Financial Stability Report

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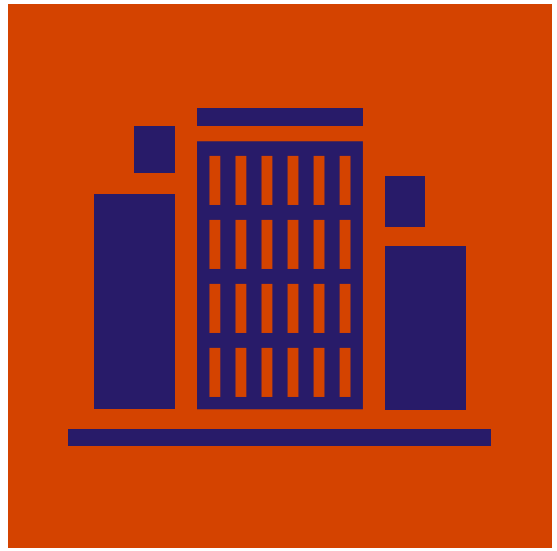


Banks' capital framework: lessons from the crisis

Risk outline

Menno van der Ven and Ralph Verhoeks

The economy is showing a strong recovery from the crisis caused by the coronavirus pandemic and the outlook is positive. At the same time, the vulnerabilities and risks facing the financial system are growing over the longer term. The persistently low interest rates and accommodative monetary policies have given further impetus to a search for yield that has been ongoing for some time. This search is reflected in increasingly risky behaviour among investors and a rise in the prices of risky assets. This makes financial markets vulnerable to a downturn in market sentiment, particularly if financial conditions should tighten unexpectedly. The systemic risk in the housing market has also grown further due to persistent overheating and riskier borrowing behaviour by households. In order to increase banks' resilience, we will therefore pursue in introducing the previously announced minimum floor for the risk weighting of bank mortgages with effect from 1 January 2022.

Macrofinancial environment

The economic outlook has continued to improve since the last spring and the global economy is recovering strongly. The increasing vaccination coverage has reduced the number of hospitalisations in many countries and eased the acute pressure on healthcare sectors. Containment measures have accordingly been relaxed in many countries, and almost all sectors of the economy have reopened, leading to an acceleration of the macroeconomic recovery. The IMF has adjusted its growth estimates upwards particularly for the developed economies, with economic growth in 2021 and 2022 expected to be 7.0% and 4.9% in the United States and 4.6% and 4.3% in the euro area. Although the spread of the Delta variant and the possible emergence of new variants could cause a resurgence of the pandemic, economies appear to be adapting better and faster to changing conditions, reducing the economic impact of new waves of infection.

The economic recovery is unevenly spread, however, and is largely dependent on access to vaccines. The economic growth and outlook of countries with high and low vaccine coverage are increasingly diverging. Particularly in countries where a large proportion of the population remains unvaccinated, concerns persist about a resurgence of the pandemic and the economic damage resulting from containment measures. New virus mutations are also more likely to occur when vaccination coverage is low.

Wide differences in the recovery can also be seen between economic sectors. While some sectors of the economy have already recovered fully from the damage caused by the coronavirus pandemic, or have even grown, others are still lagging behind. Many countries still have social distancing measures in place, particularly in indoor spaces, so night-time hospitality and cultural venues, for example, remain closed. Some segments have also seen structural shifts in consumer demand or an acceleration of existing trends due to the coronavirus pandemic. This is the case of the travel sector, for example, which, among other things, is still having to contend with relatively low demand for business travel due to the further digitalisation of the work environment at home and abroad.

Sovereign and corporate debt has risen sharply in many countries since the outbreak of the coronavirus pandemic. Governments have ramped up their spending to provide financial support packages and additional budget headroom for the healthcare sector amidst declining tax revenues. The scale and accessibility of these support packages differ greatly depending on the country. In low-income countries and emerging economies in particular, firms have largely been left to mobilise their own resources to get through the coronavirus crisis, so their indebtedness has grown. In Europe too there are wide differences, with high public deb, levels sharp increases in budget deficits (Figure 1) and fairly extensive use of public guarantee schemes to maintain levels of private lending to companies in southern Europe particularly (Figure 2). These guarantee schemes have increased European governments' exposures to corporate credit risk. European banks have also financed a considerable part of the rising government debt, which caused banks, companies and sovereign to be increasingly financially interconnected since the outbreak of the pandemic (see also the Spring 2021 FSR). In emerging markets and low-income countries, refinancing and debt sustainability risks may continue to grow substantially due to rising financing costs as soon as developed economies normalise their policies and wind down their monetary support measures.

The Dutch economy has staged a strong recovery since the second quarter of 2021. The economy grew by 3.8% during this quarter compared to the previous quarter and by as much as 10.4% compared to the previous year, the highest growth rate ever recorded by Statistics Netherlands. The macroeconomic recovery is thus stronger than expected in the Netherlands. The growth was driven primarily by rising consumption among households, which spent 9.3% more than in the second quarter of 2020, when a strict lockdown was in force, and by a large increase in Dutch goods exports. Record growth in vacancies led to a marked tightening of the Dutch labour market in the second quarter of 2021, with the number of vacancies outstripping the number of jobseekers for the first time. The number of business failures also continues to fall in the Netherlands. According to Statistics Netherlands it reached the lowest level in more than 30 years in July 2021.

It remains uncertain whether some Dutch companies will be viable when the support measures are wound down. The Dutch government's generic support measures for businesses – the Temporary Emergency Bridging Measure for Work Retention (NOW), Reimbursement of Fixed Costs (TVL) and Self-employed Income Support (TOZO) schemes – came to an end on 1 October. The facility to defer tax payments has also been withdrawn. From 1 October 2022 companies must start paying off their tax debt over a maximum of five years. A number of schemes continue to operate, aimed mainly at sectors still impacted by containment measures, such as night-time hospitality, and at support for business lending, such as guarantee schemes. The withdrawal of support may still push some businesses into bankruptcy.

Financial markets

The search for yield on financial markets persists. Equity markets have reached new highs in the past few months and risky asset valuations are at historically high levels. Fuelled by low interest rates and the accommodative monetary policy, a search for yield among investors began some time ago and was only interrupted briefly in the spring of 2020. The growing market for leveraged loans, the continued falls in risk premiums on risky corporate bonds and high price/earnings ratios in equity markets illustrate investors' high risk appetite. Despite the economic uncertainty, risky asset prices have risen almost constantly since the spring of 2020. This reflects not only the improved economic outlook but also an assumption of continued accommodative policy on the part of governments and central banks.

At the same time sentiment is less exuberant. The positive sentiment is being tempered by a range of factors. Earlier this summer, investors were concerned about the spread of the Delta variant of the coronavirus and the possible strain on economic recovery. More recently, increased inflation rates and concerns over the possible unwinding of monetary purchase programmes (tapering) have weighed on sentiment. Uncertainties surrounding the US debt ceiling and the difficulties facing Chinese real estate giant Evergrande have also caused financial market turmoil.

Inflation expectations remain high compared to the beginning of the year. Inflation has risen further in recent months. In the euro area, both HICP and core inflation have reached their highest levels since 2008. The first half of 2021 in particular also saw an upturn in long-term inflation expectations, both in the United States and in the euro area. The broadly based economic recovery is causing a rapid pick-up in demand and a lag in supply, thereby fuelling inflation. In the United States the substantial budget stimulus adds to concerns about an overheating of the economy. During the summer the rise in market expectations for longer-term inflation levelled off somewhat, particularly in the United States.

Rising inflation and interest rate levels may therefore rapidly put pressure on the high risky asset valuations. The economic outlook has improved strongly since the outbreak of the pandemic, which is reflected in lower credit risks and higher profitability in the corporate sector. This has resulted in further rises in prices of risky assets. Financial markets are therefore increasingly vulnerable to a downturn in market sentiment, particularly if unexpected shifts occur in the inflation trend and the level of interest rates. Current risky asset valuations are heavily reliant on the assumption that financial conditions will remain loose for a long period and that monetary authorities will maintain accommodative policies. A change in market expectations may lead to a shock adjustment in risky asset valuations and risk appetite among market participants. Sudden, substantial market corrections pose a financial stability risk particularly if they are accompanied by leverage in the financial system. Indications of such a build-up of leverage can be seen in various market segments (see also Chapter 1: Search for yield and inflation risks in a low interest rate environment).

The outlook does not point to sustained higher inflation, but alternative inflation scenarios cannot be ruled out. The observed rise in inflation can be partly attributed to temporary factors linked to the reopening of the economy in many countries after a long period of containment measures. The coronavirus crisis is still disrupting various production chains. The current expectation is that euro area inflation will fall back below 2% in 2022. At the same time, a stronger or more sustained rise in inflation cannot be excluded (see Box 4: Alternative inflation scenarios in Chapter 1).

Financial institutions

Banks' capital positions remain solid. The economic shock resulting from the outbreak of the pandemic has barely spread to the banking sector. Dutch banks' capital positions have not deteriorated, partly because the proportion of non-performing loans has shown only a limited rise. The resilience of the banking sector is also borne out by the stress test of European banks, the results of which were published last summer (EBA (2021) and ECB (2021)). In a black three-year scenario, the average CET1 ratio for 89 banks supervised by the ECB falls by 5.2 percentage points compared to the starting position of 15.1%. The impact of the scenario on Dutch banks that took part in the EBA stress test is in line with the European average, at 5.3%, having initially been above average. The stress test shows that the euro area banking system as a whole is resilient to a severe macroeconomic scenario. The resilience of the banking sector is primarily due to the tightening of

capital and liquidity requirements after the financial crisis and the accumulated management buffers (capital held by banks in excess of the capital requirement). The fiscal, prudential and monetary support measures in particular have also played an important role in mitigating the economic damage.

Uncertainties remain with regard to losses on corporate loans, but Dutch banks are also resilient to economic setbacks after the support measures have been unwound. These support measures have made it difficult for banks to conduct proper creditworthiness analyses on companies. Some companies and sectors may still encounter problems once support is withdrawn, particularly if economic recovery is delayed. In order to determine the potential impact of this on the banking sector, we conducted a stress test with a scenario of lagging economic growth and consequently an increase in solvency risks among SMEs. The analysis shows that Dutch banks are resilient to such a scenario (see also Box 1: 'Stress test for rising losses among non-financial corporations after winding down of government support').

Box 1 Stress test for rising losses among non-financial corporations after winding down of government support.

Francesco Caloia and Alessandro Pollastri

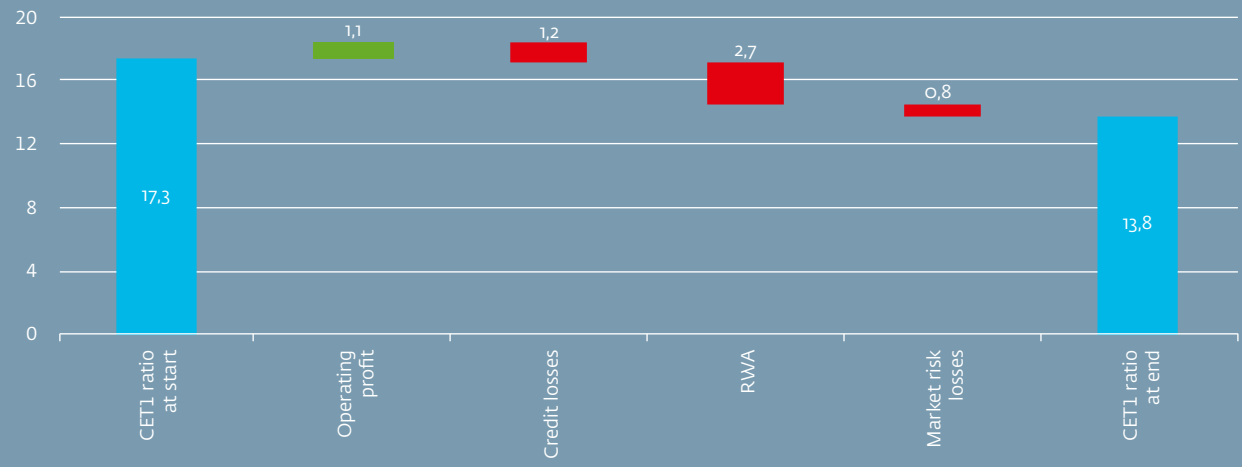
With a steadily growing share of the population now vaccinated and the containment measures largely wound down, the recovery phase has begun in almost all sectors of the Dutch economy. Given the positive macroeconomic outlook and the need to restore market dynamics to the economy, the government decided to wind down the support measures after the third quarter of 2021. Certain companies may still be unviable or encounter financial difficulties after the government support is withdrawn. A key factor in this regard will be the ultimate shape of the repayment scheme for deferred tax payments.

In order to assess the impact on the financial sector we use a stress scenario focused on the possible cliff-edge effects for Dutch companies if the economic recovery lags behind after government support is wound down. The stress scenario is based on the "severe" macroeconomic stress scenario used in the our most recent Economic Developments and Outlook. In this scenario unemployment rises to 6.1% in 2023, but the support measures are neither reintroduced nor extended. In line with the ECB decision not to renew the recommendation to restrict dividends, we assume that banks will continue to distribute dividends.

The winding down of the support measures has a direct impact on Dutch businesses' cash flows. This is transmitted through higher labour costs, due to the winding down of the NOW scheme, and production-related expenditure, due to the winding down of the TOGS and TVL scheme. Depending on a company's reserves, higher income will ultimately have to be generated to meet the increased expenditure. Problems in the non-financial corporate sector may spill over to the banking sector if companies' reserves evaporate and they are ultimately unable to meet their commitments. Defaults or write-downs of bank loans may then increase. The four largest banks' combined portfolio of loans to non-financial corporations amounts to around 25% of these banks' total assets.

Figure 3 Impact on Dutch banks' capital positions

Percentage of risk-weighted assets

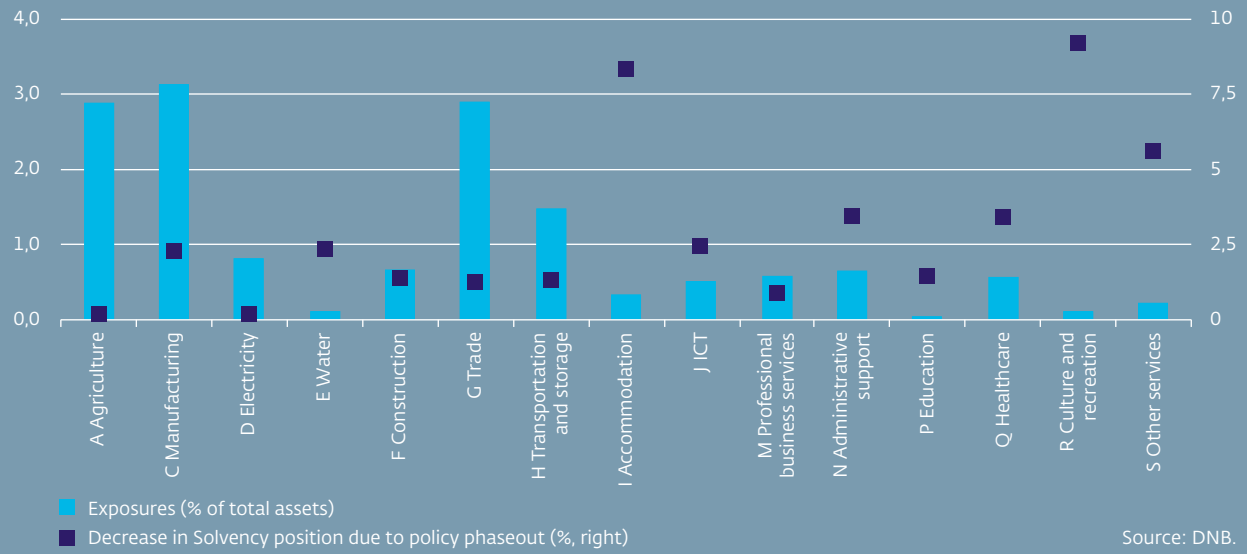


Source: DNB.

One of our recent studies[1] shows that the public support measures prevented a deterioration in the solvency of small and medium-sized enterprises in the Netherlands. This is particularly true of the worst-affected sectors, which include hospitality, art and recreation, and business services. In order to assess banks' credit risk when the support measures are wound down, we conduct a stress test analysis on their sectoral corporate exposures.[2] In addition to the impact of the macroeconomic environment, it is assumed that the probability of default in every corporate sector will increase in proportion to the average sectoral impact of the support on the solvency of SMEs, as calculated in DNB (2021). The increase in loan defaults consequently reflects banks' relative exposures to the most vulnerable sectors, and the impact of the support on those exposures.

The analysis shows that Dutch banks are resilient to a scenario of lagging economic growth, winding down government support and increasing solvency risks among SMEs. In the severe macroeconomic scenario the Dutch banks' capital position (CET1) would decrease by 3.5 percentage points to 13.8%,[3] so banks would remain above their minimum capital requirements (Figure 3). This is partly due to Dutch banks' limited exposure to corporate sectors hit hard by the coronavirus pandemic, and hence also the sectors that were relatively dependent on the government support (Figure 4).

Figure 4 Exposures and mitigation of solvency risks by sector
EUR billions; percentages



Source: DNB.

1 DNB (2021). The financial position of Dutch SMEs one year after the COVID-19 outbreak.
2 Compared to the recent stress test by the European Banking Authority, this analysis uses newly available data and a different scenario. The assumption concerning dividend payments has been added, and this analysis focuses on banks' sectoral exposures and risks in the corporate sector.
3 The bulk of the impact is due to rising RWAs, driven by a growing probability of default among SMEs once the support is wound down.

Persistently low interest rates put the business models of banks and insurers under increasing pressure. Banks' share prices and profitability have recovered since the outbreak of the pandemic. At the same time, the low interest rates continue to put bank interest margins under pressure. The difference between interest rates on new loans to households and companies and interest rates on savings and deposits has narrowed gradually over the years. Measures taken by the ECB, enabling banks to finance themselves cheaply by means of TLTROs, provide relief, as does the application of negative interest rates to (large) deposits. Nevertheless, interest still made up 70% of Dutch banks' income in the first half of 2021, so the business model remains vulnerable and the pressure to cut costs and diversify income sources is growing. Insurers are also having to contend with persistently low interest rates. The low interest rates mean that insurers need to sell new life insurance policies with relatively high premiums in order to maintain profitability. Tax changes have nevertheless made these products less attractive to customers. Progress has been made in increasing the sector's resilience by means of cost-cutting, consolidation and product rationalisation, but it remains highly vulnerable to low interest rates.

Fleshing out the details of the pension agreement represents an important step towards a more future-proof pension system, with fewer intergenerational tensions and better alignment with the changing labour market. The parties involved are currently working hard to reach agreement on the details. To leverage the benefits of the new system, it is important that the agreements made are implemented carefully and energetically. This is evident in their continued relatively low funding ratios, despite improved financial positions. The reform will not increase pension funds' capital, while low interest rates will make pension accrual expensive even in the new system. Transparent communication with participants on the consequences of the change of system for future pensions and the attendant uncertainty is very important in order to limit the risk of overly optimistic expectations. The diverse nature of the new system may also lead to greater complexity, making it harder to explain and to control its implementation. This requires appropriate controls.

Cyber risks pose a major threat to financial institutions and financial stability. The economy and the financial sector are becoming increasingly dependent on digital infrastructure, and cybercriminals are capitalising on this dependence. In addition to the increase in the number of cyberattacks, the destructive impact of attacks is steadily increasing.[4] Cyberattacks thus pose an increasingly significant operational risk to financial institutions, which may seriously damage the continuity of operations (see Box 2 for an analysis based on this operational risk).

4 See, for example: Cybersecurity Assessment Netherlands (CSAN) 2021 | Dutch-language report | Rijksoverheid.nl.

Box 2 Cyber risks remain one of the principal threats to financial stability.

Alessandro Pollastri

Cyber risks remain one of the principal threats to financial stability around the world. The financial sector is more often the target of a cyberattack than other economic sectors (BIS, 2020). Various surveys show that the number of cyberattacks in the financial sector has increased considerably since the outbreak of the coronavirus pandemic. According to these surveys the proportion of financial service providers that had to contend with a cyberattack rose from 44% in 2020 to 55% in 2021. This box analyses the losses suffered by Dutch financial institutions as a result of cyberattacks.

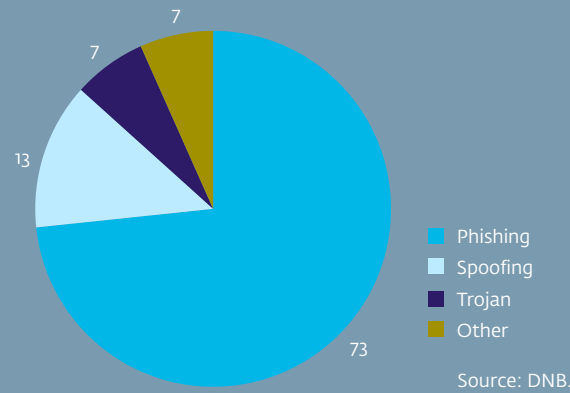
According to the IMF (2020) there are three ways in which a cyberattack can undermine financial stability: unsubstitutability, interconnectedness and loss of trust. If a cyberattack is targeted at an important and concentrated service provider, a problem of substitutability may arise. Financial institutions are also interconnected, partly because they trade with each other on a large number of digital platforms. A cyberattack on a strongly interconnected financial institution may also lead to liquidity problems for that institution's counterparties. Finally, a cyberattack can undermine financial stability as a result of a loss of trust in the financial infrastructure or an individual institution. If a cyberattack impedes the availability of critical services for a prolonged period, market participants may be prompted to reconsider lending or providing liquidity. In the most extreme case, investors and depositors will seek to withdraw their deposits or close their accounts. In the Autumn 2020 FSR we described a possible scenario in which a cyberattack threatens financial stability in the Netherlands by undermining trust in the financial sector. In that case, the impact on financial stability is an indirect consequence of a cyberattack.

The direct financial consequences of a cyberattack are the losses suffered by financial institutions as a result of having to repair the damage. This damage ranges from theft of confidential data to misappropriation of funds and possible interruption to business continuity.

The part banks play in funding the economy exposes them to a relatively high risk of cyberattacks. Above a certain level, banks are required to report their losses associated with operating risks in the Common Reporting (COREP) templates. This also includes losses due to cyberattacks, but the template does not specify them separately. We have nevertheless created a subset using the most common keywords associated with cyber risks.[5] The losses relate to the period from 2018 to 2020. Figure 5 shows the most common types of cyberattacks that lead to operating losses.

Figure 5 Cyberattacks by type

Percentages



Source: DNB.

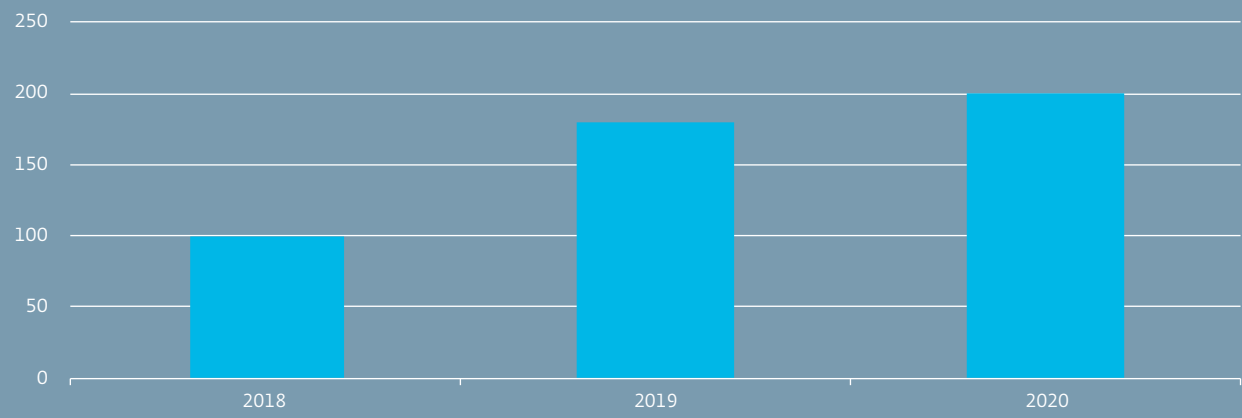
5 The most common keywords associated with cyber risks are malware, ransomware, DDoS, rootkit, spyware, trojan, worm, virus, phishing and spoofing.

The majority of cyberattacks are the result of phishing. This is where a bank customer clicks on a link, for example in a text message, and thereby unintentionally discloses confidential data to the cybercriminals. From the dataset we can deduce how many successful cyberattacks have been carried out in the period from 2018 to 2020. We have used 2018 as the base year with a value of 100 to show the variation in the number of cyberattacks in 2019 and 2020.

Figure 6 shows that the number of successful cyberattacks in 2020 doubled compared to 2018. The rise between 2019 and 2020 is less pronounced, however, possibly because of the additional IT security measures taken by financial institutions in response to increased homeworking. To understand better the magnitude of the cyber risks, we compare the losses resulting from cyberattacks to the total losses resulting from operational risks.

In 2020 the share of losses as a result of cyberattacks was 6.5%, a fourfold increase compared to 2018. To illustrate the magnitude of the losses more clearly, light blue bars show the percentage of cyberlosses relative to income. This percentage was highest in 2020, at around 0.10%. This means that for every €1,000 of profit €1 was lost due to a cyberattack.

