

Euro area inflation and the pandemic

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1. Setting the stage

1.1 Introduction

After being subdued for a number of years, euro area inflation has recently increased markedly. This raises two main questions. What are the drivers of this development? To what extent is this increase transitory and what are the risks that inflation may be higher in the future?

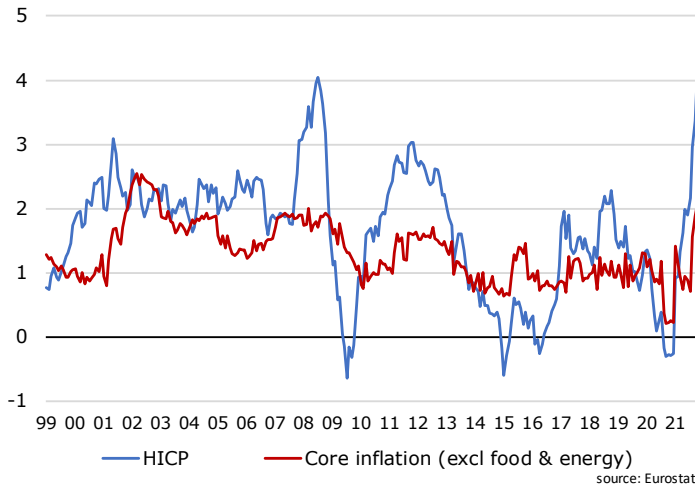
This article addresses these questions. We start by documenting how in the years before the outbreak of the Covid pandemic, inflation was low and below the ECB's inflation target. This has been particularly challenging for ECB monetary policy because policy rates have been at their effective lower bound. Next, we discuss how inflation has developed during the Covid crisis and what factors may have been relevant. We distinguish two phases of the crisis. In the first phase, lockdown measures imposed by governments to contain the pandemic pushed inflation broadly downwards. In the second phase, starting in the fourth quarter of 2020, the euro area experienced a strong recovery and a marked increase in inflation. In the final part of the paper we look forward, and review what different indicators of inflation expectations tell us about risks to the inflation outlook.

1.2 Low inflation before the pandemic

For most of the past decade, headline inflation in the euro area has been well under 2%. Core inflation – which excludes volatile components such as energy prices – has been even more subdued (Figure 1). On average, HICP-inflation since 2011 has been 1.3%, and core inflation 1.1%. This means that inflation has been below the ECB's inflation target. Until July 2021, the ECB aimed for euro area inflation to be below, but close to 2%. Following a review of its monetary strategy, the ECB announced on 9 July 2021 that it was adopting a symmetric inflation target of 2%.

Figure 1

Inflation euro area
Annual percent change



The persistently low inflation can be explained by a combination of factors. These include cyclical factors (such as the degree of economic slack) and structural trends that are outside monetary authorities' influence (most notably globalization, digitalization and demographic changes).¹ Among the structural factors, globalization has received much attention. It has both a direct effect on inflation through lower import prices, as well as indirect effects through its impact on competition (Ascari and Fosso, 2021). The impact of these factors has been compounded by nominal interest rates falling in tandem with inflation and the reduced monetary policy space, as policy rates reached their effective lower bound. In this environment, subdued inflation expectations, as captured by surveys of professional forecasters and market-based measures, have also been seen as dampening inflation through their effect on price and wage setting (Koester et al, 2021).

¹ Bonam et al. (2019) provide empirical evidence on the downward trend of inflation and discuss its possible structural drivers, which are not directly affected by monetary policy.

