# ASSESSMENT of RISKS to the FRENCH FINANCIAL SYSTEM

**June 2018**

*Finalised on 14 June 2018*

BANQUE DE FRANCE
EUROSYSTÈME

# PREFACE

The assessment of risks and vulnerabilities in the French financial system brings together analyses prepared by staff from the Banque de France and the Autorité de contrôle prudentiel et de résolution (ACPR – Prudential Supervision and Resolution Authority). The exercise is steered and coordinated by the Banque de France's Financial Stability Directorate, and a report is published twice annually, in June and December. The process is part of the financial stability assignment entrusted to the Banque de France by Law No. 2013/672 of 26 July 2013 on the separation and regulation of banking activities, and is coordinated with France's Haut Conseil de stabilité financière (HCSF – High Council for Financial Stability).[1]

The following report seeks to identify the risks and vulnerabilities present in the French financial system along with the system's strengths and sources of resilience. This analysis is used in particular to inform the deliberations of the Banque de France's governing authorities, the college of the ACPR and the HCSF. It also seeks to provide support for the proposals on macroprudential policy made by the Governor of the Banque de France to the HCSF and, where applicable, to assess the impact of these proposals on financial stability.

François Villeroy de Galhau
Governor of Banque de France

1 *The High Council for Financial Stability (HCSF) is the French macroprudential authority charged with supervising the financial system as a whole, with the aim of safeguarding its stability and ensuring that the financial sector makes a sustainable contribution to economic growth (Article L. 631-2-1 of the French Monetary and Financial Code). The HCSF has a total of eight members: five ex officio members, and three qualified persons selected on the basis of their skills. The ex officio members are the French Minister of the Economy and Finance, the Governor of the Banque de France and Chairman of the ACPR, the Vice-Chairman of the ACPR, the Chairman of the Autorité des Marchés Financiers (French Financial Markets Authority), and the Chairman of the Autorité des Normes Comptables (French Accounting Standards Authority).*

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# 1 Summary: Assessment of risks to the French financial system

The Banking Act of 26 July 2013 states that "the Banque de France shall work with the *Haut Conseil de Stabilité Financière* (HCSF – High Council for Financial Stability)[1] to ensure the stability of the financial system". As part of this, the Banque de France publishes a semi-annual assessment of risks to the French financial system, which brings together analyses prepared by Banque de France and *Autorité de contrôle prudentiel et de résolution* (ACPR - French Prudential Supervision and Resolution Authority) staff. This offers a way for the Banque de France to share its analysis of France's current situation in terms of financial stability. The report is also used to support binding macroprudential measures that the Governor of the Banque de France recommends to the HCSF for adoption.

The assessment presents risks to the French financial system in three main categories: risks linked to the macroeconomic environment, risks to financial institutions and market risks. These various risks, which may be connected, are set against a low interest rate environment that presents the financial sector with structural challenges, including the quest for profitability and challenges relating to technological innovation.

## Macroeconomic environment

The global economic recovery appears to be continuing. Economic growth came out at 3.8% in 2017 and is set to reach 3.9% in 2018 and 2019 according to forecasts from the International Monetary Fund (IMF). The overall outlook for the euro area also remains positive, with expected growth of 2.1% in 2018, after 2.6% in 2017, as the labour market improves markedly and global demand firms.

In this more upbeat international environment, French growth took off in 2017, climbing to 2.3%. According to Banque de France projections finalised in late May 2018, French GDP should remain robust in 2018, expanding at 1.8%, before easing slightly to 1.7% in 2019 and 1.6% in 2020, while remaining above current potential growth estimates. Average annual inflation is expected to increase temporarily to 2.0% in 2018 and then fall back to 1.5% in 2019. It is projected at 1.8% in 2020.

Risks to the real GDP projection look balanced. Reforms currently underway and in the pipeline for France could translate into supplementary potential growth before the end of the projection period. Conversely, the international political situation represents a source of downside risk. In particular, political uncertainty has increased significantly in Italy. US trade policy could also affect demand for products and services from Europe in general and France specifically, which would have a bearing on the capacity for a rebound in our exports. These risks may be partially offset by the prospect of expansionary fiscal policies by euro area countries running fiscal surpluses, such as Germany. We have not integrated this possibility into our projections at this stage. In the medium term, however, the risks to economic growth are being fuelled by pockets of financial vulnerability that can be observed worldwide, including in Europe. Areas of concern include mounting private debt, growing risk appetite, persistent political and economic uncertainties at the global level and rising protectionism.

1 *The HCSF is the French macroprudential authority in charge of monitoring the financial system as a whole, with the aim of safeguarding its stability and ensuring that the financial sector makes a sustainable contribution to economic growth (*Article L. 631-2-1 of the French Monetary and Financial Code*). The HCSF has a total of eight members: five ex officio members, and three qualified persons selected on the basis of their skills. The ex officio members are the French Minister of the Economy and Finance, who chairs the council, the Governor of the Banque de France who is also Chairman of the* Autorité de Contrôle Prudentiel et de Résolution *(ACPR – French Prudential Supervision and Resolution Authority), the Vice-Chairman of the ACPR, the Chairman of the* Autorité des Marchés Financiers *(AMF – French Financial Markets Authority), and the Chairman of the* Autorité des Normes Comptables *(ANC – French Accounting Standards Authority).*

## Identified risks

**1. Risks linked to private sector debt: the ongoing rise in the indebtedness of non-financial companies (NFCs) and households contrasts with trends observed in other European countries. NFC debt dynamics could be a source of cyclical risks. Growth in household lending remains sustained, and calls for careful monitoring in the face of a possible easing of lending conditions.**

The assessment highlights positive prospects for business conditions and reveals that the French financial cycle[2] continues to gather pace, after accelerating for several quarters. **The financial cycle may be linked to, but should not be confused with, the business cycle, which tracks economic activity.** So although it goes with improving business conditions, the pick-up in the French financial cycle, potentially beyond the economic fundamentals, could drive the formation of financial imbalances that might play an accelerating role in the event of a shock or a reversal in activity.

**The continued increase in indebtedness of non-financial companies (NFCs) and households, measured as a percentage of GDP, contrasts with the change observed in other European countries:** NFC and household debt was equivalent to 130% of GDP in the final quarter of 2017, with NFCs accounting for 72 percentage points and household debt for the other 58 points.

Growing NFC debt reflects a **structural financing need** (investment and inventories) specific to French NFCs, against the backdrop of persistently low interest rates and a substantial build-up in short-term cash holdings. Recent NFC debt dynamics have been driven not only by growth in bank credit but also by a more muted increase in fixed income securities, with total outstanding debt swelling to **EUR 1.645 trillion at end-2017**. Since mid-2016, outstanding bank loans have increased relatively steadily, rising by 5.8% year-on-year (yoy) in Q4 2017, while market debt has grown vigorously despite marking time since mid-2017, with 1.9% yoy growth in Q4 2017. Moreover, the current appetite among non-bank investors for leveraged loans (to finance risky transactions) and high-yield bonds could cause financial imbalances to emerge. A careful watch needs to be kept on the sustainability of NFC debt trajectories and the sensitivity of their financial health to a rise in interest rates.

**Risks related to household debt look more diffuse.** The situation primarily reflects the real estate cycle, which has accelerated recently. The debt-to-GDP ratio for French households is in a median position relative to other major European countries, but has been rising constantly since 2011, whereas it has mostly fallen elsewhere. The increase in debt – the total outstanding amount reached **EUR 1.320 trillion**[3] in Q4 2017 – reflects vibrant growth in consumer credit (especially car loans) and home loans. While home loans account for the lion's share of bank debt, at EUR 960 billion out of a total EUR 1.166 trillion in loans taken out by individuals, and have been sustained in part by increased financing for buy-to-let investments, credit risk on this type of loan is contained by characteristic features of the French market, including fixed interest rates and guarantee mechanisms.

However, with property prices picking up speed since mid-2016, lending conditions have been eased somewhat, making this an area to monitor.

**2. Market risks: the threat of a sudden correction in risk premiums is rising as markets continue to exhibit favourable momentum for equities and bonds, driven by procyclical behaviour that reflects substantial appetite for risk. Economic and**

*2 The financial cycle can be defined as substantial and persistent differentials recorded for financial variables, such as asset prices and new loans, relative to their equilibrium trend levels.*

*3 Household debt as measured by the National Accounts, i.e. including individuals and individual entrepreneurs.*

**political uncertainty has intensified and could be a source of instability, particularly in connection with US economic policy and the Italian situation.**

Vulnerabilities are growing on global financial markets, some segments of which are being transformed by technological innovation. The risk of a sudden correction in bond and equity risk premiums is rising as financial market valuations continue to head upwards, driven by procyclical behaviour reflecting substantial appetite for risk.

There are **concerns about increased volatility**, with US and euro area stockmarkets hitting volatility peaks in the last four months, ending a spell of historically low volatility. Elsewhere, there are worries about **stretched equity valuations, especially in the USA and France**. On these markets, upside revisions to expectations about monetary policy normalisation and uncertainty over geopolitics and fiscal and trade policies are introducing potential sources of instability.

Investors are also exhibiting appetite for risk on **fixed income markets, which are posting high valuations**, particularly on the high-yield bond market.

Market sentiment is bullish overall for the time being. Yet it looks unstable, as illustrated by recent stress in some emerging countries (which are highly exposed to the risk of capital outflows in the context of US monetary policy normalisation). In Europe, recent political developments in Italy are raising concerns, which carry the threat of a spillover to other countries and to the European banking sector.

Elsewhere, monetary and prudential authorities are keeping a close eye on technological innovations, particularly those relating to the development of cryptoassets, which could spur the emergence of new risks.

**3. Risks linked to the interest rate environment in Europe: financial institutions remain resilient in a context of historically low interest rates and positive macroeconomic conditions. The possibility of a sharp rise in long-term interest rates continues to represent a potential source of risk.**

The **risks facing French financial institutions are broadly unchanged from those reported in the December 2017 assessment**. The banking sector and insurance sector alike continue to demonstrate their resilience.

While a gradual rise in interest rates theoretically favours financial institutions, i.e. banks and insurers, a sudden increase presents them with risks, notably for their asset/liability management and valuation of their securities portfolios. Conversely, a scenario of persistently low interest rates could undermine their profitability.

The largest French banking groups maintained their overall profitability in the second half of 2017, particularly thanks to strong non-interest income and the ongoing decline in the cost of risk. Even so, their profitability, which has already been impacted by waves of home loan buybacks and renegotiations, will continue to bear the burden of loans contracted at low rates in the coming years. The low interest rate environment may also have encouraged additional risk taking by institutions in some sectors. Although this trend looks to be contained for now because the overall quality of credit portfolios is improving, a number of risk areas need to be monitored, particularly leveraged buyouts (LBOs) and the potential easing of lending conditions.

The insurance sector faced major changes in 2017, including modified termination terms for creditor insurance contracts, announced amendments to tax treatment, and repeated natural disaster events. French insurers continued to display resilience, however, adapting to the low interest rate environment and posting better solvency

ratios than in 2016, averaging solvency capital requirement (SCR) coverage rates of 234% on a solo basis and 212% on a group basis, reflecting the increase in capital set aside to cover risk.

### 4. Risks linked to structural changes in the financial system: rising operating costs remain an area to watch as financial institutions forge ahead with efforts to adapt and transform their business models

The financial system continues to face structural challenges, including controlling costs in a low interest rate environment, identifying new profit sources in different business lines, such as market activities, insurance and asset management, and coping with persistent legal risks and disputes, regulatory and compliance costs and competition from non-banks. In recent years, French banks have implemented cost-cutting plans that have generated immediate albeit non-recurring restructuring expenses whose effects will take time to be felt. This is reflected in the cost-to-income ratio for France's six largest banks, which climbed from 66.5% in 2012 to 68.7% in 2017. That said, this level is comparable to the European median of around 69%. Difficulties in curbing operating costs are shared by many financial institutions throughout the euro area, where such expenses rose by 11% between 2011 and 2017.

Table 1

Summary of the main risks to the french financial system in june 2018

| Main risks to the French financial system | Level and outlook |
|---|---|
| **1. Risks linked to private sector debt**<br>The ongoing rise in the indebtedness of non-financial companies (NFCs) and households contrasts with trends observed in other European countries. NFC debt dynamics are a source of cyclical risks. Growth in household lending remains sustained and calls for careful monitoring in the face of a possible easing of lending conditions. | ↑ |
| **2. Market risks**<br>The threat of a sudden correction in risk premiums is rising as financial markets continue to exhibit favourable momentum for equities and bonds, driven by procyclical behaviour that reflects substantial appetite for risk. Economic and political uncertainty has intensified and could be a source of instability, particularly in connection with US economic policy and the Italian situation. | ↑ |
| **3. Risks linked to the interest rate environment in Europe**<br>Financial institutions remain resilient in a context of historically low interest rates and positive macroeconomic conditions. The possibility of a sharp rise in long-term interest rates is a potential source of risk | → |
| **4. Risks linked to structural changes in the financial system**<br>The financial system continues to face structural challenges, from digitalisation to cost control and the quest for new profit sources. Rising operating costs remain an area to watch, as financial institutions forge ahead with efforts to adapt and transform their business models. | → |

↑ Systemic risk ↑ High risk ↑ Moderate risk

*The current level (shown by the colour code) is based on an expert assessment that reflects the probability that the risk will materialise and its potential systemic impact. The outlook (shown by the direction of the arrow) indicates the likely change over the next six months.*

## Macroprudential policy

On the basis of this analysis, the HCSF recently adopted two macroprudential measures:

– On 11 May 2018, the HCSF announced the introduction of a measure capping the exposure of systemically important French banks to large and highly indebted companies resident in France at 5% of eligible capital. The measure will come into force on 1 July 2018.

– On 11 June 2018, based on a proposal by the Governor of the Banque de France, the HCSF decided to activate a capital surcharge for banks by introducing a countercyclical capital buffer (CCyB) set at the moderate rate of 0.25%. The CCyB is designed to act as a preventive buffer that banks can draw on in the event of a cyclical reversal, enabling them to cushion potential losses while safeguarding their ability to finance the economy. The measure will come into force on 1 July 2019, if the ECB does not object.

# 2 Risks linked to the macroeconomic environment

The French economy grew by 2.3% in 2017 and appears to be taking off in the more upbeat international environment. The Banque de France's baseline projection scenario has activity slowing only slightly in 2018, while inflation will spike at 2%. However, with the macroeconomic environment experiencing substantial changes and an elevated level of uncertainty surrounding future economic policies, it could be that medium-term developments are less favourable.

## 2.1 Macroeconomic outlook

The global economic recovery appears to be continuing. Growth came out at 3.8% in 2017 and is set to reach 3.9% in 2018 and 2019 according to forecasts from the International Monetary Fund (IMF). The overall outlook for the euro area also remains positive, with expected growth of 2.1%, after 2.6% in 2017, as the labour market improves markedly and global demand firms. Growth is expected to ease slightly from 2019, while remaining above potential. French GDP growth reached 2.3% in 2017 and, according to Banque de France projections finalised in late May 2018, should stay robust in 2018, at 1.8%, before cooling somewhat to 1.7% in 2019 and 1.6% in 2020, while remaining above current potential growth estimates.

Inflation looks likely to firm in the euro area, drawing closer to the Eurosystem target with an average annual rate of 1.7% in 2018, 2019 and 2020 (with 1.9% forecast for core inflation in 2020). French inflation, as measured by the Harmonised Index of Consumer Prices (HICP), could spike to 2.0% on an average annual basis in 2018 before easing back to 1.5% in 2019.

This outlook is subject to numerous risk factors. These appear to be balanced as regards the inflation projection for France. The future path of oil prices is one risk factor. Likewise, it is impossible to rule out the possibility that the effect on non-energy inflation of the previous oil price shock might be greater than expected. Conversely, higher potential growth and lower structural unemployment could delay the rise in inflation excluding food and energy.

The risk factors for activity also look balanced. Reforms currently underway and in the pipeline for France could translate into supplementary potential growth before the end of the projection period. Conversely, the international political situation represents a source of downside risk. In particular, political uncertainty has increased significantly in Italy. US trade policy could also affect demand for products and services from Europe in general and France specifically, which would have a bearing on the capacity for a rebound in our exports. These risks may be partially offset by the prospect of expansionary fiscal policies in some euro area countries running fiscal surpluses, such as Germany, but we have not integrated this possibility into our projections at this stage. Further out, there are numerous risks to economic growth. In detail, these include:

– financial vulnerabilities: asset price correction and tougher international financial conditions linked to monetary policy tightening in advanced economies, especially the United States; increase in the US fiscal deficit and federal debt; materialisation of risks in the Chinese financial system, which could trigger a sharp economic slowdown in China;

– rising protectionism;

– policy uncertainty in general: the economic policy uncertainty index[4] peaked between the end of 2016 and the start of 2017. It is currently sitting slightly above

4 *Based on recurrence in news articles of words related to uncertainty.*

its historical average (since 2003), both globally and within the G20. However, dispersion between the countries making up the index is far greater than in the past.

In what follows, after describing the Banque de France's baseline projection scenario in greater detail, we will zero in on four of these risk factors: US fiscal stimulus policy, rising protectionism, continued tightening of US monetary policy and the normalisation process for Eurosystem monetary policy.

## a. Baseline projection scenario: growth is expected to be robust in 2018 but may slow further out

Global growth is firming. In its April 2018 forecasts, the IMF upgraded its projections to 3.9% in 2018 and 2019, after 3.8% in 2017. America's expansionary fiscal policy and its positive effects on short-term US growth explain much of the upside revisions for 2018 and 2019. Overall, however, growth in advanced countries is expected to slacken in 2019 as monetary and fiscal supports are set to be taken away at a time when investment dynamics are to weak to drive self-sustaining growth. Moreover, the lack of productive investment since the financial crisis may have lowered the potential growth rate in advanced economies over the longer term. Global trade, meanwhile, is fuelling activity among emerging and commodity-exporting countries.

Table 2 shows the expected changes in the main economic aggregates for France, based on Banque de France forecasts released in June 2018. They suggest that French GDP growth should stay robust in 2018, at 1.8%, before easing slightly to 1.7% in 2019 and 1.6% in 2020, while remaining above current potential growth estimates. As a result, the output gap should close in 2019.

Table 2

Summary of projections for France

| | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|
| **HICP** | **0.3** | **1.2** | **2.0** | **1.5** | **1.8** |
| **HICP excluding food and energy** | **0.6** | **0.6** | **1.0** | **1.2** | **1.5** |
| GDP deflator | 0.2 | 0.7 | 0.9 | 1.4 | 1.6 |
| **Real GDP** | **1.1** | **2.3** | **1.8** | **1.7** | **1.6** |
| Contributions (in GDP percentage points) *: | | | | | |
| Domestic demand excl. changes in inventories | 2.0 | 2.0 | 1.6 | 1.6 | 1.6 |
| Net exports | -0.5 | 0.1 | 0.4 | 0.0 | 0.0 |
| Changes in inventories | -0.4 | 0.2 | -0.2 | 0.0 | 0.0 |
| Private consumption (53%) ** | 2.0 | 1.1 | 1.1 | 1.6 | 1.6 |
| Government consumption (24%) | 1.4 | 1.4 | 1.0 | 0.9 | 1.0 |
| Total investment (22%) | 2.7 | 4.7 | 3.2 | 2.4 | 2.3 |
| Government investment (3%) | 0.1 | 1.6 | 2.9 | 2.1 | 1.8 |
| Household investment (5%) | 2.8 | 5.6 | 2.2 | 1.1 | 1.9 |
| Business investment (NFCs-FCs-IEs) (13%) | 3.4 | 5.2 | 3.6 | 2.9 | 2.5 |
| Exports (29%) | 1.5 | 4.7 | 4.1 | 4.7 | 4.1 |
| Imports (31%) | 3.1 | 4.1 | 2.6 | 4.3 | 3.9 |
| Household real gross disposable income | 1.8 | 1.4 | 1.2 | 2.0 | 1.7 |
| Net job creation (thousands) | 197 | 314 | 196 | 168 | 190 |
| ILO unemployment rate (France and overseas territories,% of labour force) | 10.1 | 9.4 | 9.1 | 8.8 | 8.3 |

*Annual growth rate unless stated otherwise.*
** Because of rounding, the sum of contributions does not necessarily match GDP growth.*
*** Bracketed percentages show the GDP share of each item in 2017.*
*Source: INSEE for 2016 and 2017, (national accounts at 30 May 2018, 2014 base) and Banque de France projections shaded in blue.*

From mid-2018 onwards, GDP growth should be close to an average annual rate of 1.6%, cooling to a more moderate pace after the elevated rate of 2017. This will follow a temporary slowdown in Q1 2018, which may continue into Q2, with a 0.3% expansion according to the Banque de France's short-term forecast, in response to the 2017 performances. Over the remainder of the projection horizon, France is expected to post quarterly growth of approximately 0.4%.

Household consumption is projected to mark time in 2018. Despite a solid showing on employment and wage growth, consumer spending will take a temporary hit as the surge in energy and tobacco prices crimps household purchasing power gains. However, spending should pick up over the year, and especially when tax measures lend strong support to household income in late 2018 and early 2019. More vigorous growth in spending is therefore on the horizon for 2019 and 2020.

Investment should gradually revert to a growth rate more in line with fundamentals, while continuing to outpace GDP. Exports should once again receive support from vibrant global demand. The contribution from external trade is expected to be markedly positive in 2018, thanks to carryover from Q4 2017, and then neutral over the forecast horizon.

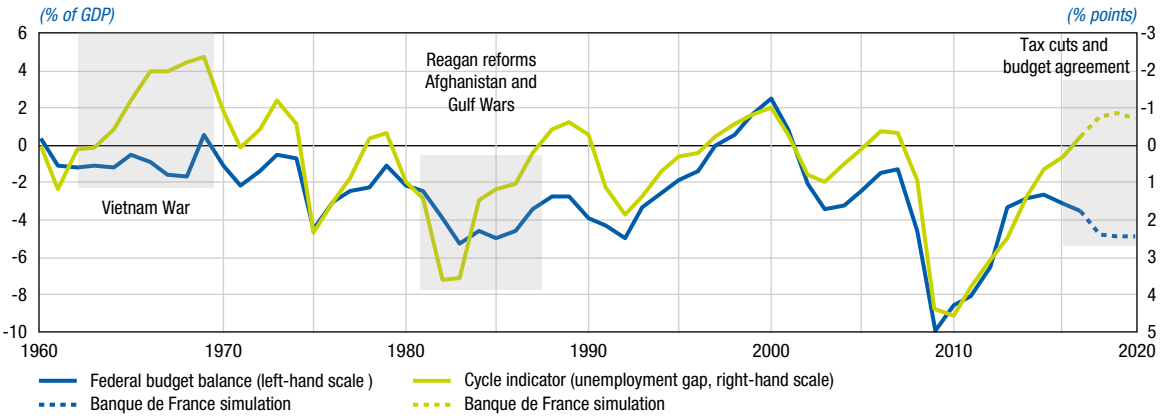
Inflation, as measured by the HICP, could spike to 2.0% on an average annual basis in 2018, pushed up by the surge in energy prices and increased tobacco and fuel duties, before easing back to 1.5% in 2019. It is projected to be 1.8% in 2020, driven by a steady rise in inflation excluding food and energy over the projection horizon, as the ongoing decline in unemployment fuels wage acceleration.

