Autumn 2017

Financial Stability Report

DeNederlandscheBank

EUROSYSTEEM

De Nederlandsche Bank
Financial Stability Report

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Country abbreviations are in accordance with the relevant ISO standard.

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Preface

DNB is responsible for overseeing financial stability in the Netherlands, a task embedded in the Bank Act. DNB expressly considers the interaction between financial institutions and their environment: other institutions, the macro economy, financial markets, and financial infrastructure. Early detection of systemic risks comprises an important part of DNB's financial stability task.

DNB publishes its Financial Stability Report (FSR) every six months. The FSR outlines systemic risks that may affect groups of institutions or entire sectors as well as the Dutch financial system, and which may eventually disrupt the real economy. DNB publishes the FSR to raise awareness among stakeholders - financial institutions, policy makers and the public - of systemic risks and the potential impact of shocks to the financial system. Where possible, DNB uses macroprudential instruments and issues policy recommendations to prevent or mitigate these systemic risks.

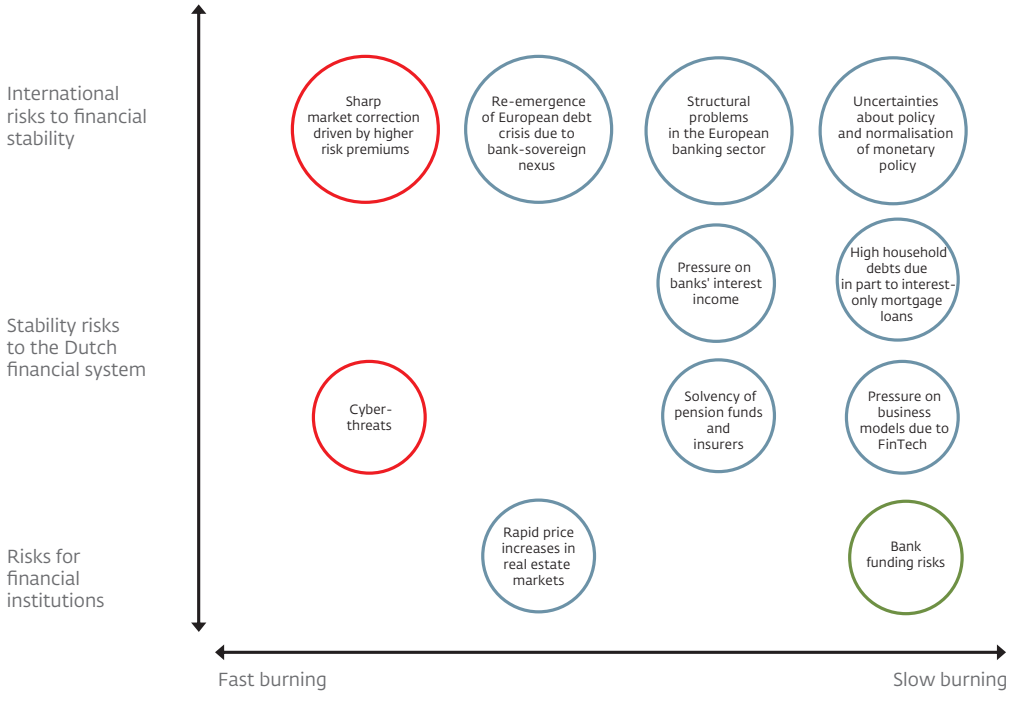
The FSR does not include projections, but analyses scenarios. Chapter 1 lists the main current risks to financial stability and includes a risk map that summarises the main risks to financial stability discussed in this and previous issues of the FSR. The next three chapters address a number of themes in more detail. They are: (i) the risks of interest-only and investment-based mortgages; (ii) the interaction between banks and governments in the event of a financial market correction; and (iii) past, present and future practices in stress testing.

1 Financial Stability Report

Key points and recommendations

- Financial market volatility is very low, partly due to accommodating monetary policy. Low volatility may, however, mask risks. For example, there is still a great deal of policy uncertainty due to the Brexit. Also, investors tend to be prepared to take higher risks in times of relative calm, thereby causing new imbalances to emerge in due course. In addition, monetary policy is bound to be normalised at some point in time, which will drive up interest rates.
- Viewed against this background, financial markets are at risk of experiencing a correction, which may reveal new vulnerabilities, but well-known vulnerabilities may also return. For instance, debt dynamics in heavily indebted euro area countries may deteriorate as risk premiums go up. With banks being relatively highly exposed to debts issued by their own governments, the negative interaction between banks and governments in these countries may resurface.
- The Dutch housing market shows a strong upswing, as well as signs of overheating locally. Growth in mortgage lending lags behind house price increases, but mortgage loan portfolios still contain significant legacies from the past. For example, more than half of the aggregate Dutch mortgage debt does not involve any contractual repayments during the loan term. As these loans expire, frictions may emerge, for instance because homeowners are forced to sell their property or face higher debt service costs at lower income levels. Households should take measures to prevent such frictions. Lenders must be proactive in assisting their customers to mitigate potential risks inherent in their interest-only loan and encourage them to reduce the interest-only portion of their loan whenever possible. For example, customers may use the financial leeway they get when refinancing loans at a lower rate for making extra repayments towards their interest-only debt.
- Several years ago, the economic slowdown and the housing market correction were mutually reinforcing. Similarly, the economic upturn and the revival in the housing market are mutually beneficial at present. This procyclicality may come at unnecessarily high economic and social costs and is related, among other things, to the fact that borrowing limits and mortgage interest tax relief are generous by international standards, due to which mortgage debt in the Netherlands is relatively high. Curtailment of mortgage interest tax relief should preferably be considerably accelerated and borrowing limits should be lowered further to mitigate the risks inherent in high household debts.
- Stress tests are an indispensable tool for identifying risks, to which supervisory authorities and macroprudential authorities increasingly turn in ever more areas. To financial institutions, they represent a vital aspect of their risk management. Although no stress test will ever provide full certainty, the further development of stress test is desirable, for instance by including liquidity or second-order effects.

Risk map

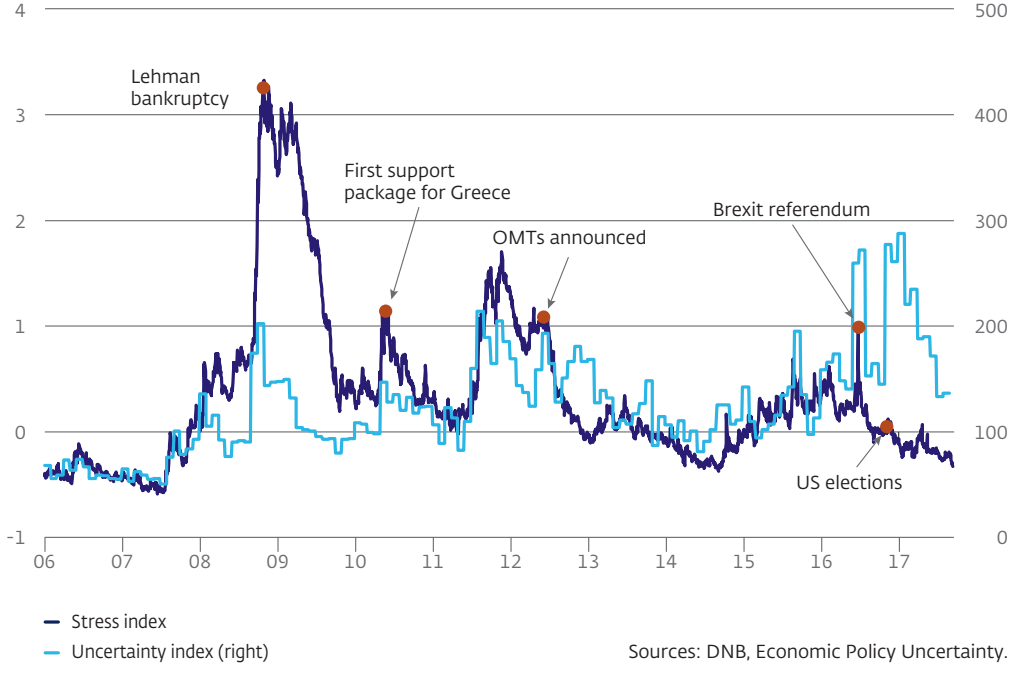


This risk map provides a schematic overview of the key risks to financial stability. The size of the circles reflects the magnitude of each risk. The colour of the circles reflects whether viewed over the medium term, risks increase (red), decrease (green) or remain unchanged (grey).

International developments

Amid an improved economic outlook, financial market volatility is still very low. The financial stress index dropped towards the pre-crisis level in recent years (see Chart 1). Similarly, other indices, such as the VIX and the MOVE index point to low volatility in the financial markets (see Chapter 3). This calm can be explained in part by the favourable macroeconomic outlook. At a projected economic growth rate of 3.5% in 2017 (July projection of the International Monetary Fund – IMF), global recovery continues at a robust pace, and economic recovery in the euro area is also accelerating. At 1.5% in the second quarter of 2017, economic growth in the Netherlands markedly exceeds the European average.

Chart 1 While policy uncertainty is high, financial market stress is low



Sources: DNB, Economic Policy Uncertainty.

Notes: The stress index is based on indicators of equity, bond and forex markets relevant to the Netherlands and a health index of financial institutions. The uncertainty index is a GDP-weighted average of uncertainty indices in 17 countries, measuring the level of policy uncertainty by the frequency with which specific word combinations appear in major newspapers. These words are terms pertaining to uncertainty and economics, combined with words characterising a policy area, like "deficit" or "regulation". See www.policyuncertainty.com.

The apparent calm in the financial markets is due in part to the exceptionally accommodating monetary policy. During the crisis, central banks created increasingly generous financial conditions, lowering key policy rates and introducing unconventional monetary measures, such as programmes under which debt securities were purchased. While this policy contributed to ease deflationary pressures and support economic recovery, it may also cause investors to disregard risks and add to vulnerabilities in the economy (see Chapter 3).

The calm prevailing in financial markets may mask risks. The global financial system is in better shape than several years ago, thanks in part to stricter international regulations. However, there are uncertainties about future policies in various areas. Negotiations about the UK's exit from the European Union (EU) were formally started in June 2017, but the results remain highly uncertain. A hard divorce between the UK and the EU, which will come at high economic costs, cannot be excluded. In addition, the new US administration's position on international trade and financial sector regulation remains unclear. There is a risk of international trade policies becoming more restrictive, which could have a dampening effect on global economic growth.

A faster than expected normalisation of monetary policy in the United States could turn around market sentiment. In the United States, economic recovery has been underway for some time, and the Federal Reserve System (Fed) is phasing out its accommodating monetary policy. In June, it raised the federal funds rate to a target range of 1% to 1.25% and it will start unwinding its massive balance sheet in October by reinvesting successively smaller portions of the bonds that expire. Remarkably, financial markets expect interest rate moves to come at a slower pace than the Fed has communicated (see Chart 2). A faster than expected normalisation of monetary policy could take financial markets by surprise. In the euro area, by contrast, the key policy rate is still at 0%, with the deposit rate in negative territory. The ECB has announced that it plans to continue its purchase programme at least until the year is out. Market sentiment can also swing due to other developments, such as disappointing economic news or geopolitical developments like an armed conflict involving North Korea.

Chart 2 Market participants expect more gradual interest rates rise than FOMC members

Percentages per annum

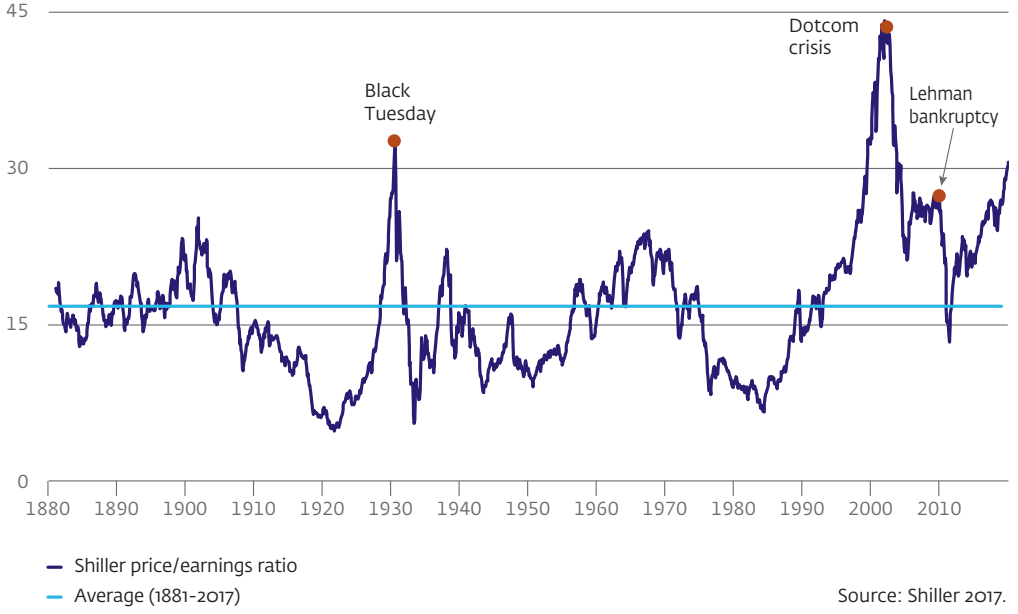
Sources: FOMC, Bloomberg.

Note: The chart plots expectations of individual members of the Federal Open Market Committee and of financial markets with respect to the level of the federal funds rate.

A swing in sentiment carries a real risk of sharp market corrections. Prices of various securities have increased markedly in recent years, and they appear to have become unrelated to their fundamental values. For example, US equity prices have far outstripped corporate earnings, causing price/earnings ratios to far exceed the long-term average (see Chart 3). Other markets, such as bond markets, also show signs of prices being out of line with their fundamental values. Valuations that cannot be explained by underlying fundamentals are sensitive to sharp corrections. A swing in market sentiment may therefore depress asset prices and drive up risk premiums. Financial institutions with large investment portfolios like pension funds and insurers may be hit especially hard.[1] Moreover, banks that depend on market funding may face rising funding costs in such a scenario. In addition, tighter financing conditions could cause highly leveraged households and businesses to run into trouble as interest expenses go up. Similarly, countries with high sovereign debts may face quickly deteriorating debt dynamics as risk premiums go up (see Chapter 3).

Chart 3 US price/earnings ratio is far above long-term average

Ratio



Source: Shiller 2017.

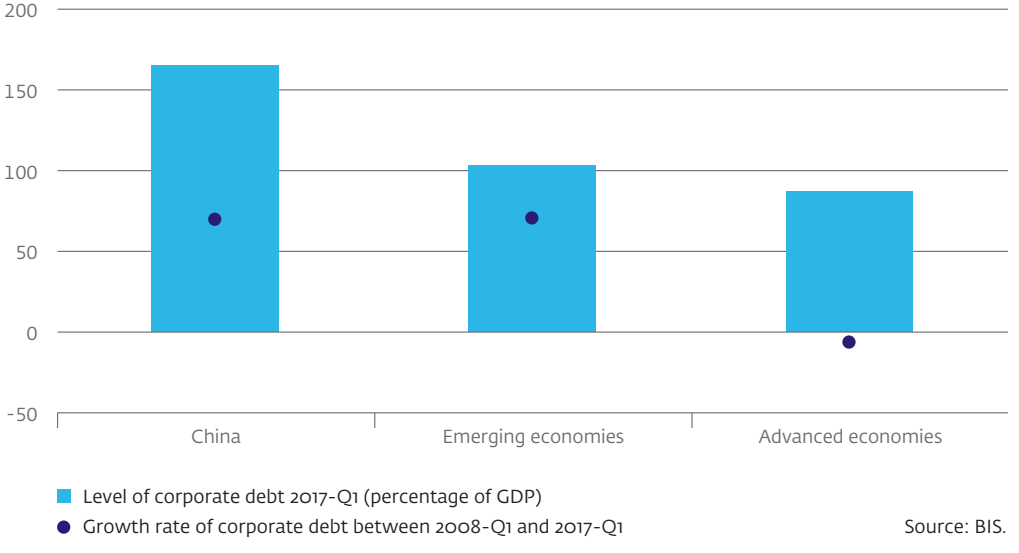
Note: The price/earnings ratio is based on average earnings over the past ten years.

