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Inflation expectations: quo vadis?

Policy Department for Economic, Scientific and Quality of Life Policies
Directorate-General for Internal Policies
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Abstract

Against the backdrop of the recent surge in inflation, we discuss available measures of inflation expectations and implications for monetary policy in the euro area. While long-term expectations are currently still in line with the ECB's inflation target, the risk of a further rise increases should actual inflation remain high for an extended period of time. If expectations de-anchor the ECB may face difficult trade-offs.

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LIST OF ABBREVIATIONS

CES	Consumer Expectations Survey
ECB	European Central Bank
HICP	Harmonised index of consumer prices
HICPX	HICP excluding energy and unprocessed food (core inflation)
NEIG	Non-energy industrial goods
NGEU	NextGenerationEU
SIGE	Survey on Inflation and Growth Expectations
SPF	Survey of Professional Forecasters

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EXECUTIVE SUMMARY

- **The recent sharp increase of inflation well above the ECB's inflation target of 2% has raised concerns that inflation expectations could de-anchor.** Well-anchored inflation expectations are an important condition for price stability and persistent deviations of actual inflation from the inflation target become more likely if expectations de-anchor.
- **There is no unique measure of inflation expectations.** Measures of inflation expectations are available for private households, firms, financial markets, and professional forecasters. These measures differ in terms of their scope, their horizon, and the way they are compiled resulting in different strengths and limitations. Short-run inflation expectations provide information about near-term inflation developments. Long-run inflation expectations can serve as an indicator for the credibility of a central bank to achieve its inflation target. Consumer and firm expectations are of particular interest because they can have a direct impact on consumer prices. However, due to the shortcomings of inflation expectations measures for private households (e.g., large deviation from actual inflation; only available for the short-run) and firms (e.g. only qualitative measures available; only for the short-run), measures from financial markets and surveys of professional forecasters are in the focus when the anchoring of long-run expectations is discussed.
- **Inflation expectations are important for economic decision-making and are driven by several factors, including monetary policy.** Inflation expectations have a direct impact on wage and price setting. By affecting the real interest rate, they have also an impact on intertemporal decisions of private households and firms on savings, consumption, and investment, which in turn can influence inflation. As a result, an increase of inflation expectations tends to put upward pressure on actual inflation. Inflation expectations can be influenced by several factors, such as recent inflation trends, personal experiences, or monetary policy. Given the multitude of transmission channels, it is difficult to gauge the precise impact of expectations on the economy as well as the determinants of fluctuations in inflation expectations.
- **All available measures for short-run inflation expectations have sharply increased and indicate that inflation will remain above the inflation target for some time to come.** There are several factors in place putting upward pressure on inflation for the time being. These factors include supply bottlenecks raising the cost of inputs and shipment of goods, a relatively high willingness to pay of consumers due to substantial extra savings built up in the pandemic period, and tight labour markets leading to upward pressure on wages. Moreover, price pressure could remain high if commodity prices continue trending upwards as a result of the progressing energy transition.
- **Long-run inflation expectations have inched up recently and are now in line with the modified inflation target of the ECB.** Before the pandemic, long-run inflation expectations were somewhat below the inflation target of the ECB for several years indicating that expectations were de-anchoring to some extent. With the recent increase in inflation, long-run inflation expectations have returned to the target of the ECB. However, a final assessment on how firmly expectations are anchored at the inflation target is not possible at the current juncture.
- **The risks for de-anchoring of long-run inflation expectations increase if actual inflation remains high for an extended period of time.** In principle, it is more convenient for the ECB to deal with inflation above rather than below its target, as it is easier for monetary policy to dampen than to stimulate inflation, in particular at the zero lower bound. According to its modified strategy, the ECB can tolerate high inflation for some time. However, if inflation remains above its target for

an extended period, the ECB may face a delicate trade-off. A tightening of monetary policy could lead to stress in financial markets, particularly in sovereign bond markets, while complacency in face of high inflation risks that long-run inflation expectations de-anchor above the inflation target and that upward pressures on consumer prices will further increase.

1. INTRODUCTION

The recent surge in inflation in the euro area has raised concerns about prospects for inflation in the longer term. Consumer price inflation increased sharply in the course of 2021 and reached 5% in December, a record-high since the beginning of the monetary union. The assessment of the European Central Bank (ECB) that the increase above the 2% inflation target is mainly a temporary phenomenon is increasingly being questioned. Higher long-run inflation expectations could be a main driver of a persistent increase in inflation. However, so far there is little evidence that recent increases in short-run expectations are systematically passed-through to long-run expectations.

The debate whether the increase in inflation is transitory or permanent is closely linked to the anchoring of inflation expectations. Short-run expectations are predominantly driven by actual inflation and transitory factors, such as fluctuations in oil prices, while long-run inflation expectations are reflecting the credibility of the central bank to achieve its inflation target. Long-run expectations therefore also reflect the effectiveness of monetary policy and forward guidance with regard to expectation management. They are often anchored in the sense that short-run macroeconomic news are considered neutral with respect to inflation expectations in the long-run by market participants (Nautz et al., 2019). If long-run expectations persistently exceed the inflation target of the ECB, the risk increases that actual inflation persistently remains at elevated levels.

There is no obvious and unambiguous way to measure inflation expectations. Inflation expectation measures are available for private households, firms, financial markets, and professional forecasters. They differ in several aspects, such as their horizon, the way they are measured, or whether they provide quantitative or qualitative assessments, resulting in different strengths and limitations. Central banks use inflation expectations to assess their credibility with regard to their inflation target, to evaluate the impact of their policy, or to forecast future inflation. Firm and consumer expectations are of particular relevance for inflation as firms ultimately set consumer prices, taking the consumers' willingness to pay into account. However, there is a lack of harmonised data when it comes to long-run expectations measures of firms and households for the euro area. Recent efforts by the ECB are aiming to improve the coverage of existing measures, for example, via the pilot Consumer Expectations Survey (CES).

The signalling channel of monetary policy aims to affect inflation expectations by providing information about the future stance of monetary policy. Inflation expectations are driven by a wide range of factors and do matter for economic choices of households and firms. The existing experimental and empirical evidence has so far struggled to provide clear evidence on how inflation expectations are formed and to which extent they can be directly influenced by monetary policy. Monetary policy effects tend to be under-estimated by market participants (Ball and Crousshore, 2003). Monetary policy announcements and surprises often have a direct impact on financial market expectations while inflation expectations of households and firms do, for example, not systematically respond to all monetary policy announcements (Coibion et al., 2020; Lamla and Vinogradov, 2019). Empirical determinants of successful anchoring of inflation forecasts in the long-run include institutional factors, such as credibility and central bank independence.

In this paper, we discuss different measures of inflation expectations and their recent developments as well as the risk of their de-anchoring. We start with an overview of the role of inflation expectations in theory (Section 2). We proceed by discussing different measures of inflation expectations and their current developments (Section 3). In Section 4 we address the risks of a de-anchoring of inflation expectations, before we conclude with a summary of our results and implications for monetary policy (Section 5).

2. INFLATION EXPECTATIONS AND ECONOMIC DECISIONS

2.1. How inflation expectations affect economic decisions

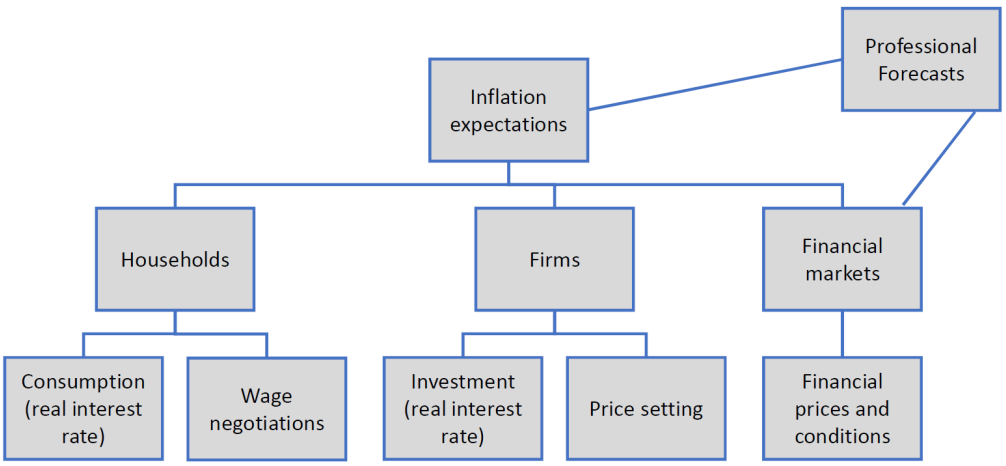
Inflation expectations are important for economic decision making. As they affect price and wage setting, inflation expectations are an important intermediate target for policymakers, and they are relevant for the propagation of monetary policy shocks (Sousa and Yetmann, 2016). In theoretical models, inflation expectations of households and firms have direct effects on the wage and price setting and affect consumption and investment decisions via the perceived real interest rate (Figure 1).

