

Research Institute

Assessing Global Debt

Introduction



Since the financial crisis, global debt has risen to a new historic high relative to GDP. This could potentially imply that we are once again heading for a disruptive crisis in key countries or even globally. The following report attempts to assess this risk by investigating the debt issue from a broad range of angles.

The report's key conclusion is that there appear to be a number of specific pockets of risk but that "systemic" instability seems less likely than often perceived. One of the key reasons is that leverage in our own sector, global banking, has receded markedly since the crisis, although there are some new areas of heightened financial sector leverage outside the formal banking system.

Many advanced economies as well as China have seen a marked rise in government, or government-related debt. Outright crisis risks nevertheless seem fairly moderate: market pressures impose longer-term discipline to some extent, while low real interest rates increase debt sustainability. Meanwhile China's growth potential seems sufficient for leverage to be kept in check, albeit at the cost of some continued "financial repression."

A final area of heightened risk is non-financial corporate debt. Credit quality has, no doubt, suffered in certain market segments. But, even here, the report concludes that risks seem somewhat more limited than in the last period of serious stress, i.e. 2000 to 2002.

Clearly, all these conclusions are tentative in nature and must be continually revisited. Most importantly, significant political or economic shocks emanating from "outside" the debt markets per se could lead to sudden non-linear increases in risk.

I encourage you to examine – and also question – the findings of this report in detail. The authors and I look forward to your critical feedback.

Urs Rohner

Chairman of the Board of Directors
Credit Suisse Group AG



02	Introduction
04	Executive summary
08	A guide to sources for debt data
11	Chapter 1: How debt has evolved since the Global Financial Crisis
17	Debt crises: Commonalities and differences
21	Chapter 2: Government debt – will the end of QE trigger defaults?
29	TARGET2 imbalances: Not a sign of a heightened default risk in the Eurozone
33	Chapter 3: Banks – after ten years of “repentance,” new “sins”?
45	New financial stability risks beyond bank balance sheets
49	Chapter 4: Emerging markets – great diversity, but few systemic risks
53	Middle East: The new debt issuers
57	Chapter 5: China – a challenging path out of excessive indebtedness
64	China’s debt overhang may constrain the Belt and Road Initiative
67	Chapter 6: Corporate debt – declining quality on the growing fringes
75	Performance of debt markets over the economic cycle
79	Chapter 7: Real estate – some overheated markets, but less toxic debt
88	About the authors
90	General disclaimer / important information

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Executive summary

Oliver Adler and Michael O'Sullivan

China and US corporates the main pressure points

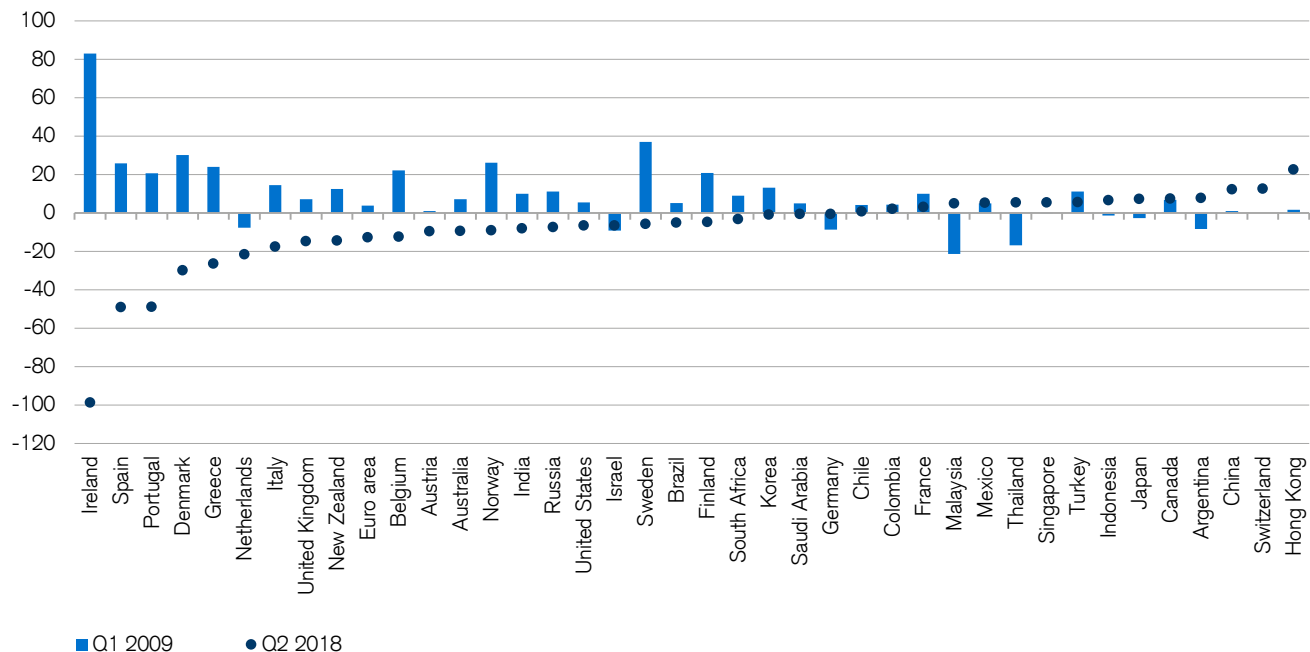
This study provides an overview and detailed assessment of the global debt situation. The key question that we try to answer is: do we face the risk of a major debt crisis in any of the key countries, akin to past crises, or are such fears overblown? These questions cannot be answered with certainty of course; while pre-conditions for crises can be identified to some extent, the actual point in time at which they are triggered almost always comes as a surprise. With this disclaimer in mind, we draw a number of tentative conclusions from the analysis that is laid out in the following chapters.

Debt has risen to a new historic high....

Debt has increased significantly since the financial crisis and is now at its highest level (relative to Gross Domestic Product) since World War II. That said, the increase in debt is far from uniform across countries and sectors. In advanced economies, overall leverage has been stable since 2009, but government debt has increased sharply in most countries. Assessing the sustainability of government debt is therefore key. While non-financial corporate debt has increased moderately overall, the increase has been more significant and, in parts, worrisome in the USA. The trend for overall non-financial private sector leverage, as measured by the

Figure 1: Credit gaps are very diverse, but have mostly narrowed since the crisis

Difference between the credit-to-GDP ratio and its long run trend, in percentage points



Source: Bank for International Settlements (BIS), Credit Suisse

so-called “credit gap,”¹ has nevertheless improved in most advanced economies since the financial crisis (**Figure 1**). Finally, banks in advanced economies, which were at the heart of the financial crisis, have seen substantial deleveraging. By far the biggest driver of the global debt expansion in the post-crisis years has been the rise in the debt of China’s state-owned enterprises, i.e. effectively public sector debt. How China deals with this debt overhang will be of key importance to the global economy.

...but so long as real interest rates remain low, higher debt is sustainable

The rise in the ratio of global debt to GDP in principle increases the vulnerability of the global economy to interest rate shocks. However, while debt is very high, the level of real interest rates is lower in key countries than at any time since the 1970s. More importantly, real interest rates are also low relative to real economic growth (**Figure 2**). While this increases debt sustainability, the tension between low rates and high debt can cause its own problems. If rates stay low because growth is low, this can undermine the creditworthiness of companies and countries with high debt levels, and make them more vulnerable to even small rises in interest rates

1. The credit gap is a measure of the deviation of the actual credit to GDP series from its own trend.

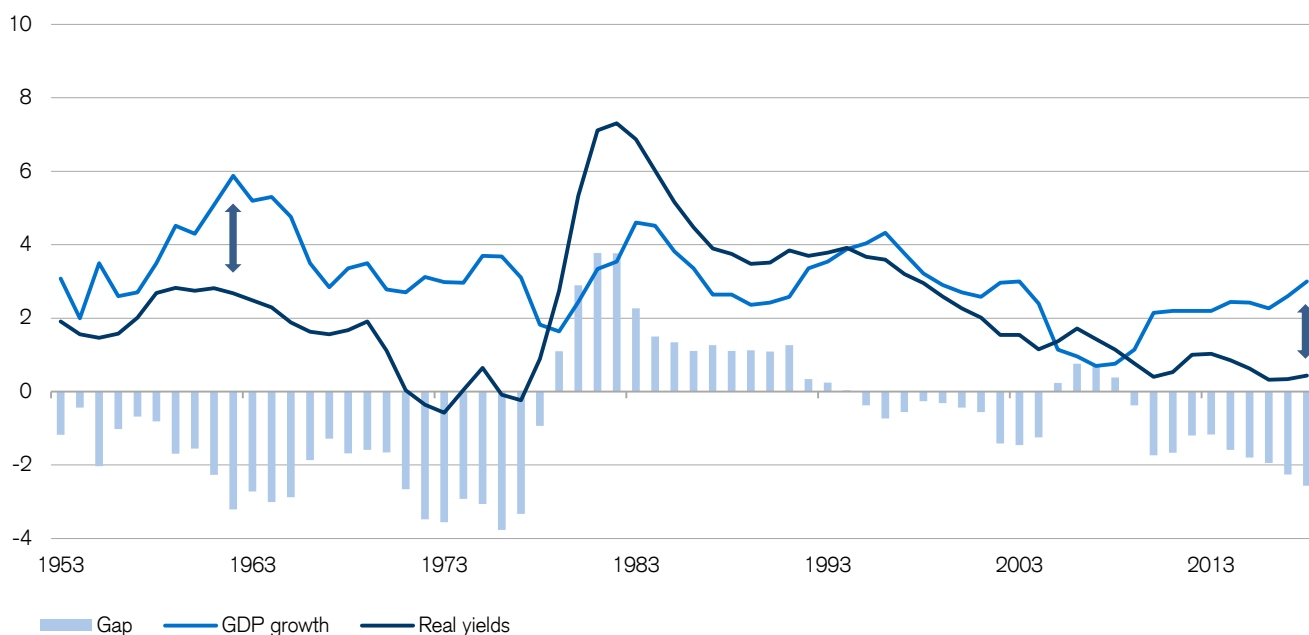
as the stresses in various debt markets demonstrated in 2018. High debt levels are, in turn, a constraint on credit and economic growth. Finally, a significant rise of real interest rates cannot be ruled out if, for example, the “savings glut” in Asia were to dissipate.

US fiscal policy after the QE wind-down poses risks, mainly to others

The significant purchases of government bonds by central banks (quantitative easing, or QE) have, in principle, alleviated the debt burden of governments by lowering yields. Conversely, the winding down of QE in principle increases the vulnerability of government finances, especially if governments do not rein in their deficit spending (for details see Chapter 2 on government debt). Among the major economies, the most worrying trajectory for government debt is to be found in the USA, especially after the significant tax cuts of early 2018. However, a default by the US government remains highly unlikely given the backstop that the US Federal Reserve would most likely provide. But, if the Fed were to cut interest rates in a scenario of high debt and weakening growth, a sharp depreciation of the US dollar could be the result. The fairly high US current account deficit adds to the vulnerability of the US dollar. The UK’s twin deficits suggest a similar risk for the British pound, although the undervaluation of the pound mitigates that risk, especially if Brexit were to be “soft,” or possibly even reversed.

Figure 2: Low real interest rate increases debt sustainability

Five-year moving average for US 10-year Treasury yields (deflated by CPI inflation), real US GDP growth and difference (gap) between real yields and real growth, in %



Source: Federal Reserve Bank of St. Louis, Credit Suisse

Italian debt is as sustainable as Japan's, absent political tail risk

Some other advanced economies also exhibit very high levels of government debt, notably Japan and Italy. In Japan, risk-averse and aging savers have been willing to hold large amounts of zero-interest-bearing government debt or cash, which renders debt sustainable for now. In Italy, fiscal metrics such as the primary balance are stronger than in Japan and domestic savers also hold a large share of government debt. However, the European Central Bank's constitution (and Eurozone politics) does not allow it to provide an iron-clad backstop to Italian debt. This "QE inequality" implies that debt sustainability in the Eurozone periphery is subject to significant political (tail) risk.

The quality of key segments of the US corporate debt market has been deteriorating

After an initial phase of deleveraging, corporate debt has been rising significantly since 2014, especially in the USA (see Chapter 6 on corporate debt). Measures of credit quality have worsened within the investment grade bond segment, albeit not dramatically so; for now, the vulnerabilities seem to be concentrated in some highly indebted "old economy" companies, which are under significant competitive pressure. Within the high yield area, financial discipline has increased since 2015. However, non-capital-market financing in the form of lower-quality leveraged loans has surged. Should the economy slow significantly and/or interest rates rise sharply, default rates are likely to increase markedly. The limited exposure of banks to leveraged loans limits systemic risks, however.

China's high debt likely to be tackled with continued "financial repression"

Since the financial crisis, China's government has tried to maintain high economic growth rates with aggressive credit expansion largely favoring state-owned enterprises (see Chapter 5 on China). However, the marginal growth impact of credit expansion has decreased over time, resulting in a very high debt to GDP ratio. At the same time, speculative excesses in the real estate sector have burdened households with considerable debt. In our view, China should nevertheless be able to emerge from excessive leverage. But the continued focus on highly indebted state-owned enterprises will tend to limit the country's growth potential, while requiring continued "financial repression" to mobilize domestic savings in order to sustain debt.

Fiscal discipline has been better in most other major emerging markets

Overall debt ratios in emerging markets declined in the decade following the emerging market crises of the late 1990s. However, government as well as private sector debt has increased again in most countries over the past ten years or so. Nevertheless, the risk of crises and contagion is more limited, not least because the quality of monetary policy has generally improved, allowing countries to better deal with external shocks. Importantly, currencies are not pegged to the US dollar any longer. However, some countries with unsustainable fiscal policies and high external deficits continue to remain at risk. High foreign-currency-denominated corporate debt poses risks to investors as well (see Chapter 4 on emerging markets).

Reduced leverage is the key reason to worry less about a bank-triggered crisis

Ten years ago, the shortage of capital and low-quality "toxic" assets combined to bring the banking system in the USA and Europe to the brink of collapse. Deleveraging in combination with a moderated overall risk profile of banks' balance sheets has since reduced systemic risk in key countries. However, some new areas of risk have emerged, in part on the fringes of the formal banking sector. In contrast to the pre-crisis period, monetary policy tightening now represents less of a threat, however. In fact, banks would on balance benefit from monetary policy normalization. The key issue in the sector, especially in Europe, seems to be insufficient consolidation, which depresses profitability, rather than raising systemic risk (see Chapter 3 on banks).

Some real estate markets have overheated on the back of cheap debt

"Toxic" mortgage debt used to finance over-priced real estate lay at the heart of the financial crisis. While the crisis markets such as the USA have rebalanced and households have deleveraged, a number of smaller real estate markets have been heading for a boom since the financial crisis as declining interest rates encouraged borrowing and real estate investment. Owing to high valuations, some of these markets are quite vulnerable to setbacks in our view (see Chapter 7 on real estate). That said, financing structures have generally become less risky in both private as well as commercial real estate, thus limiting systemic risks.

New financial stability risks beyond bank balance sheets

During the financial crisis, runs on “shadow banks,” including money market funds, exacerbated the downturn. The risks in these and other funds have since diminished. However, the constraints on bank lending since the crisis have given rise to a new wave of “shadow bank” lending, especially in the USA and in China. In the USA, a significant share of real estate lending has been funded by such new and less-regulated vehicles; greater regulatory focus may be required here. In China, such vehicles have funded real estate as well as corporations. In the meantime, the Chinese authorities have clamped down on shadow banks, reducing stability risks. Some observers suggest that other areas pose risks, including the use of off-balance sheet “pledged collateral” by banks. Meanwhile, the stability risks resulting from a potential failure of netting of derivatives on exchanges appears limited.



A guide to sources for debt data

Bank for International Settlements

The Bank for International Settlements (BIS) gathers data from central banks and other national authorities. Its debt data include data on debt securities and on credit to the non-financial sector. Data on debt securities cover borrowing activity in debt capital markets and include all debt instruments traded in financial markets, including treasury bills, commercial paper, negotiable certificates of deposits, bonds, debentures and asset-back securities. These statistics distinguish between debt securities issued in international markets, e.g. a German corporate issuing US dollar debt in the USA, and those issued in domestic markets, e.g. a Swiss corporate issuing a bond on the Swiss market. However, data on domestic debt securities are available only for a few countries. The BIS also distinguishes by the type of issuer (financial corporations, non-financial corporations and general government). The statistics on credit to the non-financial sector capture borrowing activity of the private non-financial sector and the government sector in more than 40 economies. All forms of financing are included, i.e. currency and deposits, loans and debt securities from all sources, i.e. domestic banks, other domestic financial corporations, non-financial corporations and non-residents. Finally, the BIS provides statistics on international banking. The locational banking statistics provide data on banks' assets and liabilities from a residence perspective, i.e. focusing on the location of the banking office. Consolidated banking statistics include data on international banking activity from a national perspective, i.e. focusing on the country where the banking group's parent is headquartered.

Institute of International Finance

The Institute of International Finance (IIF) provides the IIF Global Debt Monitor database, which comprises 30 emerging countries and 21 mature markets. Most of the headline debt numbers – for public, non-financial corporates

and household sectors – reported by the IIF are based on BIS figures. On the other hand, financial sector debt statistics reported by the IIF are derived from the respective countries' financial accounts. For countries that do not compile financial accounts, financial sector indebtedness is estimated as a summation of cross-border bank loans and bond financing. Within the financial sector, credit by non-banks is excluded, potentially underestimating financial sector debt in countries with large “shadow banking” entities, such as China. Data on currency breakdowns and sources of credit are mainly based on national sources and BIS databases, but incorporate assumptions of, and estimations by the IIF. For instance, the breakdown data for non-financial corporate debt are computed by combining the BIS cross-border banking and debt securities statistics with the BIS total credit statistics, while the currency breakdown of government debt is computed using Bloomberg and BIS government debt statistics.

World Bank

The World Bank's International Debt Statistics are used to analyze external debt statistics and major financial indicators for 121 low- and middle-income countries since 1970. We also use the Bank's World Development Indicators, a cross-country comparable database, for annual statistics such as bank non-performing loans (NPLs), GDP, current account balances and interest expenses of governments. The World Development Indicator database covers 217 countries (both advanced and emerging) since 1960. Data for national accounts and balance of payments come from a combination of data from national statistical organizations and the World Bank's country management units. Adjustments are made in the balance of payments data to account for fiscal and calendar year differences.

International Monetary Fund

The International Monetary Fund (IMF) historical public debt database (HPDD) provides data at the general government level for 174 countries over the period from 1971 to 2015. Given the dearth of reliable data/surveys available on a longer time horizon, the starting date varies across countries and is usually around the date of independence for most of formerly colonized countries. As per the IMF, “the general government sector consists of all government units and all non-market non-profit institutions that are controlled and mainly financed by government units, comprising the central, state, and local governments. The general government sector does not include public corporations or quasi-corporations.” In order to minimize step differences in the data and ensure compatibility across countries, the IMF deploys breaks to address the former issue and uses medians and Purchasing Power Parity (PPP) GDP weighted averages for calculating regional aggregates. External debt statistics are taken from the Joint External Debt Hub (JEDH), a joint initiative by the BIS, IMF, Organisation for Economic Co-operation and Development (OECD) and World Bank. Additionally, the database on the IMF’s Financial Soundness Indicators (FSIs) for deposit-takers is also used for this report. Deposit-takers are defined as “those units that engage in financial intermediation as a principal activity and have liabilities in the form of deposits payable and instruments that may not be readily transferable, such as short-term certificates of deposit.”

Federal fund flow data

Fund flow data by the US Federal Reserve is a comprehensive dataset covering a wide range of financial accounts pertaining to the US economy. It provides data across 30 sectors (broadly falling into the domestic non-financial sector and domestic financial sector) and 21 instruments, starting from 1950 at a quarterly frequency. The Financial Accounts Guide defines debt as “debt securities (open market paper, Treasury securities, agency and GSE-backed securities, municipal securities and corporate and foreign bonds) and loans (depository institution loans not elsewhere classified, other loans and advances, mortgages and consumer credit).” In addition to debt variables, the balance sheet data of households and non-financial corporates are also used in this report.



1. How debt has evolved since the Global Financial Crisis

Vibhuti Mehta and Krithika Subramanian

Global debt has reached almost three times global Gross Domestic Product (GDP) and international financial institutions as well as other observers are issuing warnings intermittently about the seemingly unsustainable accumulation of debt. In this chapter, we provide a broad overview of debt accumulation since the financial crisis, while the following chapters look in greater detail at the developments and vulnerabilities of individual regions and sectors.

Globally, debt seems to be growing inexorably. According to the Institute of International Finance (IIF), total debt stood at close to USD 250 trillion at the end of Q2 2018, or almost three times global GDP. While the pace of debt accumulation has varied significantly over time, debt growth accelerated in the pre-crisis period from 2002 to 2007. It then slowed in the post-crisis period, only to accelerate again after mid-2016 – the latter being largely due to the debt build-up in China (note that the absolute decline in debt in 2014 shown in **Figure 1** was largely a result of US dollar appreciation, which reduced the US dollar value of non-USD-denominated debt).

At the end of Q2 2018, debt was around 80% higher relative to GDP in advanced economies (ca. 380%) compared to emerging economies (ca. 210%); for emerging economies excluding China, debt was actually considerably lower (100% of GDP – see **Figure 2**). In terms of sectoral distribution, non-financial corporates represented the largest share, accounting for 29.7% of total outstanding debt, followed by government (26.9%), financial corporates (24.5%) and households (18.8%).

Within this broad picture, the following “stylized facts” on global debt stand out: (1) in advanced economies, overall debt stopped growing relative to GDP shortly after the financial crisis, while

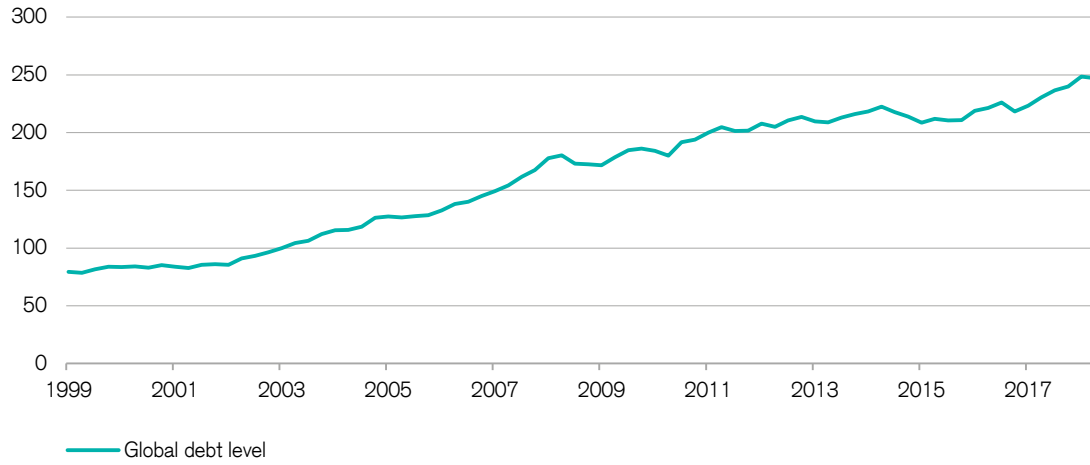
debt growth accelerated in emerging economies; (2) in advanced economies, government debt has been the only segment growing strongly since the crisis, while household as well as bank debt have contracted and corporate debt has grown only moderately; (3) US corporate debt has, however, grown very strongly since 2012; (4) debt growth in emerging economies has been dominated by China while it has been moderate in other emerging economies; (5) in emerging economies, household and non-financial corporate debt have grown more strongly, whereas government debt has increased only moderately – that said, much of China’s corporate debt must effectively be regarded as government debt given that it is owed by state-owned enterprises.

Household and bank deleveraging in advanced economies

As shown in **Figure 2**, the overall debt ratio of advanced economies stopped growing in 2009 and has even declined slightly since then. This is essentially due to the deleveraging of households and banks since the financial crisis (see **Figure 3**). Non-financial corporates deleveraged somewhat in the immediate aftermath of the crisis, but have since then increased leverage, albeit not dramatically. However, US corporates have increased their debt exposure substantially

Figure 1: Global debt

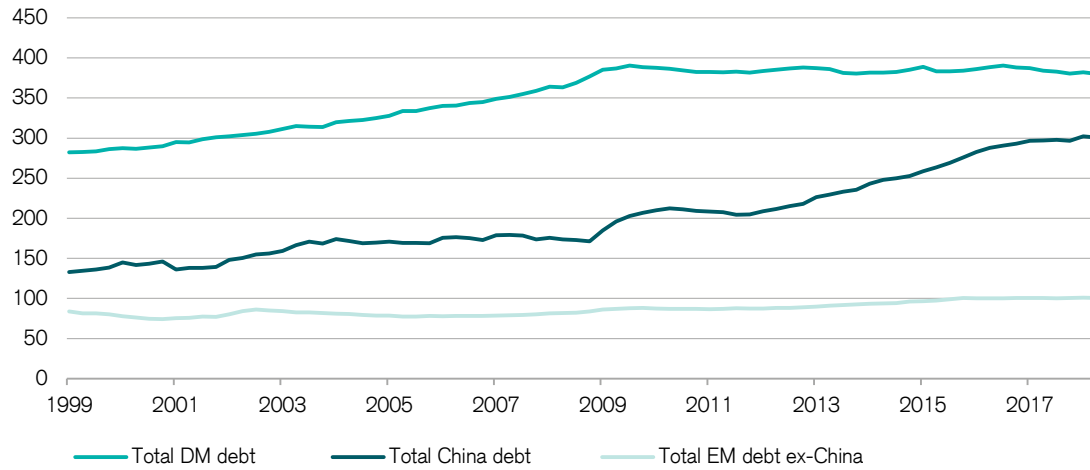
In USD trillion



Source: IIF, Credit Suisse

Figure 2: Debt in major regions

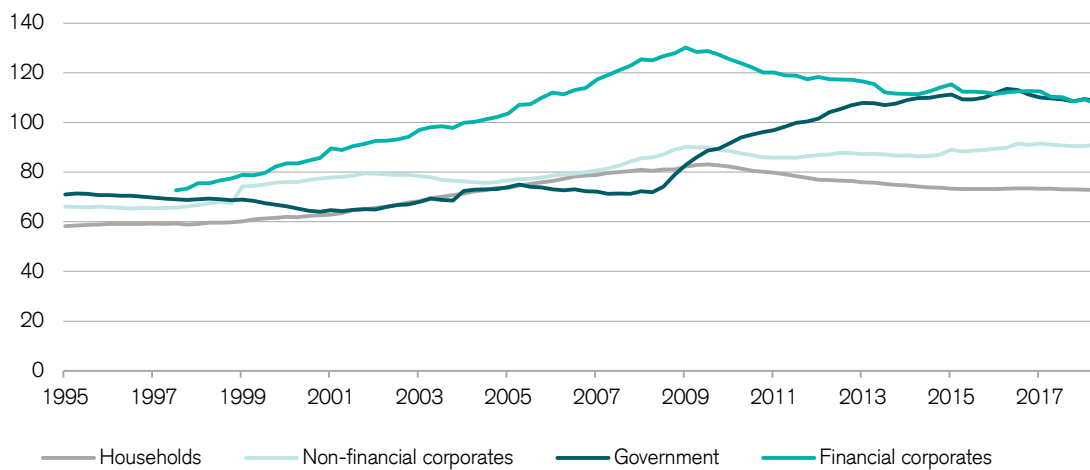
In % of GDP



Source: BIS, Credit Suisse

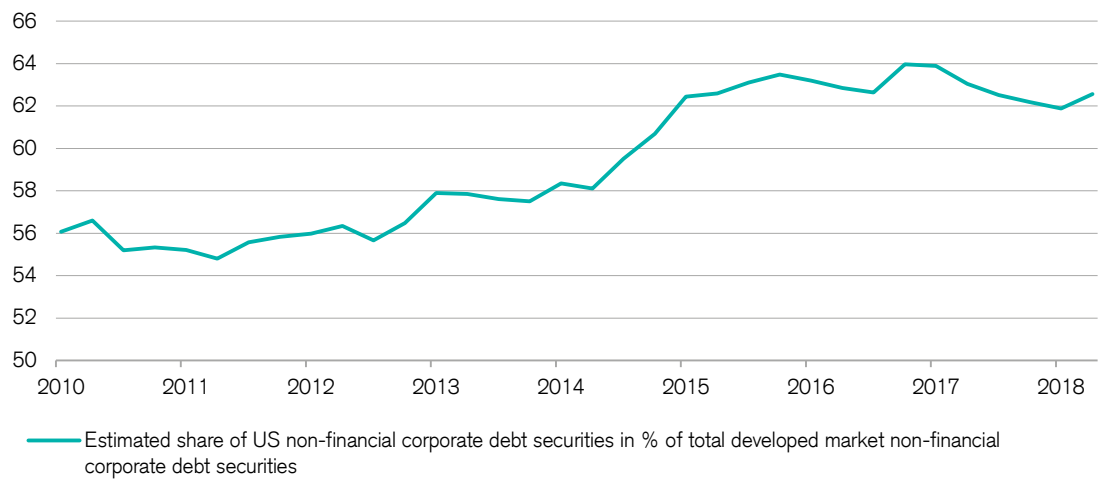
Figure 3: Developed markets – private sector debt declined, public sector debt increased

In % of GDP



Source: IIF, Credit Suisse

Figure 4: Strong expansion of US corporate debt



Source: BIS, Credit Suisse

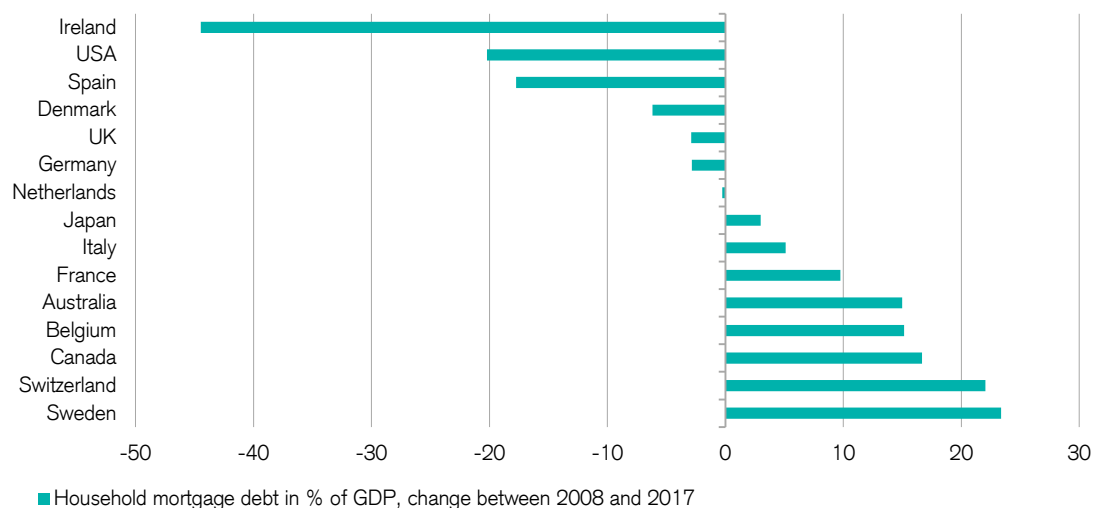
since 2012. As a result, the share of outstanding US corporate bonds in the overall corporate bond market of advanced economies has increased to above 60% (see **Figure 4**).

In the meantime, the deleveraging of financial corporates in developed markets in the post-crisis period has essentially been due to more stringent capital requirements, various other regulations, higher risk aversion of banks and reduced credit demand in some countries (Chapter 3 provides more details).

Household deleveraging was also essentially the result of the crisis. As real estate values declined and lenders implemented more stringent credit conditions, households were forced to reduce their outstanding debt. In some countries, the USA above all, outright defaults by mortgage debtors also contributed to deleveraging. Household debt has not declined everywhere, however, but has in fact increased significantly in a number of countries, including Australia, Canada, Sweden and Switzerland, and has generally been associated with a boom in real estate and higher mortgage debt (see **Figure 5**).

Figure 5: Households have not deleveraged everywhere

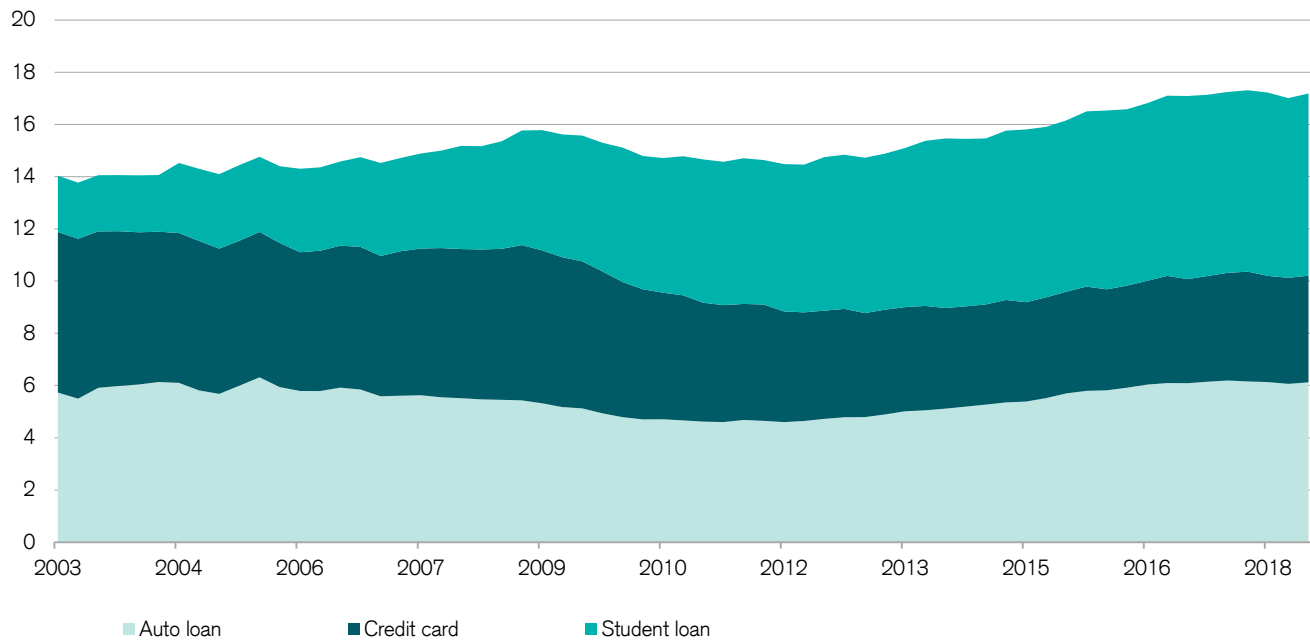
In percentage points



Source: Thomson Reuters, Credit Suisse

Figure 6: US student loans surged after the crisis

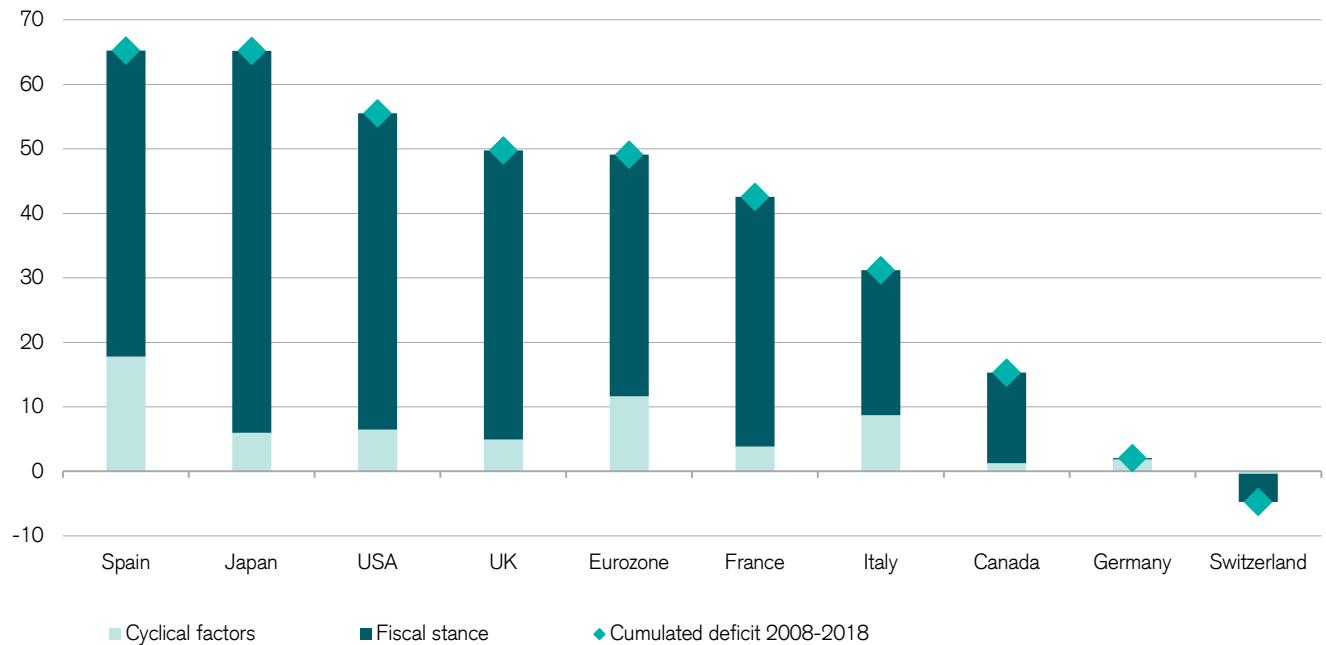
In % of GDP



Source: Thomson Reuters, Credit Suisse

Figure 7: Weak growth a partial cause of government debt build-up

Drivers of the change in the net government debt ratio, 2008–18, in % of GDP



Source: IMF, Credit Suisse

Chapter 7 discusses the nexus between real estate markets and debt in greater detail. Finally, other forms of debt have also had an impact on household debt. In the USA (see **Figure 6**), credit card debt has declined markedly since the financial crisis relative to GDP, most likely due to more restrictive lending conditions, while student loans have surged, possibly because students tend to remain at university for longer in periods of labor market weakness and the government provides loan guarantees.