1 See Financial Stability Report, spring 2017, Chapter 1.

Tighter global financing conditions may also hit businesses in emerging countries hard.
Driven by low interest rates, debt levels of non-financial corporations in emerging countries increased substantially between 2008 and 2016 (see Chart 4). In China, in particular, debt levels have quickly risen to a high level (see also Box 1). As a percentage of GDP, corporate debts in emerging countries have even surpassed those in developed countries since mid-2014. BIS research has shown that burgeoning debts in emerging countries are often accompanied by an increase in foreign-currency loans and lower corporate profitability.[2] This makes the corporate sector in emerging countries vulnerable not only to interest rates ratcheting up and revenues declining, but also to foreign exchange fluctuations.

Chart 4 Corporate debt in emerging countries shows sharp growth

As a percentage of GDP (level) and percentage change (growth rate)



Source: BIS.

2 Chui, Kuruc and Turner (2016), A new dimension to currency mismatches in the emerging markets: non-financial companies, BIS Working Paper, 550.

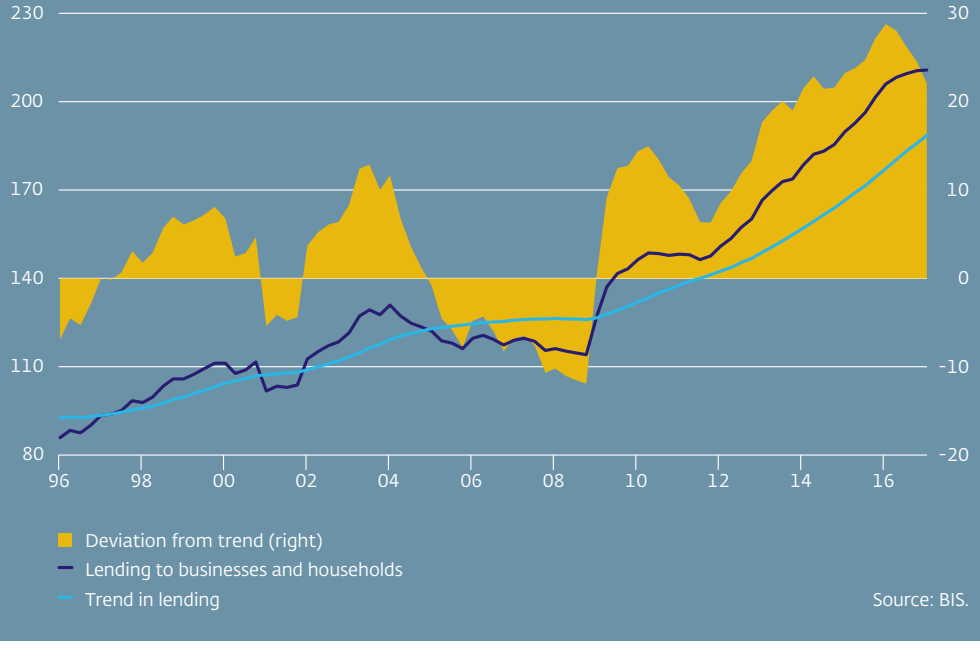
Box 1 Chinese vulnerabilities

Lending has grown strongly in China over the past few years. The credit gap, which represents current lending volumes compared with their long-term trend stands at more than 22%, which is very high (see Chart 5). The surge in lending has fed a bubble in Chinese real estate markets and accelerated leveraging in the real economy. Corporate lending in particular has reached a high level: as a percentage of GDP, Chinese corporate debts stood at more than 165% in the first quarter of 2017. Chinese debts are largely financed domestically, with banks being the principal lenders. The aggregate assets of Chinese banks are now over 300% of China's GDP, and roughly half are loans. Shadow banks also play a major part in lending in China. These non-bank operators have grown strongly as they are less strictly regulated than banks.

Credit growth in China recently flattened somewhat, reflecting an interest rate hike by the central bank and stricter regulation of shadow banks, but the vulnerabilities persist. Rapid debt accumulation was accompanied by reduced corporate profitability in China, which makes it more difficult to service debt costs, and the number of defaults may increase accordingly. The IMF reckons that potential debt at risk is over 15% of China's aggregate corporate loans portfolio.

Chart 5 Chinese growth in lending above long-term trend

As a percentage of GDP



Source: BIS.

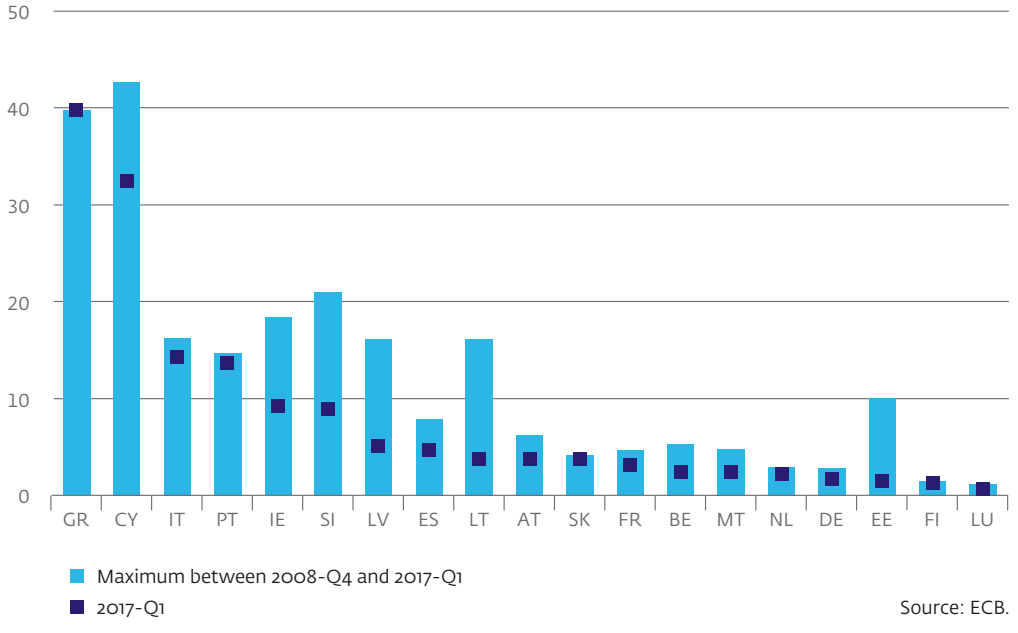
A financial crisis in China will have global knock-on effects, especially if it is accompanied by a serious slowdown in economic growth. After all, China plays a leading role in the world market, accounting for around 10% of goods and services trade and over one-sixth of global output. While the Dutch financial sector's exposure to Chinese debtors is limited – direct outstanding exposure by Dutch banks totals around EUR 20 billion – a possible financial crisis in China could indirectly pass through to the Dutch financial sector. Global trade growth could be depressed or exposures to countries that depend strongly on China may be affected.

Part of the European banking sector still faces a number of structural weaknesses. Partly on the back of newly introduced European regulations, most banks have considerably improved their capital positions over the past few years. On average, the capital ratio of euro area banks went up from 9.1% in 2008 to 15% at year-end 2016. That said, part of the European banking sector continues to face several structural weaknesses, such as excess capacity and high costs. In addition, particularly in Greece, Cyprus, Italy and Portugal, the number of non-performing loans (NPLs) is still high (see Chart 6). This is holding back economic growth in these countries, as banks burdened with high volumes in NPLs have less scope for extending new credit. Significant progress was recently made in resolving the issues through write-downs, provisioning, recapitalisation and consolidation. Amendments to insolvency laws and more streamlined legal procedures could help speed up the settlement of NPLs[3] and foster the further development of a market for trading NPLs.

3 See Financial Stability Report, autumn 2016, Chapter 3: Non-performing loans and flaws in insolvency legislation.

Chart 6 Non-performing loans in the euro area are declining

NPL percentage in banks' loans portfolio



Source: ECB.

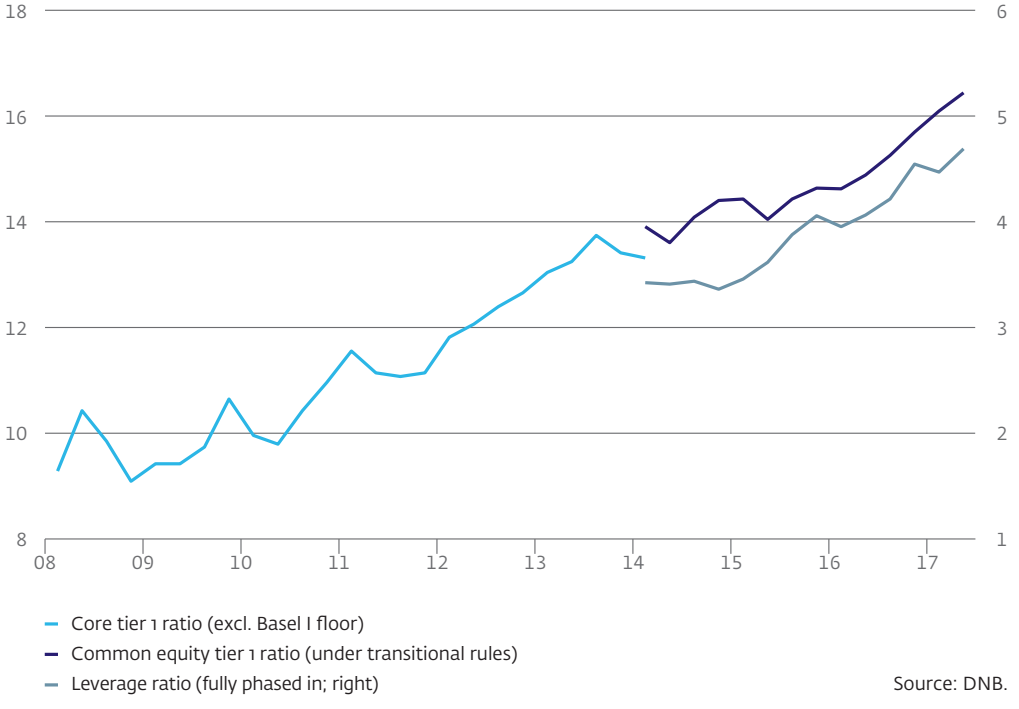
For the banking union to be credible, the new resolution regime must be applied consistently. The recent developments involving several Italian banks revealed a great deal of political resistance against charging the costs of resolution to retail creditors. In the end, the banks' problems were solved without relying on the resolution regime, which has fuelled new uncertainty surrounding its application. It is, however, important that the resolution framework is applied, so that the harmful interaction between banks and governments is reduced (see Chapter 3).

The Dutch financial sector

The Dutch banking sector has consistently become more resilient since the outbreak of the crisis. The risk-weighted capital ratio shows a marked increase over the years (see Chart 7). This means Dutch banks are well on track towards meeting the higher capital requirements set in the Basel 3 accord, which are being phased in between 2014 and 2018. Likewise, the unweighted leverage ratio has gone up markedly, although it is still at a relatively low level viewed from an international perspective. The relatively low leverage ratios of Dutch banks can be explained by the relatively low degree of risk in their banking assets. For example, losses on mortgage loan portfolios remained limited in spite of the sharp price correction in the housing market between 2008 and 2013, and Dutch banks have relatively few NPLs compared

Chart 7 Capital ratios of Dutch banks show sustained improvement

Percentages of risk-weighted assets (left) and percentages of total exposures (right)



Source: DNB.

Notes: The common equity tier 1 ratio is the ratio between a bank's common equity tier 1 capital (CET1) and its risk-weighted assets. The leverage ratio is the ratio between a bank's tier 1 capital and its total exposures.

with their counterparts elsewhere in Europe. Stress tests recently conducted by the European Banking Authority (EBA) and the IMF confirm that the resilience of the Dutch banking sector is adequate. All in all, the Dutch financial sector is in better shape than it was in the run-up to the financial crisis in 2007 (see Box 2).

Nevertheless, Dutch banks face a number of important challenges. Their profitability picked up recently, but they are less profitable than before the crisis. This is due in part to stricter prudential regulations, which have made banks safer. Still, their future profitability may be depressed by for example persistently low interest rates or increased competition driven by technological innovation. Finally, banking legislation is in constant development. Basel 3.5 can be expected to result in significantly stricter capital requirements for Dutch banks.[4]

4 The impact of stricter prudential rules on bank profitability is discussed in: Tijmen Daniëls and Shahin Kamalodin (2016), The return on equity of large Dutch banks, DNB Occasional Study, No. 14-5.

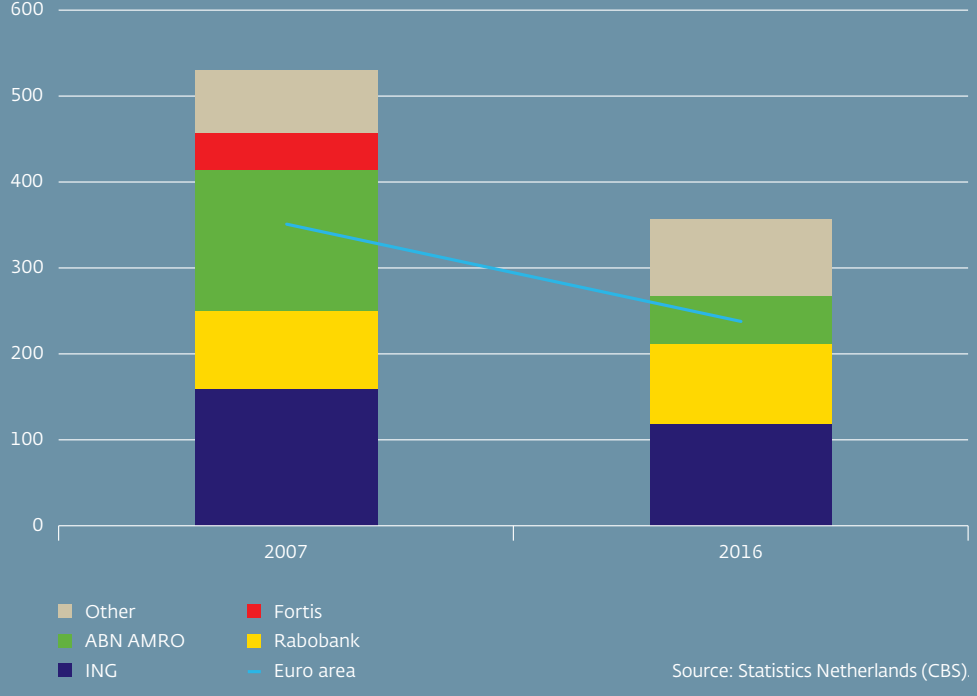
Box 2 Ten years after the crisis: has the Dutch financial system become safer?

In August 2007, central banks and governments around the world were forced to intervene heavily to safeguard the continued operation of the financial system. This month is widely seen as the onset of the global financial crisis, soon to be followed by the sovereign debt crisis in Europe. Governments had to intervene many times during the crisis, for example by providing banks and other institutions with state support. Measures were also taken to make the financial system more resilient. So what is the current state of the Dutch financial system?

The key systemic risks have decreased. The Dutch banking sector has become smaller and less complex (see Chart 8), due mainly to the fact that ABN AMRO was split up and ING sold off part of its operations. The solidity of the banks has also been strengthened. They hold more capital than before the crisis, and it is of a higher quality (see Chart 7). If they should still run into difficulties, losses must first be borne by providers of debt and equity capital, rather than by taxpayers. In addition, Dutch banks have become less dependent on market funding, meaning they are less vulnerable to a deterioration in market sentiment than they were a decade ago.