2. Inflation during the pandemic

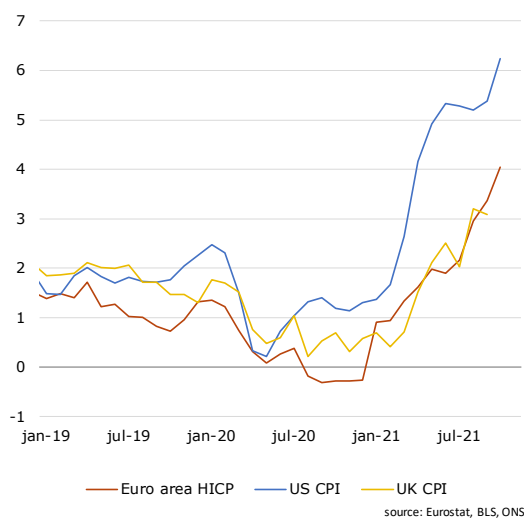
2.1 Two different phases

When in Europe the pandemic started in March 2020, both HICP (Harmonised Index of Consumer Prices²) inflation and core inflation (excluding energy and food) in the euro area were both around 1%. In terms of inflation dynamics and their drivers during the pandemic, one can distinguish two different phases. During the first phase, from March to December 2020, inflation fell significantly, first to levels slightly above 0% and then into negative territory. During this period, price developments were subdued, despite temporary relaxations of lockdown measures. In the second phase, which started around towards the end of 2020, euro area inflation increased markedly, reaching 4.1% in October 2021, a level last seen in 2008.

The initial fall and subsequent rise of inflation is an **international phenomenon**, as illustrated in Figure 2, which shows broadly similar swings in consumer price inflation in the United States, the euro area and the United Kingdom. This suggests that global factors may have been at play, including the global spread of the pandemic, restrictions introduced by governments in response, the developments in energy prices and the emergence of supply bottlenecks. At the same time, country specific effects – such as differences in the composition of consumption baskets across countries (most notably the different weight assigned to housing), or the type and scale of fiscal response – explain the different magnitude of these swings.

Figure 2

Inflation in international perspective
annual percent change



² In this article, we focus on the current HICP, which excludes the cost of owner occupied housing. The ECB aims to move to a more complete index, see this [DNBulletin \(2021c\)](#).

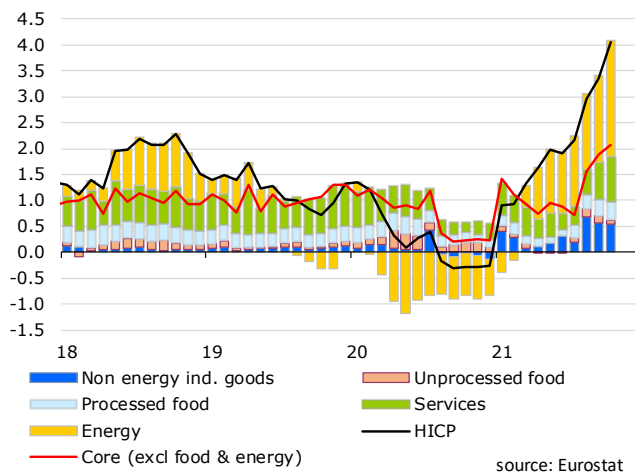
Explaining these different inflation dynamics is a complex task, for different reasons. First, the pandemic crisis has generated both **demand and supply shocks**, which pull inflation in opposite directions. Second, the pandemic has been characterized by very high, pervasive **uncertainty** about the extent to which the virus could be contained, about behavioral responses of households and firms to the spreading of the virus and the restrictions imposed by governments, and about the macroeconomic outlook. And our workhorse macroeconomic models are poorly equipped to estimate the impact of atypical shocks like a pandemic. Third, the pandemic was met with an **unprecedented reaction by fiscal and monetary authorities**, which entered uncharted waters by deploying new policy tools, most notably the NextGenerationEU (NGEU), whose effects still need to be tested.

2.2 Drivers of falling inflation in the first phase

In the first phase of the pandemic, a combination of several factors generated a widespread downward pressure on prices. This downward pressure, starting in the spring of 2020, was clearly visible in the several components of HICP-inflation (Figure 3).

Figure 3

Euro area HICP inflation and components
Percent annual change cq contributions



First, falling **energy prices** were the main contributor to low inflation from the start of the pandemic until the start of the global recovery. Worldwide energy prices fell early 2020 as a result of the pandemic, the lockdown measures and the uncertainty about the impact on the world economy. In the euro area, energy inflation for consumers fell to around -10% in April 2020, and contributed around -1%-point to headline inflation.