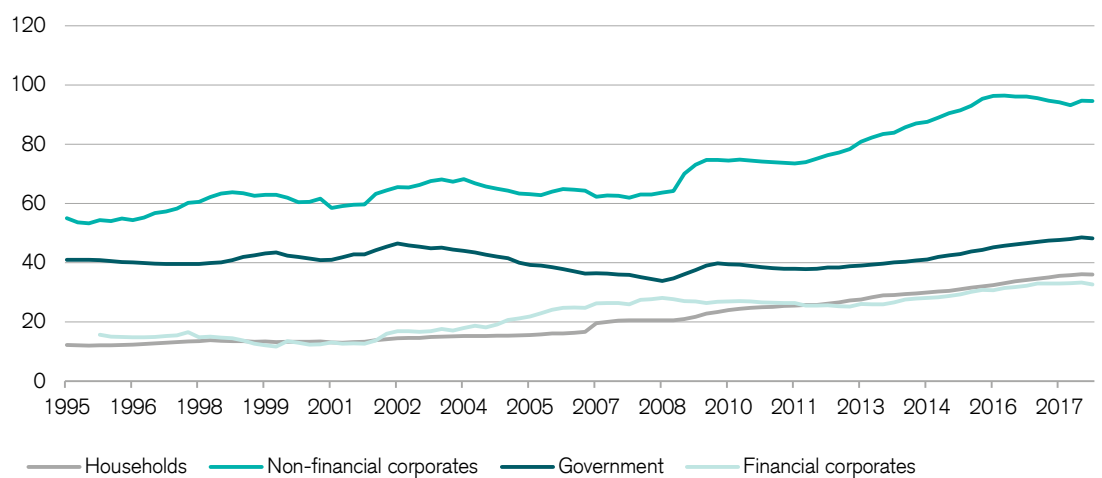
Meanwhile, the gross debt of developed market governments rose sharply from about 70% of GDP in 2007 to above 110% in 2016 before declining slightly to about 108.7% in Q2 2018. In countries that suffered deep or prolonged recessions and stagnation periods, e.g. Spain and Italy, a considerable part of the debt build-up was due to cyclical factors, i.e. the consequence of below-trend growth (**Figure 7**). In fact, our estimates, which are based on data for cyclical and structural deficits from the International Monetary Fund (IMF), may underestimate the cyclical impact as the underlying assumptions regarding trend growth may have been too high in some cases in the post-crisis years. Finally, in some countries, specific measures, such as the setting up of “bad banks” to support the financial system, contributed considerably to government debt, although asset sales by these institutions subsequently reduced that debt to some extent.

Emerging market debt build-up mainly by corporates

The evolution of the emerging market debt profile since the crisis is quite different to that of advanced economies. While corporate debt in advanced economies has only just surpassed the pre-crisis levels, non-financial corporates in emerging markets have rapidly built up their debt levels since the crisis (**Figure 8**). Corporate debt has grown especially strongly in China – by Q2 2018, China’s share of overall emerging market corporate debt had reached 69.5%. Given that a large share of this debt (estimated at 73%) is owed by state-owned enterprises (SOEs), it must to a large extent be regarded as government debt.

Meanwhile, formal emerging market government debt has grown only moderately in the post-crisis period, after having declined in the post-2001 period (see **Figure 8**). This was the period that followed the series of emerging market debt crises of the late 1990s. On the one hand, emerging market governments were far more constrained in their ability to issue debt and, on the other hand, they also implemented more cautious fiscal policies following these crises. In contrast, global borrowing conditions were more favorable in the period following the financial crisis because the economic outlook for emerging markets generally improved and interest rates declined. Moreover, the search for yield by international investors favored emerging market debt issuance.

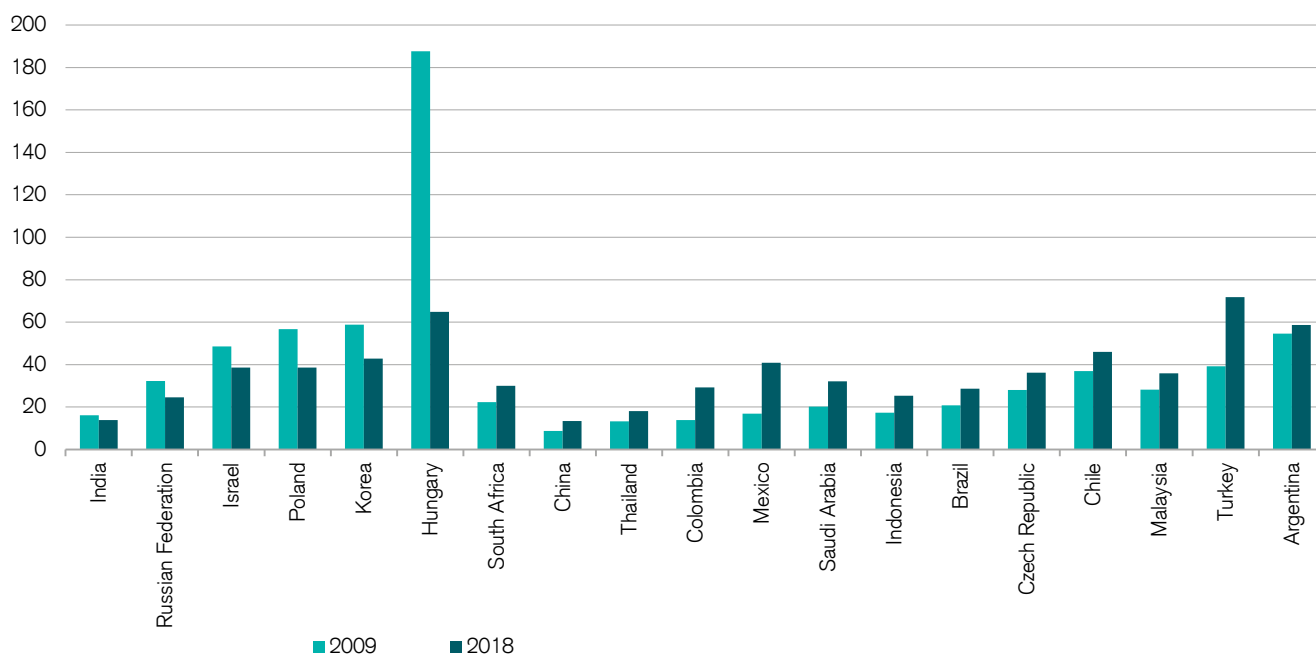
Figure 8: Emerging market non-financial corporate debt has risen sharply
In % of GDP



Source: IIF, Credit Suisse

The significant decline in interest rates in the major bond markets also made it attractive for emerging market borrowers to issue debt in hard currency. As a result, the share of foreign-currency-denominated debt increased for the majority of countries (**Figure 9**), although it is still moderate in most cases. The two countries with the highest share of debt, Argentina and Turkey, subsequently suffered most when US interest rates rose in 2018. The two countries where foreign currency debt declined most were Hungary and Poland. Here, households borrowed heavily in euros and Swiss francs during the pre-crisis boom period as the respective interest rates were much lower than in domestic markets, only to run into great difficulties when their local currencies depreciated sharply, especially against the Swiss franc.

Figure 9: Most emerging markets have increased foreign currency debt exposure since the crisis
Foreign currency debt, in % of GDP



Source: IIF, Credit Suisse

Debt crises: Commonalities and differences

Krithika Subramanian

Common triggers for debt crises are asset-liability mismatches, which are exacerbated when interest rates rise, increasing the value of liabilities and reducing that of assets, especially when economic weakness further undermines asset values and reduces their liquidity. If banks are highly leveraged, the crisis risk increases. Foreign-currency-denominated debt can increase stress when external deficits are large and when, as was often the case prior to past crises, borrowers pegged their currency to the USD; when the peg broke, the asset-liability mismatch was multiplied. Exchange-rate flexibility is thus a key in reducing crisis risks. Government debt crises are most serious especially in the absence of a credible domestic lender-of-last-resort; financial support from official lenders is then

crucial. The faster debts are restructured after a crisis, the more limited the negative economic impact of crises tends to be.

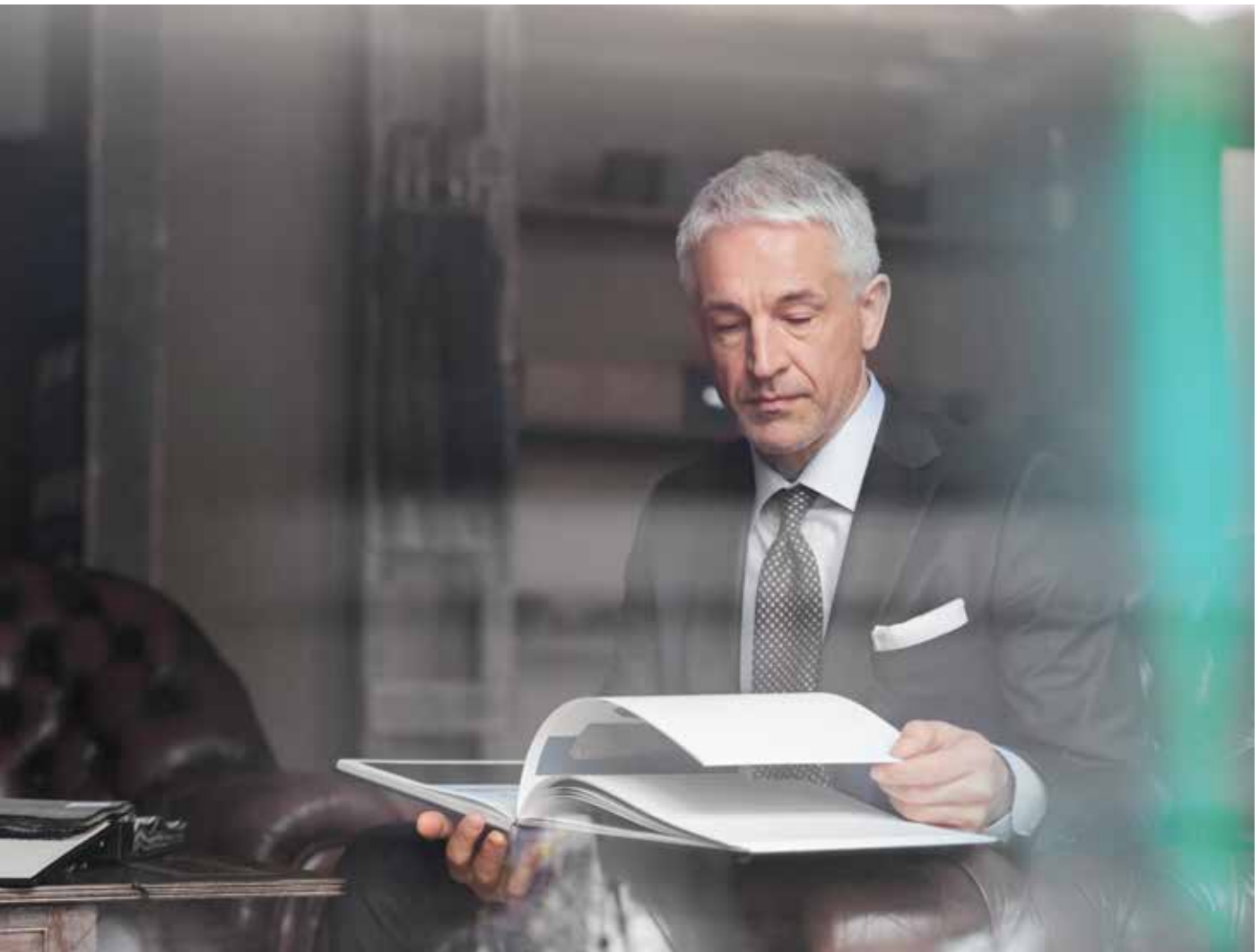
The following table provides an overview of debt crises that have occurred in the past few decades, pointing to common aspects and differences. This may help in assessing current crisis risks. Major crises (i.e. crises that caused severe contagion) are highlighted in white, while minor crises are highlighted in gray. Prior to the Global Financial Crisis, developed economies experienced only minor crises that could be fairly easily contained and that did not have any major macroeconomic fallout. The severe debt crises with international ramifications were limited to emerging markets.

Year	Crisis	Causes and impact
1973–75	The UK's Secondary Banking Crisis	Encouraged by rising property prices during the 1960s and 1970s, smaller banks in the UK were exuberant about lending against property. Sentiment was already fragile due to the collapse of the Bretton Woods system in 1971. The 1973 oil crisis and the subsequent stock market crash added to the woes of banks exposed to the UK property market, where prices were declining in response to rising interest rates and economic weakness. The Bank of England managed to contain the crisis by supporting banks.
1980s	US Savings & Loan Crisis	Savings and loan (S&L) institutions in the USA accepted savings deposits and made loans (mortgage, auto and personal). In order to tame inflation, the Federal Reserve raised rates sharply from 9.5% to 12.0% in 1979. This resulted in significant asset liability mismatches for S&L institutions, eventually leading to insolvency in most cases. Inadequate regulation, concentrated lending to the real estate sector and speculative investment strategies added to the risks associated with these thrift institutions. Due to the reluctance of politicians to take on the issue, it took until the mid-1990s for the debts to be completely resolved.
1982	First Latin American Debt Crisis	Latin American economies borrowed heavily in the boom periods of the 1960s and 1970s, including in US dollars. Faced with weaker commodity prices (after two oil price shocks), they ran huge current account deficits that were financed with increased external borrowings. However, repayments became costlier as US interest rates rose. Mexico was the first to default, leading to panic in the region. Refinancing loans which were often short-term proved impossible. Only after US Treasury Secretary Brady proposed a restructuring of the debt in 1989 did the crisis move to full resolution.

1985	Japan Asset Price Bubble	Following the Plaza Accord (1985), the yen appreciated sharply, weakening the Japanese economy. To combat this, the government adopted a loose fiscal and monetary policy that led to increased economic overheating from 1986 onward. Japanese real estate and equity markets became significantly inflated, amid rapid credit expansion and speculation. This in turn prompted the central bank to tighten policy, thereby triggering a downturn in the real estate market. As the government was unwilling to help restructure mortgages, bank credit remained tight for years and arguably contributed to almost two decades of stagnation and deflation.
1989	US Junk Bond Crash	Prior to the crash, the high yield bond market recorded exponential growth for a decade. Legal action due to alleged insider trading against US investment bank Drexel Burnham Lambert, a bank that was strongly exposed to the junk bond market, resulted in a retreat of investors, fading liquidity and defaults. Drexel Burnham eventually defaulted, but as it was not a deposit-taking bank, contagion did not spread.
1994–95	Mexico's Tequila Crisis	An expansionary fiscal stance ahead of elections led to a widening external deficit which was financed through a heavy reliance on foreign borrowing; this eventually prompted speculative attacks on the peso's peg against the US dollar. A forced devaluation of the Mexican currency intensified capital flight and led to a vicious cycle of depleted foreign exchange reserves, higher borrowing costs and, ultimately, default. The crisis was contained after the USA, IMF and BIS provided large bailout loans.
1997–98	Asian Financial Crisis	Asian economies experienced an economic boom in the early 1990s. As many countries pegged their currencies to the US dollar, current account deficits widened sharply and countries borrowed heavily and short-term while the US dollar appreciated. Imbalances increased as the US Federal Reserve began to tighten policy in 1996 while the Japanese yen and the Chinese renminbi were devalued. The crisis began in Thailand and spread to other Asian economies (particularly Indonesia, South Korea and Malaysia). The Thai baht peg broke and the currency was forced to float due to insufficient foreign currency reserves; this led to a major confidence crisis and credit crunch in the region. The IMF stepped in to provide support and most economies began to recover in 1999.
1998	Russian Financial Crisis	Russia had borrowed substantially as the economy took off following the collapse of the Soviet Union. It also maintained a fixed exchange rate, which boosted the external deficit. Russia was heavily impacted by the Asian crisis and the subsequent drop in oil and metals prices. This led to rapid depletion of foreign currency reserves and a worsening of government finances, which were already burdened by costs related to the first war in Chechnya. Despite receiving a loan from the IMF, Russia was forced to devalue the ruble as it defaulted on domestic debt, and announced a moratorium on its foreign debt. International banks, especially in Germany, were seriously affected and the LTCM hedge fund had to be rescued.
1998–2002	The Argentine Great Depression	Military rule and poorly managed public finances resulted in high budget deficits, civil unrest, high unemployment and hyperinflation. The government tried to stabilize inflation by pegging the peso to the US dollar. However, as government borrowing was not contained, the currency peg collapsed and Argentina defaulted on its public debt in 2001.
2001–04	The Enron Collapse	Accounting "tricks" were used by the company to hide debt in various special purpose vehicles; this magnified operational constraints and investment losses. Ultimately, the collapse of Enron Corporation was due a failure of audit procedures and corporate governance.
2007–09	Global Financial Crisis	The Global Financial Crisis originated from a major US real estate asset bubble, excessive leverage in the private sector (including banks) and the subsequent near-collapse of the banking system. Prior to the crisis, the US economy had enjoyed six years of solid expansion, peaking in December 2007. House prices had already begun to decline in 2006, but the overleveraging in the subprime mortgage market and the mispricing of risk, especially in the form of complex financial products, only became fully apparent in 2008. The crisis spread to Europe, where many

banks were strongly exposed to mortgage-backed securities. It was only contained with heavy financial support from the US government (TARP program) and the Federal Reserve, which also provided very substantial US dollar swap lines for European central banks to on-lend to their banks.

2008	Hungarian Crisis	<p>In the post-2002 boom years, Hungarian banks tended to borrow internationally and lend foreign-currency-denominated debt (particularly Swiss francs and euros) to local households and companies. Amid global turmoil originating from the Global Financial Crisis and the advent of recession in Europe, the Hungarian forint depreciated significantly, resulting in large unhedged FX risk in Hungary's private sector. Banks bore substantial costs, which worsened their capital adequacy ratios, forcing them to deleverage and slow the pace of credit growth. Hungary received a significant IMF loan, which helped the country recover fairly fast.</p>
2009–11	Eurozone Debt Crisis	<p>The Global Financial Crisis spread to Europe due to the significant exposure of European banks, triggering a sharp global recession. In late 2009, the newly elected Greek government revealed that its predecessor had significantly understated the budget deficit and external debt. In the preceding boom period, both the government and private sector had borrowed heavily abroad and financed a real estate bubble. Concerns about a Greek exit from the Eurozone triggered a sharp rise in yields and a crisis that heavily impacted banks holding the debt. Hence the leverage effects were multiplied when both real estate values and government debt prices collapsed. The Greek government and its banks became insolvent. Debts were partially restructured and the EU, in combination with the IMF, provided huge loans to support the government and Greek banks while the ECB continued to support commercial banks via the Greek central bank. Owing to insufficient debt restructuring and the inability of Greece to devalue its currency, the crisis carried on for many years. Other countries that suffered a real-estate related crisis, including Ireland and Spain were able to recover more quickly, partly because their banks were bailed out much faster.</p>
2018	Argentina currency crisis	<p>Argentina has a history of debt crises – the latest of which occurred in 2018 – which have essentially been triggered by the inability of government to maintain fiscal discipline in the face of pressure from entrenched interest groups. With reformist President Macri being elected in 2015 and raising hopes for fundamental reform, Argentina settled its outstanding debt issues with foreign lenders and was subsequently able to re-access international bond markets after a hiatus of 15 years. However, as the US Fed began to tighten policy faster in early 2018, doubts over Argentina's repayment capacity began to intensify which led to a rapid and sharp depreciation of the peso – by July 2018 the peso had lost more than half its value relative to the start of the year. The request for IMF emergency lending only worsened investor sentiment, as the country struggled with a surge of inflation and worsening growth. The government secured a 3-year funding plan worth USD 50 billion from the IMF and promised to follow an austere fiscal program, while the central bank hiked rates massively (from 40% in May 2018 to 60% in August 2018) to curb the peso drop. Skepticism regarding the success of the program remains.</p>
2018	Turkey stresses	<p>In the midst of the Argentine crisis, Turkey's currency also came under severe pressure. The country was running a very high current account deficit (5.5% of GDP in 2017) on the back of excessive election-related government spending, and external debt had grown significantly in past years. That said, almost 70% was private sector debt while government debt was moderate. The pressure on the currency was also due to investors' concerns over the independence of the Turkish central bank, credit rating downgrades and clashes between the Turkish and US governments. Between May and September 2018, the Turkish lira had depreciated 62%. Capital flight became a real concern as demands for debt restructuring grew in the face of a much weaker lira. The central bank eventually raised interest rates by over 600bps, and capital flight was also reduced by limiting bank activity. The currency recovered ground quite substantially but it may be too early to declare all-clear.</p>



2. Government debt – will the end of QE trigger defaults?

Maxime Botteron and Oliver Adler

Quantitative easing reduced the fiscal burden of advanced economy governments by lowering interest rates and by replacing interest-bearing government debt with zero-interest-bearing cash. If governments do not rein in their deficits as quantitative easing ends, the resulting rise in interest rates could, in principle, trigger defaults.

Within the Eurozone, populist politics add to the risks. That said, the demand for government bonds has, so far, proven extraordinarily resilient, probably due to the somewhat deflationary state of the global economy. Japan is a case in point. To prevent deflation from taking hold again, central banks may even have to abandon their monetary tightening plans and restart quantitative easing (QE) – which would once again support government bonds. In countries with large twin deficits such as the UK and USA, however, such a policy shift could trigger sharp currency devaluation and boost inflation; the AAA rating of US Treasuries could be in question. However, the risk of outright default seems considerably greater in non-government sectors that borrowed excessively on the back of the QE-induced financial market boom than for government debt itself.

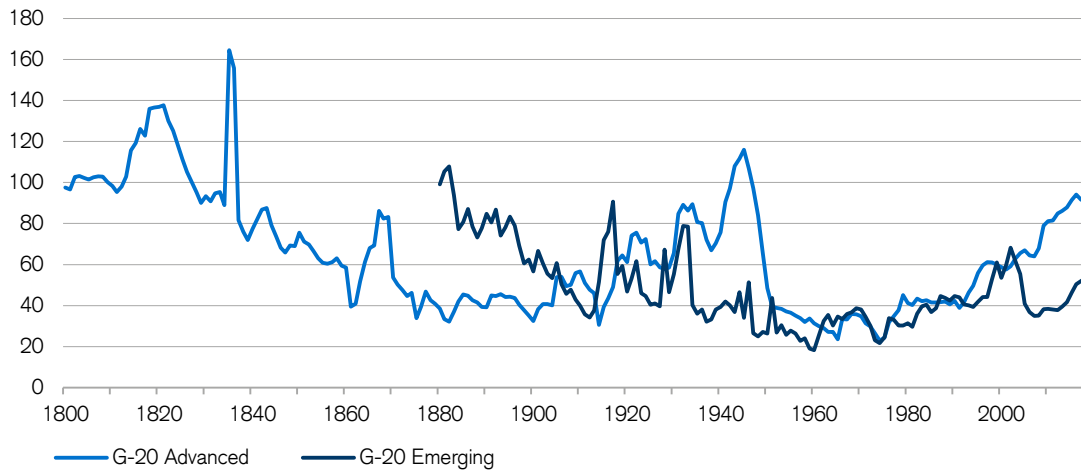
After declining somewhat from the early 1980s until the mid-1990s, the ratio of government debt to GDP rose significantly in the late 1990s in advanced economies (**Figure 1**); the main drivers included heightened military spending by the USA, a worsening fiscal situation in Japan, and the economic slowdown around the turn of the millennium. Despite quite strong economic growth the debt picture failed to improve in the 2000s, only to worsen significantly after the financial crisis, in part due to cyclical factors (see **Figure 7**, page 22). The Bank for International Settlements estimates that general government debt, which includes liabilities of all government levels and of social security

schemes, had reached almost USD 60 trillion in advanced economies at the end of 2018, up from USD 33 trillion at the end of 2007. In percent of GDP, Japan tops the “debt league” with an estimated ratio of 213%, followed by Greece (180%) and Italy (144%). Meanwhile, the US and Japanese governments owe about 40% and 22% of total advanced economy government debt, respectively. France, the UK and Italy, with each slightly above 6% are next. The US debt ratio has reached approximately the same level as after WWII, i.e. a point in time at which the potential for the USA to outgrow its debt was hugely superior to now. Given that fact as well as the de-facto default of the Greek government during the Eurozone crisis and the loss of access to capital markets by others, apprehension over government indebtedness is, understandably, high.

The trajectory of government debt is markedly different in emerging markets. Here, governments also borrowed strongly in the 1990s, as interest rates declined, only to run into severe difficulties in the late 1990s. However, a combination of outright defaults and more restrictive fiscal policies lowered the debt ratio very significantly in the 2000s. While borrowing has picked up again in the past few years, the government debt ratios generally remain significantly lower in emerging markets than in the advanced economies (see also **Figure 3** on page 73).

Figure 1: Advanced economy government debt ratio almost back to its 1945 peak

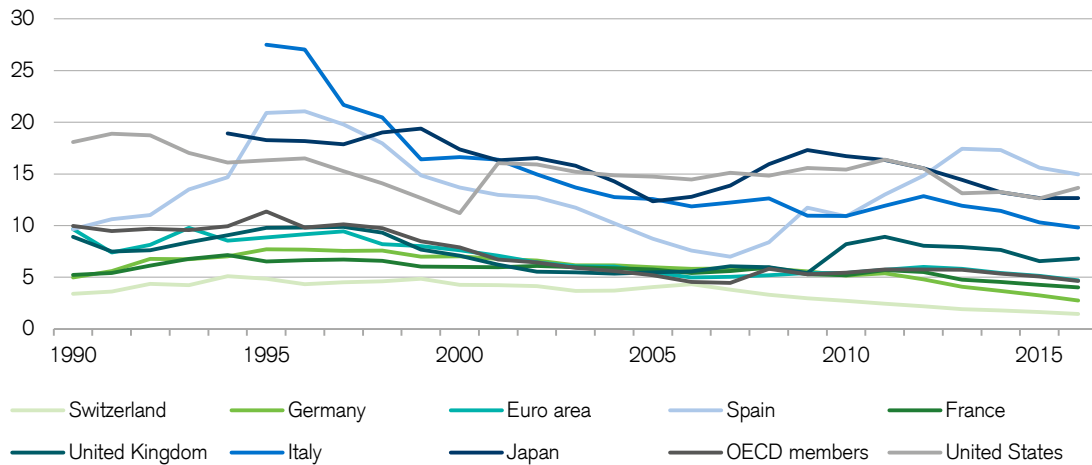
In % of GDP



Source: IMF, Credit Suisse

Figure 2: The interest burden of governments has remained moderate so far

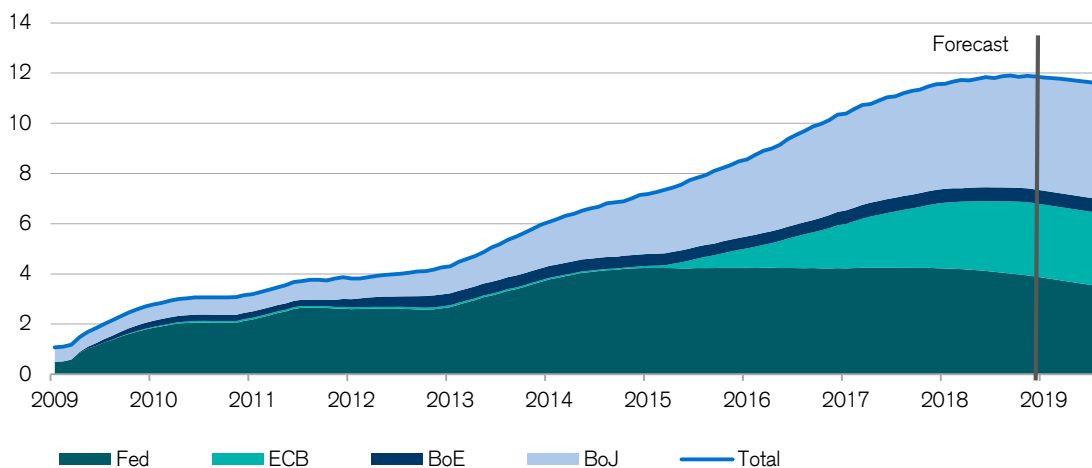
has remained moderate so far Interest payments (% of total government revenue)



Source: World Bank, Credit Suisse

Figure 3: How central banks accumulated assets

In USD trillion



Source: Thomson Reuters, Credit Suisse

QE alleviated the debt burden

Despite the significant increase in the debt ratio, the burden of debt remained limited for advanced economy governments in the post-crisis era. In fact, the ratio of interest rate expenses relative to government revenue was stable, or even continued to decline after a temporary rise in the immediate aftermath of the crisis (**Figure 2**), as interest rates continued to retreat across the advanced world, at least until quite recently. In some of the countries shown in **Figure 2**, notably Italy and Spain, the ratio of interest payments to overall revenue is likely to have declined further in 2017 as well as 2018, due to the effect of bonds bearing high interest rates being replaced by bonds with lower interest rates.

Quantitative easing, which was launched by various central banks in the post-crisis years, most likely contributed to this decline in interest costs. **Figure 3** shows the process of asset accumulation of central banks in the post-crisis period. Academic studies suggest that in the USA, the first QE program led to a decline in government bond yields of 0.9 to 2.0 percentage points. In the UK, the estimates vary between 0.75 and 1.0 percentage points and the Bank of Japan's purchases between 2009 and 2012 are estimated to have reduced yields by an estimated 0.5 percentage points.¹ In the Eurozone, studies

1. See Yu, Edison, "Did Quantitative Easing Work," from the Federal Reserve Bank of Philadelphia, 2016.

found that the QE program has reduced weighted average yields by around 0.6 percentage points, with yields of the more vulnerable periphery countries dropping the most.²

Insofar as QE boosted economic growth, the impact on the debt burden was likely even larger. Finally, as central banks – part of government – now own significant portions of government bonds outstanding (**Figure 4**), net government debt has declined which, arguably, reduces default risk as well. In the countries which were supported by the European Stability Mechanism (ESM) or its predecessor, the EFSF, as well as the International Monetary Fund, most prominently Greece, but also Spain, Portugal and Ireland, these loans are classified in **Figure 4** under "debt held by non-residents." As these loans were granted under preferential terms, they effectively also alleviate the debt burden and reduce default risk.

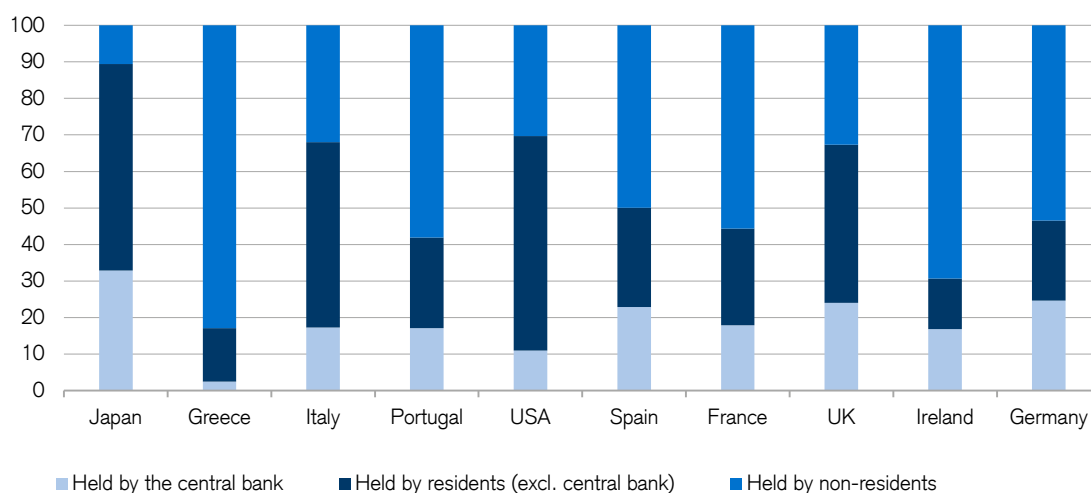
The ending of QE potentially raises default risks

Just as QE eased fiscal constraints, the risk is, of course, that an end to QE (quantitative tightening) will boost borrowing costs of governments and thereby increase default risk. How high this risk is essentially depends on whether

2. See De Santis, Roberto, "Impact of the asset purchase programme on euro area government bond yields using market news," from the European Central Bank (Working Paper Series), 2016.

Figure 4: Central banks now own significant shares of government debt

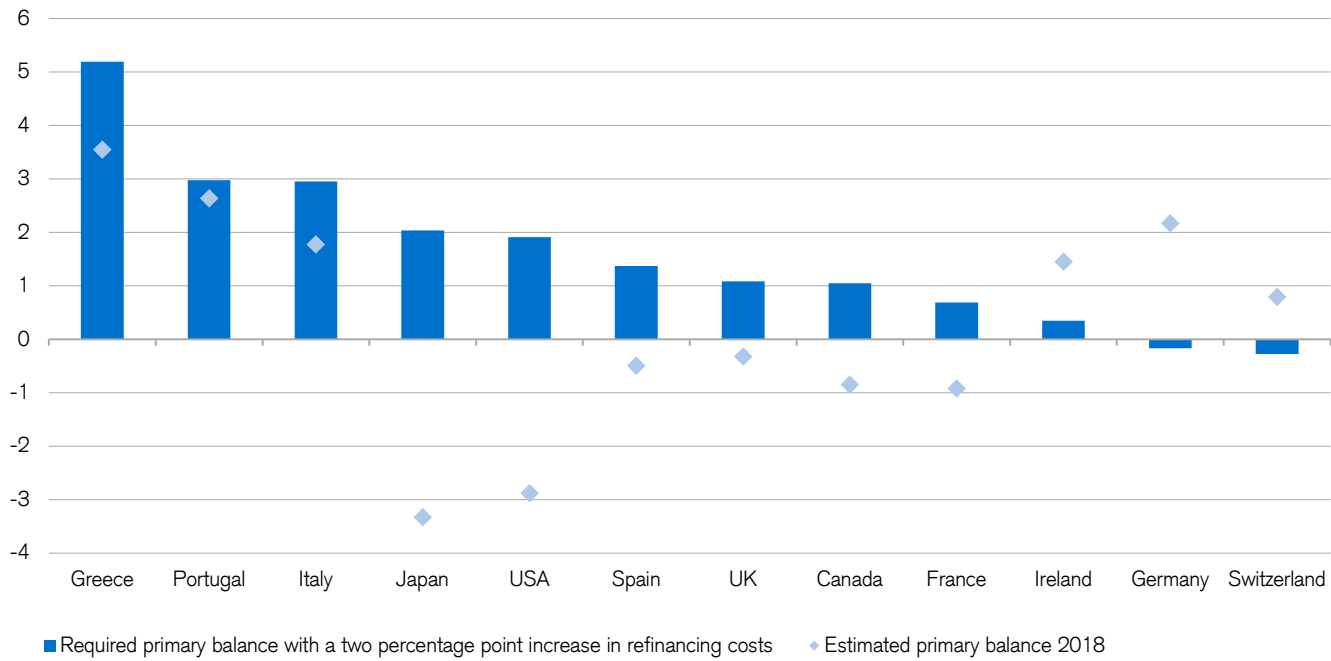
In %



Source: IMF, World Bank, Thomson Reuters, Credit Suisse

Figure 5: How debt sustainability would be affected by an interest-rate shock

In % of GDP



Source: IMF, Credit Suisse

the government debt ratio moves onto an “explosive” unsustainable path. Formally, the evolution of the ratio of debt to GDP depends on three parameters: the average nominal interest rate on debt, the growth rate of nominal GDP, and the primary fiscal balance (i.e. the government balance excluding interest payments).³ Higher economic growth will make the ratio decline, whereas higher interest rates or a higher primary deficit will make the ratio grow faster.

Figure 5 shows the current primary balance of selected advanced economies and the primary balance that would be required to stabilize the debt-to-GDP ratio if the average debt-refinancing costs were to rise by two percentage points

3. Formally, the change in debt is computed as follows: $\Delta d_t = d_{t-1}(i_t - y_t) - pb_t + sf_t$, where Δd_t is the change in the debt-to-GDP ratio, d_{t-1} is the debt-to-GDP ratio from the previous period (year), i_t is the nominal interest rate, y_t is the nominal GDP growth rate, pb_t is the primary balance and sf_t the so-called stock-flow adjustment, i.e. exceptional spending such as bank bailouts. Assuming no stock-flow adjustment, the debt-to-GDP ratio is therefore constant when $\Delta d_t = 0$, which implies $d_{t-1}(i_t - y_t) = pb_t$. Hence, the higher the nominal interest rate i_t or the lower the nominal GDP growth y_t , the larger the primary balance pb_t must be. Only when the nominal interest rate is lower than GDP growth can a government run a (limited) primary deficit (i.e. a negative primary balance) without increasing the debt-to-GDP ratio.

relative to their current levels, while GDP growth remained unchanged. As the chart suggests, such a rise in refinancing costs would not be particularly painful for Ireland, Germany and Switzerland, which all run primary surpluses that are currently higher than what would be needed to stabilize their debt-to-GDP ratios in a higher-interest-rate environment. Greece, Portugal and Italy currently run primary surpluses as well, but some more fiscal tightening would be needed if their respective financing costs were to climb by two percentage points.