Chart 8 Balance sheet total of Dutch banking sector contracted

As a percentage of GDP



Source: Statistics Netherlands (CBS)

Risks persist in some areas, however. For example, the Dutch financial sector is still dominated by a small number of key players. For this and other reasons, DNB imposed an additional capital requirement (systemic risk buffer) on the major banks (see also Table 1). In addition, the contraction and simplification of the Dutch banking system also means that Dutch banks have become less diverse. These operations have become more one-sided, focusing more on the Netherlands and on interest income. This has made them more sensitive to economic developments in the Netherlands and to the consequences of persistently low interest rates. Outside the banking sector, risks have not completely disappeared either. For instance, the solvency of insurers and pension funds is under pressure due to low interest rates, and Dutch households and businesses are still relatively highly leveraged.

In addition, it remains vital that financial institutions bolster their resilience against cyberthreats. Cybercrime is becoming more sophisticated. One of its manifestations is ransomware, which is used to block or control computer systems to disrupt operations or demand payment. In May 2017, a massive ransomware attack (WannaCry) infected over 200,000 computers in more than 150 countries. Several Dutch non-financial corporations were also hit. As cybercrime increasingly targets the financial sector,[5] it remains vital that individual financial institutions bolster their resilience. Of equal importance is that the resilience of the financial system as a whole against cyberattacks is stepped up. This is why, in tandem with other institutions in the financial core infrastructure, DNB has developed a framework for simulating sophisticated cyberattacks and testing resilience against these attacks (Threat Intelligence Based Ethical Red-teaming – TIBER).

The financial position of both insurers and pension funds remains under pressure. The increase in capital market rates seen in the past six months has improved the financial positions of financial institutions with long-term commitments somewhat. For example, the funding ratio of pension funds stood at 107% in the second quarter of 2017, against 97% in the second quarter of 2016. However, the financial position of insurers and pension funds remains under pressure. This is due first and foremost to the trend-based decline in interest rates in the past three decades, which worked out adversely for financial institutions with long-term commitments, such as insurers and pension funds (see Financial Stability Report, spring 2017). Moreover, the earnings-generating capacity in the insurance sector has been eroding for some time, due among other things to declining demand for life insurance products and emerging new competitors. In addition to low interest rates, demographic developments weigh on the pension sector, such as rising life expectancy and lower birth rates.

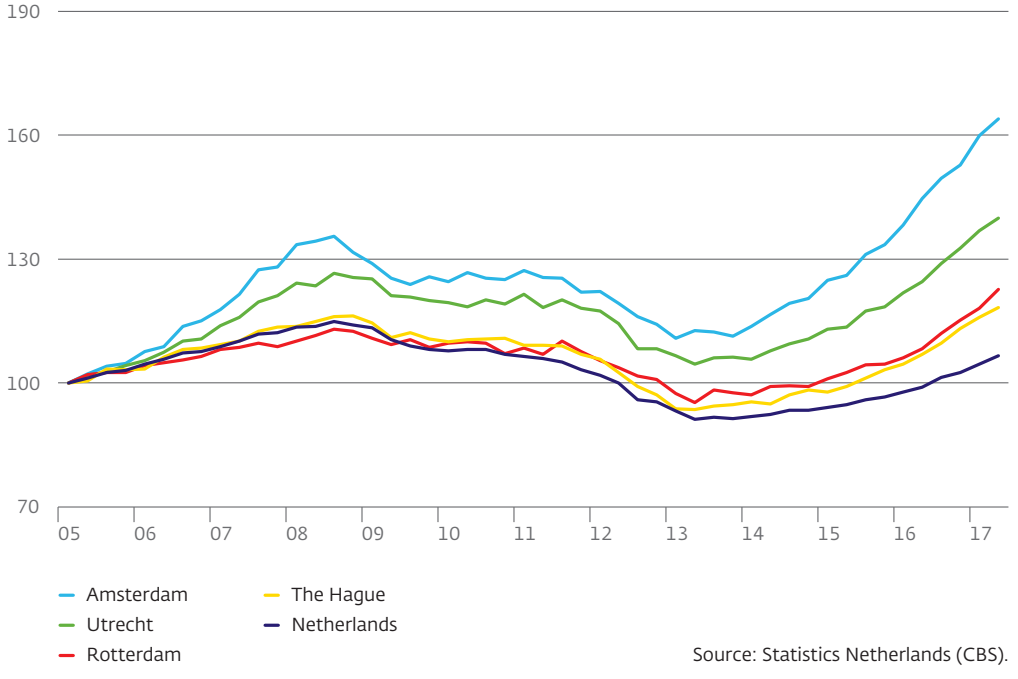
5 According to the Global Threat Intelligence Report 2017, 14% of all cyberattacks were targeted at financial institutions in 2016, against a mere 3% in 2015.

Real estate markets in the Netherlands

The housing market shows a strong upswing, as well as signs of overheating locally. Since 2013, the Dutch housing market has been recovering from the slump seen between 2008 and 2013. Recovery is fuelled both by the economic upturn and by low interest rates. Prices and sales have risen for the past four years. Average house prices have gone up 19.5% since the trough of June 2013, and sales are now above pre-crisis levels. Regional discrepancies have widened since 2013, however. In the major cities, recovery has been speedier and firmer than elsewhere and house prices are above levels seen before the crisis. Amsterdam stands out, showing clear signs of overheating (see Chart 9). The average selling time is short, houses are often sold above their ask prices and the average price per square metre is the nation's highest. Overheating in Amsterdam is partly due to structural migration to the cities and increasing interest shown by private investors, which drive up demand while supply cannot keep up.[6]

Chart 9 House prices show rapid increase in major cities

Index, 2015-Q1 = 100



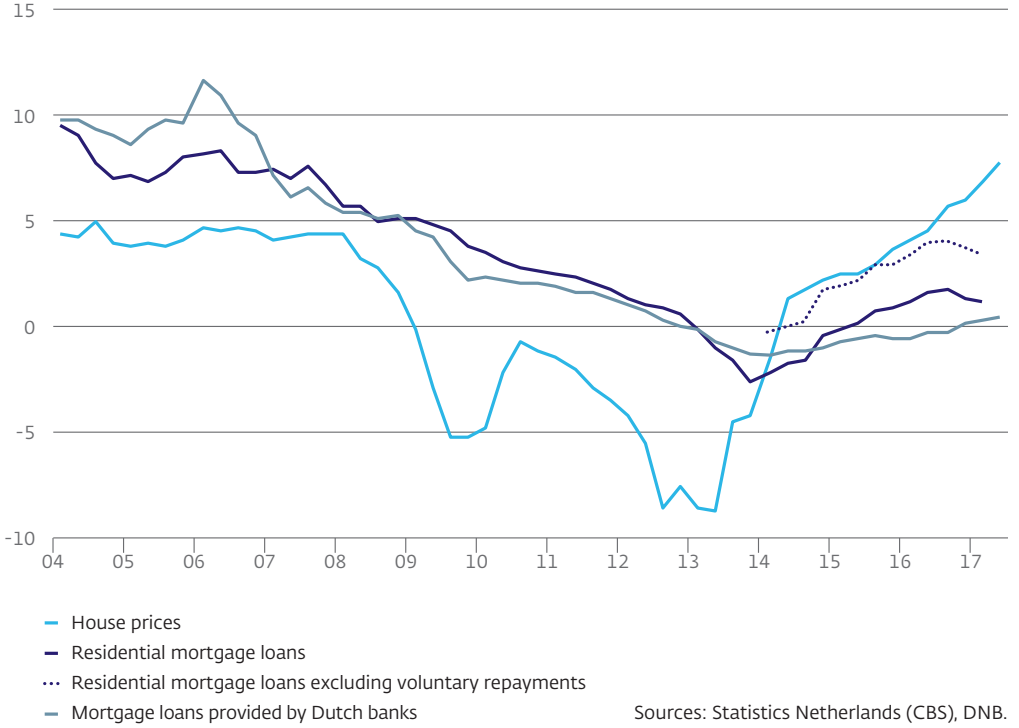
Source: Statistics Netherlands (CBS).

6 Melanie Hekwolter of Hekhuis, Rob Nijskens and Willem Heeringa (2017), The housing market in major Dutch cities, DNB Occasional Study, No. 15-1.

Despite the recovery in the housing market, growth in mortgage lending lags behind increases in house prices. Although house prices have been picking up since the second quarter of 2014, the Dutch mortgage portfolio contracted until the second quarter of 2015 (see Chart 10). What is more, mortgage lending specifically by banks did not pick up until the fourth quarter of 2016, due to the larger role played by non-bank lenders, such as insurers and investment funds.[7] A key aspect explaining the lagging growth in mortgage lending are voluntary repayments of existing loans. An estimated EUR 60 billion has been repaid on a voluntary basis since 2013, primarily due to the low interest rates and the gift tax exemption for home purchases. Even

Chart 10 Growth in mortgage loans lags behind increase in house prices

Year-on-year percentage changes



Sources: Statistics Netherlands (CBS), DNB.

Notes: The series of residential mortgage loans excluding voluntary repayments is available from 2014 onwards. Voluntary repayments are based on loan level data.

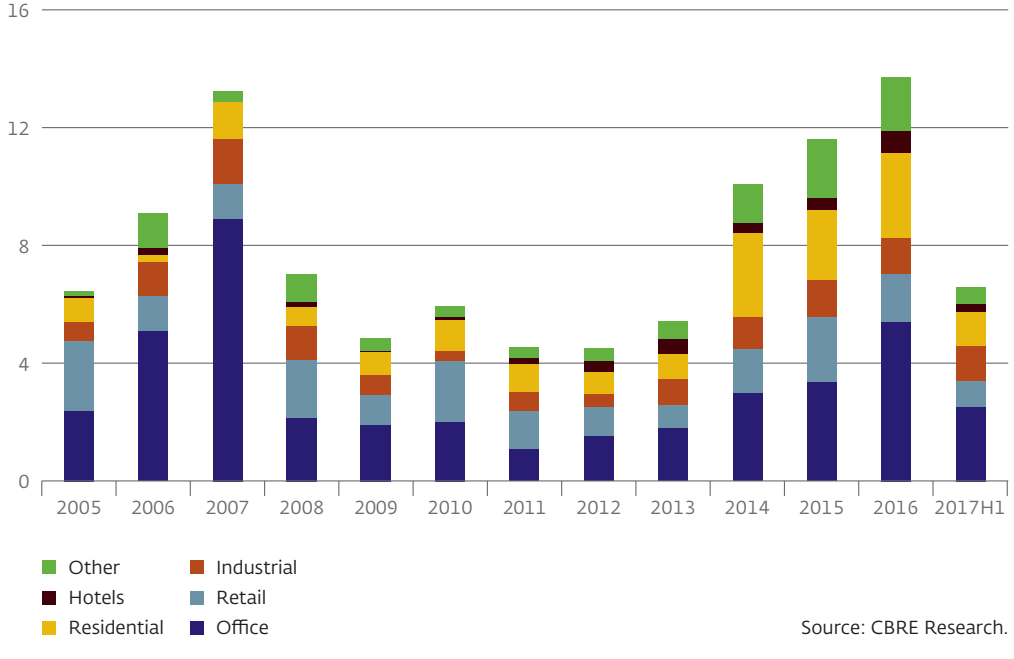
7 By year-end 2016, non-bank lenders had mortgage loans worth over EUR 130 billion on their balance sheets. With outstanding mortgage debt of almost EUR 520 billion in March 2017, banks continue to play a major role in the mortgage loan market, but their market share went down in favour of insurers and pension funds. See also DNB (2016) Credit markets in motion, for a more detailed analysis of the growing role played by non-bank mortgage loan providers.

when adjusted for such repayments, growth in mortgage lending lags behind increases in house prices. Demographic factors also act as a drag on growth in mortgage lending, as elderly people, who typically hold more assets, have been taking up a larger share of the housing market than younger people. Lastly, in spite of the recovery in the housing market, home equity of many households is still limited, and a certain proportion of all mortgage loans are still underwater. This means that many transactions do not involve much higher mortgage debts for a home, causing mortgage lending to grow at a slower rate than average house prices for the moment. Further price increases will cause home equity to grow, allowing credit growth to accelerate. Also, the dampening effect of voluntary repayments on lending growth is expected to be transient, as households can use their savings only once to lower their mortgage debt.

The market for Dutch commercial real estate is picking up, fuelled in part by a search for yield among investors. In spite of the adverse structural outlook for the commercial real estate market,[8] transaction volumes for investments in Dutch real estate have grown strongly (see Chart 11). This robust growth is driven by the economic recovery and a search for yield. Foreign investors also consider Dutch commercial real estate to be an attractive asset class. In 2016, almost 60% of the capital invested in Dutch real estate was of foreign origin. Initially,

Chart 11 Investments in commercial real estate are growing

EUR billions



Source: CBRE Research.

8 See Financial Stability Report, autumn 2015, Chapter 3: Commercial real estate: office and retail market.

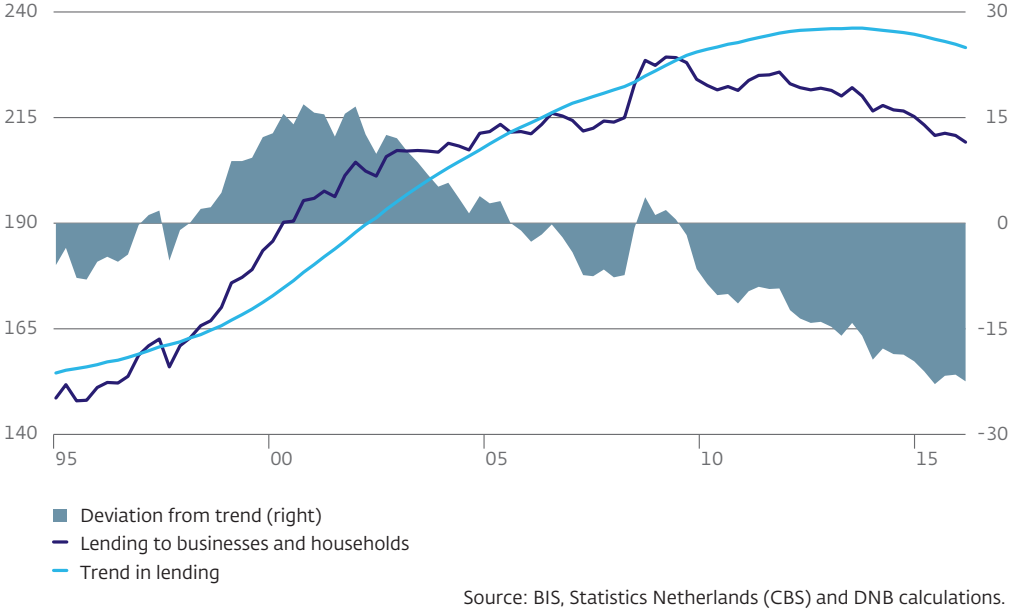
investors only selected prime locations, but investments are currently also being made in office and retail properties situated in less attractive locations, where prices have gone up less rapidly. The share of debt financing has declined in favour of equity financing over the past few years, but Dutch banks have recently seen their exposure to commercial real estate pick up. Loan level data show that the interest which banks receive on commercial real estate loans decreased during 2016, whereas loan maturities increased. While this limits risks for borrowers, it increases risks for lenders.

Macroprudential policy measures

The countercyclical capital buffer is 0%. Despite the robust upswing in the housing market, credit growth is still markedly below its long-term trend (see Chart 12). Based on this and other indicators, DNB has decided on a countercyclical buffer every quarter since 2016, which is an extra capital charge to protect the Dutch banking sector against risks attached to excessive lending. So far, we have not activated the buffer, nor have national supervisory authorities in most European countries, with the exception of Norway, Slovakia, the Czech Republic, Sweden and the United Kingdom, where it ranges between 0.5% and 2%. Dutch banks with exposures to these countries are required to maintain additional dedicated buffers.

Chart 12 Lending in the Netherlands is below the trend

As a percentage of GDP



Source: BIS, Statistics Netherlands (CBS) and DNB calculations.

