.6	3,002.2
Accounts receivable	0.1	0.2	0.2	0.7	0.7	8.9	10.8
Total on-balance sheet exposure	22,581.5	56,499.9	101,675.0	18,408.0	14.0	9.5	199,187.9
Commitments							
Undrawn unsecured facilities	–	–	–	194.1	–	–	194.1
Undrawn secured facilities	–	797.2	813.2	1,118.4	–	–	2,728.8
Total commitments	–	797.2	813.2	1,312.5	–	–	2,922.9
Total exposure	22,581.5	57,297.1	102,488.2	19,720.5	14.0	9.5	202,110.8

C. Credit risk mitigation

Netting

Netting agreements give the Bank a legally enforceable right to net transactions with counterparties under potential future conditions, notably an event of default. Such master netting or similar agreements apply to counterparties with whom the Bank conducts most of its derivative transactions, as well as to counterparties for repurchase and reverse repurchase agreements. Where required, netting is applied when determining the amount of collateral to be requested or provided, but the Bank does not settle assets and liabilities on a net basis during the normal course of business. As such, the amounts shown on the Bank's balance sheet are the gross amounts.

Collateral

The Bank also mitigates the credit risks it is exposed to by requiring counterparties to provide collateral. The Bank receives collateral in respect of most derivative contracts, reverse repurchase agreements and for advances made under collateralised facility agreements. During the term of these transactions, further collateral may be called or collateral may be released based on the movements in value of both the underlying instrument and the collateral that has been received. The Bank is required to provide collateral in respect of repurchase agreements.

For derivative contracts and reverse repurchase agreements, the Bank accepts as collateral high-quality sovereign, state agency and supranational securities and, in a limited number of cases, cash. For advances made under collateralised facility agreements, eligible collateral accepted includes currency deposits with the Bank as well as units in the BIS Investment Pools.

Under the terms of its collateral arrangements, the Bank is permitted to sell ("re-hypothecate") collateral received on derivative contracts and reverse repurchase agreements, but upon expiry of the transaction must return equivalent financial instruments to the counterparty. At 31 March 2015 the Bank had not sold any of the collateral it held (2014: nil).

The fair value of collateral held which the Bank had the right to sell was:

As at 31 March

SDR millions	**2015**	2014
Collateral held in respect of:		
Derivatives	4,003.7	515.9
Securities purchased under resale agreements	38,825.4	42,378.7
Total	**42,829.1**	42,894.6

Financial assets and liabilities subject to netting or collateralisation

The tables below show the categories of assets and liabilities which are either subject to collateralisation, or for which netting agreements would apply under potential future conditions such as the event of default of a counterparty.

The amount of collateral required is usually based on valuations performed on the previous business day, whereas the Bank's balance sheet reflects the valuations of the reporting date. Due to this timing difference, the valuation of collateral can be higher than the valuation of the underlying contract in the Bank's balance sheet. The amount of the collateral obtained is also impacted by thresholds, minimum transfer amounts and valuation adjustments ("haircuts") specified in the contracts. In these tables, the mitigating effect of collateral has been limited to the balance sheet value of the underlying net asset.

As at 31 March 2015		Effect of risk mitigation				Analysed as:	
SDR millions	Gross carrying amount as per balance sheet	Adjustments for settlement date effects	Enforceable netting agreements	Collateral (received) / provided (limited to balance sheet value)	Exposure after risk mitigation	Amounts not subject to risk mitigation agreements	Amounts subject to risk mitigation agreements
Financial assets							
Securities purchased under resale agreements	49,003.6	(6,813.4)	–	(42,169.2)	21.0	–	21.0
Advances	1,413.1	–	–	(1,413.1)	–	–	–
Derivative financial assets	6,958.7	–	(2,001.8)	(3,961.1)	995.8	81.8	914.0
Financial liabilities							
Securities sold under repurchase agreements	(773.3)	–	–	773.1	.	.	.
Derivative financial liabilities	(2,162.2)	–	2,001.8	–	.	.	.

As at 31 March 2014		Effect of risk mitigation				Analysed as:	
SDR millions	Gross carrying amount as per balance sheet	Adjustments for settlement date effects	Enforceable netting agreements	Collateral (received) / provided (limited to balance sheet value)	Exposure after risk mitigation	Amounts not subject to risk mitigation agreements	Amounts subject to risk mitigation agreements
Financial assets							
Securities purchased under resale agreements	50,554.4	(7,107.9)	–	(43,422.2)	24.3	–	24.3
Derivative financial assets	3,002.2	–	(2,325.7)	(509.9)	166.6	7.0	159.6
Financial liabilities							
Securities sold under repurchase agreements	(1,169.3)	249.9	–	919.4	.	.	.
Derivative financial liabilities	(2,632.9)	–	2,325.7	–	.	.	.

D. Economic capital for credit risk

The Bank determines economic capital for credit risk (except for settlement risk, which is included in the utilisation for credit risk) using a VaR methodology on the basis of a portfolio VaR model, assuming a one-year time horizon and a 99.995% confidence level. The amount of economic capital set aside for settlement risk reflected in the Bank's economic capital calculations is based on an assessment by Management.

