Analysis

Inflation and monetary policy

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1 Introduction

After a long period in which inflation remained well below the European Central Bank's target, prices in the Netherlands and the euro area have shot up in recent months. This is partly due to the reopening of the economy after the COVID-19 crisis, which was accompanied by a sharp increase in demand that supply has yet to catch up with. The Ukraine crisis has added to this conundrum, especially as energy prices have risen sharply. Economic growth is losing momentum due to the war in Ukraine, and this puts the ECB in a difficult position. The central bank has to balance curbing inflation (by raising interest rates) with stimulating growth (by keeping interest rates lower). As the ECB's primary mandate is to ensure price stability, it has started to phase out its support measures. In the longer term, however, high inflation and low growth are not necessarily incompatible: a recent study by DNB researchers shows that an inflation level of above ~4% harms long-term growth potential. Reducing very high inflation therefore can foster economic growth in the long run.

This DNB analysis is a follow-up to a DNB analysis from March 2022, which presented a scenario in which the Dutch economy is exposed to long-term disruption of the commodity market as a result of the war in Ukraine.[1] That analysis shows that the Dutch economy and that of the euro area as a whole both suffer considerably from these disruptions. The focus of this analysis is on the euro area and the implications for monetary policy. The first section describes the economic outlook, the role of energy prices and the broadening of inflationary pressures. The second section focuses on the role of monetary policy. In particular by looking at the importance of demand and supply shocks, the risks of inflation expectations moving away from the 2% target (de-anchoring) and second-round effects through wage formation. Finally, we discuss the steps already taken by central banks to curb inflation and possible further steps they can take.

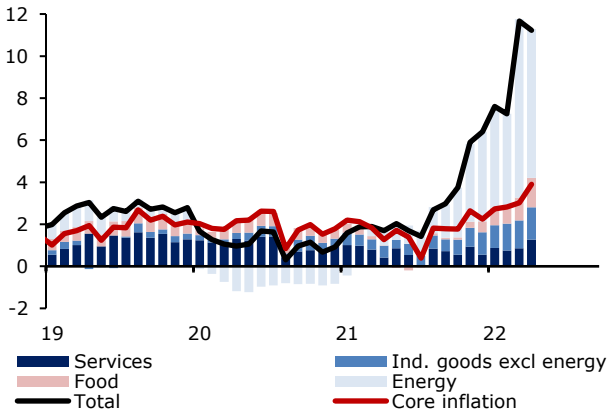
[1] On 13 June 2022, DNB will publish new estimates for the Dutch economy.

2 Economic outlook and drivers of inflation

2.1 Energy and commodity prices

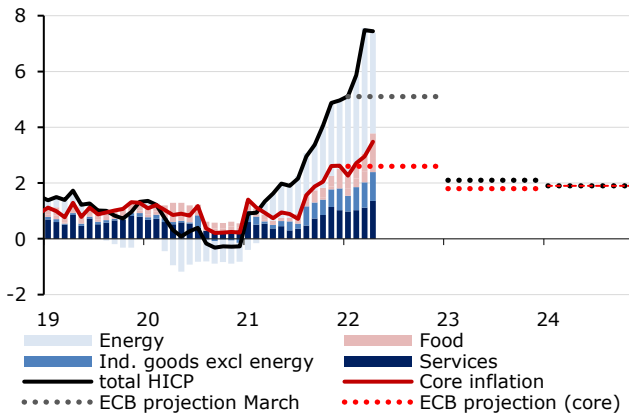
Dutch inflation started to rise in the second half of 2021, when economic demand picked up due to the relaxation of coronavirus restrictions. During this period, supply struggled to keep up with this increasing demand, due to the lingering distortions in production and supply chains and scarcity in the global markets for energy and other commodities. The Russian invasion of Ukraine has added to the supply problems, causing commodity prices – and the price of natural gas in particular – to rise to unprecedented levels. The sharp rise in energy prices is one of the main driving forces behind the rise in inflation. Since the end of 2021 households and businesses have been paying significantly more for fuels, especially natural gas and electricity. In April 2022, energy prices in the Netherlands were 83% higher compared to the year before. This obviously has an impact on inflation. Dutch inflation, calculated according to the harmonised consumer price index (HICP), was 11.2% in April, of which as much as 7.0 percentage points were due to energy inflation (Figure 1).

Figure 1 – Dutch inflation and its components
percentage points and percentage changes (y-o-y)



Sources: DNB HICP estimate, Eurostat and Statistics Netherlands

Figure 2 – Euro area inflation and its components
percentage contributions resp. annual changes and average annual estimates



Sources: Eurostat and Statistics Netherlands.