## b. US fiscal stimulus: a support for growth in the short term, a source of concern in the medium term

Less than two months after the adoption of the Tax Cuts and Jobs Act, which lowered taxes for households and businesses, the US Congress voted in February 2018 on a budget agreement that will raise government spending in 2018 and 2019. With this additional and unexpected support for growth, the Trump administration is introducing the largest stimulus package seen during a cyclical upswing since the Vietnam War (Chart 1). Although the actual amounts are still uncertain, the combined measures are expected to be worth about 3.4% of GDP over two years (Chart 2) and would be equivalent, according to our estimates, to approximately two-thirds of the stimulus plan introduced by the Obama administration in 2009 in the wake of the financial crisis.

Chart 1

United States: federal budget balance and business cycle since 1960

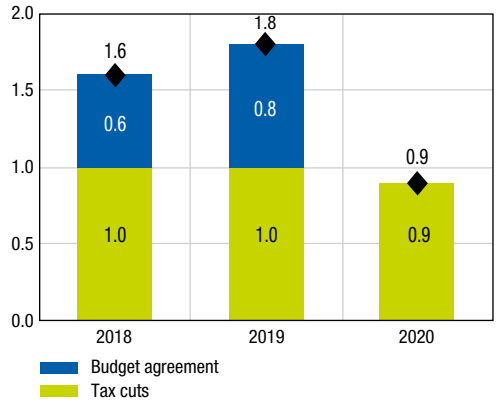



*Source: Data from the Bureau of the Fiscal Service, Bureau of Labor Statistics and Congressional Budget Office; Banque de France calculations.*

Chart 2

Stimulus components

*(GDP points)*

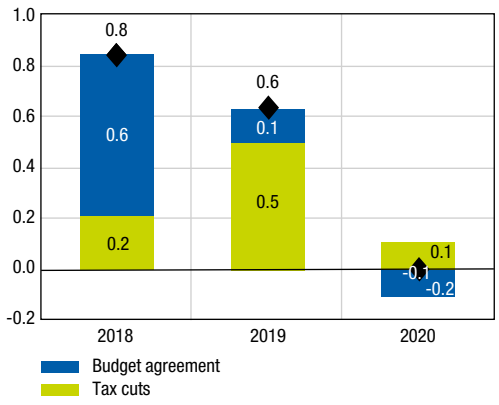



*Source: Banque de France calculations.*

Chart 3

Simulated impact on US growth

*(% points)*




*Source: Banque de France calculations.*

An estimate prepared by the Banque de France taking into account the tax cuts for business and households and the announced government spending increases suggests that US fiscal policy will have a major macroeconomic impact on the United States economy[5]. The GDP growth gains are shown in Chart 3.

The effect of the US measures on French inflation and GDP, computed using the Banque de France's macroeconometric forecasting model, is expected to be positive but weak: after having no discernible impact in 2018, the measures will add 0.1% to GDP and the price level in 2020. The effect on GDP will be channelled mainly through an increase in demand for euro area and French products and services. The inflationary impact will result chiefly from increased imported inflation, somewhat augmented by positive Phillips effects linked to accelerating economic activity in the euro area and slightly attenuated by a small decline in oil prices.

However, the **positive effects of the fiscal stimulus on demand will cause the US trade and current account deficits to widen substantially to 4% and 3.8% of GDP respectively in 2019**, compared with 2.9% and 2.4% respectively in 2017. The government deficit will also widen from 4.8% of GDP in 2017 to 6.1% in 2019. Conversely, lighter tax pressure on the private sector should enable it to generate surplus savings, thereby moderating the risks to financing for the current account deficit. Taking all the effects into account, slippage in the government deficit could translate into an increase worth ten points of GDP in government debt, which could reach close to 120% of GDP by 2027.

The net external asset position of the United States could worsen further. It stood at -40% of GDP in 2017 (reflecting the fact that America was a debtor relative to the rest of the world) and will exceed -50% of GDP in 2027 according to our estimates. Changes to the system of taxation for multinationals, which is one of the planks of the tax reform, could encourage US firms to repatriate profits earned abroad, but the positive impact of this repatriation on the current account might be neutralised by reduced income on foreign assets. All in all, the increase in risks to financing for the US current account deficit looks real and may explain the current dollar depreciation, at a time when the favourable interest rate differential should support the US currency. In 2017, net foreign direct investment flows to the United States declined compared with 2015-2016, in what may be a sign that the US economy has lost some of its appeal to international investors.

5 *Assuming no monetary policy response.*

### c. Rising protectionism: a trade war would be extremely harmful to global growth

Increased trade tension between the United States and its partners is raising fears of mounting global protectionism. So far, the United States has begun renegotiating the North American Free Trade Agreement (NAFTA), applied import duties of 20% on Canadian softwood lumber and imposed tariffs of 25% on steel and 10% on aluminium imports[6]. It is threatening to impose USD 60 billion in tariffs on Chinese exports to the United States in response to failure by China to respect US intellectual property. For the time being, these measures are expected to have a limited impact on the world economy, given their small place in US (and global) imports. Steel and aluminium tariffs covered about 2% of US imports in 2017, not including exemptions. There is however a risk, albeit a small one for the time being, of a global trade war. Responding to the imposition of customs tariffs on US steel and aluminium imports, China announced in early April that it would impose tariffs on 128 products imported from the United States and worth around USD 3 billion, including pork, fruit, soy, aluminium and steel products. **If these risks materialise, continuation of a protectionist policy by the United States would have a negative impact on the US and global economies.** An assessment of measures introduced by the Bush administration in 2002 to protect the domestic steel industry shows that they had a negative effect on jobs overall by pushing up production costs in industries using steel, such as the auto sector. When the Chinese retaliation measures were announced, moreover, the S&P 500 index fell by around 2.2%.

Work by the Banque de France suggests that a 10% increase in a country's import duties reduces exports from trade partners by 13% to 25% in value terms[7]. An IMF study based on simulations using the Global Integrated Monetary and Fiscal Model (GIMF) found that an across-the-board increase in protectionism involving all countries and leading to a 10% increase in import prices for three years would cause a 15% reduction in world trade after five years and a decrease in global GDP of approximately 2%[8]. A scenario featuring a trade war and rising uncertainty (10% increase in US customs tariffs for all trade partners; symmetrical 10% increase in partners' tariffs for the United States; 50 basis point (bps) increase in corporate risk premiums and a two standard-deviation decline in stock prices in all countries) would reduce world trade and GDP by 3% and 1% respectively over the course of the first year[9].

### d. Tighter US monetary policy: effects on the French economy are expected to be modest

How might the French economy be affected by a sudden increase in the US term premium (TP)? We assess the impact of a 100 bps shock to the US TP using a semi-structural global model and the Banque de France's macroeconometric forecasting model. Based on the international correlation of term premiums (Chapter 4), we expect that a 100 bps increase in the US TP will mean a 40 bps increase for the euro area TP. In addition, we assume that the Fed and the ECB do not react to the shock by cutting short-term interest rates, purchasing assets or making announcements; accordingly, the impact of the shock would be lessened if, in the United States and euro area, monetary policy were actively used to offset the negative impact of the shock from the higher TP on inflation. According to the simulation, the increase in the US TP would cause a decrease in consumption and investment owing to higher long-term borrowing costs: US GDP would be lowered by 0.4% after a year relative

6 *Except imports from South Korea, Argentina, Brazil and Australia, which remain covered by an exemption after agreeing to reduce their steel and aluminium exports to the United States.*
7 *Bénassy-Quéré, Bussière and Wibaux, (2018), "Trade and currency weapons", WP CEPII; Berthou and Fontagné, (2016), "Variable Trade Costs, Composition Effects and the Intensive Margin of Trade", The World Economy.*
8 *IMF, WEO, October 2016.*
9 *"The consequences of protectionism", Benoît Cœuré, ECB, 6 April 2018.*

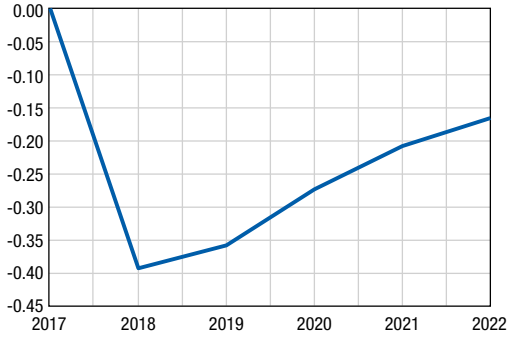
to the reference scenario (Table 2). The downturn in domestic demand would cause inflation to decline by 0.27 of a percentage point. The increase in the TP would also cause dollar appreciation.

This scenario would negatively affect activity and inflation in France. After a negligible impact in 2018, it would take 0.1% off GDP and the price level by 2020. Half of the impact on GDP (0.05% in 2020) would be attributable to reduced demand for euro area products and services. The reduction in demand would be around 0.2% in 2018, taking into account direct trade with the United States as well as the indirect impact on the activity of France's other partners. The increase in euro area sovereign yields would account for the other half of the impact on GDP (0.05% in 2020). These negative impacts would only be attenuated by a decrease in oil prices, which would also explain the slightly deflationary effect of this scenario in France, with a 0.05% decrease in inflation (HICP) by 2020.

Chart 4

Reaction of US GDP to a 100 bps increase in the term premium

*(%)*




*Source: Banque de France calculations.*

## e. Normalisation of Eurosystem monetary policy: the ECB is keeping an eye on the risks

The ECB is pursuing its policy of supporting the economy and continues to use four main sets of measures:

- net asset purchases at a monthly rate of EUR 30 billion through to September 2018 and EUR 15 billion a month thereafter until the end of December 2018, when the net purchases are scheduled to stop;
- the stock of existing securities holdings, whose principal is reinvested at maturity;
- the low interest rate policy;
- forward guidance about the future path of policy rates: the Governing Council has stressed that interest rates will remain at current levels for a prolonged period and at least through the summer of 2019.

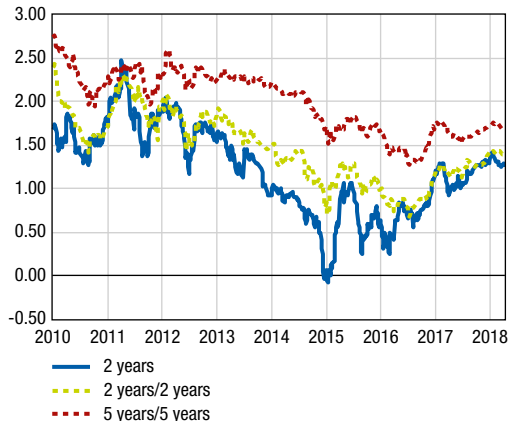
Inflation expectations derived from euro area inflation swaps increase with the horizon, at 1.24% for two-year inflation, 1.42% for two-year inflation two years in the future and 1.69% for five-year inflation expectations five years in the future (Chart 5).

A change in the monetary policy stance is conditional on three criteria: 1) inflation has to be on a trajectory that will make it possible to achieve levels below but close to 2%; 2) uncertainty around the trajectory should be reasonably contained; and 3) inflation should be capable of staying on its trajectory without monetary support.

Chart 5

Inflation expectations derived from euro area inflation swaps

*(5-day moving average, %)*




*Source: Bloomberg.*

Two potential sources of risk have been identified and are being monitored by the ECB. First, the euro appreciation observed in 2017 could compromise inflation's upward trajectory, although core inflation does not appear to have been affected by this so far. Second, the potential repercussions of trade measures announced by the US administration are being closely watched (Section 2.1.c).

## 2.2 Debt in the French non-financial private sector

### a. Non-financial companies (NFCs): increased debt could be a source of risk

Since 2015, the increase in the debt of French NFCs has been driven by two main factors10[10]:

– increased cash and investment requirements among NFCs against a backdrop of economic growth and significant international expansion by major firms;

– the decline in financing costs, which has been more pronounced in France than elsewhere in the euro area.

Continued growth in French NFCs debt from already elevated levels could create credit risk for the financial system. This risk could materialise in the event of an abrupt rise in bank or bond interest rates or a cyclical reversal, which would negatively impact the solvency of the weakest NFCs. For this reason, the HCSF has already imposed a limit on the exposures of systemically important French banks to the most heavily indebted large French companies. The measure will come into force in July 2018.

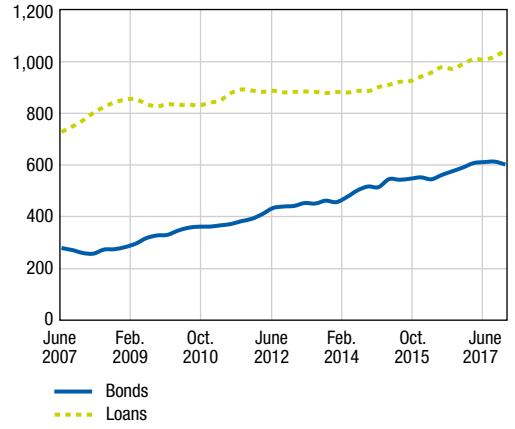
- **The gross debt ratio is growing more quickly and is at a higher level than in other major European countries**

The debt of French NFCs totalled EUR 1.645 trillion in Q4 2017, comprising EUR 1.043 trillion in loans and EUR 602 billion in fixed income debt measured in nominal terms (Chart 6). This was equivalent to 71.8% of GDP, compared with a euro area average of 62%, **giving France the highest NFCs debt ratio of any major European country** (Chart 7).

Chart 6

Outstanding debt of French NFCs, by type

*(EUR billion)*




*Sources: Banque de France, quarterly financial accounts. Excluding intragroup loans. Debt securities measured at nominal value.*

Between 2009 and 2014, the increase in debt was chiefly driven by large companies and mid-tier firms. The debt of small and mid-sized enterprises (SMEs) also went up, but at a slower pace (Chart 8). Bond debt (about 90% of which is attributable to large companies) grew more vigorously over the period than bank loans (Chart 9).

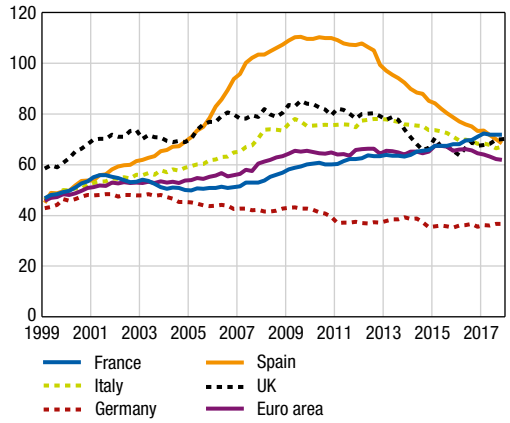
Since 2015, a rebalancing process has taken place, with a recovery in bank credit, which grew by 5.8% year-on-year at end-2017 compared with 1.9% for debt securities. The movement reflects the sharp acceleration in debt from 2016 onwards for SMEs, which have limited access to other sources of finance.

*10 See "La Situation des entreprises en France en 2016" (Bulletin de la Banque de France 215, January-February 2018) for a broader examination of NFCs activity.*

Chart 7

Comparison of gross debt ratios in Europe

*(% of GDP)*

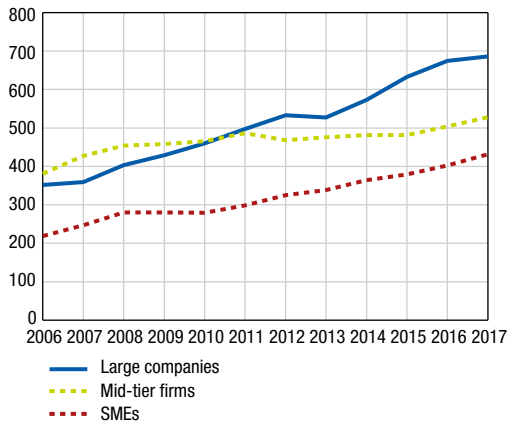



*Sources: ECB, quarterly financial accounts. Excluding intragroup loans. Debt securities measured at nominal value.*

Chart 8

Breakdown of total debt by company size in France

*(EUR billion)*

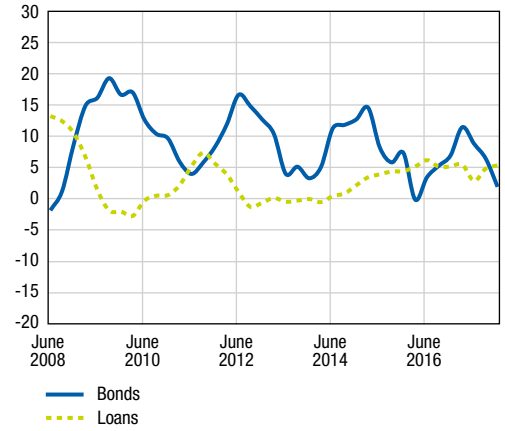



*Sources: Banque de France, quarterly financial accounts and Fiben data. Excluding intragroup loans. Debt securities measured at nominal value.*

Chart 9

Annual growth in the debt of French NFCs, by type

*(%)*

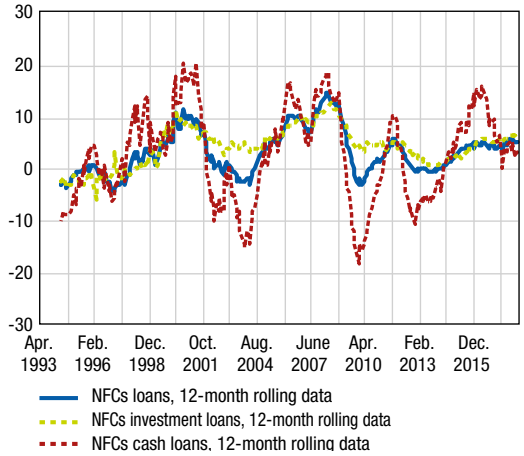



*Sources: Banque de France, quarterly financial accounts. Excluding intragroup loans. Debt securities measured at nominal value.*

Chart 10

Annual growth in outstanding bank loans, by use

*(%)*




*Sources: Banque de France, monthly monetary statistics on credit. Excluding intragroup loans.*

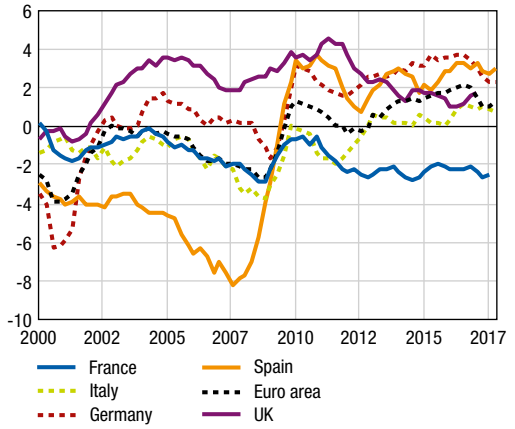
- **Debt is fuelling investment and cash**

The pick-up in bank credit from 2015 has been mainly driven by investment loans related to firming economic conditions in France and elsewhere in the world. Cash loans, which grew sharply in 2015 and 2016, have been slower for a year (Chart 10). In parallel, at the macroeconomic level, meanwhile, the NFCs investment rate climbed from 12.0% of GDP in Q4 2014 to 12.9% in Q4 2017. Taking a longer-term view, the sharper increase in debt in France compared with other European countries since 2010 may be attributed to the persistent negative net lending of French NFCs during this period, which contrasts with the situation of their European counterparts (Chart 11). However, this observation is tempered by revisions to the financial accounts made by Insee, France's National Statistics Office, and published on 15 May 2018: while NFCs profit margins and investment rates were largely unchanged, the net lending ratio was adjusted sharply upwards because of

Chart 11

Comparison of NFCs net lending in Europe

*(% of GDP)*




*Sources: ECB, based on national accounts. Quarterly data smoothed over four quarters.*

a downside revision to net property income paid by NFCs. As a result, the NFCs net lending ratio stood at 92.9% of gross fixed capital formation (GFCF) in 2016 based on the revised data (up from 84.7% according to the previous estimates) and was slightly higher still in 2017 at 95.5%.

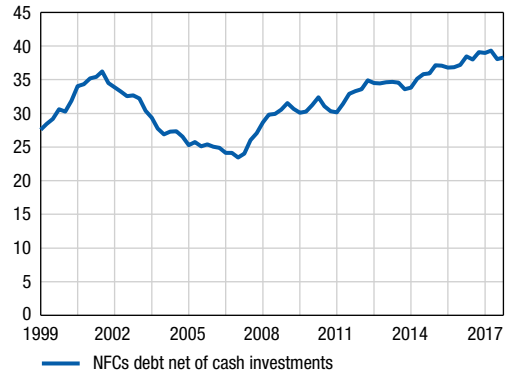
At the same time, the low interest rate environment is encouraging companies to boost their cash holdings to satisfy a number of objectives, which include having a larger safety buffer, centralising financial management in the case of large French groups, and tapping into external growth opportunities. The NFCs net debt ratio, i.e. corrected for liquid assets, is thus markedly lower than the gross ratio, even if it is also on the rise (Chart 12).

Note however that NFCs in France are characterised by strong representation for large companies with international business operations and investment spending. This may create an upside bias in the level of debt relative to domestic GDP. When compared against world GDP, the debt of French NFCs is now a bit lower than the ratio observed in 1999, although it has been rising since 2015 (Chart 13).

Chart 12

Net debt ratio of French NFCs

*(% GDP)*




*Sources: Banque de France, Insee. Debt securities measured at nominal value.*

Chart 13

Ratio of French NFCs net debt to world GDP

*(%)*


*Sources: IMF (World Economic Outlook April 2018), Banque de France. Debt securities measured at nominal value.*

The credit risk associated with NFCs debt depends partly on the proper allocation of debt to the most profitable NFCs. From this perspective, work by the Banque de France on a sample of companies suggests that:

– the share of new loans allocated to the most profitable[11] and financially sound companies increased between 2008-2013 and 2014-2017, except in the services sector (Chart 14);

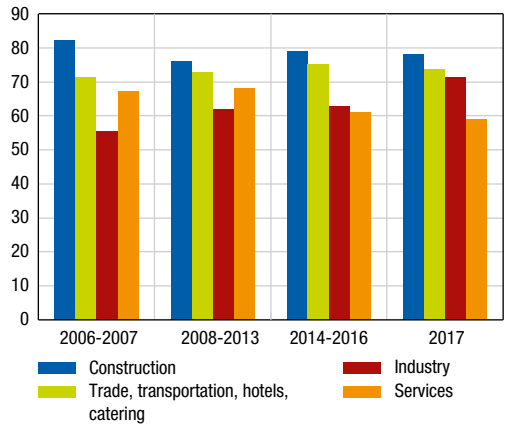
– the increase in outstanding bank loans is being directed towards the most productive companies[12]. This trend seems to have gathered momentum since the 2008 crisis and was particularly pronounced in 2017 (Chart 15).