As at 31 March	**2015**				2014			
SDR millions	Average	High	Low	At 31 March	Average	High	Low	At 31 March
Economic capital utilisation for credit risk	8,124.1	8,970.1	7,372.6	**8,402.7**	7,421.5	7,990.1	6,175.7	7,774.1

E. Minimum capital requirements for credit risk

Exposure to sovereigns, banks and corporates

For the calculation of risk-weighted assets for exposures to banks, sovereigns and corporates, the Bank has adopted an approach that is consistent with the advanced internal ratings-based approach.

As a general rule, under this approach risk-weighted assets are determined by multiplying the credit risk exposures with risk weights derived from the relevant Basel II risk weight function using the Bank's own estimates for key inputs. These estimates for key inputs are also relevant to the Bank's economic capital calculation for credit risk.

The credit risk exposure for a transaction or position is referred to as the exposure at default (EAD). The Bank determines the EAD as the notional amount of all on- and off-balance sheet credit exposures, except for derivative contracts and certain collateralised exposures. The EAD for derivatives is calculated using an approach consistent with the internal models method proposed under the Basel II framework. In line with this methodology, the Bank calculates effective expected positive exposures that are then multiplied by a factor alpha as set out in the framework.

Key inputs to the risk weight function are a counterparty's estimated one-year probability of default (PD) as well as the estimated loss-given-default (LGD) and maturity for each transaction.

Due to the high credit quality of the Bank's investments and the conservative credit risk management process at the BIS, the Bank is not in a position to estimate PDs and LGDs based on its own default experience. The Bank calibrates each counterparty PD estimate through a mapping of internal rating grades to external credit assessments taking external default data into account. Similarly, LGD estimates are derived from external data. Where appropriate, these estimates are adjusted to reflect the risk-reducing effects of collateral obtained giving consideration to market price volatility, re-margining and revaluation frequency. The recognition of the risk-reducing effects of collateral obtained for derivative contracts, reverse repurchase agreements and collateralised advances is accounted for in calculating the EAD.

The table below details the calculation of risk-weighted assets. The exposures are measured taking netting and collateral benefits into account. The total amount of exposures reported in the table as at 31 March 2015 includes SDR 184.5 million for interest rate contracts (2014: SDR 208.5 million) and SDR 1,229.5 million for FX and gold contracts (2014: SDR 229.4 million). In line with the Basel II framework, the minimum capital requirement is determined as 8% of risk-weighted assets.

As at 31 March 2015

Internal rating grades expressed as equivalent external rating grades	Amount of exposure	Exposure-weighted PD	Exposure-weighted average LGD	Exposure-weighted average risk weight	Risk-weighted assets
SDR millions / percentages	*SDR millions*	*%*	*%*	*%*	*SDR millions*
AAA	34,886.4	0.01	35.6	2.9	1,024.7
AA	52,401.7	0.02	39.6	7.0	3,662.2
A	55,387.4	0.04	48.6	9.4	5,227.3
BBB	6,154.7	0.16	50.8	26.2	1,610.7
BB and below	8.6	1.32	50.7	80.3	6.9
Total	**148,838.8**				**11,531.8**

At 31 March 2015 the minimum capital requirement for credit risk related to exposures to sovereigns, banks and corporates amounted to SDR 922.5 million.

As at 31 March 2014

Internal rating grades expressed as equivalent external rating grades	Amount of exposure	Exposure-weighted PD	Exposure-weighted average LGD	Exposure-weighted average risk weight	Risk-weighted assets
SDR millions / percentages	*SDR millions*	*%*	*%*	*%*	*SDR millions*
AAA	20,887.6	0.01	35.6	3.5	727.3
AA	52,972.0	0.02	37.6	6.5	3,447.8
A	64,401.2	0.04	42.3	7.1	4,541.3
BBB	6,612.5	0.17	40.6	21.6	1,429.9
BB and below	12.6	0.70	35.6	48.8	6.2
Total	144,885.9				10,152.5

At 31 March 2014 the minimum capital requirement for credit risk related to exposures to sovereigns, banks and corporates amounted to SDR 812.2 million.

The table below summarises the impact of collateral arrangements on the amount of credit exposure after taking netting into account:

SDR millions	Amount of exposure after taking netting into account	Benefits from collateral arrangements	Amount of exposure after taking into account netting and collateral arrangements
As at 31 March 2015	204,224.3	55,385.5	**148,838.8**
As at 31 March 2014	197,550.2	52,664.3	144,885.9

Securitisation exposures

The Bank invests in highly rated securitisation exposures based on traditional, ie non-synthetic, securitisation structures. Given the scope of the Bank's activities, risk-weighted assets under the Basel II framework are determined according to the standardised approach for securitisation. Under this approach, external credit assessments of the securities are used to determine the relevant risk weights. External credit assessment institutions used for this purpose are Moody's Investors Service, Standard & Poor's and Fitch Ratings. Risk-weighted assets are then derived as the product of the market values of the exposures and the associated risk weights. In line with the Basel II framework, the minimum capital requirement is determined as 8% of risk-weighted assets.