The same applies to the euro area, although the picture is slightly less extreme (Figure 2). Year-on-year inflation in the euro area was 7.4% in April. The difference with inflation in the Netherlands is largely due to the fact that the price movements of natural gas and electricity are measured differently in the Netherlands than elsewhere in the euro area. In particular, Statistics Netherlands (CBS) measures the prices that energy companies offer on new contracts every month. However, a large proportion of consumers have multi-year contracts with a fixed delivery price. As a result, they are not yet affected by the high energy prices, even though the

increase has already been fully incorporated into the inflation rate. Another reason why Dutch and euro area inflation differ is that compared to the euro area average, the Dutch economy is more dependent on natural gas consumption. The increase in natural gas prices therefore has a more significant impact on Dutch inflation than on euro area inflation.

2.2 Broadening of inflation

The sharp rise in the energy component of inflation does not tell the whole story, however. We see clear indications that inflationary pressures have been increasing across the board. In part, these are higher costs of energy and commodities that companies pass on to consumers. However, rising demand, especially for goods and to a lesser extent for services, is also driving price increases. The broadening of inflation has an important consequence. High inflation rates for non-energy components are more persistent than those for the energy components and therefore remain high for longer, even when energy inflation falls again. This is one of the findings of the Inflation Persistence Network (IPN) which examined the dynamics of inflation in the euro area. A persistently high inflation rate can lead to a de-anchoring of inflation expectations. To get a feel for the degree of inflation persistence, central banks therefore look closely at the development of underlying inflation, trying to see through temporary fluctuations.

Figure 3 – Measures of underlying euro area inflation at or near historic highs

**y-o-y changes, box plots*

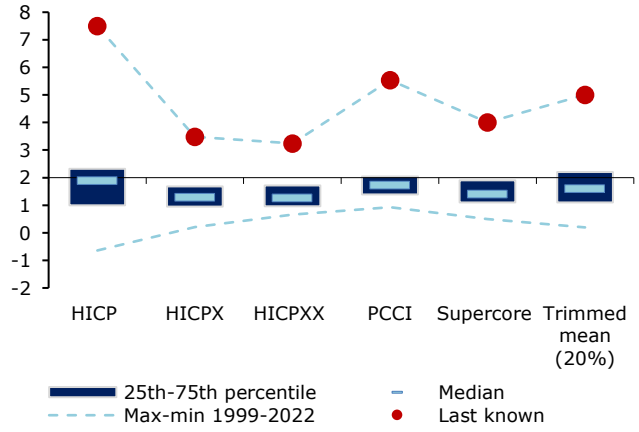
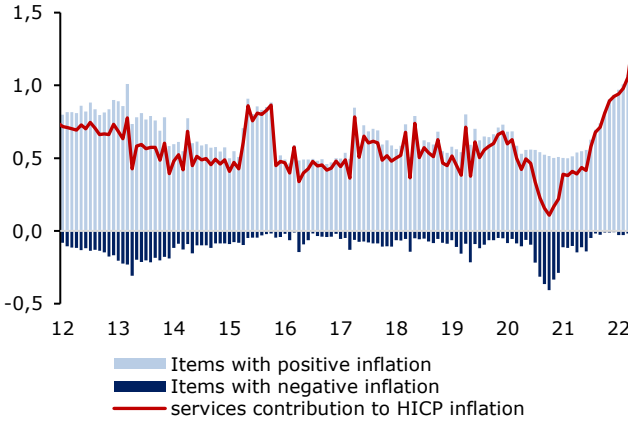


Figure 4 – Euro area services inflation rises sharply

**percentage point contribution to headline HICP*



Source: DNB based on ECB/SDW data. The most recent observation is the April inflation rate. The figure on the left shows, in addition to HICP inflation (left), five measures of underlying inflation: inflation excluding food and energy; inflation excluding food, energy and other volatile items; the persistent components of inflation; the components that move with the business cycle; *trimmed mean* measure leaving out the 10% of items with the highest and 10% with the lowest inflation, thus leaving out the most volatile items.

Several measures of underlying inflation show an increase. Figure 3 – which shows box plots for the HICP index and for five measures of underlying inflation – documents how for each of these measures, recent figures have been at or near the historical maximum. For example, at 5.5% the Persistent and Common Component of Inflation (PCCI)[2] inflation rate is higher than

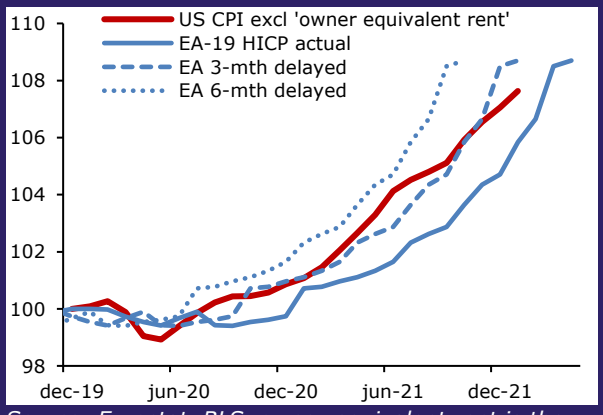
[2] Persistent and Common Component of Inflation (PCCI) is a measure developed by the ECB to analyse common and persistent inflation developments. PCCI uses information from 1,000 subcomponents of twelve euro countries in an econometric analysis.