The decline in energy inflation was mainly driven by the fuel component, which is closely linked to oil price developments (Figure 4). Consumer prices for electricity and natural gas typically adjust more sluggishly to changing commodity prices. These prices are often set in longer term

contracts or there are country-specific regulations which limit the immediate pass-through to consumer prices.

Second, inflation in the price of **non-energy industrial goods** (NEIG), which had been low in the years before the pandemic as a result of competition, globalization and technological progress, declined further in 2020 (Figure 5). This pattern is partly affected by tax-measures implemented in a number of member states, notably the temporary VAT-reduction in Germany in 2020.

Figure 4

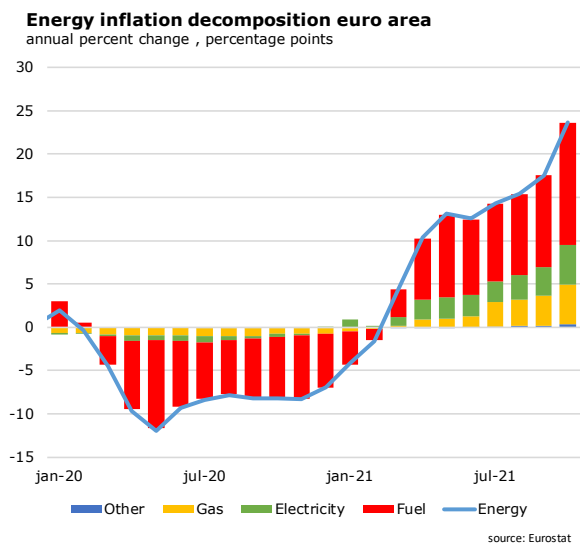
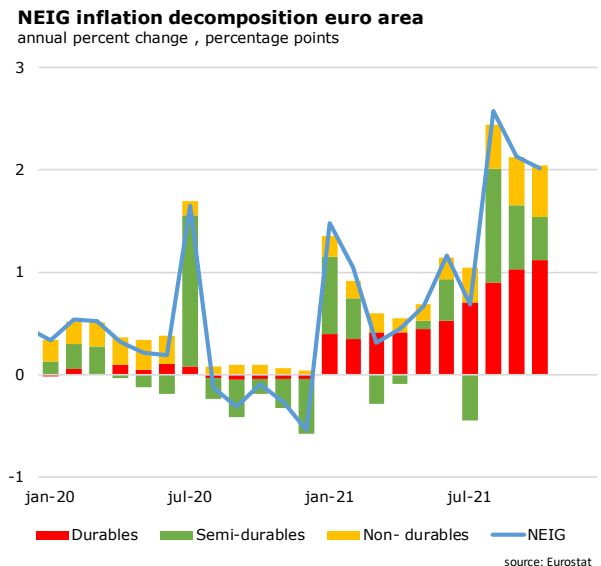


Figure 5



Third, **food prices** played a role. Initially, food prices increased in early 2020 by around 3%, reflecting inter alia shortages in supermarkets and cross-border travel restrictions for workers in food production. In the second quarter of 2020, food prices contributed an additional 0.2 %-points to overall inflation. Food price inflation normalized in the summer of 2020 and started to decline down to levels below 1% in the first quarters of 2021.

Fourth, **services price inflation** is historically a relatively stable and important contributor to euro area-inflation, with housing, mainly rents, as a large component. The recreation and leisure services sector, including transport by air, was strongly affected by the pandemic. Price developments in these sectors contributed to low services inflation in the summer and autumn of 2020. In the second half of 2020, the contribution of services to headline HICP-inflation was around 0.3 %-points lower than in the first half of 2020.

Finally, an important factor weighing on inflation was the change in **consumption patterns** in response to lockdown measures, and a large increase in **savings**, which reflects restrictions on shopping on goods and services, as well as an increase in precautionary savings in an environment of strongly heightened uncertainty.