As **Figure 5** shows, the primary surplus which the Greek government is running is already extraordinarily high. There must be serious doubts whether this ultra-restrictive policy stance can be maintained over the longer-term, as would be required to reduce debt, given the negative impact on the economy and society. It rather seems likely that official debt relief will need to be granted to Greece in order for the economy to be able to recover. The other economies shown in **Figure 5** currently run primary deficits and would all need to switch to primary surpluses in order to stabilize their debt-to-GDP ratios. The fiscal effort required would be particularly pronounced in Japan and in the USA, where an adjustment of around five percentage points of GDP would be required in the primary balance. Given that interest rates in the USA have increased over the past two years

and the fiscal deficit has been boosted considerably due to the tax cuts in early 2018 while US growth is now slowing, stabilizing the US government debt ratio would be difficult.

That said, a further rise of interest rates by 2% is a rather stark assumption. It would likely only come about if economic growth were also markedly higher. This would, in turn, improve debt sustainability. However, although this sounds somewhat implausible, fundamentals do suggest that the risk of an unsustainable development of government debt is in fact higher in the USA than in the Eurozone, including Italy. That said, outright default by the US government seems highly unlikely given the ability of the Federal Reserve to act as a lender of last resort. In the following, we take a closer look at the debt situation in the G-4, i.e. the USA, Japan, the Eurozone and the UK.

Japan: So far no signs of unwillingness to accumulate non-interest-bearing cash

A key factor that mitigates the risk of sovereign default is the ability of the central bank to potentially provide very large amounts of funding to the government, i.e. to act as a lender of last resort for the sovereign without destabilizing markets. While having long been a taboo, monetizing debt seems to have proven itself a viable option under certain circumstances; namely when the long-term inflation outlook is subdued, the risk of currency depreciation appears low or, more generally, the willingness of the public to accumulate non-interest-bearing cash is robust. A strong net foreign asset position of countries adds to this robustness because it tends to increase foreign demand for the local currency. Switzerland is certainly an economy that fulfills these conditions, although its low level of government debt makes this less relevant. Japan is a much more relevant case given its very high level of government debt.

The Japanese economy has been characterized by low growth and deflation since the 1990s. Repeated fiscal stimulus programs as well as the prolonged efforts of the Bank of Japan (BoJ) to generate inflation have so far at best seen modest results. Meanwhile, as a consequence of its large-scale purchases of government debt, the BoJ holds approximately one third of its government's outstanding debt (see **Figure 4**). Much of the remainder is held by large Japanese institutional investors such as the Government Pension Investment Fund (GPIF), the world's largest pension fund, which in turn invests savings of Japanese households. As long as the latter are willing to hold increasing amounts of savings at zero interest, the BoJ can continue its QE policy and fund the government. A default by the government is effectively ruled out under these circumstances.

Obviously, this scheme is only viable as long as trust in the domestic currency is maintained. Structural issues that depress interest rates, particularly the high savings rates of the aging Japanese population, arguably make it easier for the BoJ to continue this policy. Effectively, Japanese investors do not seem to believe that there is another "safe" asset that can compete with government bonds at close to zero yields or, equivalently, cash. Of course, the risk that inflation expectations suddenly rise in Japan cannot be excluded, e.g. in the context of an oil-price shock or rising wages due to increasing labor shortages; that could drive up yields and render the debt path unsustainable. To maintain stability, the government would at that point need to drastically change its fiscal policy stance. So far, however, there have not been any indications that the bond market is becoming destabilized on account of the BoJ's aggressive monetary policy stance.

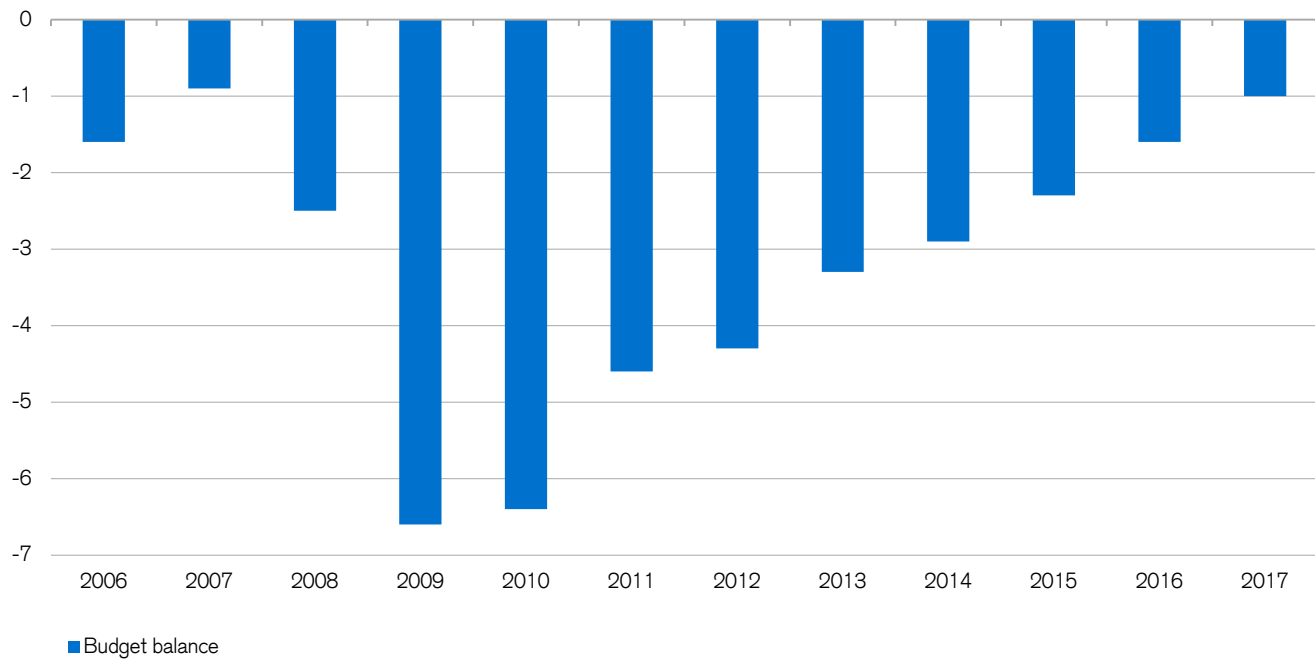
Eurozone: Solvency and default are political choices

The situation in the Eurozone differs from Japan's in various ways. On the positive side, the fiscal situation is far better than in Japan, with primary fiscal balances positive in many of the critical countries and close to balancing elsewhere (see **Figure 5**). This is due to substantial fiscal tightening in the aftermath of the financial and euro crises (**Figure 6**). In addition, the European Central Bank (ECB) also engaged in large-scale government debt purchases during its QE program (which lasted from 2015 until the end of 2018) and therefore also holds a considerable amount of government debt on its balance sheet (see **Figure 4**), which arguably reduces default risk.

However, in contrast to Japan, interest rates have not uniformly declined in the Eurozone. The main reason is that the bonds of individual governments are not mutually guaranteed by a fiscal union. Quite the contrary, the currency union's formal "no bailout clause" limits such support and also constrains the ECB in its lender-of-last-resort function. This, in turn, means that it is less likely for country risk premiums on sovereign debt to narrow. The October 2010 Deauville agreement between former French President Sarkozy and German Chancellor Merkel, which called for the private sector having to bear some losses in the case of sovereign-debt restructuring, may have added to those premiums as well. In principle, government debt in the Eurozone is thus more akin to state or municipal debt in other countries, including the USA and Switzerland, which are also not backed by either the federal government or the central bank.

Figure 6: Marked reduction in Eurozone budget deficit since the crisis

In % of GDP



Source: Eurostat, Credit Suisse

Even so, the no-bailout rule has been softened to some extent – first by the rescue of Greece and then by the launch of the ECB’s QE program, which effectively also supported government debt, although not just that of fiscally fragile countries (the ECB also bought government debt of fiscally strong countries by purchasing debt in proportion to the member countries’ capital shares in the ECB). A more formal, albeit limited, lender-of-last-resort function was agreed upon after ECB President Draghi’s famous 2012 intervention that the ECB would “do whatever it takes to preserve the euro.” This is the so-called “Outright Monetary Transactions” (OMT) scheme, which allows the ECB to support sovereign debt of individual member states under certain conditions, notably fiscal-policy tightening and the implementation of structural reforms.

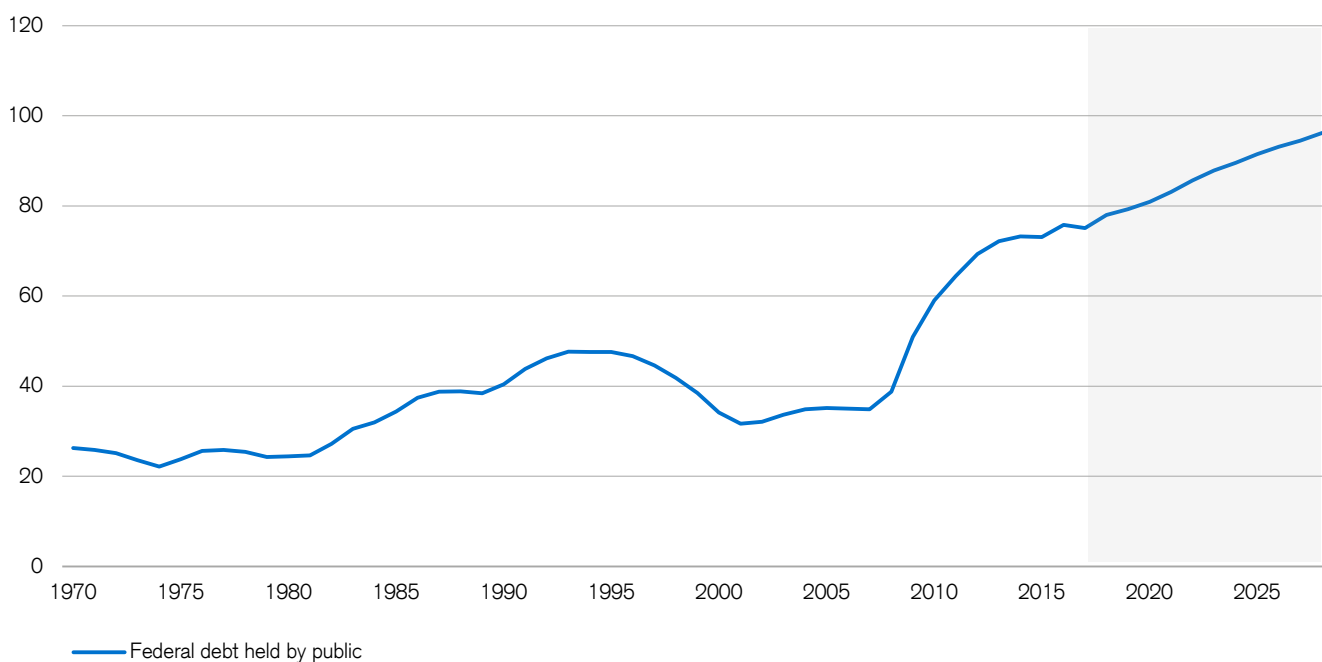
While the OMT program was formally approved by the European Court of Justice in 2015, for a government to actually obtain OMT support from the ECB would require difficult political choices. In particular, highly unpopular austerity measures would likely be required, and such commitments are usually only forthcoming when market pressures are very intense. In other words, governments would likely only take refuge in an OMT program in the event of a financial crisis, i.e. once markets assign a positive probability to a default, e.g. if a government threatened to leave the euro and to redenominate its euro-

denominated government bonds (which is equivalent to default). This demonstrates that the lender-of-last resort function still remains fairly weak in the Eurozone.

While we believe that Eurozone governments are very unlikely to opt for euro exit given the dire consequences for domestic savers, a deliberate political decision of a euro member to default still cannot be ruled out completely. Of course, the stance of other member states would also influence the outcome – a decision to support fiscally weak governments would also generate political strains in the strong countries. Ultimately, sovereign default in the Eurozone would likely be the outcome of a political “game of chicken” gone awry. Assessing the risk of such a political “accident” occurring is thus a least as important as undertaking quantitative debt sustainability analyses. Indeed, as recent developments in Italy show, political shifts in an anti-euro direction have led to a marked spike in bond yields, without economic fundamentals having changed meaningfully.

Figure 7: US government debt is expected to rise significantly over the next decade

Federal debt in % of GDP



Source: FRED Economic Data, Congressional Budget Office (CBO), Statista Open source, Credit Suisse

USA and UK: Currency declines instead of debt crises?

Both the US and the British central banks also purchased significant amounts of domestic sovereign debt in order to support the economic recovery after the financial crisis. However, the US Federal Reserve began reducing its holdings of government debt in the autumn of 2017, and has since raised interest rates multiple times. At the same time, the US government moved to cut taxes with the result that the fiscal deficit has widened considerably. The combination of tighter monetary policy and easier fiscal policy has boosted interest rates, thus essentially reducing the sustainability of US government debt. Indeed, the US Congressional Budget Office now projects a significant upward trend in the ratio over the coming years (**Figure 7**).

With all US government debt denominated in domestic currency, the risk of an outright US government default is nevertheless minimal. After all, the Federal Reserve could, in principle, be forced by the government to provide funds to the US Treasury in order to refinance its debt. However, such a development would likely cause a significant loss of confidence in the US dollar internationally, leading to a sharp decline of the dollar in foreign-exchange markets. It might also lead to a downgrade of

US government debt by rating agencies. In any case, the strong US reliance on capital inflows to cover the country's large current account deficits suggests a considerable vulnerability of the US dollar.

A somewhat different scenario that is becoming more probable is a slowdown in US growth, or possibly even a recession, as a result of the fading fiscal impulse and tighter monetary policy; the decline in US bond yields and the flattening of the US yield curve are pointing in this direction. While the decline in bond yields of course enhances the sustainability of debt, slower growth works in the opposite direction. Moreover, if the Federal Reserve responded to such economic weakening by easing policy, the US dollar could well depreciate quite significantly. That would boost US inflation and result in stagflation. In both scenarios, losses would be imposed on foreign holders of US government debt, but without an explicit default. With the dollar depreciation boosting inflation, the Federal Reserve would however find itself in a very difficult situation unless the US Congress moved toward fiscal consolidation. Whether the two political parties would find sufficient common ground to restore fiscal sustainability looks quite unlikely from today's vantage point. Not surprisingly various US political leaders have therefore pointed to US government debt as the greatest threat to US national security.

The UK is in a somewhat similar position to the USA, although the government has done much more to reduce the deficit, which is currently running at only about 2% of GDP. Interest payments are also less burdensome than in the USA (see Figure 2). The fact that the weighted average maturity of UK government debt stands at about 15 years (ten years longer than in the USA) also reduces sovereign vulnerability. At the same time, the UK current account deficit continues to run at about 3.5% of GDP, which makes the British pound (GBP) vulnerable to setbacks. A negative shock in the UK, particularly a “hard” Brexit, would quite likely trigger a further depreciation of the pound, which would in turn lead to higher inflation and could boost UK yields. However, an outright default of the UK government seems almost as unlikely as the US government defaulting, given the ability of the Bank of England to act as a lender of last resort. But if a hard Brexit were to be followed by a period of fiscal and monetary easing, financial market stress could become quite severe in the UK as well. A soft Brexit would, conversely, contribute significantly to reducing the risk of stress in the UK Gilt market and the GBP exchange rate.

Defaults unlikely, an eventual return to QE quite possible

Our analysis suggests that sovereign default risk remains limited in the advanced economies because central banks should be able to act as lenders of last resort in an emergency, especially since government debt is denominated in domestic currency. A possible exception is the Eurozone in which the ECB is only allowed to provide support to governments under stringent conditions. A government such as Italy’s could therefore, in principle, decide to opt for a redenomination of its debt into a weaker currency and thereby try to rid itself of debt. However, given the serious damage this would do to domestic investors, the likelihood of such a choice seems very low in our view. In some countries, including the USA and UK, we have argued that fiscal policies that seem to be on an unsustainable path raise the risk of significant currency devaluation rather than default. Of course such devaluations would impose losses on foreign debt holders.

A formal restructuring of government debt remains a theoretical possibility of course, also in advanced economies. It could occur, for example, if political pressure to limit intergenerational transfers mounts – the largest component of fiscal spending in most advanced countries consists of social spending and such spending is also the key driver of any future build-up in debt. To alleviate this problem, explicit restructuring of debt would nevertheless be a rather crude

measure. Indirect forms of debt rescheduling (e.g. in the form of reducing transfers to the elderly or increasing the retirement age) would support government debt markets instead of disrupting them.

Risk scenarios: Rising real yields more worrying than slower growth or deflation

In the absence of such policy adjustments, the risk of markets worrying increasingly about debt sustainability cannot be ruled out. This will ultimately depend on the willingness of investors to hold such assets at interest rates that are sufficiently low to prevent debt moving onto an explosive path. So far, indications are that investors are indeed willing to do so: yields on government bonds have only moved up slightly in the USA and UK, but generally remain extremely low in both nominal and real terms, suggesting that investors simply do not regard other assets as viable alternatives in terms of expected risk-adjusted returns.

If the global economy were to slow further, or even enter recession, yields would likely decline even further; lower rates would then offset lower growth and render debt sustainable. Such a development would likely also reawaken the risk of deflation. QE might then need to be revived to fund government spending and support the economy. That would push debt levels up even further while once again postponing defaults or restructuring.

A potentially more worrying risk scenario than slow growth and/or deflation would be an upward shift in real interest rates. One US economist has recently suggested that such an increase could come about if the significant (ex ante) savings surplus being generated by China in particular were to dissipate. This would lower China’s external surplus and thereby weaken demand for global government bonds, especially US Treasuries. As such a shift would come about in the context of lower, rather than stronger global economic growth, the impact on debt sustainability would be especially deleterious. In such a scenario, higher risk bonds would, of course, be affected even more negatively than government bonds. Moreover, such an exogenous shift in real yields could only be offset to a very limited degree by monetary easing. Only fiscal tightening would be able to lower yields, but at the cost of lower economic growth that would, in turn, weaken risk assets.

TARGET2 imbalances: Not a sign of a heightened default risk in the Eurozone

Maxime Botteron

TARGET2 is a payment system owned by the Eurosystem, i.e. the European Central Bank (ECB) and all the national central banks of the European Economic and Monetary Union (EMU). TARGET2 settles payments related to both the Eurosystem's monetary policy operations as well as commercial transactions. In the buildup to the Eurozone crisis, imbalances increased within the system, as the Eurozone "periphery" increased its borrowing from the core. These imbalances receded in the aftermath of the crisis, but began to increase again in 2015. This has been interpreted by some as an increase in default risk within the EMU, although it coincided with a reduction in fiscal imbalances within the Eurozone, as discussed above.

In fact, the rising imbalances reflect capital flows within the Eurozone banking sector. To put it simply, banks in European "periphery" countries, including Italy, Spain, Greece and Portugal, have processed far more payments in favor of banks in "core" European countries (especially banks in Germany) than "core" European banks have done in their favor. These transactions are not made directly between the banks, but via the Eurosystem. For example, a Spanish bank that makes a payment to a German bank will proceed via Banco de España, the Spanish central bank. Banco de España will have a claim on the Spanish bank, while the Eurosystem will have a claim on Banco de España. On the other hand, the German bank will have a claim on the German Bundesbank, which in turn will have a claim on the Eurosystem. The TARGET2 imbalances reflect this mechanism: the Eurosystem owes the German Bundesbank EUR 928 billion (as of October 2018), while the Banca d'Italia and Banco de España owe EUR 490 billion and EUR 397 billion to the Eurosystem, respectively. Due to technical factors related to the ECB's asset purchase program, the ECB itself owes the Eurosystem EUR 246 billion (see **Figure 1**).

Recent increase in imbalances due to QE

The reason why TARGET2 imbalances have increased since 2015 is largely a side-effect of the ECB's quantitative easing (QE) policy. The creation of central bank money in the Eurosystem is largely decentralized, meaning that each national central bank creates money (i.e. provides liquidity) to the benefit of its national banking system. When aggregate liquidity in the Eurosystem is larger than total liquidity needs, TARGET2 imbalances can grow. In 2011/2012, excess liquidity created by credit operations of the Eurosystem "fled" the more vulnerable countries and was accumulated in the more solid banking systems, i.e. southern Europe experienced deposit outflows. Between 2015 and 2018, the purchases of assets by the ECB in the context of QE once again raised excess liquidity, leading to a renewed rise of TARGET2 imbalances. Each national central bank purchased bonds of its respective country from investors across the world, but commercial bank (intermediaries) selling the securities were not necessarily located in the home country. The bulk of the proceeds from such purchases were deposited in German banks which saw their claims on the Eurosystem rising, thus explaining the rise in Germany's TARGET2 balance. The rise in the imbalances in the TARGET2 system that prevail today thus largely reflect the distribution of commercial banks' excess reserves within the EMU and not the fiscal imbalances in the system. It should be noted that as QE was wound down within the Eurozone in 2018, these imbalances stopped growing. A shrinking of the ECB's balance sheet would thus reduce excess liquidity and hence TARGET2 imbalances.

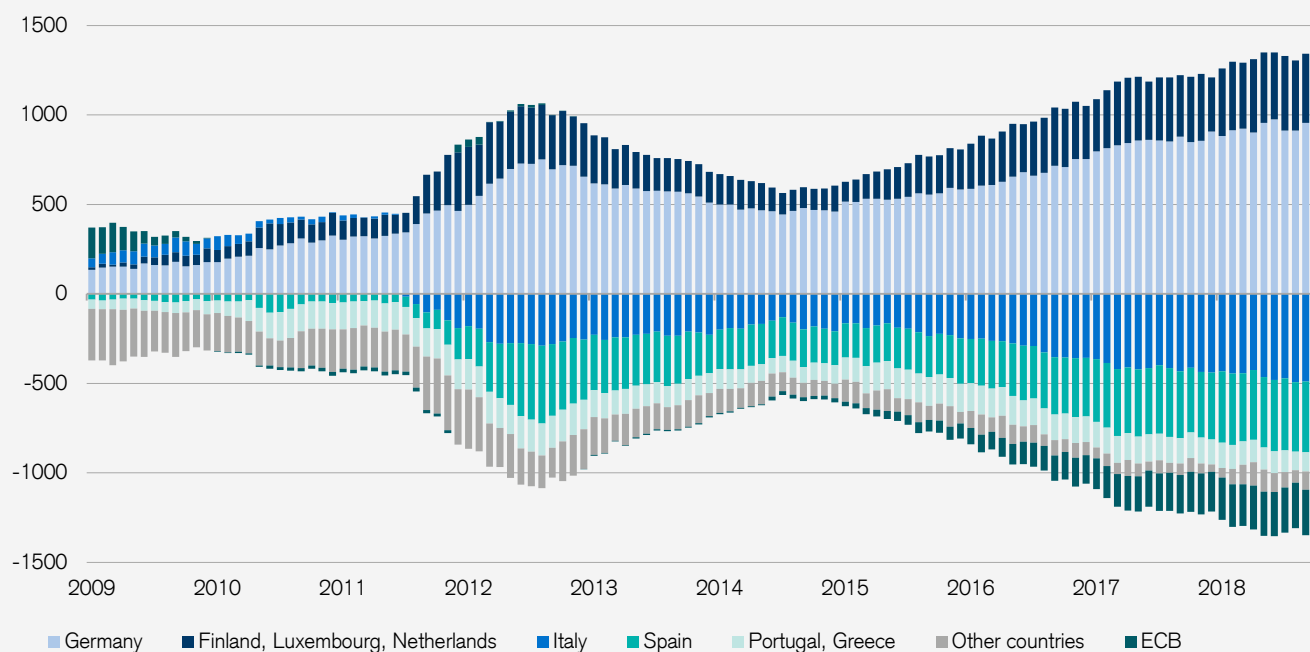
What if someone leaves after all?

It is still worthwhile considering what would happen in case a country left the Eurosystem, e.g. as consequence of the decision to exit the euro. In a letter, Mario Draghi, President of the ECB, stated in January 2017 that “if a country were to leave the Eurosystem, its national central bank’s claims on or liabilities to the ECB would need to be settled in full.” Hence, in the event that Spain or Italy (or any country with a TARGET2 liability) were to leave the Eurosystem, TARGET2 liabilities would clearly need to be included in the costs of leaving the EMU. In the event that a country with a TARGET2 liability were to leave the Eurozone and default on its TARGET2 liability, the loss would be shared by the Eurosystem overall according to a distribution key, and not specifically by countries with TARGET2 claims, such as Germany. Moreover,

TARGET2 liabilities would be netted with potential claims on the Eurosystem. In the case of Italy, for example, Banca d’Italia has a claim of EUR 47 billion on the Eurosystem related to the allocation of euro banknotes within the Eurosystem, while the German Bundesbank has a liability of EUR 395 billion. This difference results from the fact that the Bundesbank has issued many more banknotes than its capital key (i.e. its official share in the Eurosystem) would suggest, whereas Banca d’Italia has issued fewer banknotes. Even if loss-making “strong” central banks such as the Bundesbank could probably recapitalize themselves in the case of an exit of a weaker member, such an event would nevertheless cause a major crisis in the system.

Figure 1: TARGET2 imbalances have increased until recently, despite fiscal consolidation

TARGET2 balances in EUR billion



Source: Thomson Reuters, Credit Suisse





3. Banks – after ten years of “repentance,” new “sins”?

Oliver Adler and Maxime Botteron

Ten years ago, low-quality “toxic” assets and the shortage of capital combined to bring the banking system in the USA and Europe to the brink of collapse. In the Eurozone, the high exposure of banks in the “periphery” countries to fragile government debt triggered a second serious crisis after 2010. Deleveraging in combination with a moderated overall risk profile of banks’ balance sheets has since reduced systemic risk in key countries. However, some new areas of risk have emerged, partly on the fringes of the formal banking sector. In contrast to the pre-crisis period, monetary policy tightening now represents less of a threat; in fact, banks would on balance benefit from monetary policy normalization.

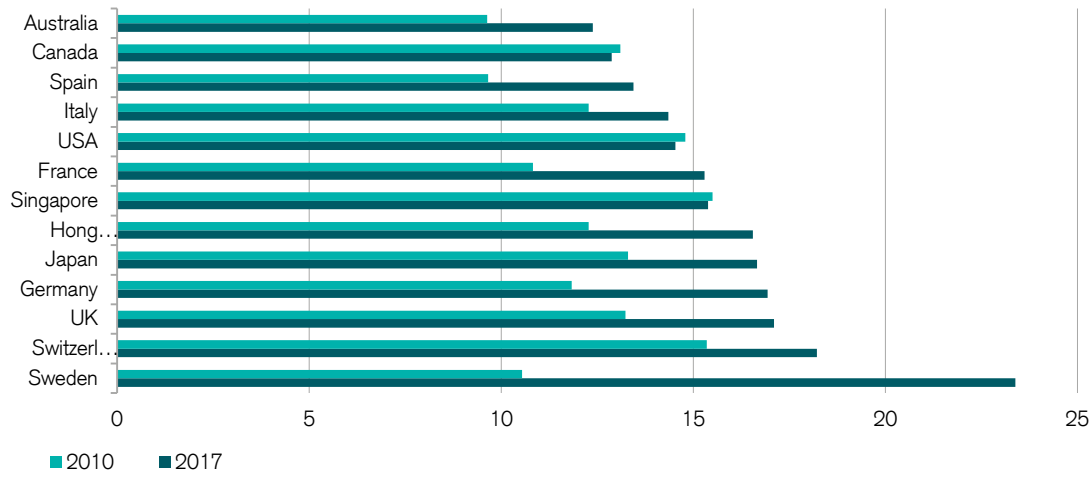
Ten years of risk reduction (“repentance”)

To comply with new regulatory prescriptions, credit institutions in most countries have increased their capital positions since the crisis (**Figure 1**), allowing them to better absorb potential losses. At the same time, funding via bond markets has been reduced until recently (**Figure 2**), which is another indication that banks have deleveraged, in contrast to non-financial corporations. In addition, they hold more high-quality liquid assets, particularly in the form of central bank deposits (**Figure 3**). These make them less reliant on volatile short-term funding in markets and should shield them from losses as the value of these liquid assets is expected to remain stable in the event of a crisis. Furthermore, in countries hit by the Global Financial Crisis and under pressure from regulators and investors, banks have generally been in risk-reduction mode since 2008. By now, most regulators acknowledge that banks have become noticeably sounder and the markets’ risk assessment of banks, as measured by bond spreads for example, has also improved substantially.

Not all banking segments have recovered at the same pace, however, and regional differences in the degree of improvement are still substantial. Improvements have been more marked in the USA because the pressure from the Federal Reserve and other regulators to rapidly recapitalize was greater and bad loans were therefore written off more aggressively (**Figure 4**). The more rapid improvements in the USA were reflected in a faster recovery of profits and stock prices in the years following the crisis. In much of Europe, forbearance by regulators was more generous, which delayed the “cleanup.” This is particularly true for Italy. In contrast to Spain, but also Switzerland, the recovery of Italy’s banks was also delayed because the government failed to set up a “bad bank” in a timely manner. Italian banks also remain more exposed than others to sovereign risk, as they continue to hold significant volumes of Italian government bonds (ca. 10% of total assets.) The recent conflict between the Italian government and the European Union over fiscal plans brought this risk to the fore. Since the launch of the Banking Union and its Single Supervisory Mechanism, however, pressure on banks to strengthen their balance

Figure 1: Capital strength has generally increased

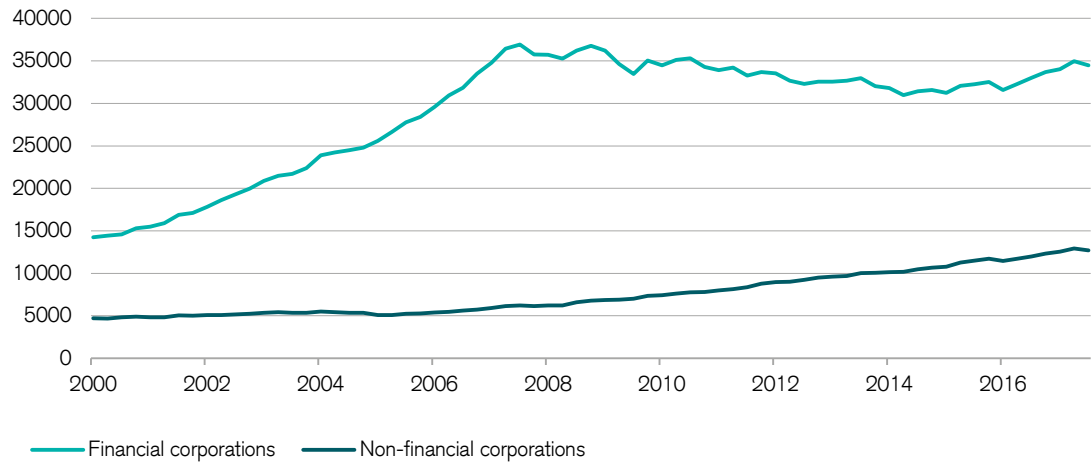
Regulatory capital as a percentage of banks' risk-weighted assets



Source: IMF Financial Soundness Indicators, Thomson Reuters, Credit Suisse

Figure 2: Banks have until recently reduced debt exposure

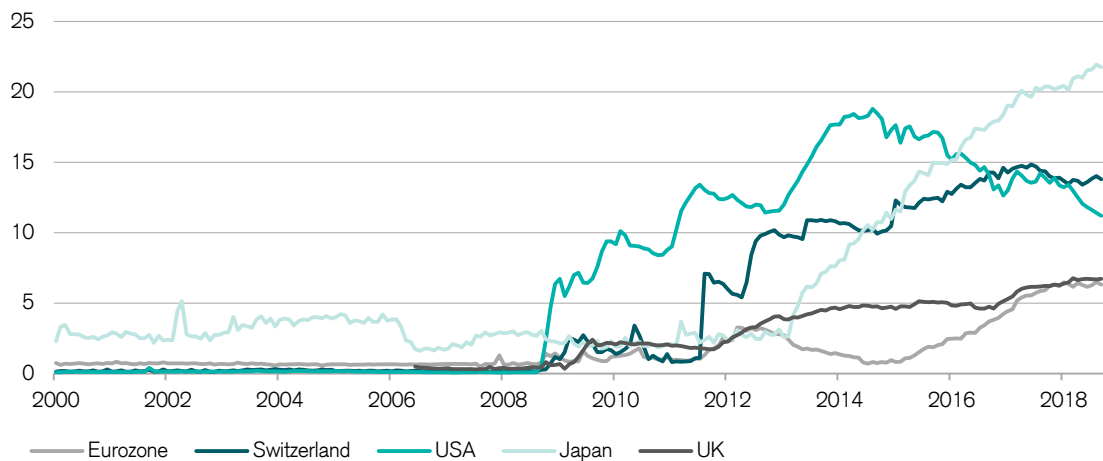
Debt securities outstanding, in USD billion



Source: BIS, Credit Suisse

Figure 3: Higher and more stable liquidity

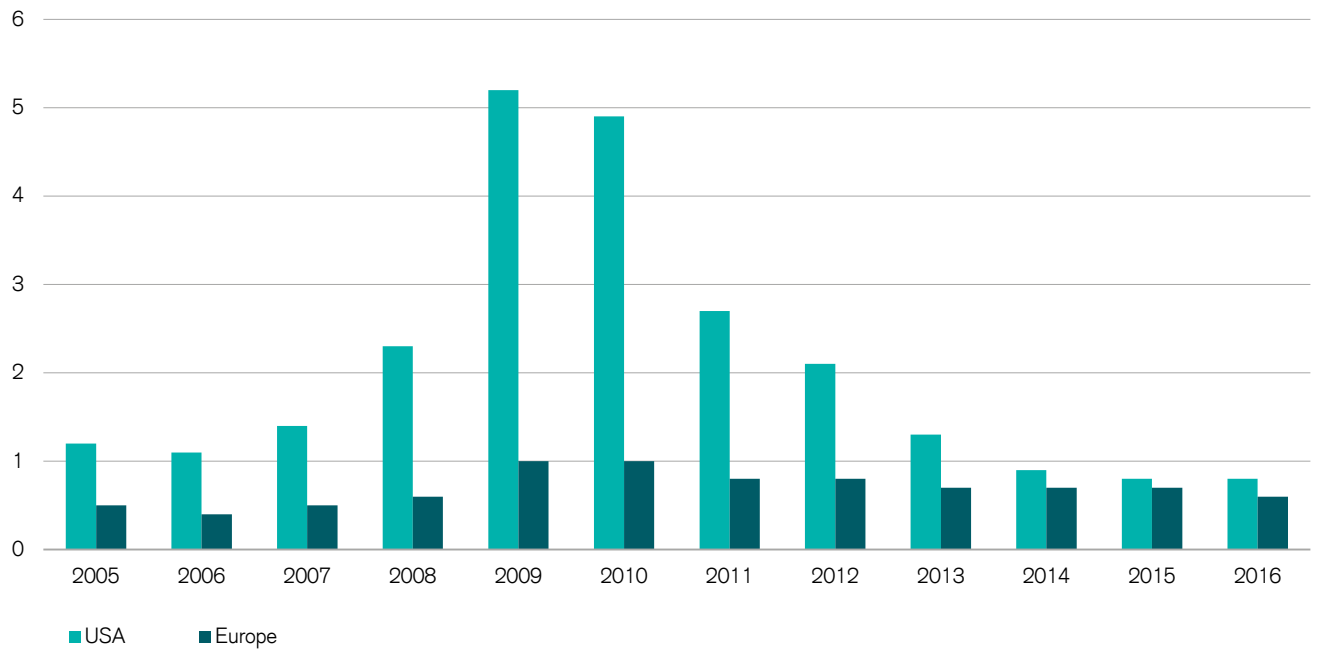
Deposits at the central bank, in % of all assets



Source: Thomson Reuters, Credit Suisse

Figure 4: US banks wrote off bad loans much more aggressively

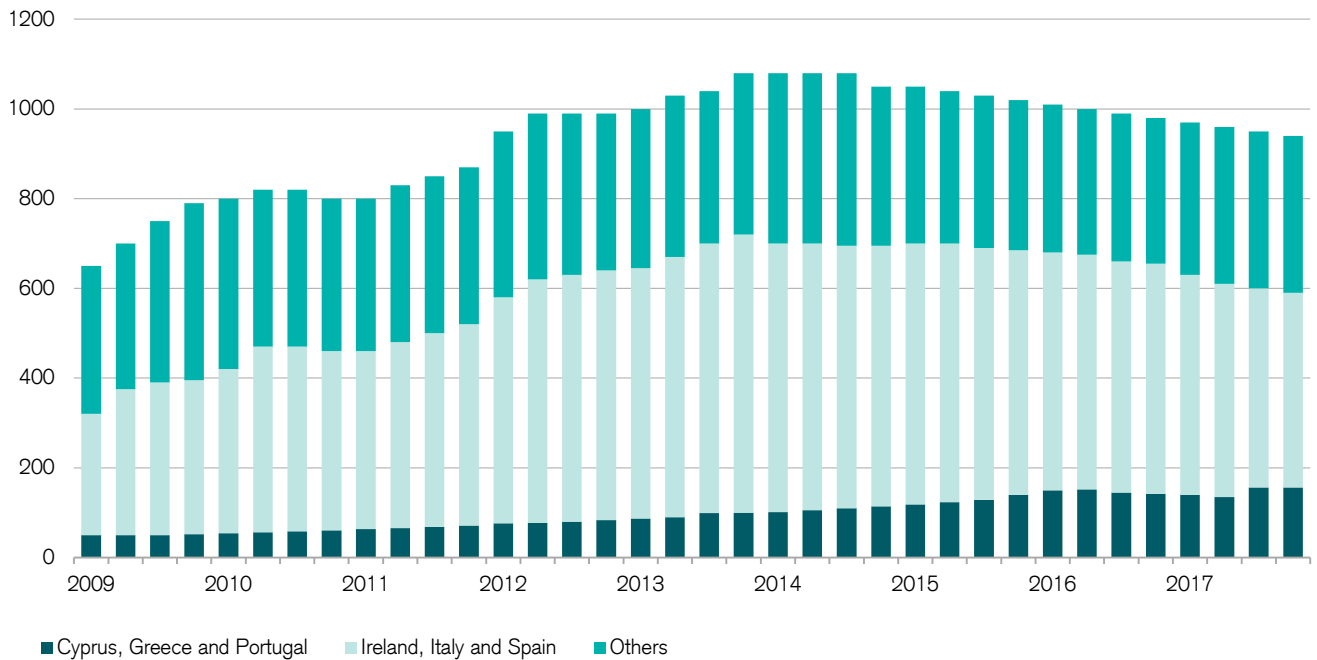
Average write-offs relative to loan volumes, in %



Source: The Boston Consulting Group, Credit Suisse

Figure 5: Since 2015, bad loans have also declined in the Eurozone

In EUR billion



Source: IMF Global Financial Stability Report 2018

sheets has increased across the Eurozone and bad loans have also declined (**Figure 5**). In sum, since holding risky assets requires banks to hold more (costly) capital, banks have reduced them, as shown by the drop in the ratio of risk-weighted assets to total assets in the aftermath of the financial crisis in developed markets.