*11 Financial profitability is defined as the ratio of net profit to value added.*
*12 Corporate productivity is measured by dividing value added by the production resources used.*

Chart 14

Share of new loans distributed to the 75% most profitable French companies in each sector

(%)

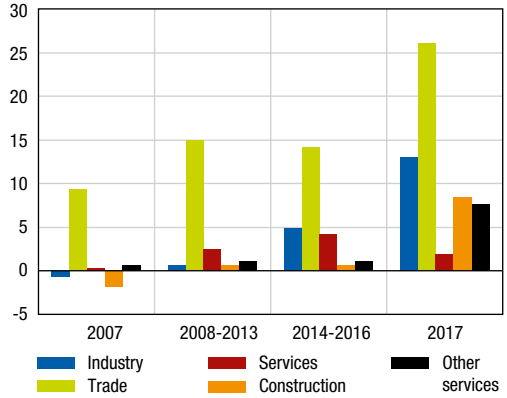



Source: Banque de France.

Chart 15

Average difference in productivity between French companies that increased their outstanding loans and the others (all companies)

(%)




Source: Banque de France.

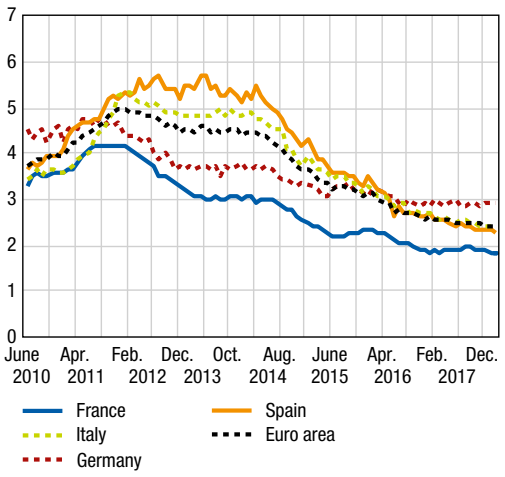
## • Extremely attractive financing costs

The increase in NFCs debt has also been supported by the sharp decrease in the cost of debt since 2011 (Chart 17). Although the decline is less pronounced for bank loans than for debt securities, SMEs in France have access to borrowing rates that are half a percentage point lower on average than in the euro area as a whole (Chart 16). In particular, there is a sizeable difference with Germany, which cannot be solely attributed to the spread between sovereign yields (which favours Germany). A more radical selection of financing choices by French banks may also have had an impact, a notion corroborated by the observation that French banks have a lower net interest margin than their foreign rivals, but also a lower cost of risk.

Chart 16

European comparison of interest rates on loans of less than EUR 250,000

(%)

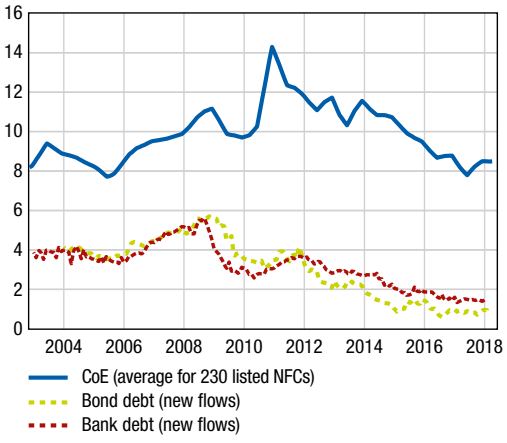



Source: ECB, monthly monetary statistics on credit.

Chart 17

Average cost of financing for French NFCs

(%)




Sources: Banque de France, monthly monetary statistics on credit. Excluding derivative products. Loans over EUR 1 million only. Datastream for the CoE (WACC).

NFCs have an incentive to raise debt because the average cost of equity (CoE[13]) is much higher than the average cost of bank and bond debt (Chart 17). The risks associated with equity financing are also more elevated and may exceed the risk tolerance of some investors, leading them to prefer bond investments. It is also important to bear in mind that increased equity-based financing of investments is desirable to foster innovation and ensure sustainable funding for long-term growth.

In June 2016, the Eurosystem launched its Corporate Sector Purchase Programme (CSPP), whose aim is to strengthen the transmission of monetary policy measures to the real economy by contributing directly to improving the financing conditions of euro area companies.

In the low interest rate environment, the Eurosystem's regular involvement in the primary issues of private companies and its continuous presence on the secondary market have created a favourable climate. Significant participation by other investors in primary issues likewise reflects the debt-friendly impact of the brighter macroeconomic environment.

*13 Measure of the return required by investors and estimated using a capital asset pricing model as the risk premium (additional return required by an investor to invest in equities rather than a risk-free asset) multiplied by the beta of companies (degree of companies' exposure to systemic, i.e. non-diversifiable, risk).*

Box 1

## Leveraged finance in France: development and lending conditions

The weakest NFCs, rated non-investment grade, i.e. below BBB-, by rating agencies or reporting a high debt/EBITDA[1] ratio (>4), are typically forced to seek financing from investors specialising in **leveraged finance** through **leveraged loans** or **high yield bonds**. While high yield bonds were extremely popular in the United States during the 1980s, they currently have a much smaller market share than leveraged loans because they are more complex to implement. **Activity levels in leveraged finance are an advanced signal for the credit cycle.** With this in mind, interviews were conducted during the second quarter of 2018 with French banks and other financial participants (investment funds and banks, rating agencies) to assess the development of, and lending conditions applicable to, this type of financing in France. The main findings were as follows:

(i) **In Europe, leveraged finance has seen a surge in activity since 2013** that strongly echoes the robust growth in 2004-2007, with 2017 issuance volumes estimated at EUR 120 billion for leveraged loans and EUR 94 billion for high-yield bonds. France is reckoned to account for 14% of leveraged loan volumes in 2017, behind the UK (18%). Structured products involving leveraged loans and collateralised loan obligations (CLOs) are on a similar trajectory with strong growth in issuance volumes, which rose from EUR 1 billion in 2010 to EUR 21 billion in 2017. Leverage ratios[2] for corporate leveraged finance transactions are also on the rise, with the average climbing from 4.4 in 2009 to 5.1 in 2017.

Note that the ECB's guidance on leveraged transactions states that a leverage ratio of over six should be monitored[3]. In particular, EBITDA projections need to be watched carefully: if EBITDA turns out *ex post* to be lower than the *ex ante* projections, it means that leverage ratios were underestimated initially and will automatically go up.

(ii) **Leveraged loans** are granted and arranged by investment banks, some of which follow an originate-to-distribute model designed to limit the credit risk that they keep on their balance sheet. Final lenders are chiefly non-banks, which accounted for 84% of leveraged loans flows in 2017, compared with just 16% for banks. In Europe and France, leveraged buyouts (LBOs) make up the lion's share of leveraged loans, at 67% of volumes in 2018 according to market sources.

1 *Earnings before interest, taxes, depreciation and amortisation. EBITDA is a financial indicator similar to operating cash flow.*
2 *Debt / EBITDA ratio.*
3 *ECB, Guidance on leveraged transactions, May 2017: "For most industries, a leverage level in excess of 6.0 times Total Debt to EBITDA raises concerns".*

(iii) **French banks'** LBO exposures have been a focus of constant supervisory attention for years. Interviews point to a deterioration in the documentation and covenants in this segment. However, it is also true that: (i) exposures are small (EUR 35 billion out of a total EUR 1.6 trillion in loans to businesses); (ii) the share of cov-lite exposures is still below the European level; exposures involve small individual amounts (EUR 50/60 million) and many reflect business transfers; they are also well diversified both geographically and by sector; (iv) high valuation levels for targets are mostly deemed to be justified owing to sufficient cash flow generation capacity and are supported by high equity contributions; (v) the latest generation of LBOs has involved targets with higher credit quality.

(iv) Borrowing NFCs are in a position of strength **vis-à-vis non-bank lenders**. The returns currently offered, at between 300/475 bps over Euribor, are appealing to lenders hunting out higher returns amid the protracted decline in returns on investment grade assets. The imbalance in supply relative to high demand is leading to credit spread compression and a deterioration in the risk/reward tradeoff, despite recognised liquidity and credit risks and high leverage ratios.

The imbalance between borrowers and lenders is being accompanied by a relaxing of covenants for leveraged loans[4] through the development of covenant-light agreements, which is leading to convergence with the standards for high-yield bonds. Several factors are underpinning this shift. Companies, particularly in the case of LBOs, want to concentrate on their core activity, ease the financial pressure and alleviate the reporting burden associated with complying with maintenance covenants. Non-bank investors with a bond background are familiar with light requirements for bonds and are more inclined to accept reduced covenants on leveraged loans as part of a shift towards convergence with bonds. By doing this, they sacrifice the early signs of credit issues or incidents offered by regular monitoring of compliance with maintenance covenants. Covenant-light deals now account for around 76% of leveraged loan flows. The trend towards simplifying lender requirements is definitely playing a part in the development of leveraged loans not just on the primary market but also on the secondary market.

However, the leveraged loans market is more opaque than that of listed high-yield bonds. In the case of LBOs, for example, the agreement of a financial sponsor may be required before loans can be sold. An in-depth knowledge of lender portfolios is considered necessary to conduct transactions on the secondary market. The legal documentation for leveraged loans is more streamlined but also deemed less accessible by many market participants compared with issue prospectuses for listed bonds.

In this environment, a scenario of higher interest rates and/or credit spreads that makes sovereign bonds and investment grade-rated corporate bonds more attractive could alter the current imbalance based on strong demand for leveraged loans. Portfolio reallocations to lower-risk bond assets could then curb demand for new issues, exposing NFCs to higher financing/refinancing costs. The secondary market for leveraged loans could come under selling pressure and also be adversely impacted.

4 *Loan contracts contain maintenance covenants that require compliance with certain financial ratios (debt/EBITDA, debt interest cover, operating cash flow to investment). The covenants thus require regular reporting by borrowers and close monitoring of companies. Non-compliance with covenants can result in restructuring of loan conditions or even a call for early repayment by the bank.*

- **Debt service has not gone down despite the decline in interest rates**

The ratio of interest expense to overall cash flow[14] is at a low level for companies of all sizes except small and mid-sized businesses, although it headed upwards in 2016 owing to debt volumes (Chart 18). This rising trend is even more pronounced if principal repayments are factored in.

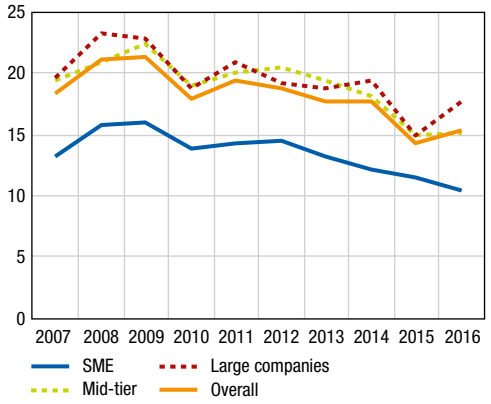
Accordingly, the debt service ratio of French NFCs is going up, while it is declining in other large euro area economies (Chart 19).

*14 Operating cash flow + non-operating income/expense, such as income/expense on financial and non-recurring transactions.*

Chart 18

Percentage of interest in overall cash flow of French NFCs

*(%)*

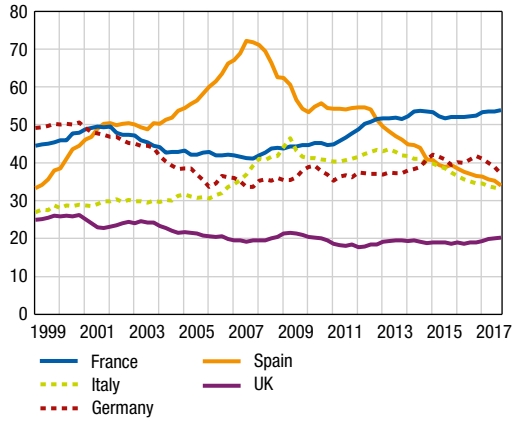



*Source: Banque de France.*

Chart 19

NFCs debt service ratio (interest and principal)

*(% of income)*




*Source: BIS.*

**What effect might an increase in interest rates have?** Research by the Banque de France into the impact of an increase in short-term interest rates (Euribor 3M) and long-term interest rates (10Y constant maturity (TEC) rate) on the cost of bank and bond debt for companies shows that:

– an increase in short-term rates would feed through quickly (within the month) to rates for large-value and short-term loans, cash loans and floating-rate loans;

– an increase in long-term rates would have more of an impact on the cost of bond financing, with the effect on bank loans showing up in the longer term and being concentrated in low-value loans;

– transmission of interest rate changes does not generally vary according to company size, sector or rating.

Table 3

Fixed/floating rate distribution, French NFCs debt

| | Floating rate | Fixed rate |
|---|---|---|
| Bank loans | 42% | 21% |
| Bond debt | 2% | 35% |

*Source: Banque de France.*

The impact is measured at the end of one year and takes into account the renewal of maturing debt and increased repayments on floating-rate debt that is not renewed (Tables 3 and 4).

The increase in the cost of NFCs debt needs to be considered in relation to their net interest expense, which totalled EUR 27 billion in 2016[15]

Table 4

Impact of interest-rate increase scenarios for French NFCs' cost of debt after one year

| Scenario | Short rate shock (bps) | Long rate shock (bps) | Impact (EUR billion) |
|---|---|---|---|
| 1 – Euribor increase | 100 | 0 | 3 |
| 2 – Yield curve movement | 100 | 100 | 5 |
| 3 – Yield curve steepening | 100 | 200 | 7 |

*Source: Banque de France.*

*15 Source: Annual accounts of institutional sectors, Insee.*

(approximately 2.4% of their value added); an increase in rates could thus have a material impact. However, a more comprehensive analysis would need to factor in the ability of NFCs to pass on higher rates to their selling prices as well as the increased income earned by NFCs from their financial assets.

## b. Households: more diffuse risks

Household debt continues to increase, driven by strong consumer lending (closely linked to car financing) and home loans. The associated credit risk looks to be under control though, as reflected in the decrease in overindebtedness, for two reasons:

– debt connected with consumer spending remains low among low-income households;

– lending conditions for home loans have not deteriorated significantly. Moreover, the risk associated with home loans is structurally low in France, thanks to guarantee mechanisms and the fact that virtually all loans have fixed interest rates.

However, with interest rates steady at very low levels since 2017, the renewed downward movement in early 2018 for certain segments (short-term floating-rate home loans and, to a lesser degree, amortising consumer loans) call for a careful watch on lending conditions given the possibility of a sudden increase in interest rates.

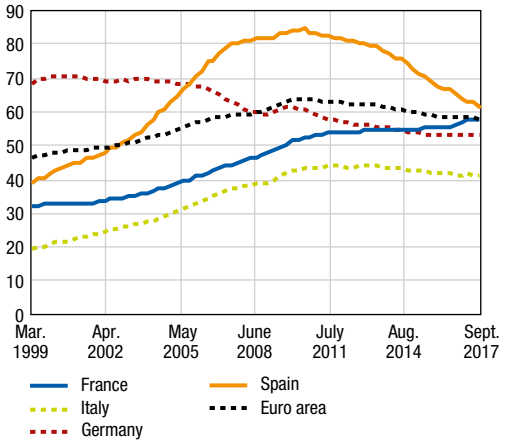
### • The debt-to-GDP ratio is rising, but overindebtedness is on the decline

Household debt totalled EUR 1.320 trillion in Q4 2017[16], or 57.8% of GDP (Chart 20). The debt-to-GDP ratio of French households is in line with the median value when compared with other large European countries. However, it has been rising steadily since 2011 in France, whereas it has generally fallen elsewhere. In Q4 2017, household debt included EUR 1.166 trillion in loans taken out by individuals from French banks. Home loans accounted for 82% of these credits, consumer loans for 15%, and other loans for 3% (Chart 21).

Chart 20

Household debt ratio

*(% of GDP)*

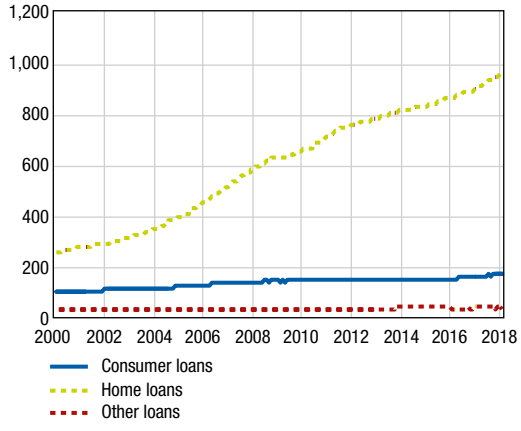



*Source: ECB.*

Chart 21

Outstanding loans to households by French banks, by type

*(EUR billion)*




*Source: Banque de France.*

16 Households as defined by the national accounts, i.e. including sole proprietors.

In 2017, France's household debt commissions noted a decline in the number of admissible cases (to 166,760, a decrease of 4.7% year-on-year) and in the outstanding debt held by overindebted households (EUR 7.2 billion, a decrease of 3.1% year-on-year). The divergent paths taken since mid-2015, with household debt increasing and overindebtedness declining, can be attributed in part to the sharp reduction in interest rates, which has made it possible to offer longer repayment periods for new loans while limiting debt service payments for indebted households, thus containing overindebtedness. These developments also reflect public policy measures aimed at protecting households more effectively against excessive practices by some lending institutions. The huge number of loan renegotiations, which actually exceeded 50% of new home lending between August 2016 and March 2017, also helped to lower the cost of debt for households, as did consumer loan consolidation and transfers[17].

While household overindebtedness has improved in recent months thanks to the decrease in interest rates, a sharp increase in rates in the future would have the opposite effect, by curbing the ability of household debt commissions to deal with the cases of households whose finances have been undermined by an unfavourable event, such as divorce or job loss. With this in mind, a close watch needs to be kept on lending conditions, especially for consumer loans, which are the biggest cause of excess debt situations.

- **Consumer loans**

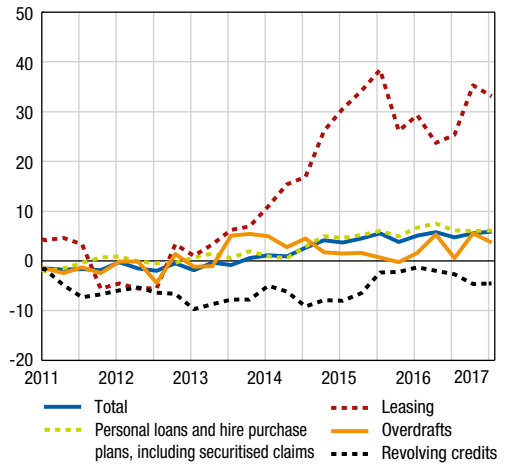
Growth in consumer lending in France has been accelerating since mid-2014 and was especially sustained in 2017, thanks to the economic expansion and strong household consumption. The growth rate for consumer lending in France is slightly higher than that of the euro area. Outstanding loans at French banks stood at about EUR 170 billion at end-2017.

The growth in consumer lending has been driven by amortising loans (6.2% year-on-year increase at end-2017) and, more marginally, by leasing, which was up 33.1% year-on-year (Chart 22). **Analyses by the Banque de France suggest that since 2015, two-thirds of the increase in consumer lending has been attributable to car finance.**

Chart 22

Growth rate of consumer loans in France, by instrument

*(%)*

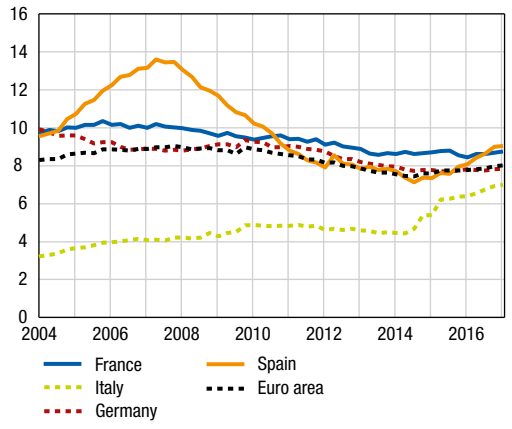



*Source: Banque de France.*

Chart 23

Household consumer debt ratio (debt/gross disposable income)

*(%)*




*Source: ECB.*

*17 For more information, see the survey of household overindebtedness in 2017 published by the Banque de France.*

A growing proportion of people are acquiring cars through leasing arrangements (32% in 2017, compared with 20% in 201518[18]) instead of buying outright.

Increase take-up of consumer credit by French households has resulted in a higher consumer debt ratio than the euro area average (9.0% compared with 7.8%, Chart 23), although the ratio is still lower than it was before the crisis. In addition, the consumer debt ratio among the least affluent French households[19] is close to the euro area average at 4.5% and 4.4% respectively, and well below the same ratios for Germany (6.7%) and the Netherlands (8.3%).

## Home loans

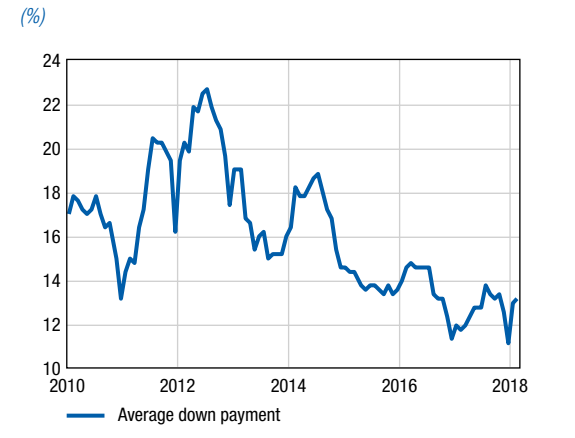
Although house prices fell between the end of 2011 and mid-2015, they have gone up since then, recording an average increase of 4.0% year-on-year in the new and existing homes segments in Q4 2017, with 5.0% growth for apartments20[20]. In 2017, transactions in the existing properties segment hit a record 970,000, up from 840,000 in 2016[21].

In this setting, outstanding home loans from French banks, which totalled around EUR 960 billion at end-2017, rose by 6.1% year-on-year. The pace seems to have cooled somewhat in the more recent period: while the growth rate for home loans to individuals reached 6.3% in the 12 months to October 2017, it had eased to 5.5% by March 2018.