Figure 6 Increase in the number of cyberattacks since 2018
Index 2018=100

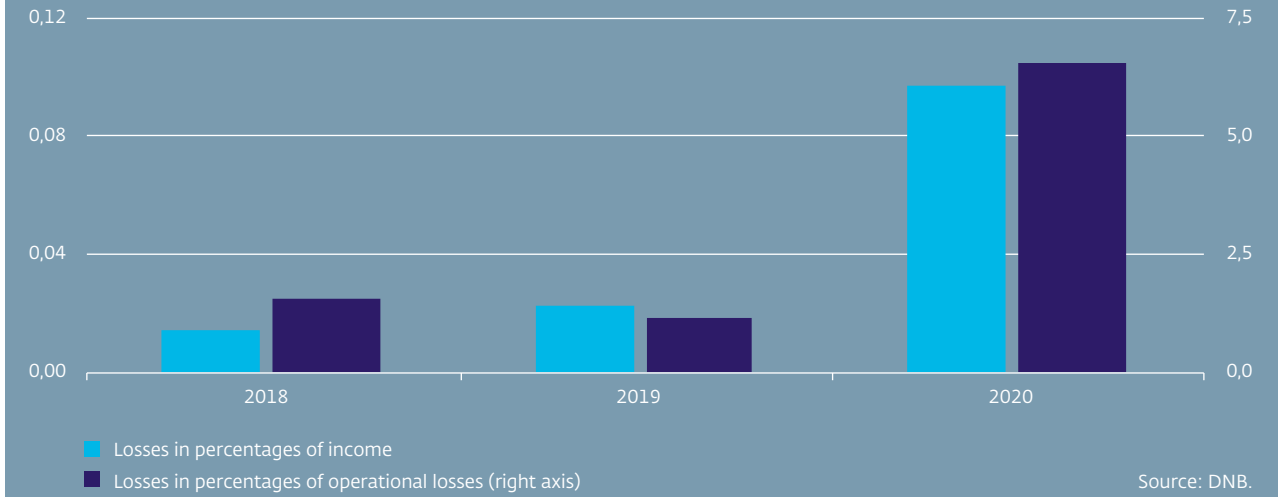


Source: DNB.

Figure 7 shows that operating losses suffered due to cyberattacks had no significant impact on banks' profitability. A cyberattack may nevertheless have systemic consequences if it undermines trust in the financial sector or jeopardises the continuity of an institution. We are currently developing a stress test to assess the resilience of the banking sector to a hypothetical, major cyberattack, both in a scenario where one or more participants in an advanced interbank payment system fails and in the event of a bank run putting pressure on Dutch banks' liquidity positions.

Figure 7 Cyberlosses as a percentage of income and operational losses

Percentages



Source: DNB.

Real estate markets

Housing market

The continuous rise in house prices in the Netherlands has accelerated since the start of this year. Over the past five years prices in the Dutch housing market have risen by an average of 8% per year, in the first two quarters of this year by 10.3% and 13% and in August by as much as 17.8% compared to a year earlier (Statistics Netherlands). The price of an average home in the Netherlands rose to €407,000, compared to €236,000 five years earlier and €262,000 at the previous peak in August 2008, just before the outbreak of the financial crisis. While the Dutch economy has been hit hard by the coronavirus crisis, the housing market has become increasingly overheated over the past 18 months.

The strong growth started in the major cities, but the rest of the country is now seeing the fastest house price growth. In Amsterdam the growth peaked at 15.6% in the first quarter of 2017 but has levelled off since the end of 2018. The growth figure in Amsterdam has been below the average of all Dutch provinces since the third quarter of 2019, but remained high at 7.5% in 2021Q2 (see Figure 8). With an average price of €541,000, households are also still paying substantially more for a home in Amsterdam than in the rest of the country. However, house prices in all provinces have begun to catch up, since the beginning of 2020. Prices in Flevoland, Zeeland, Friesland and Drenthe rose fastest in the second quarter of 2021, with growth averaging more than 15% compared to a year earlier.

Dutch house prices rose faster than in most other European countries, but practically the whole of Europe is seeing strong rises. House prices in Europe have increased annually by an average of 5% since 2016 and 6.1% in the first quarter of 2021 compared to a year earlier. Strong price growth is also being recorded in housing markets outside Europe, such as the United States, which recorded a rise of 18.6% in June 2021 (y-o-y). The strong rise in most markets is due to favourable financing conditions as a result of low interest rates, changes in households' spending preferences and a search for yield. The price rises are unusual, however, given the economic uncertainty that has prevailed since the pandemic. There are also considerable differences in price movements among European countries, suggesting that low interest rates are not the only driver of the high growth figures in the Netherlands (see Figure 9).

The house price rises in the Netherlands are closely linked to households' financing capacity. Dutch households can borrow relatively large amounts to buy a home. With the maximum loan-to-value (LTV) ratio of 100%, homebuyers can currently still finance their entire house purchase with a mortgage. This makes the Netherlands an exception in Europe, with most other countries having a maximum LTV ratio of between 70% and 90%. Generally speaking, Dutch households' financing capacity is growing closely in line with rising house prices, since they do not have to invest their personal assets. The additional purchase costs, which homebuyers are expected to pay from their personal assets, have also decreased in proportion to house prices because the transfer tax has been reduced – and abolished in the case of young first-time buyers – and because real estate agents nowadays often charge fixed amounts rather than variable fees. Financing capacity is nevertheless limited by the mandatory income test which lenders must perform, even though lower interest rates mean that households can borrow more with the same income.

Although the majority of first-time buyers still take out a mortgage covering more than 90% of the value of the property, the average LTV ratio of new mortgages is decreasing. The decrease is partly due to households' increased savings during the pandemic and the additional capital that is allocated to in the housing market – as a result of the search for relatively secure returns – but also the available home equity as a result

of price rises when moving home or switching mortgage. The average LTV, particularly among first-time buyers (86%), nevertheless remains high, and a large proportion of Dutch households are still borrowing more than 90% of the value of their home (see Figure 10).

Tax subsidies for the debt financing of homes also push prices higher. Although tax deductibility of mortgage interest is being partly phased out, from a tax perspective mortgage loans remain an attractive means of financing an owner-occupied home. Homeowners also pay hardly any wealth tax on the unencumbered part of their home, which means capital accumulated in a home is taxed less than savings or investments. Schemes introduced by the government to give first-time buyers greater opportunities in the housing market are mainly having an adverse effect, such as the introduction of a one-off zero rate on transfer tax for first-time buyers aged 18 to 35 and the increased exemption from gift tax for purchasing a home.

The supply side of the housing market is also characterised by persistent scarcity, amplifying the strong rise in prices. The number of homes on the market has been decreasing for some time, while the number of transactions has been fluctuating around the average of the last five years. The supply of homes in the Netherlands is consequently drying up: according to the NVM estate agents' association, the third quarter of 2021 saw the lowest number of homes for sale in the Netherlands since records began in 1995. The average time to sell in the second quarter of 2021 was very short at 23 days, and almost 80% of homes were sold above the asking price. The housing shortage decreased slightly over the past year from 4.2% to 3.5% of the housing stock due to lower demographic growth resulting from the COVID-19 pandemic and an increase in housing production. The shortage is nevertheless initially expected to increase again in the years ahead (Ministry of the Interior and Kingdom Relations, 2021).

The strong house price rises have further reduced the affordability of an owner-occupied home for Dutch households. As a result of the rapid rise in house prices the average financing expenses (net interest and repayments) for a home purchase increased considerably faster than households' disposable income. Whereas the financing costs of a fully annuity-based mortgage on an owner-occupied home in the major cities had for a long time been above the previous peak before the 2008 housing market crisis, this has recently been the case across practically the whole of the Netherlands. Financial pressure has increased particularly on first-time buyers. In 2013 a first-time buyer's financing costs, including repayment, for a fully annuity-based loan were 27% higher than the same mortgage for an existing homeowner. In the second quarter of 2021 these costs for first-time buyers were 57% higher. The difference in affordability between younger and older homeowners has therefore widened because households that purchased a home before 2013 are still entitled to deduct mortgage interest on their interest-only loans.

Homebuyers are also taking greater risk by more often borrowing close to the maximum amount relative to their income. In particular the proportion of first-time buyers borrowing above 90% of the maximum amount under the income test, also referred to as loan-to-income has risen substantially in recent months (see Figure 11). Households can also borrow larger amounts with the same income due to the fall in mortgage interest rates. As a result, 52% of first-time buyers and 42% of existing homeowners are currently taking out mortgages exceeding 450% of their gross annual income, compared to 31% of first-time buyers and existing homeowners at the end of 2018. Such high debt-to-income ratios pose a financial risk to households – and hence to their mortgage lenders – if their disposable income unexpectedly decreases. The flexibilisation of the labour market also represents a risk, since fewer households have the certainty of a

fixed income. Households can also get into financial difficulty if the fixed-interest period has expired, the debt has not been fully repaid and the mortgage interest rate has risen. In such a case, as mortgage interest rates rise, a household might no longer be able to borrow the outstanding debt amount or monthly costs may well increase, possibly substantially, after refinancing.

Households with a short fixed-interest period or a variable interest rate are particularly vulnerable to refinancing risks. Dutch households are on average opting for increasingly long fixed-interest periods, however. 57% of new mortgages have a fixed-interest period of more than 10 years (see Figure 12) and the average period in mid-2021 was almost 15 years, which represents a doubling compared to 2013. A longer fixed-interest period gives households a longer period of certainty about the monthly mortgage costs and reduces the risk of negative equity in standard-repayment mortgages due to the steady reduction in the residual debt.

In addition, after many years of decreases, interest-only mortgages have gained in popularity again recently. In 2013 the mortgage interest deduction for new mortgages was limited to linear and annuity-based mortgages with full repayment in 30 years. Together with the introduction of the Code of Conduct for Mortgage Financing of the Dutch Banking Association and the Dutch Association of Insurers in 2011 – which limited the interest-only portion of new mortgages to a maximum of 50% of the home value – this led to a reduction in the share of interest-only mortgage debt. Since the beginning of 2020, however, this share of new mortgages, including switching, has stabilised between 35% and 40% and rose in the second quarter of 2021 to 41% (Figure 13). In general interest-only mortgages are still less popular among younger households and are being taken out particularly by older existing homeowners. Since interest on mortgage debt entered into before 2013 is fully deductible, regardless of whether it is being repaid, existing homeowners and mortgage switchers generally take out a substantial portion of interest-only debt in a new mortgage contract. But even in the case of households below the age of 35 the proportion of interest-only debt has risen slightly this year. Rising house prices, deteriorating affordability and lower interest rates may make the lower monthly costs of partly interest-only borrowing more manageable. The renewed attractiveness of interest-only borrowing is slowing the decrease in total outstanding interest-only debt, which in the case of bank mortgage lenders went down from 59% at the end of 2013 to 44% in the second quarter of 2021. If every future homeowner were to take advantage of the maximum permitted interest-only portion, interest-only mortgage debt could even increase again.

The renewed attractiveness of interest-only borrowing entails vulnerabilities. The lower monthly cost of interest-free mortgages may prompt households to borrow larger amounts so as to have more spending capacity in the tight, expensive market. In this way they incur greater risk, however. As their loan expires, households may be confronted with higher mortgage costs, at a time when their income may have decreased, for example due to retirement. The Financial Stability Committee previously drew attention to the risks of interest-only borrowing and called on households and lenders to take a targeted approach in order to curb the risks. We additionally highlighted the desirability of limiting interest-only mortgage debt where possible. The financial sector then launched the 'happy to repay' (aflossingsblij) campaign to urge interest-only mortgage customers to consider their financial future. The current low mortgage interest rates provide an excellent opportunity for households with a relatively old mortgage and hence probably higher mortgage interest to take advantage of the lower monthly mortgage costs when switching mortgages in order to turn interest-only debt into an annuity-based loan. **Dutch households and financial institutions remain**

vulnerable to a price correction in the housing market. The high level of debt, relative both to households income and property value, and the large proportion of interest-only mortgage debt makes Dutch households vulnerable to a downward price correction in the housing market. With total debt of 100% of GDP – almost 95% of which is mortgage debt – Dutch households have the highest debt position in Europe after Danish households (109%).[6] If house prices fall, the value of their collateral, and hence their equity, will also fall, which in the case of Dutch households still relatively quickly leads to residual debt.

Any price correction in the housing market would also particularly have an indirect impact on financial institutions. An actual or expected fall in house prices would lead relatively quickly to a drop in consumption as a result of declining consumer confidence. Uncertainty about future monthly mortgage costs, for example after the end of a fixed-interest period, and possible negative equity would be key factors. A decrease in consumption caused by a house price correction would thus also have an indirect negative impact on financial institutions due to lower economic growth and rising unemployment.

With effect from 1 January 2022 we are introducing the previously announced floor for the risk weighting of mortgages. This measure remains important, because banks are failing to take sufficient account of the above-mentioned systemic housing market risks in the risk weighting of mortgage loans. The strong price rises have resulted in further decreases in risk weights among bank mortgage lenders through lower loan-to-value ratios. At the same time, households' borrowing behaviour has become riskier and overheating in the market has increased further. In our Spring 2021 FSR, we announced that we would introduce the floor for the risk weighting of mortgage loans with effect from 1 January 2022, provided the economic recovery continued. Since that condition has now been fulfilled, we have decided to definitively introduce the measure. The total capital impact of the measure currently amounts to around €5.3 billion, but that figure may change when it comes into force. The measure requires banks to hold a certain minimum capital for their mortgage portfolios so that they are better able to absorb the consequences of any correction in the housing market.

Commercial real estate

Compared to the housing market, the Dutch commercial real estate market has been hit hard by the coronavirus pandemic, although parts of the market have already fully recovered. Even before the outbreak of the coronavirus pandemic there were concerns about valuations of commercial real estate due to a growing trend towards homeworking and online shopping. The pandemic has accelerated this trend – due to the introduction of containment measures and lockdowns – and thus weighed on demand for retail premises and offices. While demand for industrial real estate had already recovered a few months after the pandemic, demand for offices and retail premises remains low, even though investors are expecting a slight recovery. The differences in demand are also reflected in divergent price trends between market segments. Whereas the average price of Dutch commercial real estate has held fairly steady over the last six months, prices of offices and retail premises have lagged behind. Investors in these segments have proved more reticent, partly because these are the segments that have suffered the greatest impact and uncertainty of the coronavirus crisis.

6 Debt positions are as at the end of 2019. Subsequent positions were obscured by the sharp fall in GDP due to the coronavirus pandemic.

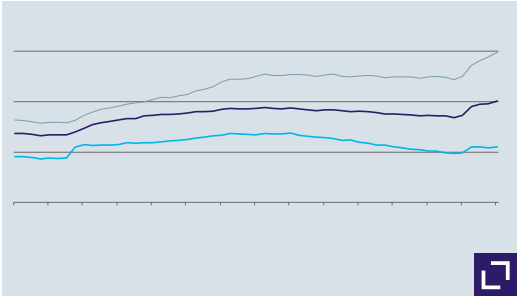
Investments in the market as a whole have nevertheless been disappointing since the beginning of this year. €21 billion in investments in commercial real estate were expected in 2021, but in the first half of the year less than €5 billion was actually invested. This may be partly due to the increase in transfer tax on commercial real estate from 6% to 8% on 1 January 2021, which may have prompted investors to bring forward some of their investments, partly cushioning a decline in investment due to the coronavirus pandemic outbreak in 2020.

Dutch banks, insurers and pension funds are resilient to a price correction in the CRE market. Earlier this year we analysed the risks posed by commercial real estate to the Dutch financial sector on the basis of a stress test of banks, insurers and pension funds. The results show that operators in the sector are resilient to a price shock in the CRE portfolio (see Box 2 of the Spring 2021 FSR).

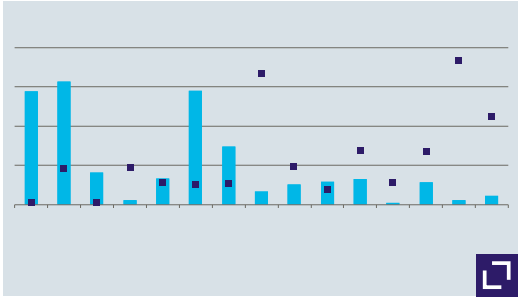
Risk map

Notes: The risk map presents a schematic overview of the main risks to financial stability. The size of the circles reflects the magnitude of risk. The colour of the circles reflects whether, viewed over the medium term, a risk sharply increases (red), moderately increases (yellow) or remains unchanged (grey).

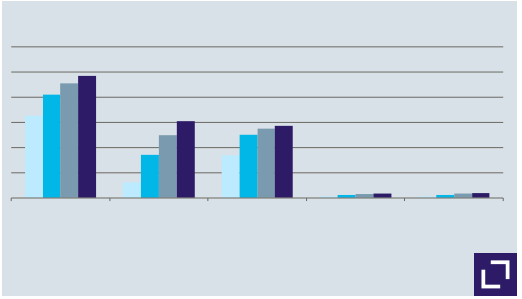
Figures



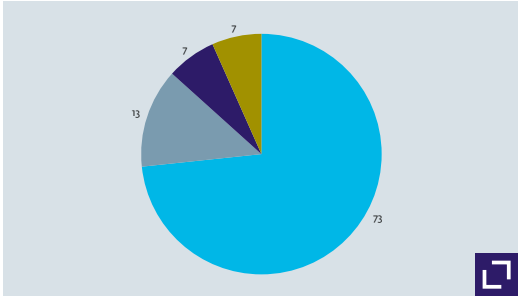
European governments' debts have increased sharply since the outbreak of the pandemic
See figure 1 →



Exposures and mitigation of solvency risks by sector
See figure 4 →

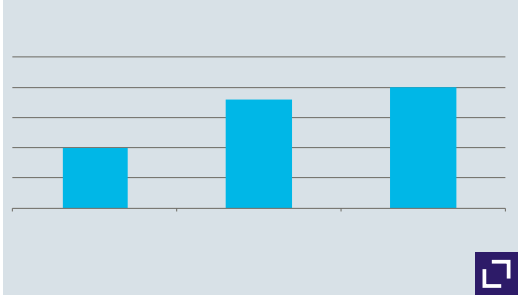


Public loan guarantee schemes have been used particularly by companies and banks in southern Europe
See figure 2 →



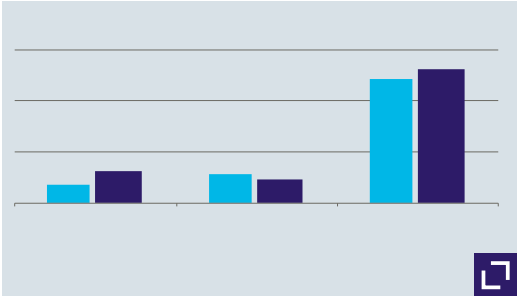
Cyberattacks by type
See figure 5 →

Impact on Dutch banks' capital positions
See figure 3 →

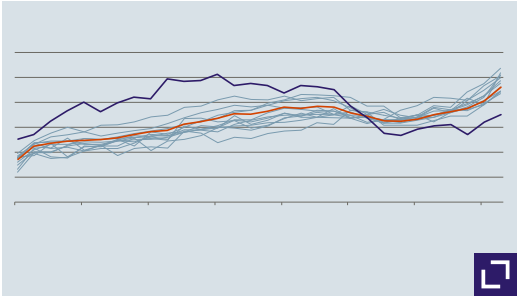


Increase in the number of cyberattacks since 2018
See figure 6 →

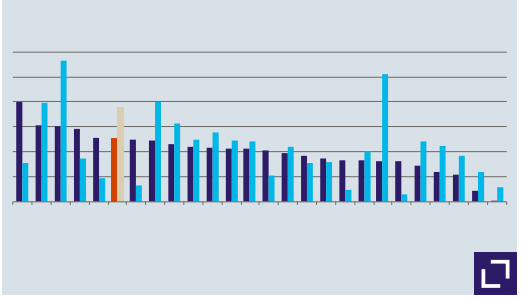
Figures



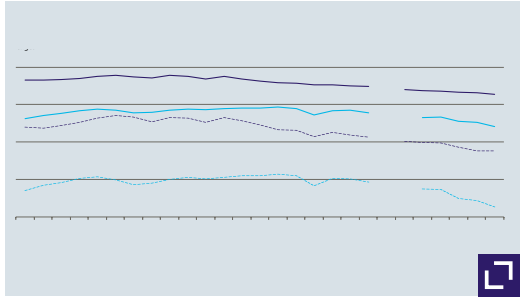
Cyberlosses as a percentage of income and operational losses
See figure 7 →



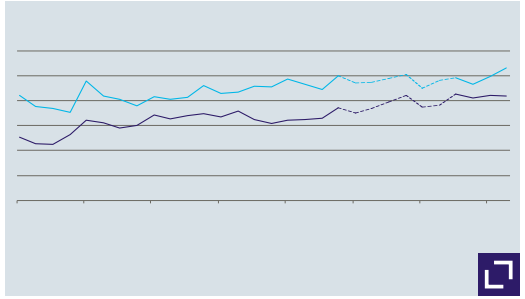
The high house price rises started in Amsterdam, but the rest of the Netherlands has been catching up
See figure 8 →



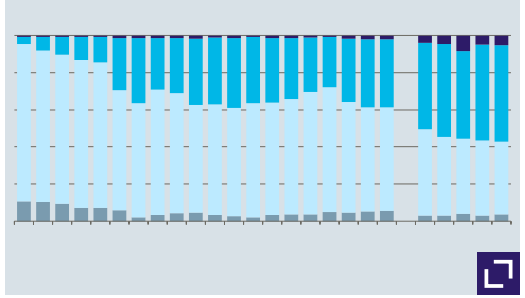
House prices rose faster in the Netherlands than in most European countries, but the European average is also high
See figure 9 →



The average loan-to-value ratio is continuing to fall in the case of new mortgages, but it remains high
See figure 10 →



The percentage of new mortgages with an LTI above 90% of the limit continues to rise, particularly among first-time buyers
See figure 11 →



Mortgage borrowers are increasingly opting for a fixed-interest period of more than 10 years
See figure 12 →

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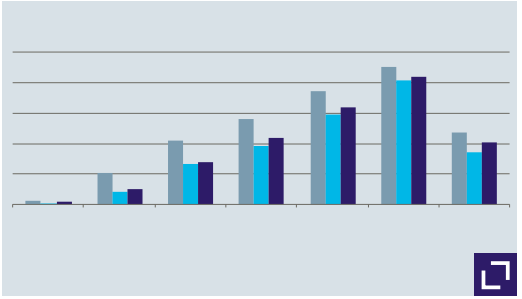
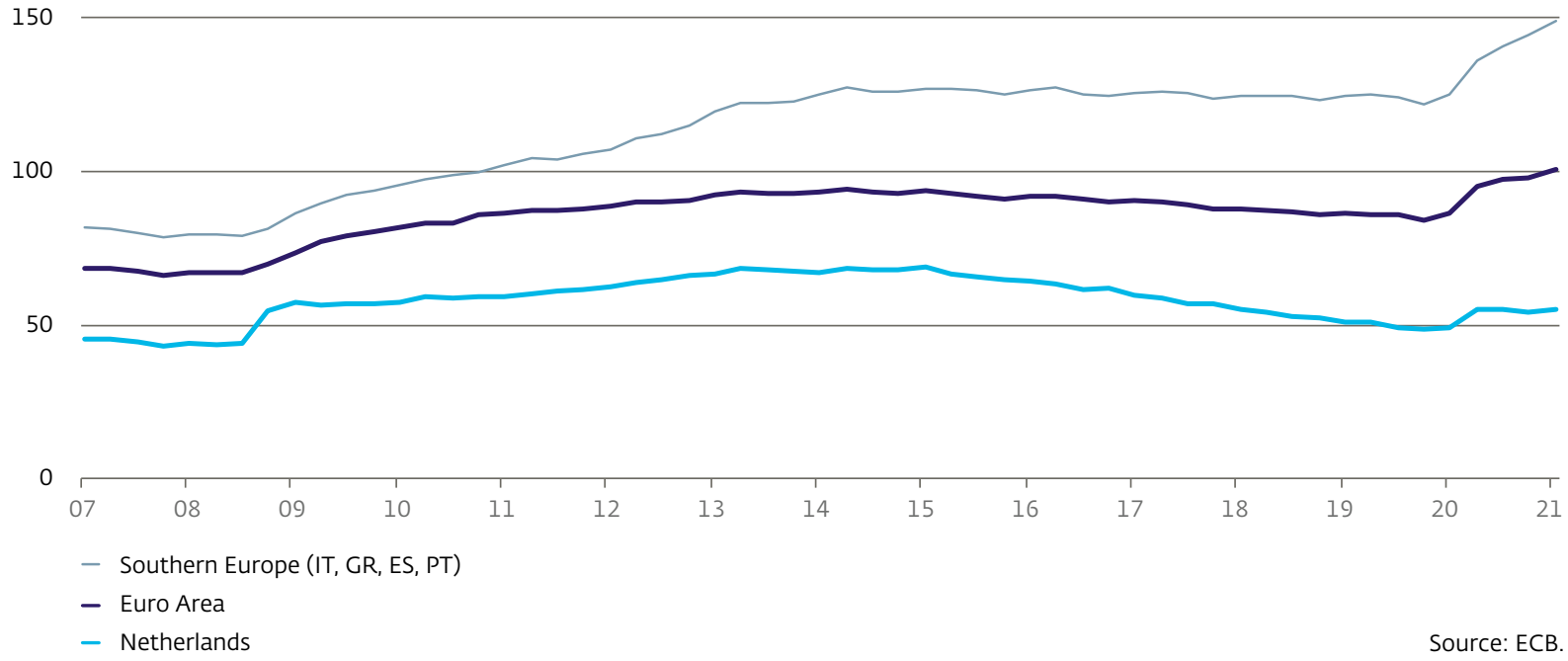


The proportion of interest-only debt is increasing in the case of new mortgages, including switching, among all age groups, but particularly among older people

See figure 13 →

Figure 1 European governments' debts have increased sharply since the outbreak of the pandemic

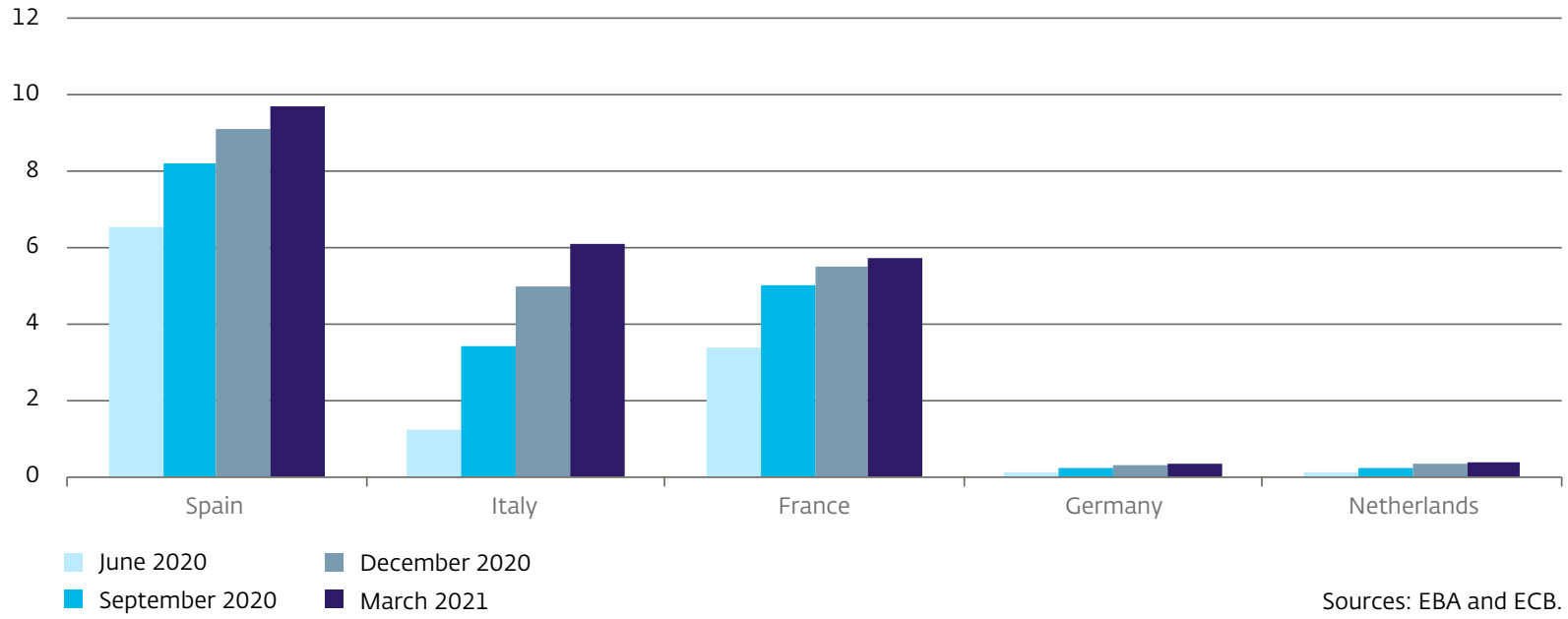
Percentage of GDP



Source: ECB.