The intertemporal decision on consumption and saving of private households depends on the real interest rate. If inflation expectations change, and in turn the perceived real interest rate changes, households will adjust their consumption pattern. For example, if the real interest rate declines, private households—ceteris paribus— will favour consumption today compared to future consumption and reduce their savings. Moreover, inflation expectations can have also an impact on wage negotiations when households consider their real income.

Firms are also influenced by inflation expectations via the perceived real interest rate when they plan their investment. Moreover, for a firm real income streams depend on their final goods prices and on the general price level. In a scenario of rising inflation expectations, firms try to anticipate the change in the price level and alter their price setting behaviour accordingly. As firms are ultimately setting consumer prices, the impact of inflation expectations on their decision making is particularly relevant.

Financial market expectations are relevant because they influence financial prices and financing conditions. Inflation expectations in financial markets are derived from financial asset prices, which also provide information about the uncertainty about future inflation via risk premia. Professional forecasts have the potential to affect other expectations, in particular those of households (Carroll, 2003) but they might in turn be influenced by financial market expectations or consumer and firm expectations.

Figure 1: Transmission mechanism of inflation expectations



Source: ECB (2021).

In practice, the relationship between inflation expectations and economic decision-making of households and firms is more complex than in theory as it involves several other factors. These

factors include, e.g., employment perspectives, income expectations, or liquidity constraints. For example, if households or firms interpret higher inflation expectations as a bad signal for the economic outlook, the resulting negative income effect may dominate potential positive effects of a lower real interest rate and lead to lower levels of consumption or investment (Candia et al., 2020). Moreover, inflation expectations are affected by a variety of factors making it difficult to gauge the underlying factors and the economic impact of changes in expectations. For example, expectations of consumers are driven by the prevailing economic environment as one important factor. Consumers who have experienced high inflation systematically have higher inflation forecasts (Ehrmann and Tzamourani, 2012; Malmendier and Nagel, 2016). There is also some evidence that households and firms tend to react stronger to inflation dynamics if they have experienced high inflation over an extended period of time (Coibion et al., 2020). Personal shopping experiences also have the potential to affect inflation expectations. Socio-economic characteristics, such as income and education, are additional important factors.

There is rich empirical evidence that expectations affect behaviour of firms and households, implying that monetary policy can influence economic activity by managing expectations. The empirical evidence for households at the zero lower bound suggests that consumption responds positively to an increase in the inflation expectations (Coibion et al., 2020). Recent evidence from a multi-country survey of consumers for the euro area confirms that higher inflation expectations also lead to a higher probability of goods purchases by consumers (Duca et al., 2018). To the extent that monetary policy can affect expectations, they can be used as a policy tool by central banks (Sousa and Yetmann, 2016; Coibion et al., 2020). However, identifying the effect of monetary policy decisions on expectations is difficult. Evidence for qualitative expectations in the euro area suggests that firms' expectations respond to unexpected monetary policy shocks. Firms increase price expectations for their own goods after an interest rate increase (Eminidou and Zachariadis, 2022).

2.2. Expectations and information rigidities

Inflation expectations can provide valuable information, even though it is a well-established stylised fact that inflation forecasts are subject to substantial errors. Part of the forecast errors are due to the unpredictability of future shocks and inflation expectations often react to shocks with a significant delay. Even in the presence of large forecast errors, inflation expectations can still contain useful information, for example, about the direction of changes in future inflation or the degree of anchoring of inflation expectations.

Information frictions or information rigidities recognise the role of informational limitations for expectation formation and delayed adjustment of expectations. They can be derived from both sticky and noisy information models and are useful to understand why market participants respond to changes in inflation with a delay. According to sticky information models, slow updating of information across agents occur due to the costs of acquiring new information. Noisy information models assume that the variable to be predicted is not directly observable and that each agent only observes an individual noisy signal instead. It has been shown that both kinds of models imply predictability of forecast errors, a finding which contradicts the conventional view of rational expectations under full information (Coibion and Gorodnichenko, 2012). The related concept of rational inattention argues that agents cannot perfectly distinguish between news about the current state of the economy and news about the future, which results in a dampened or delayed response (Maćkowiak et al., 2020). These models can also be used to explain why it is difficult for agents to distinguish between transitory and permanent shocks, in particular in an environment of changing inflation dynamics. However, inattention to news and to monetary policy does not imply that inflation expectations do not matter

for decision making of households or firms. Several studies have demonstrated that expectations do matter for decision making (Coibion et al., 2020). Evidence from New Zealand shows, for example, that firms respond to higher inflation expectations by increasing prices but the degree of pass-through is limited and quickly diminishes over time. This suggests that firms consider the underlying shocks to be temporary and will only change prices continuously if they believe that inflation has changed persistently (Coibion et al., 2020).

2.3. Anchoring of inflation expectations

Anchoring of inflation expectations is directly related to the credibility of monetary policy (King, 1995). There is no unique definition or indicator for the anchoring of inflation expectations. One obvious criterion is that inflation expectations are anchored if they are in line with an (implicit or explicit) inflation target of the central bank over longer time horizons, usually over 5 years (Bernanke, 2007; Kumar et al., 2015, Bems et al., 2021). While this concept refers to the mean, other concepts of anchoring refer to the distribution of expectations, arguing that the lower the dispersion of individual expectations, the better inflation expectations are anchored. Well-anchored expectations should also rarely be revised and be stable over time so that the degree of anchoring can be also measured by the degree of sensitivity to new information (Carvalho et al., 2020). If households and firms do not adjust their expectations in response to economic news this could therefore also be the result of well-anchored inflation expectations and a successful monetary policy (Coibion et al., 2020). When inflation expectations are de-anchored in the sense that they deviate from the inflation target it might be difficult to figure out whether an adjustment of expectations towards the inflation target is due to a re-anchoring or an accidental and temporary result of other factors, such as commodity price fluctuations.

Empirical evidence on de-anchoring of inflation expectations in the euro area is mixed. Empirical tests of anchoring based on financial market data investigate whether inflation expectations or inflation uncertainty respond to macroeconomic or monetary policy news (Gürkaynak et al., 2005). Another possibility is to test whether changes in short-run expectations propagating into long-run expectations, which is more likely in case of persistent inflation dynamics (Mehrotra and Yetman, 2018). Several studies have found evidence for a potential de-anchoring of inflation expectations in the aftermath of the global financial crisis and the European debt crisis. Some evidence for financial markets in the euro area suggests that medium-run inflation expectations (2-5 years) have been de-anchored in the sense that they respond to macroeconomic news or changes in short-run expectations after 2011, while long-run expectations (over 5 years) did not change and remained in line with the 2% level (Nautz et al., 2017). Long-run inflation expectations among professionals slightly decreased during the European sovereign debt crisis in 2013 but the overall distribution remained in line with the slightly but below 2% target of the ECB. At the same time, uncertainty regarding long-run inflation increased substantially (Dovern and Kenny, 2020).

The degree of anchoring depends on a variety of institutional factors. Relevant factors include central bank independence, transparency regarding instruments and objectives as well as sustainable fiscal policy (Bems et al., 2021). A natural question is whether systematic under- and overshooting of inflation targets will lead to adjustments and de-anchoring of long-term expectations. Given the existing evidence on information rigidities and the sluggish adjustment of expectations over time, de-anchoring would require substantial and sustained deviations of actual inflation from the inflation target. Before the pandemic, actual inflation in the euro area was below the inflation target for an extended period of time and there was concern that inflation expectations might have lost their anchor. At the current juncture, the probability of a prolonged period of elevated inflation has increased, giving rise to the risk of a de-anchoring of expectations above the inflation target of the ECB.

3. MEASURES OF INFLATION EXPECTATIONS AND CURRENT DEVELOPMENTS

Inflation expectations are available for firms, consumers, professionals and financial markets. Inflation expectations can be derived from prices in financial markets as well as from surveys of firms and consumers or professional forecasters. Market-based measures can also reflect risk premia, which implies the need to disentangle the expectation and the risk component. Survey-based measures for consumers and households are not explicitly available for euro area inflation; professional forecasts are often based on small samples. Nevertheless, both kinds of measures are potentially useful for predicting future inflation (Meyler and Grothe, 2015).

For the euro area, the coverage of inflation expectations is incomplete. Measures of inflation expectations available for the euro area differ remarkably with regard to coverage, frequency and number of participants (Table 1). Inflation expectations of consumers and firms are usually only available for a horizon of up to one year, while market-based measures and professional forecast are available for longer horizons. Market-based measures can be derived on a daily basis. Survey measures are only available at monthly or quarterly basis, which makes it difficult to use these data to identify the effects of monetary policy (Bańkowska, et al., 2021). The ECB recently started a project to increase the availability of harmonised data for consumer expectations. However, the data are still only available for a relatively short time period.