The following table shows the Bank's investments in securitisation analysed by type of securitised assets:

As at 31 March 2015

SDR millions	External rating	Amount of exposures	Risk weight	Risk-weighted assets
Residential mortgage-backed securities	A	17.5	50%	8.8
Securities backed by other receivables (government-sponsored)	AAA	804.4	20%	160.9
Total		**821.9**		**169.7**

At 31 March 2015 the minimum capital requirement for securitisation exposures amounted to SDR 13.6 million.

As at 31 March 2014

SDR millions	External rating	Amount of exposures	Risk weight	Risk-weighted assets
Residential mortgage-backed securities	AAA	19.4	20%	3.9
Residential mortgage-backed securities	A	24.5	50%	12.2
Securities backed by other receivables (government-sponsored)	AAA	830.8	20%	166.2
Total		874.7		182.3

At 31 March 2014 the minimum capital requirement for securitisation exposures amounted to SDR 14.6 million.

4. Market risk

The Bank is exposed to market risk through adverse movements in market prices. The main components of the Bank's market risk are gold price risk, interest rate risk and foreign exchange risk. The Bank measures market risk and calculates economic capital based on a VaR methodology using a Monte Carlo simulation technique. Risk factor volatilities and correlations are estimated, subject to an exponential weighting scheme, over a four-year observation period. Furthermore, the Bank computes sensitivities to certain market risk factors.

In line with the Bank's objective of maintaining its superior credit quality, economic capital is measured at the 99.995% confidence level assuming a one-year holding period. As from 1 July 2014, the Bank calculates the economic capital utilisation for market risk on the basis of a stressed market data set. The Bank's Management manages market risk economic capital usage within a framework set by the Board of Directors. VaR limits are supplemented by operating limits.

To ensure that models provide a reliable measure of potential losses over the one-year time horizon, the Bank has established a comprehensive regular back-testing framework, comparing daily performance with corresponding VaR estimates. The results are analysed and reported to Management.

The Bank also supplements its market risk measurement based on VaR modelling and related economic capital calculations with a series of stress tests. These include severe historical scenarios, adverse hypothetical macroeconomic scenarios and sensitivity tests of gold price, interest rate and foreign exchange rate movements.

A. Gold price risk

Gold price risk is the exposure of the Bank's financial condition to adverse movements in the price of gold.

The Bank is exposed to gold price risk principally through its holdings of gold investment assets, which amount to 108 tonnes (2014: 111 tonnes). These gold investment assets are held in custody or placed on deposit with commercial banks. At 31 March 2015 the Bank's net gold investment assets amounted to SDR 2,998.3 million (2014: SDR 2,981.8 million), approximately 16% of its equity (2014: 17%). The Bank sometimes also has small exposures to gold price risk arising from its banking activities with central and commercial banks. Gold price risk is measured within the Bank's VaR methodology, including its economic capital framework and stress tests.

B. Interest rate risk

Interest rate risk is the exposure of the Bank's financial condition to adverse movements in interest rates including credit spreads. The Bank is exposed to interest rate risk through the interest bearing assets relating to the management of its equity held in its investment portfolios and investments relating to its banking portfolios. The investment portfolios are managed using a fixed-duration benchmark of bonds.

The Bank measures and monitors interest rate risk using a VaR methodology and sensitivity analyses taking into account movements in relevant money market rates, government bond yields, swap rates and credit spreads.

The tables below show the impact on the Bank's equity of a 1% upward shift in the relevant yield curve per time band:

As at 31 March 2015

SDR millions	Up to 6 months	6 to 12 months	1 to 2 years	2 to 3 years	3 to 4 years	4 to 5 years	Over 5 years	Total
Euro	(6.5)	(13.5)	(11.6)	(28.8)	(40.5)	(36.5)	(12.6)	(150.0)
Japanese yen	(1.1)	(1.8)	0.1	(0.1)	–	–	–	(2.9)
Pound sterling	(1.2)	(1.6)	(8.5)	(15.6)	(20.0)	(6.8)	0.3	(53.4)
Swiss franc	5.7	(1.1)	(1.3)	(1.2)	(0.3)	–	3.5	5.3
US dollar	(1.7)	(13.0)	(40.8)	(49.3)	(66.1)	(63.6)	(3.1)	(237.6)
Other currencies	–	0.2	(0.7)	(1.4)	(1.8)	(1.3)	(0.4)	(5.4)
Total	**(4.8)**	**(30.8)**	**(62.8)**	**(96.4)**	**(128.7)**	**(108.2)**	**(12.3)**	**(444.0)**

As at 31 March 2014

SDR millions	Up to 6 months	6 to 12 months	1 to 2 years	2 to 3 years	3 to 4 years	4 to 5 years	Over 5 years	Total
Euro	0.5	(7.9)	(28.6)	(41.1)	(42.7)	(35.0)	(9.9)	(164.7)
Japanese yen	(1.4)	(2.1)	0.1	(0.1)	–	–	–	(3.5)
Pound sterling	(0.2)	(1.8)	(7.7)	(15.0)	(23.8)	(4.8)	3.8	(49.5)
Swiss franc	10.3	(0.2)	(1.8)	(2.1)	(1.5)	(0.4)	5.6	9.9
US dollar	8.7	(10.2)	(34.8)	(40.6)	(58.5)	(40.1)	12.2	(163.3)
Other currencies	0.4	(0.3)	(1.4)	1.1	(2.3)	0.3	(0.3)	(2.5)
Total	18.3	(22.5)	(74.2)	(97.8)	(128.8)	(80.0)	11.4	(373.6)