Note: The trend was computed based on an HP filter. For more information, see ESRB (2014), Recommendation on guidance for setting countercyclical buffer rates, ESRB/2014/1.

It is desirable that policies aimed at reducing the financial vulnerabilities of Dutch households are continued and intensified. Recent developments seen in the Dutch economy and housing market illustrate the procyclical nature of the Dutch economy. Several years ago, the economic slowdown and the housing market correction were mutually reinforcing. Similarly, the economic upturn and the revival in the housing market are mutually beneficial at present. This procyclicality comes at unnecessarily high economic and social costs and is related, among other things, to the fact that mortgage interest tax relief and borrowing limits in the Netherlands are generous by international standards. In recent years, various measures have been taken to mitigate the risks inherent in the housing market to financial stability in the Netherlands and Dutch households. Mortgage interest tax relief is being gradually curtailed and mortgage borrowing limits have been lowered. Over the past years, the loan-to-value ratio, which is the maximum mortgage loan relative to the value of the home, has been reduced and now stands at 101%. Despite these measures, mortgage indebtedness is still very high in the Netherlands, owing in part to the large proportion of interest-only mortgage loans (see Chapter 2). Curtailment of mortgage interest tax relief should preferably be considerably accelerated and borrowing limits should be lowered further to mitigate the risks inherent in high household debts.

Table 1 Current use of the main macroprudential instruments

Instrument	Status	Notes
Capital buffer requirement for systemic banks	Gradual phasing in until 2019	Applicable to Rabobank, ING Bank, ABN AMRO (all 3%) and Volksbank and BNG Bank (1%)
Countercyclical capital buffer	Set at 0% effective 1 January 2016	Not activated thus far
LTV limit	Phased reduction to 100% by 2018	Financial Stability Committee (FSC) recommends further reduction to 90% after 2018
LTI limit	Over four times gross income	Statutory regulation based on gross housing costs relative to annual income

2 Interest-only and investment-based mortgages

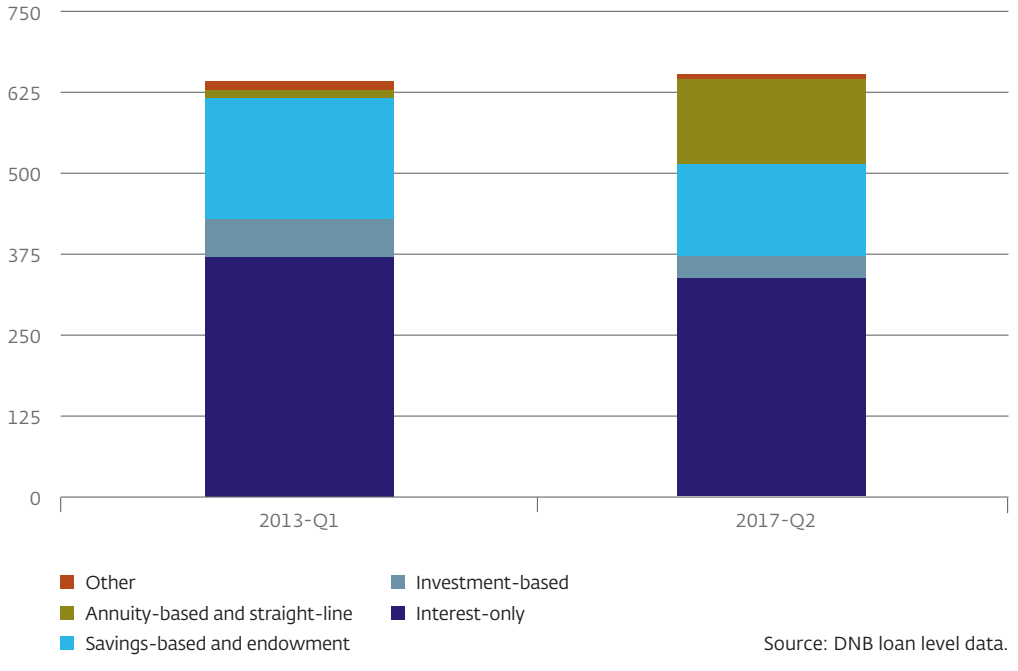
More than half of the aggregate Dutch mortgage debt does not involve any contractual repayments during the loan term. Although the aggregate interest-only debt is gradually falling, a large proportion of the households involved may not have the means to repay their debts before or when their loans expire. Frictions may then emerge, for instance because households are forced to sell their home or face higher debt service costs at lower income levels. It is imperative that households take measures in good time to prevent such frictions. Lenders must actively contact customers who may get into difficulties. Also, they should encourage their customers to limit the interest-only portion of their mortgage loan facility whenever possible. For example, customers may use the financial leeway they get following an interest rate reset to a lower rate on their existing loan for making extra repayments towards their interest-only loan or converting it into an annuity-based loan.

Almost 55% of the aggregate Dutch mortgage debt are interest-only and investment-based mortgage loans. This portion of the Dutch mortgage debt does not involve any contractual repayments during the loan term. This implies there is no certainty that homeowners have the means to repay their debts in full. Although "interest-only" seems to suggest otherwise, this type of mortgage loan also involves repayment of the principal amount, namely upon maturity. During its term, however, a homeowner only makes interest payments, so no corresponding capital is accumulated to repay the loan upon maturity. An investment-based mortgage loan does involve the accumulation of capital, but its value depends on the returns on the investments made, which is often lower than expected. This means the amount that accumulates until the loan's expiry date is often less than the principal sum of the loan. Savings-based and endowment mortgage loans typically accumulate sufficient capital to repay the loan upon expiration.

Over the past few years, the aggregate Dutch interest-only debt has declined by around 2% each year on average, thanks in part to voluntary repayments. Since 2013, the aggregate interest-only debt has decreased by over EUR 30 billion, and it currently stands at some EUR 340 billion (see Chart 13). The number of debtors with interest-only loans has fallen by 8% since then. In 2013, the median interest-only debt of households with fully or partly interest-only mortgage loans stood at EUR 98,000, a figure that dropped to EUR 96,000 by 2017. Fully interest-only mortgage loans registered the sharpest reductions, partly reflecting voluntary repayments. Since 2013, Dutch households have made voluntary mortgage repayments of more than EUR 60 billion. Households have the incentive to use their savings for making loan repayments, given the current low interest rates and the additional tax relief granted to homeowners with no or small home purchase loans. The relaxation of the gift tax regulations has also made it more attractive to repay mortgage debt, including interest-only loans.

Chart 13 The largest part of the Dutch mortgage debt is still interest-only

EUR billions



Source: DNB loan level data.

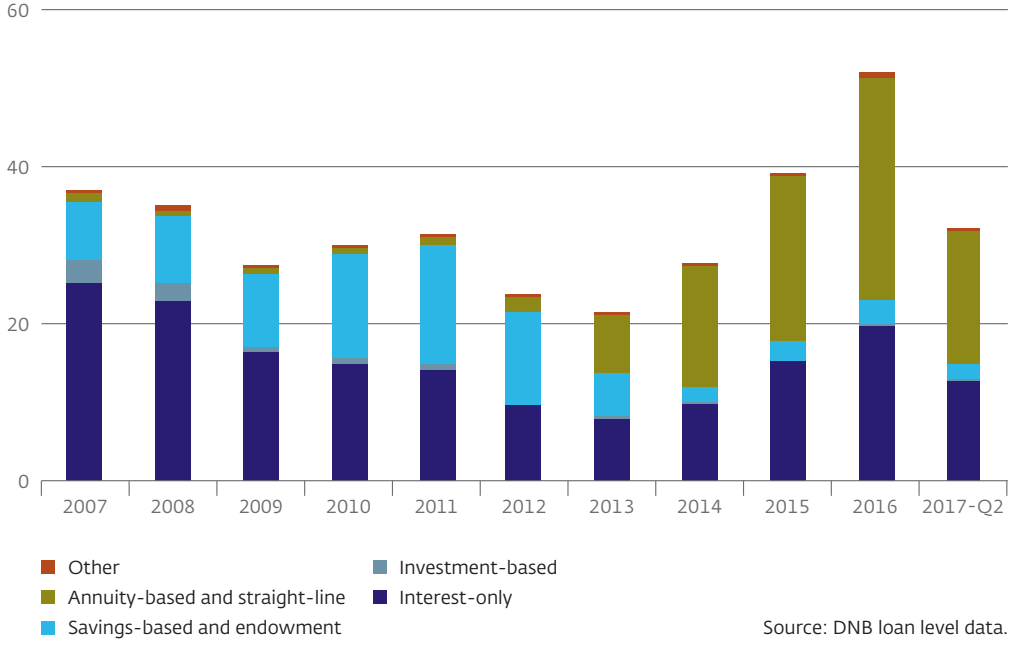
Expectations are that the increase in voluntary repayments will be transient. After all, households can use their savings only once to lower their mortgage debt. Similarly, gifts made for the purpose of making mortgage loan repayments are typically one-off occasions.

Interest-only mortgage loans enjoyed their greatest popularity before 2013, but home movers are still holding on to them. Between 1995 and 2012, virtually none of the mortgage loans taken out involved any contractual repayments during the loan term. Many households combined an interest-only loan with a savings-based, endowment or investment-based mortgage loan. Tax incentives mainly explain the popularity of these loan types, as tax relief caused monthly expenses to be lower than for a comparable loan with contractual repayments. Nowadays, first-time homeowners find them less attractive, given that interest tax relief for these loan types was scrapped in 2013. Since then, they have predominantly chosen to take out annuity-based mortgage loans. This does not apply to home movers, however. With tax relief still available for interest-only loans taken out before 2013, home movers or switchers often choose to hold on to their interest-only loans or incorporate them into their new mortgage credit facility.

As a consequence, interest-only loans still account for over one third of all new mortgage loans granted. Almost 40% of the mortgage debt taken out between 2013 and 2017 represented interest-only loans (see Chart 14). Of all households that took out a new mortgage loan during this period, almost half chose to combine an interest-only loan with another type of loan, with interest-only loan portions typically representing around 50% of the mortgage credit facility. This type of loan is especially favoured by homeowners who are in their forties and fifties. In addition, one in six were fully interest-only loans, a loan type selected mainly by homeowners aged sixty and over.

Chart 14 Strong increase in annuity-based loans, but interest-only loans remain popular

EUR billions, debt outstanding as at 2017-Q2 by year of grant



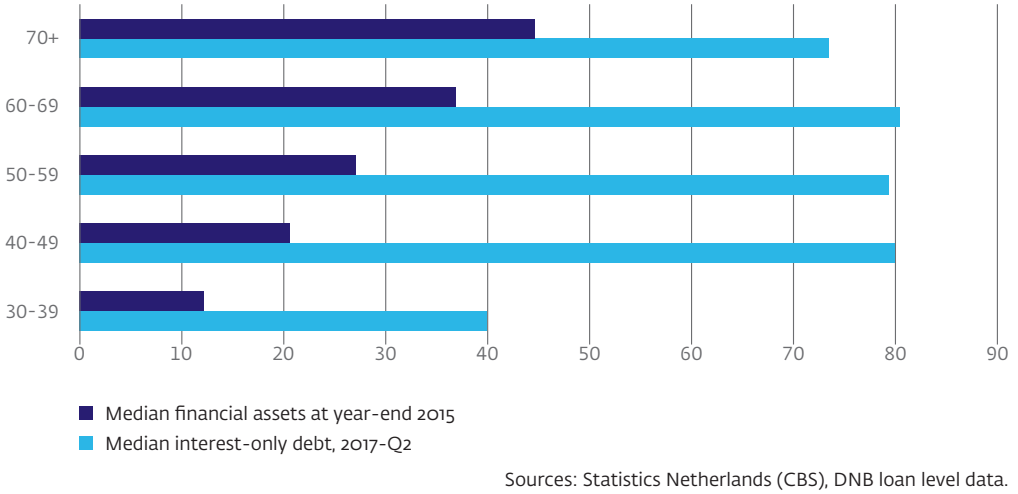
Source: DNB loan level data.

A large proportion of the households may not have sufficient savings or other financial assets to repay the loan in full before or when it expires. Chart 15 shows the current levels of interest-only debt per household for different age groups (light blue bars) and the current level of their financial assets (dark blue bars). The current interest-only debt will not be repaid by means of contractual repayments or accumulated financial assets linked to the loan, which is why it provides a reliable picture of the potential level of residual debt upon loan expiry. Well over half a million households could face a residual debt in excess of EUR 150,000. Current financial assets of households are significantly lower than their potential residual debt. This applies

most to homeowners in their forties and fifties, who still have time left to accumulate financial assets, but also to elderly, who do not have much time left to accumulate financial assets and are expected to deplete their reserves. It appears likely, therefore, that many households with interest-only and investment-based mortgage loans will accumulate insufficient assets to repay their debts in full. A large number of households therefore run the risk of facing a residual debt when their mortgage loan expires.

Chart 15 Interest-only debt significantly exceeds current financial assets

EUR thousands, homeowners by age group



Sources: Statistics Netherlands (CBS), DNB loan level data.

Note: Financial assets of households are current account and savings balances, equities and bonds.

Residual debts upon maturity are expected to be the highest for households with investment-based mortgage loans. These 150,000 households will have an expected median residual debt of EUR 160,000, which is more than that of other households. First of all, this is due to the fact that households that have an investment-based mortgage loan typically combine it with an interest-only loan. Secondly, on average, they have a higher mortgage debt. Thirdly, returns on investments have been disappointing. Returns were typically projected at 8% per annum when these loans were provided, but they turned out much lower, due to which the value of the investment account linked to the loan lagged behind. In turn, this caused a sharp increase in the premium of the endowment insurance policy linked to the loan. As a result, the target capital will not be achieved in most cases. Under a scenario assuming a 4% annual return on investments from now on, the value of the investments will on average equal 30% of the outstanding debt upon maturity. This means the remaining outstanding debt will need to be repaid from other means or rolled over.

Implications for the financial system

The large proportion of interest-only loans is an important factor explaining the very high Dutch mortgage indebtedness. Whereas a homeowner's debt under an annuity loan decreases over its term, that under an interest-only loan remains the same throughout. Increased indebtedness makes households more vulnerable to interest-rate and income shocks. In addition, it makes banks, which finance the lion's share of the Dutch mortgage debt, more dependent on market-based funding. Furthermore, interest-only loans have higher loan-to-value (LTV) ratios during their term than similar loans that do feature contractual repayments, which makes them riskier.

Expiring interest-only loans may affect household spending patterns. First of all, households may want to avoid being left with a sizeable residual debt, so if they expect to have insufficient savings to repay their loan, they may decide to start saving up in the run-up to the expiry date, which will depress consumption. Alternatively, households may want to roll over their residual debt to a new loan. This may be a good solution in many cases, but for households with low incomes this may turn out infeasible. Furthermore, rolling over remaining debt could mean that a larger share of household income must be used to service the debt. This is not only because interest and repayment may be higher, but the right to mortgage interest tax relief expires after thirty years, and household income usually drops following retirement. This may force households to adjust their spending patterns, particularly those faced with a high residual debt.