Table 1: Key features of different empirical measures of inflation expectations for the euro area

Name	Agent	Geog.	Horizon	Target	Frequency	Sample	Size
European Commission Consumer Survey (ECCS)	Households	Individual Countries	1 year ahead	Consumer Prices	Monthly	2004	~ 25000
ECB Consumer Expectations Survey (CES)	Households	Individual Countries	1year ahead, 3 years ahead	Prices	Monthly	2020	~ 8000
European Commission Business Survey (ECBS)	Non-financial corporations	Individual Countries	3 months ahead	Producer Prices	Monthly	1962	~ 70000
ECB Survey of Professional Forecasters (SPF)	Professionals	Euro Area (EA)	Multiple	HICP (HICPX)	Quarterly	1999	~ 75
ECB Survey of Monetary Analysts (SMA)	Professionals	EA	Multiple	HICP (HICPX)	6-weekly	2019	~ 30
Consensus Economics (CE)	Professionals	Individual Countries/EA	Multiple	HICP (HICPX)	Monthly/ quarterly	1990	~ 30
Euro Zone Barometer (EZB)	Professionals	Individual Countries/EA	Multiple	HICP	Monthly	2002	~ 30
Swaps/bonds	Market	EA (Individual countries)	Multiple	HICP excl. Tobacco	Daily	2005	

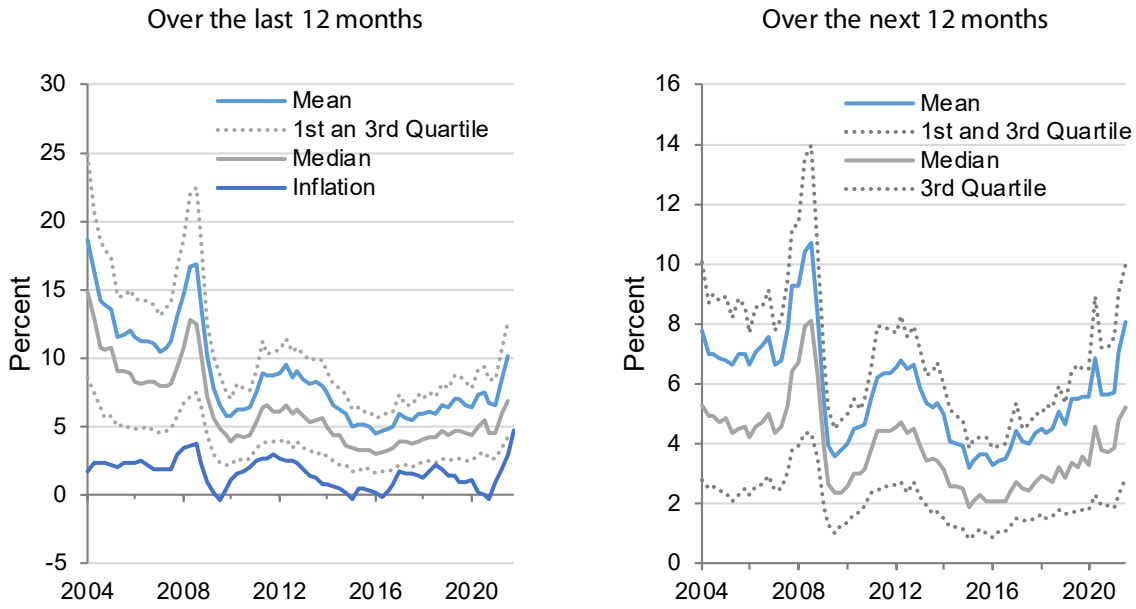
Source: ECB (2021).

3.1. Household surveys

Inflation expectations of private households are usually far above actual inflation. Households are often not aware of recent inflation dynamics as measured in official statistics and believe consistently that inflation has been higher than it actually was (Dräger and Nghiem, 2021). At the same time, disagreement about future inflation across households is much higher than among professional forecasters (Coibion et al., 2020). Nevertheless, consumer inflation expectations can reflect trend changes in inflation dynamics (Lane, 2019).

Inflation expectations in the Consumer Survey of the European Commission have risen sharply. In the European Commission's Business and Consumer Survey, consumers are asked about the change in consumer prices in the last 12 months and about the expected change in consumer prices in the next 12 months. Therefore, the survey does not provide information about the long-term inflation expectations of private households. The survey reports quantitative consumer inflation expectations on a quarterly basis—qualitative expectations are available at a monthly basis—and is available for the countries of the European Union for long time periods. The survey data shows that consumers systematically perceive inflation to be considerably higher than it actually is (Figure 2). The large gap between the quartile-results indicates a huge dispersion of answers across consumers. There is a high correlation between perceived and expected inflation, suggesting that perceived inflation is one important determinant of expected inflation. Even though the systematic difference between perceived and actual inflation makes it difficult to interpret the survey in quantitative terms, it might be useful to identify the direction of changes in inflation expectations (Lane, 2019). In the course of 2021, consumer inflation expectations have increased considerably. Expectations are now at their highest level since 2008.

Figure 2: Perceived and expected inflation by consumers and actual inflation



Source: European Commission – Business and Consumer Survey.

Notes: Quantitative data collection was started by the European Commission on quarterly basis in 2004. The latest observation corresponds to the 3rd quarter of 2021.

Due to the shortcomings of existing consumer survey data the ECB has started a pilot Consumer Expectations Survey (CES). The survey was launched in January 2020 and is conducted online at a monthly and quarterly frequency for six euro area countries (Bańkowska et al., 2021). Overall, the survey provides more detailed and more timely information about inflation expectations compared to the EU Consumer Survey. The survey provides also information about long-run inflation expectations for a horizon of three years and about inflation uncertainty. It is based on a quasi-experimental set-up, which allows the analysis of different scenarios, also providing quantitative information on durable and non-durable consumption plans. The survey is conducted online each month with approximately 10,000 participants during the pilot phase. So far, 6 countries are included (Belgium, France, Germany, Italy, The Netherlands and Spain) with the country coverage planned to be increased over time

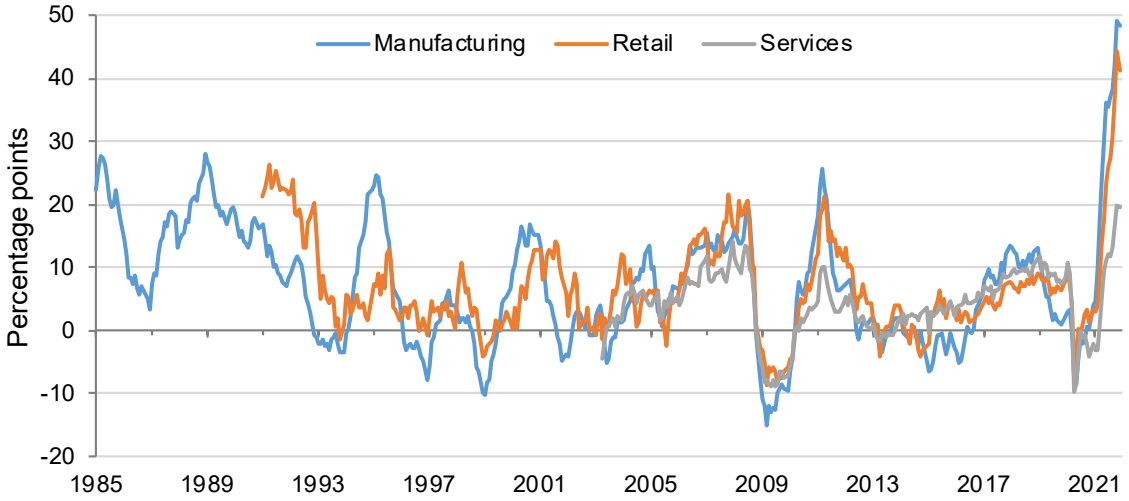
(Bańkowska et al., 2021). First results of the CES from December 2020 look promising. Expected inflation deviates substantially less from actual inflation than the expectations from the EU Consumer Survey.

3.2. Firm surveys

Data on firm expectations in the euro area from the business survey of the European Commission are of qualitative nature. The firm survey corresponds to the consumer survey as it is available for the countries of the European Union at a monthly basis for a long time period. In the survey, the participants are asked about their own price setting for the next three months ahead. Therefore, the survey only covers short-run expectations. Moreover, the survey does not provide information on the expectations of firms about overall consumer price inflation. The survey only provides qualitative results because firms are asked whether they plan to increase or decrease prices. The results are presented as the balance between the share of firms planning to increase and to decrease prices. In the last months of 2021, the indicator reached record-high levels in the manufacturing, service, and retail industries in the euro area (Figure 3). Price pressure is particularly high in the manufacturing and retail industries.