The constraints imparted by the pandemic on activity, employment and inflation were to an important extent buffered by fiscal and monetary policy support. Governments worldwide offered substantial support through **furlough schemes**, which prevented large lay-offs, and large-scale fiscal stimulus measures to prevent bankruptcies. Monetary policy remained accommodative in order to maintain relaxed credit conditions and sufficient liquidity.

2.3 Inflation rebound in the recovery phase and its drivers

During the recovery that started in late 2020, inflation rose markedly. A first factor contributing to the rise in inflation is a so-called **base effect**, i.e. the higher inflation being the consequence of low prices the year before.

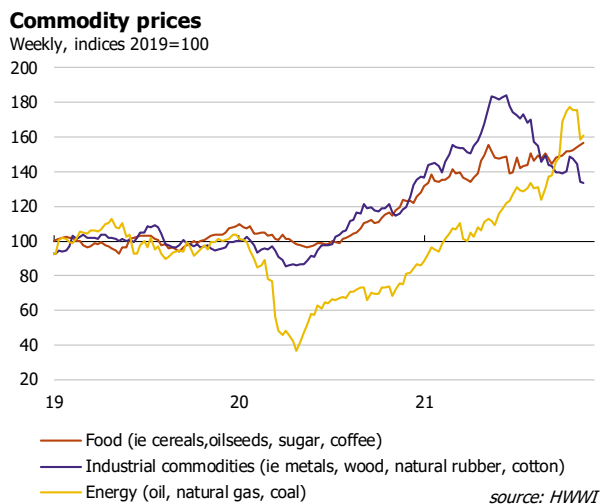
Second, **household savings** had risen in 2020 due to a large increase in precautionary savings, as well as restrictions on travel, shopping and the availability of services. When lockdown measures were lifted, the **pent-up demand** was in part released, especially in service consumption. In the first half of 2021, this led to a relatively modest and transitory increase in inflation. Pent-up demand was not fully released, arguably reflecting two factors at play (see [DNBulletin \(2021b\)](#)). First, most of the rise in savings were concentrated in high-income groups, who tend to consume a smaller portion of their income. Second, in line with a patterns that has been observed in the past, people tended to spend only a small amount of their precautionary savings.

Third, in addition to an increase in excess savings and pent-up demand, the recovery phase was also characterized by significant **supply bottlenecks**, arising from a large imbalance in demand and supply. A multitude of supply and trade disruptions has made it difficult for businesses to keep up with the strong rebound in consumer goods demand. This has led to major shortages of raw materials and container transportation with subsequent increases in their prices. This has been compounded by continuing congestion in international ports and factories, labour shortages and low company stocks. Production delays attributable to Covid-19 in factories in some trading partner countries may also have played a role. As a consequence, delivery times of products and input materials have increased sharply worldwide, and the gap between the number of orders that companies receive and realized production has widened significantly (Van Schaik and Hemmerlé, forthcoming 2021). These disruptions in global supply chains still persist in autumn 2021, and they significantly hamper production and put upward pressure on prices. In 2021Q3, more than 40% of manufacturing companies in the euro area have reported production limitations due to shortages of materials.

Fourth, when economies opened after the Covid-19 lockdowns, demand for inputs rose rapidly. Supply was scaled back during the pandemic and could not meet the strong rise in demand during the recovery, leading to inflationary pressures. Energy prices surged. Most notably, **oil prices**, which had crashed to around \$20 for a barrel of Brent-oil in the spring of 2020 as the global economy was hit by a sharp recession, started to recover in November 2020 and have shown a steep rise since then. They reached levels above \$80 in October 2021, exceeding pre-

Covid levels. The impact on consumer prices for energy goods, fuel but also natural gas and electricity, is visible in Figure 4.