the other underlying measures, whereas in previous months it was mostly between 1.5% and 2.0%. As this measure reflects the development of the persistent components of inflation, it suggests a risk that inflation will remain high for some time. Service inflation (Figure 4) also shows that inflationary pressures have broadened. Services account for 42% of the euro area HICP price index, and they are not directly affected by higher commodity prices or disrupted production chains. However, we also see a sharp increase in the contribution of services to inflation from the second half of 2021, with almost no services experiencing a fall in prices.

Box 1 - Euro area and United States inflation comparison

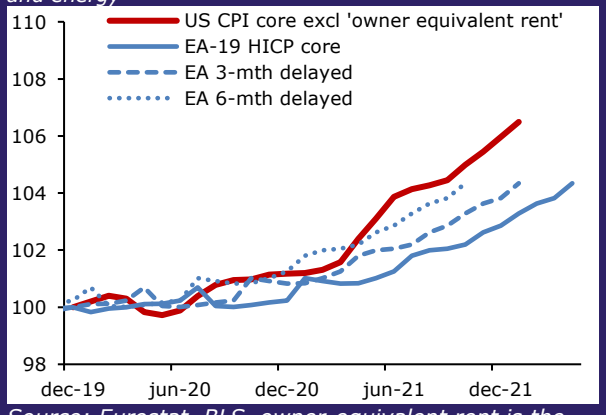
Compared to the euro area, the economic recovery from the COVID-19 crisis started one to two quarters earlier in the United States. Partly as a result of this, inflation dynamics in the United States also started earlier than in the euro area. The figures below show a comparison between US and European price trends from 2019, for total expenditure and for expenditure excluding energy and food. For the sake of comparability, the US figures exclude imputed rent for owner-occupiers, and the euro area price index is adjusted for seasonal patterns. Figure A shows that the development of headline inflation in the euro area lags behind the United States by about three months. For core inflation, the euro area lag is at least six months, and price developments seem to have accelerated only recently (April) to the level already observed in the United States in April 2020 (Figure B). It is important to note that this is a description of stylised facts of recent years and does not imply a forecast for the euro area based on US inflation.

Figure A - Headline inflation – EA versus US
Seasonally adjusted indices Dec 2019 = 100



Source: Eurostat, BLS, owner-equivalent rent is the imputed rent for owner-occupiers

Figure B – Core inflation – EA versus US
Seasonally adjusted indices Dec 2019 = 100, excl. food and energy



Source: Eurostat, BLS, owner-equivalent rent is the imputed rent for owner-occupiers

A possible explanation for the stronger rise in core inflation in the United States is the faster economic recovery. Wages in the United States also react more strongly to the business cycle and labour shortages than in the euro area, where labour relations and wages are more rigid. Moreover, more so than in the euro area, coronavirus support has been distributed directly to households in the United States. It therefore has a stronger impact on consumption and, ultimately, on consumer prices.

3 The role of monetary policy

The rise in inflation raises the question of the role of central banks and how monetary policy can be used to curb inflation. Monetary policy does not directly affect all price developments and has a delayed effect. Central banks therefore focus on price stability over the medium term, with the ECB aiming for 2% inflation. In the short term, deviations from this target are inevitable, for example in the case of economic shocks. The Eurosystem prepares quarterly projections to assist the ECB's Governing Council in gaining an understanding of inflation over the medium term. The next projections for the euro area will be published on 9 June and take into account the most recent data on the economy and financial markets. The projections are important input for further discussions on the design and calibration of monetary policy.

The ECB is currently facing very high inflation, but economic growth is also under pressure – which is likely to slow down inflation over time. Both are largely due to the war in Ukraine. If high inflation starts to affect wages and inflation expectations, the risk increases that inflation remains high for a long time – which ultimately will have a structurally negative impact on growth. The role of central banks is therefore not to let high inflation permanently infect the behaviour of households and businesses. In addition, governments can mitigate the negative effects of high inflation with targeted compensation measures for vulnerable households.

3.1 Inflation affecting wages and inflation expectations

In the Netherlands, negotiated wage increases have increased in recent months to 2.8% y-o-y in April, according to Statistics Netherlands. According to the measure used by the Dutch General Employers' Association (AWVN), which is based on the unweighted contracts concluded in May and is more forward-looking, the negotiated wage increase amounts to 3.7%. For the euro area, wage growth lags further behind inflation, with contract wages 1.8% higher in March compared to a year earlier (excluding one-off payments)[3]. The rise in Dutch negotiated wages is understandable, given current inflation and the very tight labour market. Real wages have fallen sharply and employees and trade unions are trying to make up for this loss at the negotiation table. This is a normal economic phenomenon in which imbalances created by high inflation are corrected. In this process, underlying inflation is usually reflected in negotiated wages with a lag of a few quarters. The dynamics between wages and prices only become problematic when a leapfrogging effect between prices and wages occurs: a wage-price spiral.