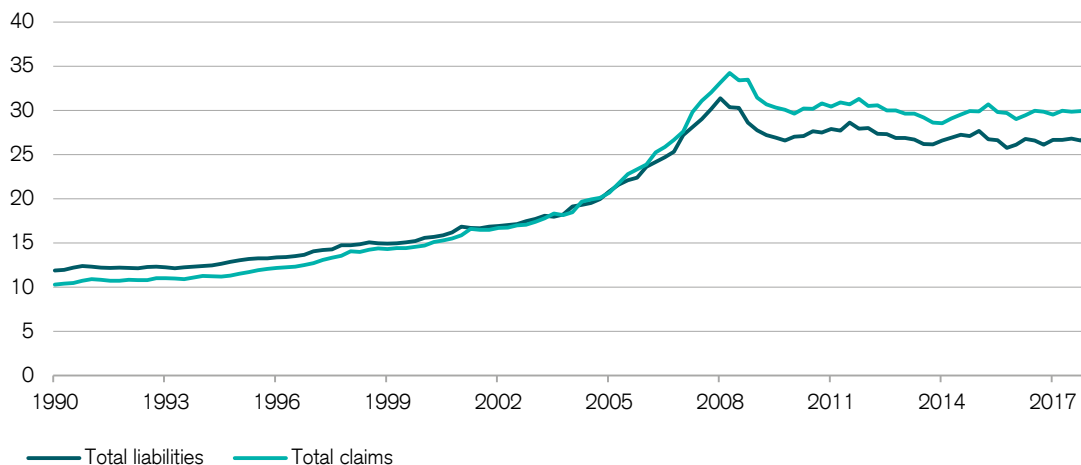
A further measure of reduced risk exposure by banks is the substantial slowdown in cross-border borrowing and lending (**Figure 6**). While, in principle, cross-border banking is not necessarily any riskier than domestic banking as long as the same lending standards are applied and the country and currency risks are well managed, surges in cross-border lending and investment

have typically been associated with greater risk exposure as they often reflect a deliberate search for yield. Indeed, such lending grew rapidly in the years prior to the Global Financial Crisis. Since then, the volume of outstanding cross-border assets and liabilities has declined and stagnated in absolute terms. Relative to Gross Domestic Product (GDP), lending has declined more significantly. This trend has been quite pronounced in the Eurozone, UK and Switzerland (**Figure 7**).

In the Eurozone, banks retrenched in the course of the crisis and their cross-border business (as measured by cross-border claims) declined by more than 20% for the “core”

Figure 6: Cross-border lending has stagnated since the crisis

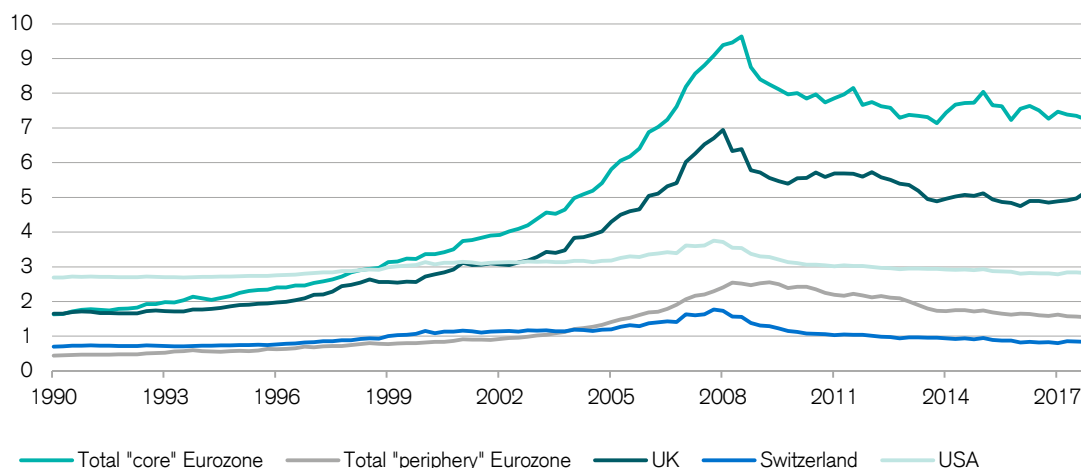
Total cross-border liabilities, in USD trillion



Source: BIS, Credit Suisse

Figure 7: European and US banks reduced cross-border lending

Cross border claims of reporting banks in selected markets, in USD trillion



Source: BIS, Credit Suisse

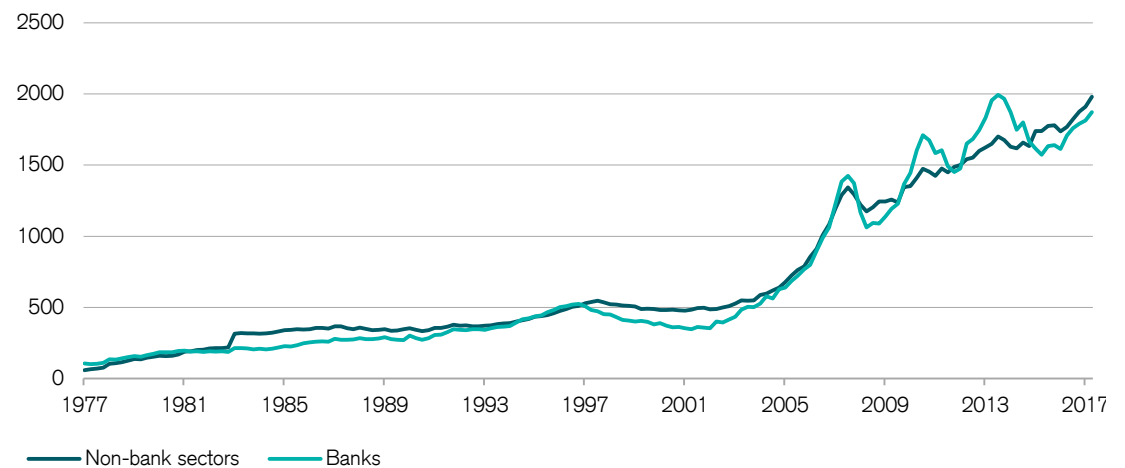
Eurozone countries and by almost 40% in the periphery countries since Q2 2008. **Figure 7** shows that cross-border claims of banks based in the London financial center, as well as those of the large Swiss banks, surged in the global credit boom prior to the Global Financial Crisis, mostly in the form of investments in US housing-related assets. After the collapse of this credit bubble, banks in these countries reduced their foreign exposure. The retrenchment has been particularly pronounced in Switzerland, where banks have almost halved their foreign claims.

In contrast, cross-border lending by banks¹ to emerging markets, although interrupted briefly in the wake of the financial crisis, has continued to rise in the years since the crisis, with lending roughly divided between banks and non-banks (**Figure 8**). A closer look at the data reveals that the bulk of lending, especially to banks (probably also in the form of acquisitions of local banks or funding of subsidiaries), went to the Asia Pacific region (**Figure 9**). Cross-border claims on banks in emerging markets have almost tripled since the end of 2007, while cross-border claims on non-banks

1. Banks located in one of the 47 BIS reporting countries.

Figure 8: Lending to emerging markets continued to expand after a short-lived dip

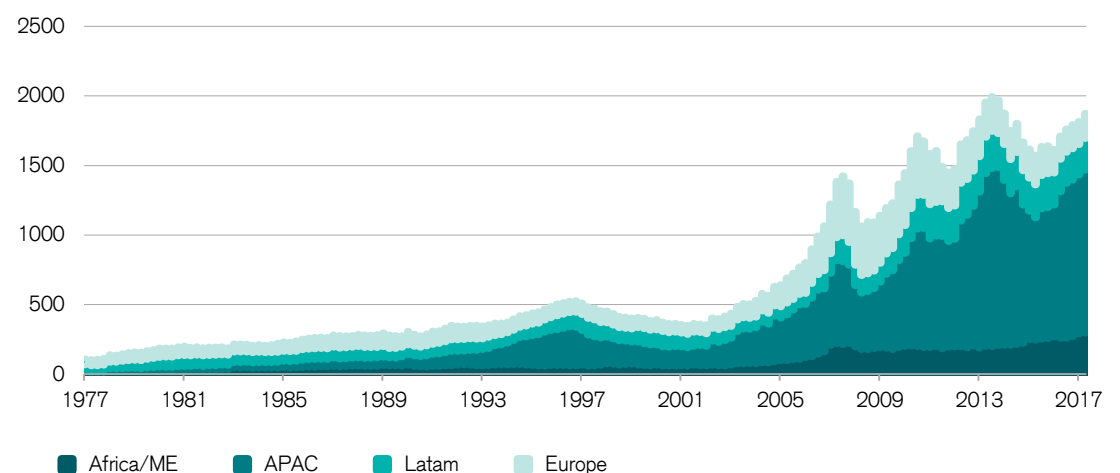
Cross-border claims of banks in BIS reporting countries on emerging markets in USD billion



Source: BIS, Credit Suisse

Figure 9: Interbank lending mainly to Asian emerging markets

Cross-border claims of banks in BIS reporting countries on emerging markets in USD billion



Source: BIS, Credit Suisse

have risen by almost 130% over the same period. Growth was slower and outstanding claims are smaller in Latin America and Africa/Middle East, while cross-border claims to Emerging Europe declined.

Given that the majority of Asian emerging markets have continued to exhibit fairly strong economic growth as well as limited external imbalances, the risk to banks from this lending activity should, on the whole, not raise stability risks inordinately. In fact, the stresses that have arisen in emerging markets in the past year have mostly been outside the Asian region. Meanwhile, the exposure of banks to countries where financial stability is generally regarded as less assured remains limited. Even in countries where banks have a fairly high exposure to emerging markets, it is limited relative to the overall balance sheet. The exposure of Spanish banks to Turkey and Brazil, for example, represents only 2% and 4% of their overall assets, respectively. British banks have more exposure to China, but this is still slightly less than 2% of their assets. This suggests that contagion risks for banks in advanced economies from stresses in emerging markets are now likely to be much lower.

Not only has asset quality improved, as mentioned above, but the banks' funding (i.e. the liability side of the balance sheet) has also stabilized. As noted, banks have increased deposits as a source of funding (**Figure 10**), which is more stable than interbank lending or short-term borrowing. While Japan already had a relatively high and stable deposits-to-

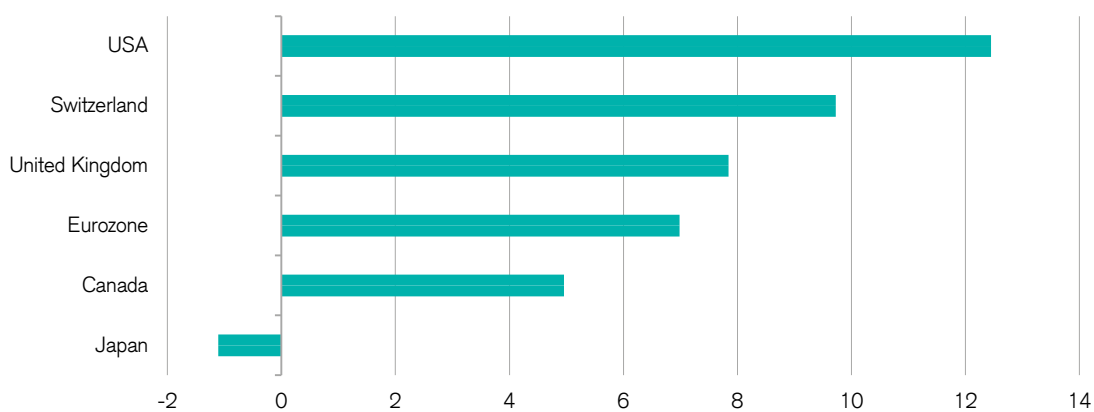
liabilities ratio before the crisis, the funding situation was initially far more fragile in the Eurozone. With banks suffering deposit outflows, the European Central Bank had to provide banks with cheap funding to support bank lending. However, funding conditions have improved significantly in the past few years, and banks are now much less dependent on central bank funds. That said, the liabilities of banks in Portugal, Italy and Spain still include more than 5% of central bank funds, compared to less than 2% for banks in France and Germany.

Banks have also reduced off-balance sheet items and notably derivatives. Outstanding notional amounts dropped by 25% between end-2013 and end-2017 (**Figure 11**). The decline has been particularly marked in credit default swaps – instruments which protect against the default of a borrower. Since end-2008, the outstanding notional amount has fallen by almost 90%. While notional amounts are still remarkably high (more than USD 500 trillion), they say little about the effective risk exposure. First, the bulk of derivatives are interest rate swaps. Counterparties entering these derivatives agree to exchange interest rate payments based on a notional amount, but the risk is much lower than the notional amount. Second, once netted, derivative positions are much smaller and are reported on banks' balance sheets.

A final, but important, factor reducing risks has been the recovery in bank profitability. Recurring profits also provide an important buffer in the case of a potential shock. That said, the

Figure 10: A larger share of banks' liabilities consists of deposits

In percentage points

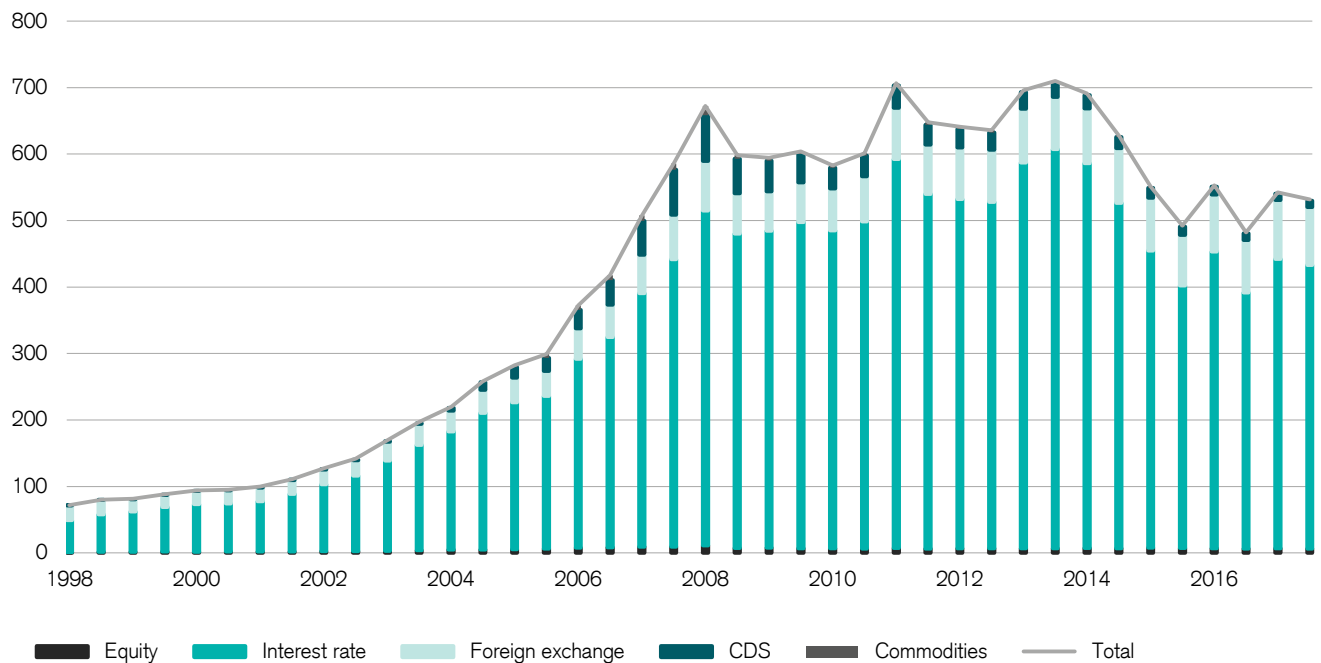


■ Changes in the ratio of deposits to total liabilities between December 2007 and June 2018

Source: Thomson Reuters, Credit Suisse

Figure 11: Exposure to derivatives has dropped

Notional amounts outstanding, in USD trillion



Source: BIS, Credit Suisse

recovery in bank profits has been very uneven across and within countries. In general, profits of US banks have recovered far more substantially than those in Europe, which is arguably due to the above-mentioned fact that the bank cleanup proceeded much faster in the USA than in Europe. Moreover, the support by the central banks in the form of very easy money was much more decisive and came earlier in the case of the Federal Reserve than, say, in that of the European Central Bank. Economic growth performance was, of course, also much better in the USA than in many European countries in the post-crisis years, which helped speed up the profit recovery. Finally, the earlier move by the Federal Reserve to raise interest rates also supported the profitability of US banks' maturity transformation business in contrast to the Eurozone, where extremely low rates continue to hamper the profit recovery.

Because leverage is now much lower and asset quality higher, a rise in interest rates would now benefit banks, in contrast to the pre-crisis years where the rise in rates was a key trigger for the crisis. However, the chances that European banks will any time soon be provided that support in any meaningful way seem quite low.

New "sins"? Selective increase in risk exposure...

While banks in key regions have become more resilient, risks may have been building in other regions and certain sectors. A somewhat simplistic approach to measure the evolution of risks emanating from the banking system is to look at how bank balance sheets have grown relative to the respective economies. Credit growth was more or less in line with nominal GDP growth in the USA over the period from 2007 to 2017, and well below that in the Eurozone. In some other countries, however, credit growth has been far more rapid (Figure 12); these are generally countries where banking systems were not strongly exposed to the Global Financial Crisis or the Eurozone Debt Crisis.

While domestic credit growth has largely been in line with GDP in Japan, Japanese banks stand out in terms of the growth in their cross-border lending. More than 25 years after the country's housing and banking crisis, the financial strength of Japanese banks has improved substantially, with Japan running a persistent current account surplus. And, given the extremely low domestic interest rates, there has been a considerable incentive to recycle this surplus. However, assessing to what extent Japanese banks'

balance sheets are at risk from foreign shocks is difficult. Some Japanese banks may have provided funding to US non-bank financial institutions. A significant part of the increase of cross-border loans seems to have been to offshore centers, most likely in Asia, and from there, quite possibly, to other Asian destinations. It is difficult to ascertain how high the risk exposure is in these cases, but, in general, the risk metrics for Japanese banks have nevertheless remained quite stable. With the Japanese residential real estate market fairly stagnant, risk exposure has most likely not increased in this area. Of greater concern for Japanese banks, as for those in the Eurozone, is more likely to be the extremely low level of interest rates and the flat yield curve, which is hampering profitability.

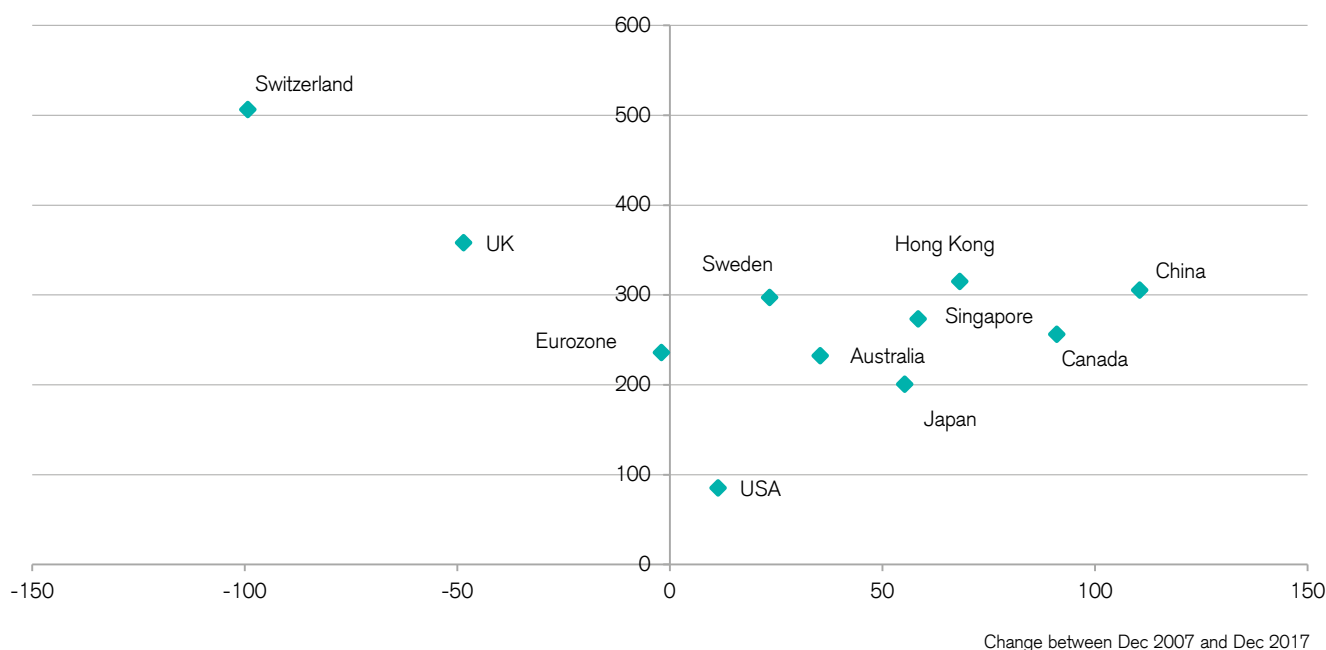
Some other, smaller, economies have also seen a rapid expansion of credit growth since the financial crisis. These include Canada, Sweden, Australia, Hong Kong and Singapore. On the one hand, cross-border lending has increased rapidly here as well. At the same time, domestic credit growth has been strong in some of these economies, notably Canada and Australia, and to a lesser extent Singapore and Sweden. To some extent, this lending has been related to the real estate booms in some of these countries (see Chapter 7 on real estate). The environment of

extremely lax monetary conditions prevailing for many of the post-crisis years did, of course, significantly stimulate the real estate sector and lending to it, including in diverse countries such as China (see Chapter 5 on China) and Switzerland. While the overall size of banks' balance sheets has shrunk in Switzerland due to the retrenchment of the large banks, domestic credit has expanded significantly faster than GDP, and private mortgage debt has risen sharply in contrast to countries such as the USA and a number of European economies where the real estate sector suffered a severe setback during the crisis. Arguably, new risks are thus more likely to emerge in some domestic lending markets than in the area of cross-border lending where previous stresses for banks emerged.

Over the last five years, leveraged loans have boomed (**Figure 13**). Leveraged loans are loans made to borrowers (in general large companies) with a higher default risk and generally with a floating rate. There are two types of tranches, the pro-rata and the institutional. The pro-rata tranches are held by banks, while the institutional tranches are invested in by institutional asset managers such as collateralized loan obligation (CLO) managers and pension funds. With the Federal Reserve tightening its monetary policy, leveraged loans have been popular among

Figure 12: Retrenchment in some, rapid expansion in other countries

Bank balance sheets in % of GDP and changes in percentage points



Source: Thomson Reuters, Credit Suisse

investors due to their floating rate feature, not least to protect against rising yields in longer maturities. While institutional investors (and CLO managers in particular) have been the main investors in leveraged loans, the issuance of pro-rata tranches has also been elevated. In addition, the share of so-called covenant-lite loans, i.e. riskier leveraged loans, has increased. Hence, for banks, leveraged loans would represent a risk in the event of a recession in the USA (the US market is much larger) or if the Federal Reserve were to tighten its monetary policy much beyond expectations, as both developments would be associated with higher defaults (see also Chapter 6 on corporate debt).

... and potential pressure points

While we have pointed to insufficient capital strength and toxic assets as key causes for the last banking crisis, the crisis was only actually triggered once the Federal Reserve had substantially tightened monetary policy beginning mid-2006. Bank risk and debt risks are thus intimately related to monetary policy developments. Should our base case materialize (i.e. the Federal Reserve raises interest rates by less than an additional 100 basis points in this cycle, implying that the real federal funds rate would barely exceed 1%), stresses in the US banking

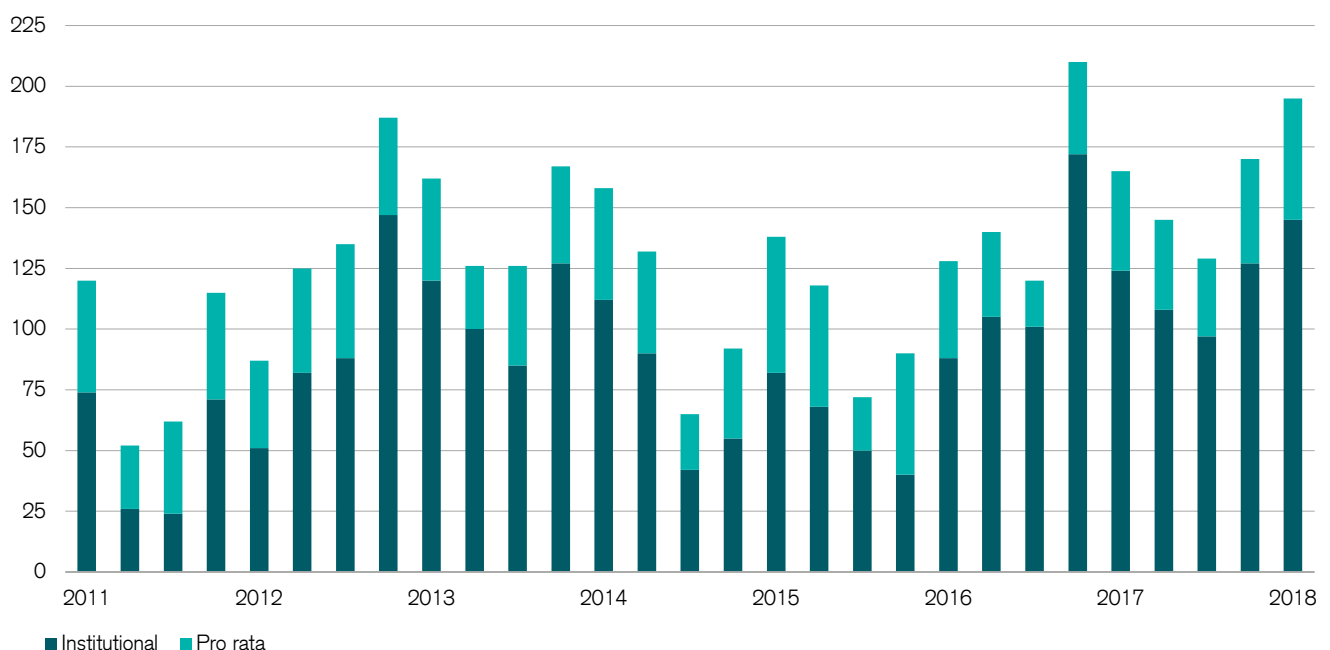
system, at least, should essentially remain limited even if a flatter yield curve reduces the profitability of the maturity transformation business. In other regions that are highly dependent on US dollar liquidity, but where currency stability is in doubt (i.e. a number of emerging markets), some stresses may still re-occur as developments in 2018 suggest.

It is not just the level of interest rates, but also the volume of US dollar liquidity required by banks that is likely to determine whether and to what extent stresses arise. The banks' need for US dollar liquidity is of course a function of the volume of USD-denominated credit outstanding. Moreover, liquidity needs are likely to be higher to support USD-denominated credit outside the USA. The US dollar is generally the default currency for key areas such as commodity and trade finance, and is often used as a funding currency by corporate borrowers, particularly in emerging markets. The outstanding volume of USD-denominated bank credit² is estimated at USD 17.5 trillion, which is more than the foreign

2. Defined as the cross-border and local USD claims of non-US banks, as well as the cross-border USD claims of US banks, according to the Bank for International Settlements (BIS) locational banking statistics by nationality of reporting banks.

Figure 13: Leveraged loan issuance has surged in the post-crisis years

US leveraged loan issuance (gross), in USD billion



Source: S&P Global Market Intelligence's Leveraged Commentary & Data (LCD)

and domestic assets of all banks in the USA combined (USD 16.7 trillion). However, US banks provide only about 12% of international US dollar bank credits, while the rest is being lent by non-US banks (**Figure 14**). While lower than before the crisis, growth of international US dollar bank credit has been solid over the last few years and, as noted above, Japanese banks have been particularly keen – and able – to lend US dollars. As a result, the demand for US dollar liquidity remains very high.

In the domestic US market, customer deposits are the main US dollar funding source of US banks. Non-US banks, however, do not have a large base of US dollar deposits and must therefore fund US dollar credits from other (often short-term) sources. US money market funds, as well as US corporates have been important funding sources for them. However, both have been impacted by recent reforms (the money market fund reforms and the US corporate tax reform), which have reduced their incentive to lend dollars to non-US banks. Activities of the US Treasury have had a similar effect as it has increased its borrowing from banks through the issuance of T-Bills. When the US Treasury keeps the proceeds from this borrowing on its account at the US Federal Reserve, the supply of US dollars available to banks diminishes. For these

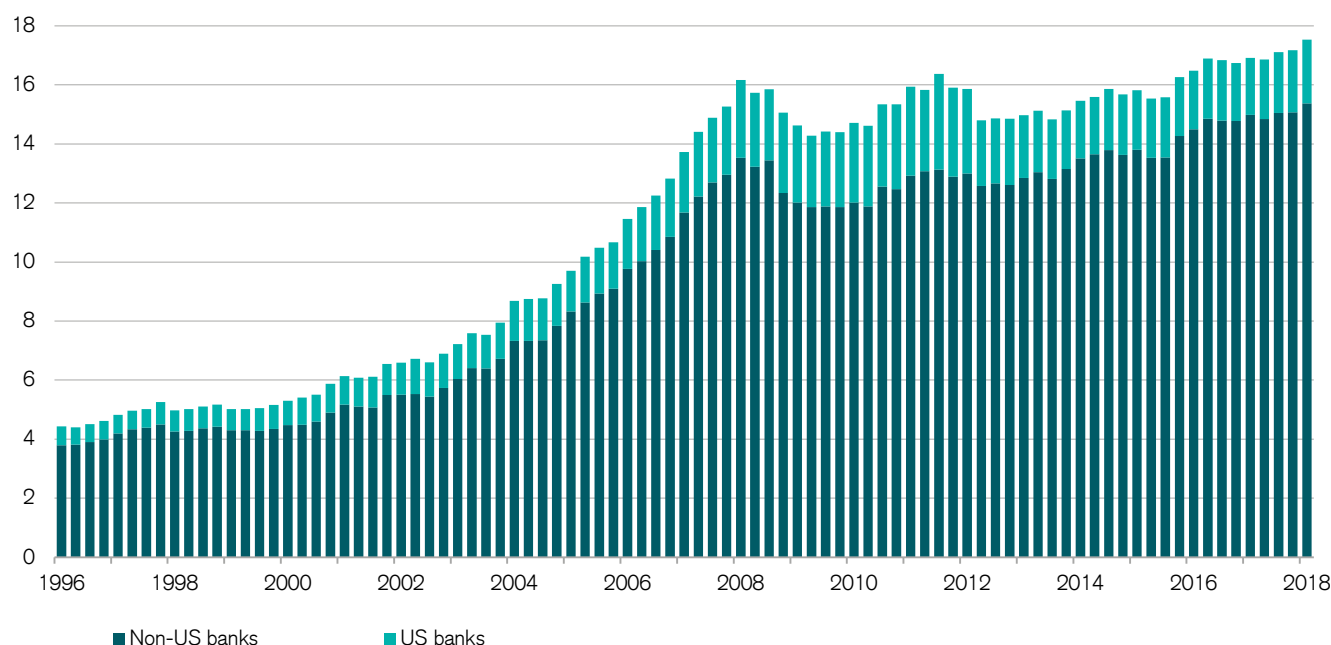
reasons, the supply of US dollars available to fund US dollar credit outside the USA has dropped and the borrowing cost for “international” US dollars has risen.

This increase has at times been visible in the widening of the spread between the 3-month USD Libor (the rate at which banks borrow unsecured funds from each other) and the 3-month Overnight Indexed Swap (OIS) rate, which is a proxy for the expectations for the US Federal Reserve’s policy rate and hence costs at which banks with access to federal funds (i.e. domestic banks in the USA) can borrow US dollars (**Figure 15**). An alternative for non-US banks is to borrow funds in local currency (or in another funding currency than US dollars) and swap these funds for US dollars. Owing to the international demand for US dollars, institutions that borrow US dollars using swaps must usually pay a premium, reflected in a so-called negative cross currency basis swap³ (CCBS). The CCBS is however volatile (**Figure 16**), so that these non-US banks can be confronted with sudden increases in their funding costs. In a context in which the US Federal Reserve is tightening its monetary policy through interest rate hikes

3. The premium for US dollar demand is translated into a negative CCBS

Figure 14: The international supply of US dollar bank credits is dominated by non-US banks

In USD trillion



Source: BIS, Credit Suisse

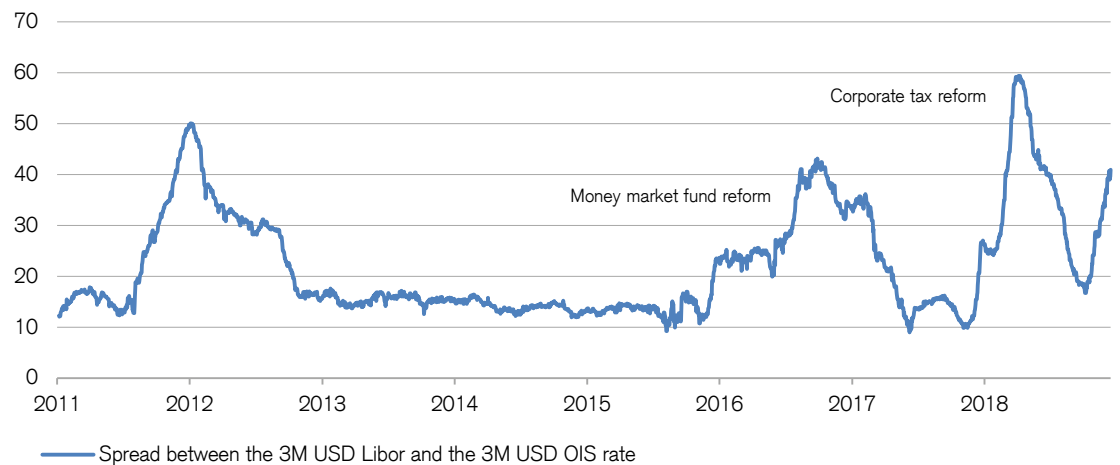
(which raise borrowing costs for both US and non-US banks), most non-US banks must currently pay an additional premium to borrow dollars. Big bank funding needs and Treasury bill issuances have lately led to a widening of the Libor-OIS spread again.

In its Global Financial Stability report dated April 2018, the International Monetary Fund pointed to the risk emanating from “thin” US dollar liquidity reserves of non-US banks, which, in addition to the volatility of US dollar funding costs for non-US banks, could exacerbate funding problems in the event of a crisis. That said, since the Global Financial Crisis, major

central banks have agreed on swap lines with the US Federal Reserve, allowing them to provide US dollars (at a premium) to their domestic banking system, thus somewhat mitigating the risk of US dollar funding shortages for non-US banks. It should also be noted that signs of stress in the US dollar funding market actually dissipated in the late summer of 2018. In the absence of major interest rate shocks due to Federal Reserve policy or a serious deterioration of asset quality due to, for example, a recession, funding stresses for banks should thus also remain contained.