C. Foreign exchange risk

The Bank's functional currency, the SDR, is a composite currency comprising fixed amounts of USD, EUR, JPY and GBP. Currency risk is the exposure of the Bank's financial condition to adverse movements in exchange rates. The Bank is exposed to foreign exchange risk primarily through the assets relating to the management of its equity. The Bank is also exposed to foreign exchange risk through managing its customer deposits and through acting as an intermediary in foreign exchange transactions. The Bank reduces its foreign exchange exposures by matching the relevant assets to the constituent currencies of the SDR on a regular basis, and by limiting currency exposures arising from customer deposits and foreign exchange transaction intermediation.

The following tables show the Bank's assets and liabilities by currency and gold exposure. The net foreign exchange and gold position in these tables therefore includes the Bank's gold investments. To determine the Bank's net foreign exchange exposure, the gold amounts need to be removed. The SDR-neutral position is then deducted from the net foreign exchange position excluding gold to arrive at the net currency exposure of the Bank on an SDR-neutral basis.

As at 31 March 2015

SDR millions	SDR	USD	EUR	GBP	JPY	CHF	Gold	Other currencies	Total
Assets									
Cash and sight accounts with banks	–	39.2	41.0	0.8	3,047.6	8,233.8	–	12.9	11,375.3
Gold and gold loans	–	0.9	–	–	–	–	14,154.6	–	14,155.5
Treasury bills	–	2,135.2	10,307.2	62.4	17,403.6	–	–	4,017.6	33,926.0
Securities purchased under resale agreements	–	5,686.7	27,415.5	14,832.7	1,068.6	–	–	0.1	49,003.6
Loans and advances	505.6	9,830.0	3,565.1	1,564.7	428.1	(2.1)	–	2,074.8	17,966.2
Government and other securities	–	33,771.5	29,973.7	6,988.2	4,205.8	–	–	5,971.0	80,910.2
Derivative financial instruments	2,744.9	79,188.3	(38,215.4)	(8,693.4)	(18,067.8)	(3,541.8)	(1,295.7)	(5,160.4)	6,958.7
Accounts receivable	–	1,133.0	1,096.0	43.1	–	6.7	–	66.6	2,345.4
Land, buildings and equipment	184.6	–	–	–	–	9.6	–	(0.1)	194.1
Total assets	**3,435.1**	**131,784.8**	**34,183.1**	**14,798.5**	**8,085.9**	**4,706.2**	**12,858.9**	**6,982.5**	**216,835.0**
Liabilities									
Currency deposits	(3,614.6)	(130,280.1)	(22,739.9)	(10,853.9)	(1,590.7)	(377.8)	–	(7,385.0)	(176,842.0)
Gold deposits	–	–	–	–	–	–	(9,857.3)	–	(9,857.3)
Securities sold under repurchase agreements	–	–	(478.0)	(295.3)	–	–	–	–	(773.3)
Derivative financial instruments	244.7	8,057.1	(564.4)	(1,715.3)	(5,012.6)	(3,823.2)	(0.4)	651.9	(2,162.2)
Accounts payable	–	(2,135.6)	(5,372.9)	(58.4)	(483.1)	–	–	0.1	(8,049.9)
Other liabilities	–	(0.6)	–	–	–	(876.3)	–	(0.3)	(877.2)
Total liabilities	**(3,369.9)**	**(124,359.2)**	**(29,155.2)**	**(12,922.9)**	**(7,086.4)**	**(5,077.3)**	**(9,857.7)**	**(6,733.3)**	**(198,561.9)**
Net currency and gold position	**65.2**	**7,425.6**	**5,027.9**	**1,875.6**	**999.5**	**(371.1)**	**3,001.2**	**249.2**	**18,273.1**
Adjustment for gold	–	–	–	–	–	–	(3,001.2)	–	(3,001.2)
Net currency position	**65.2**	**7,425.6**	**5,027.9**	**1,875.6**	**999.5**	**(371.1)**	**–**	**249.2**	**15,271.9**
SDR-neutral position	(65.2)	(7,272.0)	(5,006.8)	(1,816.9)	(1,111.0)	–	–	–	**(15,271.9)**
Net currency exposure on SDR-neutral basis	**–**	**153.6**	**21.1**	**58.7**	**(111.5)**	**(371.1)**	**–**	**249.2**	**–**