Figure 2 Public loan guarantee schemes have been used particularly by companies and banks in southern Europe

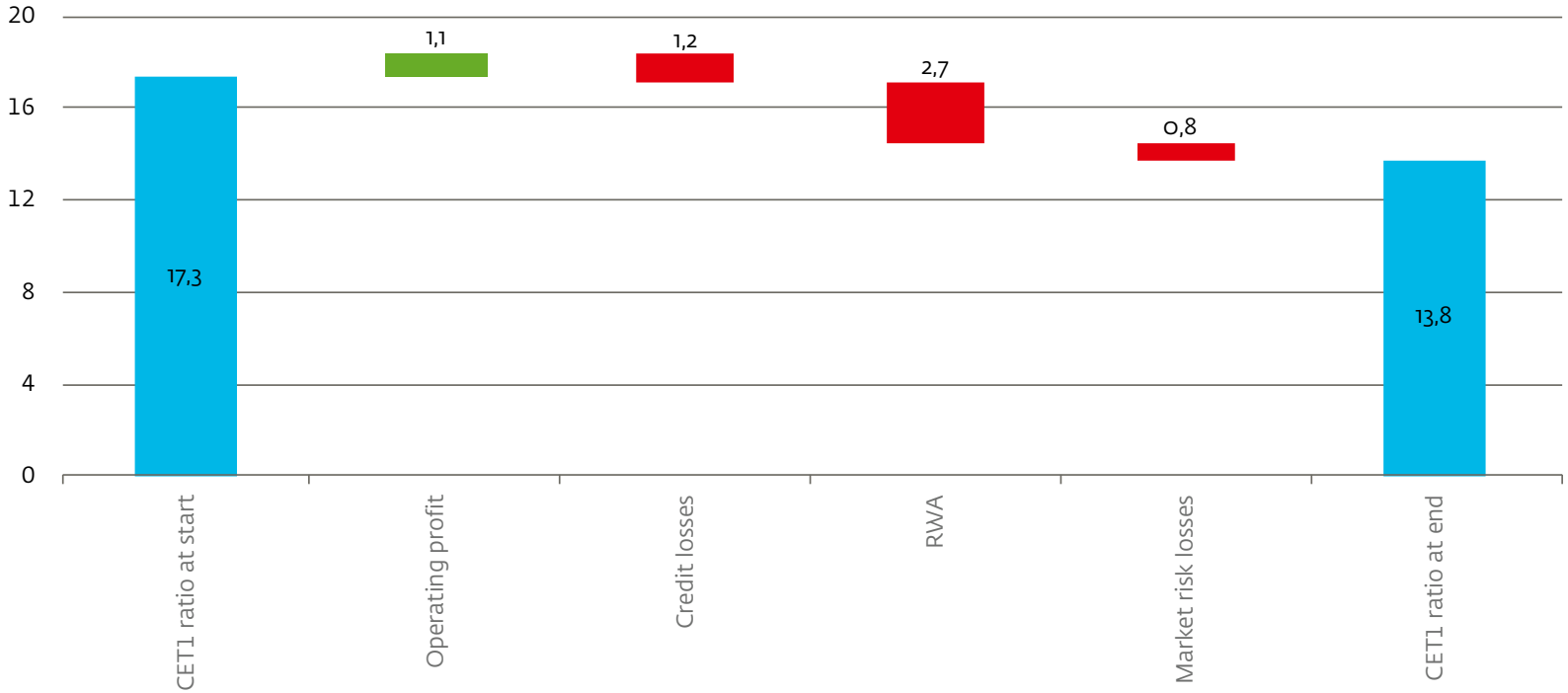
Percentage of GDP



Sources: EBA and ECB.

Figure 3 Impact on Dutch banks' capital positions

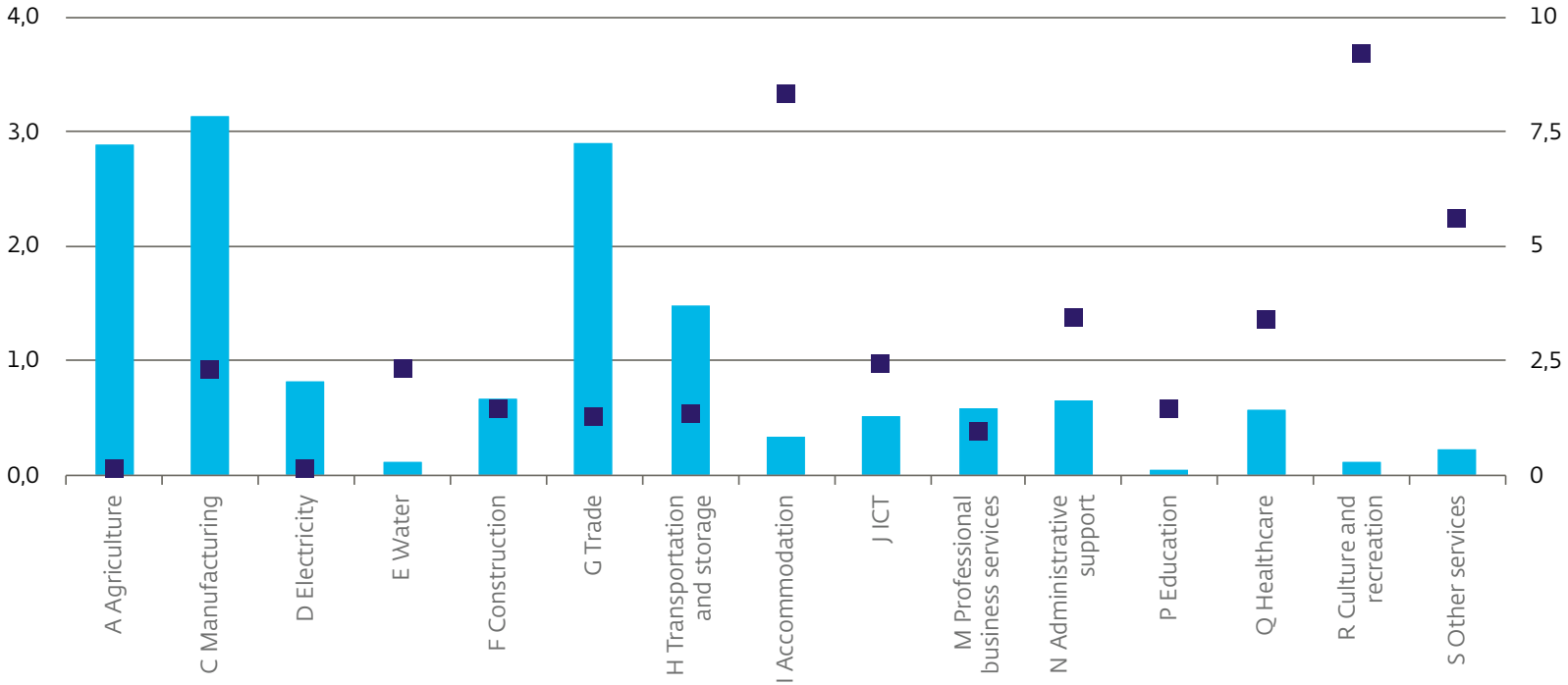
Percentage of risk-weighted assets



Source: DNB.

Figure 4 Exposures and mitigation of solvency risks by sector

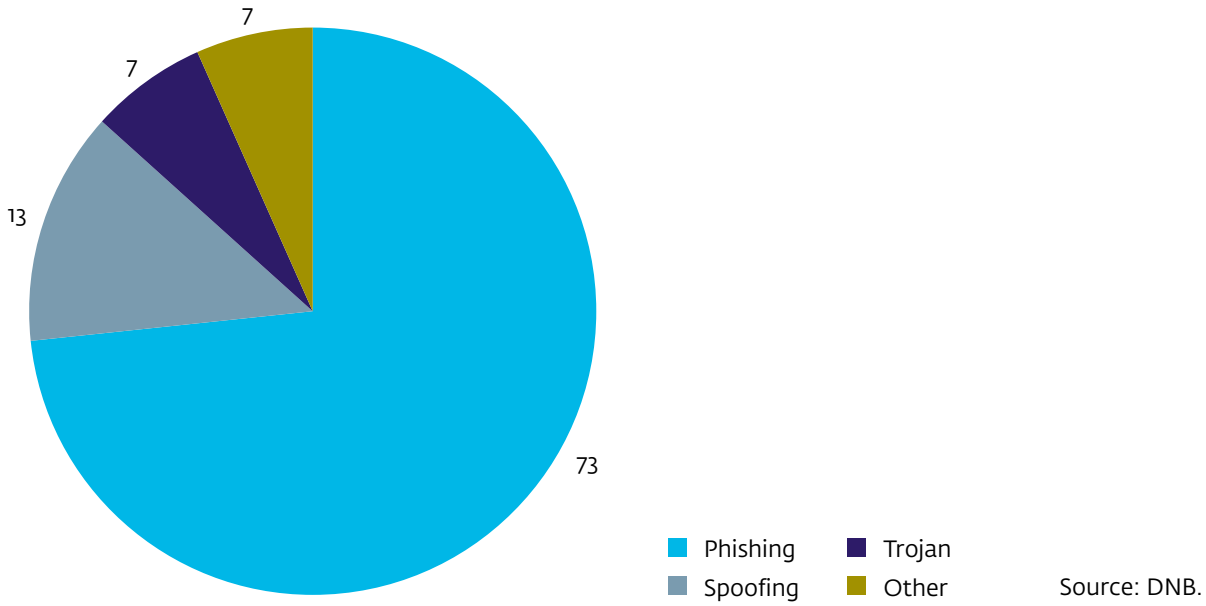
Percentages



Source: DNB.

Figure 5 Cyberattacks by type

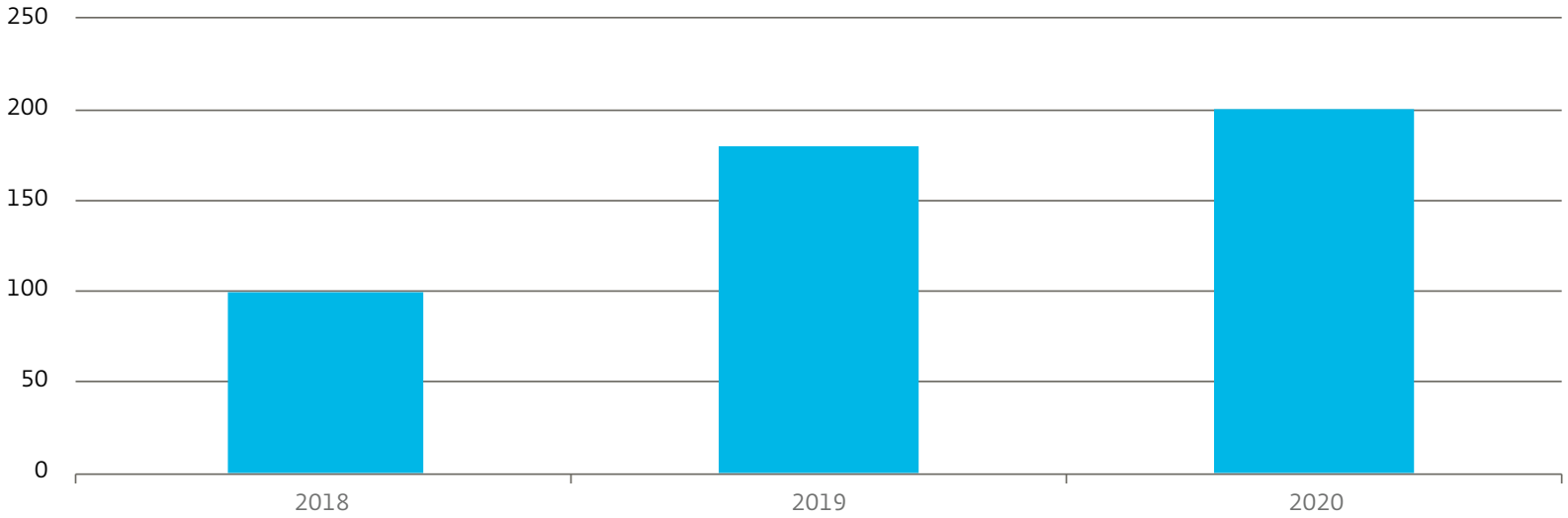
Percentages



Source: DNB.

Figure 6 Increase in the number of cyberattacks since 2018

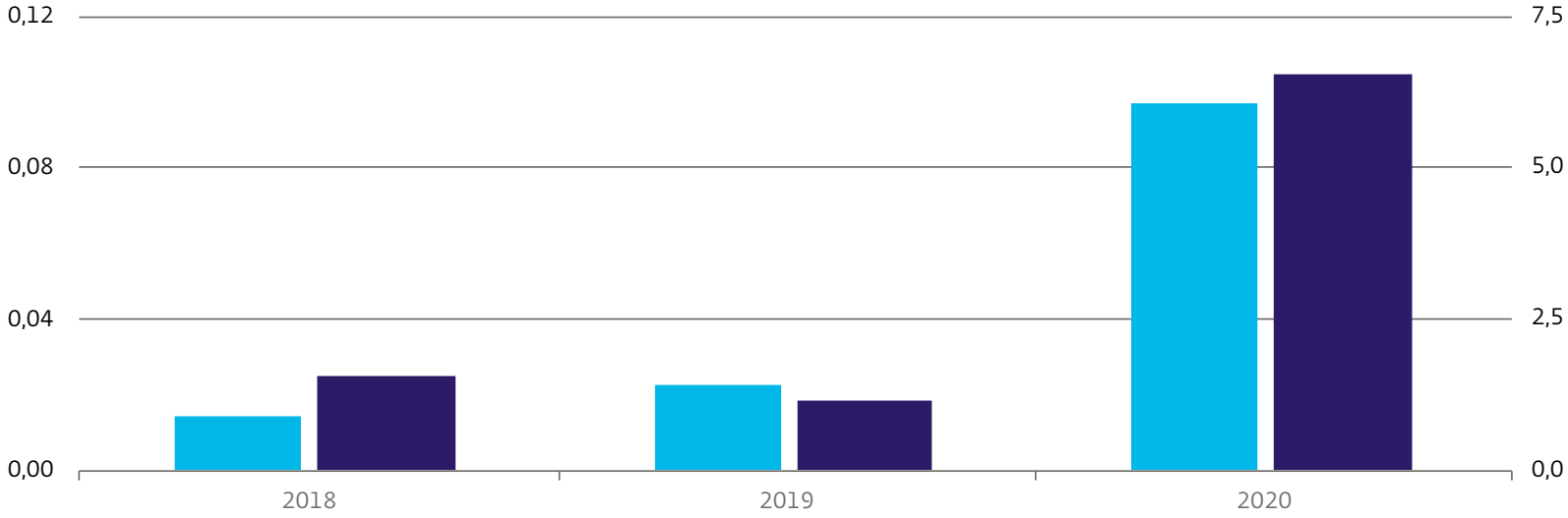
Index 2018=100



Source: DNB.

Figure 7 Cyberlosses as a percentage of income and operational losses

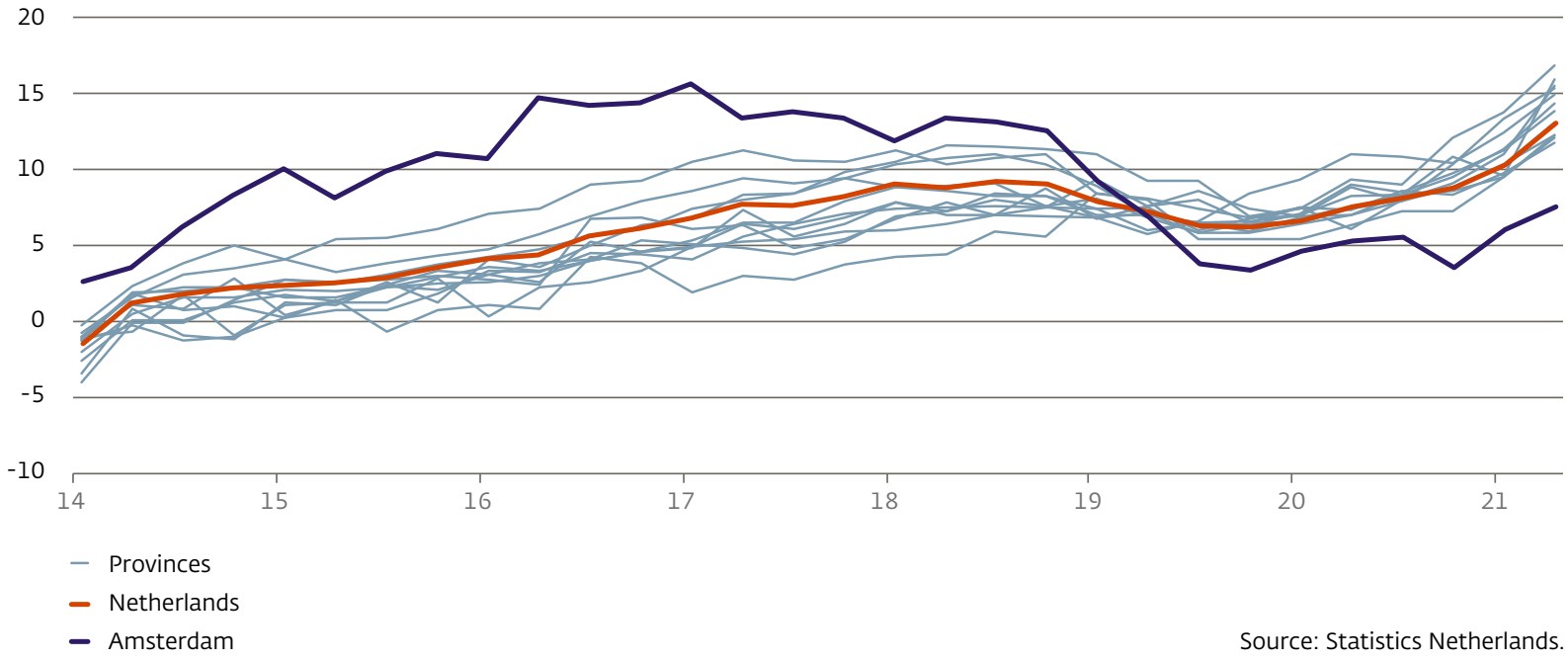
Percentages



Source: DNB.

Figure 8 The high house price rises started in Amsterdam, but the rest of the Netherlands has been catching up

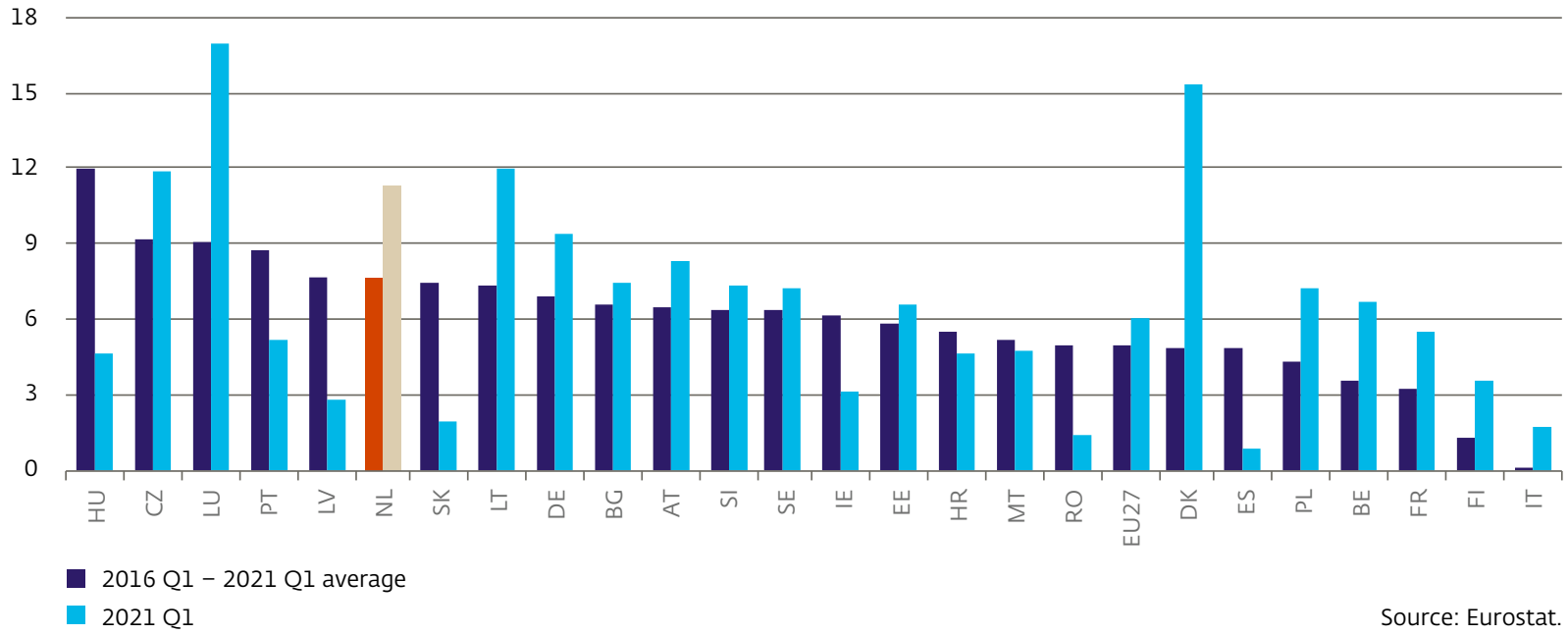
Percentage change per year



Source: Statistics Netherlands.