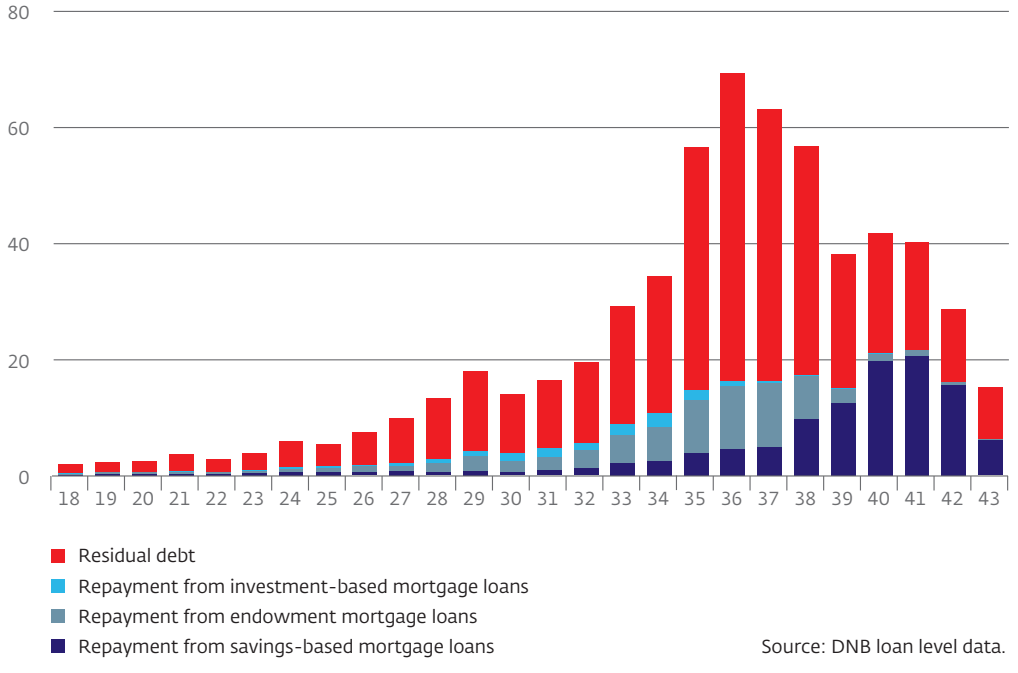
Households may also opt to sell their home and use the proceeds to repay their residual debt. Most homeowners are expected to have surplus value on their homes. Roughly half of all households combine an interest-only loan with another type of loan that does involve repayments during its term or upon expiry. As a result, even amid stable house prices, the average LTV ratio of a mortgage loan drops to between 40% and 50% upon expiry. As house prices go up, surplus values also increase, meaning that most households are able to repay their debts after selling their homes. This also implies that credit risks for banks are usually low, given that the underlying collateral is expected to be sufficient to cover the mortgage loan.

Even if households have substantial home equity upon maturity, frictions may emerge once interest-only loans expire. For example, massive home sales during a period in which many interest-only loans expire may affect the housing market and house prices. Between 2035 and 2038, the interest-only loans of more than 700,000 households are expected to expire, and their right to mortgage interest tax relief will also end. In many cases, a residual debt will remain (see Chart 16). This may temporarily result in additional supply in the market, thereby depressing house prices. In turn, this may have consequences for financial institutions. If customers run into difficulties when their mortgage loan expires, this may damage the reputation of banks and possibly result in claims for compensation if they failed to adequately inform their customers. Moreover, whether households stay in their homes will also depend on

the willingness of financial institutions to provide the financing needed. This could be by rolling over the loan, but other arrangements are also conceivable, such as mortgage loans whose interest payments are paid by cashing the surplus value of the home.

Chart 16 Residual debt to peak between 2035 and 2038

EUR billions



Source: DNB loan level data.

Notes: Mortgage loans not involving contractual repayments during the term. Repayments from investment-based mortgage loans assume average annual returns of 4% until expiry.

Policy conclusions

It is imperative that households with interest-only and investment-based mortgage loans take measures in a timely manner to prevent running into difficulties when their loans expire. They can make inquiries well in advance to establish whether they will face a residual debt upon expiry of their loan and take this into account in their financial planning. Homeowners with investment-based mortgage loans in particular may face substantial residual debts, and they will be well-advised to take measures in good time. With many loans not expiring until in 15 or 20 years' time, households that make timely adjustments in their capital accumulation will be able to spread these over a longer period.

Lenders must actively alert customers to their future repayment obligations. Banks and insurers should devote more attention to informing their customers about the risks inherent in interest-only and investment-based mortgage loans. In particular, realistic repayment plans must be prepared for mortgage loans that expire in less than ten years' time and that involve high LTVs. Lenders must be active in contacting their customers and provide advice about tailored solutions. For example, if a fixed-interest period expires or an existing loan is rolled over, a customer's debt service costs will in many cases go down. The resulting financial leeway could be used to reduce the interest-only portion of the loan. Lenders should encourage their customers to do so. Several lenders have already adopted policies to assist their most vulnerable customers.

Lenders must improve their risk management of interest-only loans. While credit risks on these mortgage loans appear to be limited on average, it is important that lenders monitor their risks more comprehensively. Among other things, this means that lenders must improve information about the value accumulated in deposit accounts pledged as part of the mortgage loans. This will enable them to identify the customers exposed to the highest risks and contact them as a matter of priority. The AFM and DNB work together closely in this matter, and they monitor the banks' progress in improving their risk management.

3 Interaction between banks and governments in the event of a market correction

The sentiment in the financial markets is currently bullish, fuelled by the favourable economic outlook and the persistent accommodating monetary policy. However, experience has shown that the likelihood of risks accumulating is often disregarded during periods of low volatility. As a result, once the sentiment is reversed, price corrections can reveal vulnerabilities. Furthermore, the negative interaction between banks and governments may resurface in such a scenario.

Volatility is low and asset prices are rising, reflecting a bullish sentiment in the financial markets. The low volatility is apparent in various markets, such as the equity and bond markets (see Box 3 and Chapter 1). In addition, risk premiums have gone down sharply in recent years, and asset prices have risen strongly. Price increases are not limited to financial markets. They are also increasingly seen in real estate markets, such as the Dutch housing and commercial real estate markets (see Chapter 1).

The positive sentiment largely reflects the favourable economic outlook and the accommodating financial conditions. Recent IMF projections point to further robust global economic recovery. In addition, central banks across the globe have pursued a very accommodating monetary policy for several years now, including unconventional measures, such as negative deposit rates and large-scale asset purchase programmes. Rather than terminating them abruptly, such accommodating policies must be phased out gradually. A start has meanwhile been made in the United States, but monetary conditions are still accommodating. In the euro area, the decision has not yet been taken to phase out the accommodating monetary stance.

Persistent accommodating financial conditions may set the risk compass in financial markets spinning. Central banks deliberately used their accommodating policies as an incentive that should encourage risk-taking in the real economy. This has helped contain deflationary pressures and fuelled economic recovery. If this policy is maintained over a longer period, vulnerabilities may emerge, however. For example, low interest rates facilitate less profitable investments, which can lead to misallocation and result in losses over time. In addition, the accommodating financial conditions encourage investors to take financial risks. This creates the danger of market participants taking positions on the assumption that central banks will be prepared to intervene should negative market shocks occur. This means that the accommodating financial conditions are dampening the mechanisms operating in the financial markets.

Box 3 Measures of volatility

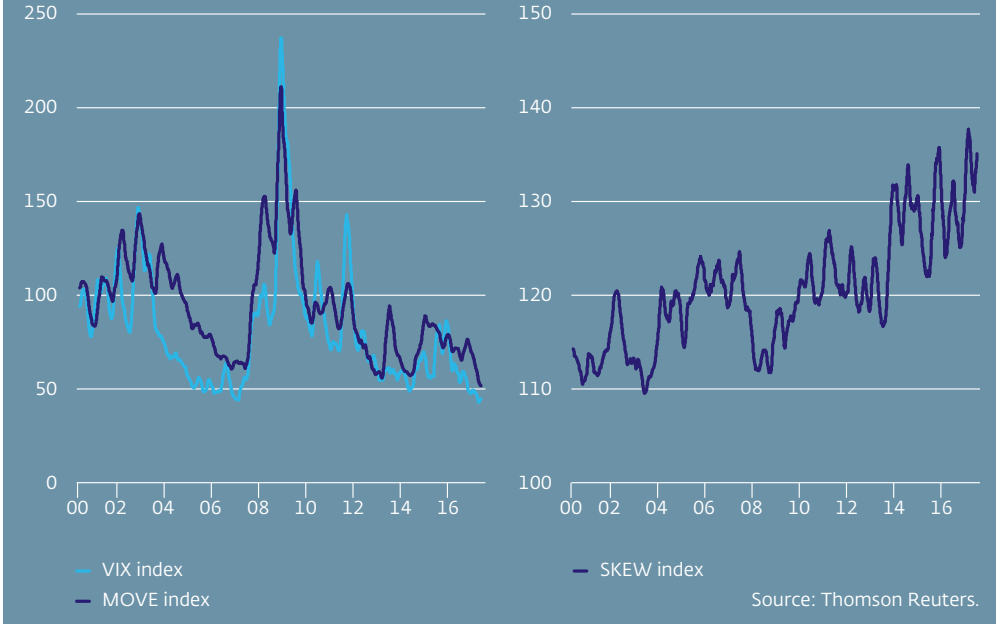
Volatility in the financial markets can be measured in various ways. In our Financial Stability Reports, we use the financial stress index based on various market indicators pertaining to the Netherlands (see Chart 1). Internationally, three other indices are often used:

- The **VIX index** measures implied volatility derived from equity options (S&P 500) and reflects market participants' expectations concerning the volatility of underlying equity prices. If the VIX index is low, there is little volatility.
- The **MOVE index** is a similar index of implied volatility, also derived from options, but aimed at the US bond market.
- The **SKEW index** measures the extent to which market participants are factoring in tail risks. Like the VIX index, it derives from equity options. The index is designed to move between 100 and 150. As it moves up, market participants increasingly factor in a larger downward correction.

Chart 17 shows that the VIX index and the MOVE index both point to record low volatility, in line with the stress index shown in Chart 1. For several years now, volatility has been at a level similar to that seen in the pre-crisis period. At the same time, however, the rising SKEW index suggests that market participants increasingly factor in the likelihood of a downward correction in the equity market. This means that, although financial market operators consider continued low volatility to be the most likely scenario, they increasingly factor in tail risks.

Chart 17 Volatility at record low, but tail risks factored in more strongly

Indices



Source: Thomson Reuters.

In the past, imbalances typically built up during periods of relative calm. For example, in the run-up to the credit crisis, volatility in the financial markets was also very low (see Chart 17), and vulnerabilities emerged with respect to complex financial products, such as sub-prime loans, and excessive debt financing. In the more distant past, imbalances typically emerged in periods of low volatility, as investors – en masse – took more risks. Research has shown that this often culminates in a financial crisis, particularly if the low volatility persists for several years and is accompanied by rising debt levels.[9] This research demonstrates that the likelihood of a banking crisis increases when volatility is below its trend-based level for a sustained period.

Although the low market volatility has now persisted for several years, financial market participants gradually start to factor in the likelihood of a major correction. For example, the SKEW index, which shows the extent to which a tail risk is factored in in the equity market, has gradually gone up over the past few years (see Box 3). This may be related to the sharp price increases in equity markets (see Chart 3). After all, valuations that differ widely from underlying fundamentals are sensitive to sharp corrections. This means that while investors consider positive scenarios to be most likely, they increasingly take the likelihood of a correction into account. It is difficult to predict what will prompt such a shock. It could for example be triggered by rising geopolitical tensions. In addition, monetary easing will need to be normalised at some point in time, which will drive up interest rates. In the past, phasing out accommodating monetary policy, and indeed its mere anticipation, at times sent interest rates rapidly up. For instance, in 1994 capital market rates surged once it became clear that the Fed would phase out its accommodating monetary policy. The "taper tantrum" is a more recent example. In mid-2013, long-term interest rates rose quickly following the announcement by the Fed that it was planning to reduce monthly purchase volumes under its purchase programme.

9 See for example Brunnermeier and Sannikov (2014), A macroeconomic model with a financial sector, American Economic Review, Vol 104, 379-421. For an empirical analysis based on two hundred years of data, see Danielson, Valenzuela and Zer (2016), Learning from History: Volatility and Financial Crises, Finance and Economics Discussion Series, 2016-093, Federal Reserve Board, Washington DC.

Potential consequences of a correction: impact on sovereign debt market

A correction in the sovereign debt market will affect an economy's risk profile. Generally speaking, a correction could occur in any asset market, but the sovereign bond market is of particular relevance. First of all, this is because it sets the tone for the risk profiles allocated to other sectors in a country's economy. Credit rating agencies typically consider the rating they award to a national government to be the upper limit in terms of the creditworthiness of businesses in the same country. Also, sovereign bond rates often serve as a benchmark for other fixed-interest securities, and the term premium on sovereign bonds often provides important guidance for other risk premiums. In addition, a creditworthy government is of crucial importance to pursue a stabilising budgetary policy in the face of economic setbacks, which will benefit the risk profile of the economy as a whole. Sovereign debt of advanced countries was traditionally considered to be virtually risk-free, but experience gained in recent years shows that vulnerabilities can still emerge. Substantial interventions were required to support the government finances of some euro area countries, by means of financial support programmes of the IMF and other euro area countries, as well as, in the case of Greece, debt rescheduling.

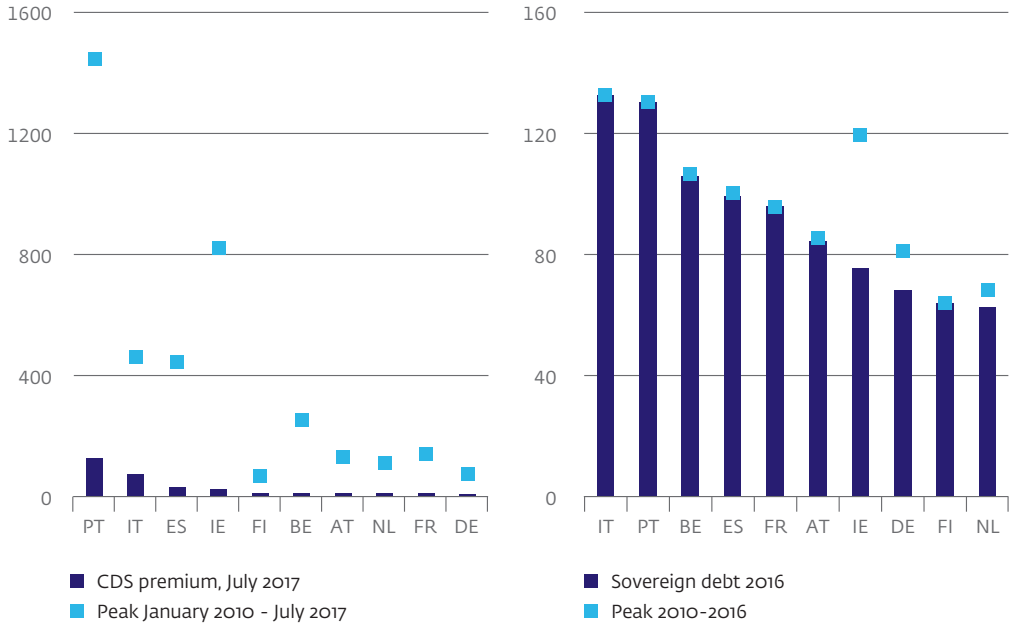
While the market for European sovereign bonds has recovered during the past few years, underlying vulnerabilities did not materially change. For example, CDS premiums and interest rates for countries that were hit hard by the sovereign debt crisis some years ago have fallen sharply (see Chart 18). However, with the exception of Ireland, their debt levels remained high and credit rating agencies did not raise their credit ratings to any significant extent. The recovery in the sovereign bond market was caused in part by monetary policy, given that the Eurosystem's unconventional measures, which included a negative deposit rate and the public sector purchase programme (PSPP), helped to lower interest rates and risk premiums in the euro area. The combined effect of these measures on nominal long-term rates is estimated at 80-150 basis points, and the most vulnerable countries benefited most.[10] A side effect of large-scale purchases by the Eurosystem, however, is that they could inhibit the market's disciplining function and may loosen the relation between market prices and fundamental developments.[11]

10 The 80 basis point reduction concerns the risk-free interest rate, while the 150 basis point reduction refers to a weighted index of sovereign bonds issued by EMU countries. Peter Praet, Calibrating unconventional monetary policy, 6 April 2017.

11 Van Lamoen, Mattheussens and Dröes (2017), Quantitative easing and exuberance in government bond markets: Evidence from the ECB's expanded asset purchase program, DNB Working Paper, No 548.