Even though firms are the heart of consumer price developments, existing information on firm expectations is limited. The relation between the firm's own selling prices, aggregate producer prices and consumer prices is complex. Therefore, quantitative survey data on inflation expectations of firms in addition to expectations about their own prices would be particularly useful for monetary policy. There is also no explicit information regarding long-run inflation expectations, which is important to analyse the anchoring of inflation expectations at the firm level.

Figure 3: Selling price expectations of euro area firms over the next three months



Source: European Commission – Business and Consumer Survey.

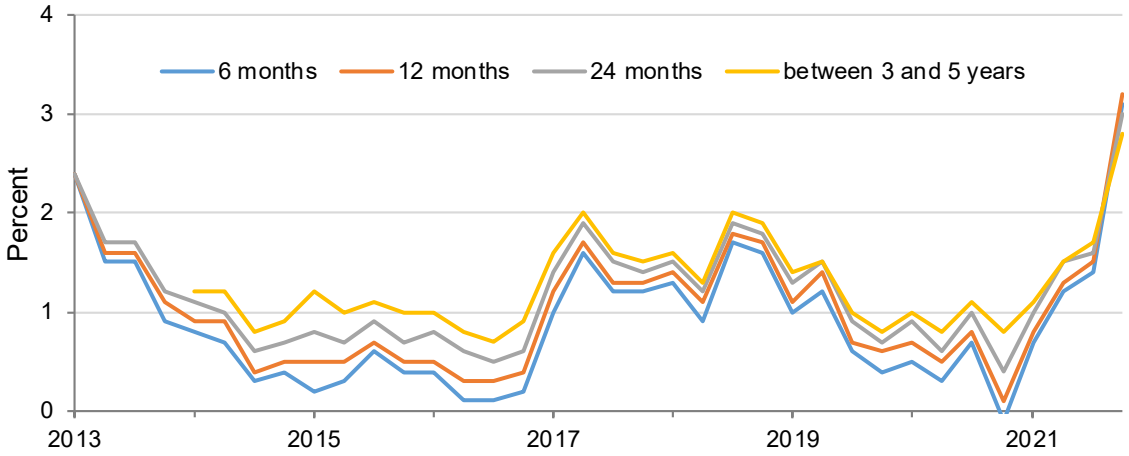
Notes: The figure shows the balance (percentage points) between the share of firms indicating that they will raise their prices and the share of firms indicating that they will lower their prices. The latest observation corresponds to December 2021.

The Bank of Italy collects data on inflation expectations of firms for the near term and for the long term. The Survey on Inflation and Growth Expectations (SIGE) has been conducted by the Bank of Italy on a quarterly basis since 1999. At the beginning, only industrial and non-financial service firms participated. Since 2013, also firms from the construction industry are participating. The survey covers firms with 50 or more employees. A total of 1,000 firms participate in the survey and the results can be decomposed by geographic location, number of employees, and industry. The firms are asked about

their quantitative expectation for consumer price inflation 6, 12 and 24 months ahead. These answers serve as indicators for short-term inflation expectations. In addition, firms are asked about their long-run inflation expectations over the period in 3 to 5 years. Since 2017, the participating firms receive different information: 60% of the firms receive the current inflation rate as information, 20% receive the ECB's inflation target as information, and the remaining 20% receive no information.

In the fourth quarter 2021, Italian firms' inflation expectations were roughly 3% for all horizons. In the course of 2021, inflation expectations have risen in line with the increasing actual inflation (Figure 4). While the term structure of inflation expectation was positively sloped between 2014 and 2020, recently long-run inflation expectations were lower than short-run expectations. This suggests that the firms expect high inflation to be transitory at least to some extent. However, inflation expectations for all horizons are currently above the inflation target of the ECB.

Figure 4: Italian firms' consumer price expectations



Source: Bank of Italy - Survey on Inflation and Growth Expectations (SIGE).

Notes: The includes industrial, non-financial services and construction firms. The latest observation corresponds to the 3rd quarter of 2021.

At the euro area level, the available survey data is not useful for assessing firms' long-term inflation expectations. They merely depict the short-term trends in firms' own price setting and are only available in qualitative terms. The quantitative data of the Bank of Italy are far more instructive, as they explicitly ask about consumer price inflation for different time horizons. In particular, inflation expectations for the period between 3 to 5 years from now can be useful for analysing the anchoring of inflation expectations at the micro level. Also, in the literature the need to create large and representative firm surveys with quantitative information and a better coverage has been emphasised (Coibion et al., 2018; Andrade et al., 2021). Such surveys should include control groups to distinguish between firms which are informed or uninformed about recent developments, as in the survey of the Bank of Italy.

3.3. Professional forecasts

Survey-based measures of professional forecasters are available for long time periods and a large number of countries. The surveys summarise the forecasts of financial institutions and research institutes on a regular basis. The mean over all forecasts is used as a measure of expectations. Surveys of professional forecasters are available from different sources, most prominently from Consensus Economics. The ECB also conducts a survey of professional forecasters. However, the ECB survey provides less detailed information than Consensus Economics and is only available on a quarterly basis

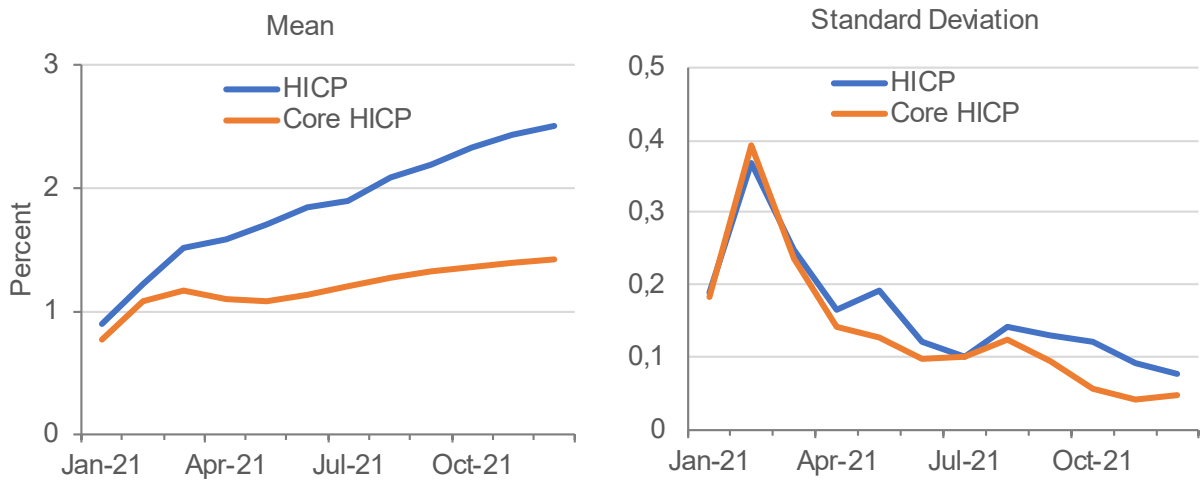
beginning in 2004, while data from Consensus Economics is available at a monthly basis starting in 1989. Usually, the differences across different surveys of professional forecasters are relatively small.

Consensus Economics collects annual forecasts for the current and the next year on a monthly basis and forecasts for up to 10 years on a quarterly basis. The short-run forecasts for the current and the next year mainly reflect the impact of short-run factors, while the long-run forecasts for up to 10 years can be interpreted as a measure of the credibility of the central bank to achieve its inflation target. The forecasts are fixed event forecasts (i.e., for a specific year) and are available for a broad range of countries beginning in 1989. Participants include both private banks and research institutes. In the case of short-run forecasts, names of participants are published with the individual entries, which tends to increase the credibility of forecasts due to reputation effects (Beckmann and Czudaj, 2018). Consensus Economics has a good track record compared to forecasts of the International Monetary Fund (An et al., 2018) which is in line with the evidence that the combination of forecasts can reduce the forecast error compared to individual forecasts (Bates and Granger, 1969). Standard deviations of the individual forecasts provide information about the uncertainty about future inflation, which is one dimension of anchoring of inflation expectations.

A weakness of the surveys is that they are based on a small number of participants and that they do not provide regular information about the factors influencing the forecasts. The number of participants varies across countries and over time and is usually below 50. Respondents usually only provide quantitative forecasts so that no direct conclusion regarding the underlying expectation building mechanism can be drawn. Forecasters may use inflation expectations of firms or private households as indicators in econometric models, rely on market-based indicators or are guided by an assessment of the ability of a central bank to achieve its inflation target. Another caveat is that individual forecasts for longer horizons are not published.