Figure 9 House prices rose faster in the Netherlands than in most European countries, but the European average is also high

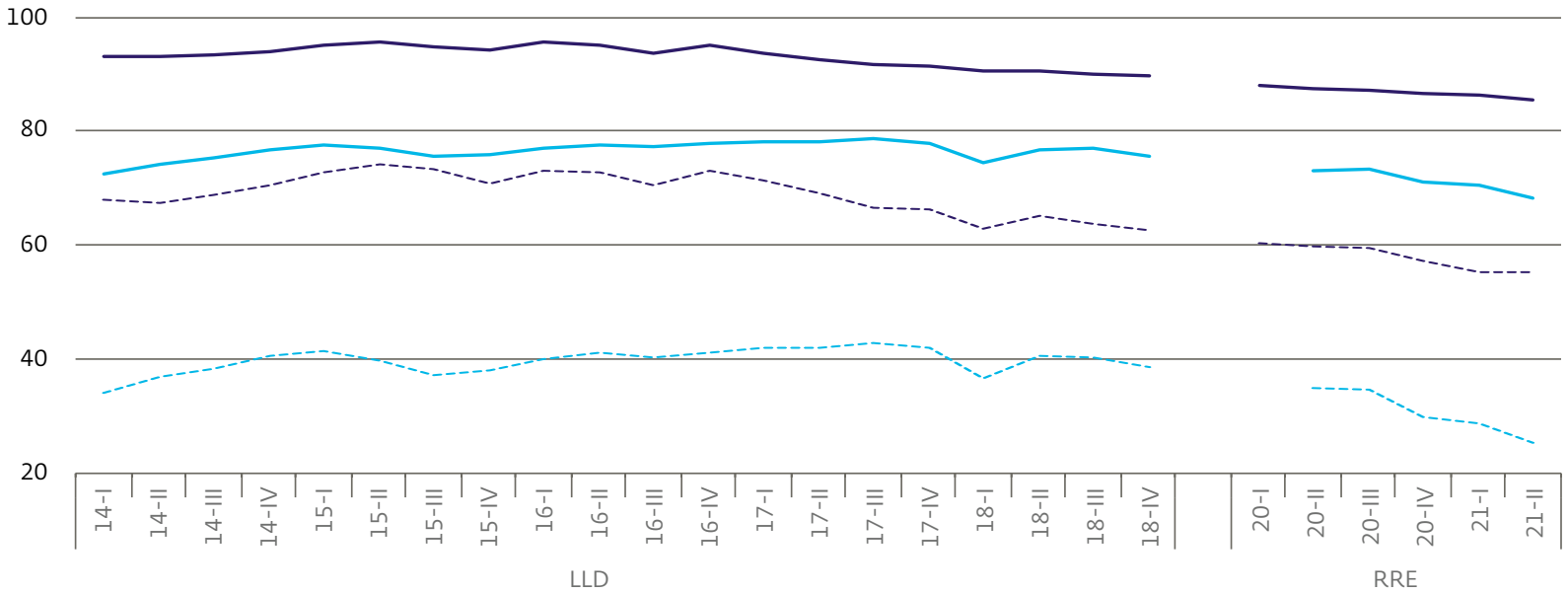
Percentage change per year



Source: Eurostat.

Figure 10 The average loan-to-value ratio is continuing to fall in the case of new mortgages, but it remains high

Percentages

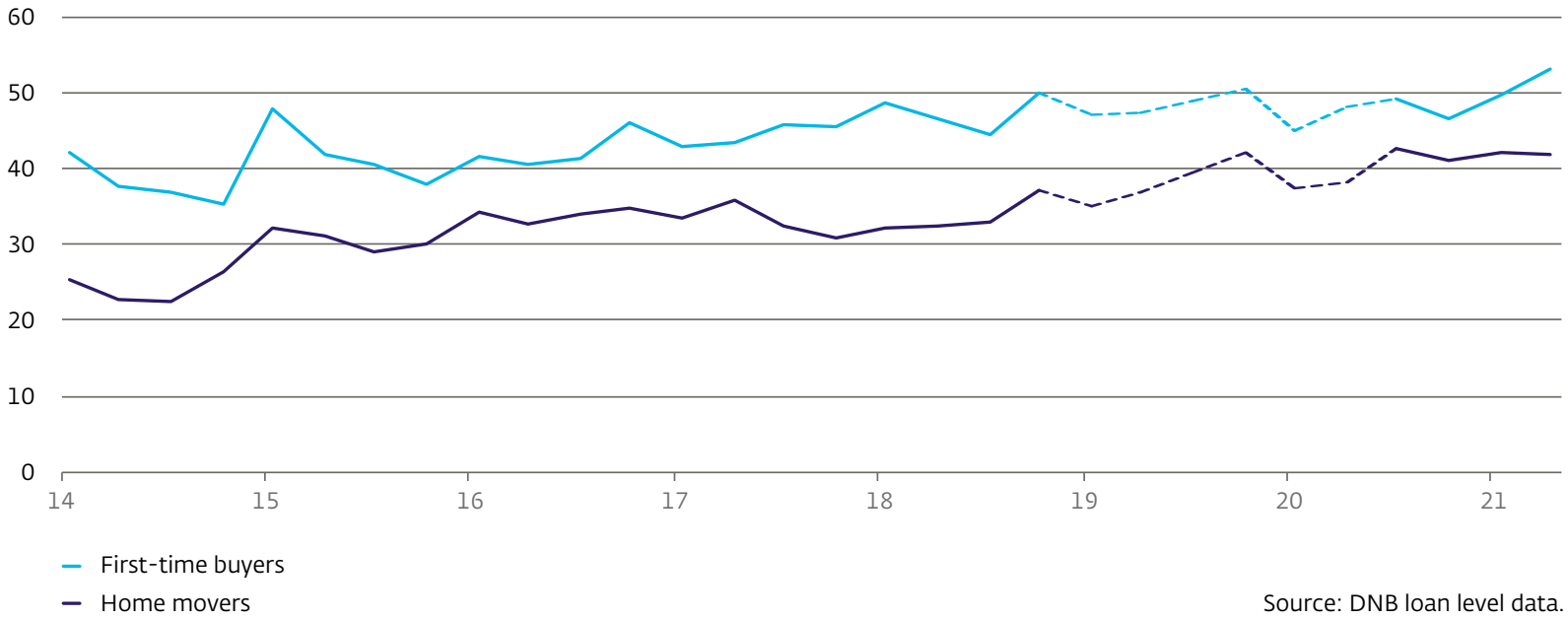


Source: DNB loan level data.

Notes: LLD (until 2018Q4) and RRE (from 2019Q1) are two different data collections with loan level data. Due to data quality issues, it is not yet possible to generate reliable numbers for 2019.

Figure 11 The percentage of new mortgages with an LTI above 90% of the limit continues to rise, particularly among first-time buyers

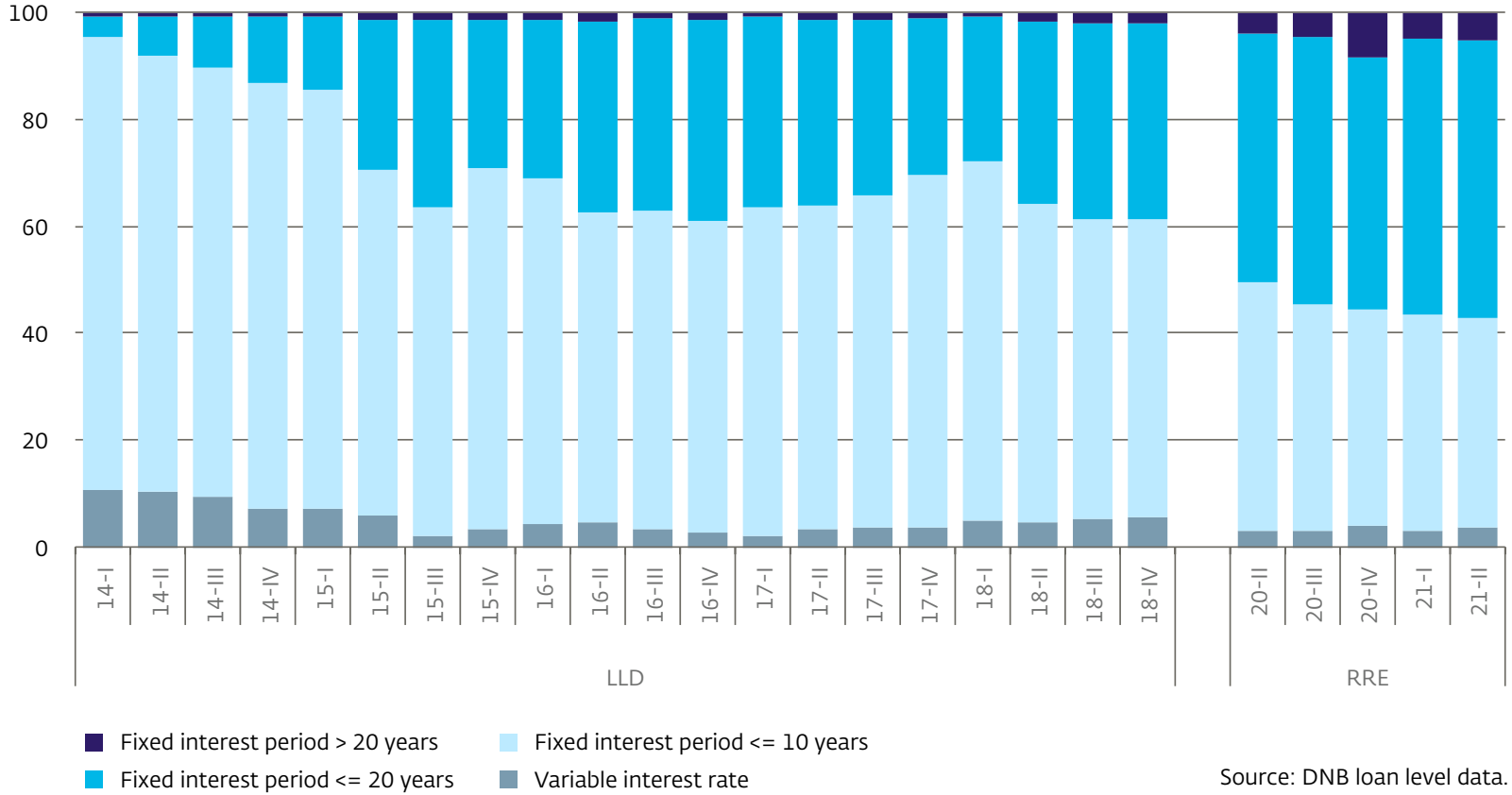
Percentages



Source: DNB loan level data.

Figure 12 Mortgage borrowers are increasingly opting for a fixed-interest period of more than 10 years

Percentages

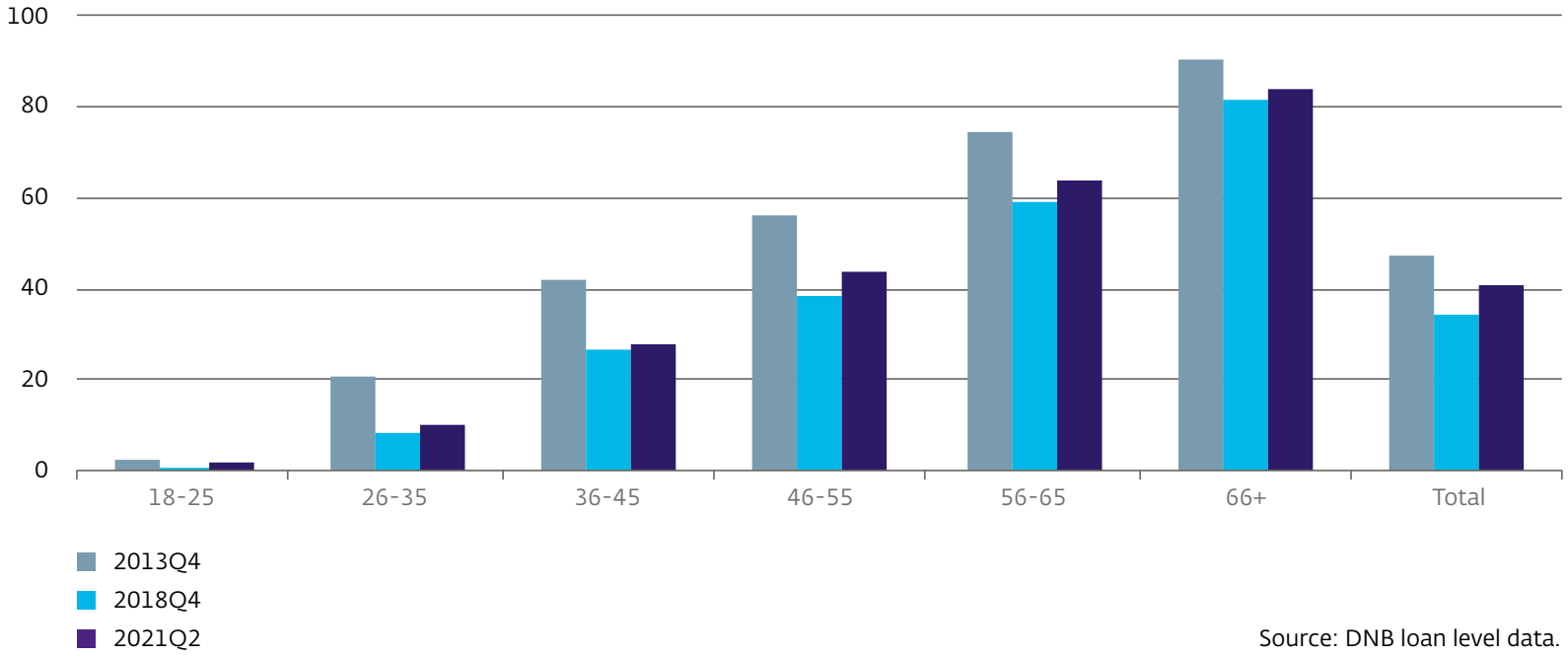


Source: DNB loan level data.

Notes: LLD (until 2018Q4) and RRE (from 2019Q1) are two different data collections with loan level data. Due to data quality issues, it is not yet possible to generate reliable numbers for 2019.

Figure 13 The proportion of interest-only debt is increasing in the case of new mortgages (including switching) among all age groups, but particularly among older people

Percentages



Source: DNB loan level data.

Search for yield and inflation risks in a low interest rate environment

Melanie Graswinckel, Marco van Hengel, Laura Izquierdo Rios and Ralph Verhoeks

Financial conditions have been accommodative for a protracted period and in such a low interest rate environment vulnerabilities can increasingly build up. Spurred on by low interest rates, investors and financial institutions are increasingly seeking yield from riskier investments. This search for yield is causing upward pressure on asset prices, a build-up of leverage and limited differentiation between risk classes. This makes financial markets vulnerable to a downturn in market sentiment, particularly if an unexpected shift occurs in the inflation trend and the level of interest rates. Current risky asset valuations are heavily reliant on the assumption that financial conditions will remain loose for a long time. Risks to financial stability can arise in the event of a sudden change in market expectations. This may lead to a shock adjustment in risky asset valuations and risk appetite among Structural reforms and macroprudential measures can help reduce vulnerabilities and increase the resilience of the financial system, and thus prevent shocks.

Various long-term trends have led to a fall in inflation around the world. Inflation has trended lower since the 1980s as a result of lower inflation expectations and structural changes in the economy. Due to a global savings surplus, low investment demand and lower potential growth, capital market interest rates have fallen (see also DNB (2020)). In this low inflation environment the ECB has lowered its main policy interest rate in recent years to -0.5%.

The ECB – partly in response to the European debt crisis and the coronavirus crisis – has also taken additional measures to keep financial conditions accommodative. This low interest rate environment has led to major shifts in financial markets.

Search for yield

The loose financial conditions have spurred a search for yield for several years.[7] The downward trend in risk-free interest rates makes it increasingly challenging for investors to achieve high returns. Only 9% of bonds worldwide are currently trading at a yield of more than 2% (Figure 14). In response, investors are switching their portfolios to riskier assets such as equities and alternative investments or extending the term of their investments. The growing market for leveraged loans, the continued falls in risk premiums on risky corporate bonds and high price/earnings ratios in equity markets illustrate investors' high risk appetite, which high risk appetite has returned following the rebound in financial conditions since the market correction in the spring of 2020. Despite the remaining economic uncertainties, risky asset prices have risen almost constantly since the spring of 2020.

The search for yield is driving up equity valuations. Since the low point in March 2020 prices have risen sharply in the United States (+99% based on S&P 500) and Europe (+74% based on Eurostoxx 50). Valuation

7 See also previous issues of our Financial Stability Report.

benchmarks are at historically high levels, particularly in the United States (Figure 15). Low interest rates play an important role in this regard (Box 3 'Persistently low interest rates and equity valuations'). The search for yield in equity markets is also evident in other indicators. For example, 2021 has so far seen 2,280 initial public offerings (IPOs) with a total value of $481 billion. That is already more than in the whole of 2020 (1,830 IPOs worth $370 billion). In addition, particularly in the first half of this year, there were a large number of IPOs of so-called Special Purpose Acquisition Vehicles (SPACs). A SPAC is a means of raising capital through a stock market listing in order to acquire businesses in the future, without investors knowing in advance which business they will invest in. 526 SPACs have raised $134 billion, already exceeding the record year of 2020, when 298 SPACs raised $84 billion.

Box 3 Persistently low interest rates and equity valuations

Kasper Goosen and Meilina Hoogland

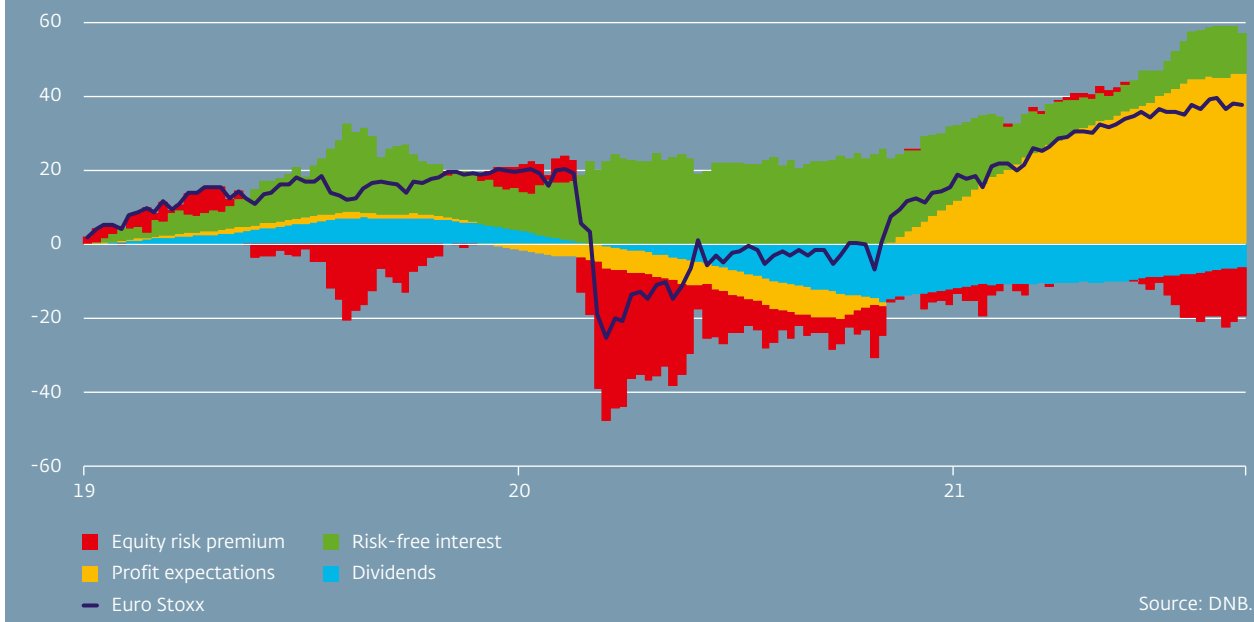
Financial products are generally valued on the basis of the present value of expected future cash flows. In the case of shares in listed companies, these are the dividends distributed, so the present value of a share is equal to the current value of future expected dividends. The discount rate used to calculate the current value consists of the risk-free interest rate plus a risk premium. The risk premium is remuneration for the fact that the value of future dividends is inherently uncertain.

The decrease in the risk-free interest rate plays an important role in the higher valuation of equities through the present value of cash flows. All things being equal, the present value of a future cash flow increases as interest rates decrease. As the interest rate comes closer to zero, this connection becomes non-linear: the value of a share then increases more in the event of a fall in interest rates than it decreases in the event of a rise in interest rates. The effect of an interest rate decrease on the present value is also greater for cash flows lying further in the future. This means that the value of companies with a good growth outlook – in recent years usually technology companies – increases more in the event of a fall in interest rates than that of companies with stable profits but a lower long-term growth outlook.

We can explain the influence of interest rates and other factors on the European equity market using a dividend discount model (see Figure 16). This model (for an explanation see Spring 2021 FSR) shows that the fall in interest rates during the period from 2019 to date has had an overall positive effect on share prices. Recently the risk-free interest rate has risen again slightly, so the positive impact on share prices has levelled off. This is more than offset, however, by the higher earnings outlook related to the strong economic recovery. Low interest rates play also a role here, even if only indirectly, since monetary policy also supports the economic recovery by keeping financing conditions accommodative. In general these indirect effects are less clear-cut, however. For example, monetary stimulus can have a positive effect on the growth outlook, and hence on the earnings outlook for companies, through lower interest rates. At the same time persistently low interest rates are the result of the low growth and inflation environment, which makes it more difficult for companies to generate more profit. Finally, low interest rates also play a role outside the valuation channel described above. A persistently low risk-free interest rate can incentivise investors to switch to higher-yielding but riskier financial products such as equities or corporate bonds.

Figure 16 European share prices primarily driven by low interest rates and higher growth expectations

Percentages; cumulative effect of the four factors on Euro Stoxx prices, based on a three-period dividend discount model



Source: DNB.

The risk premiums on risky bonds have fallen sharply, and high-yield bond issuance is at an all-time high. Compensation for credit risk is mostly back below the pre-coronavirus crisis level. The risk premiums on corporate bonds are benefiting from the improved economic outlook and reduced likelihood of bankruptcies. The supportive monetary policy is also playing an important role. The differentiation between risk classes, for example in terms of rating, has decreased sharply, as is evidenced by the narrowing of spreads in the bond markets. High-yield bond issuance in the euro area is headed for record levels in 2021 and in relative terms, too, the issuance of lower-rated corporate bonds is at the highest level since the financial crisis (Figure 17): 86% of issuance in the first half of 2021 had a rating of BBB or lower.

There are also indications that the degree of leverage in the financial system has increased. It is difficult to gain a complete picture of the degree of leverage, mainly because the use of leveraged finance by non-bank market participants sometimes falls outside the scope of regulated supervisory reporting. It is nevertheless clear that the market for leveraged loans has continued to grow. The issuance of leveraged loans set a new record in Europe in the first half of 2021 (Fitch, 2021). In addition to high issuance, there was a further easing of lending conditions. In the United

States, 85% of leveraged loans currently consist of covenant lite loans, which are loans that offer investors fewer guarantees and allow greater leverage (S&P, 2021). Leveraged loans are often securitised through collateralised loan obligations (CLOs), in which loans are bundled as marketable securities with a wide array of risk and return profiles. The Bank of England estimates that new CLO issuance is currently 35% to 50% higher than the average over the past five years, also with a further easing of lending conditions. Although no systemic risks arose in this area, the Archegos case illustrates the potential consequences of high leverage.

In a persistently low interest rate environment financial institutions are also incentivised to search for yield by investing in riskier assets. Low interest rates have a negative effect on the income of financial institutions, since both the investment returns and interest margin fall. This results in lower income with which to meet the same, or increasing, liabilities, with a negative impact on the institution's profitability and resilience. This is particularly relevant to pension funds and insurers: with their long-term obligations and a maturity mismatch between assets and liabilities they are sensitive to a low interest rate environment. Institutions that have issued guarantees or committed to certain returns are particularly vulnerable, because persistently low income means a greater likelihood that returns will not be sufficient to cover the guarantees. Financial institutions are consequently incentivised to seek higher returns from riskier asset classes (Box 4: 'Dutch institutional investors in search of yield').

Box 4: Dutch institutional investors in search of yield

Low interest rates are prompting institutional investors to search for yield. A low interest rate environment makes it more difficult for pension funds and insurers to generate the investment returns necessary to meet current and future liabilities. This creates incentives for risk-seeking behaviour. This is particularly true of life insurers, many of which offered their policyholders guaranteed returns in the past. The effect of the Ultimate Forward Rate also plays a role here: without sufficient returns above the risk-free market interest rate, insurers see their Solvency II own funds decrease year after year. The UFR effect feeds through to the regulatory solvency ratio after a time lag. Insurers therefore need to earn back the UFR effect in order to maintain their buffers.

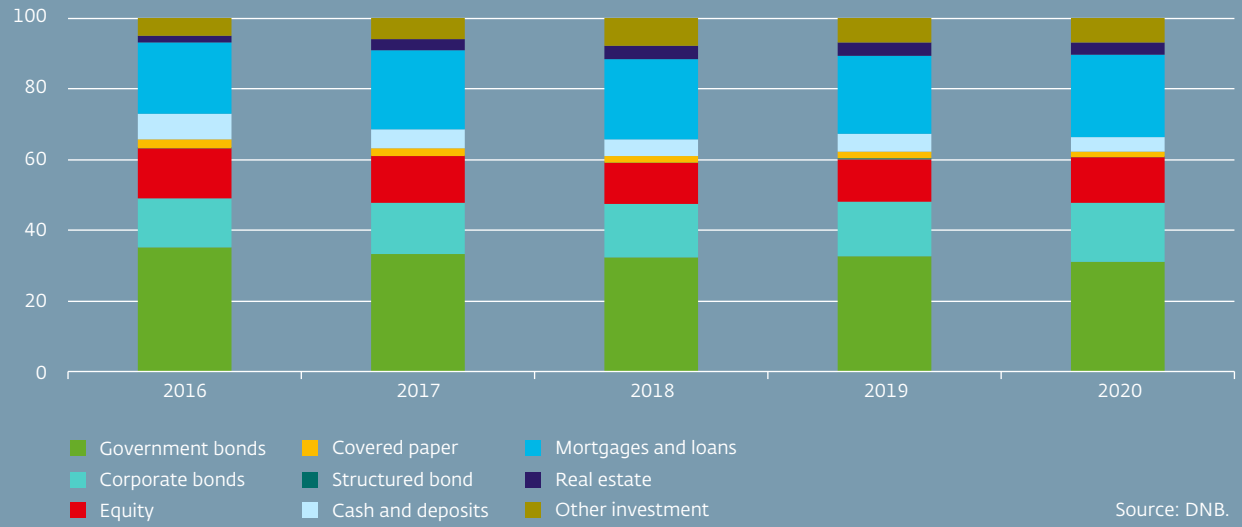
Life insurers have gradually adjusted their investment portfolios, switching out of government bonds and into investment categories with a higher risk profile (Figure 18). The government bond share of life insurers' total investment portfolio between the end of 2016 and the end of 2020 decreased from 35% to 31%. Insurers have shifted their investments towards more lucrative asset classes. Most prominent is the shift from government bonds to mortgages, as mortgages and loans rose from 20% to 23%. Insurers see higher-yielding mortgages as an alternative with a comparable risk profile, particularly where there are long fixed-interest periods and an NHG guarantee. This shift to higher-yielding assets can also be observed in the steady increase in alternative investments (real estate, infrastructure and private equity) since 2017. The overall picture shows a trend towards assets that are expected to generate higher returns and are less liquid.