Persistently high inflation has raised concerns about the anchoring of inflation expectations. These concerns are reinforced by the continued upward surprises in inflation figures and indications from sectoral data that high inflation has become more broadly based. Consequently, the longer-term (5-year) inflation expectations of professional forecasters have risen above 2% (Figure 5; SPF), and even 2.4% for the most recent 10-year Consensus forecast. Inflation expectations for 5 to 10 years, which are derived from financial instruments

[3] Including one-off payments, negotiated wages in the euro area increased by 3.7% in March, mainly due to coronavirus-related payments in Germany. One-off benefits show an acceleration, but are very volatile.

(inflation-linked swaps), rose rapidly to around 2.4% and have fallen back somewhat in recent weeks to around 2.2%.

A model-based decomposition of the inflation swap curve suggests that the increase is mainly driven by the inflation risk premium (Figure 6). This is because the observed inflation swap rate is not a clean measure of inflation expectations and contains an inflation risk premium. The inflation risk premium is the additional compensation that an investor requires to bear inflation risk, and is an indication of the risk balance that financial markets attribute to future inflation developments. The risk balance has shifted towards high inflation. All in all, professional forecasters and financial markets seem to be assuming as yet that inflation will stabilise at the upper end of the 2% inflation target, which also takes into account a number of interest rate hikes by the ECB this year (see Section 4).

Figure 5 – Survey-based and market-based inflation expectations on the rise

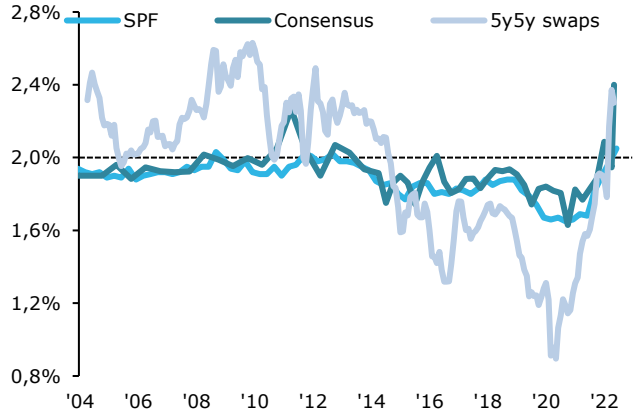
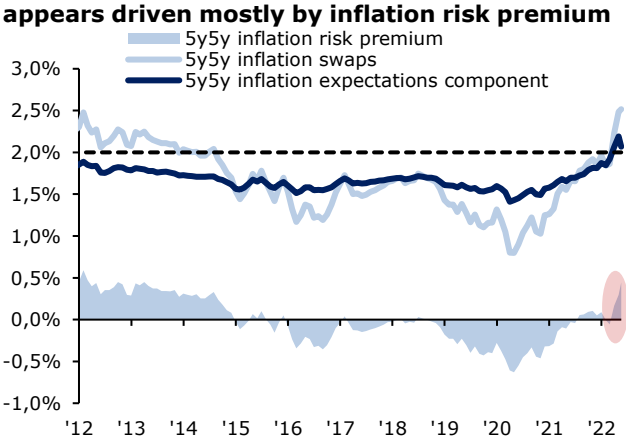


Figure 6 – Increase in inflation swap rates appears driven mostly by inflation risk premium



Sources: SPF, Consensus, Bloomberg. The decomposition of the 5y5y ILS is based on an estimated model that follows the methodology outlined in Camba-Mendez and Werner (2017). Most recent observation: 25 May 2022.

A monthly representative survey of about 2,400 Dutch households also shows that inflation expectations among households have become less anchored since mid-2021 (see Galati et al. 2022). In this survey, half of the respondents are given information on the ECB inflation target and actual inflation. Short-term expectations refer to a horizon of one year, long-term expectations to a horizon of ten years. The median short- and long-term household expectations of euro area inflation have risen sharply since last summer (Figure 7). Moreover, households' expectations of the likelihood of high inflation – i.e. 4% or higher – have increased during the recent period of high inflation realisations, both for the short and long term (Figure 8). This pattern of long-term household expectations suggests that they are at risk of de-anchoring in the euro area, as inflation has risen well above target in the aftermath of the pandemic. This pattern is even stronger for the long-term expectations of households that were not given information in the survey. These results suggest that inflation expectations may respond to realised inflation, and households' expectations are therefore to a large extent backward-looking. This is detrimental to the effectiveness of monetary policy and increases the likelihood that inflation will remain high for an extended period.