As regards lending conditions, down payments and average debt-service-to-income ratios have been stable in recent months (Chart 24); at the same time, the share of loans with a debt-service-to-income ratio of over 35% went up for the second year in a row (Chart 25), driven by first-time buyers since November 2017. The average debt-service-to-income ratio among the least affluent households does not appear to be changing significantly. The average initial maturity of new loans increased more sharply

Chart 24

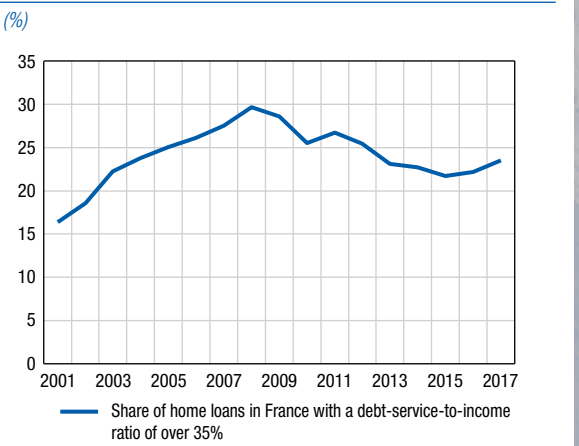
Average down payment for home purchases by French households (down payment/home value)




Source: ACPR.

Chart 25

Long-run change in the share of home loans in France with a debt-service-to-income ratio of over 35%




Source: ACPR.

18 Source: Dataneo.
19 Gross income below the first quartile.
20 Source: Insee.
21 Source: CGEDD.

Chart 26

Average initial maturity of home loans in France

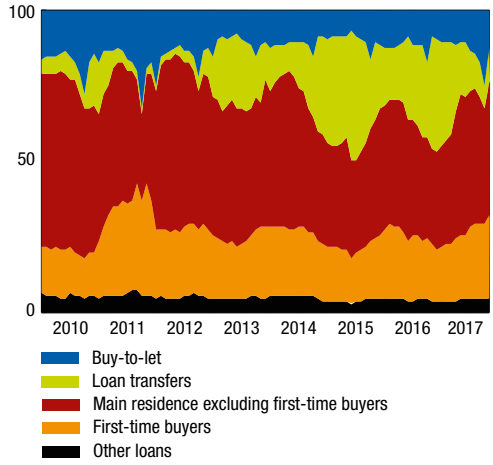
*(in years)*


*Source: ACPR.*

Chart 27

New home loans to individuals, by purpose

*(%)*




*Source: Banque de France.*

over 2017, rising from 18.4 to 19.8 years (Chart 26), making it possible to absorb higher prices and the increased average loan amount without a deterioration in the average debt-service-to-income ratio.

The end of 2017 featured a sharp increase in financing for buy-to-let investments, whose share of new lending flows climbed from 11% to 15% (Chart 27). The trend needs to be set in context, however, in two respects: first, the increase in the share of buy-to-let investments almost entirely reflects a spike in activity in December 2017 as people sought to take advantage of tax breaks; second, the levels reached are well short of those seen in 2008-2009, when buy-to-let investing accounted for almost 19% of annual new lending.

Box 2

## Commercial real estate market

**Price levels on the commercial real estate market are now above their 2007 peak, following sustained growth since 2009** (Chart 1). Prices across all segments went up by 3.7% in 2017, 0.5 of a percentage point faster than in 2016. The trend is pronounced in all segments, from retail (3.2% growth) to offices (4.1%) and residential (3.0%). Price levels are now around 30% higher than those of France's main European neighbours (Chart 2).

**In the office segment**, which accounts for 55% of the total market, trends vary considerably by location (Chart 3). Price growth is accelerating in all capital areas, with 6.8% for the Paris Central Business District (CBD), 2.6% for the La Défense and Western Crescent areas, and 4.8% for the rest of Paris[1].

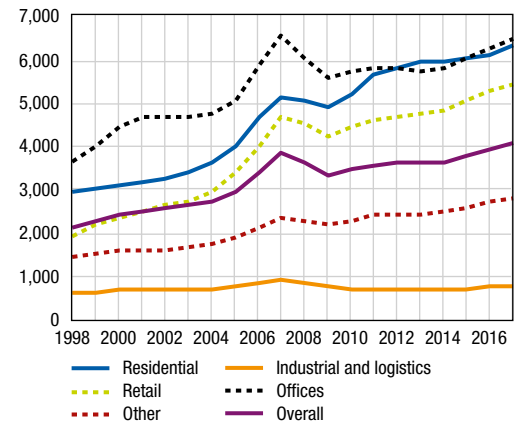
Prices are picking up in the rest of the country as well, with growth of 2.1% compared with just 0.2% in 2016. Conversely, prices in the Paris Outer Ring[2] fell in 2017 for the seventh year running, surrendering 1.5%.

1 *The Paris CBD comprises parts of the 1st, 2nd, 8th, 9th, 16th and 17th arrondissements.*
2 *Départements 77, 78, 91, 95.*

Chart 1

EUR price per m² in the commercial real estate market in France, by segment

*(EUR price per m²)*

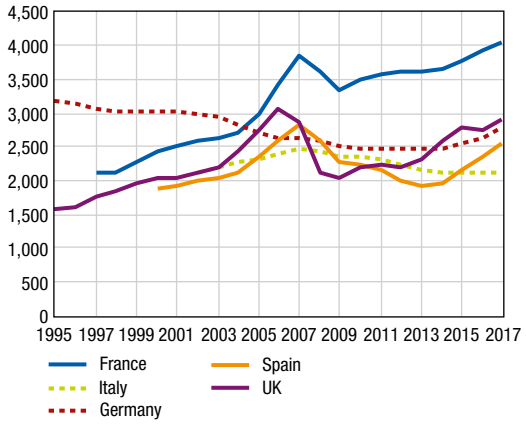



*Source: MSCI. Like-for-like data.*

Chart 2

EUR price per m² in the commercial real estate market in the main European countries (all segments)

*(EUR price per m²)*

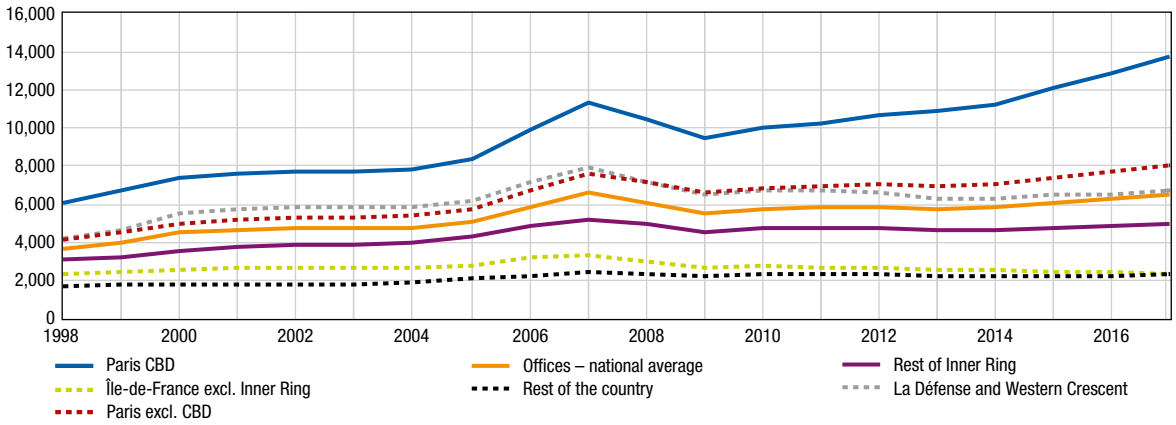



*Source: MSCI.*

Chart 3

EUR price per m² for offices in France, by sector

*(EUR price per m²)*




*Source: MSCI.*

Price growth has driven **rental yields** downwards (Chart 4) to 4.3% for all segments as a whole (0.3 pp lower than 2016), 4.2% for offices (-0.4 pp), 4.3% for retail (-0.5 pp) and 2.5% for the residential segment (-0.1 pp). In all sectors, rental yields are well below historical averages, down 1.3 pp overall, 1.9 pp for retail, 1.8 pp for offices and 1 pp for residential. While the decrease in rental yields has been observed in neighbouring countries, France has the lowest level after Italy.

The decline in rental yields is however taking place amid a broad-based contraction in asset yields: the difference between rental yields and the French sovereign ten-year yield was 3.5 pp in 2017, which is higher than the long-run average (2.2 pp) but down from the peak of 4.1 pp in 2016.

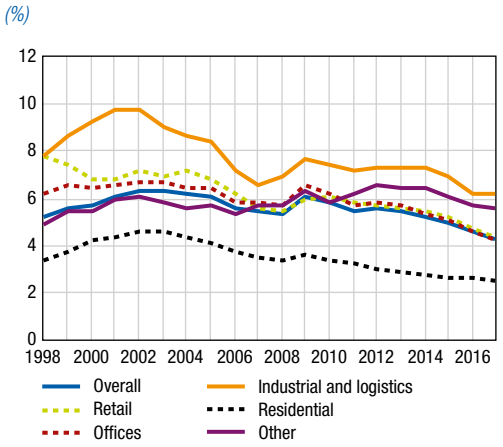
**The sharp run-up in prices since 2014 in the commercial real estate sector suggests possible overvaluation,** indicating the risk of a correction in the case of an adverse event, such as a cyclical downturn or a sudden surge in interest rates. **Several methods may be used to measure overvaluation:**

– based on the level of rental yields compared with their long-term average, prices are about 30% overvalued for the sector as a whole and 40% for offices;

– based on an econometric model linking office real estate prices to fundamentals (GDP, level of rents, empty office space, stock of offices, interest rates), overvaluation was estimated at about 10% in Q4 2017.

Chart 4

Rental yields on commercial real estate in France




Source: MSCI.

However, stress tests looking specifically at the exposures of financial institutions to the commercial real estate sector in France performed in Autumn 2016 by the HCSF revealed that financial system participants, i.e. banks, insurers and investment funds, were capable of complying with their prudential requirements even in the event of a very significant fall in asset prices in the sector.

# 3 Risks for financial institutions

The risks facing the French financial sector are broadly unchanged from those reported in the December 2017 assessment. The banking sector and insurance sector alike continue to demonstrate their resilience.

## 3.1 Risks for the French banking sector

The six largest French banking groups[22] maintained their overall profitability in the second half of 2017, particularly thanks to strong non-interest income and the ongoing decline in the cost of risk. French banks' return on equity (RoE) stood at 6.3% at end-December 2017 compared with 6.5% at the close of 2016[23].

The prolonged low interest rate environment could lead to additional risk taking by institutions in some sectors. For now, however, the accounting and prudential data reported by French banks do not signal unfavourable developments on the risk taking front. In fact, regulatory measures of credit risk show risk diminishing slightly on the corporate segment over the past year. Nonetheless, as part of preventive steps to safeguard banks' resilience against a backdrop of rising debt of certain large French businesses, the HCSF took the decision in May 2018, pursuant to Article 458 of the European Capital Requirements Regulation (CRR)[24], to apply a targeted measure to systemically important French banks, capping their exposure to the most heavily indebted large companies[25]. The measure comes into application on 1 July 2018.

However, banks' operating costs remain a subject of close attention. They continue to rise for the six main French banking groups, despite a succession of transformation programs since 2013 aimed at cutting structural costs and addressing the challenges of the digital revolution. In this setting, banks are revising business models, rationalising networks, relying on more outsourcing of support functions, investing in information systems, as well as building partnerships with FinTechs or acquiring them. Notwithstanding the increased costs, however, the average cost-to-income ratio of French banking groups is close to the median of Europe's main global banks.

**French largest banks continue to improve their prudential ratios, particularly in terms of solvency and liquidity.** Several adverse scenarios could theoretically lead to a deterioration of this situation. First, a sudden repricing of risk premiums could raise stress in the banking system through increased financing costs and losses linked to the revaluation of financial instruments. Meanwhile, a downturn in macroeconomic conditions could degrade asset quality and harm banks' earnings prospects. In this regard, the European Banking Authority (EBA) launched in January 2018 a new stress-testing exercise for the main European Union (EU) banks in order to provide valuable information about the ability of the banking system to cope with these various shocks over a three-year horizon, which are part of the simulation scenario. The results will be published in November 2018.

Furthermore, the completion of the Basel III framework on 7 December 2017 marked an important step forward. The aim is to strike a balance between reducing the unwarranted variability in banks' risk-weighted assets and maintaining risk sensitivity. The full implementation of the finalised Basel III package remains paramount for financial stability.

*22 BNP Paribas (BNPP), Crédit Agricole Group (GCA), BPCE Group (BPCE), Crédit Mutuel Group (GCM), La Banque Postale (LBP) and Société Générale (SG).*
*23 For a detailed analysis of the position of France's large banking groups at the end of 2017, see Issue No. 89 of the ACPR's Analyses et Synthèses (May 2018).*
*24 Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012.*
*25 HCSF press release dated 11/05/2018.*

## a. Despite a slight rise, the overall profitability of French banks is still remaining below the cost of equity

### • Overall earnings rose slightly at the end of 2017 but return on equity (RoE) remained unchanged

Over 2017 as a whole, the six main French banks increased their net banking income (NBI) by 0.5% to EUR 145.6 billion despite the low interest rate environment and historically low market volatility. While asset management and insurance activities, which are features of the diversified business models of French banks, performed vigorously, weak earnings growth was largely attributable to the impact of dispute settlement. Without any restatement to reflect this non-recurring component, earnings actually rose by 2.6%.

After recognising overheads, which increased by 2.7%, and the historically low cost of risk (-18%), the pre-tax income of the six main French banking groups grew by 3.9% to EUR 38.9 billion. The net income as a proportion of equity (RoE) amounted to 6.3%, very close to the median ratio for large European banks (6.4%).

### • Since late 2017, market analysts have slightly upgraded their 2019 RoE forecasts for French banks

Although market forecasts need to be treated with caution, the expected 2019 RoE of the four largest French banks[26] has improved slightly since end-October 2017, albeit by less than some major European banks. On average, in early April 2018, the forecasted RoE at end-2019 for French banks was close to the median for major European banks, although situations differed across individual French institutions.

### • Banks' cost of equity (CoE) has fallen slightly since early 2018 but still remains above RoE

In early 2018, the return required by investors began to reflect the downturn in risk premiums observed since 2016.

Chart 28 shows how risk premiums for French banks (average estimate[27] at 6.1% in April 2018, down over 1.5 percentage point (pp) compared with summer 2016) have declined to sit at levels comparable to those of their European counterparts but well above those of US banks (3.0% in April 2018). This spread in risk premiums between the United States and Europe reflects a bigger increase in the US risk-free rate towards the end of the period. Despite these developments, French banks' CoE[28] has been stable for a prolonged period owing to a higher sensitivity to non-diversifiable risk (higher beta), especially since 2012 (Chart 29). However, since the start of 2018, investor demands have seemingly decreased, and French banks' average estimated CoE fell to 8.8% in April 2018 – still 2 percentage points (pp) above the pre-crisis average. Uncertainty about CoE (measured by the two-standard deviation confidence interval) has risen in the post-crisis period, as reflected in the estimation range[29], which has

*26 BNPP, BPCE (Natixis), GCA and SG.*

*27 Average of 45 risk premiums calculated using different assumptions: forecast dividend per share growth rate at 18 months, two years and three years, GDP at three, four and five years, risk-free interest rate (ten-year Bund, one- and five-year Eonia), time horizon varying from three to ten years and Euro Stoxx 600 dividend yield. +/- 1 (2) standard deviation(s) = Premium in a range of sensitivity to parameters of +/- 1 (2) standard deviation(s).*

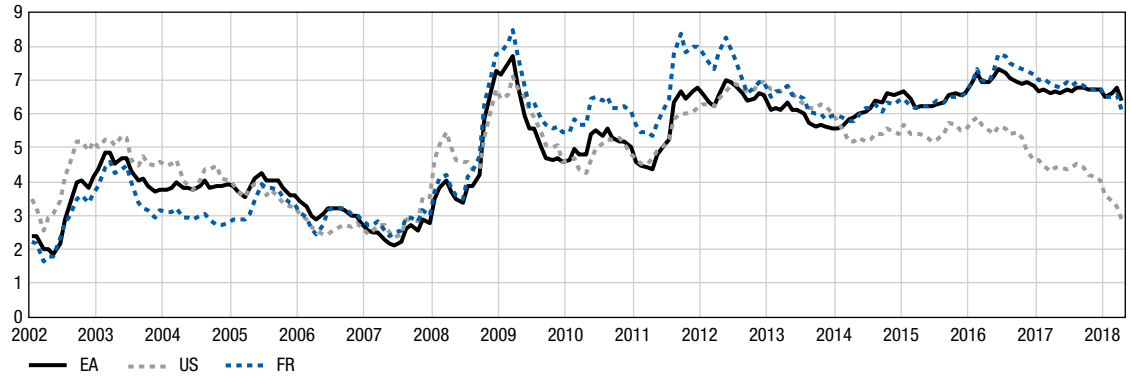
*28 Since CoE is not an observable value (expectations of future cash flows being inherently uncertain), we use a capital asset pricing model (CAPM): taking as our starting point the estimated market risk premium and beta of banks (degree of exposure to systemic risk i.e. non-diversifiable), we use the CAPM formula to calculate the return required by investors for individual banks (CoE): $E[r_{i,t}] = r_{ft} + \beta_{i,t} * p_{M,t}$ where $r_{ft}$ is the risk-free rate at time t, $\beta_{i,t}$ is the beta of bank i at time t, $p_{M,t} = k_i - rf_i$ is the risk premium of market M and $E[r_{i,t}]$ is the expected return on asset i, at time t, in our case the bank's CoE. We therefore equate $E[r_{i,t}]$ to bank i is CoE at time t.*

*29 Average CoE of French banks obtained from 130 estimates produced by a dividend discount model (Gordon Shapiro) using different assumptions: forecast dividend per share growth rate at 18 months, two years and three years, forecast GDP growth at three, four and five years, risk-free interest rate (ten-year government bond, one- and five-year Eonia), time horizon varying from three to ten years, Euro Stoxx 600 dividend yield and market beta calculated at one, two and three years.*

Chart 28

Bank risk premium in France, the euro area and the USA

(%)



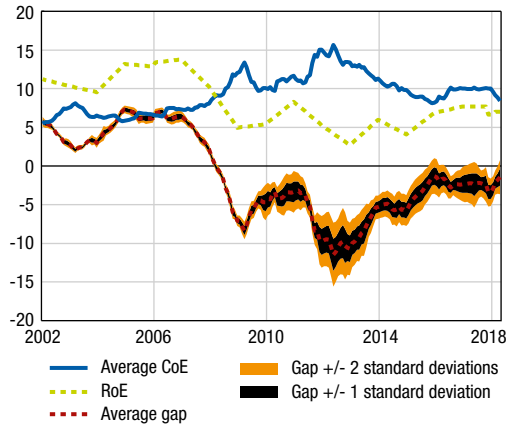

*Sources: Bloomberg, IMF, Federal Reserve Bank of St. Louis, ECB. Banque de France calculations.*

widened since 2009. That said, the gap[30] separating the average CoE, i.e. the return required by investors, and the average banks' RoE (Chart 29) narrowed due to banks' improved earnings, but was still negative at the end of April 2018.

Chart 29

Average CoE and RoE, French banks

(%)




*Sources: Bloomberg, IMF, ECB. Banque de France calculations.*

## b. Political risk: French banks have limited exposure to the UK but are more substantially exposed to Italy

**Brexit is expected to have a contained impact on the six main French banking groups** as they have relatively limited exposure to UK-based counterparties. At year end-2017, these exposures totalled just over EUR 206 billion, down 6% over the year, and accounted for a small share of bank balance sheets, at slightly more than 3% of the total exposures of the six largest French banking groups. Sterling-denominated claims, meanwhile, made up less than 14% of all UK exposures versus 15.5% in late 2016.

However, if the UK leaves the single market without an agreement, the loss of European passports for London-based financial institutions could create the risk of an interruption for some activities. With this in mind, private and public actors alike need to review the materiality of their exposures to this risk by asset class and/or line of financial services (lending, insurance, equity, liquidity, resolution, derivatives) and set up contingency plans.

In this regard, in spring 2017, the ACPR and the ECB took action under the framework of the Single Supervisory Mechanism (SSM) and (i) classified institutions according to their level of exposure and the nature of risk, (ii) requested institutions to share their Brexit contingency plans, and (iii) engaged in communication through workshops. The

*30 Indicator used to gain information about banks' cost of financing on financial markets. Theoretically, if a bank's return is too low relative to the investment risk, its share price should fall as investors turn away. The price lowers until it adjusts to reflect the return required by shareholders. This is an imperfect measure because of the timing difference between RoE, which is an accounting measure that records profitability at time t, and CoE, which is a forward-looking measure reflecting the returns expected by investors.*

ECB also issued communications[31] to verify that plans complied with its requirements in terms of governance, establishment of branches, booking models, recovery measures and internal models.

Regarding Italy, it is too early to comment on the economic policy stance of the new government and its potential impact on partners countries. However, the components of the joint programme put forward by the Five Star Movement and the League Party, according to information at 1st of June 2018, raise questions about the potential consequences for the financial sector. Measures drawing the most attention include plans to separate investment activities, limit bail-in framework for savers, reconsider the out-of-court debt collection system introduced in recent years and set up a public bank that would not be overseen by the supervisory mechanism.

The consolidated exposures of French banks to Italy, excluding off-balance sheet commitments, essentially comprise:

– exposures to the non-financial private sector (EUR 174 billion), which would be mildly affected in the short term by a crisis of confidence but would be more severely affected further out in the event of a downturn in Italian economic activity;

– exposures to Italian banks excluding subsidiaries (EUR 23 billion);

– sovereign exposures (EUR 54 billion);

– central bank exposures (EUR 8 billion).

According to statistics released by the Bank for International Settlements (BIS), these claims are primarily made up of commitments distributed locally by subsidiaries and branches (EUR 199 billion), as compared with EUR 59 billion in cross-border transactions by French institutions in the form of securities holdings and loans under the freedom to provide services.

### c. Positive change in the quality of bank exposures to non-financial companies

At year end-2017, the exposure at default (EAD) of the five main banking groups to non-financial companies (NFCs) stood at EUR 1,809 trillion. While these exposures rose by 6% between December 2012 and December 2017, they fell by over 4% year-on-year.

The fact that the **cost of risk is historically low**, as mentioned earlier, can be considered in the light of the overall improvement in the quality of credit portfolios revealed by a review of the COREP regulatory reports filled by banks and banking groups' internal risk monitoring documents. Since June 2009, the average probability of default among NFCs has decreased from 4.9% to 3.8% at end-2017. Moreover, between end-2014 and end-2017, French banks stepped up the share of exposures to NFCs with low probabilities of default (approximately 2%) while scaling back their exposure to NFCs with more elevated default probabilities. In addition to reflecting stringent management measures put in place by banks, this change in portfolio quality may also indicate an improvement in the creditworthiness of borrowers in connection with the economic cycle.