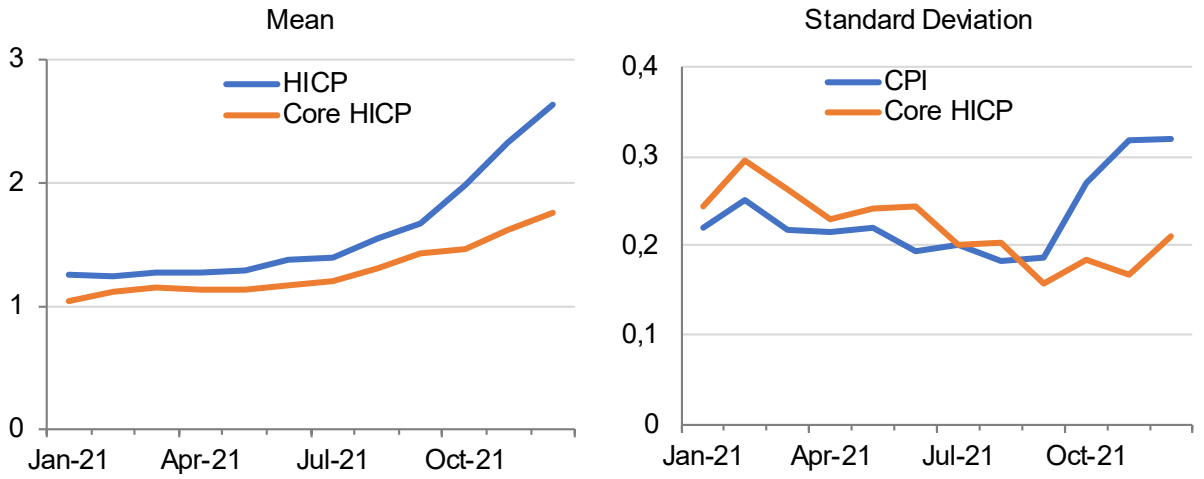
Euro area inflation forecasts of professionals for 2021 and 2022 have strongly increased recently. The forecasts for 2021 have been revised upwards throughout the year with incoming data on actual inflation (Figure 5). The forecasts for 2022 have been revised upwards since July 2021 reflecting that professionals increasingly assessed drivers of price pressures to be more persistent. In the most recent survey, the mean forecast for headline HICP 2022 was well-above 2%. Forecasts for core HICP in 2022 were still below 2%, indicating that the increase in headline inflation forecasts is to a large extent due to energy prices (or food, alcohol, and tobacco, which are also excluded), influences usually perceived to be temporary. The standard deviation of forecasts across forecasters for 2021 declined throughout 2021 as the forecast is increasingly based on actual figures for monthly inflation over time. The standard deviation of inflation forecasts for 2022 by contrast increased markedly at the end of 2021, indicating that forecast uncertainty has increased. However, uncertainty seems to be concentrated on the prospects for energy prices as the standard deviation for core inflation remained relatively flat.

Figure 5: Consensus: HICP inflation 2021 – euro area



Source: Author's own illustration based on data from Consensus Economics.

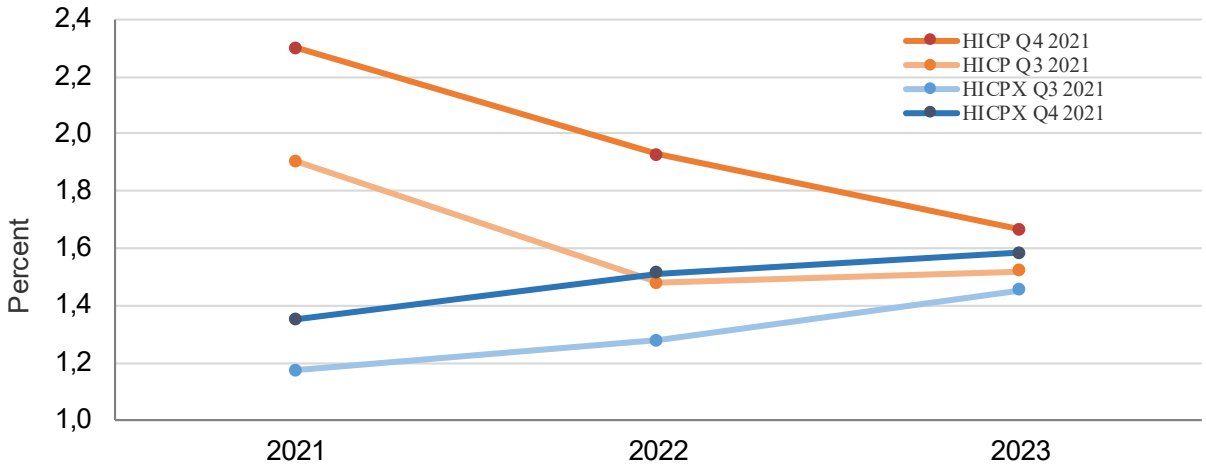
Figure 6: Consensus: HICP inflation 2022 – euro area



Source: Author's own illustration based on data from Consensus Economics.

The forecasts of Consensus Economics are broadly in line with the ECB Survey of Professional Forecasters. According to the ECB survey, inflation forecasts have been revised upwards for 2021 to 2023 from the third to the fourth quarter of 2021 (Figure 7). However, the upward revision for headline HICP was smaller for 2023 and the forecasts for 2022 and 2023 remained below 2%, indicating that forecasters assess high inflation in 2021 to be mainly due to transitory factors. Core inflation forecasts have also been revised up. While underlying inflation is expected to increase in both 2022 and 2023, it is forecast to remain contained below 2%.

Figure 7: SPF: HICP inflation 2021-2023 – euro area

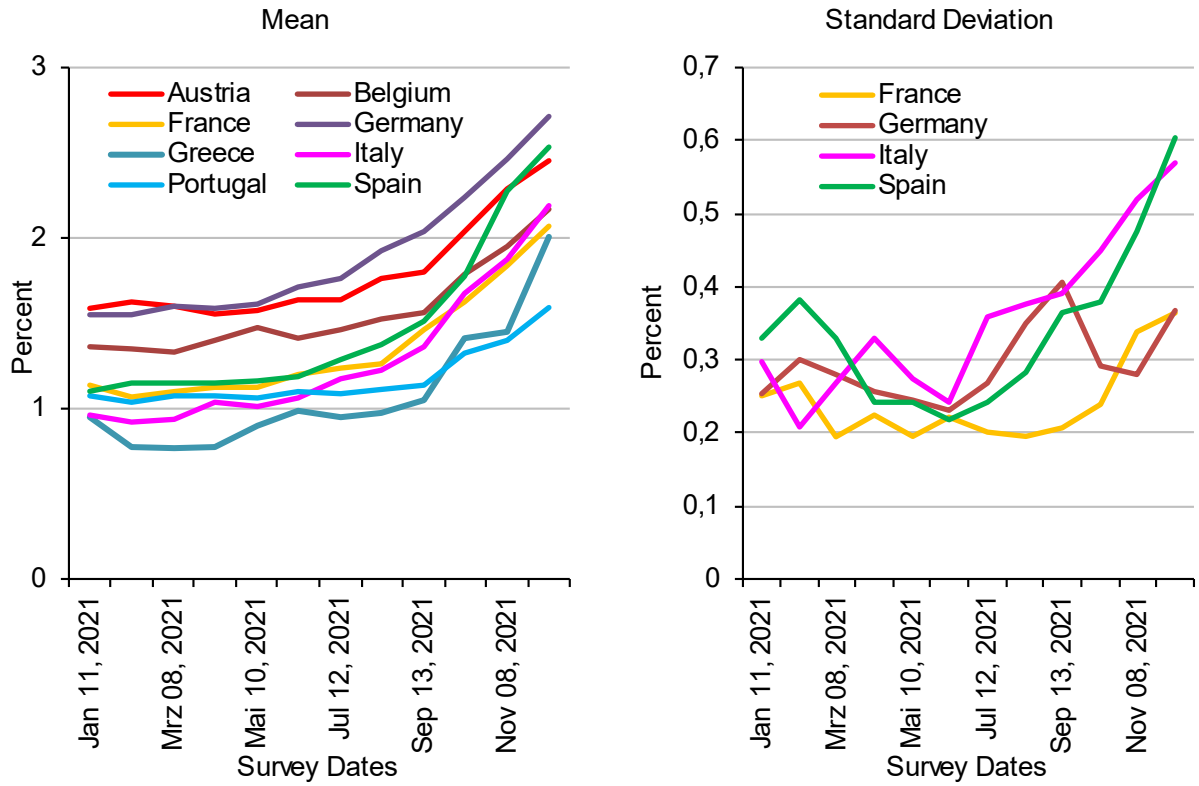


Source: ECB, Survey of Professional Forecasters.

Notes: HICPX: Harmonised index of consumer prices excluding food and energy. Survey conducted at the beginning of each quarter; Q4 forecasts date back to early October 2021.

Forecasts for consumer price inflation have been raised substantially for all euro area countries, while forecast uncertainty has diverged. Figure 8 shows that in the course of 2021 Consensus Forecast expectations for 2022 have been strongly revised upwards for all countries covered. According to the latest forecasts, Germany will experience the highest inflation rate in 2022. At the same time, forecast uncertainty as measured by the standard deviation of individual forecasts has diverged, with uncertainty for Italy and Spain having increased particularly strongly.