Figure 7 – Median household expectations of inflation

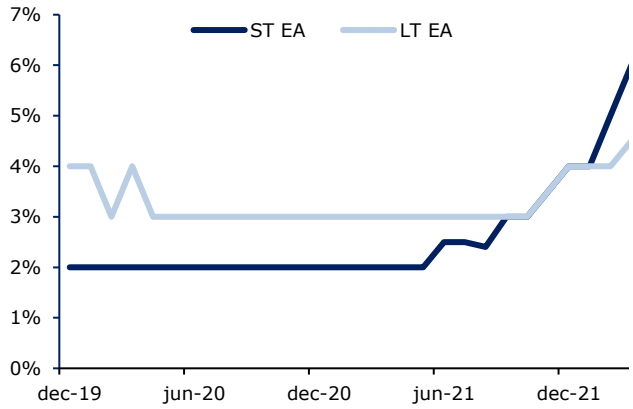
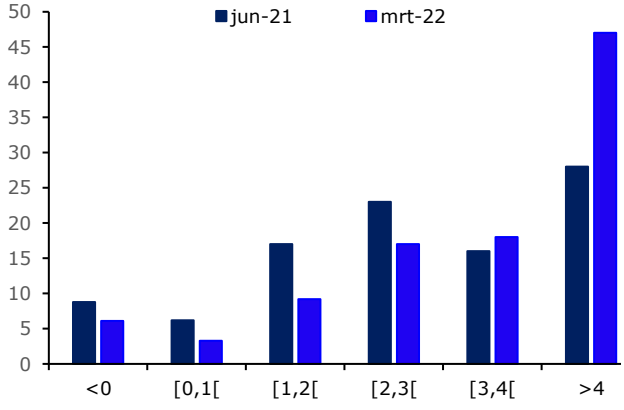


Figure 8 – Distribution of household long-term inflation expectations



3.2 Both supply and demand factors drive inflation

Another relevant question for determining the orientation of monetary policy is to what extent inflation is driven by demand shocks, which a central bank can stabilise, or by supply-side developments, which a central bank cannot directly influence, such as high energy prices. For example, higher than expected inflation can be caused by both adverse supply shocks and positive demand shocks. The broadening of inflation (see Section 2) suggests that demand shocks play a role, since the more goods in the inflation basket show an increase in price, the more likely it is that this is driven by increased demand rather than supply problems for specific goods. Intuitively, the fact that both economic growth and inflation went up unexpectedly in the second half of 2021 also seems to indicate that demand shocks play a role (Figure 9). Supply shocks, for example, are more likely to be associated with disappointing growth forecasts and higher inflation.

Figure 9 – 2021 euro area inflation and growth higher than expected

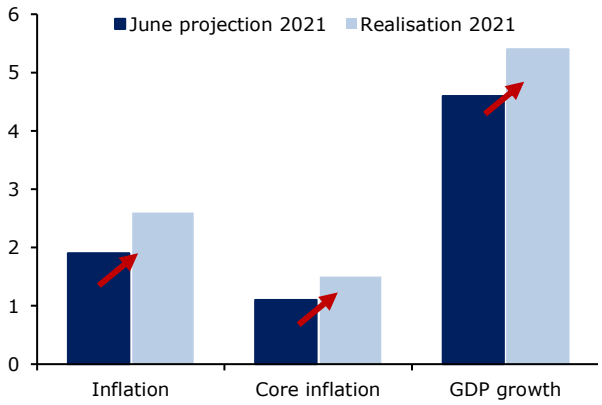
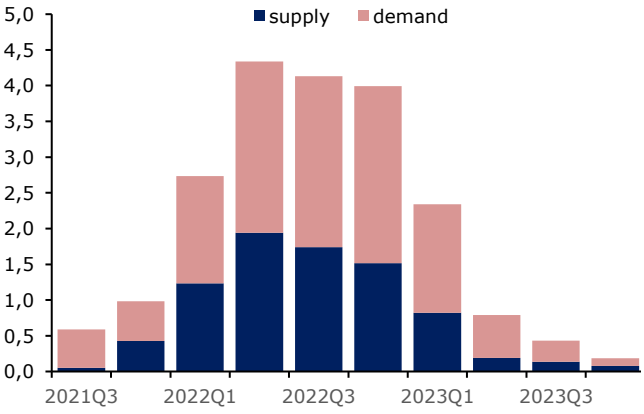


Figure 10 – Decomposition of inflation forecast errors also shows role of positive demand shocks



Source: DNB based on ECB/SDW. The figure on the right is based on a VAR analysis for inflation, the energy component of inflation, the industrial production index and the nominal interest rate. The y-axis shows the quarterly forecast errors of the June 2021 estimate for inflation in the euro area, distinguishing between the roles of demand and supply shocks. From 2022Q2 onwards, inflation forecast adjustments are used instead of forecast errors. Supply and demand shocks are identified through 'sign restrictions': for supply shocks, inflation and industrial production

move in the same direction, while for demand shocks they move in the opposite direction. Demand shocks also include monetary policy shocks.