Further, although most business credits are unsecured, between September 2014 and end-2017, the coverage ratio for these exposures, which recognises guarantees received, rose from 10% to over 14%.

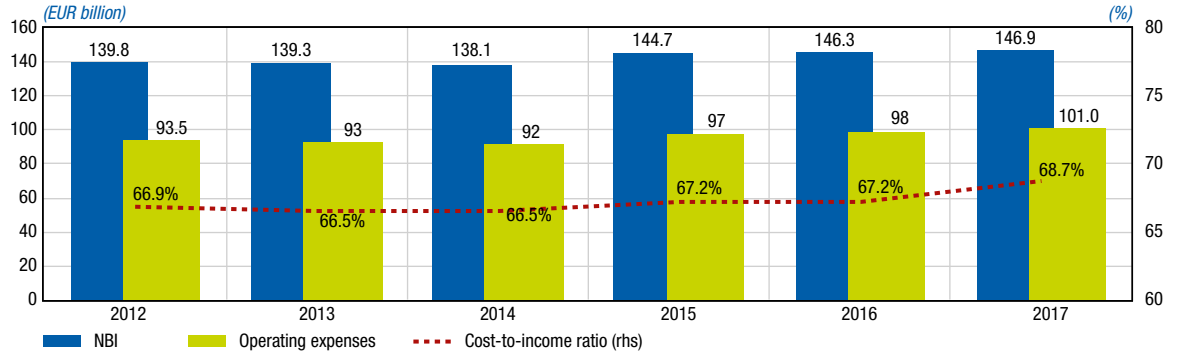
31 ECB, 16 May 2018, "Brexit: impact of a potential transition period".

## d. Cost cutting: a strategic challenge for French banks

**Cost control is one of the strategic priorities of French banks.** For some years, though, the large French banks have been unable to lower their overall cost-to-income ratio (Chart 30), despite adopting and reporting satisfactory progress in cost-saving plans. Between 2012 and 2017, earnings rose by 5.1% but expenses climbed by 8%.

Chart 30

Aggregate cost-to-income ratio of the six main French banking groups




*Source: financial reporting by French banks.*

Banks have had to contend with a number of adverse developments. First, earnings growth has been more muted than projected over the past five years, particularly among banks with a substantial presence in retail banking in France. This reflects the fact that weak economic growth and the low interest rate environment have caused two countervailing effects in the form of increased received commissions during the waves of home loan renegotiations between 2015 and 2017, offset by razor-thin interest margins on the new lending. In addition, soaring regulatory and compliance costs and new taxes, meanwhile, have also had a significant negative impact, erasing operating cost savings. Finally, banks have had to recognise substantial non-recurring restructuring expenses in relation to new cost-cutting plans introduced in 2016 and 2017. These expenses, which are particularly high when plans are first deployed, accounted for between 1% and 2% of NBI in 2017.

Difficulties in curbing operating costs are shared by many banks in the euro area, where such charges rose by 11% on average between 2010 and 2016. Breaking down the increase in costs reveals that, overall, this trend in the euro area banking sector can be attributed to two main factors: i) competition to attract and retain personnel in the banking sector is driving a sustained increase in wage costs per worker; ii) technological developments in the digital field are forcing banks to invest heavily. These factors could persist in the coming years, restricting the ability of French and European banks to keep their cost-to-income ratios under control.

## e. French banks are improving their regulatory ratios and getting ready for new regulations

### • Solvency and liquidity ratios improved in the second half of 2017

During the second half of 2017, the aggregate CET1 ratio of the main French banking groups rose by 30 basis points (bps) to 13.9% at end-December 2017. This was attributable to an increase in equity and a small decrease in risk-weighted assets (RWAs). By end-December 2017, the aggregate leverage ratio under "full Basel III"

had improved slightly compared with June 2017, inching up 0.1 pp to 4.9%. The spread of ratios between individual banks remains significant, ranging from 3.9% at La Banque Postale to 6.7% for Crédit Mutuel Group. The six banking groups comply with the 3% minimum requirement, and the current leverage ratio of the three French global systemically important banks (G-SIBs) is appropriate to cover the additional requirement under the macroprudential buffer on leverage ratio[32].

The short-term liquidity coverage ratio (LCR) of all the main French banking groups is now well above the minimum requirement, with an aggregate ratio of 131.7% at end-December 2017 compared with 127.3% at end-June 2017. All the six main banking groups have net stable funding ratios (NSFRs) of over 100%, although some institutions still have very low margins. The consolidated NSFR of the six main banks was 107.9% at end-December 2017, up 1 pp on June 2017.

As regards assessing the future resilience of the French banking system from a solvency perspective, the EBA launched in January 2018 a new EU-wide bank stress-testing exercise, undertaken every two years. The 2018 exercise covers a sample of 48 EU banks, including six banking groups from France that cover approximately 90% of the French banking sector's total assets. For the first time, the exercise will incorporate IFRS 9 accounting standards. The adverse scenario used in the exercise assumes the materialisation of four systemic risks that are currently deemed by the ECB as representing the most material threats to stability: (i) an abrupt and sizeable repricing of risk premiums in global financial markets, (ii) an adverse feedback loop between weak bank profitability and low nominal growth, (iii) public and private debt sustainability concerns, and (iv) liquidity risks in the non-bank financial sector with potential spillovers to the broader financial system. The implied GDP growth rate from 2020 onwards under the adverse scenario implies a deviation from the baseline scenario level in 2020 that is more severe than in the previous EBA's exercises. The results are expected to be published in early November 2018.

- **The finalisation of Basel III package is an important step forward, but the application of this agreement in Europe and the rest of the world must be monitored**

Since the last risk assessment was carried out, an agreement was reached on 7 December 2017 as the Basel Committee's Group of Central Bank Governors and Heads of Supervision (GHOS) endorsed the final set of Basel III reforms. The aim of the agreement is to strike a balance between reducing risk-weighted assets variability across banks while maintaining risk sensitivity when calculating the solvency ratios. Accordingly, the finalisation of Basel III marks an important step towards restoring trust in the methods used to calculate banks' capital ratios and will thereby help improve investor confidence in the solvency of the banking sector as a whole.

The full implementation of the finalised Basel III reform package in all jurisdictions, in particular in the EU, the United Kingdom and the United States, is essential to maintain global financial stability and ensure a level playing field for banks. International cooperation, which has been a driver in the post-crisis effort to develop common standards, should continue during the implementation phase at the level of the Basel Committee.

## 3.2 Risks for insurance

In 2017, the insurance sector experienced changes that are set to have a gradual impact: in the savings segment, amendments to the tax treatment of financial income decided at

*32 Buffer on top of the 3% minimum and set at 50% of the required solvency buffer for G-SIBs.*

the end of 2017 could change the attitude of retail investors to life insurance; the annual right to terminate creditor insurance contracts (including pre-existing contracts) may influence a market that is currently captured by *bancassureurs*; in property and casualty insurance, repeated natural disasters in 2016 and 2017 raise questions about the effects of climate change and the possibility that the frequency of natural events may have risen permanently.

In a European market characterised by the low interest rate environment and rising numbers of natural disasters, EIOPA is organising a stress-testing exercise in 2018 to assess the sector's resilience to a set of specific shocks: 42 European insurance groups, including nine from France, have been selected to be part of the exercise.

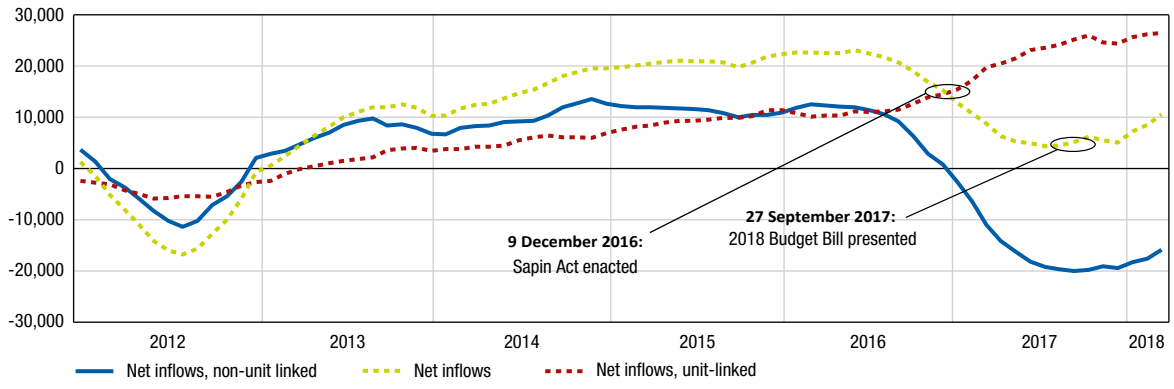
## a. After stabilising, inflows into life insurance picked up, driven by unit-linked products

After decreasing sharply since summer 2016 (cf. Chart 31), inflows into life insurance stabilised in 2017 against a backdrop of major regulatory developments (HCSF empowered by the Sapin II Act of 9 December 2016 to temporarily restrict surrenders, increased taxation through introduction of a flat tax). In fact, net inflows across all products began rising in mid-2017, propelled by historically high inflows into unit-linked products. Outflows from non-unit linked funds continued, albeit to a less marked degree, reflecting the effect of declining returns and the fact that in the current low interest rate environment, insurers are promoting unit-linked investments. Offering a more diversified financial or property market investment profile than that of non-unit linked products, which are mainly invested in low-risk placements such as bonds, unit-linked products have better return prospects. Unlike with non-unit linked products, however, where the investor's outlay is guaranteed and credited interest is locked in, holders of unit-linked contracts bear the risk of capital loss linked to market fluctuations.

Chart 31

Net inflows into life insurance (12-month rolling window)

*(EUR million)*



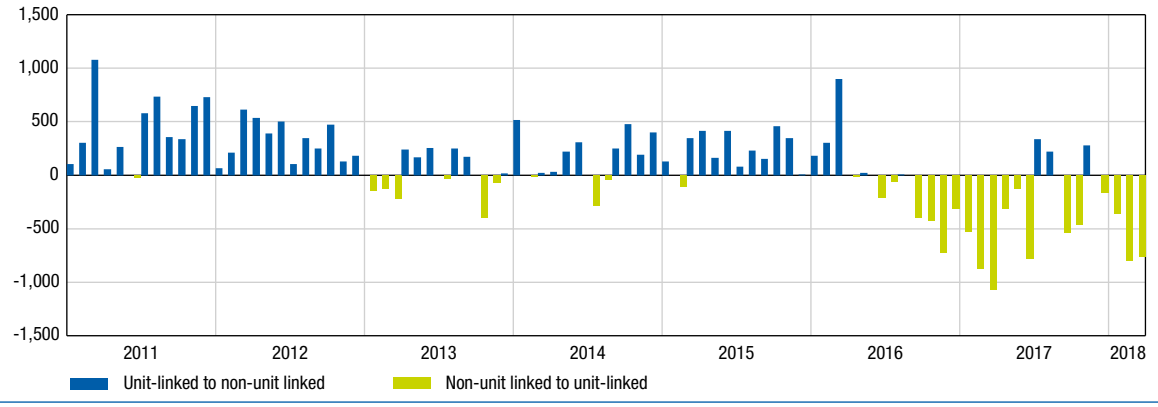

*Source: ACPR.*

Unit-linked contracts, then, are driving growth in life insurance outstandings. Their strong performances have been further supported by switching, which has been significant since mid-2016 (cf. Chart 32), although the volumes involved have been too small to alter the basic make-up of liabilities, which remain dominated by non-unit linked products.

Chart 32

Switches between non-unit linked and unit-linked funds

*(EUR million)*




*Source: ACPR.*

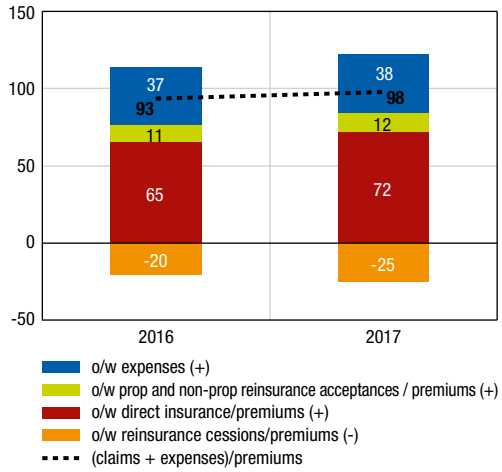
## b. Natural disasters in France: first assessment of 2017 and outlook for property and casualty insurers

Climate-related events by end-2017 resulted in approximately EUR 3 billion in claims for French insurers[33]. Hurricane Irma, which hit the islands of Saint Martin and Saint Barthélémy, caused EUR 1.8 billion in insured damage. As a result, the loss ratio on natural events increased by 13% compared with 2016, even though that year featured record flooding for the Paris area. In the long run, climate-related events could account for an increasingly large share of claims on property and casualty insurers. The climate events of 2017 played a part in reducing the underwriting profitability of fire and other property insurance business lines. The combined ratio of French insurance companies subject to quarterly reporting requirements rose by five points between 2016 and 2017 in these activities, while remaining below 100%, which marks the profitability threshold for these lines of business (cf. Chart 33).

Chart 33

Decomposition and change between 2016 and 2017, combined ratio (claims + expenses)/insurers' premiums*

*(%)*




** Fire and other property insurance business line.*
*Source: ACPR.*

The increase in the frequency and intensity of natural disasters is one of the main risks to which the property and casualty insurance sector is exposed, and property insurers make extensive use of reinsurance to cover such events. Reinsurance is therefore a vital link in the chain of protection by providing broad geographical and temporal risk diversification. In the short run, the cost of reinsurance could rise owing to the increase in claims.

*33 Source: French insurance federation.*

Box 3

### France's natural disaster insurance framework

With the Act of 13 July 1982, France established a framework for mandatory natural disaster insurance based on a public-private partnership, thereby providing coverage for natural risks that were previously very lightly insured.

**Mandatory coverage:**

Contracts insuring against fire and damage to property located in France, including vehicles, must include a set of natural disaster coverage. This is mandatory associated insurance: that is, an asset without primary insurance is not entitled to coverage. As a result, insurance coverage of natural disasters depends heavily on the penetration rate of property insurance.

Article L. 125-1 of the French Insurance Code states that covered claims, including for operating losses, must be the direct result of natural disasters, which are defined as "unusually intense natural phenomena". The scope of coverage cannot be contractually overridden, and the contractual provisions are set by standard clause (Article A. 125-1). Deductibles are gradually reassessed in the event of repeated claims for assets located in areas without a natural hazard prevention plan.

**Pricing:**

The additional coverage is not subject to specific pricing recognising the risk intrinsic to each policy, but takes the form of a set additional premium based on the premiums under the principal coverage provided by the contract (Article A. 125-2). For example, the additional premium for automobiles is set at 6% of the premiums relating to theft and fire coverage or, failing that, at 0.5% of the premiums for property and casualty coverage. The rate is set at 12% for other contracts, after deducting premiums relating to certain items of coverage, notably civil liability.

**Triggering coverage:**

Entitlement to compensation depends first of all on submission of an application to recognise a state of natural disaster in the affected area, and is suspended pending the issuance of an inter-ministerial decree recognising such a situation and identifying the zones and periods affected by the disaster. The insurer must pay compensation no later than three months following submission by the insured party of estimated losses or issuance of the decree, without prejudice to more favourable contractual provisions (Article L. 125-2).

**Caisse centrale de réassurance (CCR):**

The CCR is authorised to provide State-backed reinsurance coverage against natural disaster risk arising from the mandatory insurance regime by entering into bilateral treaties with insurers. In this capacity, it covers about 90% of the French market. In practice, coverage is organised around two treaties: a quota share treaty (50%) and a stop-loss treaty for the residual portion.

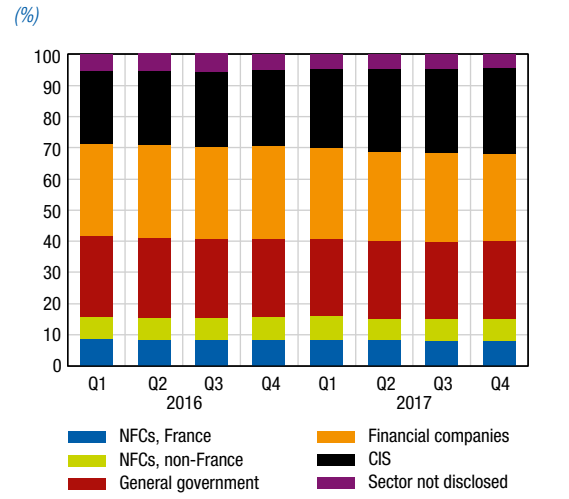
## c. Insurers' exposure to non-financial companies has been stable since 2016

In the low interest rate environment, non-financial companies[34] (NFCs) may see fit to step up bond issuance to tap into favourable financing terms. Institutional investors such as insurers, meanwhile, might view these bonds as a way to maximise their returns on assets. Since financing issued by NFCs carries higher counterparty risk on average, however, it is important to make sure that investments by French insurance entities in these companies are contained within a reasonable range.

*34 NFC issuers are identified by exclusion as being neither financial nor public.*

Chart 34

Change since 2016 in the investment sectors of insurance entities authorised in France




Source: ACPR.

**General government and financial companies** are the two primary beneficiaries of financial investments by insurers, which totalled EUR 2.543 trillion at end-2016 (realisable value, Chart 34). The share of direct investments in NFCs fell from 15.7% of investments in Q1 2016 to 15.2% at the end of 2017. **Bonds account for the lion's share of securities issued by NFCs and held on insurers' balance sheets**, at 70.1%, with equities making up 21.3%.

About half of the investments of French insurers in NFCs are in companies established in France, specifically 53.5% at end-2017. This proportion declined slightly between Q1 2016 and Q4 2017, falling by 1.3 points, without necessarily signalling a downward trend. Investments in French NFCs are more equity-focused (27.3%, with bonds taking a 64.3% share).

## d. SCR coverage improved in 2017

Solvency II regulations are based on assessing the risks taken on by insurers and set the capital requirements needed to cover the risks to which insurance entities are exposed. The solvency capital requirement (SCR) is the amount of capital that an insurer must have to absorb potential losses on a one-year horizon at a 99.5% confidence level, meaning that the risk of failure is limited to once in 200 years. The SCR coverage ratio is an indicator of the level of resilience of insurers and reveals that the solvency of the French market improved markedly in 2017 compared with 2016[35] (Chart 35).

At end-2017[36], average coverage ratios stood at 234% on a solo basis and 212% on a group basis. Life insurers in particular reported a larger increase, with coverage ratios rising from 205% in 2016 to 217% in 2017. Even so, coverage rates among life insurers remain below those of non-life insurers, which fell by 2 pp relative to Q4 2016, declining to 274% in Q4 2017.

Note that the increase in the solvency ratio has less to do with a decrease in risks that insurers have to cover than with an increase in covering capital, which is applied directly to the increase in net assets: specifically, the reconciliation reserve[37] holds the bulk of the capital used to calculate the SCR coverage ratio (unrestricted Tier 1 capital).

Overall, the change in and level of the average coverage ratio for insurers in France are on par with the average observed for the main insurance entities in the European Economic Area (EEA)[38]. Like French insurers, EEA insurers saw their average coverage ratios increase steadily in 2017, rising to 239% in September 2017, compared with 235% in France during the same period.

*35 The 494 insurance entities established in France and subject to Solvency II on a solo basis at 31 December 2016 make up 99.9% of the sector's total assets.*

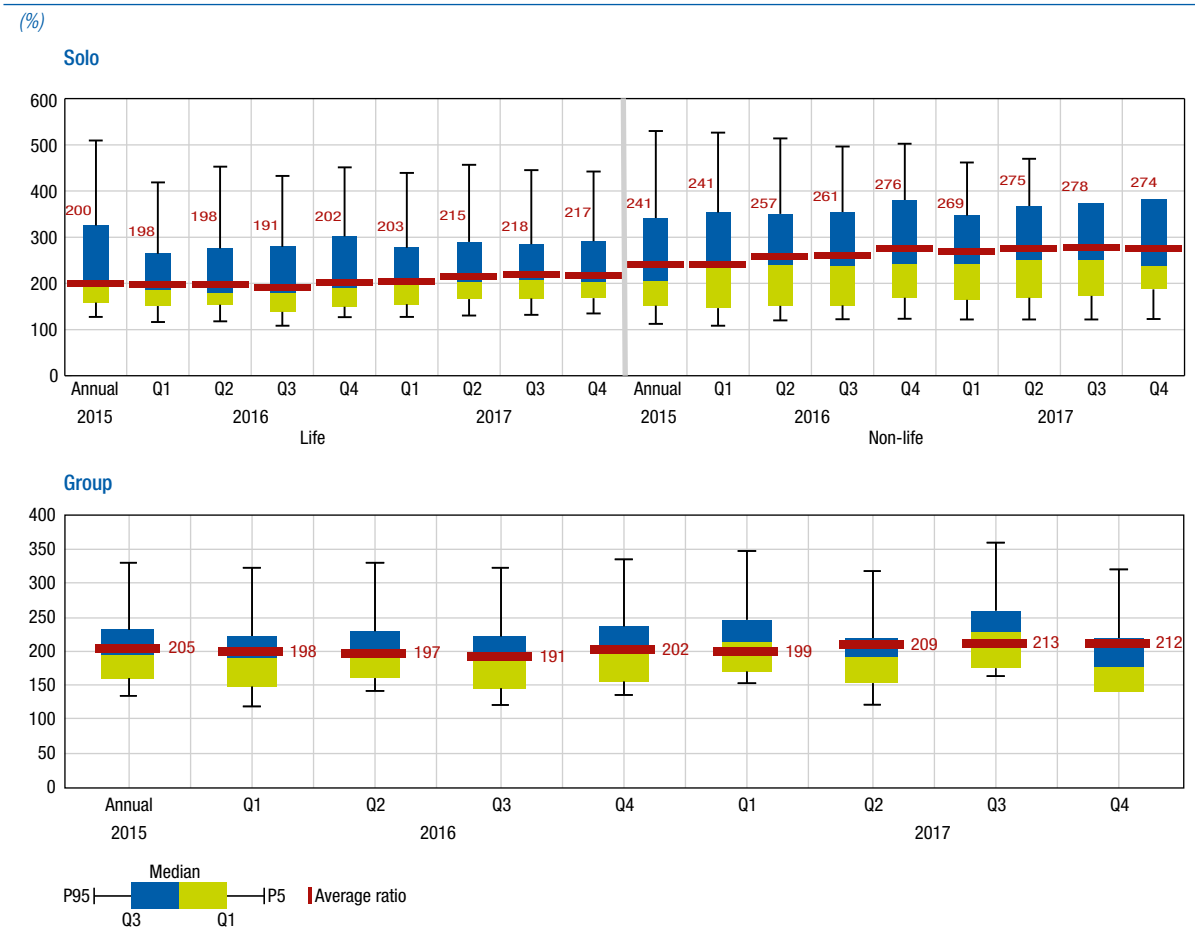
*36 All the coverage rates described were calculated using quarterly reports (by a population of 134 individual entities and 36 groups). In 2016, reporting entities in Q4 accounted for 94% of total assets on a solo basis and 84% on a group basis.*

*37 The reconciliation reserve is the portion of net assets on the Solvency II balance sheet made up of items other than share capital and share premium. It includes the estimated current value of the company's projected future earnings within the contract boundary as required by the regulations.*

*38 According to aggregate statistics published by EIOPA based on Q3 2017 data.*

Chart 35

SCR coverage ratios, insurance entities and groups subject to Solvency II




Source: ACPR.