Insurers' equity and bond portfolios show a shift to less creditworthy securities. The proportion of corporate bonds with high credit quality shows a gradual decline over the period from the end of 2016 to 2021Q2. For example, the proportion of corporate bonds with credit quality step 0 or 1 – equivalent to an AA rating or higher – fell from 18% to 11% for life insurers (see Figure 19). The equity portfolio shows a shift from developed countries to emerging markets.Figure 18. Indications of search for yield among insurers Percentages

Although pension funds' total investment allocation has not changed significantly, there has been a slight increase in alternative investments and a deterioration in credit quality. If we examine the allocation of assets since the introduction of the new financial supervision framework (nFTK), we see no significant changes in the pension sector's investment policies overall. The proportions of the main asset classes – government bonds, credit and equities – have remained stable. In relative terms, however, there have been substantial increases in the shares of alternative investments, from 4.5% in 2015 to 6.3% in the first quarter of 2021, and mortgages, from 2.2% to 4.3%. The increase in theallocation to mortgages is consistent

Figure 18 Indications of search for yield among insurers

Percentages

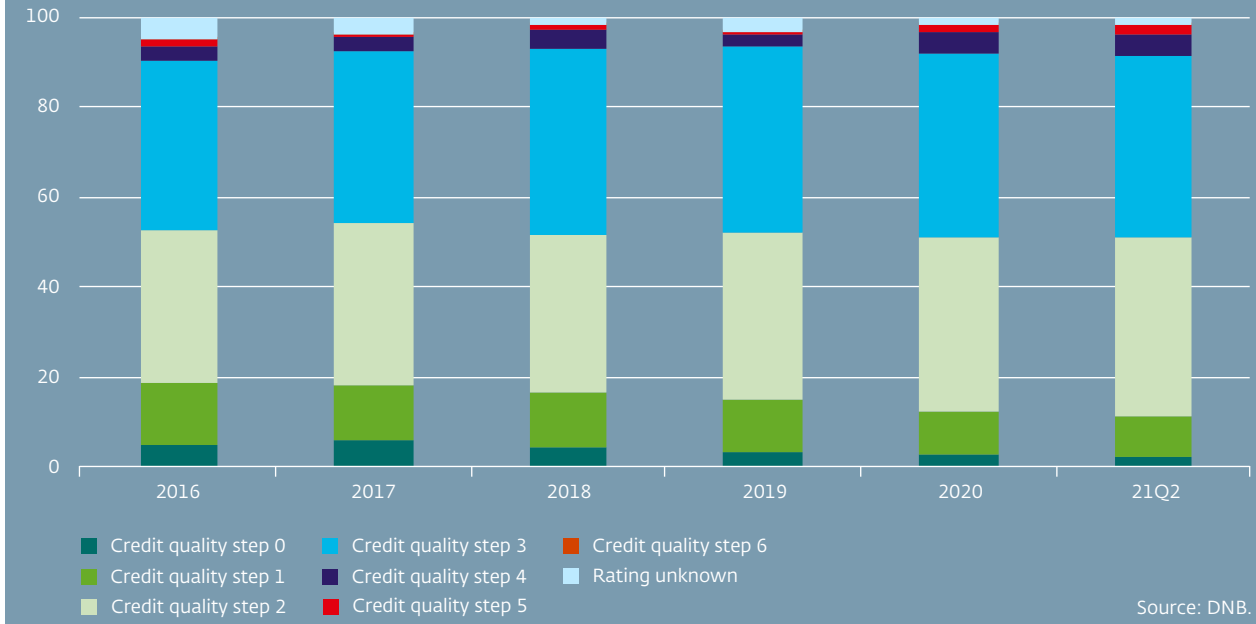


Source: DNB.

with the broader picture of institutional investors gaining market share from banks in the mortgage market, while the increase in alternative investments reflects greater exposure to infrastructure and private equity. The proportion of bonds with AAA or AA ratings decreased from 64% in 2015 to 58% in the first quarter of 2021. The proportion of bonds without an investment grade rating rose during the same period from 13% to 16%.

A search for yield is also evident among households and private investors. The number of private investors in the Netherlands rose by 11% to 1.6 million households in 2020 (AFM, 2021). This increase is linked to the lower returns on savings and higher household savings rates due to the coronavirus pandemic. The increase in speculative investments in cryptocurrencies is consistent with this picture. A growing number of people in the Netherlands hold bitcoin, most of them having purchased it this year.

Figure 19 Insurers holding lower-rated fixed-income securities
Percentages



Source: DNB.

Financial stability risks

Search for yield behaviour is also evident among households and private investors. The number of private investors in the Netherlands rose by 11% to 1.6 million households in 2020 (HYPERLINK "https://verslaggeving.afm.nl/trendzicht-2021/trendzicht-2021/" AFM, 2021). This increase is linked to the lower returns on savings and higher household savings rates due to the coronavirus pandemic. The increase in speculative investments in cryptocurrencies is consistent with this picture. A growing number of people in the Netherlands hold bitcoin, most of them having purchased it this year.

Search for yield leads to a build-up of leverage and liquidity risks, which in turn can increase the vulnerabilities in the financial system. Yield-seeking investors are replacing relatively secure assets with riskier assets that are often less liquid. If liquidity problems arise, fund investors may be forced to sell, for example to meet increased redemptions or liquidity management requirements. An investment fund manager may decide to suspend redemptions to prevent excessive redemptions and fire sales. The ECB notes, for example, that 215 investment funds, with net assets of €73.4 billion, suspended redemptions during the turbulent period in March 2020 (ECB, 2021). Many

of these funds had invested in illiquid assets – real estate or high-yield bonds – and used leverage. Liquidity problems can be exacerbated by the use of leverage, including synthetic leverage through derivatives, which can increase the need for liquidity due to higher margin calls under stress. That is a matter for concern, for example, for euro area bond funds, which hold the majority of the high-yield debt (ECB, 2021), particularly in the case of funds with an open-ended structure that can use leverage.[8]

Search for yield behaviour contributes to boom-and-bust cycles and financial instability. In boom times the search for yield pushes risky asset valuations higher. Conversely, search for yield is less likely during an economic downturn: investors look for safe havens and there is more incentive for a flight to quality. The ratings of high-risk bonds also become less stable, as the likelihood of a downgrade increases in an economic recession, which can encourage a flight to safer investments. Financial institutions may be forced to sell risky assets in order to curb losses and continue to meet capital and liquidity requirements. These fire sales have a procyclical effect, reinforcing an existing price correction. Search for yield behaviour can therefore precipitate a liquidity crisis (ECB, 2018). During a boom phase, a 'liquidity illusion' can arise, whereby investors consider the liquidity risk to be low. This sentiment, coupled with low interest rates, encourages a continued search for yield, leading to a further build-up of liquidity risk. In the event of a downturn in sentiment, a systemic liquidity crisis may arise, leading to fire sales and further contagion to the system. Such a risk arises particularly when institutions are vulnerable to runs, as in the case of deposits and open-ended investment funds, or if they have increased liquidity needs in a stress situation, for example due to increased margin calls on derivatives (ECB (2018) and ESRB (2021)).

A tightening of financial conditions, for example due to a structural rise in inflation, may trigger a strong market reaction. Inflation in the euro area has risen above 2% since the beginning of 2021. This is mainly due to temporary factors compared to the previous year, such as higher energy prices, the reversal of a previous VAT reduction in Germany and the pick-up in the economy after the lifting of the containment measures. Restrictions due to the coronavirus crisis are also still in place in various production chains, partly as a result of the coronavirus crisis. Euro area inflation is currently expected to fall back below 2% in the course of 2022. An unexpected stronger or more sustained rise in inflation is nevertheless possible[9] (see Box 5 'Alternative inflation scenarios'). In such a scenario the high valuation of risky assets may soon come under pressure. Recently, increased inflation rates and concerns over the possible unwinding of monetary purchase programmes (tapering) have weighed on financial market sentiment. Nevertheless, at present market participants are largely assuming that financial conditions will remain loose for a long time to come and that central bank policy will remain accommodative. This leads to risky behaviour and the longer the vulnerabilities continue to build up due to the search for yield, the greater will be the detrimental impacts of such a turnaround.

8 In the period ahead we will implement the recently published 'ESMA guidelines on Article 25 of Directive 2011/61/EU'. These guidelines are a more detailed implementation of Article 25 of the AIFMD. We will periodically monitor whether the use of leveraged finance leads to increased systemic risk in the financial system and impose a leverage limit if necessary.
9 See also "Inflatie is niet dood", interview with Klaas Knot in NRC of 2 July 2021

Box 5 Alternative inflation scenarios

The economic outlook currently shows no persistent higher inflation in the medium term,10 but alternative scenarios cannot be ruled out. Various inflation risk scenarios can be identified depending on the underlying causes.

The first scenario that could arise is that incidental factors disrupt the inflation picture for a longer period. A rise in energy prices, higher commodity prices and production chain bottlenecks could cause inflation to peak, as is currently the case. In the event of a series of such shocks, this could even remain the case for a prolonged period. If, at the same time, the structural factors of low inflation and the underlying economic picture remain unchanged, this scenario will ultimately prove temporary (spike inflation). In that case no major changes in financial conditions can be expected.

A second scenario is that the economic recovery gains strength and inflation moves sooner towards the 2% target. The post-coronavirus economic recovery has so far been faster than expected and is also stronger than after previous crises, which were more of a financial nature (see also DNB (2021)). This could be bolstered by a combination of accommodative monetary support measures and the strong fiscal stimulus that is currently being deployed as a result of more accommodative fiscal policies in member states and funding from the European Recovery Fund. In the United States, where the economic recovery has been outpacing that of Europe for some time, economists are pointing to the risk of overheating11. If GDP moves above potential, inflation could also pick up faster (recovery rebound inflation). If this happens relatively quickly without being sufficiently factored into market expectations, it may be accompanied by shock effects.

Finally, there is a third possible scenario of more persistent, higher inflation pressure. In the event of a structural shift in economic developments, there is a risk that inflation will exceed the 2% target for a longer period (inflation overshooting). This could happen particularly if a wage-price spiral develops. Low unemployment or recent price rises have not so far led to higher wages, but the trend in wages is always a lagging indicator and in some segments of the labour market there are indications of incipient tightness. In addition, there may be upward pressure on producer prices if the coronavirus crisis leads to more deglobalisation and fragmentation of supply chains. Inflation could ultimately also assert itself if the large liquidity positions in the financial system translate more strongly into rising prices. Money supply growth has levelled off slightly in recent months, but the various support measures have led to strong growth in the ECB's balance sheet in recent years.

10 ECB staff macroeconomic projections for the euro area, September 2021
11 See, for example: O. Blanchard: 'In defense of concerns over the $1.9 trillion relief plan | PIIE)

If higher inflation or higher inflation expectations translate into rising capital market interest rates, financial stability may be at risk. A higher nominal interest rate will lead to losses on portfolios of fixed-income securities. Increasing uncertainty and a general change in risk sentiment may also lead to a correction in financial markets. Risky asset valuations are heavily reliant on the assumption that financial conditions will remain loose for a long period. A change in the level of inflation and interest rates may lead to a shock adjustment in risky asset valuations and risk appetite among market participants. The problem of the sustainability of European sovereign debt may also re-emerge. If interest rates rise, the debt dynamics will deteriorate, possibly leading to fresh doubts about the sustainability of debt over the longer term. Companies that have gone deeper into debt due to the coronavirus crisis will also be increasingly vulnerable. This may then translate into a growing proportion of non-performing loans faced by financial institutions. Finally, higher interest rates may make mortgage financing more expensive and weigh on valuations in real estate markets.

Policy implications

At the outbreak of the coronavirus crisis monetary policy made a crucial contribution to guaranteeing financial stability. When the pandemic struck the world in March 2020, huge risks rapidly arose in the financial system due to a widespread shortage of liquidity and a sudden tightening of financial conditions. Concerns also arose about a fragmentation of European financial markets, which threatened to disrupt the effects of monetary policy. The acute, system-wide nature of the crisis made the monetary policy response, including the PEPP purchase programme, necessary and effective in preventing a shock wave in the financial system and serious disruption to the functioning of the real economy.

The ECB will need to strike the right balance in the period ahead. Monetary policy in the euro area is focused on price stability and the broad economic factors that influence it. While it is important to provide exceptional support during a crisis, it is also a challenge to wind down measures down promptly and prudently if they are no longer appropriate for the financial and economic situation. After the initial shock resulting from the outbreak of the pandemic, the economic outlook has improved substantially. Lending in the euro area is stable and unemployment is falling towards the pre-crisis level. The output gap is expected to be positive for most European countries in 2022. In its updated monetary strategy the ECB set out the assessment criteria for future changes to its interest rate policy. These will be implemented if inflation reaches the 2% level well ahead of the end of its projections horizon and durably for the rest of the projection horizon. In addition, underlying inflation must be sufficiently advanced to be consistent with the 2% target over the medium term (ECB, 2021). At the same time it has been decided that the ECB will take more account of long-term developments and the proportional importance of financial stability in its new analytical framework (DNB, 2021). On the one hand, an overly abrupt tightening of financial conditions may jeopardise financial stability and thus indirectly have a negative impact on the price stability objective. On the other hand, the accommodative financial conditions produce negative side effects as a result of the search for yield. To ease this tension, it is also important to take other policy measures to reduce the current vulnerabilities in the financial system.

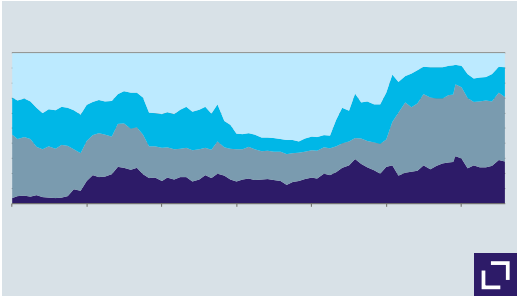
Structural reforms that promote the growth potential contribute to an increase in the resilience of the financial system. A broadly based economic

recovery in Europe will lead to more balanced growth and greater stability in the euro area.[12] The European recovery fund is making an important contribution to that objective. Higher economic growth also improves the sustainability of government debt, since GDP growth is higher than the interest on the outstanding debt.

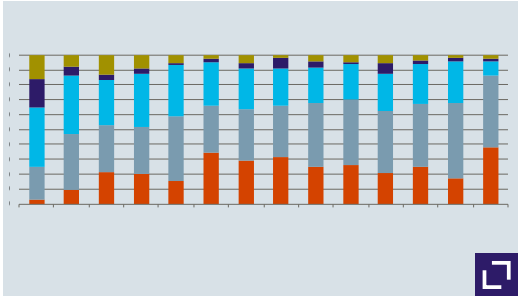
Targeted macroprudential measures can make an important contribution to increased resilience of the financial system. By maintaining sufficient buffers financial institutions and households are better able to absorb shocks. That being said, macroprudential policy can only provide so much counterweight to the build-up of vulnerabilities resulting from search for yield behaviour. For example, there are no macroprudential instruments available to counter risk-seeking behaviour in financial markets and non-bank players still fall largely outside the scope of the macro-prudential toolkit. Macroprudential policy can focus particularly on specific vulnerable segments in the market, such as the introduction of a floor for the risk weighting of mortgage portfolios or the build-up of bank-wide buffers, including the introduction of a countercyclical capital buffer (see also DNB (2020), and Chapter 3 'Capital framework for banks: lessons from the crisis'). For insurers the revision of the Solvency II Directive could bring improvements to the legal framework, such as the inclusion of macroprudential instruments. The government could also restrict the mortgage borrowing potential to ensure that households do not build up vulnerable debt positions. Finally, international reforms in non-banking financial intermediation[13] and new agreements on European fiscal policy can contribute to a more solid financial system.

12 See also the HJ Schoo lecture given by Klaas Knot, September 2020.
13 See Box 4 'The role of non-bank financial intermediation and the need for macroprudential policy', Spring 2021 FSR.

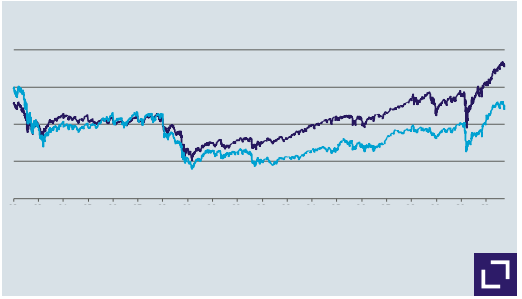
Figures



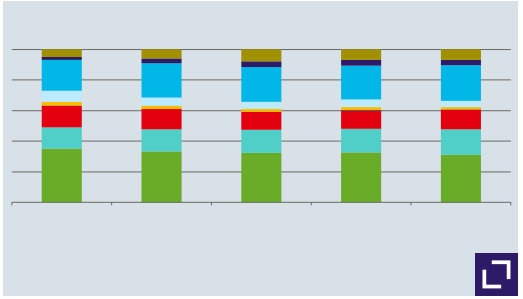
Only 9% of bonds worldwide are trading at yields of more than 2%.
See figure 14 →



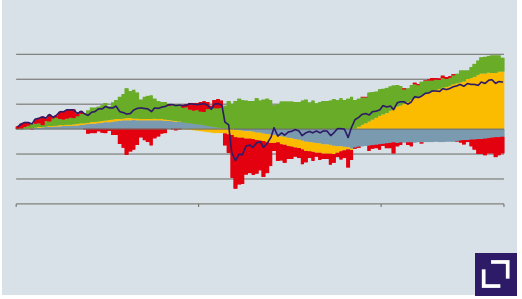
Increased issuance of lower-rated corporate bonds in the EU
See figure 17 →



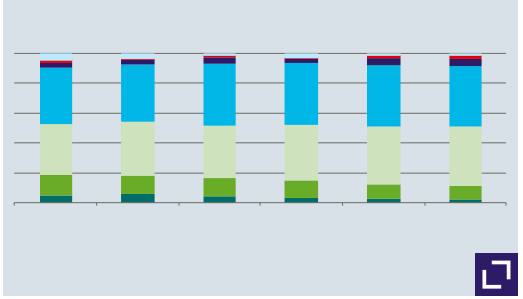
Equity valuations at all-time highs
See figure 15 →



Indications of search for yield among insurers
See figure 18 →



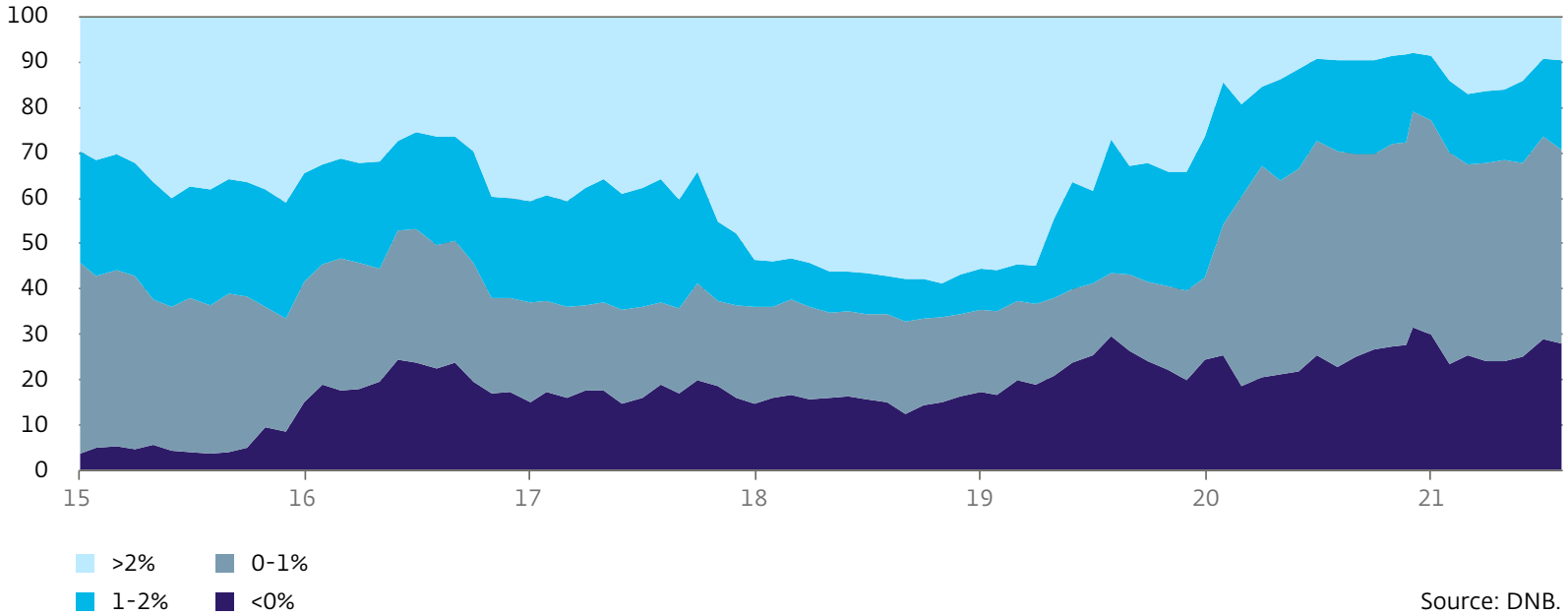
European share prices primarily driven by low interest rates and higher growth expectations
See figure 16 →



Insurers holding lower-rated fixed-income securities
See figure 19 →

Figure 14 Only 9% of bonds worldwide are trading at yields of more than 2%

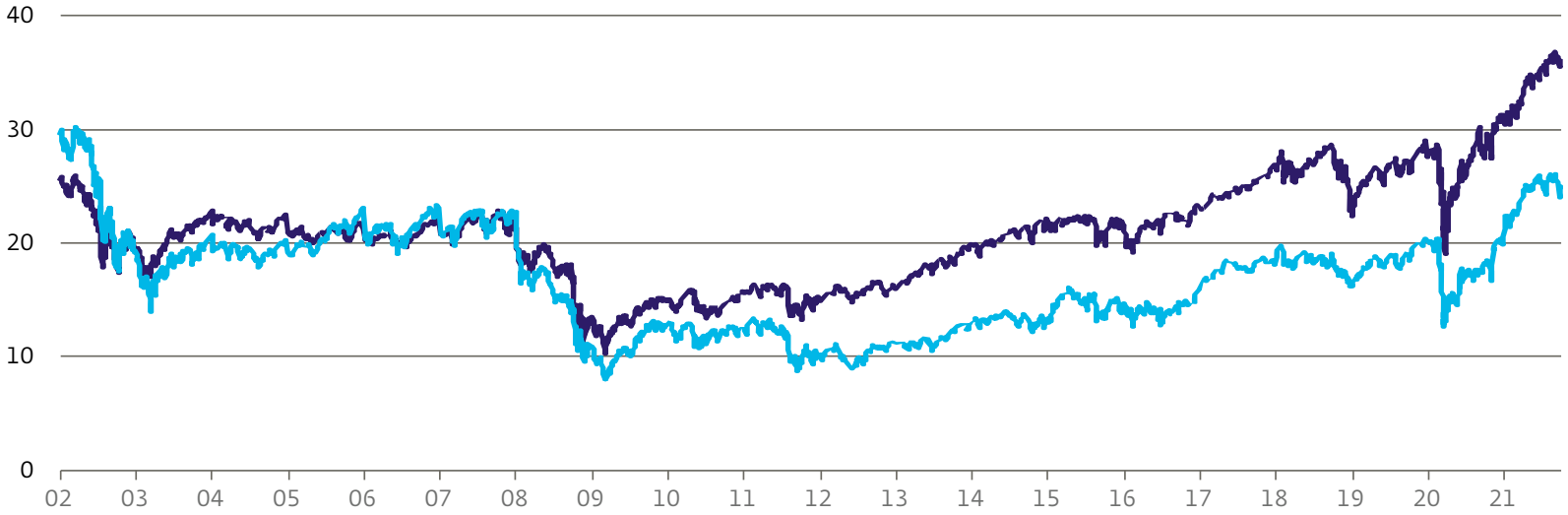
Percentage of total bonds



Source: DNB.