As at 31 March 2014

SDR millions	SDR	USD	EUR	GBP	JPY	CHF	Gold	Other currencies	Total
Assets									
Cash and sight accounts with banks	–	5.3	430.1	(8.8)	4,996.7	5,774.5	–	13.7	11,211.5
Gold and gold loans	–	8.6	–	–	–	–	20,587.8	–	20,596.4
Treasury bills	–	2,910.6	8,085.7	–	29,445.4	–	–	4,089.1	44,530.8
Securities purchased under resale agreements	–	13,588.4	15,725.9	20,171.7	1,068.5	–	–	(0.1)	50,554.4
Loans and advances	299.7	10,994.0	456.0	2,408.1	5.5	3.2	–	5,433.8	19,600.3
Government and other securities	–	37,816.3	18,613.1	7,562.9	1,858.8	–	–	4,190.0	70,041.1
Derivative financial instruments	1,178.2	37,183.3	(185.4)	(1,653.8)	(24,096.4)	(1,190.9)	(5,176.2)	(3,056.6)	3,002.2
Accounts receivable	–	1,793.7	429.0	511.8	–	7.8	–	35.1	2,777.4
Land, buildings and equipment	188.1	–	–	–	–	8.1	–	–	196.2
Total assets	1,666.0	104,300.2	43,554.4	28,991.9	13,278.5	4,602.7	15,411.6	10,705.0	222,510.3
Liabilities									
Currency deposits	(4,856.2)	(131,291.6)	(23,073.6)	(9,848.8)	(2,404.8)	(475.5)	–	(8,521.7)	(180,472.2)
Gold deposits	–	(7.2)	–	–	–	–	(11,290.3)	–	(11,297.5)
Securities sold under repurchase agreements	–	(323.5)	(845.8)	–	–	–	–	–	(1,169.3)
Derivative financial instruments	3,207.0	35,397.7	(11,149.1)	(13,462.1)	(9,514.9)	(4,072.6)	(1,135.8)	(1,903.1)	(2,632.9)
Accounts payable	–	(1,637.9)	(2,661.6)	(3,812.9)	(188.6)	–	–	(110.5)	(8,411.5)
Other liabilities	–	(0.6)	–	–	–	(798.1)	–	(0.3)	(799.0)
Total liabilities	(1,649.2)	(97,863.1)	(37,730.1)	(27,123.8)	(12,108.3)	(5,346.2)	(12,426.1)	(10,535.6)	(204,782.4)
Net currency and gold position	16.8	6,437.1	5,824.3	1,868.1	1,170.2	(743.5)	2,985.5	169.4	17,727.9
Adjustment for gold	–	–	–	–	–	–	(2,985.5)	–	(2,985.5)
Net currency position	16.8	6,437.1	5,824.3	1,868.1	1,170.2	(743.5)	–	169.4	14,742.4
SDR-neutral position	(16.8)	(6,289.2)	(5,553.6)	(1,762.9)	(1,119.9)	–	–	–	(14,742.4)
Net currency exposure on SDR-neutral basis	–	147.9	270.7	105.2	50.3	(743.5)	–	169.4	–

D. Economic capital for market risk

The Bank measures market risk based on a VaR methodology using a Monte Carlo simulation technique taking correlations between risk factors into account. Economic capital for market risk is also calculated following this methodology measured to the 99.995% confidence level and assuming a one-year holding period. With effect from 1 July 2014, the Bank calculates the economic capital utilisation for market risk on the basis of a stressed market data set. The reported economic capital utilisation figures for market risk for the prior reporting period have been restated for comparative purposes. The stressed data set is subject to regular review and calibrated to take account of the Bank's key market risk exposures and market risk drivers.

The Bank measures its gold price risk relative to changes in the USD value of gold. The foreign exchange risk component, resulting from changes in the USD exchange rate versus the SDR, is included in the measurement of foreign exchange risk. The table below shows the key figures of the Bank's exposure to market risk in terms of economic capital utilisation over the past two financial years:

For the financial year	**2015**				2014 restated			
SDR millions	Average	High	Low	At 31 March	Average	High	Low	At 31 March
Economic capital utilisation for market risk	3,282.6	3,509.8	3,074.3	**3,434.7**	3,201.6	3,693.5	2,959.7	3,110.3

The table below provides further analysis of the Bank's economic capital utilisation for market risk by category of risk.

For the financial year	**2015**				2014 restated			
SDR millions	Average	High	Low	At 31 March	Average	High	Low	At 31 March
Gold price risk	2,111.1	2,278.1	1,960.7	**2,125.5**	2,250.0	2,766.2	1,967.8	2,115.3
Interest rate risk	2,356.4	2,680.3	2,017.3	**2,562.2**	2,137.3	2,264.1	1,966.8	2,031.3
Foreign exchange risk	895.9	985.5	789.6	**912.0**	1,082.5	1,226.0	918.3	1,006.4
Diversification effects	(2,080.8)	(2,446.2)	(1,878.4)	**(2,165.0)**	(2,268.2)	(2,441.1)	(2,042.6)	(2,042.7)
Total				**3,434.7**				3,110.3

E. Minimum capital requirements for market risk

For the calculation of minimum capital requirements for market risk under the Basel II framework, the Bank has adopted a banking book approach consistent with the scope and nature of its business activities. Consequently, market risk-weighted assets are determined for gold price risk and foreign exchange risk, but not interest rate risk. The related minimum capital requirement is derived using the VaR-based internal models method. Under this method, VaR calculations are performed using the Bank's VaR methodology, assuming a 99% confidence level and a 10-day holding period.

The actual minimum capital requirement is derived as the higher of the VaR on the calculation date and the average of the daily VaR measures on each of the preceding 60 business days (including the calculation date) subject to a multiplication factor of three plus a potential add-on depending on backtesting results. For the period under consideration, the number of backtesting outliers observed remained within the range where no add-on is required. The table below summarises the market risk development relevant to the calculation of minimum capital requirements and the related risk-weighted assets over the reporting period.