## 3.3 Risks linked to shadow banking

### a. A precise mapping of the risks linked to shadow banking in France

According to the narrow definition provided by the Financial Stability Board (FSB), shadow banking includes all non-bank entities involved in intermediation activities presenting a risk to financial stability. France's shadow banking sector was worth EUR 1.750 trillion in 2016, or 12.5% of total French assets. The sector is extensively regulated by the AMF as regards asset management (see Economic Functions 1 and 5 in Table 5) and by the ACPR as regards activities counted under Economic Functions 2 to 4[39].

The following shadow banking mapping is based on the analysis by the Financial Stability Board (FSB), which has recommended an activity-based approach organised into five Economic Functions (EFs).

- **Investment funds (EF1) account for the lion's share (66%)**

French shadow banking is largely dominated by investment funds, which account for 66% of total assets. These funds take part in credit intermediation through purchases

39 See the Banque de France's most recent Financial Stability Review entitled "Non-bank finance: trends and challenges", April 2018.

Table 5

Mapping of shadow banking in France in 2016

| Economic function | Typology | Amount (EUR bn) | Share (%) |
|---|---|---|---|
| EF1 | Money market funds | 351.7 | 20.1 |
| | Fixed income funds | 301.8 | 17.3 |
| | Mixed funds | 403.8 | 23.1 |
| | Other funds | 97.3 | 5.6 |
| | **Sub-total** | **1,154.5** | **66.0** |
| EF2 | Finance companies | 8.4 | 0.5 |
| EF3 | Broker-dealers | 335.3 | 19.2 |
| EF4 | Mutual guarantee companies | 23.2 | 1.3 |
| EF5 | Structured financial vehicles | 226.8 | 13.0 |
| **TOTAL** | | **1,748.3** | |

*Source: Global Shadow Banking Monitoring Report 2017 – Monitoring Dataset, FSB.*
*Note: funds exclusively comprising equities are excluded from the definition and hence from the scope of the FSB's data collection.*

of debt securities and equity investments. This involves maturity and liquidity transformation, potentially including leverage. Depending on the underlying assets, funds may be money market, fixed income or balanced funds. The main risk linked to investment funds is the possibility that investors might lose confidence, triggering large-scale redemptions of units and forcing funds to sell off their assets. Liquidity risk may arise if a substantial volume of assets is sold.

- **Finance companies (EF2) make up a tiny share (0.5%)**

EF2, which occupies an extremely small place in France, corresponds to finance companies that provide funding for specific assets or services, such as vehicles or transport and farming equipment. Only independent entities that do not have a banking licence and that are not consolidated as part of a banking group are counted in shadow banking, insofar as they cannot draw on stable financing from deposits and must therefore seek market funding (notably in the short run). Accordingly, they are especially exposed to maturity transformation.

- **Broker-dealers (EF3) have a moderate share (19.2%)**

In France, EF3 covers investment firms that provide investment services such as order execution for third parties and investment advice. These activities rely on short-term funding and are therefore subject to maturity transformation but also to liquidity transformation, sometimes with leverage.

- **Small share (1.3%) for mutual guarantee companies (EF4)**

EF4 covers credit facilitation activities serving bank and non-bank entities and provided by credit insurers, financial guarantors and monoline insurers. These intermediaries participate in credit growth and thus play a part in generating leverage.

- **Moderate share (13%) for structured financial vehicles (EF5)**

EF5 covers structured financial vehicles. These vehicles participate in bank refinancing through market funding raised from institutional investors.

## b. Certain shadow banking risks must not be overlooked

Progress remains to be made to gain a better understanding of the connections both between shadow banking entities and also between them and banks, in order to more effectively gauge the risks of contagion. An initial analysis suggests that the interconnectedness of the French asset management sector and the wider French financial system is fairly limited (Box 4).

Box 4

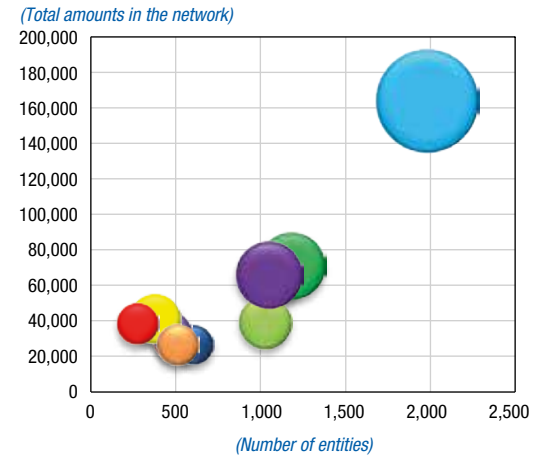
### Interconnectedness of the French asset management sector and the wider French financial system[1]

– **The asset management sector has experienced an important growth over the recent period, and its complex interconnections with other participants of the financial system such as banks and insurance companies need close monitoring as potentially posing threat to financial stability.** At end-2016, France had 630 management companies, which manage investment funds. The top-ten firms account for over 60% of total assets under management, with the largest three accounting for 20%, 8% and 8% respectively. The amounts invested by the biggest banks and insurers in investment funds range from 1% to 6% of assets depending on the exposed entity. Connections between investment funds themselves or between investment funds and banks or insurers are formed through **two types of channels**, namely: (i) **on the asset side**, through funds' holdings of securities, such as equities, bonds and fund units, issued by banks, insurers and funds; and (ii) **on the liability side**, through fund units held by banks, insurers and other funds.

– **The total assets under management of French investment funds have increased by 20% since end-2011 and reached EUR 1.450 trillion**[2] at end-2016, well above the level seen in 2009. Their total assets are equivalent to 60% of the total assets of French insurers and 20% of the total assets of French banks. By asset class, fixed income and equity funds experienced the most vigorous growth between 2011 and 2016, putting on 33% and 30% respectively. Meanwhile, at end-2016, fund liabilities were mostly held by French insurers (33%), followed by other French non-banks (14%), French banks (6%) and the non-financial sector (35%). In terms of assets,

Chart 1

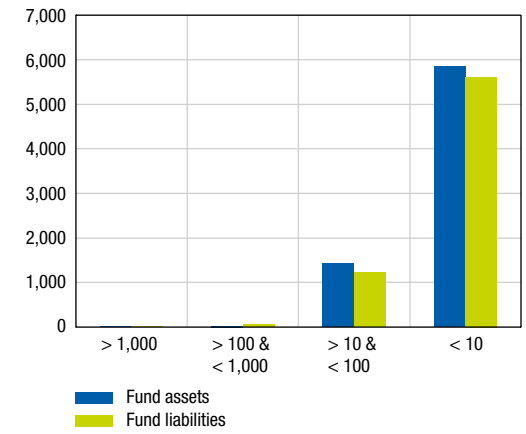
Representation of the network by total amounts committed, largest asset managers




Sources: Banque de France, AMF and ACPR.
Each bubble represents an asset manager. The size of each bubble is proportionate to the assets managed by the company.

Chart 2

Representation of the network by links to fund assets or liabilities, by entity




Sources: Banque de France, AMF and ACPR.

1 This box is based on a joint analysis carried out by the Banque de France, the AMF, the ACPR and the Treasury for the HCSF.
2 Source: Banque de France.

securities issued by the non-financial sector account for 49% of fund portfolios, while the other 51% comes from securities issued by financial sector entities domiciled in France (17% for banks and 10% for other financial entities), elsewhere in the euro area (17%) and outside the euro area (6%).

– **The analysis of interconnections uses network analysis methodology, which considers the system as being made up of nodes (entities) and links (holdings of securities issued by other entities) that connect entities to each other**. In Q4 2016, the French financial system was made up of 9,943 entities, with 9,520 investment funds, 129 banks and 130 insurers, while there were a total of 61,117 links. For comparison, in 2010, there were 11,500 entities and 77,900 links. The statistics reveal that: (i) the network is sparse with the number of links created being small when compared against the 98 million potential links that would be created if all the entities were linked to each other; (ii) the network is primarily connected by a small number of core entities with over 1,000 links, while many other entities have fewer than ten; (iii) these core entities contribute to a relatively short average distance between two entities in the network is small: any member of the network can be reached by another through 3.24 links on average. The core entities are those that are either the most widely held (i.e. that have the largest number of links on the liability side) or are the biggest holders of other entities' securities (i.e. that have the largest number of links on the asset side). The first group comprises banks and money market funds, while the second is chiefly made up of insurers. Fund portfolios are moderately concentrated on the French financial sector: 26% of funds (accounting for 12% of funds' net asset value) invest more than 50% of their portfolio in the French financial sector.

# 4 Risks for financial markets

## 4.1 Risks of an asset price correction

Vulnerabilities are growing on global **financial** markets, some segments of which are being transformed by technological innovation (Box 5). The risk of a sudden correction in risk premiums is rising as financial market valuations continue to head upwards, driven by procyclical behaviour reflecting substantial appetite for risk. There are concerns about increased volatility, with US and euro area stock markets hitting volatility peaks in the last four months, while uncertainty persists about the potential for a further correction. But there are also concerns about stretched US stock market valuations even as upside revisions to expectations about monetary policy **normalisation** and **uncertainties** about trade policies introduce potential sources of instability. Overall, risk tolerance remains high on global financial markets. This is particularly visible in the riskier segments of the fixed income markets.

Box 5

### Risks linked to the growing sophistication of algorithmic trading

**Algorithmic trading** means using computer programs to execute transactions on financial markets. However, the catch-all term encompasses a wide variety of approaches[1], participant categories and different levels of sophistication[2].

Initially, non-banks used innovative technologies to obtain faster execution speeds and penetrate a sector that banks had previously dominated. With the spread of these technological advances, modern financial markets now mostly use electronic processes. For the most standardised assets, such as equities, futures and currency products, the exponential increase in computing power has paved the way for ever more sophisticated algorithmic trading strategies.

#### Static algorithms

The first algorithmic strategies were fairly simple and were based primarily on time-weighted average price and volume-weighted average price algorithms. The aim was to divide large orders into smaller tranches to get a final execution price that was more representative of the initial market state by reducing the impact on liquidity. Other fairly simple algorithms were used to automate repetitive tasks such as hedging currency option portfolios through fully automated management of exposure to underlying assets.

#### Smart algorithms

Market fragmentation then set the stage for the rise of algorithms designed to seek out the best[3] liquidity from the range of available electronic trading systems. The associated computer programmes had to be more flexible and evolved into **increasingly "smart" agents** capable of using indicators to monitor their environment and of adjusting their behaviour. More recently, the emergence of algorithms that can instantly interpret published economic indicators, say, or the stance adopted by decision-makers has further raised the sophistication of financial markets as a whole as well as the associated risks. The pace of trading innovation shows no sign of slackening as new technologies, such as machine learning and neural networks, mature in other sectors of the economy.

#### Risks

The primary challenge is one of compliance and **responsibility**. How can a developer be confident that an algorithm using machine learning techniques will not use banned market practices? Where does responsibility lie?

1 *Although often used as a synonym for algorithmic trading, high-frequency trading (HFT) accounts for just a small part of the algorithmic universe in financial markets. A high-frequency trader will use algorithms, but not all users of algorithms are high-frequency traders. HFT is characterised by the ability to send an extremely large number of orders extremely quickly.*

2 *For more details, see the June 2016 risk assessment.*

3 *The criterion used to determine liquidity quality will depend on the participant's objective, which might be to minimise market impact, say, or to maximise profit.*

Market participants do have to obey internal governance rules. Before an algorithm is launched, several committees are convened, and programmes are repeatedly tested and monitored to check that actual and expected behaviour match. Yet the fact that an algorithm cannot be tested under real conditions ex ante greatly increases the risk of problems via potential second-round effects. Self-sustaining loops could be generated: if two algorithms enter into "competition", they could create a market anomaly that might trigger the circuit-breakers of liquidity provision programmes and interfere with orderly market functioning[4].

Last but not least, current developments suggest that the use of algorithms that are capable of trading in multiple asset classes simultaneously are set to become more widespread among some market participants. These new tools will automatically increase the porosity of financial markets and **the risks of contagion** across assets that are currently uncorrelated.

Although algorithms are enabling significant advances in trading, from enhanced traceability to reduced operational risk and improved price discovery, these innovations pose real **risks and raise a new set of governance issues.**

4 *This type of situation has the potential to trigger a flash crash.*

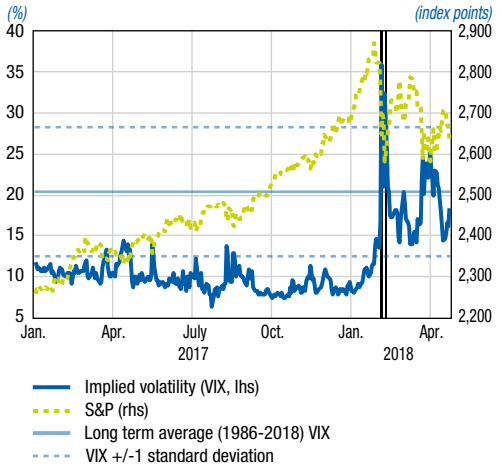
## a. Review of the volatility and valuation correction in early 2018

Even though fundamentals were in better shape than at any time since the crisis ended, equity markets underwent a correction in early February following the release of macroeconomic statistics that raised fears of an interest rate hike in the US. Financial markets went on to display increased volatility in March and April.

One especially noteworthy episode featured two substantial one-day drops as the S&P 500 surrendered 3.5% on 5 February and again on 8 February (vertical bars in Chart 36). The fall on 5 February garnered particular attention because liquidity plummeted on equity and government bond markets while the VIX volatility index[40] surged, posting a record increase at the end of the session. The VIX, which had been fluctuating for over a year at between 9.5% and 15%, spiked to 50% (Chart 36), dragging the VSTOXX[41] and VCAC[42] indices with it before falling back again. The VIX's volatility can be attributed[43] to specific characteristics of the options market that supplies the volatility used as the basis for the index. Notably, the market features specialist participants, shallow depth, reduced liquidity and an unstable supply-demand equilibrium, with potentially directional participants and potential risks of manipulation facilitated by the complexity of options pricing, particularly when it comes to determining the volatility surface. Moreover, the sale of VIX futures[44] allows participants to devise strategies betting on a decline in volatility.

Chart 36

US equity market valuation and VIX




*Sources: Chicago Board Options Exchange. Banque de France calculations. Most recent value: April 2018*

That the US equity market should have undergone a correction, in a setting of monetary tightening and at a time when many analysts had expressed concerns about

40 *Volatility Index (VIX) for the US equity market. Compiled daily by the Chicago Board Options Exchange (CBOE), it is a weighted average of 30-day implied volatilities for call and put options on the Standard & Poor's 500 (S&P 500) index. It is used to gauge the level of uncertainty among investors as implicitly indicated by option prices.*
41 *Volatility index for the Euro Stoxx 50 share index.*
42 *Volatility index for the CAC 40, the French share index.*
43 *Suspicions of manipulation were also raised by whistleblowers.*
44 *See the memo entitled "Volatility is back", BIS, 2018, and the ECB's FSR, May 2018.*

the elevated level of valuations[45], is not surprising in and of itself. Market participants and regulators, though, have focused more on the scale of VIX movements. The profile of participants trading VIX-linked products has changed drastically in recent times, with the rise in the United States of exchange-traded notes (ETNs) and exchange-traded funds (ETFs) indexed to the VIX or the inverse VIX, including some complex leveraged products and funds[46]. This development is fuelling two main concerns. Because of the marginal size of these funds compared with the US equity market, regulators fret less about the impact of a possible failure *per se* than about a butterfly effect triggered by a VIX spike and prompting reallocations across all asset classes used by institutional and private investors. Further, since the crisis, a growing share of asset managers have begun using volatility management and control techniques in their dynamic asset allocations. An upturn in volatility could prompt them to take procyclical action and liquidate risky assets. Since the VIX is the world's most widely followed volatility index, a sudden increase could cause large-scale disruption.

Despite the turbulence and sudden movements exhibited by ETN and ETF prices, which even caused a number of products to be shut down, these exchange-traded products nevertheless attracted fresh inflows in the wake of the volatility episode, signalling persistent risk appetite among investors. Note however that this type of product has been introduced to a marginal extent in Europe and Asia, and an analysis published by the AMF in April 2018 reveals that investors in French collective investments are not significantly exposed to these VIX strategies[47].

The stock market correction in France in February 2018, with the CAC 40 going down 6.0% between 31/01/18 and 08/02/18, compared with an 8.6% fall for the S&P 500 over the same period, seems partly due to the relatively high interconnectedness of global stock markets, which may have accounted for about two-thirds of the decline in the CAC 40 in February 2018 (see Box 6).

*45 See Assessment of risks to the French financial system, Banque de France, December 2017, pp 46-47.*

*46 With the development of VIX futures, "structuring" volatility-linked products became much more straightforward: inverse volatility products, for example, which move in the opposite direction to the VIX, are structured from short positions on VIX futures with potential leverage (between 1 and 2). Declining volatility against a backdrop of steadily rising equity prices fed through to implied volatility (from options), pulling the VIX down. This generated directional gains for inverse VIX ETFs, which by definition benefit when the VIX falls.*

*47 AMF Risk and Trend Mapping, 19 April 2018, "Heightened volatility in early February 2018: the impact of VIX products".*

Box 6

## Diebold and Yilmaz (DY) interconnectedness index

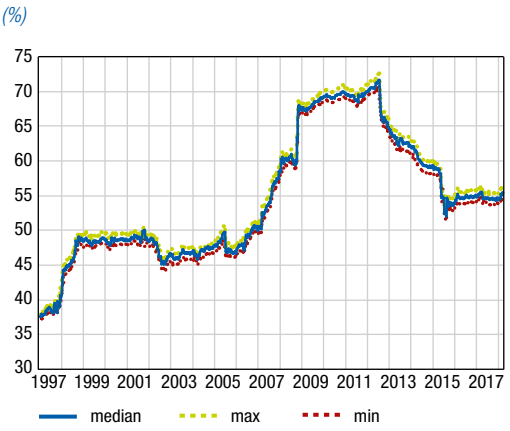
To measure the interconnectedness of equity markets, we estimate an index following the method developed by Diebold and Yilmaz (DY)[1] (2009). The DY index measures financial interconnectedness based on a decomposition of forecast error variances in a structural vector autoregressive (SVAR) model. Intuitively, the index shows to what extent the variance in returns from the countries under analysis[2] stem from foreign rather than domestic shocks. Put another way, the DY index does not show the scale of past spillovers, but the level of interconnectedness of financial markets and hence the degree of potential spillover in the event of a shock. Thus, an upward movement for the index signals increased interconnectedness of the markets in question taken as a whole. The index is estimated using a rolling window, thus showing the variation over time in the level of interconnectedness (here, 200 weeks).

1 *"Measuring Financial Asset Return and Volatility Spillovers, with Application to Global Equity Markets", Francis X. Diebold and Kamil Yilmaz, The Economic Journal, Volume 119, Issue 534, 158-171.*

2 *Stock markets included in the analysis: USA (S&P500), UK (FTSE100), France (CAC 40), Germany (DAX), Hong Kong (HSI), Japan (Nikkei225), Indonesia (JCI), Korea (KOSPI), Malaysia (FBMKLCI), Philippines (PCOMP), Taiwan (TWSE), Thailand (SET), Argentina (MERVAL), Brazil (IBOV), Chile (IPSA) and Turkey (XU100).*

Chart 1

DY index showing the interconnectedness of global financial markets




Sources: Bloomberg. Banque de France calculations.

The **DY index** (Chart 1) **was relatively stable from 2015 onwards, but began climbing in early 2018**, and notably after the early February US equity market shock, which subsequently spread to European markets. This was unsurprising given that the degree of financial contagion generally goes up following large adverse financial shocks.

To assess the contribution of the US market shock in February 2018 to the decline on the French market, we employ the model used to build the DY index and an orthogonalization of impulse response functions based on the method developed by Christiano, Eichenbaum and Evans[3] (1999).

According to our estimates, the US shock was responsible for a fall of between 3.0% and 4.9%[4] in the CAC 40, or about two-thirds of the index's decline in February 2018. A similarly sized shock in April 2018, in a setting of increased interconnectedness, would have seen the CAC 40 give up between 4.0% and 5.2%.

3 "Monetary Policy Shocks: What Have We Learned and to What End?", NBER Working Paper 6400, 1998.
4 Sum of response functions over two weeks of the French market to the US market shock for the upper and lower bounds of the 95% confidence interval.

## b. Increased risks of a correction to stock market valuations in the United States and France

### • Elevated price earning ratios (PERs)

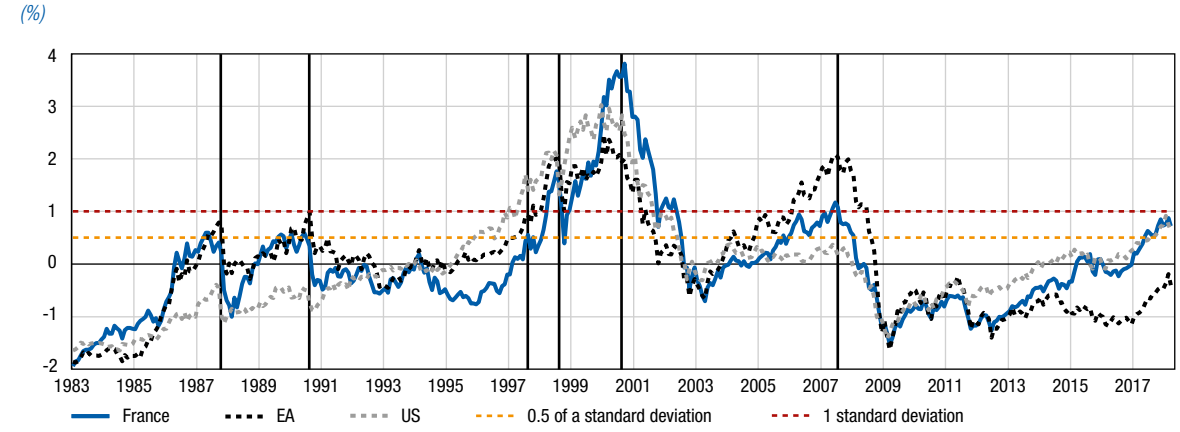
Global stock market valuations have been heading upwards since 2009, with US, German, UK and French indices now at record levels despite the correction in early 2018[48]. The European index has been somewhat more muted, held back by weaker valuation performances by Italian and Spanish companies.