Chart 18 Risk premiums have fallen sharply, but debt positions have not improved significantly

Basis points and as percentage of GDP

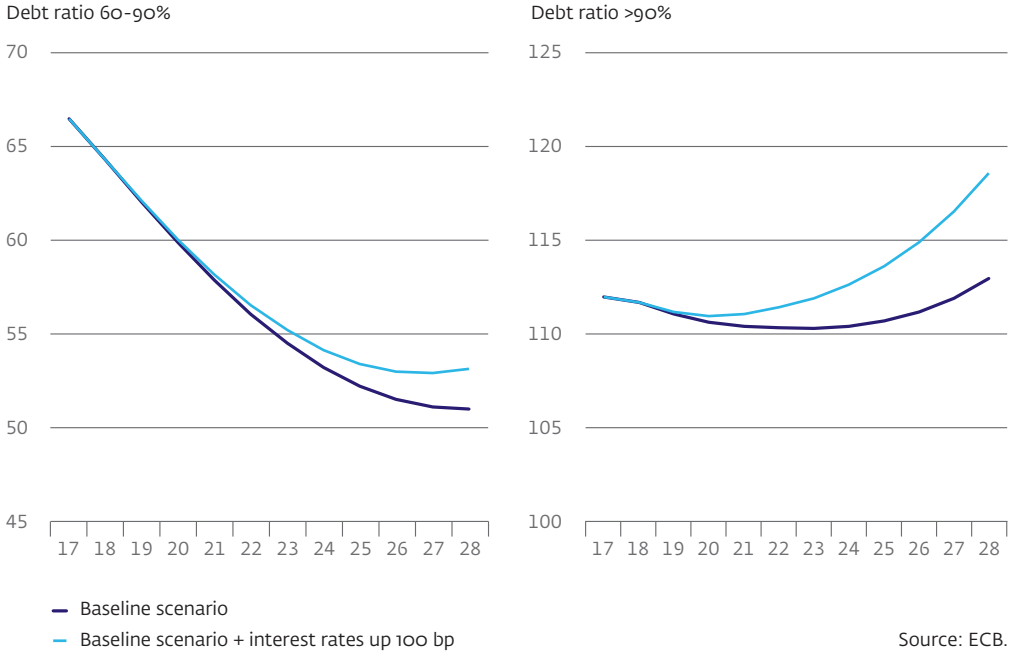


Sources: Eurostat, Thomson Reuters.

An upward interest rate shock could harm the financial position of vulnerable countries. After all, debt dynamics largely depend on debt levels, economic growth and interest rates. In addition, over the coming decades, government finances will be additionally burdened by the cost of ageing. Moreover, when investors question a country's creditworthiness, risk premiums will go up, which further deteriorates debt dynamics. It is precisely this downward spiral of creditworthiness and interest rates that materialised during the European sovereign debt crisis. ECB simulations show that a scenario in which interest rates go up 100 basis points results in quickly rising debt ratios of the most vulnerable countries (see Chart 19).

Chart 19 Countries with high debt ratios suffer most from interest rate increase

As a percentage of GDP



Source: ECB.

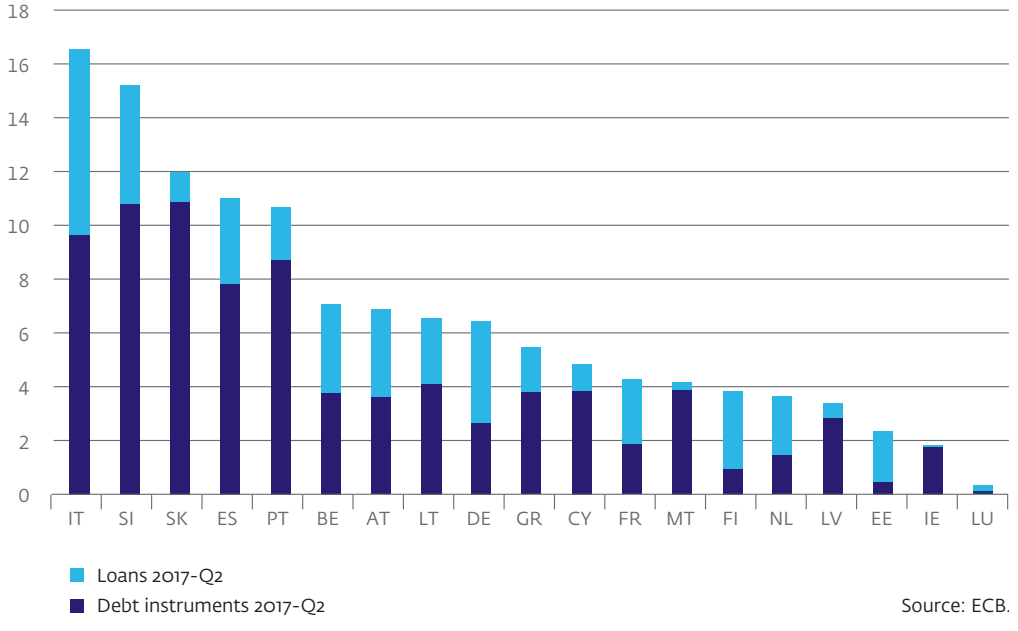
Note: The baseline scenario reflects the European Commission's winter 2017 economic forecast, assuming no fiscal policy change, combined with an ageing scenario. See ECB, Financial Stability Review, May 2017, for further assumptions.

Any downward repricing of sovereign debt could impact the financial sector in the form of losses on investment portfolios. Especially in the vulnerable European countries, banks have major exposures to their own governments (see Chart 20). Investments in sovereign debt instruments are attractive because they enjoy preferential treatment under supervisory rules: no or few capital requirements apply and there are no limits on the exposure of sovereign debt.[12] These rules are based on the assumption that sovereign debt is risk-free, whereas experience gained during the sovereign debt crisis has shown that this is incorrect. When sovereign bonds depreciate, this erodes the profits or reserves of banks, which could ultimately affect their solvency.

12 See Financial Stability Report, autumn 2015, Chapter 4: Preferential treatment of public debt. Sovereign debt is also considered risk-free under Solvency II.

Chart 20 National banking sectors' exposures to their own governments

Percentage of balance sheet total



Source: ECB.

Note: The chart shows the banks' total loans outstanding to their own governments, as well as debt instruments issued by their own governments which they hold, as a percentage of the banks' balance sheet total.

Measures have been taken over the past few years to break the interaction between governments and the banking sector. This "bank-sovereign nexus" implies that banks are hit once the financial position of their government worsens, while the converse is also true. Factors at play include implied guarantees in the form of state support for banks that run into trouble. If markets start to price in such guarantees, banks' worsened risk profiles may lift risk premiums on sovereign debt higher. The creation of the European banking union has been the key measure in preventing problems in national banking sectors from cascading down to public finances. The banking union ensures that prudential supervision is carried out and failing banks are dealt with at a European level. In addition, bail-in rules ensure that creditors are also liable for a bank's losses, thereby reducing the need for state support.

Despite these measures, recent developments show that the bank-sovereign nexus has still not been broken. For example, the correlation between risk premiums of banks and sovereign debt is still higher in the GIIPS countries than elsewhere in Europe.[13] In addition, a number of recent operations in support of Italian banks warrant the conclusion that some governments hesitate to apply the resolution regime in full, and tend to provide state support instead. This means that the available options for ensuring that shareholders and creditors contribute to a failing bank's recapitalisation are still not used to the fullest extent. It should be kept in mind with regard to the situation in Italy, however, that the new bail-in rules were fairly recently introduced due to which banks had limited opportunity to adjust to them. This is true even more of banks that were already vulnerable. For instance, Italian banks have had a short period to issue new debt instruments that satisfy the MREL requirements for loss-absorbing capital.[14] This does not alter the fact, however, that the new framework will only be effective if banks have adequate credible loss-absorbing capital to ensure that bail-in can be applied in full should the need arise. As long as this is not the case, the bank-sovereign nexus will be kept intact.

Dutch financial institutions, too, can be hit by a market correction. This could be the case if a correction triggers a flight to quality, which would depress the risk-free interest rate. In turn, this would squeeze the already narrow interest margin of Dutch banks. Dutch insurers and pension funds would see their solvency ratios and funding ratios erode further. Such a scenario would also affect the assets side of Dutch institutions' balance sheets if they are exposed to vulnerable euro area countries. Such exposures are negligible for banks, but insurers and pension funds have around 6% of their total assets invested in government paper issued by the GIIPS countries.

Policy conclusions

Monetary policymakers face the challenge of phasing out the accommodating monetary conditions gradually and in a timely manner while minimising the likelihood of downward shocks. Persistent accommodating financial conditions add to the vulnerabilities, while the need for a policy of monetary stimulus decreases if the economy recovers. It is imperative that financial market participants anticipate and price in a gradual return to normal policies. Governments must ensure that their debts are sustainable enough to withstand rising interest rates. Increased compliance with the preventive arm of the Stability and Growth Pact will help achieve this.

13 Bekooij, J., J. Frost, R. van der Molen and K. Muzalewski (2017), Hazardous tango: Sovereign-bank interdependencies across countries and time, DNB Working Paper, No. 541.

14 The European Commission's proposals to extend the creditor hierarchy with a category of subordinated senior unsecured debt instruments, which are junior to regular senior unsecured debt and senior to subordinated debt instruments, have made it easier for banks to issue loss-absorbing debt.

The negative interaction between banks and governments must be ended more resolutely. Although the European banking union has helped prevent problems in the national banking sectors to cascade down to public finances, the bank-sovereign nexus has not yet been fully broken. Reducing this harmful interaction first and foremost requires the formation of adequate loss-absorbing capital and consistent application of bail-in rules. In addition, bank balance sheets must be made less sensitive to problems faced by national governments. It is desirable that preferential treatment of sovereign debt is ended, as such debt is not risk-free. Obliging banks to maintain capital for the credit risk associated with sovereign debt will improve incentives for banks and ameliorate the allocation of capital. Concentration limits may also further restrict exposure of banks to governments.

4 Stress tests: past, present and future

Since the financial crisis, stress tests have become part and parcel of the toolboxes of financial institutions, supervisory authorities and central banks. Stress tests have evolved into an indispensable instrument for risk identification. Supervisory and macroprudential authorities are increasingly turning to stress tests, and are using them in an increasing number of areas. To financial institutions, they represent a vital component of their risk management. That said, no stress test will ever provide absolute certainty. In addition, it remains essential that the vulnerabilities identified by the stress tests are addressed proactively.

Stress tests: objective, scope, and approach

Stress tests are an indispensable risk identification instrument. Stress tests aim to reveal problem areas and vulnerabilities in a financial institution or the financial system before they materialise. It is not only a question of passing or failing: even if institutions prove to have sufficient capital at their disposal, stress tests can still reveal vulnerabilities.

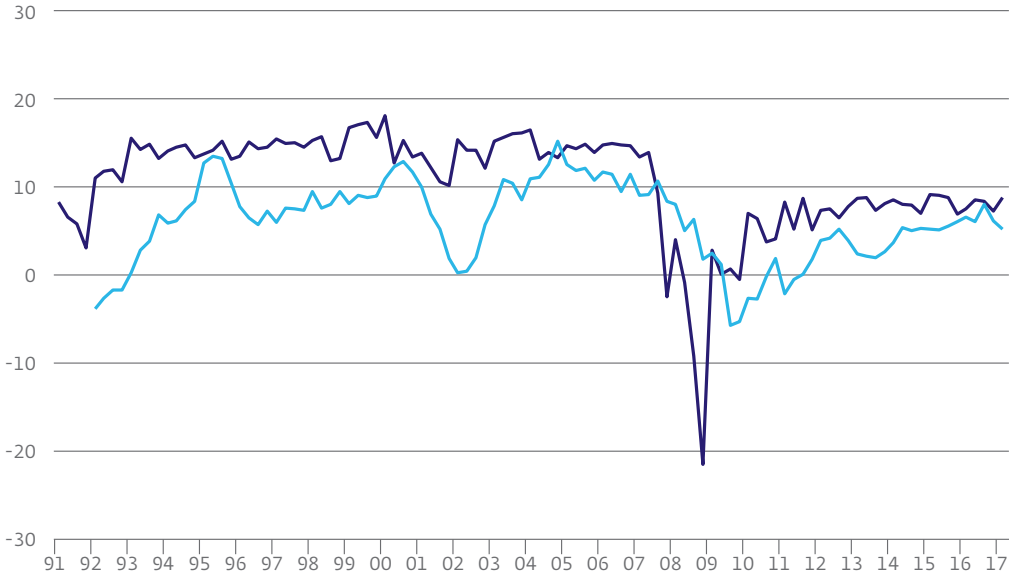
Stress tests can be used to support confidence in the resilience of the financial sector. Banks taking part in the Fed's 2009 stress test were for instance required to raise capital if they failed to meet the capital requirement attached to the stress test, referred to as the hurdle rate. Stress test results, which were published for individual banks for the first time, showed that the capital requirement for the partaking banks was feasible. Combined with the plethora of other measures taken, the Fed stress test at the time sparked a revival of lending in the US and a recovery of return on equity of the banks involved (see Chart 21).

There are both macroprudential and microprudential stress tests. A macroprudential stress test calculates the impact of severe macroeconomic and financial shocks on the financial system. These tests focus on the resilience of systemically important institutions and of the financial system as a whole. Identifying vulnerabilities at an early stage allows to take timely measures to boost the shock resilience of the financial system, enabling financial institutions to continue playing their role as financial service providers also in times of crisis. Microprudential stress tests can be used to examine the resilience of individual institutions. The stress scenarios are tuned to the institution's specific risk profile.

Stress tests can be performed both bottom-up and top-down. In bottom-up stress tests, financial institutions themselves perform the necessary calculations. The supervisory authority prescribes a scenario and a method that the institutions are required to adhere to. The institutions then perform the stress test themselves based on their own internal data and models. And last but not least the supervisory authorities perform a quality check, which includes the validity of the data used and the plausibility of the calculations made. In top-down stress tests, supervisory authorities or central banks calculate the impact of a stress scenario

Chart 21 Growth in lending and returns on equity (United States)

Percentages per annum



Source: Federal Reserve Bank of New York.

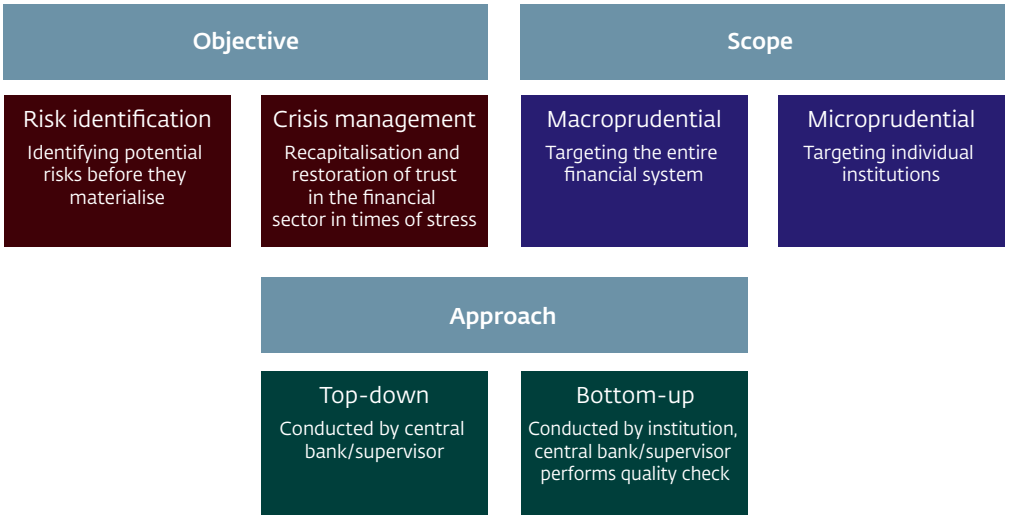
based on their own models. These models are used for all institutions taking part in the stress test, enabling quick calculations of the impact of different scenarios.

Which lessons have we learned from the crisis and what can be improved?