Figure 6



Finally, due to the **higher price of commodities**, intermediate goods and energy, as well as high consumer demand, producers have seen their input prices rise sharply (see Figure 6). This is also captured by the industrial producer prices index (PPI), which rose to historical highs in the past year. However, for most products the pass-through of producer prices to consumer prices has been very limited in the past. The relative importance of raw materials and intermediate industrial products in the value of the product shrinks with every step in the production chain as more labour is added. In the final stage, retail margins and labour-intensive services for marketing and distribution dilute the impact of producer prices further. Moreover, along the production chain prices are sticky and a price increase in an early stage of production may have reversed by the time it reaches the final consumer. Therefore, only persistent changes in producer prices became visible in consumer inflation. If high input prices last longer than expected, the pass-through might be higher than past evidence would suggest. For instance, the global economic recovery with increasing demand and strained supply chains led to clearly visible price increases in **durable goods** (see [DNBulletin \(2021d\)](#) and Figure 5).

3. Looking ahead

The combination of released pent-up demand and supply-chain disruptions is likely to generate transitory upward pressures on inflation. The persistence of these pressures depends on the dynamics and timing of the underlying shocks, as well as their interaction with longer-run, structural factors. The longer the current high inflation persists, the higher the risk that it

becomes embedded in the behavior of households and firms. To date, inflation expectations indicate that current high inflation is largely transitory and signs of second-round effects in wages are not visible in the euro area. As this is an unprecedented situation and the pandemic is not over yet, any evaluation of future inflation is, however, highly uncertain.

3.1 Transitory and structural factors affect inflation

The supply constraints that firms face are mainly due to **transitory frictions** that have arisen in the transition to a post-COVID-19 economy and therefore mainly represent a transitory phenomenon. At the same time, because of the diversity and complexity of these supply bottlenecks, it is difficult to predict when exactly they will ease.

At the moment, supply disruptions in the market for computer chips and raw materials and bottleneck effects in the market for container transport are spurring rapid price increases in these markets, which show up in higher headline HICP inflation. At some point in time, the available supply in the affected markets should increase, which would mean that prices in those markets decline again. This would tend to cause lower inflation for some time. However, we cannot yet tell how long the supply shortages will last.

Meanwhile, these supply shortages can have quite persistent effects on inflation, especially if the price rises in the above-mentioned markets cause prices to rise in a broad range of markets. Firms do not adjust their prices all the time (see [DNBulletin \(2021a\)](#)). If price adjustments are stretched out over a longer period of time, inflation would remain higher than it would have been without the supply shortages. Increasingly complex input-output networks among firms would tend to stretch out the effects even further (see Rubbo 2021, Ghassibe 2021).

Moreover, inflation dynamics may also be influenced in a persistent way by **structural changes** in the economy, which may push trend inflation up or down. One factor that may exert persistent downward pressure on inflation is the scarring effect of the Covid pandemic on economic activity and inflation. Bonam and Smádu (2021) find evidence that past major pandemics are typically followed by a significant decline in trend inflation that lasts for more than a decade. These findings suggest that, historically, pandemics have had a significant “hysteresis” effect, long after the pandemic ended. So far, there is little evidence of such a hysteresis effect, perhaps because of the fiscal and monetary policy response during the current pandemic.

Possible structural factors that could instead put upward pressure on inflation in the coming years include new environmental standards and shifts in government policies related to trade. A factor that may push up inflation in the longer run is the evolving change in global labour markets. As argued by Goodhart and Pradhan (2020), global demographic trends are reducing the size of the labour force relative to the number of consumers, leading to a global increase in the bargaining power of labour and to higher trend inflation.

3.2 No signs of second round effects - yet

Importantly, **behavioral changes** matter. The longer transitory inflation due to supply bottlenecks persists, the more likely it is that higher inflation will start to affect the behavior of consumers and firms and generate "second-round effects". This could happen through two main channels.