**The US cyclically-adjusted PER[49] has been on the rise since 2009.** It remains at a high level (26[50] in April 2018) despite the stock price correction in early 2018, and seems to offer a first sign of overvaluation. **In France[51], Germany and the UK, cyclically-adjusted PERs have also been climbing since 2009** and are well above their long-run averages (21 in France and 19 in Germany at end-March 2018). With earnings growth outpaced by that of stock prices, the cyclically-adjusted PER has reached a first critical threshold in the US and France (z-score[52] of 0.5[53] of a standard deviation,

48 In real terms (corrected for domestic inflation), only the US stock index is higher than previous peaks; the French, German and UK indices are close to but still off the highs reached in 2000 and 2007.
49 Also known as cyclically-adjusted price earning (CAPE), the indicator developed by Campbell and Shiller in "Stock Prices, Earnings and Expected Dividends", Journal of Finance (July 1988, 43(3): 661–676) and calculated as the ratio of the share price corrected for inflation over earnings corrected for inflation and smoothed over ten years. We prefer this measure to the PER or prospective PER (in which one-year forecast dividends replace dividend payments), which we see as too "cyclical", because this approach makes it possible to capture the long-term investment horizon for equities. Shiller showed that the average annual ten-year return declines with the level of the cyclically-adjusted PER. This indicator can be used to reflect the price change in net earnings over the course of the cycle and to have a relatively precise global view of stock market valuation over the long run. Nevertheless, we conducted measures of sensitivity to the length of the smoothing period and found that the five-year cyclically-adjusted PER provides results that are markedly similar and even slightly higher for France.
50 According to our calculations, the US stock market may be less overvalued than is widely thought based on analyses using Shiller's cyclically adjusted PER (>30). The difference stems from the choice of earnings definition and reference period.
51 Stock indices calculated and provided by Datastream, which offer greater historical depth than the CAC 40 and Euro Stoxx.
52 The z-score consists in centring the variable around its average and dividing it by its standard deviation = [cyclically-adjusted PER – Average (cyclically-adjusted PER)]/Standard deviation.
53 Since 1983, whenever the z-score of adjusted PERs has breached the 0.5 threshold, there has been a stock market correction (1987, 1990 and 1997), with an even larger correction in situations where the threshold of 1 was breached (1998, 2000 and 2007).

Chart 37

Cyclically adjusted PER (z-score 1983-2018)




*Sources: Datastream. Banque de France calculations. The vertical bars indicate the dates of stock market corrections. The horizontal bars show critical thresholds at 0.5 of a standard deviation (orange) and 1 standard deviation (red). Most recent value: March 2018.*

shown by the orange line in Chart 37), which characterises a significant risk of a market correction based on past observations.

The European stock market index, conversely, does not appear to be showing signs of overvaluation, since its level and cyclically-adjusted PER of 19 are on a par with readings seen in 2014, while the z-score of the cyclically-adjusted PER is in a neutral position not suggestive of an intrinsic risk of reversal.

Note however that PE indicators have their limitations, including their inability to take account of the macroeconomic environment (business conditions, growth expectations, interest rates) and tax reforms.

- **US equity market: other indicators round out the analysis**

**To round out the analysis, we construct a relative return indicator (RRI** – Box 7 and Chart 38). Our RRI is trending upwards in the US[54], but does not suggest overvaluation in the sense of a speculative bubble (currently at zero = long-run average). If anything, the indicator underlines the fact that right now the stock market is relatively cheap compared with similar previous phases of the business cycle and notably compared with the current level of interest rates. Even so, the indicator could shortly move into bubble risk territory (red zone in Chart 38) if stock prices continue to rise or if interest rates go up. Unlike the cyclically-adjusted PER, this indicator was neutral with a value of zero in April, because it takes account of the level of interest rates. However, it is trending upwards, chiefly in connection with the increase in the risk-free rate. High stock prices do not therefore appear to be linked to overly bullish growth expectations[55] (around 2%) or an unusually low risk premium[56], as in 2000 (premium at 0% compared with an average of value of between 4% and 5%, Chart 39). Rather, they reflect the environment of historically low real interest rates on the fixed income market. Accordingly, there are three possible explanations for the recent upturn in the RRI:

– Our proxy for growth expectations ($g$) is reliable, and markets have downgraded the uncertainty surrounding the future path of economic policy, allowing them to accept a smaller risk premium;

*54 We are focusing on the United States because the risks seem to be more concentrated on this market and its reversal would have a non-negligible impact on European markets.*

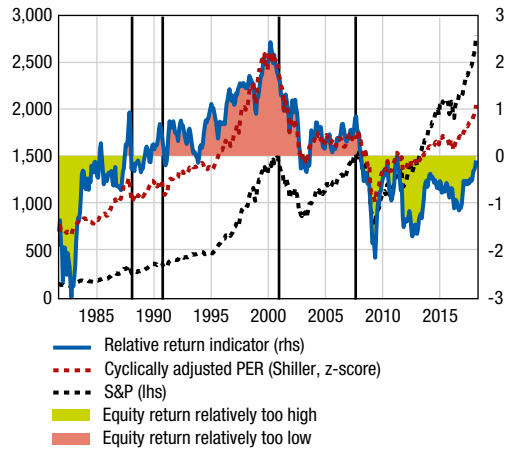
*55 Forecasts from the Survey of Professional Forecasters (SPF): average of investment bank forecasts.*

*56 The risk premium is derived from the Gordon-Shapiro formula: $\pi = \frac{E}{P} - RF + g$.*

Chart 38

Relative return indicator (RRI) for the US stock market

*(bps)*

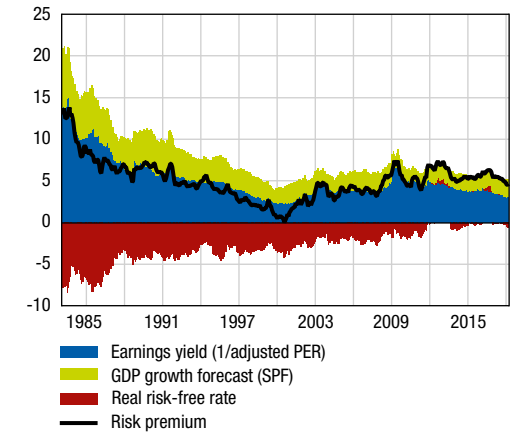



*Sources: Datastream, SPF, Fed. Banque de France calculations. The vertical bars indicate the dates of US stock market corrections. Most recent value: April 2018.*

Chart 39

Contributions to the risk premium on the US stock market

*(%)*




*Sources: Datastream, SPF, Fed. Banque de France calculations. Most recent value: April 2018.*

– Markets have upgraded their GDP growth forecasts relative to those of the Survey of Professional Forecasters (SPF) or international institutions (IMF). In this case, the increase in the RRI would be due not to diminished risk aversion, but to the fact that our proxy for investor growth expectations underestimates investor bullishness (by underestimating $g$ we underestimate the risk premium $\pi$);

– Markets are more bullish on tax reform, which would result in surplus income relative to GDP. We would similarly underestimate expectations $g$ by using $g_{GDP}$ instead of $g_{dividends}$, and wrongly attribute the increase in the RRI to the decline in the risk premium.

Box 7

## Relative return indicator

Our relative return indicator (RRI) for the US market corrects the (cyclically-adjusted) PER using the real risk-free rate[1] (Chart 44). The indicator is derived from the Gordon-Shapiro valuation model, which is defined as $p = \frac{E}{(RF + \pi - g)}$ where ($p$) is the share price, ($E$) the dividend, ($RF$) the real risk-free interest rate, ($g$) the expected economic (or dividend) growth rate and ( the risk premium. We can thus define a share's earnings yield as the sum of three factors, namely two linked to the macroeconomic environment (real growth expectations and the level of real interest rates) and investor risk tolerance, giving us: $\frac{E}{p} = RF + \pi - g$. We rearrange the equation by grouping the observable variables (risk-free rate and earnings yield) and unobservable variables (risk premium and investor dividend growth expectations) to obtain the relative return indicator: $IRR = RF - \frac{E}{p} = g - \pi$. According to this indicator, the stock market will be perceived as relatively overvalued compared to the bond market if the risk-free rate is high compared with the earnings yield (or low relative to the PER), considering that the only justification for a high price would be demanding growth expectations or low perceived risk.

Chart 38 shows the normalised RRI (z-score over the 1981-2018 period). The 1987 and 1990 bubbles look to be properly captured by our indicator (red zone) and coincide with an increase in PERs: interest rates were high at that time, implying that the record high share prices during these years may be attributed only to excessive bullishness about growth or a perception of unusually low risk[2]. Cyclically-adjusted PER and the RRI likewise do a good job of capturing the periods of market overvaluation in the 2000s and 2008.

1 *See work by Antonio Fatas (INSEAD). Indicator derived from the models by M.J. Gordon ("Dividends, Earnings, and Stock Price", The Review of Economics and Statistics, Vol 41, No 2, pp. 99-105, May 1959) and M.J. Gordon & E. Shapiro ("Capital Equipment Analysis: The Required Rate of Profit", Management Science, 3,(1) (October 1956) 102-110).*

2 *In fact, the low risk premium described here could result either from a perception of low risk or, as Shiller points out (CNBC, 13 February 2015) from a high level of risk perceived by investors coupled with a more pronounced decrease in their risk aversion.*

While US equity market overvaluation seems to be the result of unusually low interest rates rather than speculative behaviour by investors as in previous episodes involving speculative bubbles, the fact remains that a range of indicators are suggesting that a reversal or a correction in the valuation of the US equity market looks increasingly likely.

A similar analysis for the French market modulates the findings of the PER analysis by indicating that valuation dynamics on the French stock market may be partly due to the interest rate level and dynamics.

Another leading reversal indicator, based on a set of US macro-financial variables, pointed to a high risk of correction in the United States in March 2018 (Box 8).

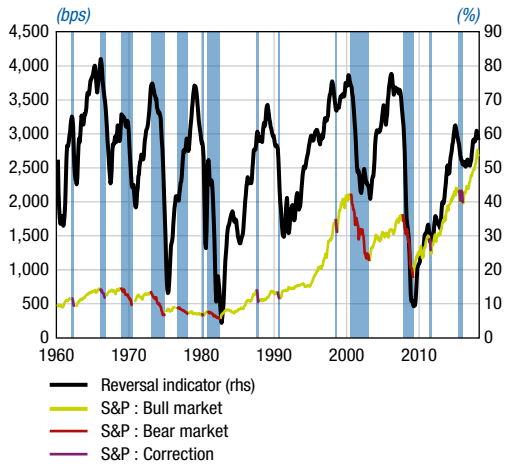
Box 8

### Equity market reversal indicator

Our leading indicator of an equity market reversal, which is designed to signal the risk of entering a reversal or correction phase, combines a set of macroeconomic variables (capacity utilisation rate), activity forecasts (manufacturing PMI), monetary variables (slope of the yield curve), macro-financial variables (cumulative three-year growth of property prices and bank credit) and financial variables (cyclically-adjusted PER). The indicator is calculated for the period since 1955 as the average of the percentiles for each variable. We identify six stock market reversals – or bear markets – (red portion of the S&P curve in Chart 1) since 1955, characterised by 18 consecutive months of decline (irrespective of the size of the decrease), and six correction phases (in yellow), characterised by declines lasting less than 18 months. Reversal and correction phases are shown by the blue bands in Chart 1.

Chart 1

Reversal indicator for the US stock market




*Source: Datastream, Federal Reserve Bank of St. Louis. Banque de France calculations. Most recent value: March 2018.*

Since 2009, the probability of a reversal has risen from 10% to 60%, indicating a high level of alert. A change in expectations about the speed of US monetary policy normalisation or a sudden reassessment of the maturity of the US business cycle could mean a correction to risk premiums and thereby increase the probability of a correction. Accordingly, a 100 bps increase in the risk-free rate would imply a potential decline of about 15%[1] for the US stock market, *ceteris paribus*. Given the recent increase in the level of financial interconnectedness (see above), this correction would certainly have spillover effects for global markets. Based on our estimates, a correction on the US market could cause the CAC 40[2] to fall by between 8.0% and 12%[3], *ceteris paribus*.

1 *Estimates based on the Gordon-Shapiro model used in section 3.1 b for the relative return indicator.*
2 *Based on the level of the DY index on 20 April 2018. Estimates based on the SVAR model described in the previous section.*
3 *Sum of impulse response functions over two weeks of the French market to a shock affecting the US stock market for the upper and lower bounds of the 95% confidence interval.*

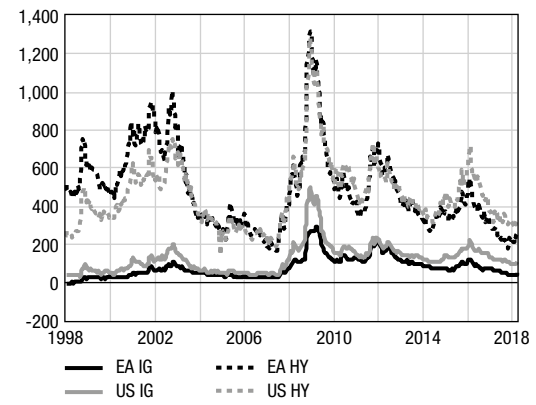
## c. High valuations on fixed income markets

**Bond market developments continue to reflect growing optimism about the economic outlook**, but vulnerabilities are increasing on global markets. Long-term government bond yields in advanced economies increased slightly at the end of 2017 and in early 2018, driven by sound prospects for growth and US tax reform. But they marked time in the spring as macroeconomic results came in slightly below expectations. **Estimated term premiums**

**built into long-term government bond yields in the euro area thus continue to move around record low levels and bond yields themselves remain well below the forecasts for nominal economic growth**. At the same time, risk tolerance remains elevated on global bond markets. This is particularly visible in the riskier segments of the fixed income markets. For example, spreads on lower quality (high yield) corporate bonds (Chart 40) in advanced economies, especially in Europe, continue to fluctuate at levels well below their historical averages. Financing costs for non-financial companies on European markets appear very low. Based on credit risk indicators estimated using the Gilchrist & Mojon method[57], the average credit spread between the yield of bonds issued by the private sector (excluding banks) and the yield of a German government bond (Bund) of the same maturity is very thin (100 bps, Chart 41). Signs of high valuations can also be observed in leveraged loans (Chapter 2.2 on non-financial private sector debt).

Chart 40

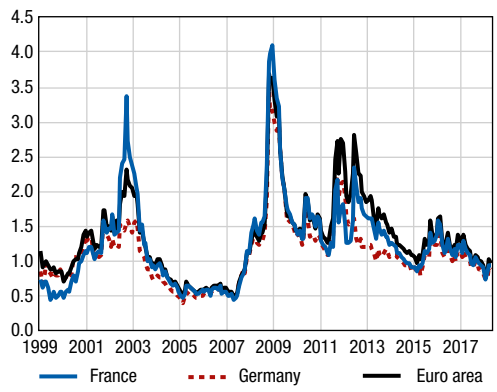
Asset swap spreads, advanced country corporate bonds




Sources: Bank of America Merrill Lynch. Asset swap spread.

Chart 41

Credit spreads, Europe




Source: Gilchrist and Mojon (2016). Credit risk indicators calculated as the average credit spread between the corporate bond yield and the yield of a German government bond of the same maturity. Most recent value: April 2018.

**Excessive risk taking is rooted in investors' hunt for returns**. Since mid-2015, correlations between the returns on different financial asset classes have been relatively high on average, historically speaking (the median value of correlations between asset pairs[58] is well above the long-run average, Chart 42), rendering portfolio diversification ineffective. At the same time, correlations have become less dispersed in recent times, particularly for the lowest correlations, leading to increased skewness in the distribution. This development could be a symptom of herd behaviour and needs be watched closely as it could have a negative impact on financial stability:

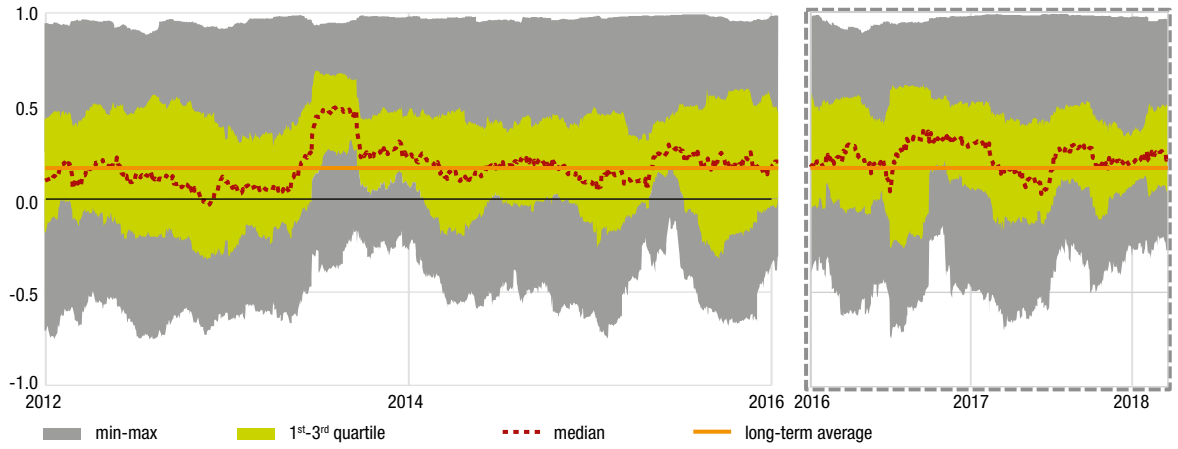
– A negative shock to the financial system might cause too many investors to try to sell the same assets simultaneously, saturating market liquidity and driving a decline in asset values accompanied by volatility;

57 "Credit Risk in the Euro Area", The Economic Journal, September 2016: "Although market-based indices of an average of corporate bond yields are commercially available, these are frequently constructed from arbitrary samples of firms whose characteristics evolve over time in a non-transparent manner. Furthermore, the lack of information regarding the underlying structure of the portfolio leads to a maturity mismatch when constructing credit spreads as the difference in yields between corporate bonds and sovereign bonds. This maturity mismatch confounds measurement by not properly distinguishing between credit risk and term premia." Gilchrist and Mojon (2016) construct a credit spread at the bond level as the difference between the corporate bond yield and the yield of a German Bund zero coupon bond of the same maturity. By constructing credit spreads at the bond-issuance level they avoid confounding credit risk premia with term premia. The bond-level credit spreads are then aggregated to obtain indices of credit risk for non-financial corporations in each country.

58 Pair correlations were calculated over 90-day rolling windows for the following 21 asset classes, sorted by region: EA: Investment Grade (IG) and High Yield (HY) corporate bonds; EA (core): Sovereign bonds and equity indices; EA (periphery): Sovereign bonds and equity indices; US: IG and HY corporate bonds, sovereign bonds and equity indices; UK: IG and HY corporate bonds, sovereign bonds and equity indices; Japan: Corporate bonds, sovereign bonds and equity indices; Emerging: Corporate bonds, sovereign bonds and equity indices; oil price (Brent).

Chart 42

Dispersion of pair-wise correlations between returns of global asset classes




*Sources: Bank of America Merrill Lynch. National stock indices provided by Bloomberg. Banque de France calculations. Guide: a value of 1 means that the return on an asset is totally correlated with the return on another asset; 0 shows that there is no correlation, while -1 indicates perfect anti-correlation.*

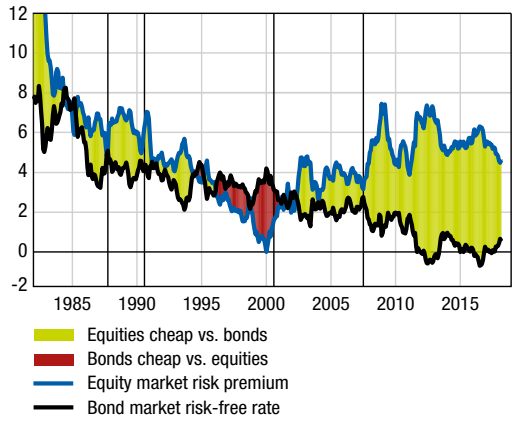
– Higher correlations between asset classes could make diversification strategies less effective, prompting investors to take on more risk.

In conclusion, the risk of a correction now looks higher on the US bond market than on the equity market according to our relative expensiveness indicator[59] (Chart 50). The 4 pp difference (green zone in Chart 43) between the risk premium on the US equity market and the yield on a ten-year US government bond, which has been in place since 2012, reveals a fairly marked difference compared with the period that led up to the global financial crisis.

Chart 43

Indicator of the relative expensiveness of the US bond market

*(%)*




*Sources: Datastream, Federal Reserve Bank of St. Louis, SPF. Banque de France calculations.*

**Several events could lead to a repricing of risk premiums**. First, if US monetary policy is tightened more swiftly than expected, this could propel risk premiums higher and eventually feed through to the euro area. Next, a significant revision to the global economic growth outlook and the impact of fiscal policies or the adverse effects of rising protectionism in the United States could potentially cause risk to be reassessed (Chapter 2.1 on the macroeconomic outlook). Since international term premiums are correlated, an increase in the US term premium could push up the euro area premium. To estimate the interdependence of US and euro area sovereign bond markets, we start by calculating the simple correlation between term premiums in the two economies using NIESR data[60]. Table 6 shows correlations for US, German and euro area term premiums over several periods.[61]

*59 Calculated based on the spread between the equity market risk premium measured using the Gordon-Shapiro model described in Section 4.1 b (see above) and the yield on a ten-year US government bond.*

*60 NIESR estimates ten-year term premiums since 1999 using the methodology developed by Adrian et al. ("Pricing the Term Structure with Linear Regressions", Journal of Financial Economics, Vol 110, October 2013).*

*61 The level of term premiums varies depending on the estimation period but the US/euro area correlation remains.*

**The three term premiums are strongly correlated** across the entire sample (Table 6), **except during the European sovereign debt crisis**. In the recent period, German and euro area term premiums have been closely correlated with those of the United States (93% and 91% respectively) although, as pointed out by ECB Executive Board member Benoît Coeuré (2018)[62], "strong correlation between international asset prices doesn't necessarily result from a common shock", but could reflect a monetary policy or fiscal decision taken by a single country. For example, an increase in US bond yields resulting from normalisation of the Federal Reserve balance sheet could bolster investor demand for US assets, curb demand for euro area assets and push up the euro area term premium. Rogers et al. (2014)[63] show that surprises from US unconventional monetary policy measures affect bond yields in other countries[64].