Figure 15: Libor-OIS spread has widened recently

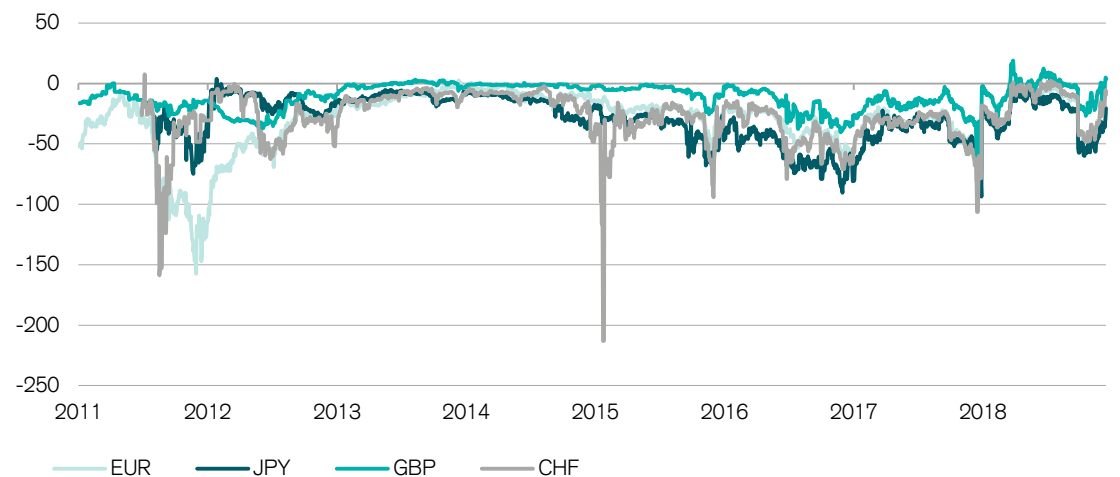
In basis points



Source: The BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 16: Large swings are not unusual for CCBS

3-month CCBS, in basis points

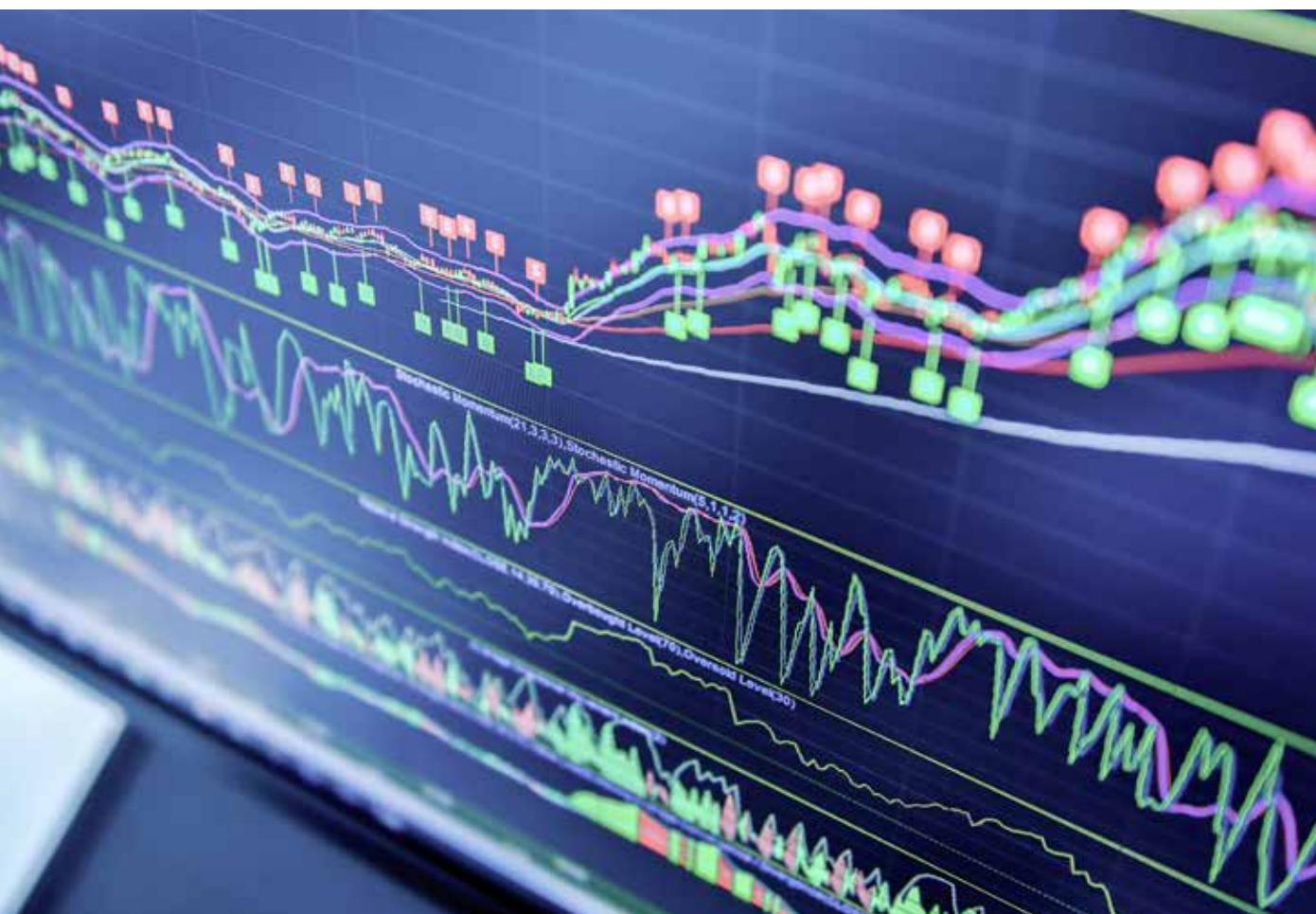


Source: The BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Conclusion: Bank leverage unlikely to trigger a new crisis

We have argued above that the risks residing in the banking systems of key regions, the USA and Europe in particular, have most likely diminished since the financial crisis due to a combination of stronger capital positions, retrenchment followed by a moderate expansion of balance sheets, better asset quality, and improved transparency and risk management. Cross-border exposure has also diminished in key markets and interbank lending has been fairly weak. Some countries have nevertheless seen a more rapid expansion of overall credit and/or cross-border lending. Moreover, in some of these countries, the expansion of credit has been associated with booming real estate markets, which could spell trouble in the future.

To what extent the risks specific to financial products that, in part, remain on bank balance sheets have diminished is difficult to ascertain. Similarly, it is difficult to know to what extent lending by non-banks ("shadow banks") has expanded and what types of risks reside there (see following box). While the overall liquidity buffers of banks have increased due to a combination of tighter regulations and expansionary monetary policy, the tightening of monetary policy by the US Federal Reserve in particular could still cause stresses in the banking system, especially for non-US banks. However, as long as this process evolves gradually – as seems to be the case – and given international arrangements to provide US dollar liquidity to non-US banks, these stresses are unlikely to be large enough to cause a renewed crisis in our view.



New financial stability risks beyond bank balance sheets

The immediate trigger of the financial crisis in 2008 was the collapse of the Lehman Brothers investment bank. This, in turn, triggered a wider “run” on banks in the USA and Europe. However, the run went well beyond commercial banks to include a wide variety of so-called “shadow banks.”¹ Most stunning for investors was the run on seemingly safe money market funds (MMFs). The reason was that these funds were themselves exposed to liabilities of Lehman Brothers or other assets that were regarded as “toxic.” Even though such assets constituted only a very small part of the portfolio, the MMFs “broke the buck,” i.e. they were no longer able to redeem their obligations at par. As a result of the run on these funds, the Federal Reserve was forced to extend protection to such vehicles as well.

Post-crisis expansion of new shadow banks in the USA and China

Since the financial crisis, researchers as well as regulators have placed far more emphasis on assessing the risks to stability that might reside in such vehicles. It should be noted that the expansion of shadow banks could in principle reduce stability risks if their vulnerabilities are lower than those of banks, particularly if they rely less on (short-term) funds such as deposits that are susceptible to runs and also, of course, where risks they engage in are lower or if the maturity mismatch between short-term liabilities and

1. The term “shadow banks” was coined by US economist in Paul McCulley in 2007. In a speech in November 2013, Ben Bernanke, the former chairman on the Federal Reserve, defined them as “compris[ing] a diverse set of institutions and markets that, collectively, carry out traditional banking functions — but do so outside, or in ways only loosely linked to, the traditional system of regulated depository institutions. Examples of important components of the shadow banking system include securitization vehicle, asset-backed commercial paper (ABCP) conduits, money market funds, markets for repurchase agreements, investment banks and mortgage companies.”

long-term assets is limited. A more problematic aspect is that shadow banking includes entities that have similar vulnerabilities as banks, but that they are less regulated and less closely monitored.

While shadow banking retreated sharply after the financial crisis, it began to expand strongly again as of 2011 (see **Figure 1**). The Financial Stability Board (FSB) estimates that a fairly narrowly defined universe of shadow banks had accumulated USD 45 trillion of assets globally by the end of 2016, which corresponds to 13% of all financial assets. Moreover, the expansion was almost exclusively driven by collective investment vehicles (CIVs) with features that potentially make them susceptible to runs, i.e. mostly investment funds that provide some form of lending. By 2016, 72% of shadow-banking assets were concentrated in these CIVs. A recent US study² points out, for example, that on-line lenders such as Rocket Mortgage, i.e. a non-bank, were extending 38% of all home loans by 2017, a threefold increase over 2007, and that these accounted for 75% of all loans to low-income US borrowers, which are insured by the US Federal Housing Administration (FHA). Moreover, the study demonstrates that the dominant reason for the success of these fintech companies was not their technological edge, but their advantages due to light regulation. Given that these credits are largely government-guaranteed, the exposure of the public sector would be no lower than in the case of commercial banks in case of a renewed real estate crisis.

The second market in which shadow banks have expanded very strongly in recent years is China, which today hosts about 16% of all shadow-banking assets or around USD 7 trillion; they have played an important role in domestic lending since the Global Financial Crisis. Chinese households

2. Greg Buchak (et al.), Fintech, regulatory arbitrage and the rise of shadow banks (NBER Working Paper 23288, March 2017).

and cash-rich firms often provided funds to corporates via off-balance-sheet investment vehicles which were, however, often set up by banks themselves. Trusts and so-called “wealth management products” (WMPs) invested in debt securities and extended loans. In some instances, these vehicles implicitly guaranteed returns, making them deposit-like products. Since 2016, however, the Chinese authorities have tightened regulations, restricting banks from investing in or financially supporting these investment vehicles (see Chapter 5 on China). According to the International Monetary Fund, this should lead to a conversion of roughly half of the market from deposit-like products into mutual funds, which are by their nature less risky.

Given the regulatory constraints put on banks after the crisis, it is maybe not surprising that non-bank finance has expanded so strongly since then. Very large and asset-rich institutions such as

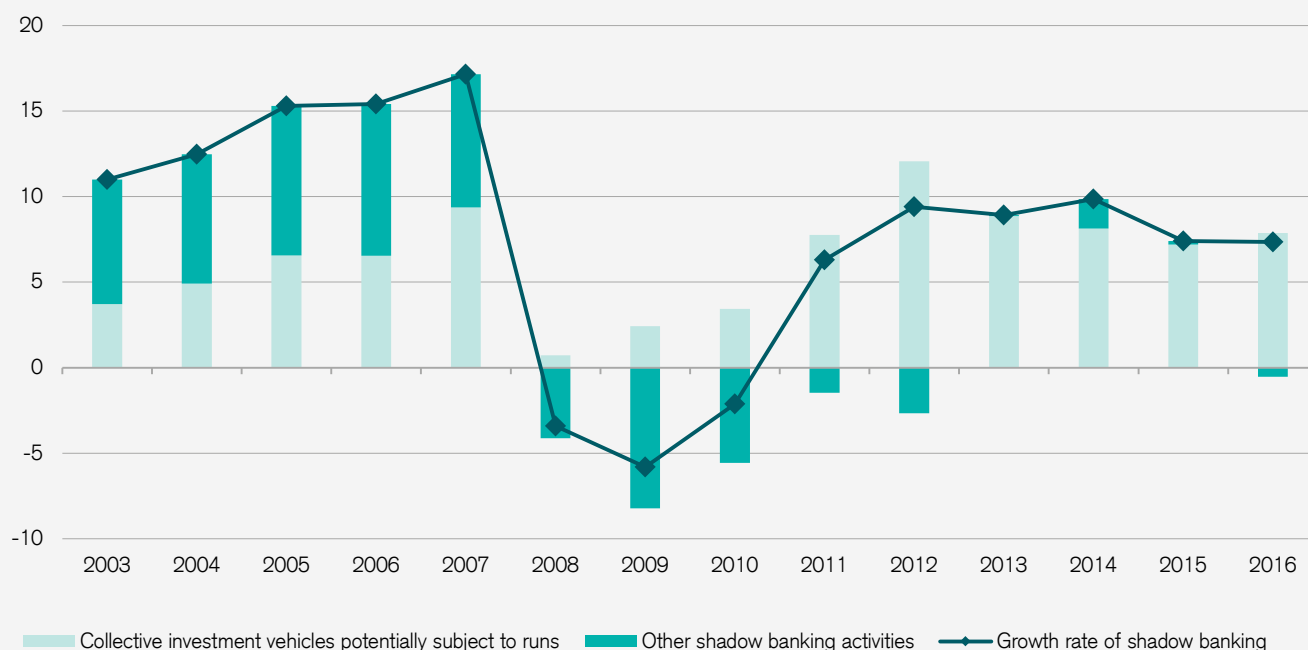
pension funds and insurance companies have also expanded significantly into lending markets. According to the FSB, the assets of the universe of non-bank financial intermediaries that it monitors reached USD 160 trillion at the end of 2017, which extends well beyond a narrower definition of shadow banks (see **Figure 2**).

Remaining “gray zones”

As noted above, the interconnectedness of non-bank lenders such as money market funds with highly leveraged financial institutions was a key reason for the fragility of the financial system in the build-up to the financial crisis. In many areas, regulation has reduced this interconnectedness since then. In the USA, for example, most money market funds now hold short-term government debt instead of short-term debt of financial institutions or corporates.

Figure 1: Growth in global shadow-banking assets driven by investment vehicles

Year-on-year (%)



Source: FSB Global Shadow Banking Monitoring Report 2017, Credit Suisse

Figure 2: Universe of non-banks extends beyond shadow banks

Overall assets globally and shares of various non-bank categories



Source: FSB Global Shadow Banking Monitoring Report 2017

FSB notes: "MUNFI = Monitoring Universe of Non-bank Financial Intermediation, includes other financial institutions (OFIs), pension funds, insurance corporations and financial auxiliaries; OFIs also include captive financial institutions and money lenders... OFIs comprise all financial institutions that are not central banks, banks, insurance corporations, pension funds, public financial institutions, or financial auxiliaries."

In other areas, financial fragility may not, however, have been reduced significantly. A recent research paper³ argues, for example, that the fragility of the banking system is greater than usually measured. Normally, only on-balance sheet items are taken into account when assessing the stability of banks, but the authors argue that, for instance, so-called "pledged collateral" that is off-balance sheet implies significantly higher vulnerability. To quote the authors: "For example, if Walmart wants to expand in Texas and needs funding from its relationship bank, Citi, the treasurer of Citi can choose to fund its client from deposits or wholesale funding (which are both on balance sheet), or from pledging collateral it has received off-balance sheet to another bank (e.g. Barclays). For the treasurer, deposits, or wholesale funding, or pledged collateral (after a few steps), are all fungible resources that can be mobilized to fund a client... Balance sheet reporting at a national level can only focus on assets and liabilities of banks in their jurisdiction, and not on transactions that cannot be identified with any jurisdiction. Transactions that are cross-border in nature, such as a large share of pledged collateral agreements (or wealth management accounts, etc.) fall through the cracks." Such

pledged collateral thus effectively boosts bank leverage and, depending on the quality of the collateral, increases the fragility of banks to a greater or lesser degree.

A final area of potential vulnerability of the financial system concerns certain exchanges, in particular exchanges for leveraged products, i.e. derivatives. This issue has, in particular, arisen in discussions about the potential risks associated with Brexit. Gross volumes on these exchanges are huge, of course, but there should not be any net leverage for exchanges, and a regime of disciplined margin requirements should provide the exchanges with a significant buffer. There might, however, be situations of extreme market gyrations where this buffer proves insufficient. That said, these exchanges weathered the global financial crisis relatively well, suggesting limited risks even under extreme market conditions. But a withdrawal of the UK from the European Union without any agreement (a "hard Brexit") may raise significant legal and operational risks. Indeed, many of these contracts are cleared in the UK, obviously also between counterparties in the EU. A hard Brexit could therefore create stresses due to a major "legal gap." Central banks, financial supervisors and market participants are, of course, aware of these issues and are working to prevent "accidents" should politics move in that direction.

3. Manmohan Singh and Zohair Alam, *Leverage—A Broader View* (IMF Working Paper 18/62, March 2018).



4. Emerging markets – great diversity, but few systemic risks

Mariano Arrieta and Florence Hartmann

While the financial vulnerability of some emerging economies has increased since the financial crisis, the risk of a systemic crisis being triggered by any of these economies seems much lower than in the late 1990s. After declining, overall debt ratios as well as the government debt ratios have increased again in most countries over the past ten years or so, but so has the ability of most countries to service debt. Moreover, the quality of policymaking has generally improved significantly, allowing them to better deal with external shocks.

The last period of major emerging market debt crises involving a series of outright defaults dates back to the late 1990s. Various governments had borrowed heavily in foreign currency and, when US monetary tightening began in the mid-1990s (see pages 26 and 27), financing stresses emerged that ultimately resulted in various governments defaulting and requiring bailouts from the International Monetary Fund. In addition to significant and persistent fiscal and current account deficits (**Figure 1**), the pegging of exchange rates to the US dollar provoked speculative attacks in financial markets. When the pegs broke, sharp exchange rate movements resulted in major mismatches between foreign currency liabilities and domestic currency debt-servicing capabilities.

Compared to that period, external imbalances in most emerging economies are far more limited now, with the most significant turnaround occurring in Asian economies as well as in Brazil. Following the 1990s crises, the overall debt ratio (**Figure 2**) dropped in a number of countries such as Mexico, Indonesia, Thailand, and Russia in particular, but has since increased again. The same goes for government debt (**Figure 3**). However, government debt is far lower than in most advanced economies, while the countries' growth potential in many cases remains markedly

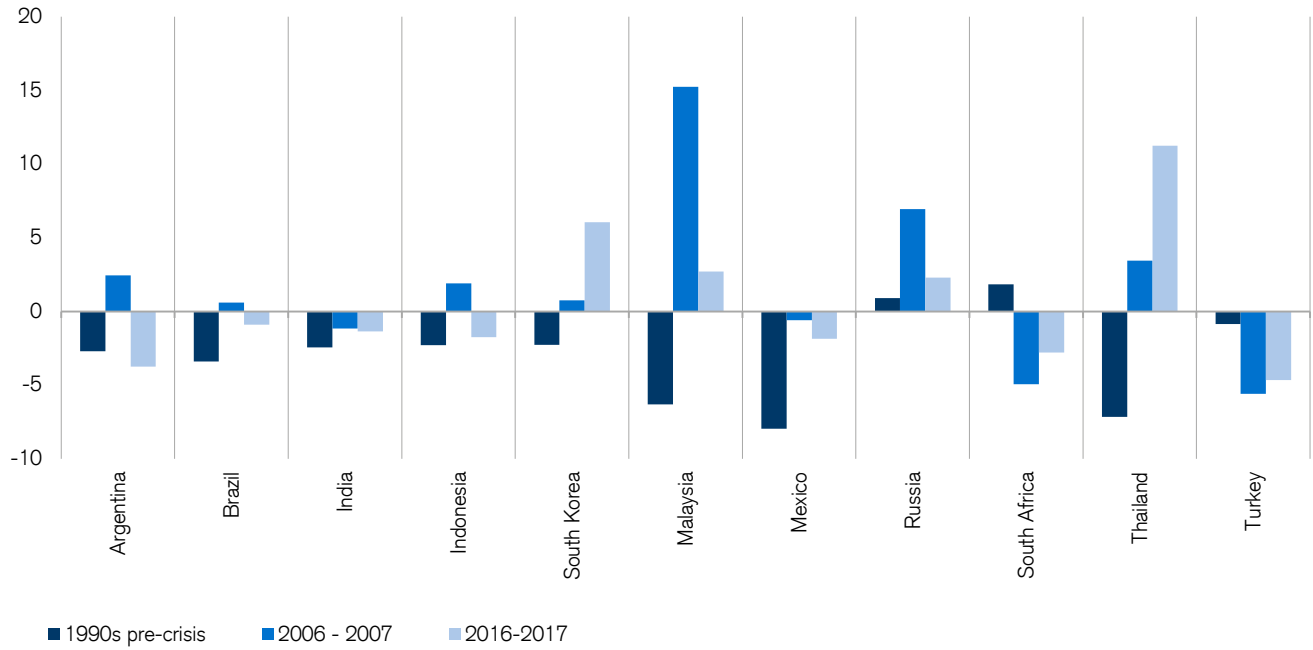
higher. Borrowing rates have also declined significantly in most emerging economies, although they remain well above those in advanced economies (**Figure 4**). Moreover, none of the major emerging economies pegs its currency to the US dollar any longer, which allows for a more flexible response when stresses emerge in funding markets. As a result, we have witnessed very few default situations in the past few years, although there have been some; the heavy borrowing of the Hungarian private sector in foreign currencies via domestic banks, for example, caused a crisis in 2008 that required an IMF rescue. The latest crisis occurred in Argentina in mid-2018 and also required significant means from the IMF to achieve stabilization.

A more detailed vulnerability scorecard

To assess the vulnerability or robustness of emerging market debt, we have developed a more detailed scoring approach, which supplements the above-mentioned measures of financial and external vulnerability with measures of growth performance and the degree of stability orientation of fiscal and monetary policy. We also add a score for development indicators, such as the Gini coefficient, which measures the degree of inequality of income distribution. The assumption is that countries that have achieved a “higher”

Figure 1: Substantial reduction in external imbalances since the 1990s

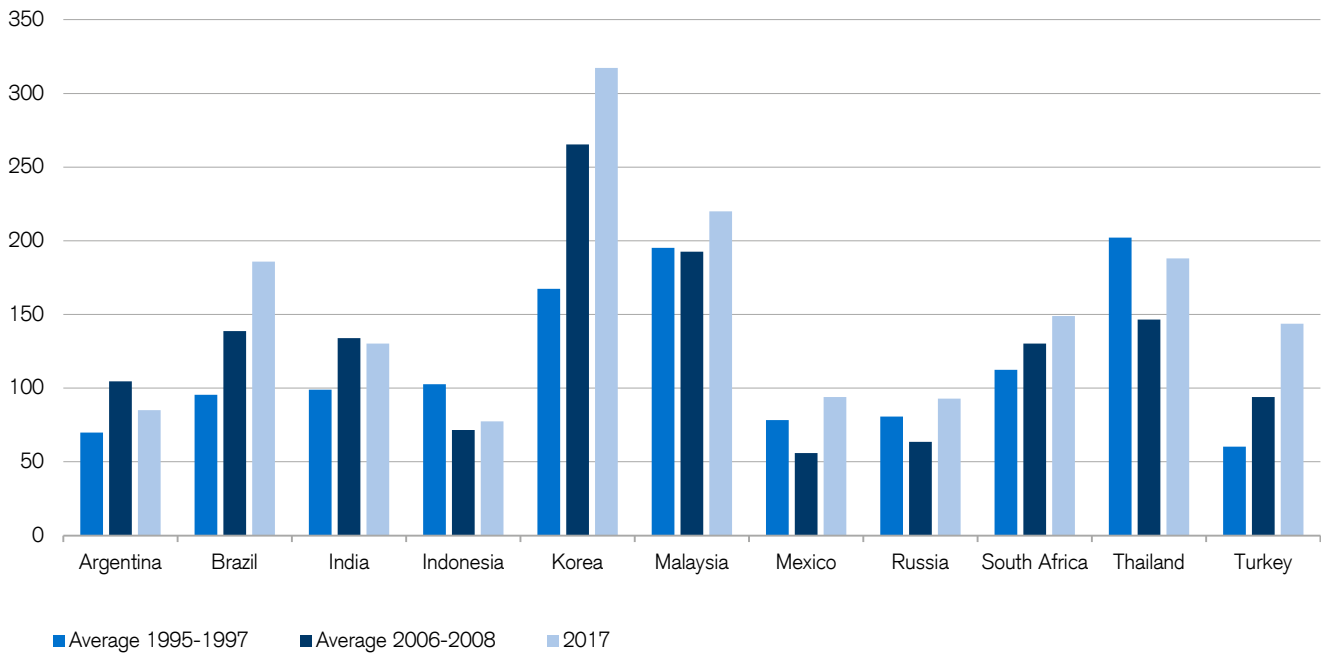
Current account balance, in % of GDP



Source: The BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 2: Debt ratios generally somewhat higher than ten years ago

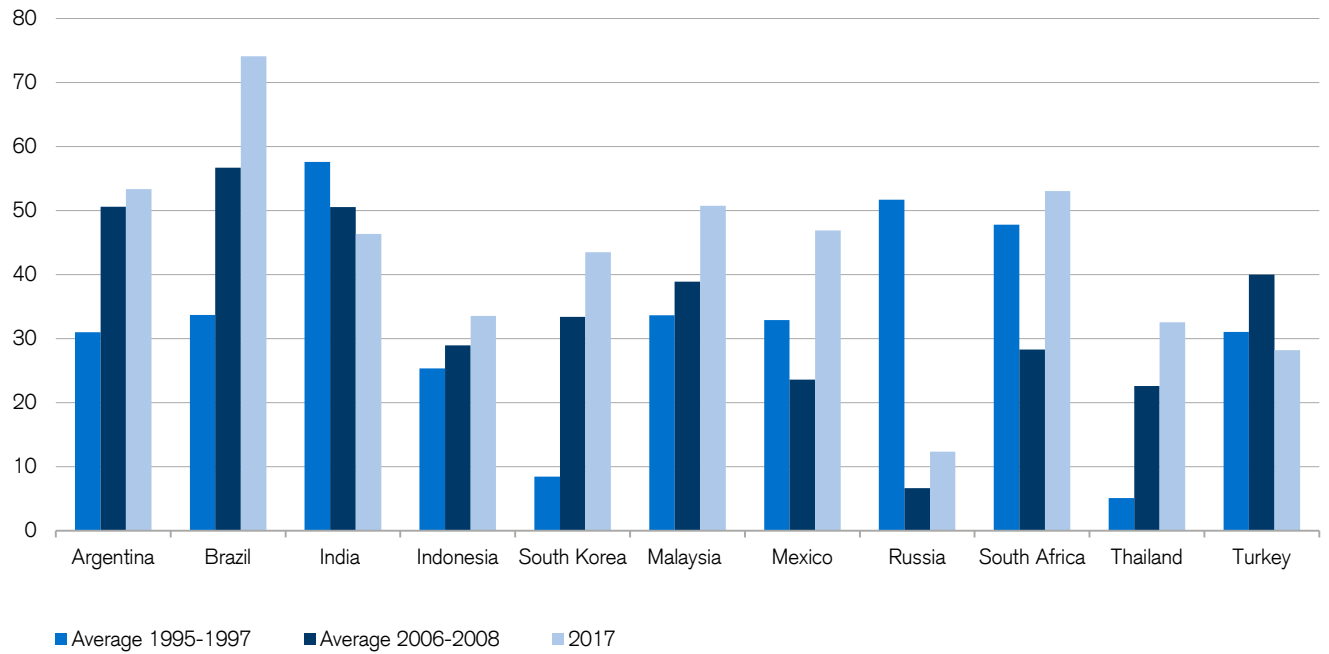
Total debt, in % of GDP



Source: IIF, Thomson Reuters, Credit Suisse

Figure 3: Government debt ratios generally far below those in advanced economies

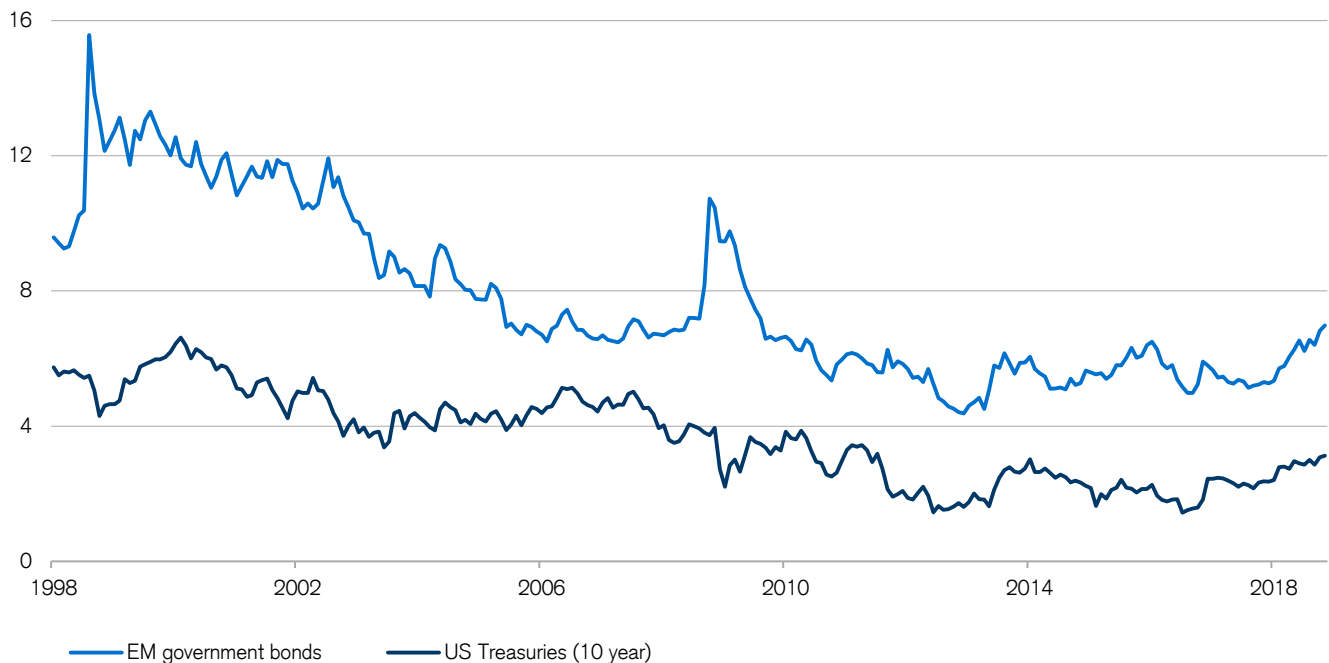
Government debt, in % of GDP



Source: IIF, Thomson Reuters, Credit Suisse

Figure 4: Emerging market borrowing rates much lower than in the late 1990s

Bond yields in %



Source: The BLOOMBERG PROFESSIONAL™ service, Credit Suisse

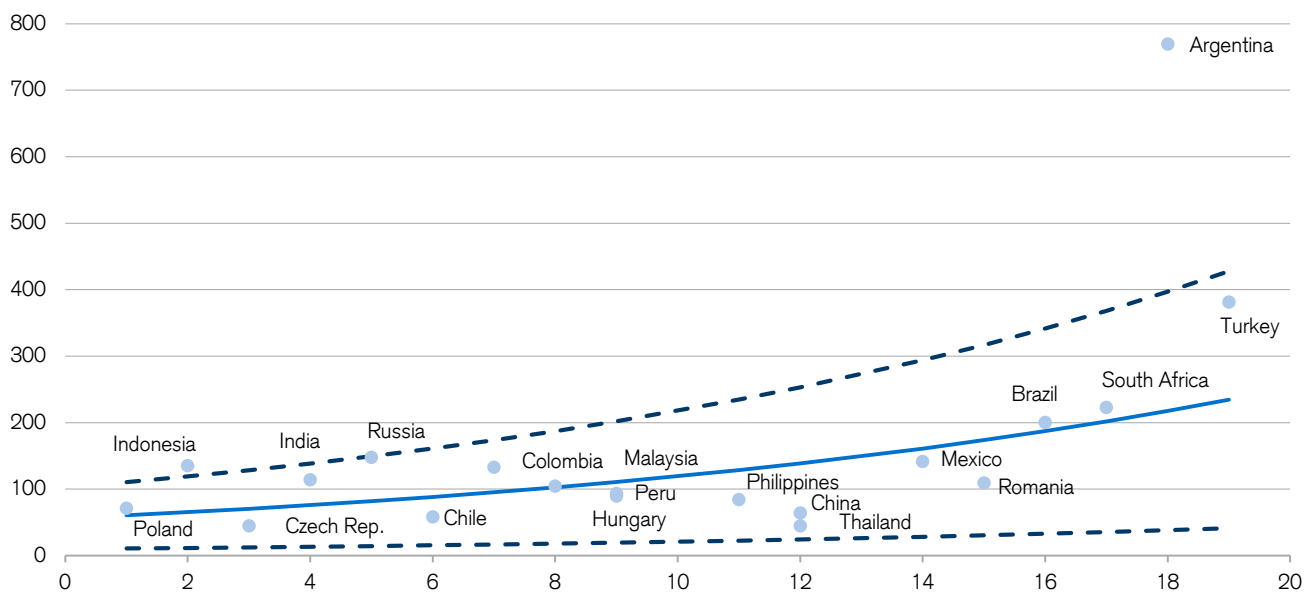
level of development should in general achieve greater stability and future policy success. This scorecard does not provide strong insights into absolute risks, but is mainly geared to making comparisons across countries. We nevertheless believe it is useful. Indeed, **Figure 5** shows that the market assessment of countries correlates fairly closely to our scores. The most important countries to analyze in greater depth are some of the large ones, such as Brazil and Russia, where some of the macro and, in Brazil's case, policy scores are weak, but the financial vulnerability score indicates considerable strength. This tends to support our view that the likelihood of a major debt crisis is low in key countries, despite a rather subdued economic outlook. A further ambiguous case is China, where corporate credit has been growing extremely fast, reflected in a weak score on the credit gap. At the same time, the country's extremely strong net foreign asset position

implies that the risk of a debt crisis affecting global markets is very low.

In contrast, the scorecard clearly shows that vulnerabilities were highest in the two countries that suffered a crisis or near-crisis in 2018, i.e. Argentina and Turkey. Given its history of multiple defaults, it is perhaps not surprising that the market effectively assigns a far worse score to Argentina than our scorecard generates – whether Argentina's latest reform efforts under the IMF program will allow it to shake off its outlier status (see **Figure 5**) remains to be seen. While both Turkey and Argentina are large countries and suffered significant setbacks in 2018, the fact that there was barely any contagion to other emerging or major markets supports our contention that systemic risks emanating from the emerging market countries are currently quite limited.

Figure 5: Overall score correlates fairly closely with debt risk

5-year CDS, in basis points



Macro vulnerability scorecard <strong/weak>

Source: The BLOOMBERG PROFESSIONAL™ service, Credit Suisse

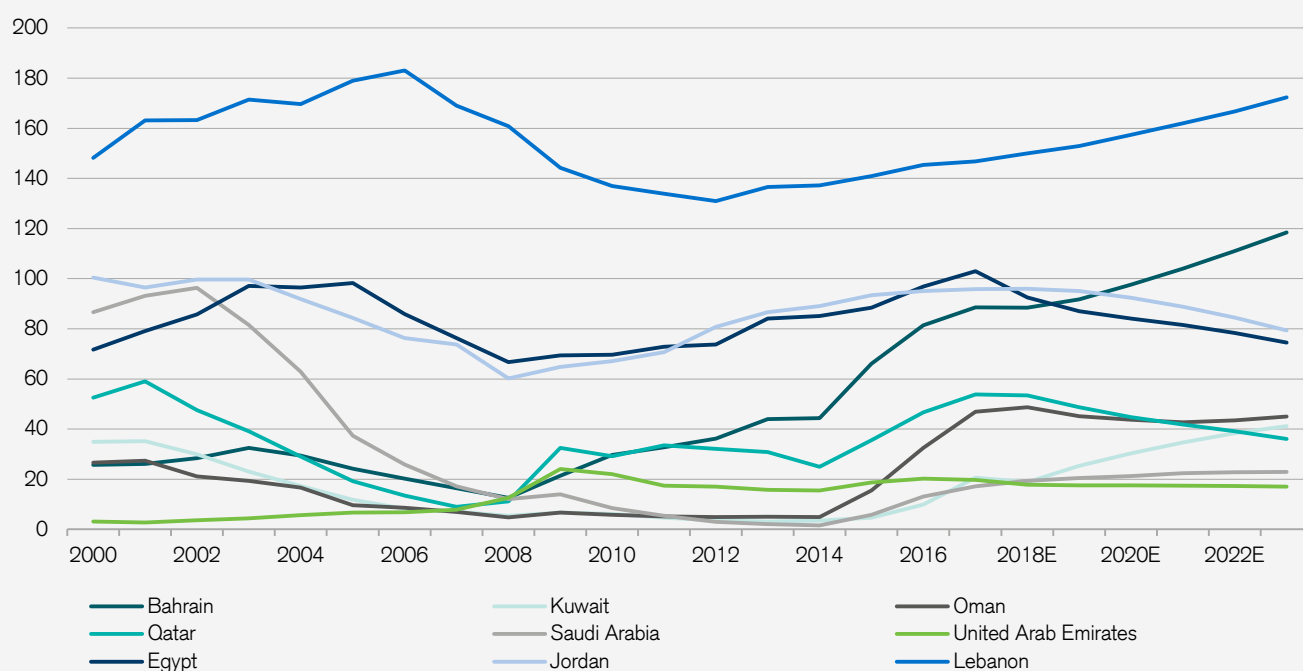
Middle East: The new debt issuers

Krithika Subramanian

The slump in oil prices that began in 2014 prompted oil-exporting countries in the Middle East to borrow in international bond markets in order to supplement lower oil revenues and support spending. According to the International Monetary Fund, Gulf Cooperation Council (GCC) countries issued debt worth approximately USD 160 billion between 2014 and October 2018, accounting for approximately 15% of all outstanding emerging market bonds.