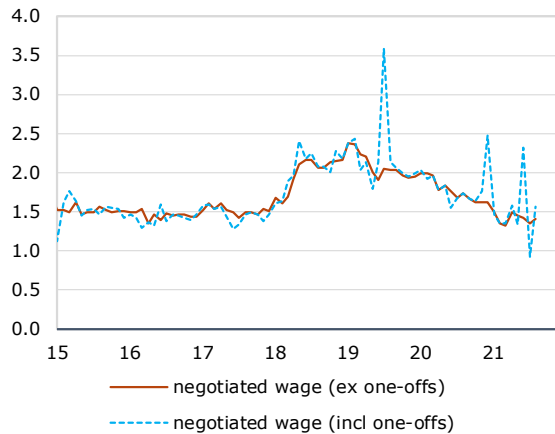
First, transitory price increases in particular sectors and in the PPI may be passed through to increases in core inflation. Empirical research has shown that over the past decades, the pass-through over time of salient price increases at the sector level into increases in core inflation has been small (Borio et al., 2021). But this time is different, as both the nature and the magnitude of the shock are truly unique. In fact, there is anecdotal evidence that retailers are raising prices in anticipation of higher future costs.

Second, temporarily higher inflation could lift inflation expectations and set off a wage-price spiral. The recent burst of inflation has prompted concerns about risks of such a **wage-price spiral**. The fact that high inflation is combined with tight labour markets in some parts of the euro area, like Germany and the Netherlands, is strengthening these concerns. A wage-price spiral arises if workers demand higher wages when confronted with higher inflation, employers then pass on higher wages to higher prices, which then leads workers to demand higher wages, and so on. Hence, a more persistent increase in wages and prices can fuel long-lasting inflationary pressures (Rees and Rungcharoenkitkul, 2021).

In spite of the sharp increase in inflation observed in recent months, there are still little signs of a wage-price spiral at the moment. Negotiated wage growth in the euro area is still on a downward path (Figure 7). Since wages usually react to economic developments with a delay, this does not rule out demands for strong wage growth at the bargaining table, and higher wage growth in the near future. We would expect these wage pressures to appear first in one-off wage increases, like bonuses. These payments are volatile in nature and currently rising faster than structural wages. Employers may be hesitant to agree with significantly higher structural wages, for two main reasons. First, firms are still faced with uncertainty about the COVID-19 pandemic, especially since we are entering a new wave of infections. Second, high inflation will only translate into excessive wage growth when there are strong beliefs about persistent elevated inflation. Currently, there is still a debate on the extent to which the recent burst in inflation is transitory, and while inflation expectations are rising they are not as elevated as headline HICP-inflation.

Figure 7
Negotiated wages euro area

Percent annual change



source: ECB

3.3 Inflation expectations rise

Policymakers regularly monitor measures of inflation expectations held by financial markets, professional forecasters and, increasingly, consumers and firms. Measures of inflation expectations are an important cross-check, both for the baseline scenario in the central bank's macroeconomic forecasts and the assessment of risks around the baseline. At the current juncture, these measures provide particularly valuable information on whether different types of agents view recent inflation developments as reflecting transitory spikes or persistent changes.

Market-based inflation expectations can be measured through various financial instruments linked to inflation, such as **inflation swaps**. In the course of 2021, inflation swaps have risen for both the short term and the long term to multi-year highs (Figure 8). Financial markets appear to expect that euro area inflation will spike over the next 1-2 years, before falling back to levels close to the ECB's 2% inflation target. Financial markets seem therefore to agree with the ECB's interpretation of the recent surge in inflation as reflecting transitory supply side factors, such as higher energy prices and supply side bottlenecks.