Figure 15 Equity valuations at all-time highs

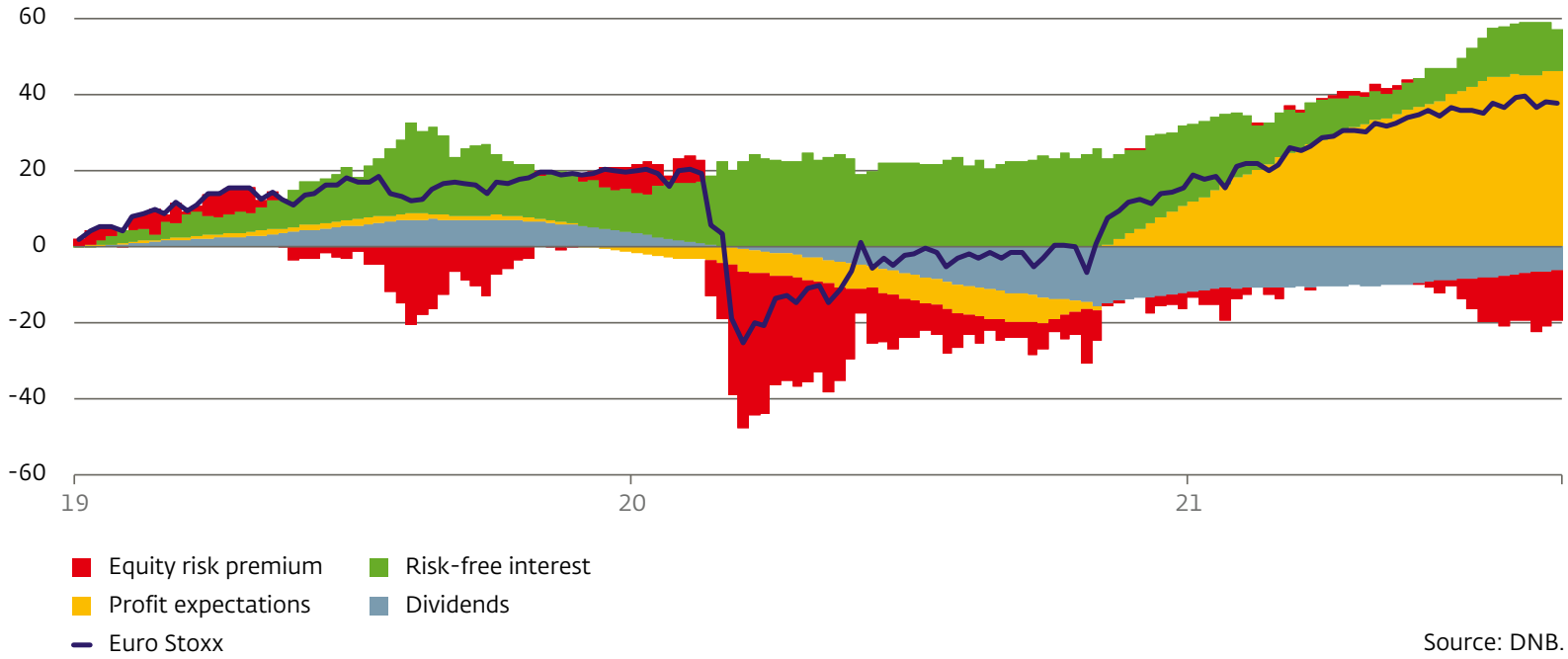
Price/earnings ratios (cyclically adjusted)



Source: Bloomberg.

Figure 16 European share prices primarily driven by low interest rates and higher growth expectations

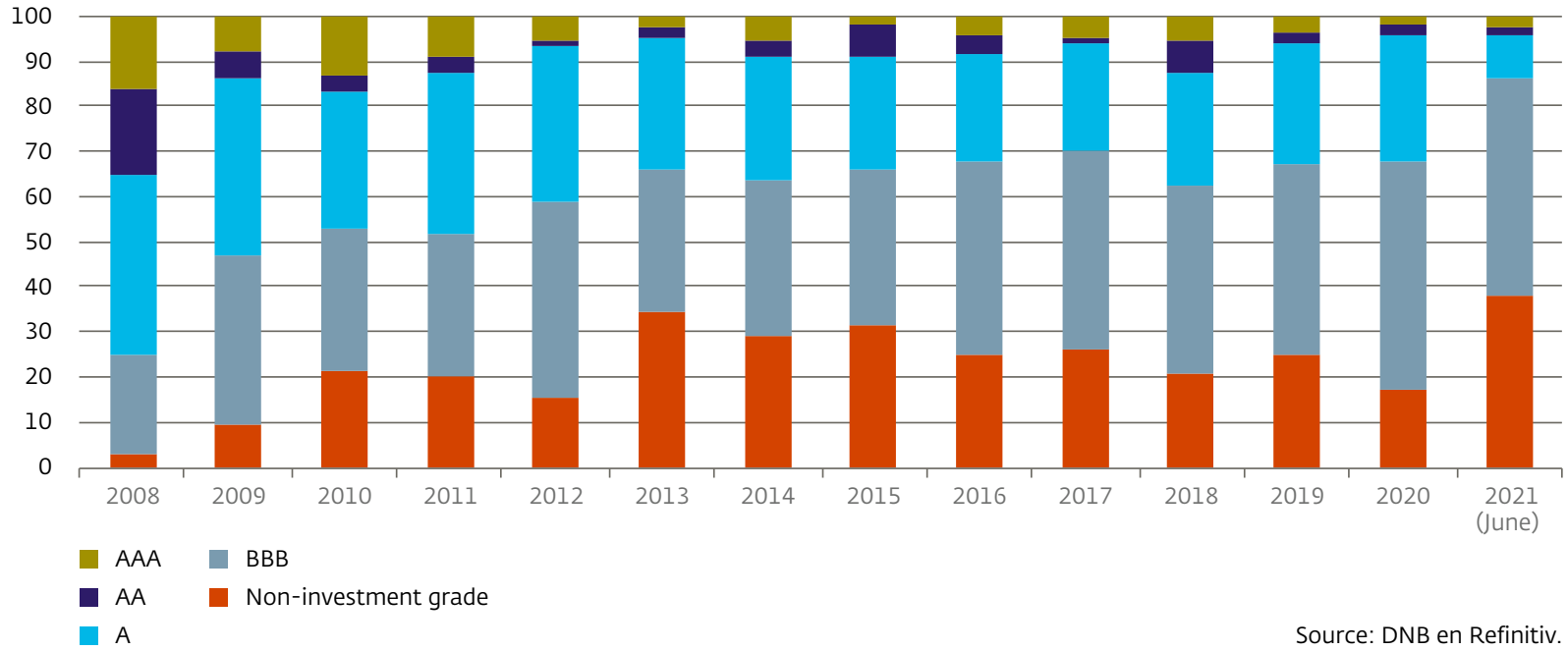
Percentages; cumulative effect of the four factors on Euro Stoxx prices, based on a three-period dividend discount model



Source: DNB.

Figure 17 Increased issuance of lower-rated corporate bonds in the EU

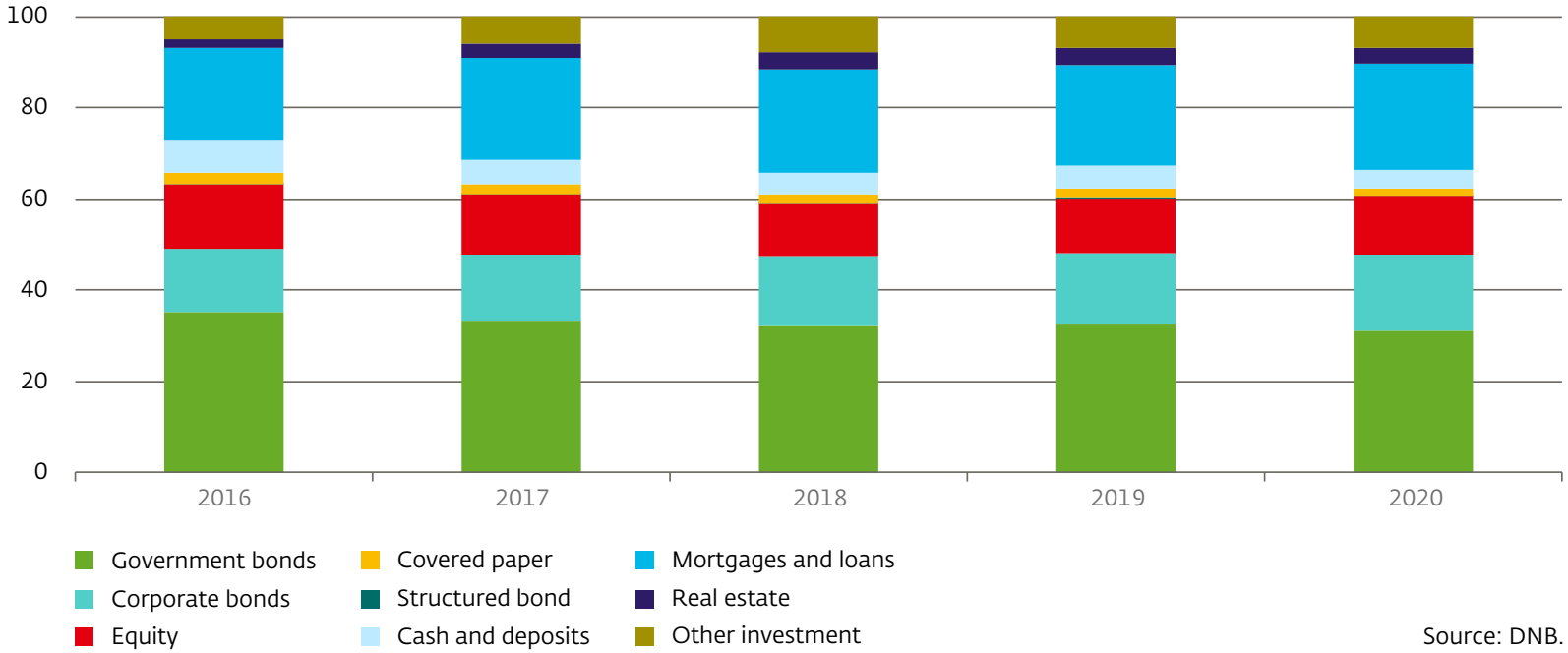
Percentage of new corporate bond issuance per year



Source: DNB en Refinitiv.

Figure 18 Indications of search for yield among insurers

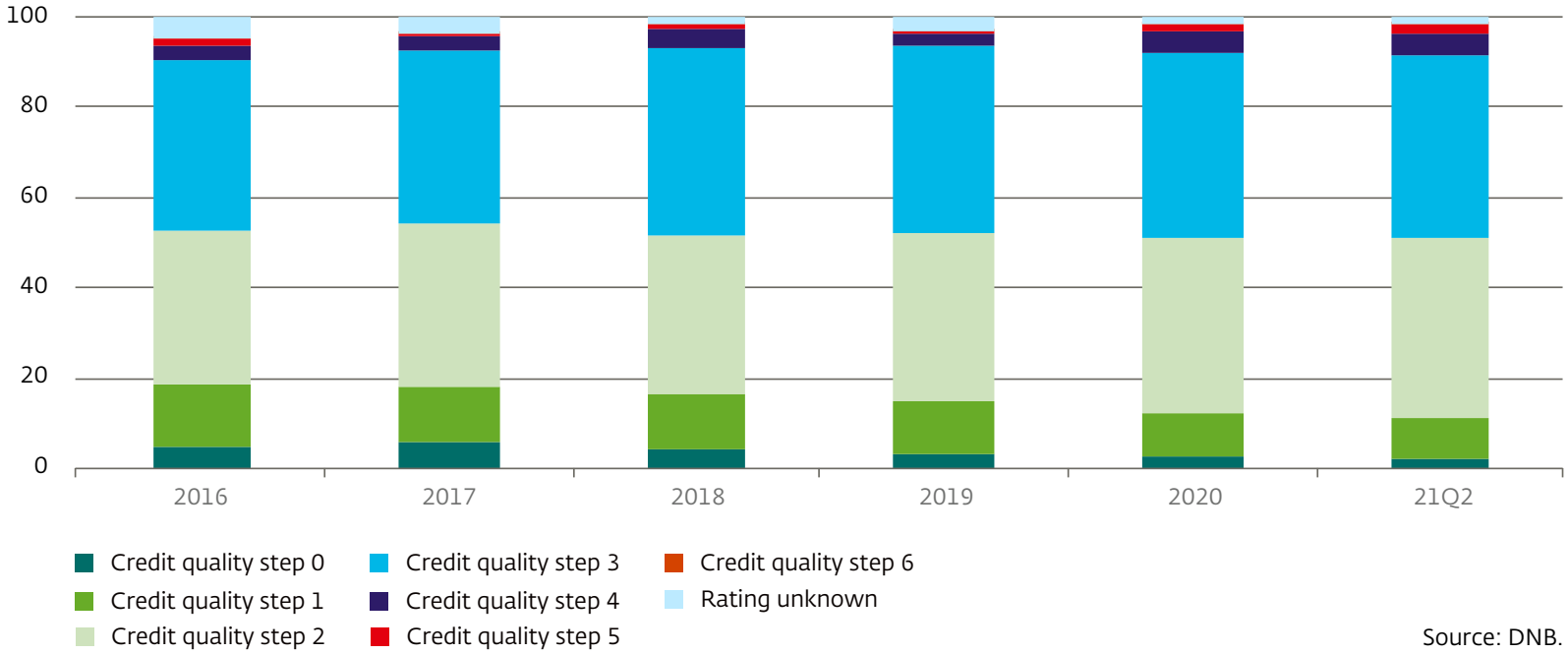
Percentages



Source: DNB.

Figure 19 Insurers holding lower-rated fixed-income securities

Percentages



Source: DNB.

Climate change and financial risks of real estate

Francesco Caloia, David-Jan Jansen, Helga Koo, Remco van der Molen and Lu Zhang

Climate change and the transition to a climate-neutral economy entail risks, also for financial institutions. These risks manifest themselves among other things through exposures to real estate. Both physical consequences of climate change, such as more extreme weather conditions, and stricter sustainability requirements can lead to a decrease in the value of homes and offices. This possible effect is relevant from the perspective of financial stability, if only because real estate investments and loans account for more than 25% of assets held by banks, insurers and pension funds. With the aid of a new climate stress test we assess how financial institutions may be affected by flooding in the Netherlands through real estate exposures. We also consider the consequences of the energy transition for the financial sector's real estate exposures.

Climate change and the associated energy transition entail risks for financial institutions. Global warming leads to a growing risk of extreme weather conditions and floods, which could cause considerable economic and financial damage. This is illustrated by the recent floods in the Netherlands and a number of other European countries. This also impacts financial institutions, for example through higher climate-related insurance claims, direct damage to real estate investments and higher credit risks on loans. If climate change continues, it is conceivable that the damage will threaten the stability of the financial system. In order to counter climate change, many countries have given commitments under the Paris Agreement to transition to a carbon-neutral economy. Over the decades ahead this will require considerable investments and have a major impact on some economic sectors. The uncertainty concerning the course of the transition may entail financial risks. An earlier stress test we conducted already showed that sudden, major changes in climate policy or energy technology could lead to substantial losses on asset positions of Dutch financial institutions. Other supervisory authorities and central banks, such as the ECB, are currently working on issues relating to climate change and the energy transition in order to understand these financial risks (see Box 6 'Financial risks of climate change: work in progress').

Climate-related risks to financial institutions manifest themselves to a large extent through exposures to real estate. Real estate plays an important role on financial institutions' balance sheets. Shocks in real estate markets have also traditionally been a major source of financial crises. Due to the CO_2 emissions associated with its construction and use, real estate plays an important role in the energy transition, and in the policy discussions on the shape of that transition. Buildings themselves may also be vulnerable to the consequences of extreme weather conditions and floods. It is not inconceivable, therefore, that either climate change or climate policy will cause shock adjustments in real estate markets. In this chapter we therefore focus specifically on the question of how climate-related risks affect financial institutions through their exposures to real estate. The focus on real estate provides a more in-depth analysis than our previous climate stress test, which focused on other types of assets, such as corporate loans. In addition,

the inclusion of physical risks to real estate represents a widening of the scope: our previous climate stress test focused solely on transition risks. The focus of this new analysis, as in the previous climate stress test, is primarily on implications on the asset side of the balance sheet for banks, insurers and pension funds.[14]

Real estate positions and implications of climate risks

Real estate plays an important role on financial institutions' balance sheets. Real estate exposures of almost €1,400 billion represent more than a quarter of the combined balance sheet total of Dutch banks, insurers and pension funds (Figure 20). In the case of the banking sector, loans secured on real estate make up 38% of the balance sheet. These include residential mortgages (27%), commercial real estate (4%) and corporate loans secured on real estate (6%). Insurers and pension funds also have substantial portfolios of residential mortgages and are major investors in commercial real estate. These real estate investments mainly concern foreign real estate. In the case of insurers the exposures to real estate amount to 17% of total assets. For pension funds the figure is 15%.

Real estate is increasingly exposed to the consequences of more extreme weather conditions. Over the past four decades there has been a clear upward trend in the number of natural disasters, as can be seen from EM-DAT data.[15] The most recent IPCC report also finds strong indications that extreme weather is occurring more frequently. The specific physical real estate risks, of course, depend greatly on the location of the home or office. Given that a large part of the Netherlands is below sea level, Dutch real estate is particularly vulnerable to flooding. The risk is not limited to the low-lying areas, however. Last summer parts of the south of the Netherlands were affected by heavy rainfall. Rivers burst their banks, leading to flood damage in areas such as Valkenburg aan de Geul. If climate change continues, serious floods may occur more frequently. Other physical risks to real estate in the Dutch context are storm damage and pile rot.[16] In view of the large foreign positions (see the dark blue areas in Figure 20), a wide range of other physical risks may also be relevant to Dutch financial institutions. Depending on the region in question, these may involve the threat of drought, forest fires, hurricanes or extreme rainfall. The picture presented by granular data on real estate positions abroad is even less clear than data on Dutch positions, but it is important to gain further insights into this matter. Concentration risks may arise if multiple institutions have a large exposure to a particular region.

Secondly, buildings are susceptible to transition risk, because they are responsible for a considerable proportion of greenhouse gas emissions. In 2020 the built environment – one of the five climate agreement sectors – accounted for 13% of greenhouse gas emissions in the Netherlands; worldwide the figure was almost 30% The Paris Agreement and the National Climate Agreement state that greenhouse gas emissions from buildings must be reduced to zero by 2050. Ambitious targets have also been set for 2030. In order to achieve these targets, large investments will be required in the decades ahead to increase the sustainability of buildings. In the European Union an estimated €275 billion of additional annual investment is required in the renovation of buildings up to 2030. This transition may have a major impact on the value of existing buildings.

14 For non-life insurers physical risks naturally also have possible implications in terms of liabilities. This matter has already been addressed in Chapter 2 of a previous study we published in 2017.
15 EM-DAT is a widely used database of natural disasters compiled by the Belgian Centre for Research on the Epidemiology of Disasters. The underlying data on the number of disasters per year and per country can be found at https://www.emdat.be
16 No further details of these risks are provided in this chapter. Pile rot may occur if climate change leads to more frequent periods of severe drought. The fluctuations in the groundwater level may then impact the quality of foundations in some cases. The vulnerability lies particularly in foundations based on wooden piles, which are still found frequently in various cities in the Randstad region.

Flood risk to Dutch real estate

A great deal of attention has been devoted to the economic consequences of flooding, but no system-wide analysis of the consequences for the Dutch financial sector has yet been conducted. It has previously been calculated, for example, that the flooding of the river Meuse in the mid-1990s led to a 9% fall in prices of the affected homes. It has also been calculated that sale values of homes in flood-risk areas in the Netherlands are around 1% lower. In addition to these academic studies, individual financial institutions are already analysing the flood risk to their exposures. No system-wide overview is yet available, however. Below we develop such a system-wide analysis in three steps. We consider exposures, discuss the risk channels and show that the impact in terms of damage in tail scenarios can rise substantially.

The majority of Dutch financial institutions' domestic real-estate exposures are located in parts of the country that are vulnerable to flooding. To map these exposures, we have drawn together granular data from a range of individual sources to create a dataset representing over €700 billion in domestic real estate exposures. This includes both regular data that we gather as well as data from a special survey of insurers and pension funds. The picture that emerges is that the majority of real estate is located in parts of the Netherlands that may be affected by flooding. These include both areas which are not protected by flood defence systems (outside the dikes) and parts of the Netherlands that are protected against floods.[17] These risk areas are located particularly in the Rhine basin, but also in the Meuse, Scheldt and Ems. As Figure 21 shows, relatively little real estate is in unprotected areas. The main area with a relatively large amount of real estate exposures is areas that would be flooded in the event of a failure of a primary flood defence, such as a dike. These areas cover much of the west of the country. The percentages range from 52% of total Dutch exposures, in the case of banks, to 66%, in the case of pension funds. In the case of insurers the percentage is 65%. Since location information is not yet available in all cases, these percentages will actually be even higher.

The flooding of vulnerable areas leads to building damage, which in highly exceptional cases can amount to €200 billion. The possible damage to homes and commercial real estate in a future flood can be estimated using damage functions. A damage function translates the water level in a flood into an amount of damage in euros. We base our calculations on three stress levels: low, average and extreme water level.[18] We then apply these stress levels to two types of floods: one in areas outside the dikes – where there is relatively little real estate – and one in areas protected by primary flood defences. In addition to the water level, the estimated damage to homes in this methodology also depends on the surface area. In the case of commercial real estate the estimated building damage depends mainly on the user function.[19] Commercial real estate in particular appears to be relatively vulnerable, with a damage percentage of more than 60% of the value in the case of an extreme flood affecting both protected and unprotected areas (Figure 22). For homes the damage percentage in the case of a low flood level is still limited. A moderate flood of an area outside the dikes would lead to damage percentages of less than 10%, whereas a moderate flood of a protected area would lead to damage slightly above 10%. In the case of extreme water stress the debt percentages rise substantially, particularly for homes used as collateral for bank

17 For details, see Slager, Kymo (2019). Handboek overstromingsrisico's op de kaart: Over de methode van kaartproductie.
18 For a description of this method, see Slager, Kymo, and Dennis Wagenaar (2017). "Standaardmethode 2017. Schade en slachtoffers als gevolg van overstromingen." The breakdown into three levels is based partly on Stuurgroep Water (2018). "Overstromingsrisico's in Nederland." The stress levels are associated with a rise in water levels of between 1 and 5 metres.
19 The calculations are focused purely on damage to buildings. The bill for businesses would be even higher due to loss of income resulting from non-use or less efficient use of the real estate.

mortgages. In the case of an extreme flood in a protected area banks would face a damage percentage for homes approaching 50%. Given that the majority of the real estate is in protected areas (Figure 21), the total amounts of damage in such a case would rise sharply. The estimate of €200 billion is based on damage percentages in Figure 22 in the case of an extreme flood (the bars on the far right) and the exposures of banks, insurers and pension funds in Figure 21 located in protected areas.

Such substantial flood damage would impact the position of financial institutions in various ways. These could include both increased credit risk, for mortgage lenders, and a materialisation of market risk, for investors. An important point is that flood damage is not insured in all cases in the Netherlands. The flood damage that we model here, which is in areas outside the dikes and in areas protected by primary flood defences, is currently not covered by regular insurance. It is not clear at the outset to what extent the government will cover the damage under the Reimbursement for Damage due to Disasters Act (Wet tegemoetkoming schade bij rampen – Wts). A recent survey also suggests that people living in risk areas in the Netherlands are aware of the flood risk but do not necessarily have higher financial buffers to absorb any setbacks (see Box 7 'Homeowners in flood risk areas do not have higher buffers'). If buffers are insufficient after a flood, the value of the collateral will fall. Failure to take account of this will increase the credit risks for mortgage lenders. This decrease in the collateral value may then affect banks, but also insurers and pension funds. The building damage also has financial consequences from the perspective of investors. This can be seen as a form of market risk, which is relevant particularly to insurers and pension funds having regard to their large investments in real estate.

So far, the macrofinancial impact of floods has remained limited. Researchers often draw a distinction between the direct and indirect impacts of a flood. The direct impact, in addition to the damage to buildings referred to above, also includes damage to production resources and infrastructure, as well as the number of persons injured and any loss of human life. There is also the indirect impact, which includes disruptions to production chains. The combined direct and indirect impacts lead to a decrease in economic growth after a flood. Hitherto scientists have considered that floods – as well as natural disasters more generally – in most cases lead only to a short-term economic contraction. While assessments vary, the consensus appears to be that the GDP effect could at most be a few percentage points.

The macrofinancial impact of a flood will nevertheless be greater if climate change continues unabated. In the context of climate change, however, the mild effects of natural disasters observed so far can no longer necessarily be assumed to be the basis going forward, as a recent BIS study also argues. In the event of more frequent extreme weather, the impact on buildings, production processes and society will be greater in decades ahead. A recent study by the Federal Reserve (the United States central bank) therefore estimates on the basis of a growth-at-risk analysis that climate change will make an economic recession both more likely and more serious.

In the event of a serious flood, the combination of substantial building damage and an economic downturn could therefore seriously impact the Dutch financial sector. This is borne out among other things by stress test calculations using the Cassandra model. We have made these calculations over a one-year horizon. Here again we use the six stress scenarios. The scenarios are therefore based partly on a flood in an area outside the dikes and partly on a flood in a protected area. The scenarios also differ in terms of assumptions about the levels of flooding and the extent to which economic growth falls. In the most extreme scenario we assume GDP growth that is around 10 percentage points lower due to flooding. Unemployment accordingly rises by a few percentage

points in that most extreme scenario.[20] The stress test calculations show in the first place that banks would be sufficiently capitalised to withstand flood stress situations in unprotected areas outside the systems of flood defence (Figure 23, left). The capital impact on banks remains limited even in the case of a major flood in areas outside the dikes. The assessment is that in the most extreme stress scenario the effect on the combined CET1 ratio would be around 130 basis points. This limited effect partly reflects the fact that there is relatively little real estate in unprotected areas.

If we assume higher water levels in protected areas, however, this picture deteriorates rapidly. In extreme cases the capital impact on banks may rise to more than 700 basis points within a year (Figure 23, far right-hand bar). First, the property damage would increase sharply as a result of the high water level. Second, the deterioration of the macrofinancial picture would then also weigh very heavily on the banks' profitability and increase the impact of non-performing loans. It can also be noted that the stress test does not even include the aspects of operational risk. Such a large impact on the capital ratio within a year is far greater than the impact normally revealed in stress test exercises. The probability of flooding as severe as considered above is of course still extremely small at present. At the same time, climate change may ultimately increase the likelihood of such extreme situations. The more frequent occurrence of flooding could also have a strong cumulative impact.

Transition risk

The transition to a climate-neutral built environment may also affect the value of buildings. As a result of stricter sustainability requirements and higher energy and CO_2 prices, the difference in value between insufficiently sustainable buildings and low-energy buildings will widen. This applies to commercial real estate, for which binding standards have already been set in some cases, but also to homes, where the implied standard will ultimately also shift to energy-neutral. This means that buildings with low energy efficiency may require substantial investment to meet future energy standards and the cost of using these buildings will rise due to higher energy or CO_2 prices. Partly for this reason it will also be increasingly difficult to finance these buildings.