As at 31 March	**2015**			2014		
SDR millions	VaR	Risk-weighted assets (A)	Minimum capital requirement (B)	VaR	Risk-weighted assets (A)	Minimum capital requirement (B)
Market risk, where (A) is derived as (B) / 8%	263.9	9,894.5	**791.6**	299.9	11,244.9	899.6

5. Operational risk

Operational risk is defined by the Bank as the risk of financial loss, or damage to the Bank's reputation, or both, resulting from one or more risk causes, as outlined below:

- Human factors: insufficient personnel, lack of requisite knowledge, skills or experience, inadequate training and development, inadequate supervision, loss of key personnel, inadequate succession planning, or lack of integrity or ethical standards.
- Failed or inadequate processes: a process is poorly designed or unsuitable, or is not properly documented, understood, implemented, followed or enforced.
- Failed or inadequate systems: a system is poorly designed, unsuitable or unavailable, or does not operate as intended.
- External events: the occurrence of an event having an adverse impact on the Bank but outside its control.

Operational risk includes legal risk, but excludes strategic risk.

The Bank's operational risk management framework, policies and procedures comprise the management and measurement of operational risk, including the determination of the relevant key parameters and inputs, business continuity planning and the monitoring of key risk indicators.

The Bank has established a procedure of immediate reporting for operational risk-related incidents. The Compliance and Operational Risk Unit develops action plans with the respective units and follows up on their implementation on a regular basis.

For the measurement of operational risk economic capital and operational risk-weighted assets, the Bank has adopted a VaR approach using a Monte Carlo simulation technique that is consistent with the advanced measurement approach proposed under the Basel II framework. In line with the assumptions of the Basel II framework, the quantification of operational risk does not take reputational risk into account. Internal and external loss data, scenario estimates and control self-assessments to reflect changes in the business and control environment of the Bank are key inputs in the calculations. In quantifying its operational risk, the Bank does not take potential protection it may obtain from insurance into account.

A. Economic capital for operational risk

Consistent with the parameters used in the calculation of economic capital for financial risk, the Bank measures economic capital for operational risk to the 99.995% confidence level assuming a one-year holding period. The table below shows the key figures of the Bank's exposure to operational risk in terms of economic capital utilisation over the past two financial years.

For the financial year	**2015**				2014			
SDR millions	Average	High	Low	At 31 March	Average	High	Low	At 31 March
Economic capital utilisation for operational risk	1,200.0	1,200.0	1,200.0	**1,200.0**	1,075.0	1,200.0	700.0	1,200.0

B. Minimum capital requirements for operational risk

In line with the key parameters of the Basel II framework, the calculation of the minimum capital requirement for operational risk is determined assuming a 99.9% confidence level and a one-year time horizon. The table below shows the minimum capital requirements for operational risk and related risk-weighted assets.

As at 31 March	**2015**			2014		
SDR millions	VaR	Risk-weighted assets (A)	Minimum capital requirement (B)	VaR	Risk-weighted assets (A)	Minimum capital requirement (B)
Operational risk, where (A) is derived as (B) / 8%	831.7	10,396.6	**831.7**	812.3	10,154.1	812.3

6. Liquidity risk

Liquidity risk arises when the Bank may not be able to meet expected or unexpected current or future cash flows and collateral needs without affecting its daily operations or its financial condition.

The Bank's currency and gold deposits, principally from central banks and international institutions, comprise 94% (2014: 94%) of its total liabilities. At 31 March 2015 currency and gold deposits originated from 166 depositors (2014: 175). Within these deposits, there are significant individual customer concentrations, with four customers each contributing in excess of 5% of the total on a settlement date basis (2014: five customers).

Outstanding balances in the currency and gold deposits from central banks, international organisations and other public institutions are the key drivers of the size of the Bank's balance sheet. The Bank is exposed to funding liquidity risk mainly because of the short-term nature of its deposits and because it undertakes to repurchase at fair value certain of its currency deposit instruments at one or two business days' notice. In line with the Bank's objective to maintain a high level of liquidity, it has developed a liquidity management framework, including a ratio, based on conservative assumptions for estimating the liquidity available and the liquidity required.

A. Maturity profile of cash flows

The following tables show the maturity profile of cash flows for assets and liabilities. The amounts disclosed are the undiscounted cash flows to which the Bank is committed. Options are included in the table at fair value and are shown in the "Up to 1 month" category.