The inclusion of these markets in global emerging market bond indices has provided new investment opportunities for investors, but has also raised questions about potential risks associated with these debts. While most countries in the region have fairly low debt-to-GDP ratios, there are exceptions, with Bahrain one of them: the International Monetary Fund estimates its debt-to-GDP ratio at 88% in 2018, the highest among the GCC countries.

Figure 1: Government debt in the Middle East
In % of GDP



Source: IMF World Economic Outlook (October 2018), Credit Suisse
Note: estimates for Bahrain, Kuwait and Lebanon start after 2016

In June 2018, Bahrain's credit default swap (CDS) spreads rose sharply to reach a peak of 468 basis points, reflecting concerns about government finances, coupled with concerns over the country's ability to maintain its currency peg to the US dollar. While funding support worth USD 10 billion from its GCC partners Saudi Arabia, the UAE and Kuwait helped calm markets in the short-term, the focus will be on Bahrain's medium-term fiscal plan to eliminate its budget deficit by 2022.

Overall debt-to-GDP ratios of other GCC countries are expected to stabilize around 40%, while those of Egypt and Jordan are expected to moderate over the next five years according to the IMF (see **Figure 1**). Significant efforts have been made to improve fiscal fundamentals in a number of countries in the region, notably tax reforms in the UAE, Saudi Arabia and Jordan and subsidy reforms in Egypt. These should all support long-term fiscal sustainability and revenue diversification. An interesting chapter for GCC debt markets begins in 2019, with the phased inclusion of Bahrain, Kuwait, Qatar, Saudi Arabia and the UAE in the JP Morgan Emerging Market Bond

Index between January and September 2019 (Oman is already part of the index). This new inclusion is expected to add approximately USD 150 billion to the index, with a weight of 11%–12% in the index, according to market estimates. The move should add depth to GCC bond markets and, all else equals, should lower the risk premium (i.e. spreads) on debt issued by both sovereign and corporate borrowers in the region. However, the potential improved access to international bond markets also brings with it a heightened focus by international investors on sustainable debt management.

Meanwhile, Lebanon has been a clear exception in the region and ranks among the most indebted countries in the world (with a debt-to-GDP ratio estimated at 150% in 2018 by the IMF). Delays in the formation of a government following the elections in May 2018 and the continued political impasse have only added to concerns about already strained fundamentals of the Lebanese economy, with CDS spreads peaking at 792 basis points in December 2018 and discussions of potential debt restructuring in the financial media.





5. China – a challenging path out of excessive indebtedness

Oliver Adler and Vibhuti Mehta

Since the financial crisis, China's government has tried to maintain high economic growth rates with aggressive credit expansion. As the marginal growth impact of credit expansion decreased over time, the debt-to-GDP ratio surged. Since 2016, the government has cautiously shifted policies toward limiting leverage. We believe the country's growth potential should suffice to gradually reduce the debt-to-GDP ratio, but some "financial repression" will likely continue to be required to support the debt.

Since 2009, China's debt has been growing at an extremely high rate. The initial trigger for the debt expansion was the government's determination to isolate the economy from the fallout of the financial crisis in the advanced economies. However, after a short slowdown of the debt expansion in 2010–11, the growth of debt accelerated once again until late in 2016. China's overall debt ratio is currently estimated at around 300% of Gross Domestic Product (GDP), which is the highest level among the major emerging markets, except for Korea, and is in the vicinity of levels seen in high-debt European economies. Actual debt may be even higher given that credit from so-called "shadow banks" may not be fully accounted for. For end-2016, estimates of shadow-banking-related debt vary between USD 1.6 trillion, or 14% of GDP (Moody's) and USD 8.26 trillion (Bank for International Settlements).

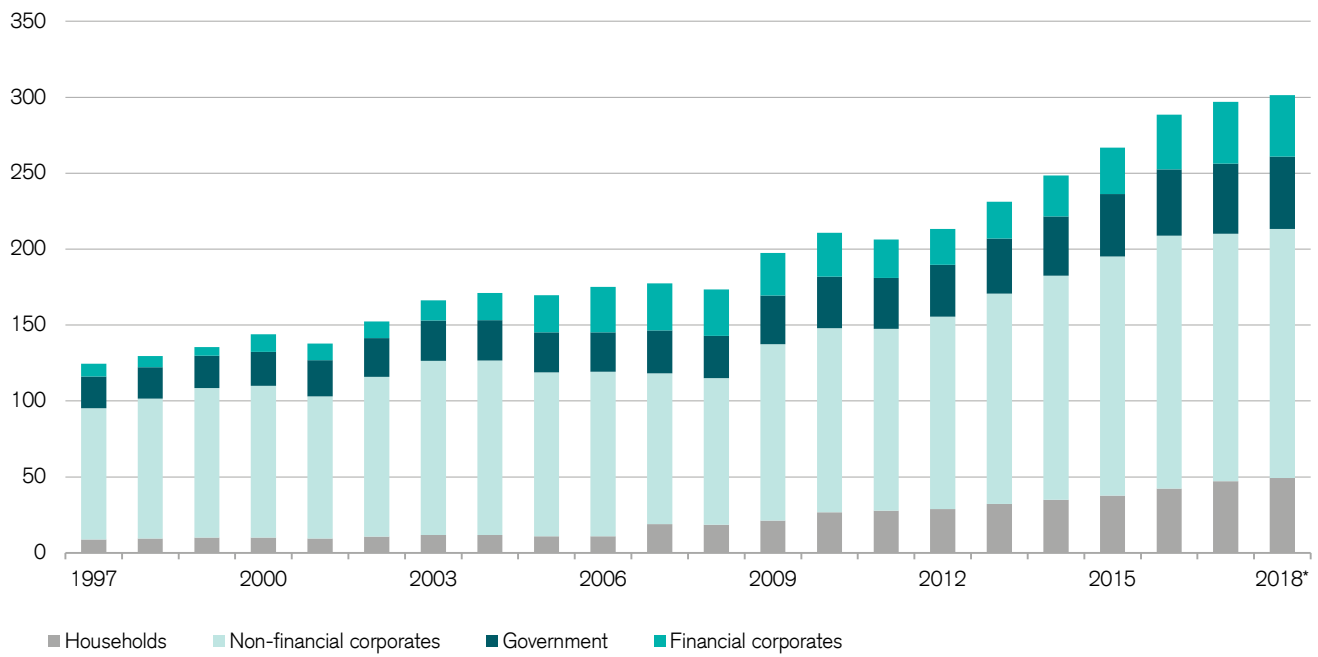
The bulk of the build-up in debt was due to the non-financial corporate sector (**Figure 2**) and, more specifically, China's large state-owned enterprises (SOEs.) The consulting firm Strafor estimates that SOEs received 60% of all new loans since 2013, with a peak of 76% being reached in 2016. This is all the more surprising given that the share of SOEs in China's GDP is estimated to have declined

from about 50% to around 25% over the past 15 years. The expansion of SOE debt must thus be seen as the result of a deliberate policy to provide these companies with the means to maintain ownership of key assets as well as preventing spikes in unemployment in the regions in which these SOEs reside. Moreover, the debt build-up was also boosted by the fact that the government provided SOEs with the means to shift their focus from "old" industrial companies (that had been in part wound down and restructured) to new areas such as finance and telecommunications. Conversely, the private corporate sector has had major difficulties obtaining credit, even though its contribution to GDP and employment by now far exceeds that of the large state companies.

While Chinese households used to carry very low debt levels, household debt has also increased significantly in past years, reaching about 50% of GDP. We estimate that debt service currently absorbs up to 30% of disposable income of middle-income urban households. The increase in household debt is essentially due to China's real estate boom. In the decade since 2006, China has seen real house price growth of around 10% per annum, mainly driven by rising land values, which are estimated to have risen by an average of almost

Figure 1: China's debt growth post-2009

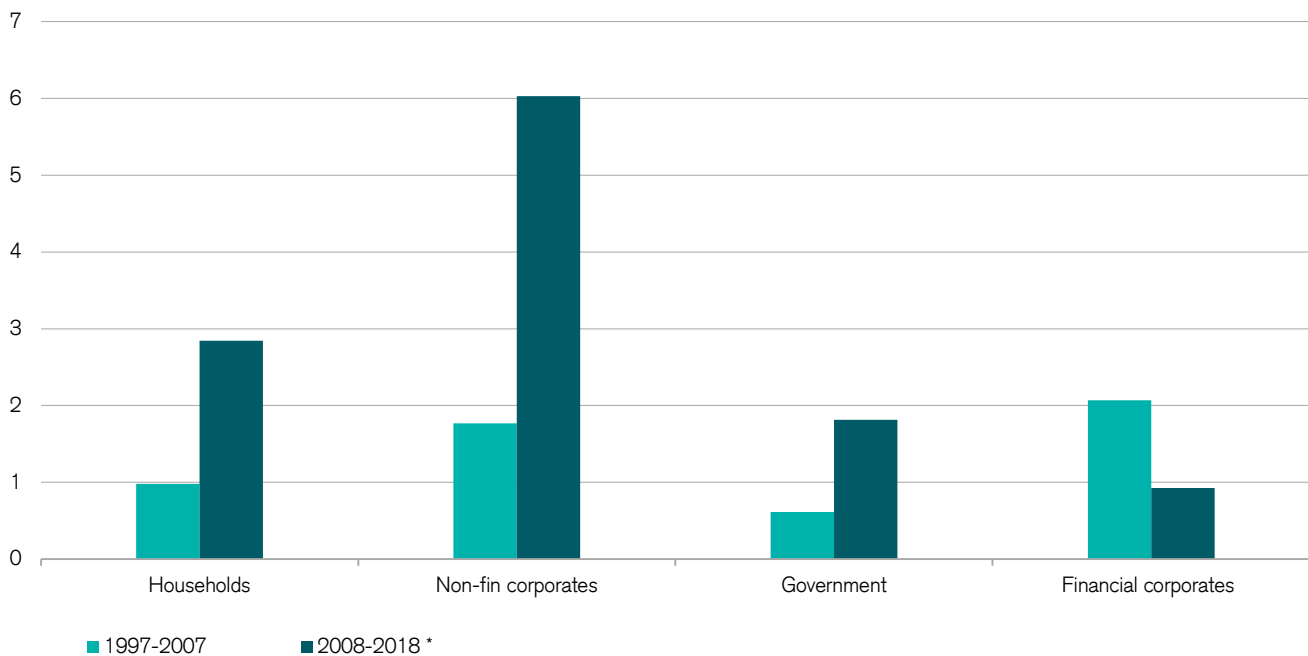
Evolution of debt-to-GDP ratio (%)



* Q2 2018. Source: IIF, Credit Suisse

Figure 2: Huge expansion of non-financial corporate debt

Average year-on-year growth in debt as a % of GDP across sectors



* Q2 2018. Source: IIF, Credit Suisse

15% per annum.¹ The affordability of housing has thus diminished, requiring households to increasingly finance real estate purchases with debt. More recently, Chinese households have started relying increasingly on credit card debt to finance consumption, partially as a result of the fact that mortgage payments have risen with house prices. This trend has increased both overall household debt as well as its servicing cost because credit card balances carry much higher interest rates. One of the consequences of the heightened debt exposure of households in combination with reduced job security is that purchases of (other) big ticket items such as automobiles declined markedly in 2018.

1. Jing Wu, Joseph Gyourko, Yongheng Deng, "Evaluating the Risk of Chinese Housing Markets: What We Know and What We Need to Know," National Bureau of Economic Research, 2018.

Inefficiency of debt build-up

By 2016, China's so-called "credit gap" was the highest (worst) of all 44 countries that the Bank for International Settlements analyzes, although Hong Kong and Switzerland surpassed China by Q2 2018. In retrospect, the expansion of credit in China has yielded very poor results in terms of economic growth. As **Figure 3a** shows, the gap between nominal GDP and credit growth widened sharply after 2008, and remained very high until 2016. In fact, the picture is somewhat reminiscent of the Japanese experience in the period from the mid-1970s to the late 1980s (**Figure 3b**).

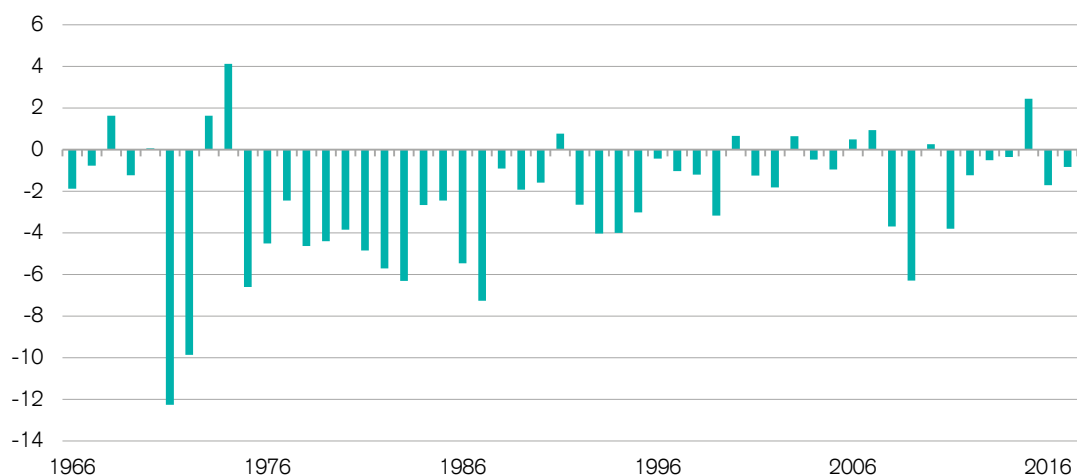
Figure 3a: Inefficient debt expansion in China post-2008

Difference between growth in overall debt (credit) and GDP, in percentage points



Figure 3b: Inefficient debt expansion in Japan post-1975

Difference between growth in overall debt (credit) and GDP, in percentage points



Source Figures 3a and 3b: IMF, Credit Suisse

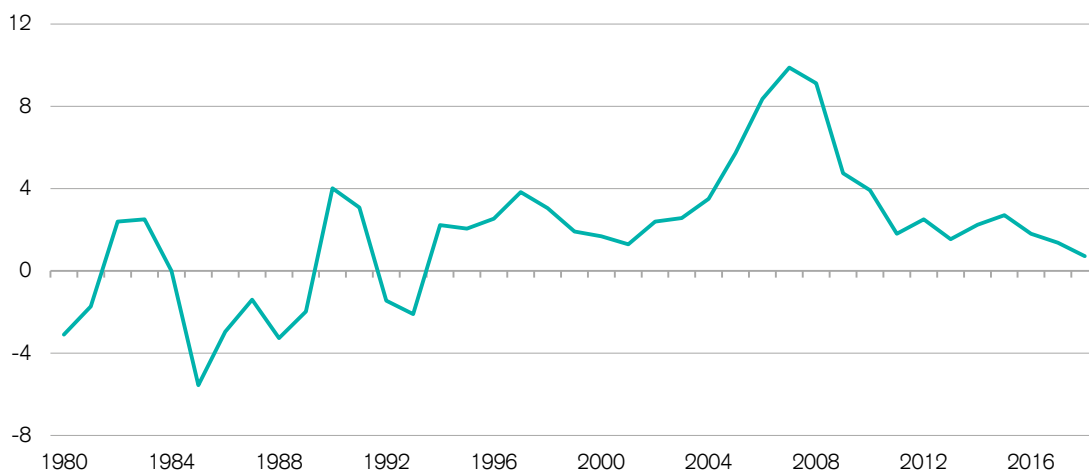
External vulnerabilities add to deleveraging pressure

Recognizing the unsustainable debt situation, the Chinese government has been tentatively moving toward a policy of deleveraging over the past years. This has not been a straight-line affair, however, given the government's fears about the negative impacts on growth that would result from tighter credit. After a sharp slowdown in economic growth in 2015–16, the government began to ease policy, only to reverse course again in 2017 as signs of overheating emerged. After the economy slowed sharply in H1 2018, the government once again changed tack in mid-2018 in the direction of easing, not least because of concerns about the negative impact from US tariff policies.

In the meantime, however, external vulnerabilities also impose some limits on policy easing. The current account surplus has diminished sharply in past years (**Figure 4**), while foreign-currency-denominated debt is estimated to have increased quite considerably (**Figure 5**). Even though foreign exchange reserves have stabilized since 2016 and remain very high, the authorities seem intent on preventing a significant depreciation of the Chinese renminbi in order to maintain confidence and limit capital outflows. That said, reliance on foreign capital remains quite low in China compared to other emerging markets. The ratio of foreign-currency-denominated debt to total debt was estimated at only 18% in 2017, well below the emerging market average of around 40%. In combination with capital

Figure 4: China's current account surplus has almost vanished

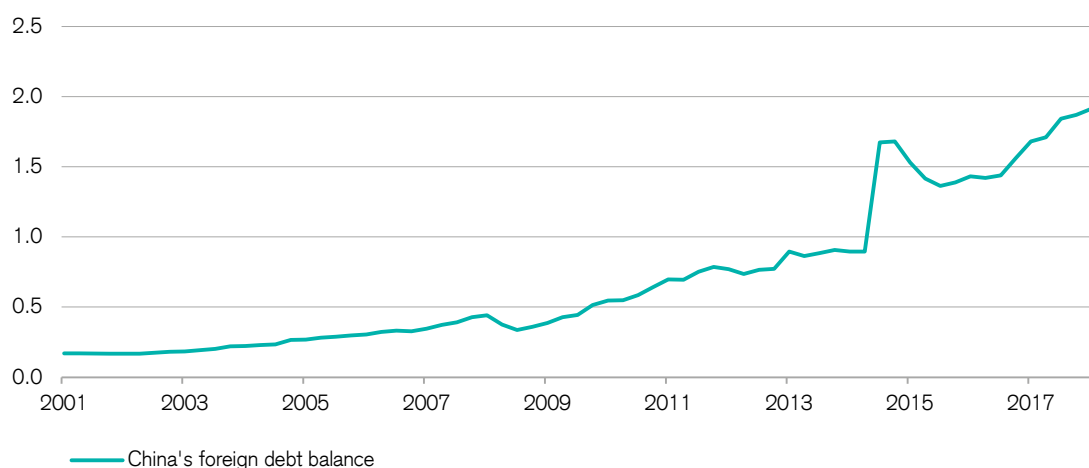
Current account balance, in % of GDP



Source: IMF, Credit Suisse

Figure 5: China's foreign borrowing has increased considerably

Foreign currency debt outstanding (in USD trillion)



Source: The BLOOMBERG PROFESSIONAL™ service, Credit Suisse

controls, this makes the country less susceptible to capital flight and provides the authorities with greater policy autonomy with regard to, for example, monetary policy easing.

Clampdown on shadow banking

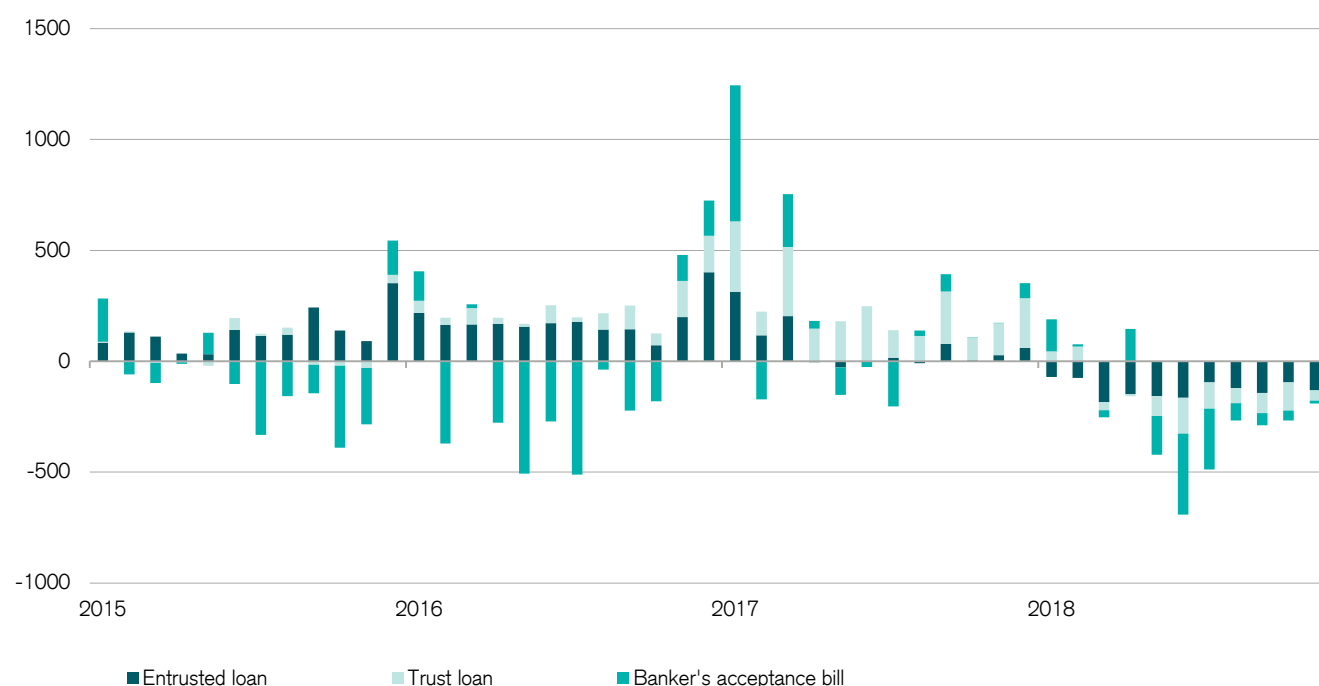
In line with its policies in support of SOEs, the main deleveraging efforts of the Chinese authorities have to date been geared toward limiting private sector debt “excesses.” Curbs on the real estate industry have, for example, been imposed in the form of higher downpayments and other restrictions on debt-financed home ownership. China has also witnessed a clampdown on shadow banking. For example, the government has tried to limit implicit government guarantees for so-called “wealth management products (WMPs)” and, more specifically, guarantees of fixed (higher) interest rates, which were the two features that attracted investors to these products in the first place.

The People’s Bank of China (PBoC) adopted a new macro-prudential assessment in 2016 by including WMPs in its calculations of banks’ capital adequacy ratios. As shown in **Figure 6**, some effects are already visible in the declining growth of shadow-banking products in 2018. The authorities have also focused on limiting indirect borrowing by local governments through so-called “local government financing vehicles (LGFVs).” That said, total new local government borrowing in the three years up to 2017 still stood around RMB 21 trillion, or 25% of GDP.² Finally, pressure from the government on the private sector can also be seen in the rise in bond defaults (**Figure 7**). As these defaults were generally on non-listed bonds they have not significantly affected China’s overall credit rating, however.

2. Credit Suisse report: “Regulatory overhaul turns into unintended tightening? Impact on economy and banks,” 2018.

Figure 6: Pressure on shadow-banking products

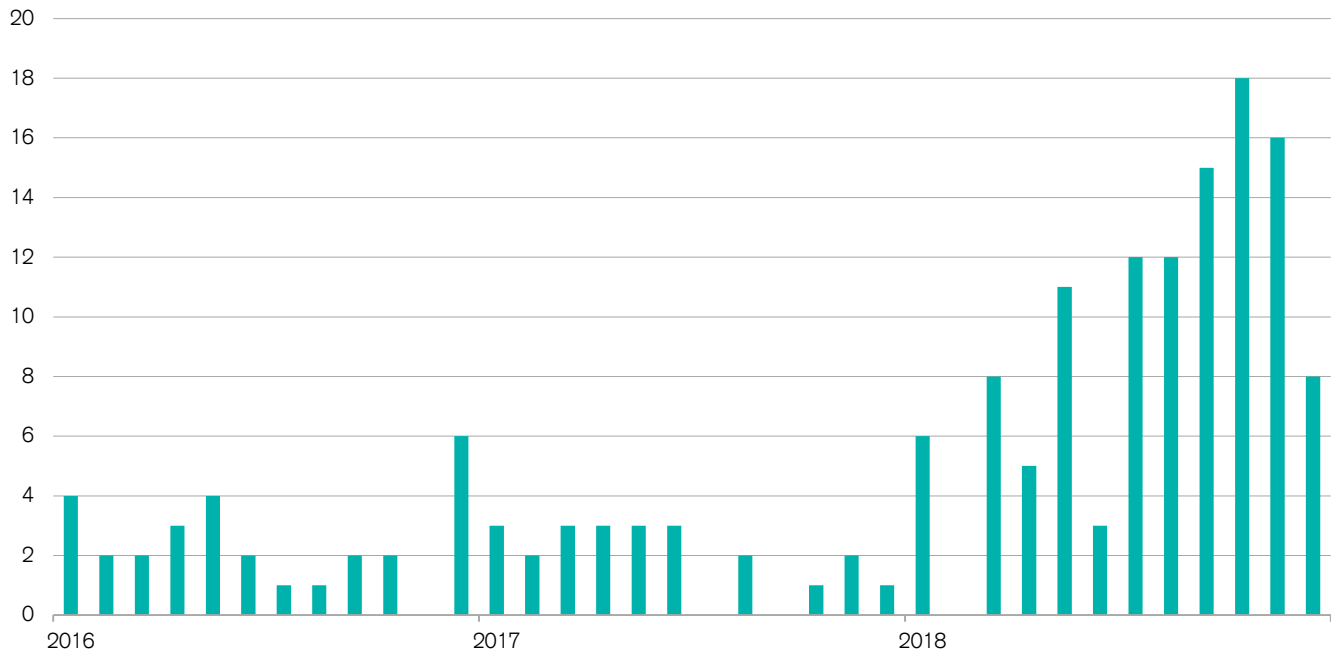
Monthly increase in RMB billion



Source: CEIC, Credit Suisse

Figure 7: 2018 saw a marked rise in corporate bond defaults in China

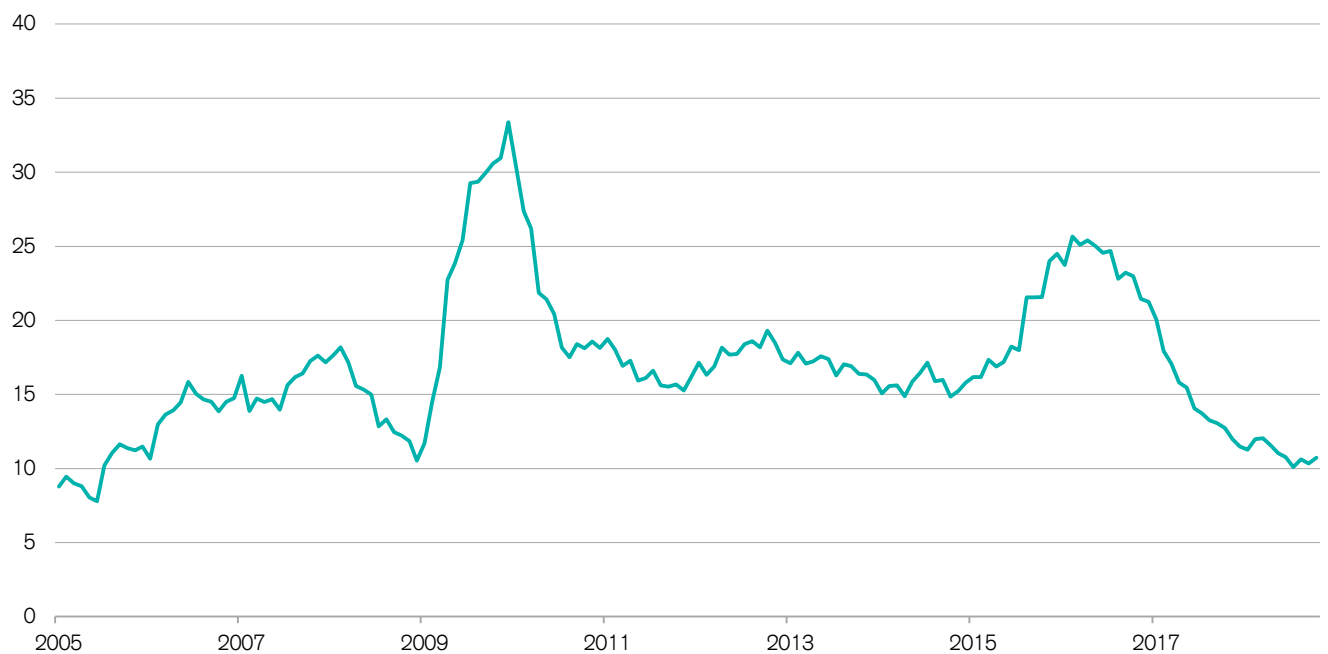
Corporate bond defaults per month



Source: The BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 8: Credit growth remains fairly vigorous

Growth of bank lending (year-on-year in %)



Source: Thomson Reuters, Credit Suisse

In the meantime, bank lending continues to grow at a rate in excess of GDP growth (**Figure 8**). Credit continues to flow to infrastructure projects in particular, which are in large part guided by local governments. This also raises some questions regarding the efficient allocation of capital.

Muddling out of the debt trap by means of financial repression

China's credit-based growth strategy has saddled the country with a very high level of debt, with the bulk of this debt owed by SOEs, i.e. effectively the Chinese government. Will the country be able to free itself from this burden and, if so, how? We believe that China still has considerable growth potential. While its demographic outlook is quite bleak with the labor force currently close to peak levels, the potential for productivity catch-up is still considerable. Actual productivity growth will, of course, depend on the concrete policies that are pursued. Under a policy of reform and market liberalization, growth would likely be higher than under the current set of policies. However, even if state-guided policies remain dominant, we still expect the country's GDP to grow at a real rate of approximately 5% per annum over the next decade, with some downside risks to this forecast.

Debt sustainability also depends on the prevailing interest rate, of course. The latter will depend on both the evolution of domestic savings and the degree of capital market liberalization. Given the limited development of state pension and health care systems as well as the population's increasing longevity, we believe that the pressure on individuals to save will remain strong.³ We also believe that the authorities will remain reluctant for an extended period of time to fully liberalize China's capital market. As a result, a large proportion of China's savings will remain "bottled" up domestically, which will tend to depress real interest rates. The combination of modestly decelerating but still robust income growth with strong incentives to save and low real interest rates should thus allow China's large debt ratio to stabilize and possibly to fall eventually, assuming this remains a high priority of policymakers. Given China's still very strong external asset position, a debt-crisis with global repercussions in any case seems quite unlikely.

3. Estimates of current household savings rates in China vary significantly: the economic consultancy Oxford Economics estimated the savings ratio at a high 38% in 2017. Meanwhile China's Southwestern University of Finance and Economics (SWUFE) household survey suggests that the savings rate of more than 50% of China's households has declined to close to zero.

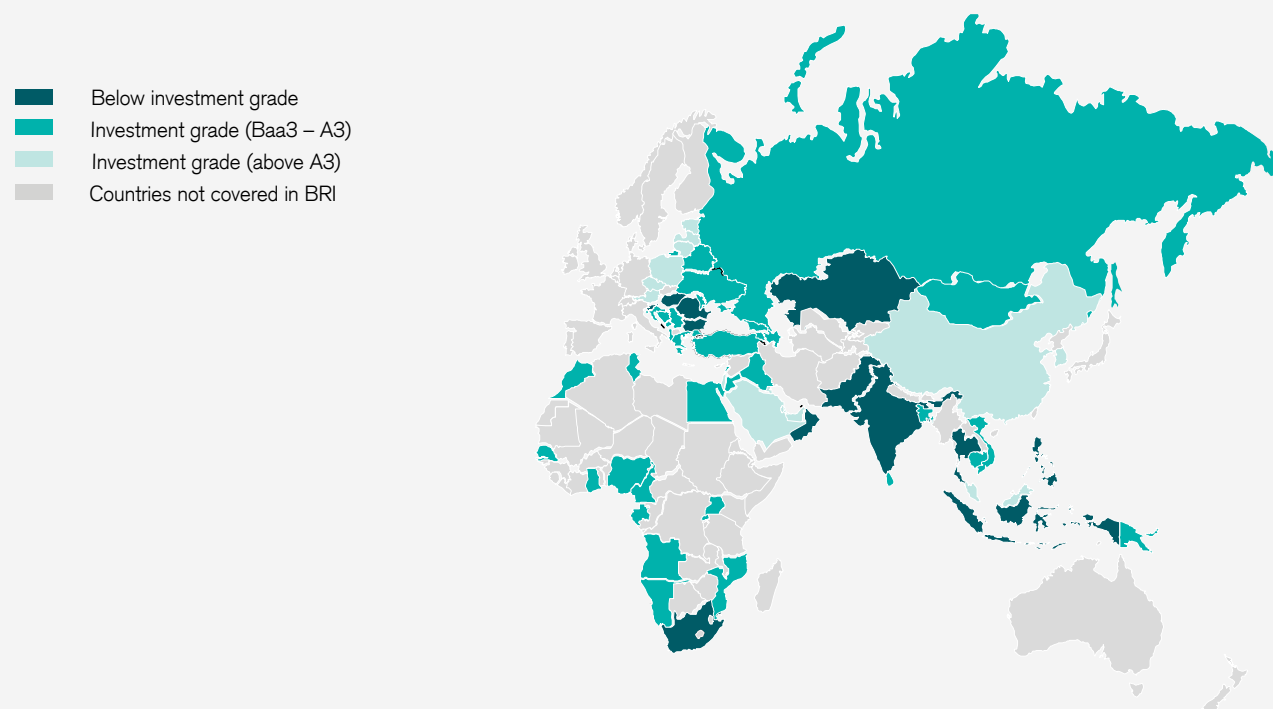
China's debt overhang may constrain the Belt and Road Initiative

At its 19th National Party Congress in 2017, China officially adopted the so-called "Belt and Road Initiative (BRI)," i.e. the plan to build a new Economic Silk Road by land and sea to connect China to its key markets in Asia, Africa and Europe. The initiative set out to invest approximately USD 1 trillion across a set of at least 70 countries. However, the dynamics of debt inside and outside of China as well as geopolitical strains may constrain these plans.

As noted previously, China's (de facto) government debt has increased sharply since the financial crisis, while economic growth has slowed and the external balance has deteriorated. Constraints on additional spending have thus tightened, and added government spending may become more focused on supporting the

domestic economy over the coming year rather than investing abroad. Moreover, geopolitical tensions between the USA as well as other advanced economies and China over trade as well as foreign investment issues could imply that the participation of the former in BRI projects may be limited to some extent, not least with regard to funding via the Asian Infrastructure Investment Bank (AIIB; note that neither the USA or Japan have joined the AIIB to date). Finally, the credit rating of a number of potential recipients of BRI funds is weak (**Figure 1**) while their debt burden has, in many cases, worsened in recent years (**Figure 2**). That may constrain both the willingness of creditors to lend additional funds to these countries as well as the appetite of such countries for taking on additional non-concessional debt.

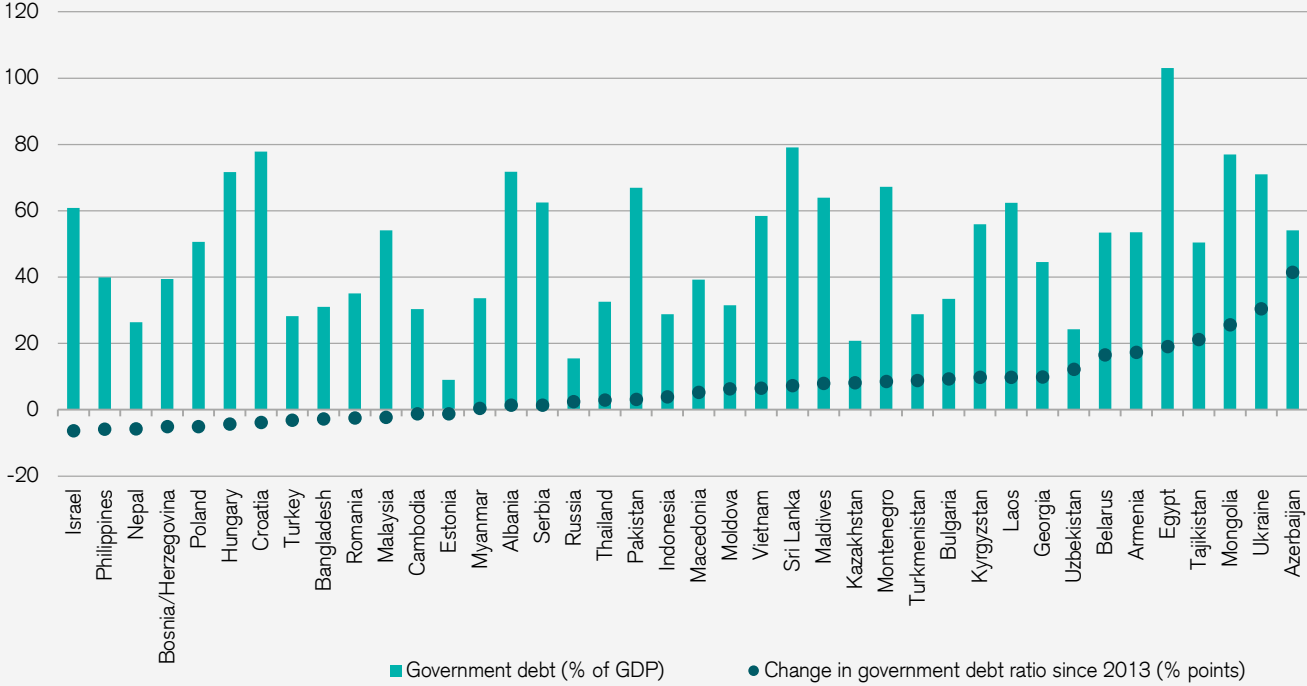
Figure 1: Credit ratings of BRI countries



Source: Moody's, Credit Suisse

Figure 2: Debt of many BRI countries has increased substantially

Government debt outstanding in % of GDP



Note: Countries for which general government debt data was not available, central government debt data is shown

Source: IMF Global debt database, Credit Suisse



6. Corporate debt – declining quality on the growing fringes

Sylvie Golay and Michael O’Sullivan

Globally, and especially in the USA, leverage of non-financial corporates has increased significantly since 2014 and has now surpassed the pre-crisis peak. Average measures of credit quality have in the meantime decreased. Within the investment grade bond segment, some highly indebted “old economy” companies are under significant pressure. In high yield, financial discipline has increased since 2015, but lower-quality leveraged loans have surged. An economic downturn would likely provoke a marked rise in defaults. The moderate exposure of banks to leveraged loans limits systemic risks, however.