Figure 8 Market-based short-term and long-term inflation expectations

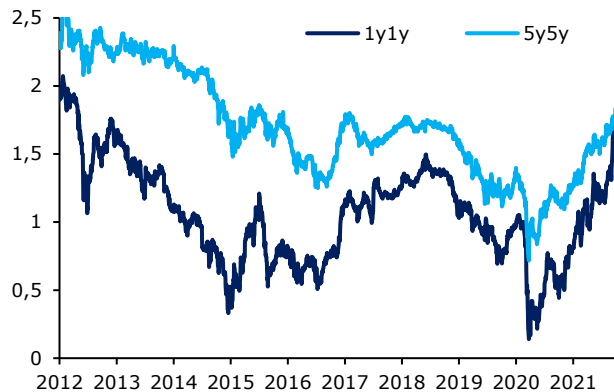
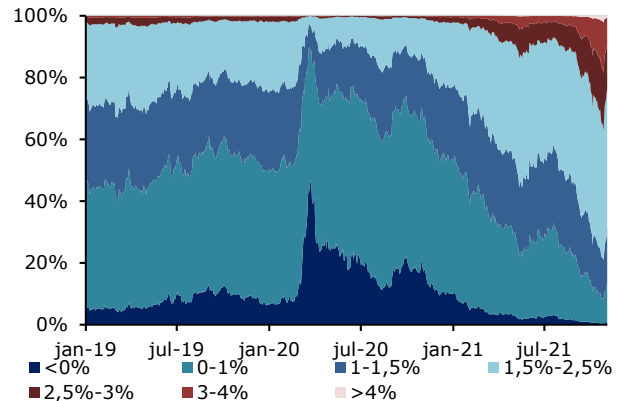


Figure 9 Option-implied distribution also points increasing possibility of higher inflation



Source: Bloomberg, DNB staff calculations. Last observation: 5 nov. 2021.

Notes: The left panel shows market expectations extracted from inflation swaps for a one-year horizon held one year ahead (dark blue line) and for a 5-year horizon held 5 years ahead (light blue line). The right panel shows measures of the probability that market participants assign to different possible future inflation outcomes, ranging from deflation (the dark blue shaded area) to inflation between 3 and 4% (the red shaded area) and above (the small pink shaded area).

It is important to note that an inflation swap rate is not a “clean” measure of financial markets’ inflation expectations, in the sense that it also contains other components, most notably an inflation risk premium. The inflation risk premium compensates investors for the possibility that inflation may rise or fall more than they expect over the period in which they hold the swap. In other words, the inflation risk premium provides information on financial markets’ balance of risks surrounding their inflation outlook.

The different components of an inflation swap rate cannot be directly observed but can be estimated. Such a decomposition illustrates that the rising inflation swap rate can to a large extent be attributed to a surge in the risk premium. This means that financial markets’ balance of risks to the inflation outlook has shifted to the upside (higher inflation), after a long time of strong downside risks (lower inflation).

This shift in the balance of risks can also be found in the probability distribution of market participants’ expectation of future inflation, estimated using a range of inflation-linked derivatives. Figure 9 shows such indicators and suggests that in financial markets, the risk of deflation or low inflation materializing over 5 years (the dark-shaded area) has markedly declined since the start of the pandemic. By contrast, the probability that financial markets assign to inflation exceeding the ECB’s 2% target over the next 5 years (the red-shaded area) has increased. At the same time, Figure 9 also shows that market-based inflation measures are increasingly centred around the ECB’s 2% inflation target (the light blue area).

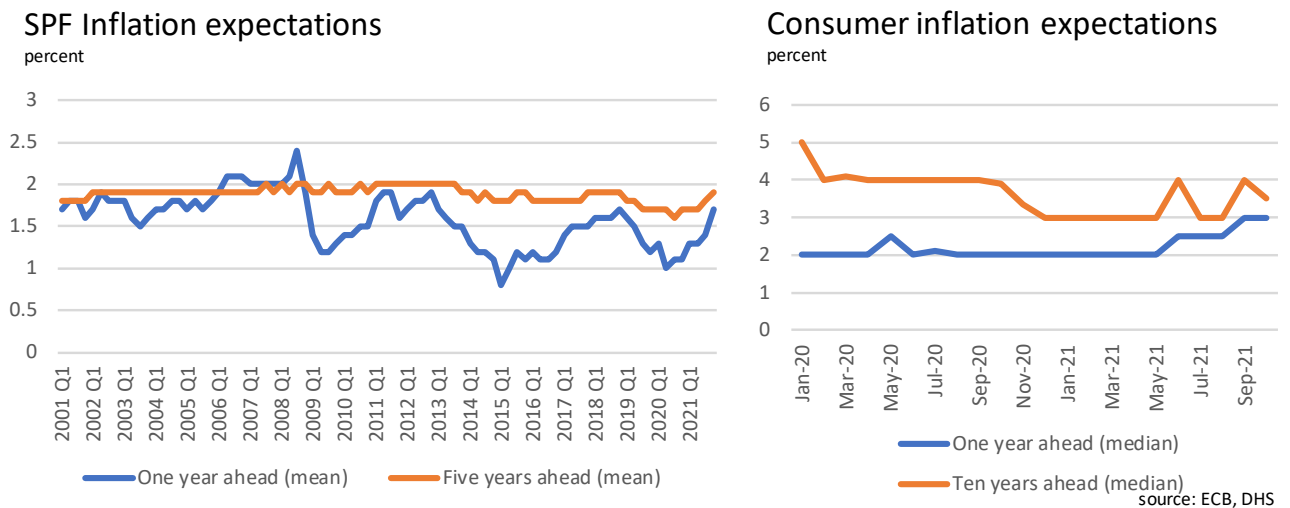
In sum, market-based measures of inflation expectations have risen across different horizons. The increase is more pronounced for short-term expectations, indicating that financial markets share the ECB’s narrative that the currently higher inflation rates are a transitory but not