Further analysis of the co-movement of surprises in GDP output and inflation confirms that supply and demand shocks have both played a role. For example, a decomposition of recent medium-term inflation forecasts shows that high inflation, especially in the second half of 2021, is not exclusively driven by negative supply shocks, but that positive demand shocks also play a role (Figure 10). About 60% of the adjustment in the inflation outlook can be explained by demand shocks and 40% by supply shocks. In the first months of 2022, the picture reversed somewhat, as the Ukraine crisis is a further de facto supply shock to the euro area economy. Examples of negative supply shocks include COVID-19 containment measures, supply chain disruptions and increased prices of energy and other commodities as a result of the war in Ukraine. The positive demand shock is linked to a strong pick-up in demand when COVID-19 restrictions were relaxed, combined with particularly accommodative fiscal and monetary policies.

4 What is the monetary policy stance?

Against the background of high inflation, which, as mentioned, is not driven by a supply shock only, the ECB Governing Council decided in December 2021 to gradually normalise monetary policy. Central banks typically steer inflation by changing policy interest rates. In recent years, however, they have also used other instruments to influence prices, as interest rates were already very low. Specifically, the ECB has provided long-term loans to banks (longer-term refinancing operations – TLTROs[4]) and purchased bonds under specific programmes such as the Asset Purchase Programme (APP) and the Pandemic Emergency Purchase Programme (PEPP). As a result, the ECB's balance sheet has grown strongly in recent years (see Figure 11) to stimulate the economy, push up inflation – which was well below the ECB's target for a long time – and prevent permanent damage from financial market turmoil following the outbreak of the COVID-19 pandemic. Accordingly, normalising monetary policy involves various instruments, and these are discussed in this section.

Figure 11 – ECB balance sheet increase mainly caused by COVID-19 crisis

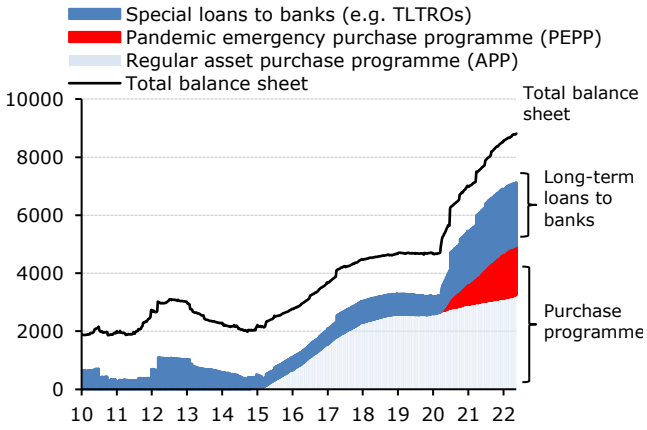
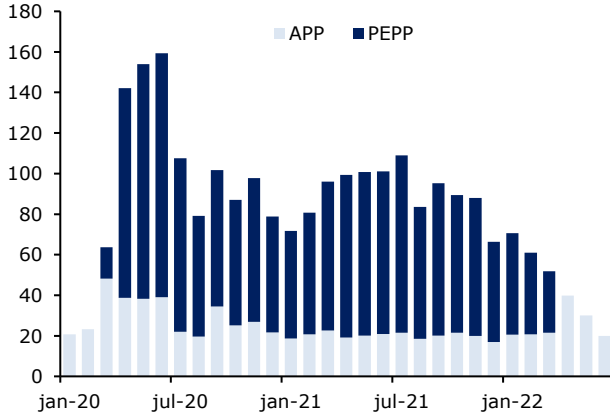


Figure 12 – Purchase programmes sharply reduced after peak of COVID-19 crisis



Source: DNB based on ECB data. The difference between the balance sheet total and the remaining items includes foreign currency, regular monetary operations (MRO, MLF), gold reserves, and covered bond purchase programmes (CBPP1 and 2). Balance sheet data until 13 May 2022. Right-hand figure: PEPP and APP figures also include other purchases, including of corporate bonds.

4.1 Purchase programmes

In December 2021, the ECB decided to terminate the pandemic emergency purchase programme (PEPP) on 31 March 2022, which happened without much friction.[5] Purchases under the regular purchase programme (APP) are currently being phased out and are expected to end at the beginning of the third quarter (see also the recent blog by ECB President Christine Lagarde). All in all, this will put a fairly rapid end to the monthly purchases, which peaked at €160 billion during the height of the COVID-19 crisis (Figure 12). This phasing out of the

[4] The third TLTRO will end in June 2023. During the COVID-19 crisis, the ECB temporarily eased the TLTRO conditions, as well as the rates that banks pay on the amounts they borrow under the programme. These special conditions end in June 2022.