The stress tests performed in the run-up to the financial crisis did not sufficiently identify many of the vulnerabilities that led to the crisis. For instance, the simulated shocks were often too weak. Scenarios were often based on historical developments and were unable to unmask the risks of new products, like sub-prime mortgage loans. Stress tests did not sufficiently factor in tail risks, second-order effects or the fact that correlations can increase sharply in times of crisis. Data quality at that time also left a lot to be desired.

Since the crisis, attention for stress tests has grown significantly, and stress tests have been refined as a result. Due to the crisis, financial institutions and supervisory authorities have come to see that stress tests are an invaluable risk identification instrument that enables quantification of tail risks. As the crisis turned out to be much more prolonged and severe than the existing

Figure 1 Stress tests: differences in objective, scope and approach



stress scenarios had assumed possible, awareness increased that the quality of stress tests left room for improvement. In the aftermath of the crisis, stress tests were subjected to more elaborate reviews, which has benefited their quality. Data quality has also been improved.

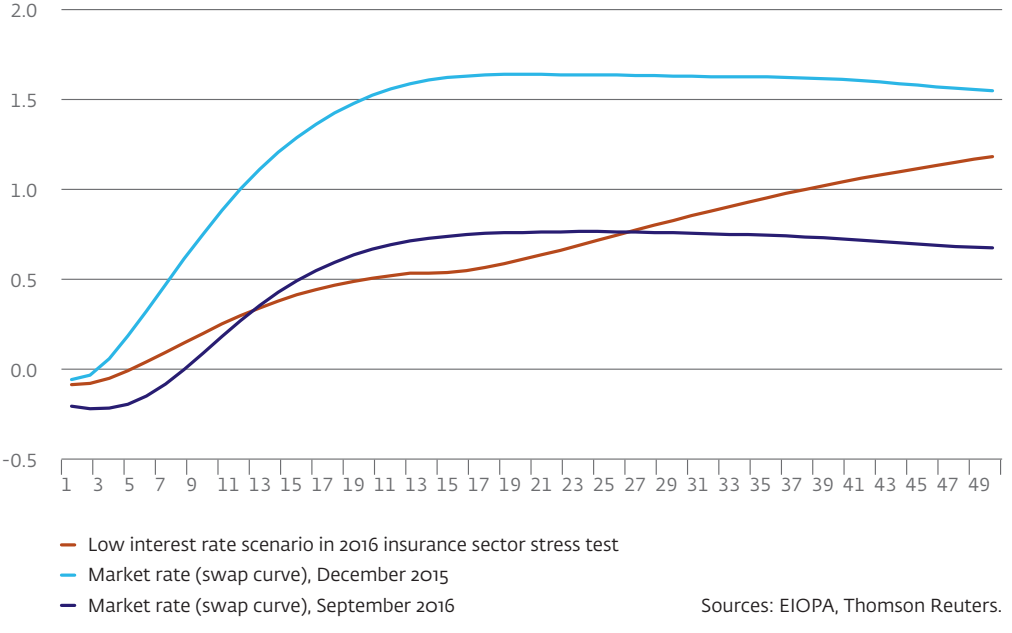
Stress tests must be strict but plausible. Strict stress tests are necessary in order to identify risks. All relevant risks must be considered and ideally tested under different scenarios, including hypothetical ones. Such scenarios may reveal hidden vulnerabilities and are often stricter than historical scenarios. Real-time scenarios where risks that are still developing (e.g. Brexit) are included in the analysis help to rapidly identify the magnitude of potential risks. Weak stress tests that lack relevant risks or whose scenarios insufficiently reflect the magnitude of specific risks may give investors or the general public an unjustified sense of certainty. They may get the unwarranted idea that the financial sector can resist heavy stress.

At the same time, stress tests must differ as little as possible between institutions. Stress tests must not treat specific institutions too leniently, or tax others too heavily. To compare stress test results of different institutions effectively, a balance must be found between bespoke tests and uniform ones.

Although improvements were made after the crisis, stress tests can never provide full certainty. Sometimes, scenarios are quickly caught up by reality, as was the case with the low interest rate scenario used in the 2016 European insurance stress test (see Chart 22). But even if sufficiently strict scenarios are used, stress tests can never provide certainty. In real life always other scenarios will present themselves than the scenarios assumed in stress tests. This means that financial institutions that pass a stress test may still run into trouble.

Chart 22 Interest rate scenario in insurance sector stress test was quickly caught up by reality

Percentages per annum



Sources: EIOPA, Thomson Reuters.

Stress tests can be further improved going forward by also including second-order effects.

In times of crisis, banks can reduce their lending operations, adapt their business models, or raise additional capital, which impacts the economy. The changing economic conditions in turn impact banks, which may exacerbate a crisis. Banks under stress may also be cut off from the interbank market, forcing them to sell liquid assets to meet their funding requirements. This may induce fire sales where asset prices continue to plunge, resulting in losses at other banks. Such second-order effects can be made transparent by using a dynamic balance sheet, where the balance sheet composition changes during the stress test. The current European stress tests are often performed under static balance sheet assumptions based on the hypothesis that the size of individual portfolios will remain unchanged over the entire stress test horizon, and that maturing instruments will be replaced by instruments carrying the same risk profile.

Including liquidity effects provides for an integral picture of the financial position of a bank.

In addition, the current stress tests often focus on solvency effects, while the crisis has revealed that liquidity effects can also play a key role. Combining liquidity and solvency stress tests will help to identify shocks to the financial system and improve the understanding of where risks to financial stability may develop. Including liquidity effects is not straightforward, however, also because they occur immediately following shocks, while solvency effects may take some time to materialise.

Cross-sectoral linkages also warrant more attention going forward. Although stress tests are often performed for banks, insurers and pension funds separately, these sectors are closely interconnected, e.g. because institutions hold loans or derivatives of other financial institutions. Due to these cross-sectoral linkages, financial distress often infects the entire financial system. A future challenge is to combine the different models and sectors into a single stress test.

Growing importance of stress tests

In the aftermath of the crisis, stress tests have taken up a larger role in banking sector supervision. The European Banking Authority (EBA) has coordinated a two-yearly bottom-up bank stress test since 2009. DNB performs quality checks on the data and calculations submitted by the banks. The most recent EBA stress test, dating from 2016, shows that Dutch banks are sufficiently resilient against an economic stress scenario. It also revealed that Dutch banks are hit relatively hard by the decline of net interest income, and that they depend relatively heavily on market funding. With the refinancing risk of market funding being higher than that of deposit funding, Dutch banks are vulnerable to financial market turmoil. Although banks could not pass or fail this stress test, the results were taken into account in the Supervisory Review and Evaluation Process (SREP) performed every year for individual banks in the Single Supervisory Mechanism (SSM). The EBA stress test results are therefore part of the ongoing dialogue between the supervisory authority and the institution, and are a determining factor for the capital that banks are required to hold.

Stress tests have also become increasingly important in the supervision of insurers, pension funds and central counterparties (CCPs) (see Table 2). The European supervision authority for insurers and pension funds (EIOPA) , carries out alternating annual bottom-up stress tests among insurers and pension funds. The European Securities and Markets Authority (ESMA) has subjected central counterparties (CCPs) to an annual stress test exercise since 2015.[15] DNB contributes to the bottom-up stress test exercise by performing a validation of the data and calculations submitted by the institutions and we are involved in compiling the stress scenarios. Top-down stress tests are performed by the IMF as part of its Financial Sector Assessment Program (FSAP) executed every five years in countries with systemically important financial systems, including the Netherlands.[16]

15 The European Market Infrastructure Regulation (EMIR) requires that standard derivative contracts are cleared by CCPs. Central clearing creates a new form of interdependence within the financial system in which CCPs play a key role. Stress tests have therefore been performed since 2015.

16 An FSAP uses stress tests to thoroughly review the resilience and stability of a country's financial system, and assesses the quality of supervision and of the crisis management framework. The IMF finished its FSAP on the Netherlands in April 2017. It performed top-down stress tests to test the resilience of the Dutch banking system against solvency and liquidity shocks and contagion risks (see Box 3 of our spring 2017 Financial Stability Report).

Table 2 Overview of recent international stress tests

Banks	Insurers	Pension funds	CCPs
CEBS 2009 and 2010 stress tests	CEIOPS 2009 stress test	EIOPA 2015 and 2017 stress tests	ESMA 2015 and 2017 stress tests
EBA 2011, 2014 and 2016 stress tests	EIOPA 2011, 2014 and 2016 stress tests		
IMF 2011 and 2016 FSAP	IMF 2011 FSAP		
ECB 2017 IRRBB sensitivity analysis			

International stress tests have again been put on the agenda for the years ahead. The next EBA bank stress test is planned for 2018. The test will involve 49 large European banks, including ING, ABN AMRO, Rabobank and BNG Bank. The stress test includes a baseline and a negative scenario for the 2018-2020 period. The impact that the stress test has on the capital ratios of individual banks will be published together with a breakdown of the underlying causes. The SSM performs stress tests on the other significant banks, including NWB Bank and Volksbank. EIOPA is currently performing a stress test on pension funds, the results of which will be published at the end of 2017, and it will subject insurers to another stress test in 2018. ESMA will again perform a stress test on CCPs this year, and in 2018 the IMF plans to launch an FSAP for the euro area, including a top-down stress test among 29 systemically important banks, including ING, ABN AMRO and Rabobank.

Not only does DNB contribute to international stress tests, it also instigates stress tests itself, e.g. by developing its own top-down stress testing framework for banks. This framework can be used to calculate the impact of stress scenarios on the portfolios and capital ratios of individual banks.[17] It consists of a series of models that each represent a component part of a bank's balance sheet and profit and loss account. It focuses on the biggest risks for banks: credit risk, market risk and funding risk.

17 Tijmen Daniels, Patty Duijm, Franka Liedorp and Dimitris Mokas (2017), A top-down stress testing framework for the Dutch banking sector, DNB Occasional Studies, 15-3.

DNB uses top-down stress test calculations to assess financial stability risks and to verify bottom-up stress test calculations. Over the past few years, we applied the top-down model several times to calculate the impact of stress scenarios on the overall financial system and to quantify specific vulnerabilities in more detail. It also helps us verify bottom-up stress test calculations. For example, we used the framework in the EBA stress test to verify the bottom-up calculations performed by the Dutch banks. Bottom-up stress test assumptions may differ between banks, whereas the top-down model is similar for all banks, ensuring better comparability of the banks' stress test results. Any unexpected discrepancies between the results of the bottom-up and top-down calculations are then scrutinised.

The top-down stress test model strengthens the synergy between macroprudential and microprudential banking supervision. The crisis has shown the importance of macroprudential policy and microprudential supervision being closely linked. At the time, many banks faced problems that originated in the macro environment. As a macroprudential and supervisory authority, DNB is well-placed to use the results of macroprudential stress tests in its microprudential supervision. This enables supervisors to understand the impact which macro risks have on banks. This understanding provides important input when capital requirements are established. The top-down stress test also serves as a benchmark for the results of banks' internal stress tests. This helps in achieving more effective supervision, which contributes to a more stable financial system.

DNB also asks insurers to conduct bottom-up stress tests. In 2017, we asked non-life insurers to conduct a stress test to gain more insight into the risks to which the sector is exposed. The test deals with a range of scenarios, including one or more windstorms, combined with a downturn in the financial markets and the failure of one or more reinsurers. Likewise, it simulates the impact of an influenza pandemic and a sudden increase in occupational disability claims. We selected a number of large and small insurers for the stress test, and we expect their results before the end of the year.

DNB also uses stress tests for pension funds. We analyse several stress scenarios as part of our regular half-review process to assess the impact of macro risks on pension funds. We can do this on the basis of the data which pension funds submit on a regular basis. The European IORP II Directive, which was adopted in late 2016 and must be transposed into Dutch law by early 2019, provides a statutory basis for our use of stress tests for pension funds.

Lastly, financial institutions also conduct their own stress tests, which represent a vital component of their risk management. Banks do so as part of the Internal Capital Adequacy Assessment Process (ICAAP), while insurers perform such tests in the context of the Own Risk and Solvency Assessment (ORSA). Several Dutch pension funds also conduct stress tests, for example as part of their liquidity management, to find out whether liquidity and collateral are sufficient in stress scenarios. Performing stress tests enables institutions to make better allowance for idiosyncratic risks, thereby reducing the likelihood of risks going undetected.

Box 4 DNB is working on a climate stress test

Climate change poses a significant long-term risk for the financial sector. The physical risks attached to climate change affect non-life insurers and other operators, and their liabilities. In addition, if the process of transition to a sustainable economy causes a carbon bubble to burst, transition risks could emerge. Write-downs of companies in the fossil energy sector may cause capital losses in the financial sector and push up credit risks in carbon-intensive sectors.

We identified the implications of climate change for financial stability in our studies "Time for transition" (2016) and "Waterproof? An exploration of climate-related risks for the Dutch financial sector" (2017). We asked the major Dutch financial institutions to submit data on their exposure to carbon-intensive sectors. Dutch pension funds have the largest exposure, at 12.6% of their balance sheet total, as well as banks, at 10.2%. The exposure of insurers is much smaller, at 4.5%.

We are currently developing a stress test that should assess the impact of transition risks on financial institutions in more detail. It first models the consequences of the energy transition for the Dutch economy, after which the top-down model is used to calculate the impact of various scenarios on the financial institutions. The model will be adapted to conduct stress tests involving climate risks. We expect the first results in early 2018.

Policy messages

Stress tests have become indispensable risk identification tools for financial institutions, supervisory authorities and central banks alike. It is important for institutions to increase their own stress testing capacity. Stress tests will be used more frequently and in a wider range of areas, also in the context of supervision. In 2018, for example, we will be conducting a top-down stress test on the commercial real estate portfolios of the Dutch major banks. We are also working on a climate stress test for the financial sector (see Box 4). In addition, our top-down stress test model for banks is becoming increasingly important. Bottom-up stress tests of major banks subject to SSM supervision are organised at the European level, but financial and economic shocks could also occur nationally. National macroprudential authorities would appear to be best placed to identify country-specific risks using macroprudential stress tests.

Stress tests have matured since the crisis and will be developed further. The crisis has placed stress tests for financial institutions more in the centre of attention, which has benefited their quality. Stress tests could be made more realistic in the future by including second-order effects and liquidity effects. The use of a dynamic balance sheet will provide a better understanding of long-term risks, and conducting cross-sectoral stress tests will provide a more comprehensive view of risks prevailing across the financial system. We are currently expanding the top-down stress test model for banks, and our first priority is on including second-order effects.

No stress test will ever provide absolute certainty, however. Weak tests that lack relevant risks or whose scenarios insufficiently reflect the magnitude of specific risks may give investors or the general public an unjustified sense of certainty, which is why they should be prevented. In addition, it must be remembered that a stress test deals with scenarios in which tail risks materialise, rather than economic developments that are actually expected. Different scenarios will always present themselves in real life. In other words, an institution that passes a stress test will not necessarily be left unscathed in a crisis. This means that clear communications about stress testing are vital. Publishing the method used may prompt institutions to improve their data and models, while disclosing individual institutions' test results will serve as an incentive to address the vulnerabilities uncovered.