As at 31 March 2015

SDR millions	Up to 1 month	1 to 3 months	3 to 6 months	6 to 12 months	1 to 2 years	2 to 5 years	5 to 10 years	Over 10 years	Total
Assets									
Cash and sight accounts with banks	11,375.3	–	–	–	–	–	–	–	11,375.3
Gold and gold loans	12,639.9	827.5	–	691.0	–	–	–	–	14,158.4
Treasury bills	4,752.7	15,038.4	7,598.0	5,583.9	–	–	–	–	32,973.0
Securities purchased under resale agreements	28,140.9	13,535.3	517.0	–	–	–	–	–	42,193.2
Loans and advances	9,079.8	8,799.4	93.4	–	–	–	–	–	17,972.6
Government and other securities	3,312.7	4,593.7	12,261.5	21,397.8	12,860.2	25,582.6	2,020.7	–	82,029.2
Total assets	**69,301.3**	**42,794.3**	**20,469.9**	**27,672.7**	**12,860.2**	**25,582.6**	**2,020.7**	**–**	**200,701.7**
Liabilities									
Currency deposits									
Deposit instruments repayable at 1–2 days' notice	(9,814.2)	(17,307.7)	(18,554.9)	(21,340.4)	(18,456.3)	(18,009.0)	(120.6)	–	(103,603.1)
Other currency deposits	(40,084.7)	(13,764.9)	(8,002.0)	(9,726.5)	–	–	–	–	(71,578.1)
Gold deposits	(9,857.3)	–	–	–	–	–	–	–	(9,857.3)
Securities sold under repurchase agreements	(773.3)	–	–	–	–	–	–	–	(773.3)
Total liabilities	**(60,529.5)**	**(31,072.6)**	**(26,556.9)**	**(31,066.9)**	**(18,456.3)**	**(18,009.0)**	**(120.6)**	**–**	**(185,811.8)**
Derivatives									
Net cash flows									
Options and interest rate contracts	4.8	63.8	85.4	93.6	87.3	(14.4)	(2.8)	–	317.7
Gross cash flows									
Interest rate contracts									
Inflows	80.1	44.7	0.5	352.8	108.1	–	–	–	586.2
Outflows	(65.1)	(40.5)	–	(323.1)	(97.7)	–	–	–	(526.4)
Subtotal	15.0	4.2	0.5	29.7	10.4	–	–	–	59.8
Currency and gold contracts									
Inflows	50,590.8	45,399.2	17,316.7	17,662.3	–	–	–	–	130,969.0
Outflows	(49,588.7)	(44,529.8)	(15,770.1)	(16,561.6)	–	–	–	–	(126,450.2)
Subtotal	1,002.1	869.4	1,546.6	1,100.7	–	–	–	–	4,518.8
Total derivatives	**1,021.9**	**937.4**	**1,632.5**	**1,224.0**	**97.7**	**(14.4)**	**(2.8)**	**–**	**4,896.3**
Total future undiscounted cash flows	**9,793.7**	**12,659.1**	**(4,454.5)**	**(2,170.2)**	**(5,498.4)**	**7,559.2**	**1,897.3**	**–**	**19,786.2**

As at 31 March 2014

SDR millions	Up to 1 month	1 to 3 months	3 to 6 months	6 to 12 months	1 to 2 years	2 to 5 years	5 to 10 years	Total
Assets								
Cash and sight accounts with banks	11,211.5	–	–	–	–	–	–	11,211.5
Gold and gold loans	20,374.5	–	–	222.6	–	–	–	20,597.1
Treasury bills	10,075.7	22,334.5	7,135.5	4,400.3	323.6	–	–	44,269.6
Securities purchased under resale agreements	34,956.5	8,497.3	–	–	–	–	–	43,453.8
Loans and advances	9,645.7	9,955.7	–	–	–	–	–	19,601.4
Government and other securities	3,990.7	7,821.5	8,208.5	11,422.5	12,341.6	26,177.5	1,458.7	71,421.0
Total assets	90,254.6	48,609.0	15,344.0	16,045.4	12,665.2	26,177.5	1,458.7	210,554.4
Liabilities								
Currency deposits								
Deposit instruments repayable at 1–2 days' notice	(9,115.8)	(19,975.2)	(16,886.1)	(17,351.8)	(16,795.8)	(23,879.9)	(16.1)	(104,020.7)
Other currency deposits	(47,375.5)	(17,579.2)	(7,913.1)	(3,210.3)	–	–	–	(76,078.1)
Gold deposits	(11,077.0)	–	–	(221.1)	–	–	–	(11,298.1)
Securities sold under repurchase agreements	(669.5)	(249.9)	–	–	–	–	–	(919.4)
Total liabilities	(68,237.8)	(37,804.3)	(24,799.2)	(20,783.2)	(16,795.8)	(23,879.9)	(16.1)	(192,316.3)
Derivatives								
Net cash flows								
Options and interest rate contracts	1.6	71.0	102.8	117.3	105.6	(37.7)	(3.9)	356.7
Gross cash flows								
Interest rate contracts								
Inflows	32.6	0.2	186.1	282.9	400.1	25.5	–	927.4
Outflows	(36.8)	(1.8)	(214.0)	(331.5)	(458.9)	(28.6)	–	(1,071.6)
Subtotal	(4.2)	(1.6)	(27.9)	(48.6)	(58.8)	(3.1)	–	(144.2)
Currency and gold contracts								
Inflows	44,188.5	40,218.5	8,699.8	7,240.7	–	–	–	100,347.5
Outflows	(44,213.2)	(39,986.0)	(8,752.0)	(7,211.6)	–	–	–	(100,162.8)
Subtotal	(24.7)	232.5	(52.2)	29.1	–	–	–	184.7
Total derivatives	(27.3)	301.9	22.7	97.8	46.8	(40.8)	(3.9)	397.2
Total future undiscounted cash flows	21,989.5	11,106.6	(9,432.5)	(4,640.0)	(4,083.8)	2,256.8	1,438.7	18,635.3