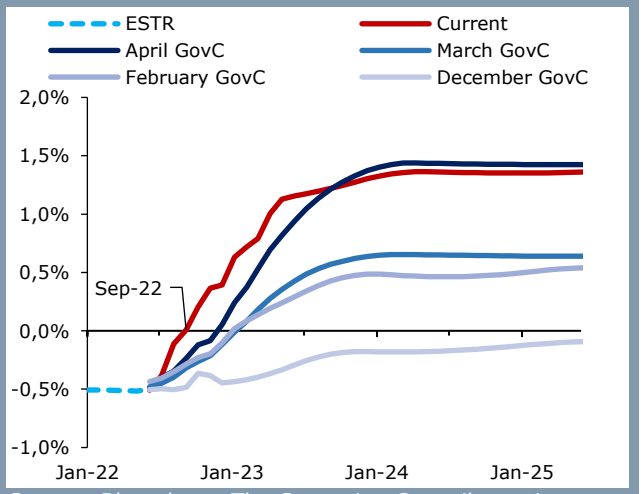
[5] Monetary policy decisions, 16 December 2021

purchase programmes is taking place much faster than the ECB had anticipated in December 2021. At the time, the Governing Council expected to return to pre-pandemic purchase volumes by the fourth quarter of 2022, and it had not yet announced their termination.[6] For the time being, however, the ECB is maintaining a presence in the market through reinvestments. It intends to continue reinvesting, in full, the principal payments from maturing bonds purchased under the APP for an extended period of time past the date when it starts raising the key interest rates. Maturing bonds under the PEPP will be reinvested until at least the end of 2024. This is relevant because it can contribute to the normalisation of monetary policy, as the ECB's market presence ensures a smoother transition, allowing financial markets to better absorb higher interest rates.

Box 2 – Financial markets' expectations of interest rate path

The €STR forward curve provides an indication of the development of policy interest rates as expected by financial markets. A forward curve shows forward rate agreements for different maturities. Market participants use these to hedge against expected changes in policy rates. By providing forward guidance, central banks attempt to influence the priced-in interest rate path, as it affects broader financial conditions. The €STR forward curve has recently moved sharply forward (see Figure c), implying that markets expect a faster rise in policy rates. Currently, a first rate hike is being partly priced in for July, and markets expect to see a policy rate increase to 0% in September (see Figure c). This shows that markets are pricing in a more aggressive policy rate path than in December, clearly moving with incoming data.

Figure C - Markets price in more aggressive policy rate path



Source: Bloomberg. The Governing Council meetings were held on 16 December 2021, 3 February 2022, 10 March 2022 and 14 April 2022. We plotted this curve on 29 May 2022.

4.2 Policy interest rates

Bringing forward the APP's intended expiry date allows for a first interest rate hike in July 2022. This is because the ECB has so far communicated that a first interest rate increase will take place 'some time' after the end of net purchases and that three conditions must first be met.[7] In particular, inflation must reach 2% well ahead of the end of the projection horizon and

[6] The ECB intended to continue the APP for as long as the inflation outlook warranted this, which is why the APP was open-ended. Purchases will be terminated just before the first interest rate increase.

[7] The fact that termination of net purchases precedes a rate hike is not a hard and fast economic rule. The ECB opted for this to avoid shocks to the economy in the absorption of a rate hike and because it has chosen to phase out the most unconventional monetary policy measures first before raising interest rates.

durably for the rest of the projection horizon, and the ECB Governing Council must judge that realised progress in underlying inflation (adjusted for more volatile inflation components, see Section 2) is sufficiently advanced to be consistent with inflation stabilising at 2% over the medium term. Given the current outlook and inflationary developments, it is likely that these conditions will be met in the short term and that key policy rates will indeed be raised for the first time in July (see also the recent blog by ECB President Christine Lagarde).

The imminent policy normalisation is already reflected in market interest rates and will therefore already have an impact on the economy in the coming quarters. The central bank influences the economy not only by raising policy rates or phasing out purchase programmes, but also through communication (i.e. forward guidance) on future changes in bond purchases and policy rates. Such communication helps central banks manage expectations about the use of the various policy instruments, which in turn affects the shape of the interest rate curve, and thus financing costs of households and businesses. Since inflation prospects shifted sharply upwards compared to the pre-COVID-19 period, it is only natural for nominal variables, including capital market yields, to move with them, as the latter also represent remuneration for holding assets that harbour inflation risks.