Figure 8: Forecasts for HICP inflation in 2022 by country

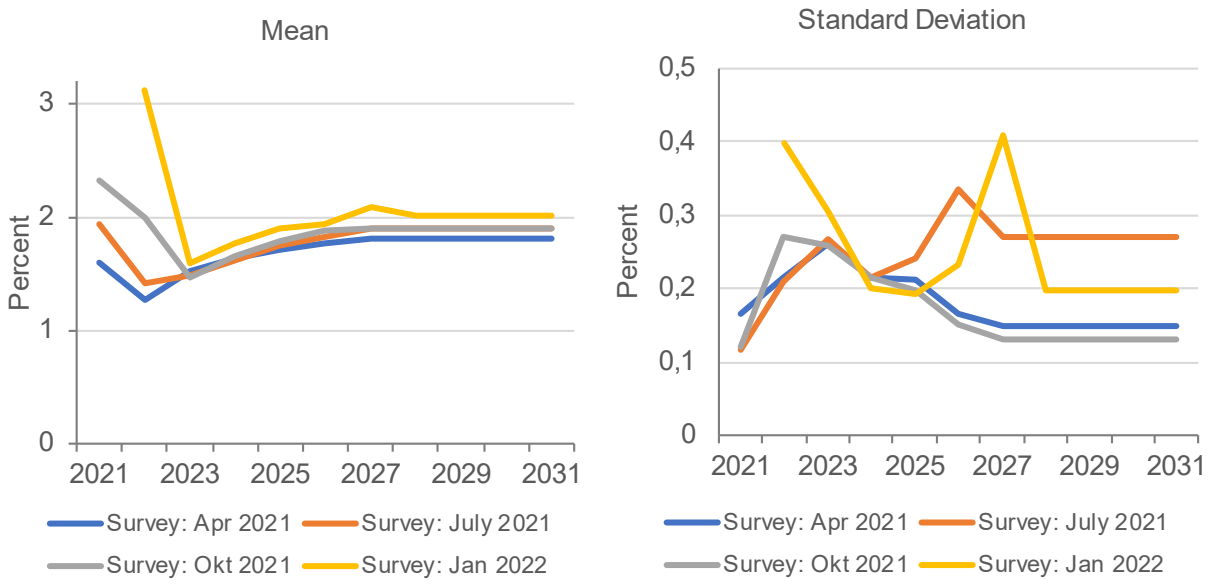


Source: Author's own illustration based on data from Consensus Economics.

Long-run inflation forecasts have increased only slightly and are now in line with the modified inflation target of the ECB. The increase in short-run forecasts has not been accompanied by a substantial upward revision of long-run expectations, suggesting that changes in short-run expectations have had little impact on long-run expectations yet. Following continuous slight adjustments during 2021 long-run expectations are now in line with the modified inflation target of the ECB (Figure 9). The standard deviation across forecasts as a measure of uncertainty among participants increased between April and July 2021, but returned to low levels in October. However, uncertainty has changed again from October to January. Long-run inflation forecasts for some countries recently slightly exceeded 2%, including for Germany, Austria, and France, while expectations for other countries remained below 2% (Figure 10). Overall, long-run expectations are for all countries relatively close to 2% after 2027. Uncertainty among participants displays a clear downward trend over the long-run. Both, forecasts and uncertainty over the medium run, have increased slightly compared to the corresponding October survey.

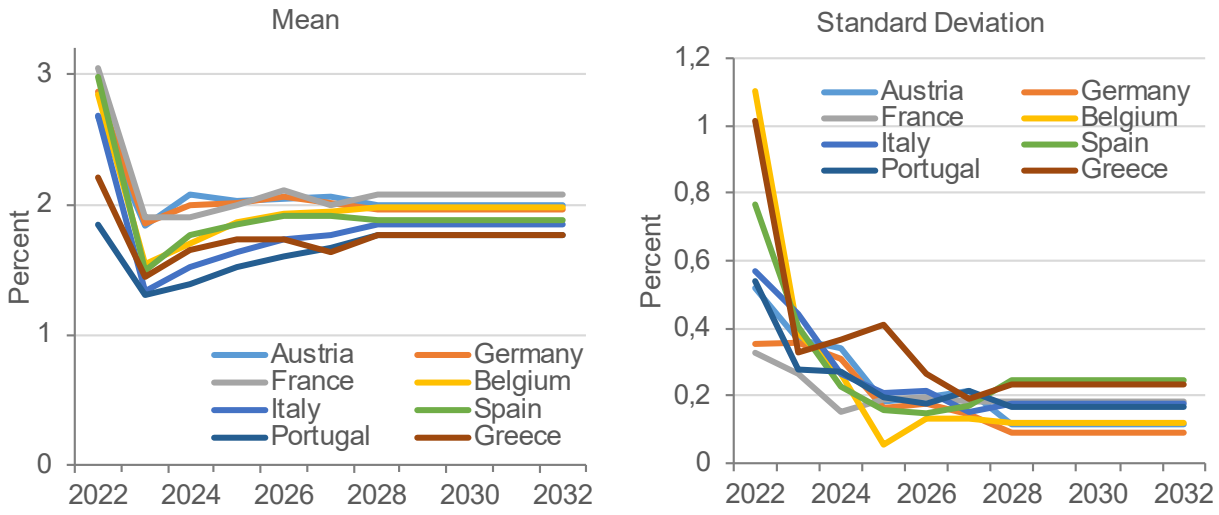
Surveys of professional forecasters also provide information about the distribution of forecasts. For example, throughout 2021 the distribution of forecasts for 2022 from Consensus Economics has shifted to higher values of inflation (Figure 11). The ECB survey of professional forecasts also provides the distribution of long-run forecasts. These have shifted to higher values of inflation over the last quarters, albeit to a smaller extent (Figure 12). The share of long-run forecasts above 2% is still relatively low.

Figure 9: Consensus: Long-run expectations for HICP Inflation – euro area



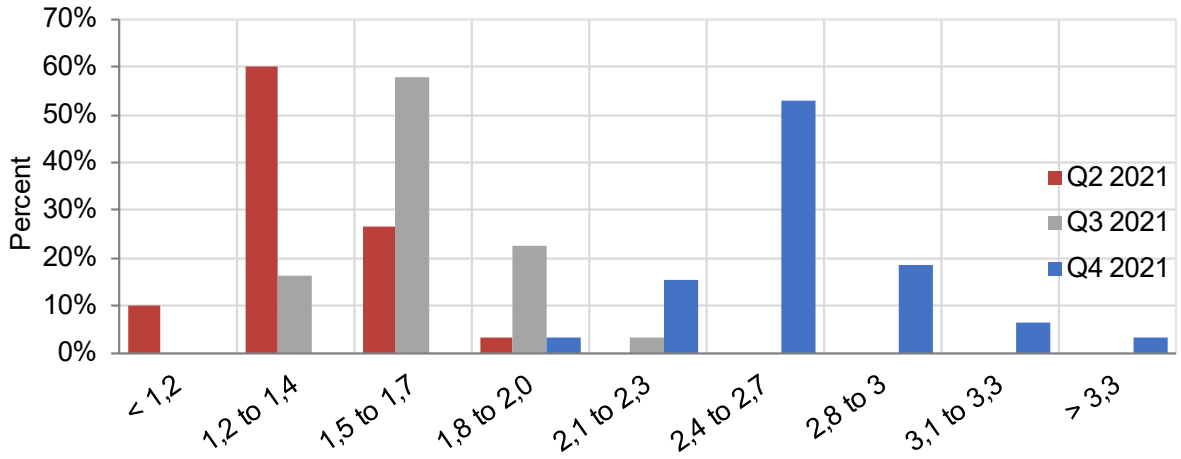
Source: Author's own illustration based on data from Consensus Economics.

Figure 10: Consensus: Long-run expectation for HICP Inflation – by country



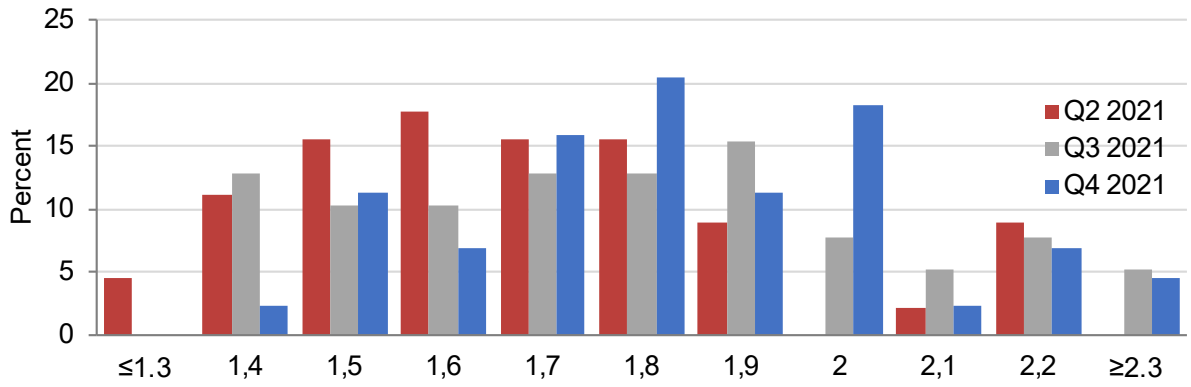
Source: Author's own illustration based on data from Consensus Economics based on the January 2022 survey.