The table below shows the contractual expiry date of the credit commitments as at the balance sheet date:

Contractual expiry date *SDR millions*	Up to 1 month	1 to 3 months	3 to 6 months	6 to 12 months	1 to 2 years	2 to 5 years	5 to 10 years	Maturity undefined	Total
As at 31 March 2015	–	–	233.5	–	–	–	–	2,863.0	**3,096.5**
As at 31 March 2014	–	–	267.5	194.1	–	–	–	2,461.3	2,922.9

B. Liquidity ratio

The Bank has adopted a liquidity risk framework taking into account regulatory guidance issued by the Basel Committee on Banking Supervision related to the liquidity coverage ratio (LCR). The framework is based on a liquidity ratio that compares the Bank's available liquidity with a liquidity requirement over a one-month time horizon assuming a stress scenario. In line with the Basel III liquidity framework, the underlying stress scenario combines an idiosyncratic and a market crisis. However, the liquidity ratio differs in construction from the LCR to reflect the nature and scope of the BIS banking activities – in particular, the short-term nature of the Bank's balance sheet. Within the Bank's liquidity framework, the Board of Directors has set a limit for the Bank's liquidity ratio which requires the liquidity available to be at least 100% of the potential liquidity requirement.

The table below provides information on the development of the Bank's liquidity ratio for the last two years. For reference, the LCR as defined by the Basel Committee on Banking Supervision is also included.

For the financial year	**2015**				2014			
Percentages	Average	High	Low	At 31 March	Average	High	Low	At 31 March
Liquidity ratio	162%	178%	145%	**153%**	154%	180%	137%	164%
LCR	386%	540%	263%	263%	251%	410%	178%	318%

Further information on the liquidity ratio is provided in the sections below.

Liquidity available

The liquidity available is determined as the cash inflow from financial instruments over a one-month horizon, along with potential additional liquidity which could be generated from the disposal of highly liquid securities, or by entering into sale and repurchase agreements for a part of the Bank's remaining unencumbered high-quality liquid securities. The assessment of this potential additional liquidity involves two steps. First, there is an assessment of the credit quality and market liquidity of the securities. Second, the process of converting the identified securities into cash is modelled by projecting the amount that could be reasonably collected.

Liquidity required

Consistent with the stress scenario, the Bank determines the liquidity required as the sum of the cash outflow from financial instruments over a one-month horizon, the estimated early withdrawal of currency deposits, and the estimated drawings of undrawn facilities. As regards the calculation of the liquidity needs related to currency deposits, it is assumed that all deposits that mature within the time horizon are not rolled-over and that a proportion of non-maturing currency deposits is withdrawn from the Bank prior to contractual maturity. At 31 March 2015, the estimated outflow of currency deposits in response to the stress scenario amounted to 41.3% (2014: 42.9%) of the total stock of currency deposits. Moreover, it is assumed that undrawn facilities committed by the Bank would be fully drawn by customers, along with a proportion of undrawn uncommitted facilities.

The table below shows the Bank's estimated liquidity available, liquidity required and the resulting liquidity ratio:

As at 31 March

SDR billions	**2015**	2014
Liquidity available		
Estimated cash inflows	55.8	70.5
Estimated liquidity from sales of highly liquid securities	56.2	56.9
Estimated sale and repurchase agreements	5.4	6.1
Total liquidity available (A)	**117.4**	133.5
Liquidity required		
Estimated withdrawal of currency deposits	71.7	76.1
Estimated drawings of facilities	4.9	4.3
Estimated other outflows	–	1.1
Total liquidity required (B)	**76.6**	81.5
Liquidity ratio (A) / (B)	**153%**	164%

Independent auditor's report

To the Board of Directors and to the General Meeting
of the Bank for International Settlements, Basel

We have audited the accompanying financial statements of the Bank for International Settlements (pages 173–243), which comprise of the balance sheet as at 31 March 2015, the related profit and loss account, statement of comprehensive income, statement of cash flows and movements in the Bank's equity for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's responsibility

Management is responsible for the preparation and fair presentation of the financial statements in accordance with the accounting principles described in the financial statements and the Statutes of the Bank. This responsibility includes designing, implementing and maintaining an internal control system relevant to the preparation of financial statements that are free from material misstatement, whether due to fraud or error. Management is further responsible for selecting and applying appropriate accounting policies and making accounting estimates that are reasonable in the circumstances.

Auditor's responsibility

Our responsibility is the express an option on these financial statements based on our audit. We conducted our audit in accordance with International Standards on Auditing. Those standards require that we comply with ethical responsibilities and plan and perform the audit to obtain reasonable assurances whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers the internal control system relevant to the entity's preparation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control system. An audit also includes evaluating the appropriateness of the accounting policies used and the reasonableness of accounting estimates made, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements for the year ended 31 March 2015 give a true and fair view of the financial position of the Bank for International Settlements and of its financial performance and its cash flows for the year then ended in accordance with the accounting principles described in the financial statements and the Statutes of the Bank.

Ernst & Young Ltd

Victor Veger John Alton

Zurich, 15 May 2015