Whereas housing-related debt and excessive leverage in the financial sector were the key causes of the 2008 financial crisis, debt of non-financial corporates did not create major stresses at the time. While defaults on bonds as well as credit spreads did spike sharply in both the investment grade and speculative grade (high yield) area during the crisis, the increase was fairly short-lived. High yield default rates were less extensive than in the recession of the early 1990s and far lower than in the 2000–02 period (see **Figure 1**), despite the fact that the recession of 2008 was much deeper than the two preceding downturns and the fact that the ratio of (US) non-financial corporate debt to GDP had reached a new peak in 2008 (**Figure 2**). This suggests that the quality of non-financial corporate debt had increased markedly in the post-2002 period, i.e. in the years before the financial crisis.

In the immediate aftermath of the crisis, tight credit conditions and the focus of businesses on re-establishing profitability led to some years of marked corporate deleveraging; the ratio of non-financial corporate debt to GDP declined sharply (**Figure 2**) and credit spreads narrowed considerably, albeit not quite to the lows reached in the mid-2000s (**Figure 3**). However, since around 2013, US non-financial corporates

began to steadily increase their leverage, and the debt-to-GDP ratio rose back to, and even slightly above, the peak reached in 2008. Looking forward, the key question is whether, and to what extent, corporate debt quality has deteriorated and, if so, whether this deterioration poses significant risks. The backup in spreads in 2018 suggests that the market is pricing in a deterioration of credit fundamentals, but also an increase in liquidity risk – the illiquidity premium is the dominant driver of credit spread widening in periods of heightened risk aversion. Overall, the rise in spreads was, however, moderate in 2018, and spreads narrowed again more recently.

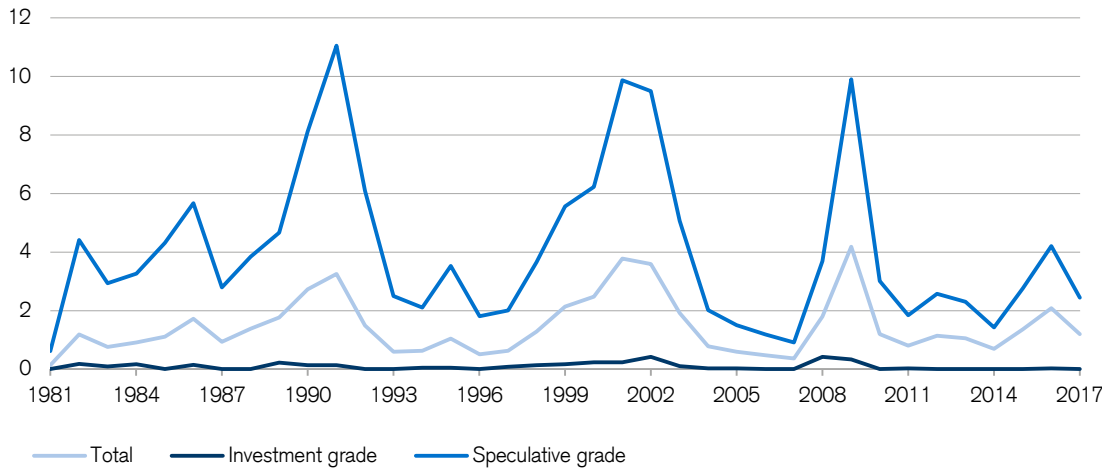
A big shift from banks to bonds since the crisis

As a result of bank deleveraging in combination with the search for yield by investors, non-financial corporations have increasingly funded themselves in bond markets rather than via loans. According to the consulting firm McKinsey¹ the share of bonds in global

1. “Rising Corporate Debt: Peril or Promise?” (McKinsey Global Institute, Discussion Paper, June 2018).

Figure 1: Defaults of non-financial corporates were limited during the financial crisis

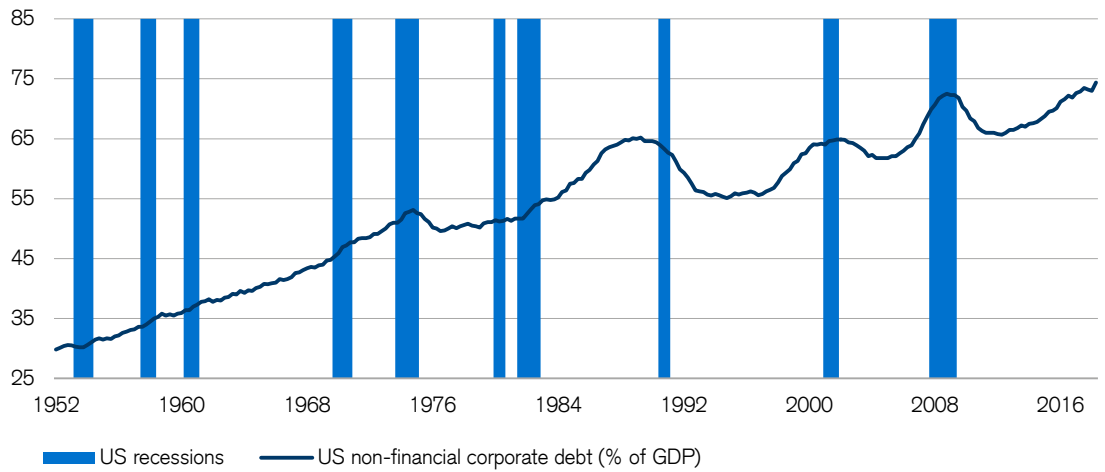
Default rates in %, globally



Source: S&P, Credit Suisse

Figure 2: : US non-financial leverage has risen back to peak levels

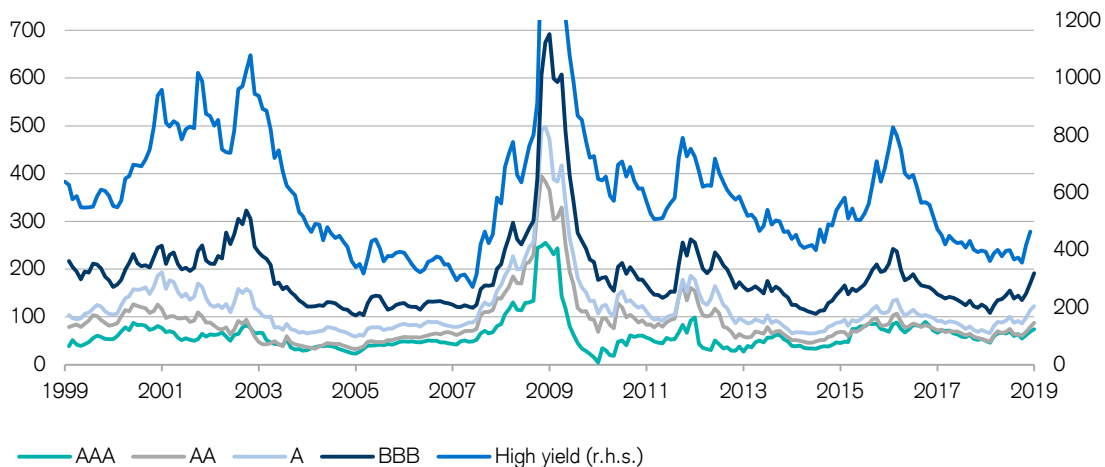
Ratio of US non-financial corporate debt to GDP (%)



Source: BIS, Credit Suisse

Figure 3: Corporate bond spreads dropped to almost mid-2000 levels in the post-crisis period

Interest differential between various US bond rating categories and US Treasuries



Source: The BLOOMBERG PROFESSIONAL™ service, Credit Suisse

non-financial corporate debt reached 19% at the end of 2017, up from 10% in 2000 and 2007. In the USA, the share rose from 19% in 2000 to 34% in 2016.

The share is still lower in Western Europe, where bank finance remains dominant, but here, too, the share of bond financing has also almost doubled from 9% to 17%. In China and other emerging markets, the same trend can be observed. In Brazil, the share has, for example, reached around 25%. It therefore comes as no surprise that corporate bond issuance has increased sharply since the financial crisis (Figure 4). In fact, bond issuance grew at an annual rate of more than 10% between 2007 and 2017, with the USA, Western Europe and China dominating the volumes. In the remainder of this chapter, we will largely focus on US developments, given that they tend to “lead” those in other advanced economies, whereas the evolution and risks associated with China’s corporate debt are addressed in Chapter 5.

As the McKinsey report suggests, a shift from bank to capital market finance does not, in itself, have any implications in terms of systemic risk. In principle, financing via bond markets could allow for a better diversification

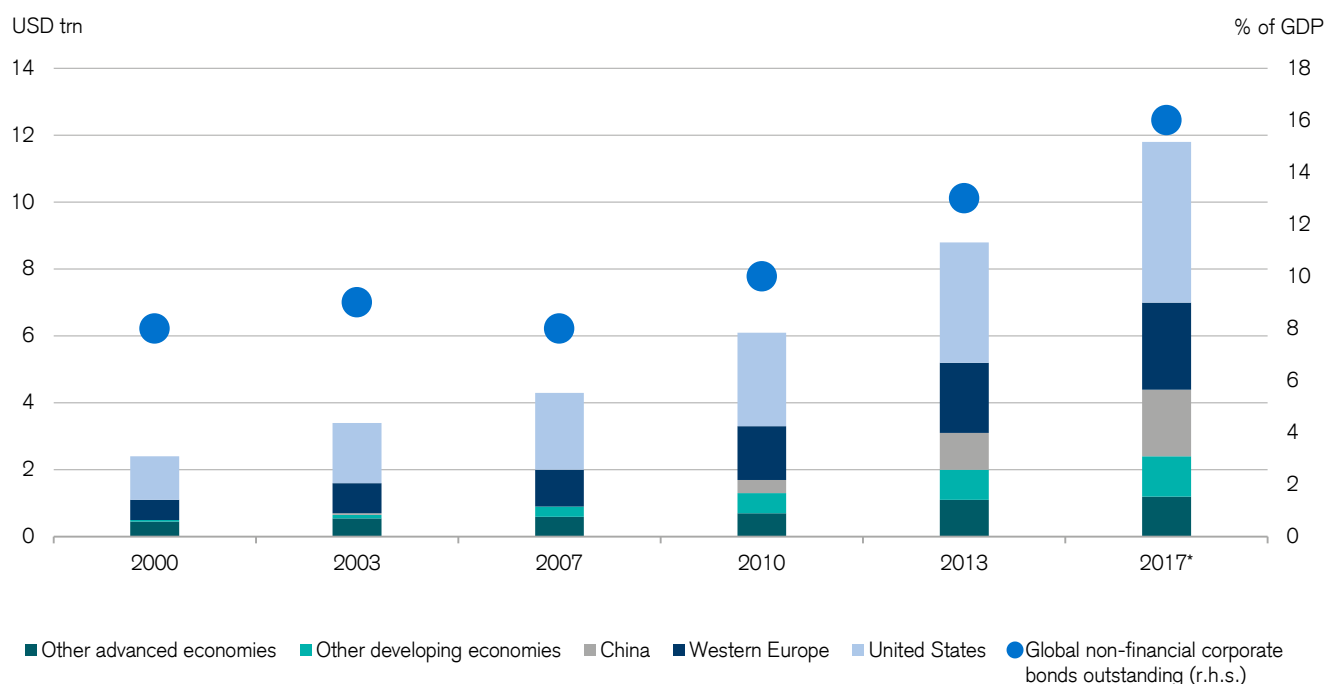
of risks. Moreover, bank finance may imply higher leverage in the system. At the same time, one of the purported advantages of bank finance, i.e. the closer supervision of “agents” (borrowers) by the “principal” (the bank) may be lost, or at least diminished. With the share of institutional investors (i.e. non-banks) providing loan finance having recently reached record highs, this stronger supervision role has arguably also diminished in the area of loan funding. In what follows we look at the shifts within the US corporate bond market in greater detail and try to assess how these have affected financial risks.

Surge in US issuance followed by slowdown

In addition to the factors mentioned above, a number of others likely drove the surge in bond issuance as of late 2013: first, business sentiment gradually improved as the Eurozone crisis drew to an end; second, following the so-called “taper tantrum,” borrowers began to realize that the period of extremely low interest rates would eventually come to an end, which enticed them to lock in still-low interest rates; third, M&A and other “shareholder-friendly” activities increased as the recovery took hold; and finally, high energy prices led to a surge of

Figure 4: Corporate bond issuance has increased massively since the crisis

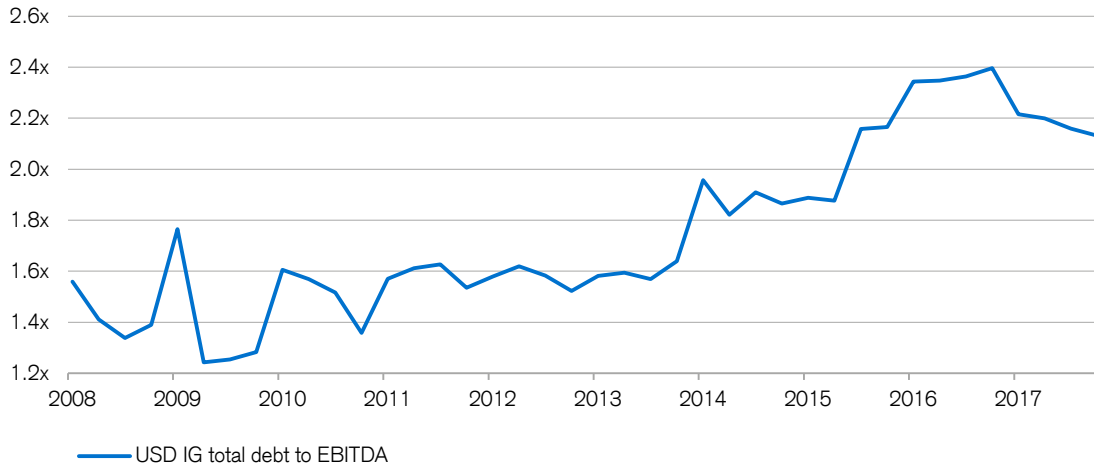
Corporate bonds outstanding in major regions and globally



Source: McKinsey Global Institute

Figure 5a: US investment grade corporate leverage surged after 2013

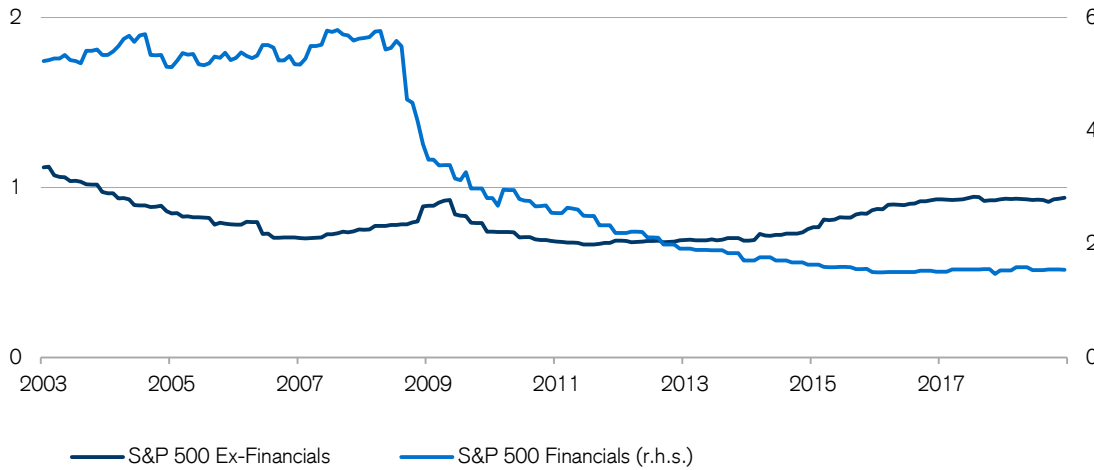
Debt/EBITDA for investment grade non-financials



Source: Factset, Credit Suisse

Figure 5b: Rising leverage for US non-financial corporates since the crisis

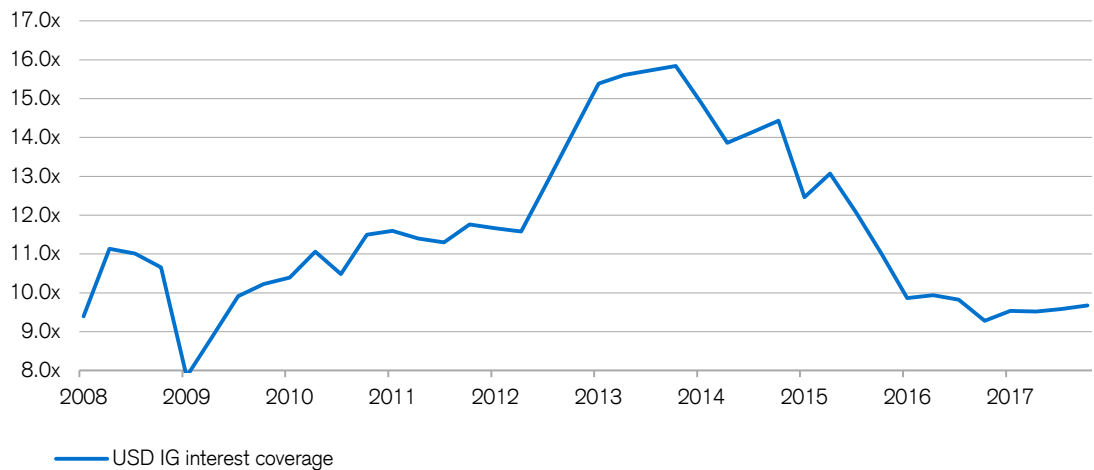
Debt/equity ratio for S&P 500 companies



Source: The BLOOMBERG PROFESSIONAL™ service, Credit Suisse

Figure 6: Decline in interest coverage within investment grade

Ratio of EBITDA to interest payments



Source: Factset, Credit Suisse

debt-financed investment in the US shale industry. Indeed, from 2014 onward, corporate leverage surged; on the measures shown in **Figures 5a and 5b**, non-financial gross corporate leverage is now above levels seen in the pre-financial crisis period and lies at levels similar to the late 1990s, i.e. the period that was followed by significant corporate debt stress. Moreover, the increase in leverage in the investment grade (IG) area also shows up in a decline in interest coverage (**Figure 6**).

That said, interest coverage is still well above the period of high corporate bond stress around the turn of the millennium. Also, **Figure 5a** shows that net leverage remains significantly lower than in the pre-2000 to 2002 dotcom bubble period, because many US corporations still hold very large cash positions. That said, the surge in share buybacks in 2018 has reduced cash positions and boosted leverage to some extent. At the same time, the rise in overall corporate bond issuance abated in the course of 2018 as monetary and financial conditions tightened, with the rate of corporate bond issuance declining below the growth of nominal GDP. In sum, average credit quality has indeed deteriorated within the investment grade area, but the development looks less dramatic

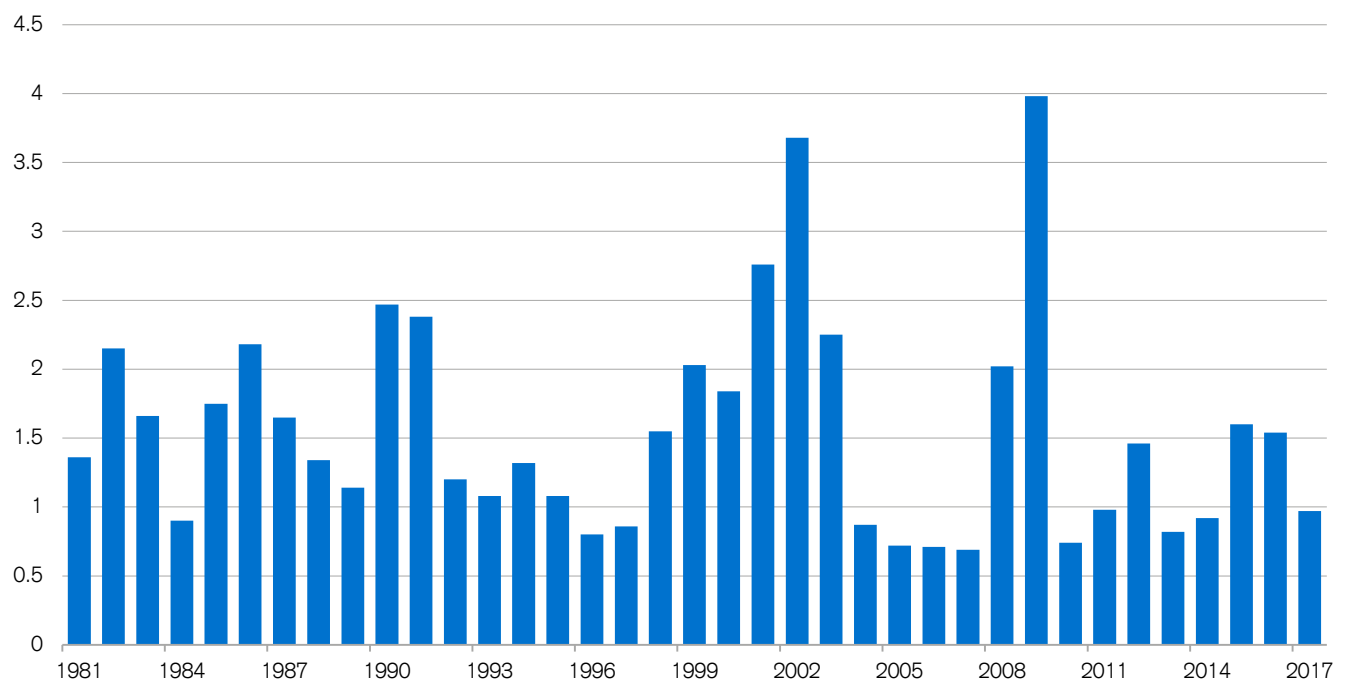
than in the pre-2000 period. Of course, averages probably do not fully capture the risks. Indeed, some large companies in areas such as industrials, autos, retail and utilities are undergoing significant structural change, and highly leveraged real-estate companies are struggling with high debt burdens so that individual defaults cannot be ruled out.

Gradual deterioration of credit quality in investment grade area, but improvements in high yield

At a global level it is, for now, difficult to discover any significant deterioration of credit quality. In fact, rating changes show a close to neutral picture with the rate of downgrades to upgrades having more or less equalized after a period of deterioration in 2015–16. That said, rating changes are a lagging indicator as rating agencies only tend to act after changes in debt servicing capacity have been observed. Still, as compared to the periods around 2000 or 2008–09, the trend is still far less dramatic (**Figure 7**). Digging somewhat deeper, quality deterioration is, however, more clearly visible. For example, within the industrials area, the share of BBB and A-rated bonds was about equal in 2011 at 25% each, but, in the meantime, the

Figure 7: More or less neutral picture with regard to rating changes

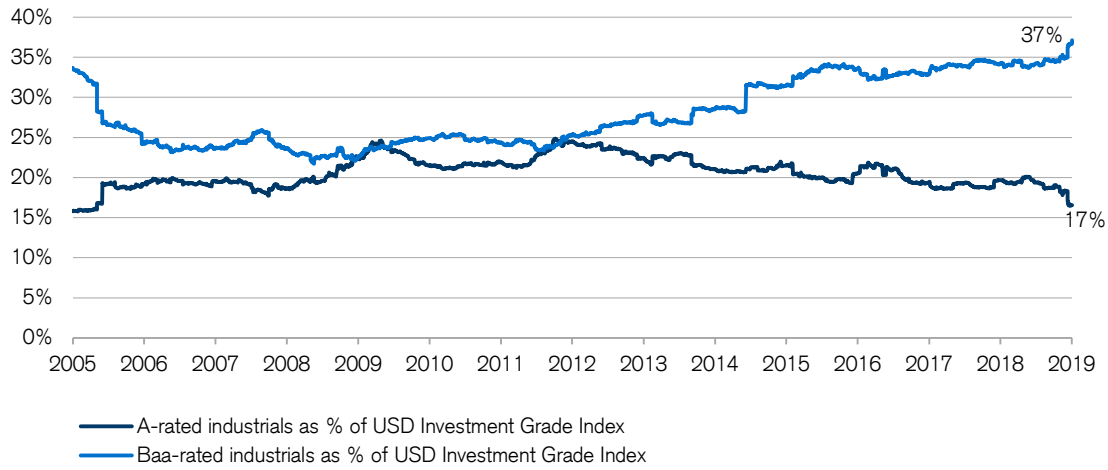
Ratio of downgrades to upgrades, globally



Source: S&P, Credit Suisse

Figure 8: Quality deterioration in US investment grade

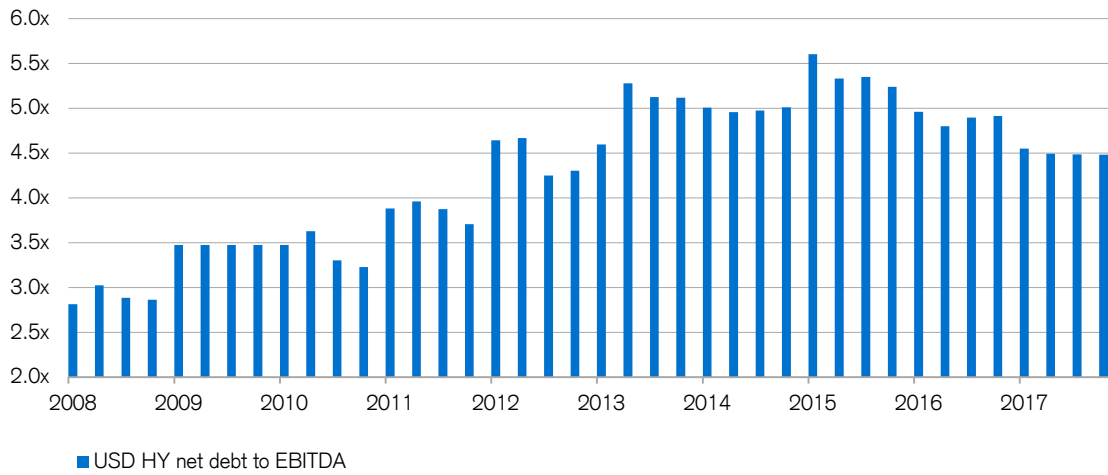
Shares of US industrial sector bonds outstanding within US investment grade universe



Source: Factset, Credit Suisse

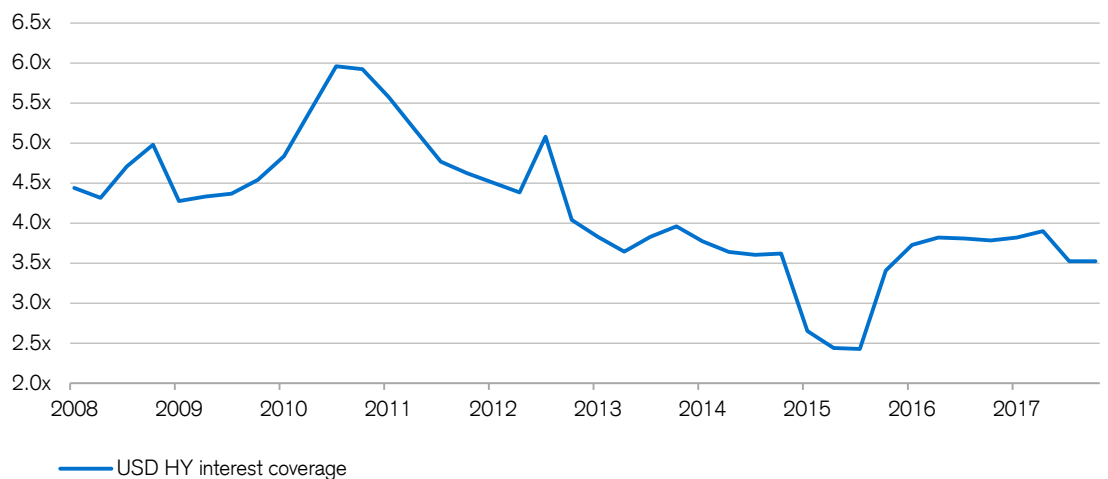
Figure 9: Declining leverage in the high yield area

Debt/EBITDA for high yield companies



Source: Factset, Credit Suisse

Figure 10: Recovery in high yield interest coverage since 2015



Source: Factset, Credit Suisse

share of BBB-rated bonds had increased to above 35% by the end of 2018, while that of A-rated bonds declined to below 20% (Figure 8).

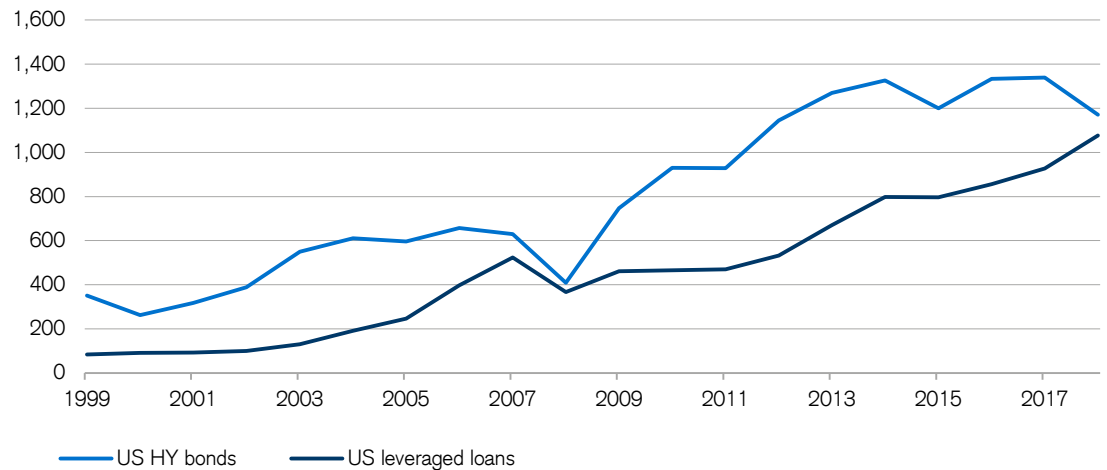
In contrast to investment grade issuers, high yield companies have deleveraged substantially since the 2015 commodity-led downturn (Figure 9), and interest cover has increased (Figure 10); in absolute terms both ratios, of course, indicate far greater vulnerability than for investment grade companies. But, on the whole, high yield issuers seem to have managed their balance sheets in a more defensive manner in recent years.

Rising risks in leveraged loans

More worrying than developments in the investment grade and high yield bond areas is the increase in non-standard forms of corporate debt. Indeed, after a sharp drop of non-capital market forms of funding in the aftermath of the financial crisis, US non-financial companies have, since 2012, once again begun to tap such sources; most notable is the surge in leveraged loan issuance (Figure 11). The latter has been supported by investors attracted by the floating rate structure of such instruments as the Federal Reserve began to

Figure 11: Surge in non-capital-market borrowing

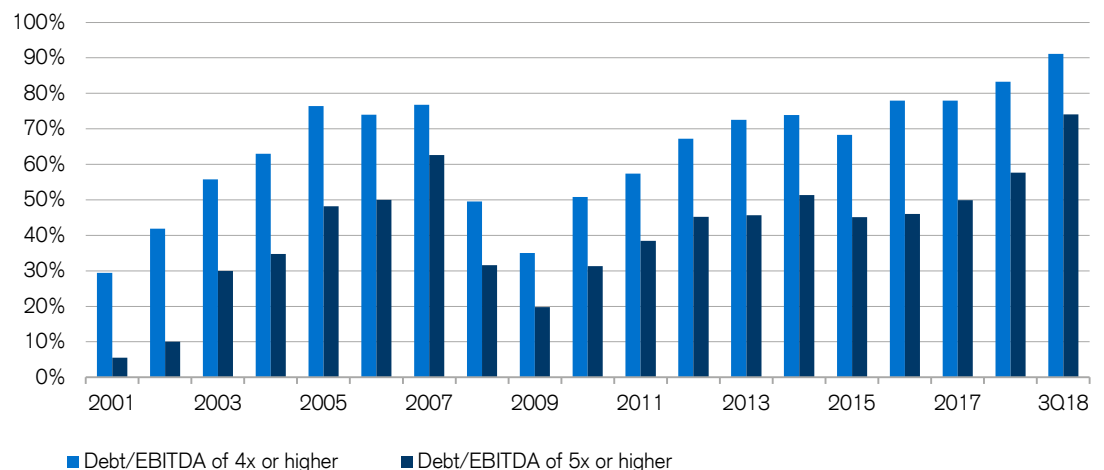
Volumes outstanding in USD billion



Source: Factset, S&P LCD, Credit Suisse

Figure 12: Increasing leverage in the corporate loan market

Debt/EBITDA ratios



Source: S&P LCD, Credit Suisse

raise interest rates. Since 2018, more than 80% of the large corporate loans have been issued by companies with leverage (debt/EBITDA) above 4x and more than 70% with leverage of 5x or higher. For smaller companies, 95% of the issuance stems from companies with leverage above 4x (**Figure 12**). Moreover, issuers have been able to secure funding at very attractive conditions. Indeed, loan issuers have in the past years often been able to renegotiate their credit terms, reducing the spreads over Libor. In addition, so-called “covenant lite loans” have surged, increasing from less than 10% in 2010 to more than 80% in 2018. Also, excluding covenant-lite loans, loan issuance has seen a sharp drop in the number of covenants imposed on issuers. Finally, the absence (or very low usage) of subordinated debt financing in the past few years has also reduced the need to have specific covenants for senior debt metrics.

Defaults to rise, but systemic risks seem limited

Credit quality in the investment grade area has deteriorated and the surge in highly leveraged loans with weak covenants suggests that downgrades (from investment grade to sub investment grade status) could rise significantly if and when a recession occurs; loan recovery rates would also decline meaningfully. Much will, of course, depend on whether, and to what extent, interest rates will continue to rise. Should growth simply moderate and the Fed slow down, or even halt, its rate hiking cycle, the risk of a significant increase in defaults would remain more limited. Moreover, the market stresses of late 2018 have dampened investor euphoria, which will likely lead to much slower growth in leverage finance issuance in 2019. That would also moderate risks going forward. Finally, US banks appear to have significantly reduced their participation in the primary loan market. Given generally stronger bank capital positions, this is arguably the most important reason why systemic risks look more limited, not just than in 2008 but also the post-2000 period (see also Chapter 3).

Performance of debt markets over the economic cycle

Satish Chandra Aluri

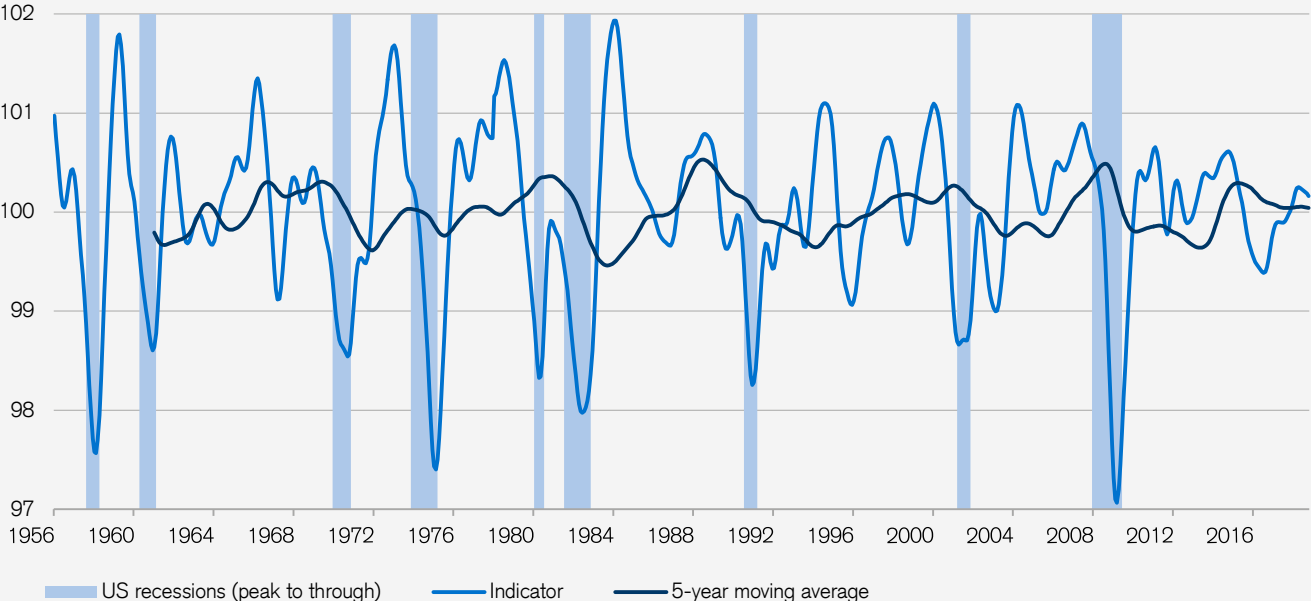
The underlying fundamentals of debt markets are closely linked to economic cycles, with the behavior of major sub-asset classes differing depending on the stage of the cycle. The Credit Suisse Cycle Clock seeks to identify turning points in business cycles and to provide guidance on investment opportunities based on typical performance patterns of assets in the past.