Table 6

Correlations between US, German and euro area ten-year term premiums

*(%)*

| | 1999-2009 | | 2010-2013 | | 2014-2017 | |
|---|---|---|---|---|---|---|
| | Euro area | Germany | Euro area | Germany | Euro area | Germany |
| Germany | 95 | | -33 | | 97 | |
| United States | 75 | 76 | -60 | 86 | 91 | 93 |

*Source: Banque de France calculations using the National Institute of Economic and Social Research (NIESR) database.*

Ultimately, in the bullish market setting, investor appetite for risk is showing up in different market segments, including the most at-risk areas such as leveraged products. Yet it looks unstable, as shown by recent stress in emerging currencies linked to the dollar or by the fears raised by the latest political developments in Italy (Box 9).

62 *"What yield curves are telling us", speech by Benoît Coeuré on 31 January 2018.*
63 *"Evaluating Asset-Market Effects of Unconventional Monetary Policy: A Cross-Country Comparison", Board of Governors of the Federal Reserve System, International Finance Discussion Papers, No 1101, March 2014.*
64 *Specifically, they show that a 25 bps increase in US long-term yields owing to unconventional monetary easing raises German and Italian long-term bond yields by 7 and 11 bps respectively.*

Box 9

## Situation in Italy and impact on financial markets (data to 11 June 2018)

The two parties that emerged victorious from Italy's legislative elections in March 2018, the Five-Star Movement and the League Party, elicited a market response when they announced their "contract for a government of change"[1] on 16 May 2018. **What are the channels through which this new political situation could affect the French financial system?**

Investors are taking account of political risk in Europe and discriminating between domestic and global risk. Uncertainty about the formation of a coalition government by the two parties in power and the potential effects of the "contract" was reflected in movements on bond and stock markets between mid-May and early June.

### – Euro area sovereign debt market

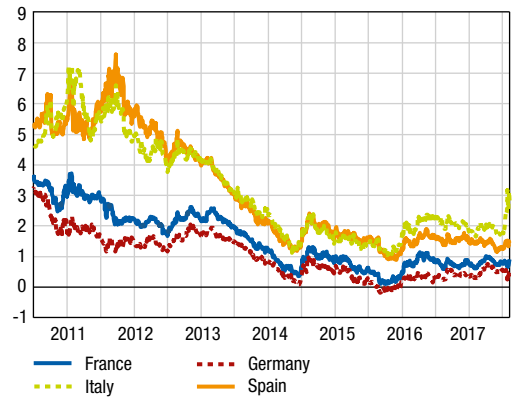
**Italian sovereign yields have gone up and spreads over German bonds have widened, but yields are still well short of the peaks seen in recent years** (Chart 1). Italian ten-year yields rose from 1.95% to 2.83% between 15 May and 11 June, while the Italy-Germany ten-year spread widened by 104 bps from 131 bps to 235 bps, reflecting sales

1 *Cost estimated at between EUR 100 billion and EUR 240 billion (14% of GDP), depending on the scenario.*

Chart 1

Ten-year sovereign bond yields

*(%)*

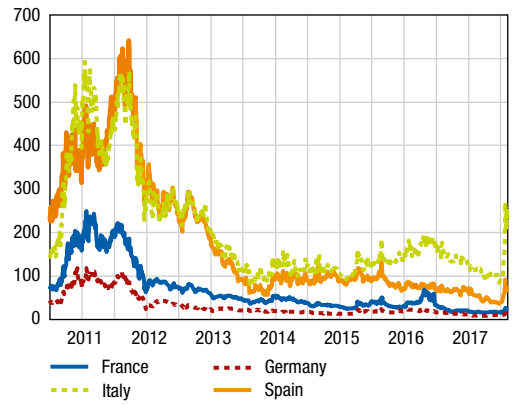



*Between 11/05 and 11/06/2018:*
*IT yield: +111 bps*
*ES yield: +31 bps*
*FR yield: -1 bp*
*Source: Bloomberg.*

Chart 2

Five-year senior sovereign CDS

*(bps)*




*Source : Bloomberg.*

of Italian securities coupled with a flight to quality that benefited Germany. Yields on Spanish and Portuguese debt have so far resisted the upward movement and, in a noteworthy development, French yields have held steady, likely benefitting from the flight to quality. Markets thus appear to be discriminating between risks and believe that the upside impact of France's fiscal policy and ongoing reforms are unlikely to be threatened by the potentially adverse effects of Italy's public spending plans.

### – Stock markets

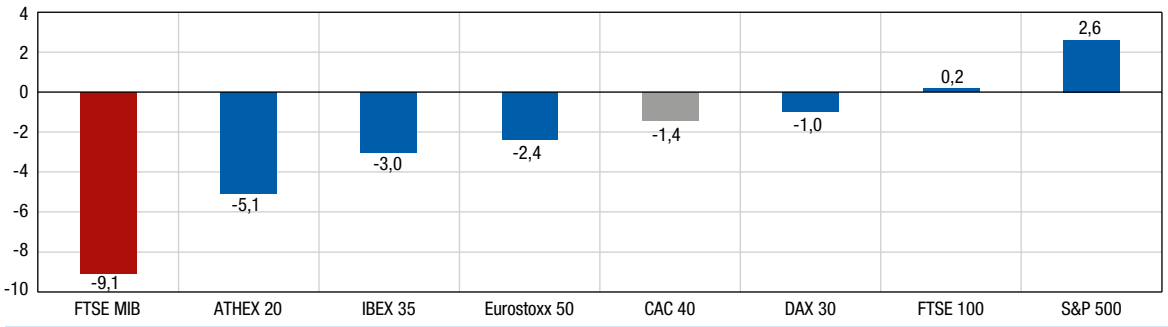
As at 11 June, **Italian bank stocks** had taken the biggest hit on financial markets. Between 15 May and 11 June 2018:

– the Milan stock index (FTSE MIB) gave up 9.1% (Chart 3);

Chart 3

Stock index performances between 15/05/18 and 11/06/18

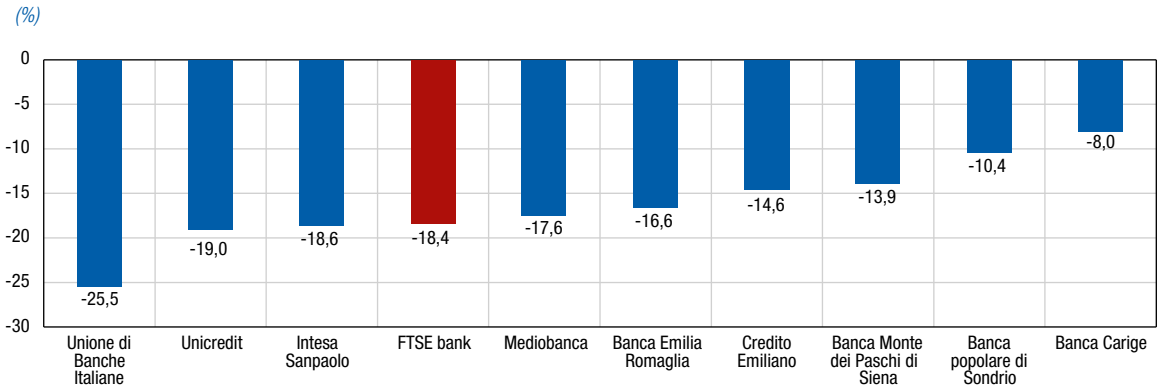
*(%)*




*Source : Bloomberg.*

Chart 4

Performance of Italian bank stocks between 15/05/18 and 11/06/18




*Source: Bloomberg.*

– Italy's bank index (FTSE Italia Banche) plunged 18.4% (Chart 4);

– five-year CDS for Italy's main banks climbed by approximately 80 bps.

The CAC 40 initially resisted and even continued heading upwards, but ultimately ended the period down 1.4%, while Germany's DAX index lost 1.0%.

## 4.2 Issues raised by crypto-assets for financial stability

A crypto-asset[65] is a token that may be used to conduct transactions recorded in public, decentralised distributed ledgers (or blockchains)[66]. They are legally defined by the French Monetary and Financial Code as "any instrument containing non-monetary units of value in digital form that can be held or transferred for the purpose of acquiring a good or service, but do not represent a claim on the issuer"[67]. Although a prime example, Bitcoin is not the sole representative of this market anymore, either in terms of market share (39%[68]) or in terms of objectives and applications (Box 10).

*65 As opposed to a "cryptocurrency", a misleading term as those tokens offer none of the guarantees associated with fiat currencies and either do not perform or only very partially perform the three functions of a currency, i.e. to act as a unit of account, a means of payment or a store of value. For a detailed presentation, see Banque de France Focus, March 2018, "The emergence of bitcoin and other crypto-assets: challenges, risks and outlook".*
*66 Private and/or centralised blockchains do not generally operate using cryptoassets.*
*67 Article L561-2 7a.*
*68 Source: CoinMarketCap.*

Box 10

### Four generations of crypto-assets

The 1,600 identified crypto-assets can be broadly classified into four generations, each with different objectives and applications: (i) **first generation** crypto-assets, such as Bitcoin, Bitcoin cash and Monero, were initially designed as legal currency alternatives but went on to become a class of speculative assets; (ii) **second generation** crypto-assets include platforms tokens, such as Ether and NEO, whose protocol is designed to go beyond merely competing with currencies and which can be used to develop applications including automated trade execution through smart contracts; (iii) **third generation** crypto-assets are tokens issued during initial coin offerings (ICOs) to fund distributed applications (DApps) developed on a platform (most often Ethereum), which are counted as utility tokens when they are not treated as financial securities; iv) a **fourth generation** is emerging in the shape of "stable coins", which have taken up the original objective of the first generation by introducing price stabilisation processes (unlike Bitcoin).

Crypto-assets face three main types of financial vulnerabilities: (i) excessive volatility favouring the formation of bubbles (Chart 45), which is an issue inherent to assets with no intrinsic value or whose value is unproven[69]; (ii) liquidity risk magnified by the ability to invest with leverage[70] (Chart 46) and manipulation risk[71]; (iii) counterparty risk relating to cyberattacks, fraud or non-viable projects[72].

Activity on crypto-asset markets thus poses real and present risks to investor protection, the safeguarding of market integrity and prevention of money laundering. Without regulation, a new form of shadow banking could emerge through deposit taking and maturity transformation products based around crypto-assets.

Table 7

Q1 2018 correlations

*(%)*

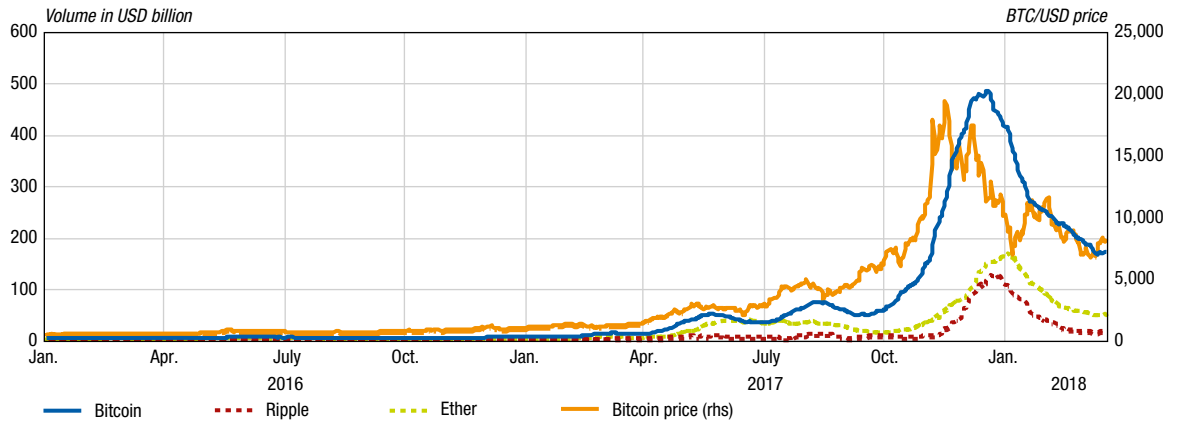
| | Ether | Ripple | S&P 500 | Gold | Swiss franc | Euro |
|---|---|---|---|---|---|---|
| Bitcoin | 79 | 67 | 20 | -8 | 9 | 7 |

*Source: Bloomberg, CoinMarketCap, Banque de France calculations.*

The risks created by crypto-assets for financial stability are a subject of concern, even if they are contained for the time being. The small size of the global crypto-asset market (less than 25% of the CAC 40's capitalisation) and weak correlations to other financial markets (Table 7) limit the scope of a shock on the market. That said, according to available statistics, trading volumes in the main crypto-assets far exceed those for S&P 500 and CAC 40 stocks, for example, suggesting that large-scale trends are at work (Chart 44). However, the data on crypto-assets need to be treated with caution, since they vary significantly from one provider to another depending on the number

Chart 44

Bitcoin price and 30-day rolling trading volumes in the three main crypto-assets




*Source: CoinMarketCap, Bloomberg, Banque de France calculations.*

*69 The cryptoasset market has surrendered more than half of its value since peaking in early 2018. Monthly trading volumes plummeted by 70% over the same period (Chart 44).*

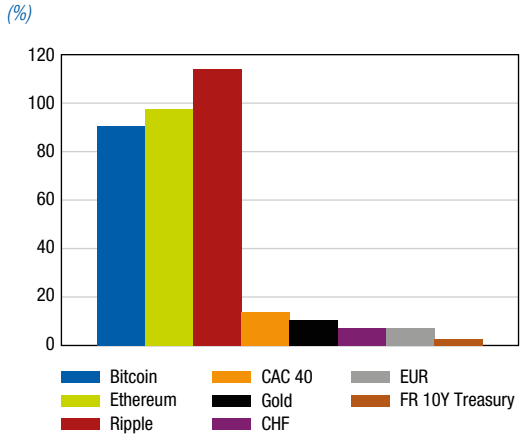
*70 Several trading platforms offer the ability to invest with leverage, ranging for example from up to 2.5x the original investment (Poloniex) to 3.3x (Bitfinex), 5x (Kraken), 15x (Bitflyer), 20x (Plus500) and even 100x (Bitmex).*

*71 In the case of Bitcoin, manipulation risk relates to the blockchain because of the concentration of mining cooperatives (ten cooperatives, including seven from China, account for 95% of Bitcoin mining) as well as to prices, because a minority of portfolios (3%) holds the majority of Bitcoins (> 95%).*

*72 We estimate that 918,992 Bitcoins, 3,000,000 Ether, 300,000 Litecoins, 523,000,000 NEM and 17,000,000 Nano have been fraudulently misappropriated since 2011 (low end of estimate), equivalent to an estimated USD 1.4 billion as at the date of misappropriation or USD 8.9 billion at current values.*

Chart 45

Historical one-year volatility




Source: CoinMarketCap, Bloomberg, Banque de France calculations.

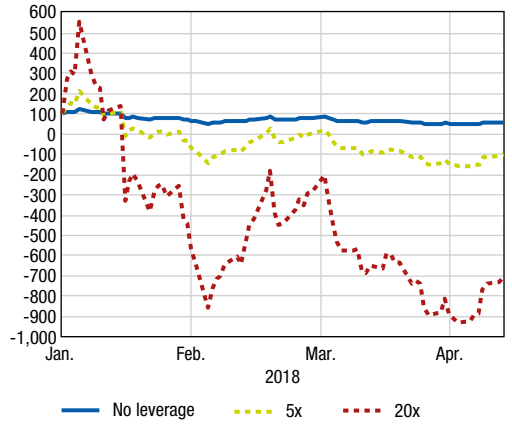
and reliability of intermediaries taken into account (trading platforms, marketplaces, digital portfolios) and the number and nature of the selected pairs[73].

The uses to which cryptoassets are put are becoming more diverse with the development of a wide array of services modelled on existing services in the conventional financial sphere. In the area of market infrastructures, for example, trading platforms enabling cryptoassets to be bought and sold against fiat currencies, such as EUR and USD, have been created. These platforms make it easier to acquire cryptoassets or convert them into legal tender. There has also been an increase in cryptoasset custody services, which operate like depositaries. Trading-related services are also being developed, such as financial reporting, data provision, investment advisory and trading services. These activities are spurring the development of investment instruments lined to cryptoassets, such as funds and derivatives, which include initiatives by the Chicago Board Options Exchange and the Chicago Mercantile Exchange. Financing activities are also benefitting from the rise of ICOs.

The identified financial vulnerabilities mean that vigilance is required. Some current developments, including the visibility acquired by crypto-assets, the vibrant growth of ICOs[74], the opening up of the futures market to crypto-assets in December 2017, the creation of crypto-asset funds[75], which promise to offer a diversification solution and a good risk/reward tradeoff through bets on a new asset class (Chart 47), the option

Chart 46

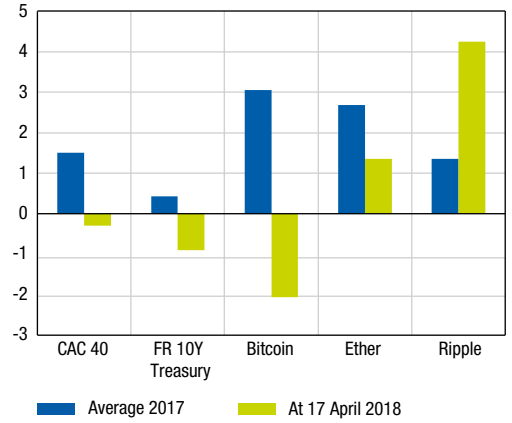
Bitcoin investment return with and without leverage
(1 January 2018 = 100)




Source: Bloomberg, Banque de France calculations.

Chart 47

Risk-adjusted return
(annualised Sharpe ratio)




Source: CoinMarketCap, Bloomberg, Banque de France calculations.

73 As regards trading volumes, some data providers only offer fiat currency – crypto-asset crosses, while others provide crypto-asset crosses. CoinMarketCap data include crypto/crypto crosses.

74 USD 9.5 billion raised between January and May 2018 compared with USD 3.9 billion in 2017 and USD 95 million in 2016 (source: coinschedule.com). By way of comparison, worldwide initial public offerings (IPOs) in the internet sector attracted USD 4.7 billion in investment over the same period (source: Bloomberg).

75 Tobam Bitcoin Fund is the first cryptoasset fund to be created in France under the "other alternative investment funds" framework. This type of fund is not regulated and is merely registered with the AMF.

offered by some neo-banks, such as Revolut, of investing in and holding crypto-assets, and the establishment of a crypto-asset trading desk by Goldman Sachs could foster the sense that crypto-assets are ordinary instruments and fuel growing demand among unsophisticated investors for crypto-asset-related services. Given this prospect, these developments need to be closely monitored, and work must be done to find appropriate regulatory frameworks for the different segments of activity (crypto-asset trading platforms and custody, ICOs, investment services, derivatives), with efforts coordinated as far as possible at international level.

# Glossary

## Acronyms

| | |
|---|---|
| **ACPR** | *Autorité de contrôle prudentiel et de résolution* (Prudential Supervision and Resolution Authority) |
| **AMF** | *Autorité des marchés financiers* (French Financial Markets Authority) |
| **ANC** | *Autorité des normes comptables* (French Accounting Standards Authority) |
| **BIS** | Bank for International Settlements |
| **CAPM** | Capital asset pricing model |
| **CBD** | Paris Central Business District |
| **CCyB** | Countercyclical capital buffer |
| **CCR** | *Caisse centrale de réassurance* (public reinsurance group) |
| **CDS** | Credit default swap |
| **CET1** | Common equity tier 1 |
| **CGEDD** | *Conseil général de l'environnement et du développement durable* (General Council for the environment and sustainable development) |
| **CIS** | Collective investment scheme |
| **CLO** | Collateralised loan obligations |
| **CoE** | Cost of equity |
| **COREP** | COmmon solvency ratio REPorting |
| **CRR** | Capital Requirements Regulation |
| **CSPP** | Corporate Sector Purchase Programme |
| **EA** | Euro area |
| **EAD** | Exposure at default |
| **EBA** | European Banking Authority |
| **EBITDA** | Earnings before interest, taxes, depreciation and amortisation |
| **ECB** | European Central Bank |
| **EEA** | European Economic Area |
| **EIOPA** | European Insurance and Occupational Pensions Authority |
| **ETF** | Exchange-traded fund |
| **ETN** | Exchange-traded note |
| **EU** | European Union |
| **EUR** | Euro |
| **Euribor** | Euro interbank offered rate |
| **FDI** | Foreign direct investment |
| **Fed** | Federal Reserve |
| **FFA** | *Fédération française d'assurance* (French Insurance Federation) |
| **FSB** | Financial Stability Board |
| **FSC** | Financial Services Committee |
| **FSR** | Financial Stability Review |
| **G-SIB** | Global systemically important bank |
| **GDP** | Gross domestic product |
| **GFCF** | Gross fixed capital formation |
| **GHOS** | Governors and Heads of Supervision |
| **HCSF** | *Haut conseil de stabilité financière* (High Council for Financial Stability) |
| **HFT** | High-frequency trading |
| **HICP** | Harmonised index of consumer prices |
| **HY** | High yield |
| **ICO** | Initial coin offering |
| **IG** | Investment grade |
| **ILO** | International Labour Organization |
| **IMF** | International Monetary Fund |
| **LBO** | Leveraged buyout |
| **LCR** | Liquidity coverage ratio |
| **LTA** | Long-term average |
| **NAFTA** | North American Free Trade Agreement |
| **NBI** | Net banking income |
| **NFC** | Non-financial company |
| **NIESR** | National Institute of Economic and Social Research |
| **NSFR** | Net stable funding ratio |
| **PER** | Price earnings ratio |
| **RoE** | Return on equity |
| **RRI** | Relative return indicator |
| **RWA** | Risk-weighted assets |
| **SCR** | Solvency capital requirement |
| **SME** | Small and medium-sized enterprises |

| | |
|---|---|
| **SPF** | Survey of Professional Forecasters |
| **SSM** | Single supervisory mechanism |
| **SVAR** | Structural vector autoregressive model |
| **TP** | Term premium |
| **USD** | US dollar |
| **VIX** | Volatility index |
| **WACC** | Weighted average cost of capital |

**Published by**
Banque de France
39, rue Croix des Petits-Champs – 75001 Paris

**Publication manager**
Gilles VAYSSET

**Editorial manager**
Ivan ODONNAT



**Translation and production**
*Service de l'édition et des langages*
*Direction de la Communication*



**Internet**
*https://publications.banque-france.fr/en/liste-chronologique/assessment-risks-french-financial-system*