Annex 1: Macroprudential indicators

	Most recent observation	Trend after 1998 Min	Max	Average	Period under review
Credit conditions					
Trend deviation credit/GDP ratio[1]	-22.4	-22.8	17.0	-0.2	1998Q1-2017Q1
Growth in household lending (y-o-y)	0.8	-2.1	17.1	6.5	1998Q1-2017Q1
Growth in non-financial corporations lending (y-o-y)	2.3	-3.9	16.8	3.7	1998Q1-2017Q1
Credit conditions for non-financial corporations[2]	-26	-47	98	8	2003Q1-2017Q3
Credit conditions for residential mortgages[2]	-30	-53	100	16	2003Q1-2017Q3
Leverage					
Leverage ratio CRD IV, fully loaded[3]	4.7	3.4	4.7	3.9	2014Q1-2017Q2
Tier 1 capital/balance sheet total of the banking sector (up to 2013Q4)	5.0	3.0	5.0	3.9	1998Q1-2013Q4
CET1 ratio of banks under CRD IV, based on transition rules	16.1	13.6	16.4	14.8	2014Q1-2017Q2
Tier 1 ratio of banks under CRD III (up to 2013Q4)[4]	12.5	8.2	12.8	10.0	1998Q1-2013Q4
Household debt (% of GDP)	105.6	65.4	117.9	100.5	1998Q1-2017Q1
Non-financial corporations debt (% of GDP)	103.6	100.5	120.5	109.9	1998Q1-2017Q1
Real estate market					
Growth in house prices (y-o-y)	7.7	-9.9	20.0	4.0	1998Jan-2017Jul
Growth in commercial real estate prices (y-o-y)	6.8	-7.8	9.4	2.1	1998Q1-2017Q1
Loan-to-value ratio of first-time buyers[5]	97.5	97.3	100.7	98.8	2005-2016Q4
Loan-to-income ratio of first-time buyers[6]	390.0	390.0	450.0	414.2	2005-2016
Interest rates on new mortgage loans 5-10 years (bp)	234.3	227.7	552.8	435.7	2003Jan-2017Jun
Bank liquidity					
Loan to deposit ratio[7]	143.2	143.2	188.6	170.0	1998Q4-2017Q2
Proportion of market funding with maturities < 1 year	27.9	16.6	38.3	29.7	2003Aug-2016Dec
Systemic importance					
Size of bank balance sheets (% of GDP)	371.4	306.5	562.5	417.2	1998Q1-2017Q1
Share of five largest banks in balance sheet total of the banking sector[8]	84.8	79.9	90.3	86.8	1998Q1-2017Q1
Rating uplift of systemically important banks (in steps)[9]	1.0	1.0	2.3	2.0	2012-2016
International risks					
Long-term interest rates (bp)[10]	54.2	2.7	566.6	329.4	1998Jan-2017Aug
BAA-AA risk premium (bp)[11]	86.0	81.0	463.0	169.2	2001Jan-2017Aug
Risk premium in money market (bp)[12]	2.8	1.2	186.0	21.1	1999Jan-2017Aug
Risk premium on senior unsecured bank bonds (bp)[13]	47.6	12.6	321.5	84.5	1999Jan-2017Aug
Financial stress index[14]	-0.19	-0.56	3.20	0.21	1999Dec-2017Aug
Growth in global lending to non-financial corporations (y-o-y)[15]	2.1	-5.8	20.2	6.0	2000Q1-2017Q1
Global growth in house prices (y-o-y)	1.8	-7.9	10.5	2.9	2001Q1-2016Q4

Concentration of exposures of Dutch banks[16]

	Netherlands	Abroad	
Total of debt securities and loans	49.7	50.3	2017Q2
Central bank	2.6	1.4	
Governments	6.4	5.8	
Credit institutions	1.1	11.3	
Other financial institutions	1.9	5.8	
Non-financial corporations	11.8	16.9	
Of which: Small and medium-sized enterprises	2.4	3.6	
Of which: Commercial real estate	4.7	3.2	
Households	25.9	9.1	
Of which: Mortgage loans	24.6	7.9	
Of which: Consumer credit	0.7	0.9	

Sources: Bloomberg, BIS, CBS, DNB, IMF, IPD, Moody's, Thomson Reuters Datastream.
Figures are expressed as percentages, except where otherwise indicated. Bp = basis points.

1 The difference between a) the ratio of lending to the non-financial private sector and Dutch GDP and b) the long-term trend for that ratio as calculated in ESRB (2014), Occasional Paper No. 5 Operationalising the countercyclical capital buffer: indicator selection, threshold identification and calibration options.
2 The proportion of banks tightening credit conditions and easing credit conditions, with a positive number reflecting a net tightening and a negative number reflecting net easing.
3 Calculated based on the most recent definition of the leverage ratio as agreed by the Basel Committee in January 2014.
4 The Tier 1 ratio reported here includes the Basel I floor.
5 The ratio of the amount of the mortgage loan to the value of the home at the time the mortgage loan is taken out. First-time buyers are defined as individuals younger than 30 at the time the mortgage loan is taken out. DNB estimate based on a sample of Dutch mortgage loans.
6 The ratio of the amount of the mortgage loan to the income of the borrower at the time the mortgage loan is taken out. First-time buyers are defined as individuals younger than 30 at the time the mortgage loan is taken out. DNB estimate based on a sample of Dutch mortgage loans.
7 The ratio of loans (including securitised loans) to deposits made by the domestic non-financial private sector.
8 The five largest Dutch banks' assets (ABN AMRO, ING, Rabobank, Volksbank and BNG) as a percentage of the Dutch banking sector's total assets.
9 The difference between credit ratings including and excluding government support, based on Moody's methodology. This is an average of ABN AMRO, ING, Rabobank and Volksbank, weighted by balance sheet total.
10 Yields on Dutch ten-year government bonds.
11 The yield differential between international BBB-rated corporate bonds and international AA-rated corporate bonds.
12 The difference between three-month EURIBOR interest rates and the three-month EONIA swap index.
13 The yield differential between European senior unsecured bank bonds and the five-year swap rate.
14 Index based on indicators of Dutch equity, bond and forex markets.
15 Trend in lending to the non-financial private sector in all countries reporting to the BIS.
16 The share of Dutch and foreign counter sectors in the exposures of all Dutch banks, based on reported consolidated figures for supervisory purposes.

Annex 2: FSR follow-up monitor

This annex provides an overview of the follow-up given to the recommendations made in previous editions of our FSR. Our purpose is to be transparent about the pursued actions, and to keep abreast of the progress made. The risks identified in the FSR are addressed via different channels. The FSR contributes towards creating timely awareness and calls for tangible policy adjustments. We also deploy microprudential and macroprudential instruments.

System-wide

Low interest rates

Resilience against an upward interest rate shock (spring 2016)

Despite having risen slightly since late 2016, interest rates are still at low levels, historically speaking. As they become more habituated to low interest rates, business and households will lose the incentive to reduce their debts. Lowered LTV and LTI limits mitigate the sensitivity of households to upward interest rate shocks. Still, additional measures are needed to reduce the incentive for excessive debt financing, such as accelerated phasing out of mortgage interest tax relief and reduction of the LTV limit to 90%, as well as more balanced tax treatment of debt and equity of businesses. Below, we will set out the consequences which low interest rates have for financial institutions.

Remuneration policy

Perverse incentives from variable remuneration (spring 2015)

The Remuneration Policy (Financial Enterprises) Act, which entered into force in early 2015 focuses on preventing and counteracting irresponsible incentives contained in variable remuneration. Financial institutions have amended their policies accordingly. The Ministry of Finance is evaluating the effects of the Act, as well as any side effects and is expected to report the outcome to the Lower House of Dutch Parliament in the first quarter of 2018. Based on the evaluation, we may determine whether a cultural change has been achieved.

FinTech

The rise of technological innovation in the financial sector (spring 2016)

DNB and the AFM facilitate technological innovation in the financial sector by means of a newly set-up inquiry service known as the InnovationHub. We received 216 inquiries until June 2017. In addition, our regulatory sandbox offers market operators more room for innovation, for instance by issuing partial licences and providing interpretation of open standards. Over the past months, we have held dozens of exploratory discussions to provide informal guidance. In addition, we have launched studies into the risks associated with FinTech. One example is a study into the risks of outsourcing by banks, payment institutions, insurers and pension funds. Specifically for the insurance sector, we are looking into the impact of innovative technologies on the market structure, the strategy and operational management.

Cyberthreats

Resilience against cyberthreats (autumn 2014)

Recent cyberattacks have once more highlighted the importance of being resilient against cyberthreats. Since 2010, we have examined the information security standards that the institutions we supervise use. We will continue to monitor the maturity of financial institutions' cybersecurity and intervene where needed. In addition, in tandem with other institutions in the financial core infrastructure, we have introduced a framework for simulating cyberattacks and testing resilience against these attacks. Tests have been performed since early 2017 within this Threat Intelligence Based Ethical Red-teaming (TIBER) framework.

Brexit

The United Kingdom's exit from the European Union (autumn 2016)

Negotiations between the United Kingdom and the EU are now underway. We will closely monitor all developments surrounding the UK's exit from the EU, given the uncertainties about the process itself, the terms of the final agreement and the consequences for financial stability.

Banks

Low interest rates

Effects on business models (autumn 2016) and return targets (autumn 2014)

Dutch banks managed to maintain their profitability in recent years. However, interest rate resets and early repayments have caused high-rate legacy mortgage loans to be replaced by low-rate loans. With funding costs not falling in line with lower income, interest margins on new mortgage loans are shrinking, making it more difficult to maintain profitability. New entrants in the mortgage lending market cause further pressure on margins.
We conducted a stress test in 2017 fully aimed at banks' resilience against persistently low interest rates. Its results will be considered in setting the capital requirements for banks.

Commercial real estate

Varying price trends caused by structural factors (autumn 2015)

Prices develop differently in different regions, and structural factors cause unattractive locations to have an unfavourable future perspective. The commercial real estate market therefore needs better data and improved transparency, for which professional and reliable valuations are fundamental. In a letter to the Register of Valuers of Commercial Real Estate, DNB and the AFM have explained that legislation will be needed if the sector's self-regulation does not lead to the desired result. In addition, a high-quality price index is needed to foster transparency in the market, and we are committed to ensuring that such an index is created. We also conduct regular studies into the real estate portfolios of the institutions we supervise.

Non-performing loans

Non-performing loans on bank balance sheets and deficiencies in insolvency legislation (autumn 2016)

Although the proportion of non-performing loans in banking balance sheets is decreasing, banks in part of the euro area are still contending with a large number of problem loans. The European Council adopted an action plan in July 2017 to reduce the number of non-performing loans in banking balance sheets and prevent them from becoming a problem again in the future. The plan comprises measures with regard to supervision, insolvency framework reforms, setting up secondary markets for non-performing loans and banking sector restructuring, building on previous actions. Until these measures yield visible results, non-performing loans will continue to pose a major risk in terms of financial stability.

Treatment of public debt

Preferential treatment of public debt (autumn 2015)

Preferential treatment of public debt results in perverse incentives and reinforces interdependencies between governments and banks. The Basel Committee will shortly deal with the treatment of public debt. We call for regulation in the form of risk weights and exposure limits.

Liquidity risks

Dependency on market funding (spring 2013) and reduced market liquidity (autumn 2015)

The declining loan-to-deposit ratio of Dutch banks illustrates their diminished dependency on market funding. One of the factors contributing to this is the larger role played by insurers and pension funds in the mortgage lending market. Stress tests conducted by the IMF under its Financial Sector Assessment Program show that Dutch banks are capable of resisting shocks and that the risk of contagion between banks is limited. The IMF also concluded, however, that the Dutch banks' dependency on market funding remains an area of vulnerability. Quantitative liquidity requirements such as the LCR and the NSFR should reduce their sensitivity to liquidity risk. By and large, Dutch banks already meet the statutory LCR requirement of 100%. The NSFR is currently being converted into a statutory requirement at European level.

Ineffective bail-in

Credibility of the bail-in instrument (autumn 2013 and spring 2015)

Banks must have sufficient loss-absorbing capacity so that the bail-in instrument can be made more credible. In 2016, the Single Resolution Board adopted the quantitative indicative group-level MREL requirements. They will be made more specific at the consolidated level in 2017, and decisions are expected to be made in 2018 on individual specific MREL requirements and how they must satisfied. Banks will be given several years to build up their buffers so that they match MREL requirements. At the same time, the statutory framework remains in a state of flux, given that the global standard for total loss absorbing capacity (TLAC) will be embedded in European law. In addition to having a sufficiently sizeable buffer, banks must hold MREL instruments that are actually bail-inable. The directive dealing with harmonisation of the hierarchy of unsecured debt instruments in insolvency procedures as adopted by the European

Council in June 2017 will contribute to this. It does, however, require complementary policies, for example to prevent banks from investing in each other's bail-inable debt instruments. As a national resolution authority, we are engaged in operationalising the resolution instruments we have at our disposal. As part of this effort, we will finalise our vision on the operation of the bail-in instrument in 2017.

Strengthening capital buffers

Banks are required to strengthen their capital positions (autumn 2011)

Increasing CET1 ratios testify to the fact that Dutch banks have strengthened their capital buffers over the past few years. This has bolstered their resilience against unexpected losses.

Insurers

Low interest rates

Erosion of financial position (spring 2015 and other publications), guaranteed returns (spring 2013) and solvency calculations based on UFR (spring 2015)

A new calculation method introduced earlier in 2017 means that the ultimate forward rate (UFR) will gradually fall to 3.65% in the years ahead. This adjustment will ensure a more accurate reflection of an insurer's solvency position, but the UFR will still be above current market interest rates. We are asking insurers to explicitly acknowledge this economic reality in their capital and dividend policies. If an insurer wishes to make a dividend distribution, we will assess the consequences for its economic solvency position and discuss these with the insurer. We will continue to monitor the UFR effects as part of our supervisory reporting. Insurers also need to deal with return guarantees provided in the past, given that it will be difficult to deliver on them in times of persistently low interest rates. We monitor that insurers adequately value these guarantees and that they proceed with care when providing new return guarantees.

Sustainability of business models

The sustainability of insurance business models (spring 2015)

The contracting market for individual life insurance means that life insurers need to ensure their business models are viable in the long term, for example by continuing to cut costs and exploring potential avenues for consolidation. In addition, they will need to leverage new opportunities through innovative technology and digitisation to improve insurance service provision to consumers. As in previous years, we monitor their progress in these respects. It is also important that we can resolve insurers in an orderly fashion should the need arise. This is why we work with the Ministry of Finance to strengthen the recovery and resolution framework.

Unit-linked insurance policies

Claim risk and duty of care in unit-linked insurance policies (autumn 2011)

At year-end 2017, the period agreed upon by insurers and the Ministry of Finance will end in which insurers must have contacted all customers who have a unit-linked insurance policy in

the context of their duty of care. The AFM is monitoring progress. The number of unit-linked insurance policies in insurers' balance sheets is gradually decreasing, but the risk of claims on account of misselling will remain for years to come, given the various legal proceedings that are still pending. Solvency II stipulates that insurers must take account of this claim risk. We will continue to see to it that insurers act correctly in this respect.

Pension funds

Low interest rates

Erosion of financial position (spring 2015 and other publications)

At year-end 2016, 181 pension funds had submitted recovery plans. Most pension funds rely almost fully on achieving surplus returns on their investments to eliminate their deficit. Surplus returns are returns achieved on top of the returns needed to finance liabilities. Should it prove impossible to achieve such returns, as was the case in 2015 and 2016, 56 pension funds may need to apply mandatory benefit curtailments in 2020 and 2021. DNB and the AFM will continue to call upon pension funds to ensure clear information provision about their financial structure and expected consequences in terms of the pension rights of pension scheme members. By clearly describing their expectations, pension funds should prevent disappointment on the part of members.

Sustainability of the pension system

Sustainability of the pension system (autumn 2011)

The Dutch cabinet outlined its views of a new pension system in July 2017. It will be up to the next government to introduce and set up a new pension system, which means it is still unclear what it will look like. That said, it is important that pension funds anticipate impending changes. As in previous years, we will assess pension funds' adaptability, as they should be able to create the conditions under which they can serve their customers going forward.

Central counterparties

Ineffective resolution

Orderly resolution in case of bankruptcy (spring 2014 and spring 2015)

The systemic importance of central counterparties (CCPs) makes it imperative that they are sufficiently resilient and can be resolved in an orderly fashion should the need arise. In late 2016, the European Commission published a proposal on CCP recovery and resolution, which is currently the subject of negotiations. In June 2016, CPMI and IOSCO published revised guidance on recovery plans. Also, the Financial Stability Board (FSB) issued guidance on CCP resolution in June 2017. Dutch CCPs have meanwhile prepared recovery plans. It is essential that the CCP recovery and resolution framework is enshrined in law and that it is operationalised, so that CCPs can be effectively resolved.

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