Figure 13 – Sovereign bond yields in the euro area rise in both nominal and real terms

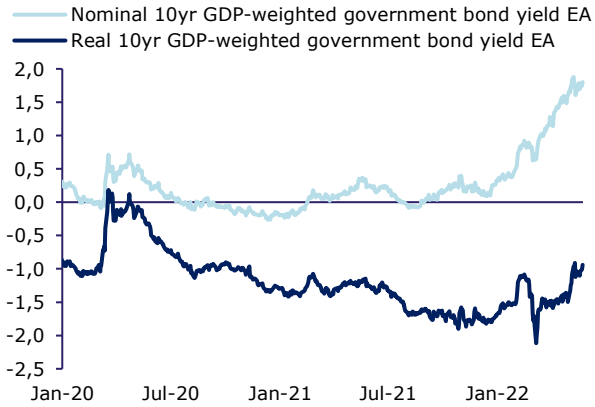
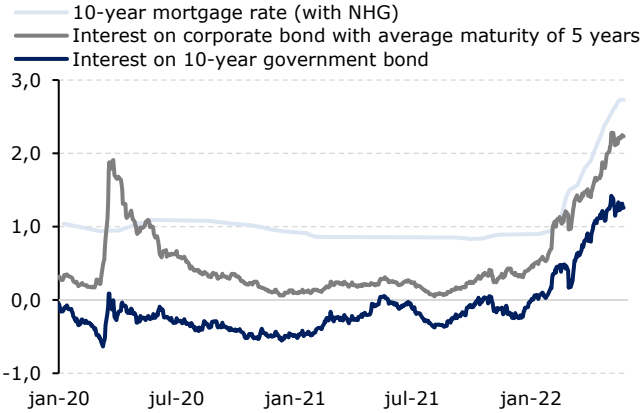


Figure 14 – Financing rates for businesses and households also go up sharply



Sources: DNB based on ECB data, Bloomberg, actuelerentestanden.nl and SDW - real interest rates have been adjusted on the basis of 10-year inflation swaps. Most recent observation: 25 May 2022

Capital market yields, even when adjusted for expected inflation (i.e. in real terms), are currently still low, but an upward movement is discernible (see Figure 13). This suggests monetary policy in the euro area is still accommodative, but tightening has started. This can be seen even more clearly in Figure 14, in which the rise in interest rates on financing instruments for businesses (corporate bonds) and households (mortgage rates) is evident. Arguably, this is partly the result of the ECB's communication about the accelerated phasing out of its purchase programmes. Related to this, markets have brought forward expectations of the lift-off (see Box 2), and they expect a higher number of rate hikes overall. The total priced-in path, and estimates where monetary normalisation would be approximately neutral during the current economic cycle, are also relevant for financial conditions (see Box 3). The pricing-in of ECB rate

hikes, together with rising real interest rates at the long end of the curve, shows that markets are taking the ECB's policy intentions into account. This implies that the ECB has actually already embarked on the course of normalisation, although this is not yet directly reflected in its policy rates.

Box 3 – The "neutral" monetary stance

To get an idea of where interest rates will move to in the longer term, it is useful to look at estimates of the neutral policy rate, i.e. the rate that neither stimulates nor slows down the economy. This interest rate is often referred to as "r*", i.e. the real interest rate that would naturally arise without central bank intervention. As this r* is not observable, it must be estimated using models. The sum of r* and the inflation target of 2% provides an estimate of the nominal neutral interest rate and can thus give an idea of the end point for policy interest rates in a given economic cycle. It must be noted, however, that interest rates must sometimes be raised above r* to put a sufficient brake on inflation, for example when the economy is overheating or if inflation expectations are de-anchoring. While the baseline scenario is that the ECB will raise interest rates to around neutral levels, this does not mean that policy rates cannot or should not rise above r*. After all, the ECB will continue to tighten until it is sufficiently clear that inflation is moving around 2% in the medium term.

In addition, current estimates of the neutral real interest rate are highly uncertain. For the euro area, they are in a range between -1% and 0%. Given the inflation target of 2%, this suggests a nominal neutral interest rate of around 1.5%. This wide range of estimates indicates that the uncertainty around r* is large, and the estimates also vary between the models used. The pandemic has exacerbated the problems experienced with the models used to estimate r* which rely on estimated trend-based growth. As the models may overestimate the impact of the COVID-19 crisis on trend growth, the estimates represent a lower bound for the neutral interest rate. Yet, the estimates are broadly in line with financial markets' estimates of longer-term policy rates (see Box 2, Figure c).

5 Final remarks

In late 2021, the ECB entered a new environment of high inflation. Inflation is becoming more widespread, which implies that prices of more and more goods are rising. This changed environment, after a long period of below-target inflation, calls for an adjustment of monetary policy. With accommodative policy no longer being appropriate, the ECB is already moving towards a neutral policy. The pace of this normalisation, however, will continue to depend on incoming data and insights into the development of inflation and the broader economy. This data dependence also applies to the end point of the normalisation. Initially, net asset purchases will be phased out, and a rise in policy interest rates from negative to positive territory will be initiated. How far interest rates will need to rise to stabilise inflation will depend on the economic situation and the extent to which inflation expectations remain anchored.

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