necessarily short-lived phenomenon. At the same time, different indicators point to some shift in the balance of risks to the inflation outlook to the upside.

Both short- and long-term inflation expectations held by professional forecasters have also increased since the start of the Covid-19 pandemic. This is evident from the Survey of Professional Forecasters (SPF), which collects expectations of expert economists working in financial or non-financial institutions (Figure 10, left panel). While professional forecasters have revised their inflation expectations upward, the magnitude of this change is more modest compared to the increase in market-based inflation expectations.

A new monthly survey of around 600 Dutch households shows that since the start of the pandemic, consumers have also adjusted their inflation expectations upward, both in the short term and the long term (Galati et al, 2021). Median euro area inflation expectations one year ahead have increased from 2 to 3%, while median expectations ten years ahead moved in a range between 3 and 4% (Figure 10, right panel). These results indicate that consumers do not necessarily believe that higher inflation is a transitory phenomenon.

Figure 10 Euro area inflation expectations of professional forecasters and consumers



Taken together, the different measures of inflation expectations held by different types of agents – financial market participants, professional forecasters and households – all reveal some upward revision of the inflation outlook. There is also evidence that the distribution of risks to the inflation outlook is somewhat tilted to the upside. At the same time, most of these measures indicate that the recent surge in inflation is expected to be transitory. And while longer-term expectations have edged up, they are still below the ECB’s inflation target. Consumers (in the Netherlands) expect inflation to be above the ECB’s target in the medium- to long term.

4. Summary

Since the start of the pandemic, euro area inflation has risen sharply, driven by a combination of factors. Some of them are transitory factors, like changes in the German VAT rate and statistical “base effects” consequent on the pandemic-induced low prices one year ago. These will fade away over the coming months. Other factors – such as consumers’ pent-up demand, supply chain bottlenecks, and rising prices for energy and other commodities – while also ultimately transitory in nature, now appear likely to persist longer than initially thought. Looking ahead, the outlook for inflation is highly uncertain. The longer the current high inflation persists, the higher the risk that it becomes embedded in the behavior of households and firms, thereby generating “second-round effects”.

To date, signs of these second-round effects are not visible in the euro area. Wage growth has been relatively modest and inflation expectations indicate that current high inflation is largely transitory. In general, a modest level of inflation serves to “grease the wheels” of labour and product markets. In the current environment, following a long period of inflation below the ECB’s target of 2%, the higher short-term inflation could boost longer-term inflation expectations, and help anchor them around the ECB’s target. This would allow the ECB to phase out some of the most intrusive monetary policy instruments.

At the same time, temporarily higher inflation could lift inflation expectations more substantially and set off a wage-price spiral. The occurrence of such phenomena is particularly hard to predict in the current environment characterized by high uncertainty. It is therefore important to continue monitoring the evolution of inflation and the dynamics of inflation expectations carefully, to avoid an undue overshooting of inflation.

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