While the USA represents only slightly over 20% of the world economy, it constitutes 54% of the global equity market and 41% of the global bond market; as noted in this chapter, the weight of the US non-financial corporate bond segment in global markets is actually far larger. For this reason, we have developed a "Cycle Clock" for fixed income markets based on the evolution of the US economic cycle. More specifically, we have used

various components of the composite leading indicators for the USA which the OECD publishes on a monthly basis.¹ We identify four cycle regimes, i.e. overheating, slowdown, contraction and recovery, based on predefined rules² and map

1. Our cycle indicator is an average of normalized leading indicators for consumer sentiment, net new orders for durable goods, weekly hours worked in the manufacturing sector, industrial sentiment and yield spreads.
2. "Overheating" is defined as the stage when the indicator is above long-term average and rising; "slowdown" is when the indicator is above long-term average and falling; "contraction" is when the indicator is below long-term average and falling; and "recovery" is when the indicator is below long-term average and rising.

Figure 1: The US cycle indicator



Source: NBER, OECD, Credit Suisse

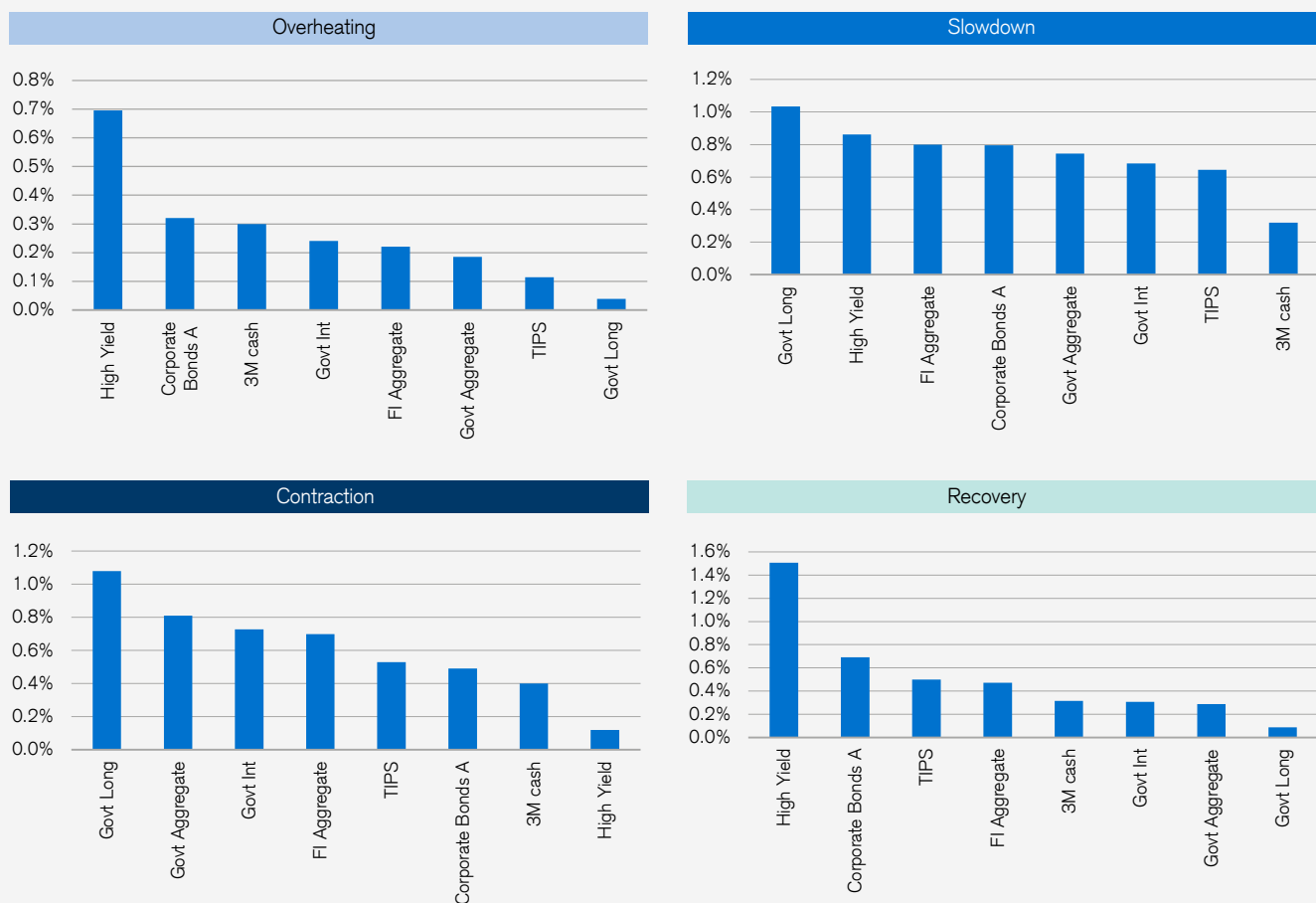
them against recessions as defined by the National Bureau of Economic Research (NBER, see **Figure 1**). We then analyze the performance of fixed income sub-asset classes since the 1970s³ in the different regimes.

Typically, the riskiest fixed income asset class (high yield) does best in the recovery phase, but performance remains robust in overheating as well as slowdown phases. In contraction phases, the highest quality bonds (government) do best, as investors tend to seek protection from risk; high yield is weakest in this regime. Single-A rated corporate bonds are in a middle position

3. Time series for all the government bond and A-rated corporate bond series start in 1973, the Fixed Income (FI) Aggregate in 1976, High Yield (HY) in 1983, Cash in 1986, and TIPS in 1997.

and do fairly well across most regimes. Interestingly, both high yield and single-A corporates perform fairly well in a slowdown period, most likely because central bank easing and the decline in government bond yields remain supportive. As benchmark yields tend to have risen in periods of strong growth, a moderate spread widening that begins when investors fear a slowdown does not seriously harm credit. Finally, and somewhat contrary to intuition, inflation-protected securities (TIPS) do not do best in an overheating period for two reasons: first, higher-risk and growth-sensitive bonds outperform, and, second, inflation tends to be a counter-cyclical variable; it rises most in slowdown phases as well as at the beginning of contraction phases.

Figure 6: Decline in interest coverage within investment grade



Source: Thomson Reuters, Credit Suisse

*All performance numbers are averages of the monthly total returns in the various phases from the inception of the various data series.

FI Aggregate: Barclays United States Aggregate; Govt. Aggregate: Barclays United States Aggregate Government; Govt. Long: Barclays United States Treasury Long; Govt. Int: Barclays United States Treasury Intermediate; Corporate Bonds A: Barclays United States Aggregate Corporate A; High Yield: Barclays United States Corporate High Yield; 3M cash: JP Morgan United States Cash 3M; TIPS: Barclays United States Treasury Inflation Linked Securities.





7. Real estate – some overheated markets, but less toxic debt

Maxime Botteron and Zoltan Szelyes

“Toxic” mortgage debt that financed overpriced real estate lay at the heart of the financial crisis. While the crisis markets such as the USA, Ireland and Spain have rebalanced and households have deleveraged to a significant degree, a number of other real estate markets have been heading for a boom since the financial crisis as declining interest rates have encouraged borrowing and real estate investment.

Owing to high valuations, some of these markets are quite vulnerable to setbacks in our view. However, given tighter regulation and risk aversion of lenders, the financing structures have generally become less risky in both private as well as commercial real estate, while a significant interest rate shock triggering a sharp sell-off seems quite unlikely. Even in countries where risks have built up since the global financial crisis, the “landing” should thus be softer. In emerging markets, debt levels generally seem lower than in advanced economies, but China stands out as a potential risk. That said, implicit government guarantees reduce crisis risks in China, as is the case in the USA where the government agencies support a large share of residential mortgages.

Key factors to consider

The post-2000 real estate boom in the USA and some European countries lay at the heart of the financial crisis: households with limited debt-servicing capacity borrowed heavily, while banks provided credit too cheaply. The repackaging of risky mortgages into leveraged financial products – which in part remained on the balance sheets of banks that are themselves by nature leveraged – amplified the crisis as the rise in interest rates triggered a sharp correction in real estate values and a subsequent recession. Where do we stand today in terms of the risks emanating from the real estate market and its funding?

To assess the risks, we look at the evolution of the key factors that potentially generate a crisis, i.e. the evolution of:

- Real estate markets and their valuations.
- Real estate-related credit.
- Debt levels of households and other borrowers.
- The debt-servicing capacity of households.
- The robustness of real estate financing instruments.

Summary data for the first four of these factors are presented in **Table 1**.

A downshift in credit and property price growth, with some exceptions

The period before the Global Financial Crisis witnessed both very strong credit growth and soaring property prices in many advanced economies. However, since the crisis, both credit growth and property price growth have generally slowed down substantially (see **Figure 1**). At only 0.8% per annum, the growth of household credit was very subdued in the USA in particular; between 2009 and 2017, it ran far below the rate of nominal GDP growth of 3.2%. Overall household debt declined significantly relative to GDP and the debt service ratio dropped off sharply (see the last two columns in **Table 1**).

Table 1: Property prices, credit growth and household debt metrics

	Nominal property prices	Last data point	Price-to-rent ratio	Credit growth	Last data point	Debt-to-GDP	Debt service ratio 2008	Debt service ratio 2017
New Zealand	6.6	4.8	203.7	4.6	5.7	92.2	-	-
Canada	6.0	1.0	199.5	5.3	4.5	99.4	13.1	12.6
Sweden	6.7	-1.7	172.8	6.3	6.5	87.7	11.5	11.4
Norway	6.1	1.7	168.6	6.7	6.2	101.6	16.4	14.8
Australia	6.1	-0.6	167.8	5.9	5.6	122.2	17.2	15.5
Belgium	2.0	3.9	147.4	4.7	4.8	60.6	6.5	7.9
United Kingdom	3.6	3.3	144.5	2.0	3.1	86.1	12.7	9.5
Israel	8.1	-0.2	135.2	6.8	4.7	41.8	-	-
Denmark	1.9	4.8	132.4	0.9	1.1	117.3	22.6	15.4
Ireland	-1.4	12.5	127.2	-4.0	-1.7	46.3	-	-
France	0.6	2.8	126.4	3.7	4.9	58.6	5.9	6.2
Spain	-2.5	6.8	120.5	-2.8	-0.8	60.5	11.7	6.8
Netherlands	-0.1	9.6	116.6	0.9	1.2	104.3	17.8	16.4
Finland	2.0	0.7	115.7	4.4	3.6	66.7	8.1	7.2
Austria	5.5	4.9	113.8	2.0	1.9	48.5	-	-
United States	3.6	6.3	110.1	0.8	3.5	77.3	11.3	8.2
Switzerland	3.1	-0.6	106.8	3.6	3.3	128.3	-	-
Korea	2.1	2.0	105.6	8.0	7.8	95.2	11.6	12.0
Germany	3.3	7.5	98.2	1.4	3.6	52.5	7.9	6.2
Portugal	1.6	11.2	93.8	-1.9	-0.2	68.7	11.2	6.8
Greece	-5.9	0.8	89.2	-3.1	-5.0	55.7	-	-
Italy	-2.0	-0.2	87.3	1.2	1.1	41.0	5.2	4.4
Japan	0.7	2.2	83.3	0.0	2.6	57.4	7.7	6.7

Nominal property prices: Compound annual growth rate in % for the period from 2009 to 2017. Last data point: YoY growth rate of nominal property prices in Q2 2018.

Price-to-rent ratio: OECD standardized price-to-rent ratio, where 100 is the long-term average. Credit growth: Compound annual rate of nominal credit growth to households in % for the period from 2009 to -2017. Last data point: YoY growth rate of credits to households in Q2 2018. Debt-to-GDP: Household debt in % of GDP.

Source: BIS, OECD, Credit Suisse

Meanwhile, US residential property prices have recovered substantially since the crisis, rising slightly faster than GDP per capita, improving the asset values of borrowers (see **Figure 2**). While it is well known that property market developments have differed significantly between regions, with California and New York City, for example, witnessing major booms that could lead to local stresses for some borrowers, the overall market seems well balanced and leverage much less of an issue. In the countries most affected by the Eurozone crisis, particularly Spain, Ireland and Portugal, credit growth has come down sharply and property markets have rebalanced as well. The same goes for the Netherlands and Denmark, which also experienced a boom prior to the crisis. Meanwhile, the rebalancing process is still underway in Greece and Italy.

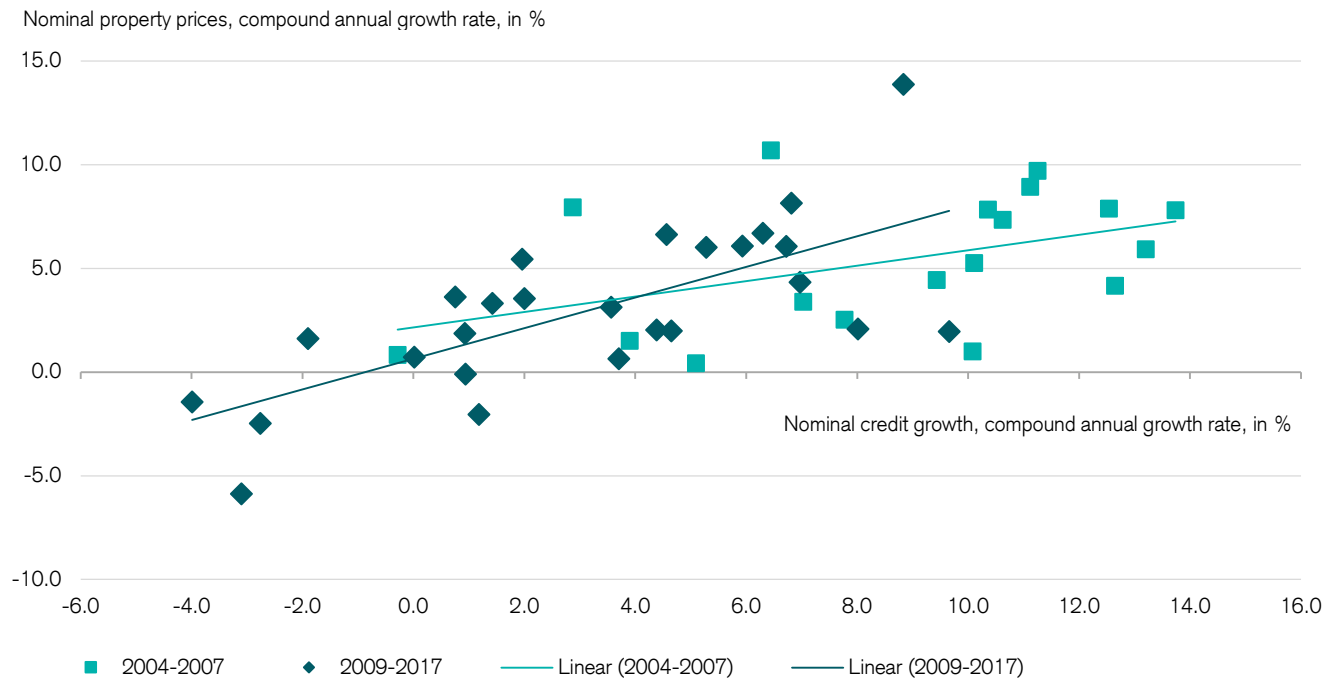
As noted above, a number of countries have had the opposite experience: New Zealand, Canada, Sweden, Norway and Australia have all recorded relatively fast property price growth and rapid credit expansion since 2009. Moreover, property prices are elevated in comparison to their historical average and household debt is high. While property price growth has slowed down

recently in these economies, households continue to borrow at a fairly rapid pace. Further corrections in these real estate markets could therefore cause local stress situations. That said, risks stemming from these markets are quite limited for the global economy, in our view. The five economies represent only around 3% of global GDP and, according to data from the Bank for International Settlements, less than 10% of global household debt. Moreover, their respective housing markets are unlikely to be strongly correlated. The risks are therefore concentrated at the regional or national level.

A closer look at Germany, Switzerland and the UK

While their data stand out less prominently, three markets deserve closer attention, in our view. The first is Germany, which has also experienced a marked real estate boom in recent years, as interest rates dropped sharply in the wake of the Eurozone crisis. That said, real estate valuations are still much less stretched than in other countries that experienced such booms, not least because the German market had been stagnant for many years before. Moreover,

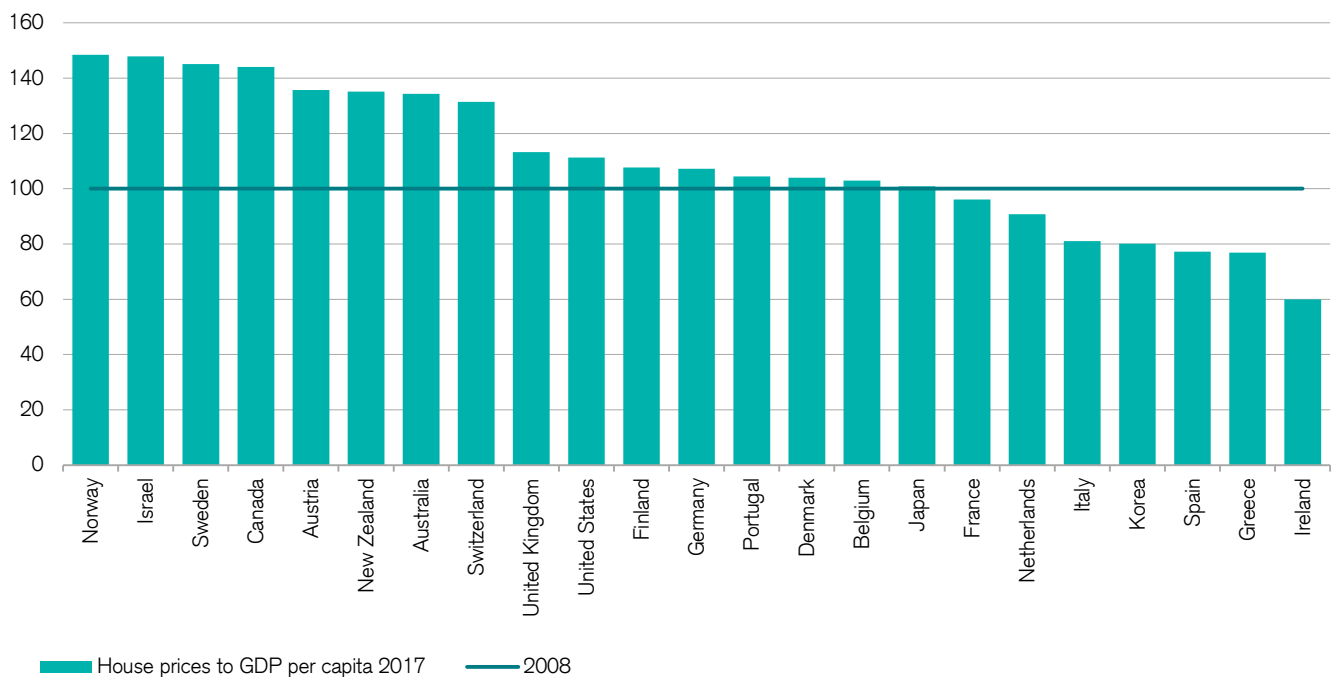
Figure 1: Both credit growth and property price growth have slowed down



Sample: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, UK, USA. 2004-2007: excl. Ireland, Luxembourg, Greece, Spain, Portugal, Japan, Finland, Belgium.
Source: BIS, Credit Suisse

Figure 2: Significant divergences in the evolution of housing affordability

Index (2008 = 100)



Source: BIS, OECD, Credit Suisse

household debt metrics are very moderate by international standards. Nevertheless, if the German market were to turn down contrary to our expectations, the effects would of course be felt beyond Germany given its central role in the Eurozone.

The second market is Switzerland. The Swiss property market has experienced an almost uninterrupted upcycle since 2002, driven by a combination of strong immigration and employment as well as the decline in interest rates during most of the period. Some valuation indicators such as the ratio of changes in property prices relative to GDP per capita are clearly stretched. Moreover, Swiss households have the highest debt-to-GDP ratio in our sample and credit is still growing, albeit no longer at rates that significantly exceed GDP growth. At the same time, affordability measures such as the ratio of house prices to rents remain supportive, and any significant backup in interest rates seems quite unlikely in the foreseeable future. Moreover, most mortgages in Switzerland are at fixed rates, so that the impact of rising rates on household expenditure would be delayed. The biggest risk to the Swiss property market stems more from a decline in global and Swiss economic activity and a reduction of immigration. However, even if property values were to decline, we would not expect a crisis-like development. Indebted households would tend to reduce spending instead, thus weakening the economy. Actual defaults of individual households are unlikely to occur to any meaningful extent – even in the real estate crisis of the early 1990s, such defaults were rare, although the overall losses of the banking system stemming from the downturn in business properties amounted to 10% of GDP, a value similar to the losses generated by the US subprime crisis.

Risks are currently higher in the area of rental apartments, where negative interest rates have triggered a surge of investment and, as a result, oversupply. Vacancy rates continue to rise as the pipeline of construction projects remains elevated. At the same time capitalization rates are at very low levels of 2%–3% and would increase in the case of higher interest rates. This would mean lower property values. That said, much of this investment was undertaken by institutional investors such as pension funds and insurance companies with very limited, if any, leverage. For commercial real estate properties, where values react much more strongly to fluctuations in the business cycle than in residential real estate, we would see some downside risks in the event of an economic downturn in light of higher vacancy rates in recent years. However, data in H2 2018 tended to point more to a

stabilization of this market segment. Moreover, leverage is also limited here, including for the various real estate funds.

Lastly, in the UK, valuations of residential property are in uncomfortable territory considering the risks emanating from Brexit. That said, the overall UK housing supply is still lagging in demand, not least due to restrictive building regulations. Moreover, overvaluation is largely concentrated in parts of London, where house prices have already started to correct downward. The situation is much more difficult to assess in emerging economies due to the lack of precise data. But, in general, debt levels of property owners are lower than in advanced economies, mitigating the risks associated with real estate. That said, the strong growth of household borrowing in China could be a risk should asset values fall for a prolonged period. In some regions, oversupply could lead to substantial price corrections. Moreover, in recent years, Chinese households have also borrowed significantly and the burden from debt service has risen significantly. A fully fledged debt crisis seems unlikely, however, as much of the credit has effectively been provided by state-owned banks. The impact of a further downturn in the real estate sector would thus boost government liabilities and might also constrain consumer spending. We discuss the debt situation in China in greater detail in chapter 5.

Evaluating stability risks from the creditor's perspective

Real estate finance makes up a significant portion of overall lending in the economy. Hence significant fluctuations of real estate prices can have a major impact on the balance sheets of financial institutions as well as institutional and private investors, and in extreme situations undermine overall financial stability. However, the fact that real estate-related debt is very high simply shows that real estate assets are huge as well: real estate is the largest asset class in the world. At the end of 2017, the total value of real estate globally stood at around USD 253 trillion according to the estimates by Savills,¹ an international real estate advisory firm. The corresponding global value for stocks and bonds was around USD 83 trillion and USD 105 trillion, respectively, while global GDP was at USD 78 trillion. Moreover, the fact that real estate is under normal circumstances a relatively safe “real” asset class, encourages lending against these assets. Residential real estate debt makes up the lion's share of debt outstanding in most advanced economies. In

1. <http://www.savills.com/impacts/economic-trends/8-things-you-need-to-knowabout-the-value-of-global-real-estate.html>

Table 2: Real estate debt outstanding in the USA, UK, Germany and Switzerland at end-2017

In USD billion

"Volume of loans outstanding at the end of 2017 (in USD bn)"	Residential real estate debt*	CRE and multi-family debt	Total real estate debt	Total mortgage debt as % of GDP
USA	10,606	4,174	14,780	75%
UK	1,776	259	2,035	77%
Germany	1,525	289	1,814	48%
Switzerland	733	240	973	146%

For the UK, Switzerland and Germany, the breakdown between residential and commercial relies on estimations and assumptions. *Residential real estate includes only owner-occupied real estate. Source: VPD, Fed, BoE, SNB

Table 2, we break down the aggregate volume for the USA, UK, Germany and Switzerland. The USA is the largest and most developed real estate debt capital market globally, with over USD 14 trillion of real estate debt outstanding. The UK is the largest and most transparent European real estate market with around USD 2 trillion of mortgage debt outstanding. Relative to its size, Switzerland also has a very high stock of real estate-related debt of almost USD 1 trillion, or 146% of GDP.

High real estate values as well as low interest rates and tax incentives that reduce the need for direct amortization of mortgage debt have boosted debt over the years. Germany continues to lag many other advanced economies in terms of debt-to-GDP ratios. But, in recent years, the boom in residential real estate has led to a substantial increase in the debt stock as well.

A similarly precise analysis is not possible for China due to limited data availability. However, estimates suggest that, of the USD 26.5 trillion (or 215% of GDP) of debt outstanding at the end of 2017 in China's non-financial sector, only about 20 percentage points were owed by households. Still, mortgage debt has been rising fast since the financial crisis, especially in urban areas. Mortgage debt now amounts to about 50% of urban disposable income and interest payments as a share of disposable income have also increased significantly. That said, as in other countries, the risk of default is arguably higher in other segments, e.g. among property developers that are highly leveraged.

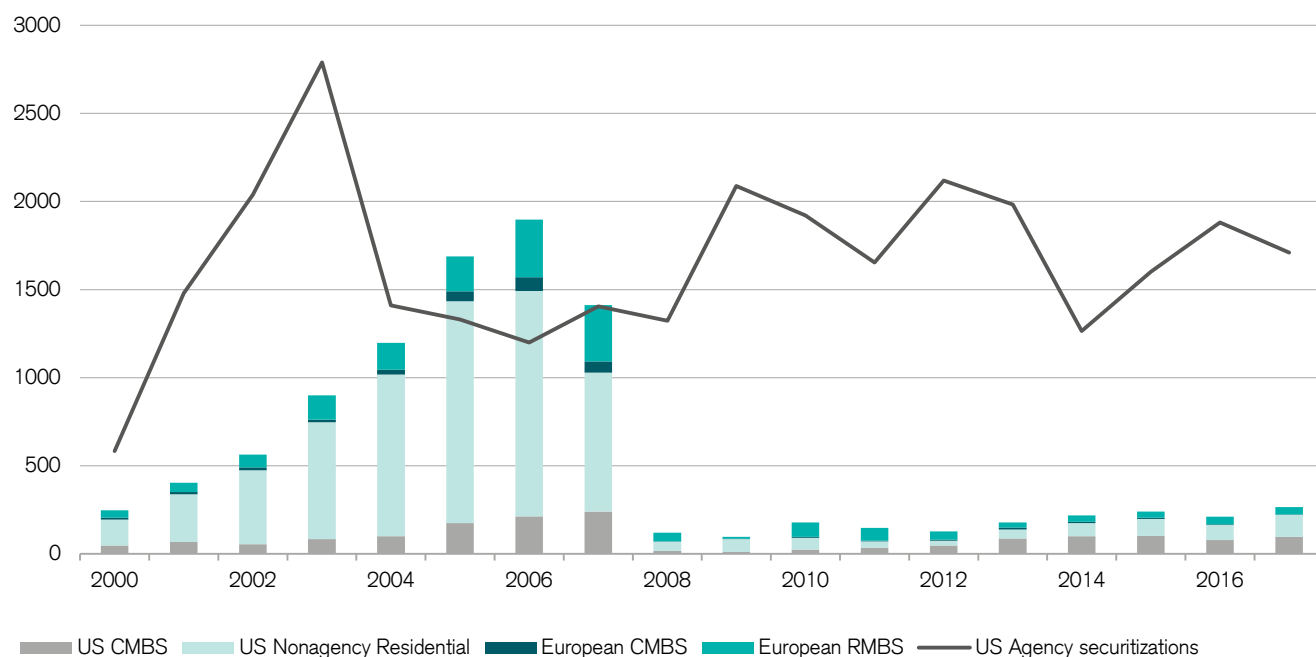
Covered bonds and securitization markets since the Global Financial Crisis

Real estate loans have traditionally been held on the balance sheets of banks and were funded by short-term liabilities (mostly retail deposits or money market liabilities.) With mortgages typically exhibiting longer maturities, an asset and liability mismatch has often resulted. The motivation to reduce this mismatch has led to two alternative funding models in Europe and the USA. In continental Europe, banks have resorted to the concept of covered bonds (also known as Pfandbriefe) to fund their mortgage lending activity. At the end of 2017, there was a total value of more than EUR 2.5 trillion of such bonds outstanding, with institutions from Germany, Denmark, Switzerland, UK, Spain as well as Ireland issuing covered bonds backed by mortgages.

In the USA, an important share of mortgage lending is funded by means of securitizations. One can generally distinguish between private sector securitizations where investors are fully exposed not just to interest rate and prepayment risks but also to mortgage losses, and credit backed by explicit or implicit governmental guarantees. The latter, also known as agency mortgage-backed securities (MBS), are typically issued by government related entities such as Fannie Mae or Freddy Mac.

Figure 3: Evolution of mortgage securitization issuances

In USD billion



Source: Association for Financial Markets in Europe (AFME), Securities Industry and Financial Markets Association (SIFMA)

Figure 3 shows the evolution of annual issuance volumes of private and agency securitizations. Private mortgage securitization grew rapidly in the years before the Global Financial Crisis; the most dominant evolution was the strong rise in the issuance of private label residential mortgage securities, which overtook that of agencies in 2005 and 2006. The lion's share of those originations was backed by lower-quality "subprime" and "Alt-A" mortgages, where underwriting standards deteriorated massively between 2004 and 2007. Securitizations also spread to Europe.

After 2008, issuance of private sector securitizations virtually collapsed. On the one hand, banks became more risk averse. On the other hand, subsequent banking and insurance market regulation was introduced that reduced the incentives for securitizing privately issued mortgages. Over the last three years, US commercial mortgage-backed security (CMBS) and private label residential mortgage-backed security (RMBS) issuance volumes have started to increase again, but the issuance volumes in both segments still reached only around USD 100 billion in 2017. Meanwhile, US agency securitizations have gained market share since 2008. In fact,

many US banks largely fund the origination of residential mortgages via the subsequent sale to the government sponsored enterprises (GSEs).

As noted on page 66, shadow banks have also expanded strongly in the lower-income Federal Housing Administration (FHA) guaranteed segment. Agency MBS were also supported by US Federal Reserve (Fed) purchases during its QE program; in mid-2018, the Fed held USD 1.7 trillion of the total amount of outstanding agency securitizations of USD 8.1 trillion. Effectively, a significant share of real estate-related residential debt risk has been transferred from the private sector to the US government. That said, after having suffered heavy losses in the financial crisis, the GSEs have become increasingly profitable and no longer represent a major burden on the public sector.

In Europe, mortgage securitization was even more marginalized as banks shifted back to traditional mortgage lending. In 2017, around USD 40 billion of residential mortgage securitizations were placed with investors. CMBS issuance was only at USD 1 billion in 2017, although some investment banks tried to relaunch the market in 2018.

Figure 4: Private real estate debt funds are a growing segment

“Dry powder,” in USD billion



Source: Preqin

Quality improvement of lending instruments

More restrictive financial regulation and reduced risk appetite of banks significantly impacted debt underwriting. The US agencies, in particular, have tightened their underwriting standards since the crisis. With the share of agency MBS rising, the quality of debt has thus increased. In many other countries that had experienced problems in residential real estate such as Spain, Ireland and the UK, underwriting standards have been significantly tightened as well.

For commercial real estate in the USA and Europe, we also observe a tightening in underwriting standards. Maximum loan-to-value ratios are typically 10%–15% lower than before the Global Financial Crisis and debt service coverage ratios are now substantially higher. Most banks only originate commercial mortgages up to loan-to-value (LTV) ratios of 50% or 60% depending on the country. They have also become more selective regarding the location, building characteristics as well as credit risks of the tenants.

The decline in LTVs has limited issuance and reduced risks (i.e. raised the quality of debt). Meanwhile, prices have increased and margins (spreads over swap rates) for senior secured

mortgages have tightened in recent years. At the end of H1 2018, the margins on senior loans at 50% LTVs backed by prime commercial real estate at central business district (CBD) locations were at only 100 basis points in Germany, 125 basis points in France and the Netherlands versus 175 basis points in the UK and USA, i.e. they are not much higher than the depressed margins of below 100 basis points that were observed in many countries before the Global Financial Crisis. However, while these tight spreads suggest that returns will be much lower going forward, they do not necessarily indicate the risk of a major setback or crisis.

Higher prices in the lower LTV segment have created a market potential for non-listed private real estate debt funds, which are similar in structure to private real estate equity funds. Their assets are commercial real estate loans with different risk profiles, such as senior secured mortgages, junior mortgages, whole loans or mezzanine debt. There exist both debt funds with high internal rate of return (IRR) targets of over 15% and low-risk funds targeting low distribution yields or specific spread levels. While these funds have grown in past years and are likely to continue to grow in the absence of a crisis, their size is still moderate and far lower than private real estate equity funds (see **Figure 4**).

Risks also reduced in commercial real estate lending

Despite the fact that the financial crisis was triggered by subprime lending for residential real estate, it was in most cases their exposure to commercial real estate that brought down more than 492 smaller regional US banks in the course of the financial crisis.²

With commercial real estate prices falling by more than 50% from the peak in 2007 to the trough in 2010, many commercial real estate and construction project loans became “toxic.” However, from 2010 onward, US commercial real estate prices staged a strong recovery that generated double-digit total returns for investors between 2010 and 2016. Since then, US returns have moderated to around 6% p.a. In Europe, commercial real estate markets essentially suffered two setbacks: first, commercial real estate prices weakened due to the effects of the financial crisis, albeit to a lesser extent than in the USA. A second dip was caused in 2011–13 by the euro crisis especially in Southern Europe, Ireland and the Netherlands. As a consequence, the recovery in Continental Europe only began to gather pace in 2014 and it continues to lag behind the US cycle. However, in most major global gateway cities in Europe, Asia and the Americas, the prices of office properties have significantly surpassed the levels of the last peak, while yields have reached all-time lows.

While commercial real estate also looks overvalued on absolute pricing and yield levels, the relative valuations are generally less stretched, with risk premiums still significantly above the post-2000 average; in Japan, valuations also remain supported by the ongoing zero interest rate environment. Due to limited construction activity, rents have also tended to be supported. Risks are greatest in those markets where property yields do not offer a clear premium versus government bonds and where the rental cycle is weak. This is, in our view, the case in some US cities, such as New York and San Francisco, where yields have declined significantly while interest rates have risen. In Italy, the rise in the risk premium on government bonds significantly reduced the premium of commercial real estate in the course of 2018, but government bond yields declined again toward the end of 2018.

Less leverage in commercial real estate as well

Finally, the current cycle in commercial real estate differs considerably from the last one. In the current cycle, buyers such as pension funds, sovereign wealth funds or other sources of institutional capital have dominated transaction activity, and many transactions have been concluded without resort to debt. The rising allocation of these investors to real estate is the consequence of a lack of return that can be generated with traditional fixed income assets, but it is not due to the search for levered returns. It therefore also seems likely to us that, when the cycle turns, the potential decline in value will be shallower. Moreover, it seems likely that equity investors rather than traditional (leveraged) lenders will be affected. While asset values would suffer, a systemic crisis emanating from real estate thus seems fairly unlikely to us. Importantly, a major rise in interest rates also looks unlikely from the current vantage point. The low margins for low LTV debt suggest on the other hand that there is not much value left for investors in this segment. Moreover, we believe investors are not adequately compensated for the lack of liquidity. Conversely, there may be opportunities in higher risk segments, such as so-called “whole loans” or “stretch senior mortgages” (where LTVs go up to a maximum of 75%); here, margins are somewhat higher, also because there is less competition in this segment. If we are correct in saying that peak-to-trough losses will be more muted in the current cycle, this segment should not suffer significant shortfalls.

2. For more details see the abstract of <https://www.bis.org/publ/work530.pdf>: “The main “toxic” exposure of the bank failures was credit to non-household real estate borrowers, not traditional home mortgages or agency MBS”

Table 3: Real estate debt outstanding in the USA, UK, Germany and Switzerland at end-2017

In USD billion

Prime office markets	NY	Tokyo	London	Berlin	Paris	Milano	Zurich
Currency	USD	JPY	GBP	EUR	EUR	EUR	CHF
Prime office yield	3.80%	2.50%	4.00%	3.00%	3.00%	3.50%	2.50%
Current office risk premia in bp	60	235	230	250	210	-10	240
Historical average office of risk premia	199	291	133	217	193	140	180
Rental market cycle	Late cycle	Late cycle	Ongoing rental decline	Further rental upside	Further rental upside	Late cycle	Stabilization after rental decline

Source: PMA, Credit Suisse



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