Financial institutions have only a limited knowledge of the energy characteristics of their real estate exposures, however, making it difficult to conduct system-wide risk analyses. Our survey of insurers and pension funds referred to above shows that on average these institutions have information on the relevant energy characteristics of only one-third of their foreign real estate exposures. There are substantial differences between institutions, however. In the case of Dutch real estate, financial institutions generally have considerably more information. Insurers and pension funds know the energy labels for almost 90% of their Dutch real estate exposures. In the case of banks this percentage for commercial real estate loans in the Netherlands is 66%.[21] For foreign real estate loans the energy labels are entirely absent from the banks' reporting. Figure 24 shows the breakdown of different types of real estate exposures by energy label, for various Dutch exposures, and CO_2 intensity, for foreign real estate investments.

By 2030 an estimated 40-60% of all buildings to which Dutch financial institutions are exposed are still to be made sustainable. To ensure that all buildings are climate-neutral by 2050, the standards for greenhouse gas emissions from buildings will be

20 For further details of the calibration, see the paper by F. Caloia and D. Jansen "Flood risk and financial stability: Evidence from a stress test for the Netherlands" (forthcoming).
21 The availability of this information has been improved compared to a survey we held in 2017, which only covered domestic real estate exposures.

gradually tightened over the coming decades. The precise shape of this transition currently remains uncertain. The Climate Agreement, for example, stipulates that 1.5 million homes must be made entirely energy-neutral by 2030, but it is not clear how that will be achieved. Stricter requirements are also likely to be imposed on energy consumption by offices and other commercial real estate, but these have not yet been determined. A plausible scenario is that by 2030 the Netherlands will require a minimum B energy label for commercial real estate, while for homes a B (rented) or C (owner-occupied) label will be the implied standard.[22] In the case of foreign real estate we assume implied standards consistent with the goals of the Paris Agreement.[23] In this scenario an estimated 40% to 60% of buildings to which Dutch financial institutions are exposed do not currently meet the standards that will apply in 2030.

The investments required to achieve these sustainability efforts depend greatly on climate policy choices, but they will in any event be substantial. Although the ultimate goal – making all buildings climate-neutral – has been determined, the magnitude of the required investments remains uncertain, particularly in the post-2030 period. The required investments will depend greatly on the technological choices made and the costs of the various options over time. It is still highly uncertain, for example, whether and on what scale green gas and green hydrogen will be available to heat buildings. The technological choices will also determine who makes the investment. If a choice is made to pursue building-specific solutions such as heat pumps, investments will be borne by building owners, whereas this is generally not the case when a district heating system is constructed. The investments required for similar buildings may therefore vary widely. For many buildings, investments will have to be made in improved insulation at the very least. The cost of these investments will in principle be borne by the owner of a building. Figures from PBL Netherlands Environmental Assessment Agency show that insulating all buildings in the Netherlands would require estimated investments of between €50 billion and €110 billion.[24]

There needs to be even keener awareness of the connection between increased sustainability of buildings and risks to the financial sector. The effect of the energy transition on the value of buildings will depend not only on the existing energy characteristics but also on future policy with regard to the sustainability of buildings. An investment in sustainability can also increase the value of a building, for example because it reduces the user's costs. In the case of commercial real estate, however, owners must make a substantial investment to be able to continue letting the building, even if it is unclear to what extent this investment will also translate into higher rental income. If building owners are unable or unwilling to make the required investment, the value of the building will be negatively impacted. In the case of owner-occupied homes in particular, it is possible that homeowners will be unable or unwilling to make the required investment. This is particularly relevant since, as Figure 24 shows, owner-occupied homes still require a major sustainability effort. This makes estimating the financial risks due to required sustainability efforts a complex matter.[25]

Policy implications

Climate risks related to real estate will require ever greater attention in the light of climate change
Physical risks will become more relevant,

22 By way of comparison, the 2013 Energy Agreement included the ambition of striving for at least an A energy label for all buildings by 2030.
23 We have based this estimate on the transition paths of each country, as calculated by the Carbon Risk Real Estate Monitor.
24 This concerns the estimated investments needed to upgrade all buildings to energy label D or B, respectively.
25 An Occasional Study to be published shortly will focus more closely on the effect of increased sustainability of buildings on the financial risks to the financial sector.

particularly given the onward march of global warming, as recently outlined in the IPCC report. Transition risks may already be significant in the shorter term if it is not made clear soon which sustainability requirements will apply to homes, retail properties and offices. Clarity on prevailing policy will also lead to clarity on the required financing and increase investment appetite among owners and investors. An important factor in this regard is the breakdown of costs between building owners and the government. The potential systemic risks of physical factors underline the importance of a timely transition to a climate-neutral built environment.

Although steps are being taken, the financial sector as a whole could integrate the real estate risks of climate change even more fully. Increasing numbers of financial institutions are now devoting attention to climate change in their risk management. In some cases climate change has already been embedded by, whereas in other cases such efforts are still in their infancy. An important focal point with regard to real estate, but also in a broader sense, remains the availability of the relevant data for robust analyses. In the case of physical risks this largely concerns location data; in the case of transition risk it mainly concerns data on energy efficiency. As Figures 21 and 24 show, the picture is sometimes still incomplete even for Dutch real estate exposures. At the same, time this need for improved data should not prevent financial institutions taking steps now towards further embedding climate change in their risk management. Our climate stress test for flood risk is an example of analytical work that can already be conducted on the basis of available data.

It is important that climate risks are explicitly included in real estate valuation. This applies both to the possible consequences of climate change and to the consequences of the transition to a climate-neutral built environment. Building characteristics relevant to these risks must be taken into account in real estate valuations. Financial institutions will be better able to assess risk on that basis.

Even if the results are still uncertain, the magnitude involved underlines the importance of further work on macroprudential implications. Like the work of other central banks and supervisory authorities (see Box 6) our analyses are still subject to uncertainty. However, in line with our previous energy transition stress test, this chapter also shows that financial risks relating to climate change are systemically relevant due to their possible magnitude. In addition to follow-up analyses it is important to conduct a timely discussion on possible ways to mitigate these systemic risks. At this stage it is important that financial institutions already take account of certain pockets of risk relating to geographic locations or transition paths in their own risk management.

Box 6 Financial risks of climate change: work in progress

Central banks and supervisory authorities increasingly use scenario analyses and stress tests to gain insight into the financial risks of climate change. In April 2021, for example, the French central bank and supervisory authority presented the results of an initial stress test for financial institutions. The ECB recently published the first results of a top-down climate stress test and is currently preparing a bottom-up climate stress test for systemically important banks in 2022. The Bank of England recently introduced a climate stress test for banks and insurers, the results of which are expected in early 2022. EIOPA, the European supervisory authority for pension funds and insurers, is also considering climate issues in relation to stress tests.

Stress tests on climate are still 'work in progress'. As outlined above, a whole spectrum of potential risks are relevant to climate change. We also need to understand better how climate change will impact the economy and vice versa. Finally, the evolution of the climate in the decades ahead is extremely uncertain. It is nevertheless important to carry out this analytical work in order to gain an initial insight into relevant channels and the magnitude involved. Critical mass is important in this regard. Extensive cooperation is therefore taking place between central banks and supervisory authorities, for example as part of the Network for Greening the Financial System (NGFS).

Since the end of 2017 the NGFS has been drawing attention to the way in which both physical and transition risks can impact financial institutions' balance sheets. For example, it recently published a set of climate scenarios. The financial impact of climate change can be illustrated with increasing accuracy and consistency by using these types of scenario. We have been involved for some time in the scenario work of the NGFS and will continue to contribute on the basis of the analyses presented in this chapter.

Box 7 Homeowners in flood risk areas do not have higher buffers

Do households anticipate possible flooding? To answer this question, we commissioned a survey of the members of the DNB Household panel in the spring of 2021, i.e. before the floods in South Limburg. Over 2,400 respondents completed the questionnaire. People living in a flood risk area are clearly aware of the risk. People living in areas outside the dikes are 10 percentage points more likely to mention a flood as the primary threat in terms of environmental factors. People living in protected risk areas are 6% more likely to do so than people who do not live in risk areas. The effects are similar in the case of homeowners (second column of the table). Awareness does not automatically lead to higher financial buffers, however. When questioned, homeowners in risk areas appear to have similar buffers to those of people not living in risk areas (third column). Knowledge of insurability does not appear to be the reason for this. People living in protected risk areas are slightly less likely to say that insurers should be primarily responsible for covering **flood damage.** People living in areas outside the dikes are more likely to mention insurers. These differences are not statistically significant, however (final column).

Table: What are the views of people who live in flood risk areas?

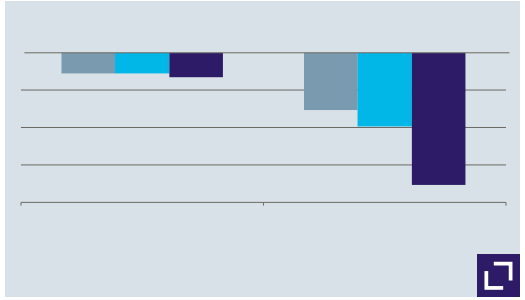
(in each case compared to people not living in a risk area)

	Sees flooding as the biggest threat	See flooding as the biggest threat	Level of financial buffer	Sees the insurer as having primary responsibility in the event of water damage
Lives in unprotected risk areas	**+10%**	+10%	-0.58	+7%
Lives in protected risk areas	**+6%**	**+7%**	-0.07	-1%
Sample	All		Only homeowners	

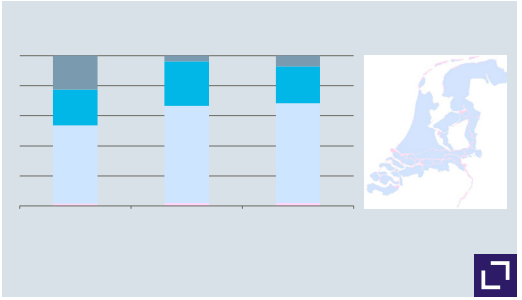
Note: With the exception of column 3, the numbers can be interpreted as the so-called marginal effect, i.e. the difference in probability of a particular outcome associated with living in a risk area. The number in the third column shows the difference in levels. Respondents could choose from seven options, numbered here from 1 to 7 on the scale. Figures in bold show that the difference is statistically significant at least at the 10% level.

Figures

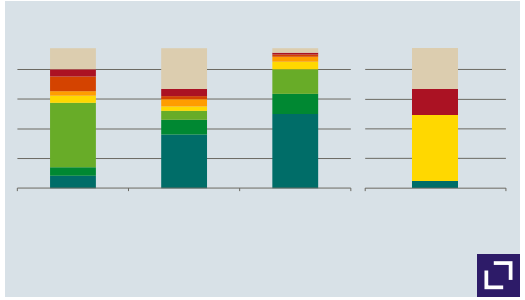
Exposures to real estate
See figure 20 →



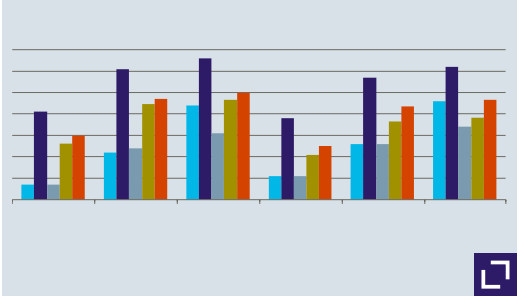
Capital impact in six flood scenarios
See figure 23 →



Flood risk and Dutch real estate
See figure 21 →



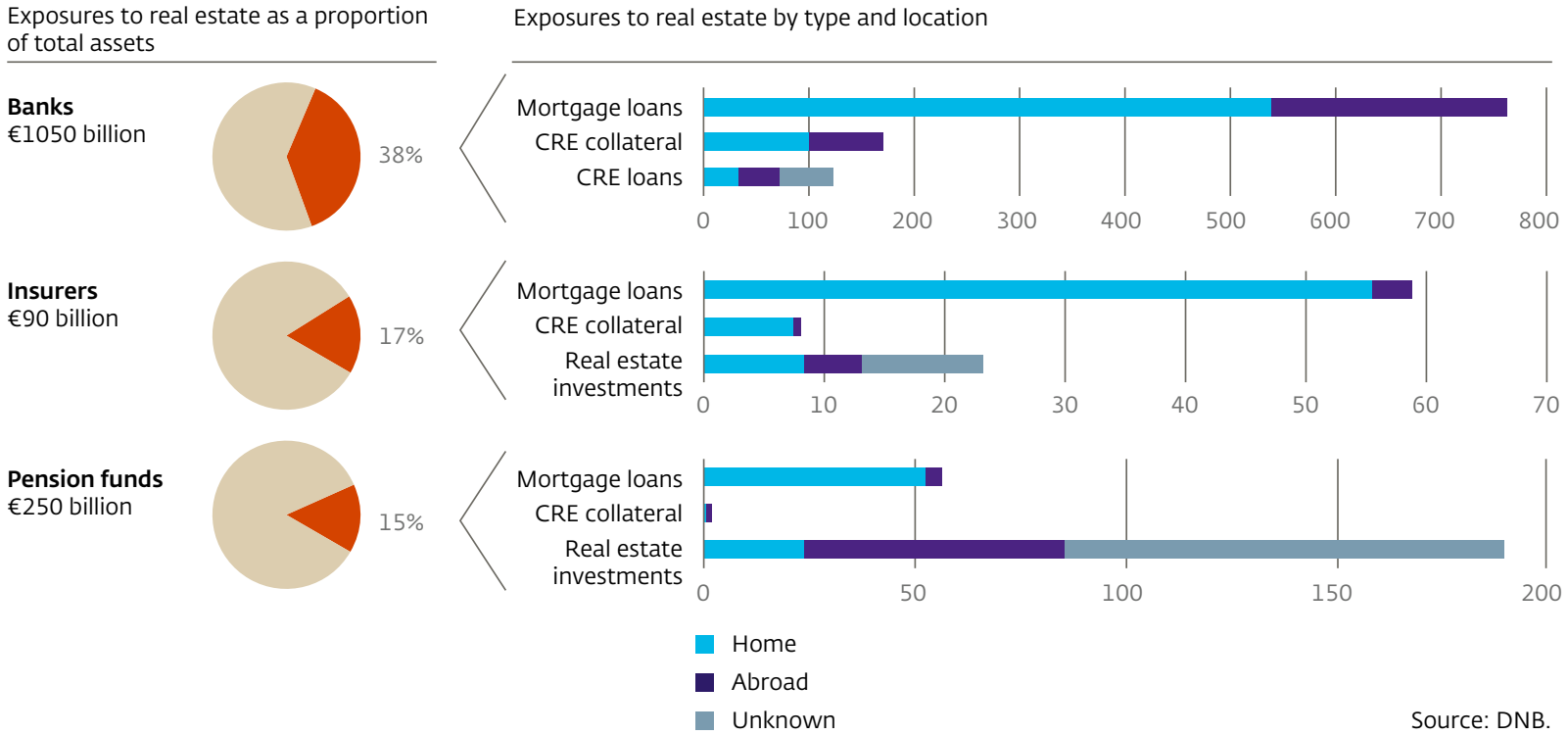
Breakdown of real estate exposures by energy label
See figure 24 →



Loss of value of real estate in six stress scenarios
See figure 22 →

Figure 20 Exposures to real estate

EUR billions

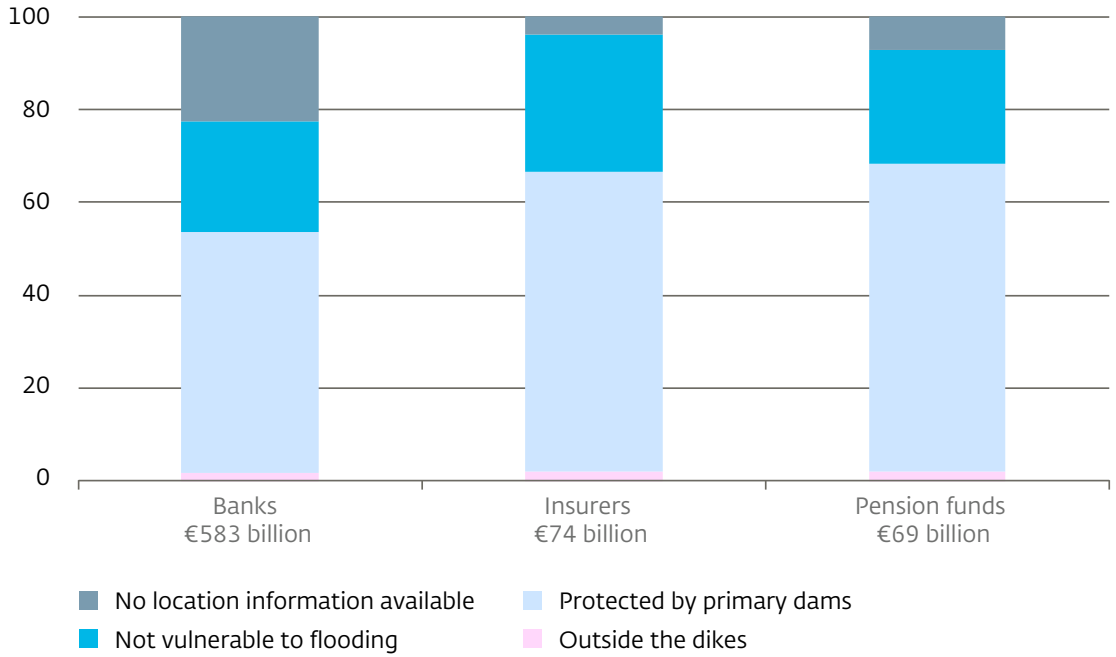


Source: DNB.

Notes: CRE collateral: loans secured on commercial real estate. CRE loans: financing of commercial real estate. Real estate investments: investments in buildings, securitisations and real estate funds and companies. The exposures for which the location of the real estate is 'unknown' concern almost exclusively foreign real estate funds.

Figure 21 Flood risk and Dutch real estate

Percentages

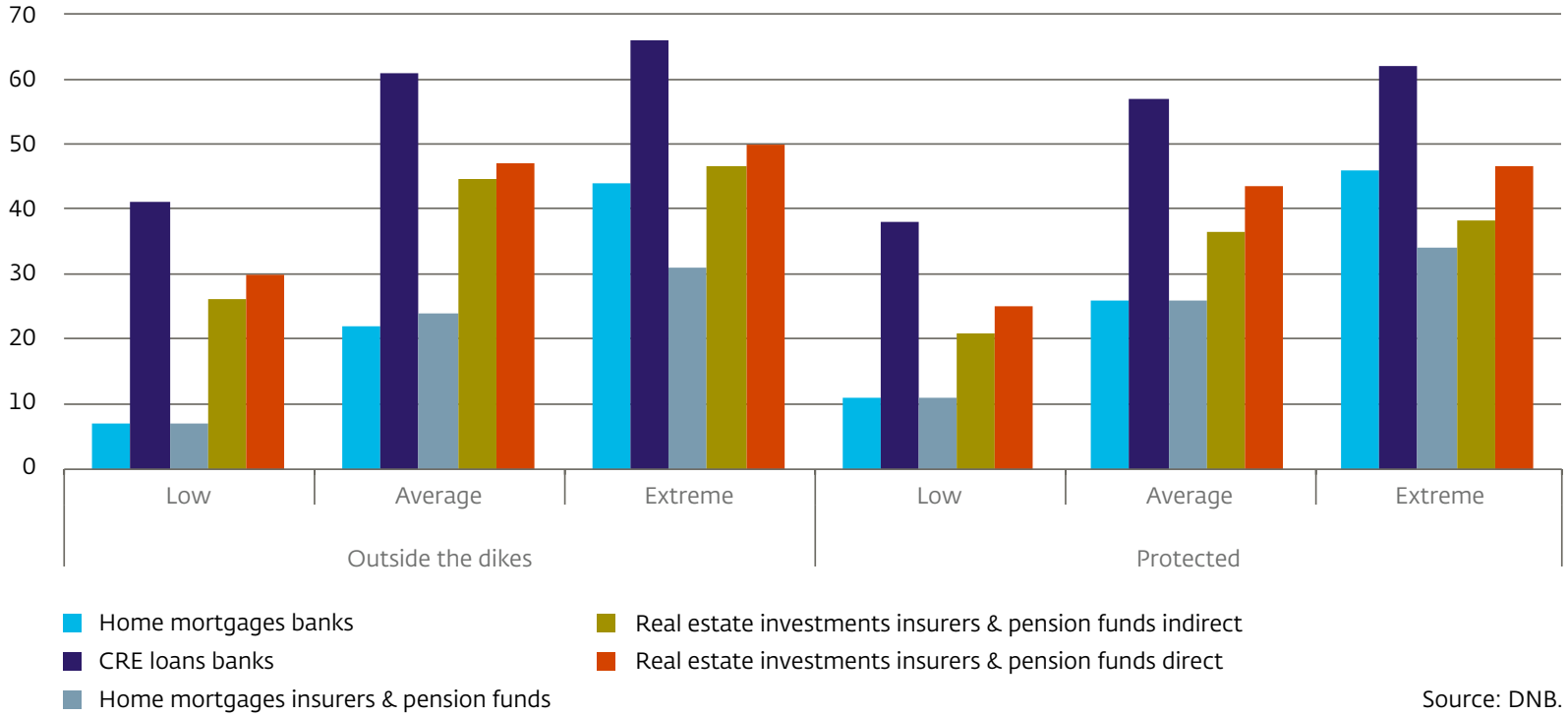


Source: DNB.

Notes: A part of the Dutch real estate exposures is missing, as DNB does not have data on the level of individual loans or buildings for this.

Figure 22 Loss of value of real estate in six stress scenarios

Percentage points

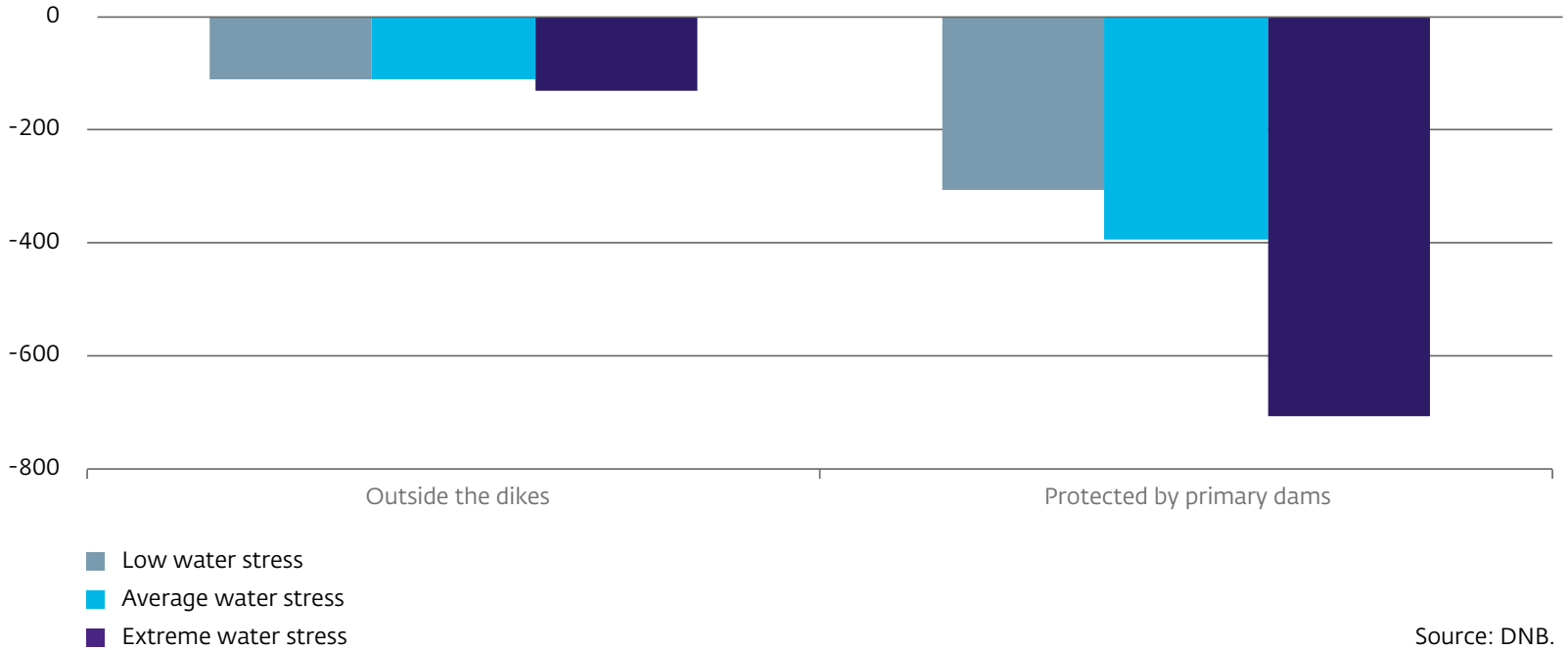


Source: DNB.

Note: Calculations by DNB based on granular data used to compile Figure 21. This shows the estimated decrease in value of real estate in percentage points for two types of flood, in each case with three levels of water stress (low, average, extreme).