Figure 11: Consensus: Distribution of expectations for HICP inflation in 2022 – euro area



Source: Author's own illustration based on data from Consensus Economics.

Figure 12: SPF: Distribution of long-term inflation expectations (5 year ahead) – euro area



Source: Author's own illustration based on data from ECB, SPF.

3.4. Financial markets

Financial market instruments can be used to derive inflation expectations of market participants. These instruments include inflation-indexed bonds, inflation-linked swaps and inflation options. However, market prices for these instruments are not only driven by "genuine" inflation expectations, but also by other factors, such as risk or liquidity premia. The inflation risk premium can be conceptualised in the following way: investors are typically risk-averse and therefore are eager to hedge against tail events (high inflation or low inflation). The risk premia vary over time and can be positive or negative depending on the economic environment. Also, the market structure of the respective financial instrument plays a role and might give rise to an additional liquidity premium. Thus, market prices can be decomposed into "genuine" inflation expectations and other factors. However, these other factors are not observable and have to be estimated. This has to be considered, when financial market instruments are used to gauge inflation expectations.

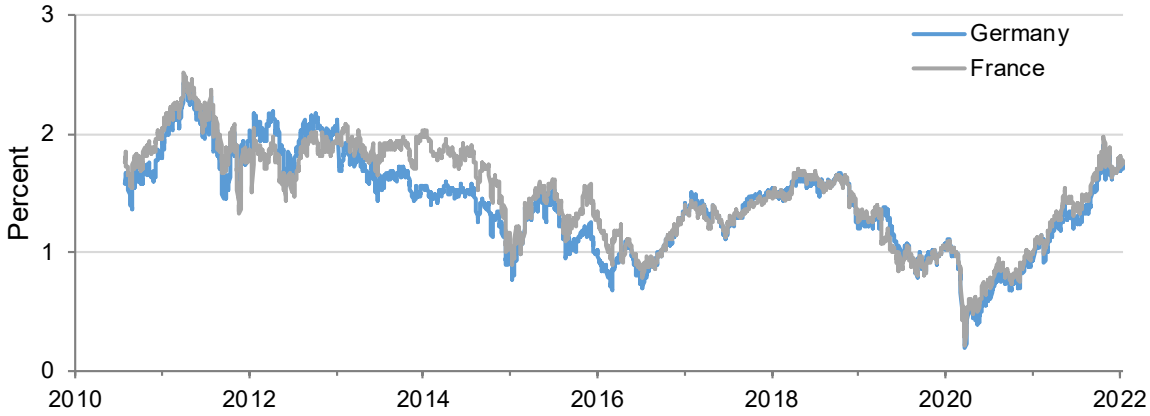
Estimated decompositions of market prices of inflation swaps find that "genuine" inflation expectations fluctuate less than risk premia. According to recent estimates, the risk premium in the euro area was positive until 2013, while it turned negative afterwards (Burban et al., 2022). In these periods it reached magnitudes of up to 0.5 percentage points. With the beginning of the pandemic, market participants expected the downside risks to future inflation to dominate so that the risk premium exhibited large negative values. In the course of the pandemic, the risk premia became smaller and were "slightly positive" in November 2021 (Burban et al., 2022).

One instrument to hedge against future inflation are inflation-indexed government bonds. Inflation-indexed bonds – as nominal bonds – provide principal and interest payments. However, the payments of inflation-indexed bonds are corrected for the realised inflation rate. Thus, the price of inflation-index bonds includes inflation expectations of market participants. The break-even inflation rate – that corresponds to expected inflation – is the difference between yields of nominal and inflation-indexed bonds with similar maturity.

In the euro area, the liquidity of inflation-indexed government bonds is relatively low. The share of inflation-linked bonds in the total amount of governments bonds outstanding is roughly 10% (Agence France Trésor, 2021; Dipartimento del Tesoro, 2021) for the largest suppliers of inflation-indexed bonds (France and Italy). For Germany and Spain, the share is even smaller at about 5% (Deutsche Finanzagentur, 2021; Tesoro Público, 2021). The low liquidity compared to nominal bonds gives rise to a liquidity premium for inflation-indexed bonds (Camba-Mendez, 2020).

Break-even inflation rates derived from 10-year government bonds have increased and seem to be broadly in line with the inflation target of the ECB currently. At the end of 2021 break-even inflation rates were 1.8% for France and 1.7% for Germany (Figure 13). In the period before the pandemic, break-even inflation rates were below the inflation target for several years. At the beginning of the pandemic in March 2020, the break-even inflation rates fell from roughly 1% to close to 0%, but then quickly recovered since May 2020 and surpassed the pre-pandemic value in January 2021.

Figure 13: Break-even inflation rates derived from 10-year bonds



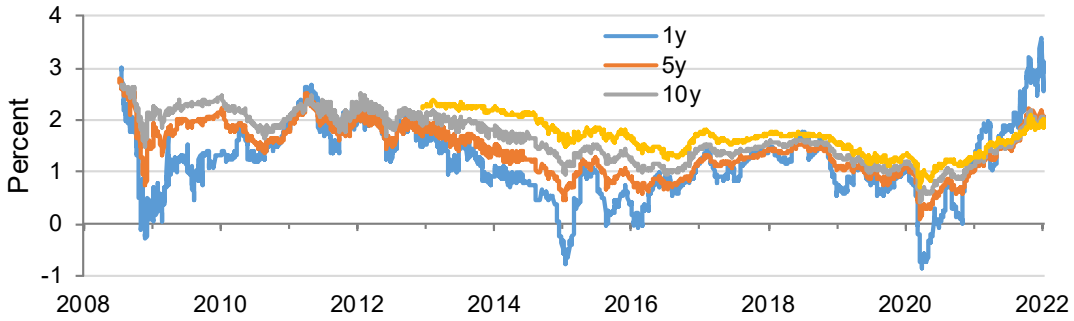
Source: Datastream, Refinitiv.

Notes: Break-even inflation rates derived from bond markets equal the difference between nominal bond yields and real yields from inflation-linked bonds of similar maturity. Break-even inflation rates do not equal "genuine" inflation expectations as a risk and liquidity premium also affect break-even inflation rates. The latest observation corresponds to 14 January 2022.

Another instrument to hedge against future inflation are inflation-linked swaps (ILS). The swap market is more flexible than the inflation-indexed bond market as the contracts can be adjusted bilaterally to the specific needs of buyers and sellers. This results also in a relatively large variety of maturities, for which inflation expectations can be derived. In principle, two parties swap a payment that depends on the difference of a fixed benchmark level of inflation and realised inflation in a specific time period. The resulting ILS rate reflects inflation expectations of market participants, even though it depends also on other factors, such as risk premia.

Inflation expectations based on euro area inflation-linked swaps have increased strongly and now exceed the pre-pandemic level. The ILS rates show that market participants expect inflation to remain elevated in the near future (Figure 14). The one-year ILS rate is currently close to 3%. Long-run inflation expectations for horizons of 5 to 10 years have increased recently according to the ILS rates and are now in line with the ECB inflation target. The five-year forward inflation swap five years ahead (5y5y), which is frequently used in monetary policy discussions, has exhibited a similar pattern. Before the pandemic, long-run inflation expectations were below the inflation target for several years according to the ILRs rates.