Figure 23 Capital impact in six flood scenarios

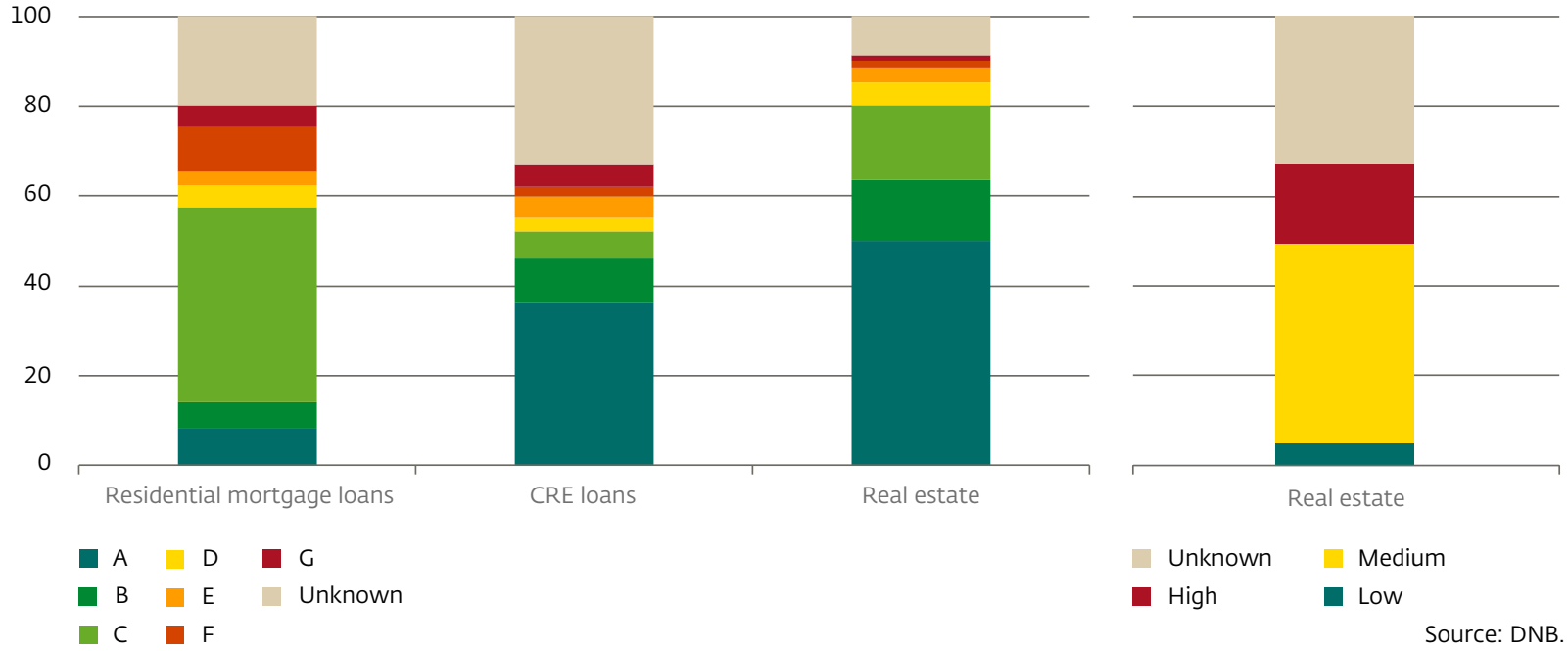
Fall in banks' CET1 ratio in basis points



Source: DNB.

Figure 24 Energy characteristics of real estate exposures

Percentages; by energy label (NL, left) and CO_2 intensity (outside NL, right)



Source: DNB.

Notes: data reported by institutions, supplemented with data from CBS and PBL for NL.

Banks' capital framework: lessons from the crisis

Ties Busschers, Marijn de Jong, Kenny Martens and Marc Reinke

The current capital framework for banks is based on the lessons learned from past crises. It is a complex set of different requirements to safeguard the sector's resilience and minimise the risk of the sector no longer being able to fulfil its vital role in the real economy. Over the past 18 months the sector has indeed proved resilient and the economic crisis has not spilled over to the financial sector. Nevertheless, one of the lessons learned is that the intended flexibility in the buffer framework had not yet been sufficiently used, so capital that was intended for crises was not available and could not be released. Within the scope that the framework already provides, more active use should be made of the releasable buffer. In this way the system remains resilient, but in crisis situations designated authorities can also give banks more headroom to maintain their levels of lending. We intend to do this by building up a Countercyclical Capital Buffer (CCyB). Our modified framework for the accrual and reduction of this buffer does better justice to the inherent uncertainties in the measurement of cyclical risks. At the same time, the more active use of the CCyB means that the system both remains resilient and that the flexibility in the capital framework is better used.

The capital framework - organically developed

The capital framework for banks has a long history of modifications and additions, with the result that banks entered the coronavirus crisis better equipped in terms of the quantity and quality of their capital buffers. The current capital framework has its origin in the international Basel I Accord on banking regulations from 1988. This accord – a milestone in international cooperation in this field – included agreements on the calculation of risk-weighted assets (RWA) and the Basel minimum capital requirement of 8%. Since then the capital framework for banks has continued to evolve, with adjustments being made in response to insights gained from previous crises, resulting in the Basel II and III Accords. This ultimately led to the current capital framework, under which banks are subject to multiple capital requirements in the form of minimum requirements, buffers and supervisory expectations. It meant that banks entered the coronavirus crisis better equipped in terms of the quantity and quality of their capital.

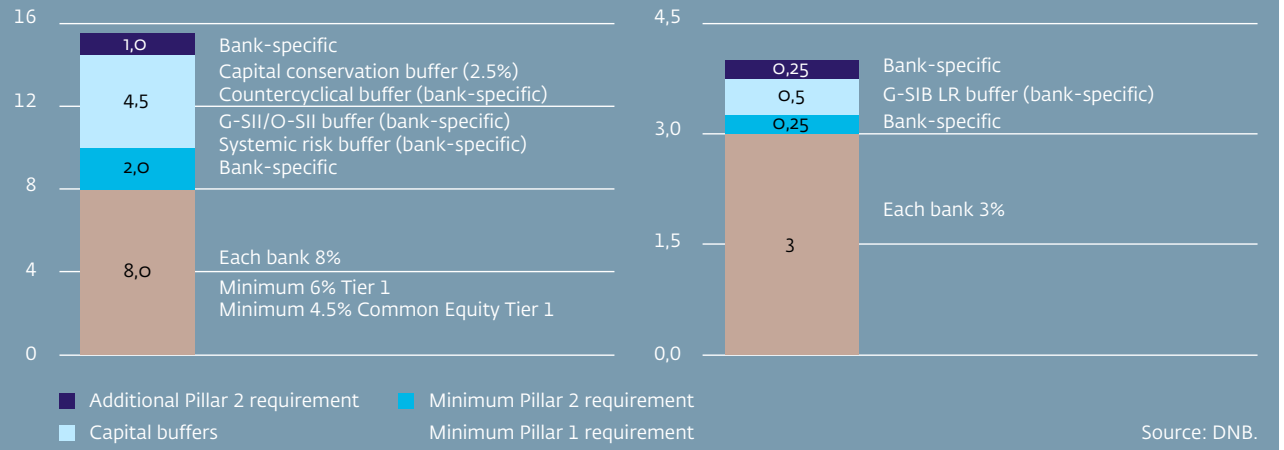
Box 8 The capital framework for banks

The European capital framework is based on the Basel Accords and comprises micro- and macroprudential capital requirements. Microprudential requirements are intended to cover institution-specific risks, while macroprudential buffers provide resilience against risks from or to the system. The capital framework consists of risk-weighted and unweighted requirements. In the case of the risk-weighted requirement a risk weight is allocated to every exposure. The riskier the assets, the higher are the risk weights and nominal capital requirements. A bank is thus required to hold – proportionately – more capital for a risky corporate loan than for a small mortgage with sufficient collateral.

The microprudential framework consists of the Pillar 1 and Pillar 2 requirements, also known as the minimum capital requirements. The Pillar 1 requirement is a uniform 8% capital requirement across of the total RWA. Banks must adhere to this minimum requirement due to general uncertainties and risks present in the banking sector as a whole. Banks must also meet a Pillar 2 requirement (P2R) that the supervisory authority specifies for each bank to mitigate institution-specific risks not sufficiently covered under Pillar 1. In Europe this P2R is determined as part of the Supervisory Review and Evaluation Process (SREP).

Figure 25 The risk-weighted and unweighted capital requirement

Risk-weighted assets in percentages; percentages of exposures



Source: DNB.

In addition to the minimum capital requirements there is the macroprudential combined buffer requirement comprising five buffers, each with its own target and scope. The combined buffer requirement is intended to cover both systemic risks to which institutions are collectively exposed and the risks to the system that an individual institution represents. Banks can use buffers to absorb losses if systemic risks materialise, so they provide additional protection against insolvency. Systemic risks can be divided into a cyclical and a structural dimension. Most buffers are primarily intended to provide resilience against structural risks.

The five buffers are: (i) Capital Conservation Buffer (CCoB): The CCoB is intended to give banks a buffer to absorb losses in times of stress. For each bank this buffer is equivalent to 2.5% of the RWA. (ii) Countercyclical Capital Buffer (CCyB): The CCyB is a buffer focused on the cyclical dimension of systemic risks. The primary aim of the CCyB is to increase the resilience of banks against a build-up of cyclical risks, and to release this capital when risks materialise. (iii)

and (iv) Globally/Other Systemically Important Institutions (G-SII/O-SII) buffer: The G-SII and O-SII buffers are capital surcharges for global (G-SII) or national (O-SII) systemically important banks. Only the highest of the two buffers is a binding requirement. (v) Systemic Risk Buffer (SyRB): the SyRB is a national buffer that can be activated if the designated authority identifies a residual macroprudential risk with potential implications for the stability of the system.

Finally, in addition to the macroprudential buffers, each individual supervisory authority has devised a capital expectation (Pillar 2 Guidance or P2G). This is a bank-specific capital surcharge serving as a buffer to absorb losses in stress situations.

In addition to the risk-weighted capital requirements, there is also an unweighted leverage ratio (LR) requirement. This requirement is specified for all exposures rather than the risk-weighted exposures. Among other things the LR requirement provides resilience against excessive leverage and model imperfections in the calculation of risk weights.

Finally, there are also requirements set by the resolution authority to ensure that failing banks can be resolved in the best possible way without disrupting the system or resorting to public funds. The various capital requirements can sometimes be met with the same capital. This leads to a partial overlap, so there may be different binding requirements depending on the circumstances.

Failure to fulfil requirements of the capital framework leads to automatic restrictions and disciplinary actions by the supervisory authority. Banks that do not comply with the P2G are required to draw up a revised capital plan and are subjected to additional requirements in the event of a prolonged breach. If a bank draws on part of the combined buffer, automatic restrictions on capital distributions come into force. This activates the maximum distributable amount (MDA) trigger and consequently the bank faces proportionate restrictions on distributions. This prevents capital outflows and encourages banks to maintain their level of capital. Finally, if the minimum capital requirements are breached, the bank may have its licence withdrawn.

The capital framework has been designed in order to address as many risks as possible. That does not mean that every buffer is used everywhere or applies to every bank. Before the coronavirus crisis, for example, only seven euro area countries had activated or announced a CCyB. The levels of their buffers also differed substantially. In Germany, for example, banks had built up a CCyB of 0.25% before the coronavirus crisis, while in Slovakia there was a binding CCyB of 1.5%. The total CCyBs in the euro area amounted to only 0.2% of the total RWA in the euro area. Only five euro area countries, including the Netherlands, had activated the SyRB before the coronavirus crisis. This buffer also differed widely before the coronavirus crisis. Most of the countries had not activated the SyRB, while others – including the Netherlands – applied an SyRB of 3%. The euro area as a whole has eight G-SIBs, including ING in the Netherlands, and each euro area country has one or more O-SIIs. The Netherlands has five. Before the coronavirus crisis all these predominantly structural buffers collectively[26] amounted to 3.4% of the total RWA in the euro area.[27]

26 CCoB, G-SII/O-SII and SyRB
27 Macroprudential policy after the COVID-19 pandemic (europa.eu)

Lessons from the coronavirus crisis

Partly due to the higher quantity and quality of capital in the banking system, the economic crisis has barely spilled over to the banking sector. The pandemic led to the biggest economic shock since the Global Financial Crisis (GFC) of 2007-08. European banks have so far weathered the economic impact of the coronavirus well. This can also be seen from the latest EBA stress test (summer 2021) in which, despite a challenging macroeconomic scenario, the average CET1 ratio for European banks – and Dutch banks in particular – remains solid. According to the stress test the average CET1 ratio in the euro area remains 9.9% of total RWA at the end of 2023 (Netherlands: 11.6%). The resilience of the banking sector is primarily due to the tighter capital and liquidity requirements and the accrued management buffers, i.e. capital above the capital requirement. Secondly, institutions have in particular also taken advantage of the extensive package of fiscal, prudential and monetary support measures, while system-wide payout restrictions ensured that extra capital remained in the system.

Banks have been able to maintain the level of lending during the coronavirus crisis (Figure 26). Banks play a vital role particularly in times of crisis. By continuing to lend they can mitigate an economic crisis and reduce the damage done to the real economy. The risk, particularly at times of crisis, is that banks collectively feel incentivised to restrict their own lending and to reduce their risk profile, in order to improve their capital position. If banks do so on a large scale, this may trigger negative macroeconomic consequences and actually exacerbate a crisis – as well as its impact on the banks. Since the outbreak of the coronavirus crisis there has been no such procyclical effect observed at the macro level. The level of lending has been maintained and only a limited number of European banks have seen their capital approach the level of the capital buffer requirements.

Although banks' capital buffers provide scope to absorb losses and to maintain the level of lending, the question is whether in practice banks view the role of buffers in that way. Buffers constitute an additional layer of capital on top of the minimum requirements, which banks can use if necessary without immediately breaching the minimum capital requirements. Drawing on buffers does nevertheless trigger payout restrictions, for example limits on dividend distributions or AT1 coupon payments, and institutions are subjected to stricter supervision, for example through the compulsory submission of a capital conservation plan. The question is whether banks are prepared to use buffers without reducing their lending or adjusting their risk profile or as additional "minimum capital requirements".

Currently there is no conclusive empirical evidence that buffers are seen in practice as being of limited use. The ECB has conducted research into the usefulness of buffers and sees indications that some banks are cautious when it comes to drawing on their buffers. These are nevertheless preliminary results which, moreover, show no trend at the macro level. It is still too early to draw any final conclusions at the macro level. Banks' capital ratios have remained stable and there has been no credit crunch, partly due to the accommodative fiscal and monetary policies. Hitherto, therefore, there has been no need to draw on buffers.

Nevertheless, there may be valid reasons for banks to be cautious when it comes to drawing on their buffers. Banks themselves may be uncertain about future losses or their ability to rebuild buffers in the future. They may also fear rating agency downgrades, rising funding costs or market stigma because they are subjected to payout restrictions as soon as they breach their buffer requirement. A final argument is that the overlap with other capital requirements, e.g. leverage ratio or MREL requirements, in practice prevents drawings on buffers because the capital fulfilling the buffer requirement is used in parallel for different

requirements. For example, the unweighted minimum requirement, i.e. the 3% leverage ratio, may restrict a bank in such a way that it cannot draw on all or part of the available capital buffers (see also Box 8 'The capital framework for banks').

The coronavirus crisis points to the added value of more releasable buffers alongside the other buffer requirements. A structurally fixed layer of buffer capital, such as the Capital Conservation Buffer, is important to provide resilience against unexpected losses without immediately breaching the minimum requirement. These buffers enhance the resilience of institutions and reduce the likelihood of a bank failure. In order to facilitate banks to maintain lending, without concerns about the effects of drawing on buffers during a crisis, in such a way that avoids unnecessary damage to the real economy, it is desirable to introduce an additional releasable buffer, for example in the form of a Countercyclical Capital Buffer. There is now broad consensus on the importance of having sufficient releasable capital, which also is evident in the results of a BCBS questionnaire sent to supervisory authorities, in which around two-thirds of the respondents endorse its importance.[28]

The current capital framework already includes the possibility of building up a releasable buffer in the form of a CCyB, but this has only been used to a limited extent. As stated in Box 8, CCyBs made up only 0.2% of the total RWA in the euro area at the end of 2019. This limited accrual of a releasable buffer is due to the fact that the rationale behind the CCyB was geared towards the lessons from the GFC. The risks of excessive credit growth became evident after the financial crisis. The methodology used to calibrate the CCyB therefore also focusses mainly on vulnerabilities due to excessive credit growth. It may consequently place too little emphasis on other types of cyclical risks. Partly for this reason, the ESRB has recommended also to take other dimensions of cyclical systemic risk into account.

The Netherlands: CCyB in the future

It is important that prudential easing is phased out in the near future and that the already existing flexibility, in terms of releasable capital in the capital framework, will be fully used. At the beginning of the coronavirus crisis a wide range of prudential, fiscal and monetary support measures were introduced. These have made an important contribution to limiting the economic damage and absorbing the shock, but ultimately they must also be phased out. From a prudential perspective this could mean among other things that the easing measures in the P2G and the Capital Conservation Buffer and the exemption of central bank reserves from the leverage ratio are reversed, and that regulations such as Basel III are implemented fully, consistently and timely, as the Netherlands and 19 other EU Member States argue in this joint letter. In addition, we believe it is important that the already existing flexibility in the capital framework will be better used more and that we can release buffers that are meant to be released in the event of (unexpected) systemic shocks.

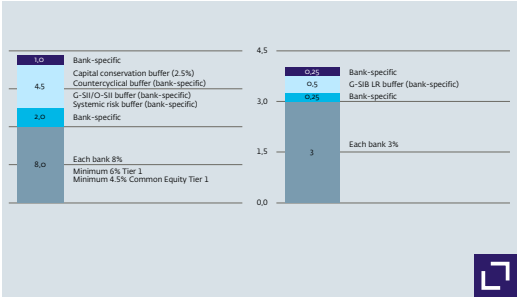
28 Survey conducted in the first quarter of 2020. See Early lessons from the Covid-19 pandemic on the Basel reforms (bis.org)

We are working on the introduction of the CCyB in a standard risk environment. In March 2020, we announced our intention to have a neutral CCyB of 2%. The CCyB will be built up in the future when risks increase and released if circumstances require so. A release of the buffer reduces the combined buffer requirement, giving banks additional capital headroom without the maximum distributable amount (MDA) trigger getting hit. Banks can thus continue to fulfil their core function. In addition, release of the CCyB in times of crisis can convey confidence and signal that a macroprudential authority stands ready to limit damage to the economy and the financial sector.

We are modifying our existing CCyB framework to accommodate the new CCyB policy. Partly due to the complexity and continuous developments of the financial system, there is inherent uncertainty surrounding the measurement of (cyclical) systemic risks. In order to take this into account more fully, the CCyB will in the future be built up in a standard risk environment, i.e. when cyclical systemic risks are neither particularly low nor particularly high. An advantage of this is that banks build up the buffer gradually and thus have timely access to capital that can be released if unexpected risks should materialise. It can also be easier for institutions to accumulate capital at this stage of the cycle, thereby ensuring that the buffer is not built up too late.

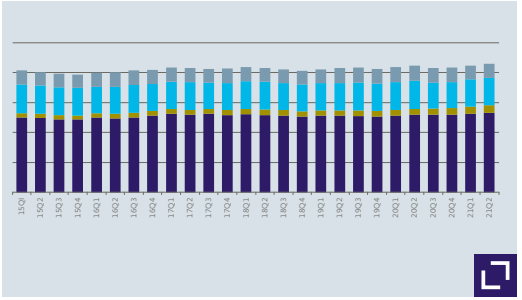
We will launch a consultation on the new CCyB framework at the beginning of December 2021. This consultation will last six weeks. As usual, responses to this consultation will be considered before the framework is adopted. We will use the revised framework to take future decisions on the CCyB. When activating the buffer in the future, we will consider the interaction of the CCyB with other capital requirements, in order to avoid the Dutch banking sector from being faced with disproportionate capital surcharges within a short period of time.

Figures



The risk-weighted and unweighted capital requirement

See figure 25 →

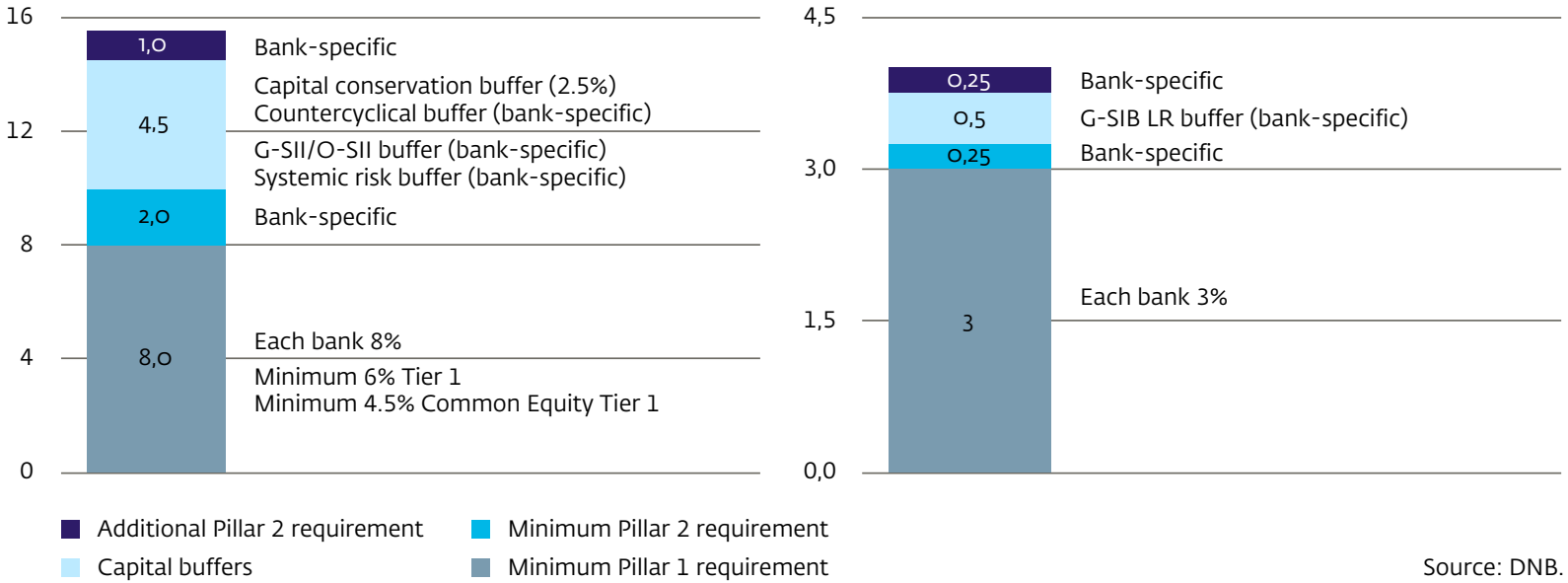


Domestic lending by Dutch financial institutions

See figure 26 →

Figure 25 The risk-weighted and unweighted capital requirement

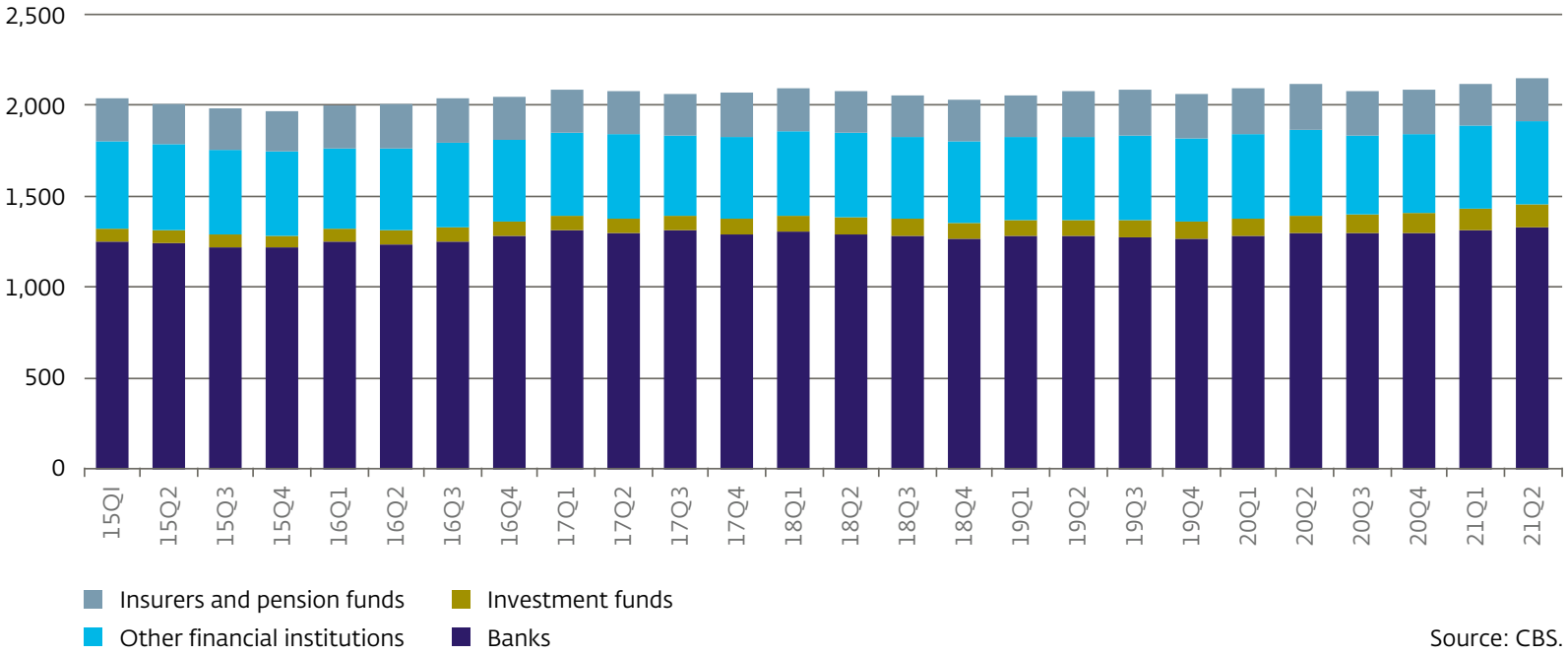
Risk-weighted assets in percentages; percentages of exposures



Source: DNB.

Figure 26 Domestic lending by Dutch financial institutions

EUR billions



Source: CBS.

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