Figure 14: Euro area inflation swaps

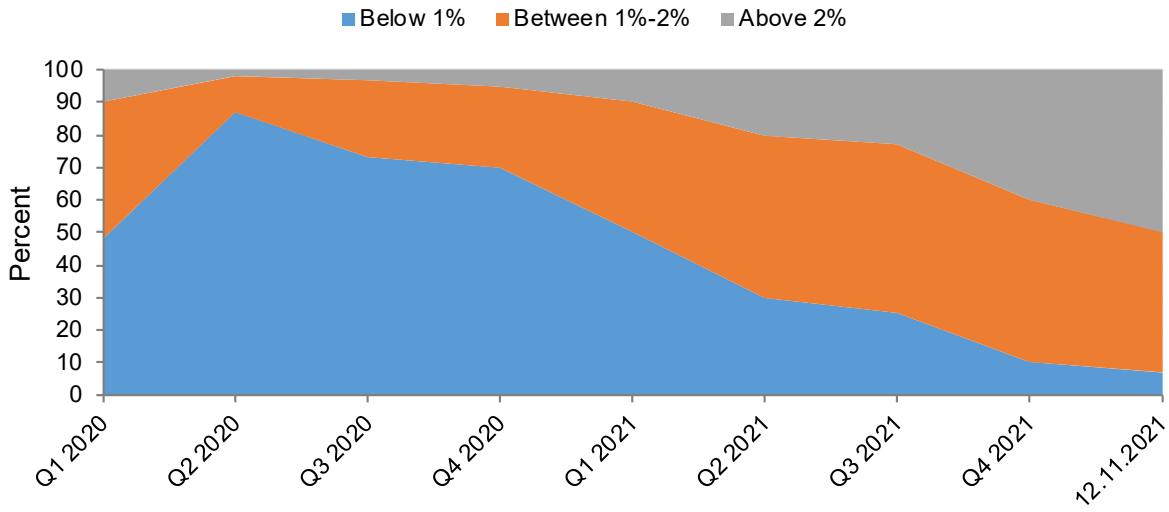


Source: Refinitiv.

Notes: Market prices from inflation swaps cannot directly be interpreted as "genuine" inflation expectations. Market prices are also influenced by an inflation risk premium. The latest observation corresponds to 14 January 2022.

A third instrument that can be used to gauge inflation expectations of market participants are inflation options. Inflation options can be used to derive probability distributions for inflation expectations of market participants. The probabilities cannot be interpreted as physical probabilities as investors are usually risk-averse so that especially in high and low inflation periods risk premia can drive market prices. Neglecting the risk premium (equal to a risk-neutral view) option price data in November 2021 indicate that market participants assign a probability of about 50% to a scenario with inflation above 2% on average for the next 5 years (Figure 15). In contrast, in March 2020, when the pandemic began, the probability for inflation rates below 1% was equal to roughly 80%. Currently, financial market agents assign the lowest probability since 2010 on inflation rates below 1% and the highest probability on inflation rates above 2%. This suggests that inflation expectations currently shift in the direction of a de-anchoring to the upside rather than to the downside, even though the risk premium has to be taken into account.

Figure 15: Average inflation over the next 5 years (risk-neutral option-implied distribution)



Source: Author's own illustration of ECB data (ECB 2021, p. 25; Schnabel 2021, p. 14).

Notes: Market prices of inflation options cannot directly be interpreted as "genuine" inflation expectations. Market prices are also affected by an inflation risk premium. A risk-neutral option-implied distribution assumes that the risk premium is zero. The observations correspond to the start of the quarter and the latest observation is 12 November 2021.

4. DE-ANCHORING OF INFLATION EXPECTATIONS AHEAD?

Over the last couple of years, long-run inflation expectations gradually slipped below the central bank target rate. The euro area experienced an extended period of underlying (core) inflation undershooting the ECB's inflation target, although the central bank, faced with the zero lower bound for the main policy rate, implemented sizable unconventional monetary policy measures. Over time, market participants appear to have to some extent lost confidence in the capability of the ECB to shift inflation back to the target range. Both market-based as well as survey-based inflation expectations fell considerably below 2% between 2015 and 2020. The decline in inflation expectations has led the ECB to make use of unconventional monetary policy measures, and the limited success of this policy to lift inflation back to target, in turn, likely contributed to concerns that the ECB may have indeed run out of effective instruments. With the recent rise in inflation, the euro area may have left this low-inflation environment.

4.1. Expectations in the face of surging inflation

Inflation has increased strongly and is expected to remain elevated for the time being. Several factors are contributing to the current upsurge of inflation (Beckmann et al., 2021). So far, energy prices and supply bottlenecks have been major drivers, with the potential to also lift the inflation rate in 2022. Wholesale energy prices are only gradually passed through to consumers. There is also a considerable lag in the pass-through of producer prices (pushed up by prices for energy and raw materials and transport costs). Higher producer prices – up almost by 24% y-o-y in November 2021 – will eventually fuel consumer price inflation via non-energy industrial goods (NEIG) prices (Koester et al., 2021). Fiscal policy has held up demand during the COVID-19 crisis and can be expected to remain supportive as the general escape clause remains in place, suspending European fiscal rules until 2023. Grants from NextGenerationEU (NGEU) funds distributed to Member States over the next couple of years and an effective relaxation of rules as a likely outcome of the current debate on a reform of the Stability and Growth Pact will allow Member States to keep a rather supportive fiscal policy stance also in the following years. On top of that, the pandemic left households with huge amounts of extra savings increasing their willingness to pay and with the potential to fuel a post-crisis expenditure boom. Finally, although there has been no signal of accelerated wage growth yet, the recent surge in inflation will likely trigger second-round effects in upcoming wage negotiations. In contrast to the situation after previous crises, labour markets in many Member States are tight and the unemployment rate in the euro area (7.2%; Nov. 2021) has never been lower in the history of the monetary union. Workers and unions can be expected to strive for nominal wage increases in 2022 and beyond that exceed inflation after average real wages have declined in 2021. Higher wage dynamics would be particularly important as a driver of higher services inflation (2.4% y-o-y in December 2021). Second-round effects via higher wage increases have not taken place yet, but the current combination of high inflation and tight labour markets raises the risk that accelerating wage pressure will fuel inflation in the coming years.

So far, market participants expect increased inflation to be temporary with long-run expectations around the 2% target. While market-based indicators suggest that inflation will remain above the inflation target for the time being, long-run expectations have shifted close to 2%. Long-run expectations of professional forecasters have also increased somewhat and are now in line with the inflation target of the ECB. This is consistent with the view that market participants believe that the central bank can control inflation. One reason behind might be that it is easier for central banks to reduce inflation if it is above target than lifting inflation when it is below the target, particularly at the zero lower bound. As a consequence, recent shifts of inflation expectations could be interpreted such that they have indeed re-anchored at the ECB's target rate. There is, however, also the possibility that

long-term inflation expectations are still de-anchored and will continue to rise going forward on the back of persistent overshooting of actual inflation.

4.2. Credibility is key: Central bank policies and communication

The ECB has in principle tools at its disposal to maintain price stability. The institutional setup of the ECB, in particular its independence from national governments and its clear mandate of maintaining price stability, is conducive to avoid runaway inflation. The ECB has all the necessary monetary policy tools at its disposal: It can reduce and reverse asset purchases, drain excess liquidity from the monetary system, increase interest rates, and use macroprudential instruments. Even if a strict tightening of monetary policy may be economically costly in terms of output, there is the possibility to control inflation if required. As long as the ECB credibly signals determination to maintain price stability, inflation expectations over the medium and longer term should remain at the inflation target. This, in turn, will contribute to moderating price pressures and facilitate the task of maintain price stability over the medium run.

The risk of de-anchoring of expectations increases, the longer inflation remains elevated. The longer households and firms experience high inflation, the more likely they are to revise their long-run expectations upwards. Expectations about short-run inflation have already increased substantially and the rich evidence for slow adjustment of expectations suggests that long-run expectations could further be revised up going forward.

The determination of the ECB to fight inflation is called into question when actual policies are not consistent with the inflation outlook. Recently, the ECB revised its inflation forecast for 2022 in its macroeconomic projection from 1.7% (in September 2021) to 3.2% (December 2021). Despite this remarkable revision, monetary policy remained largely unchanged; the ECB continued to rule out interest rate hikes in 2022 and projects to continue with net asset purchases for the entire year 2022, though with volumes declining over time. There are indeed reasonable arguments to avoid premature tightening and a fall-back into a low-inflation environment as long as inflation is expected to return to target in the medium term anyway (Schnabel, 2021). In order to avoid the impression of complacency, the ECB explicitly points to the possibility of more persistent and broad-based inflationary pressures. Instead of only considering the most likely outcome for inflation, it looks at a probability distribution in the inflation outlook. Schnabel (2021) proposes a risk-management approach in the presence of higher uncertainty in the inflation outlook in order to prepare for all eventualities and to be able to act swiftly if necessary. Nevertheless, the credibility of these assurances will be tested with the degree and duration of deviations from the inflation target to the upside, and scepticism about the ECB's willingness to fight elevated inflation will grow, and so does the risk of de-anchoring of inflation expectations.

The central bank may also have to respond to structural changes like the green transition which can create upside risks to price stability in the medium term. The path of energy prices could become a relevant factor for monetary policy decisions and long-run expectations. Energy prices are notoriously volatile and therefore central banks usually "look through" fluctuations of energy prices when they focus on the core inflation rate in their assessment of underlying inflation. However, the green transition of the economy may require persistent increases in fossil fuel-based retail energy prices via carbon taxes, aggravated by surging demand for "transition fuels" like natural gas. Monetary policy will have to react if a persistent increase in energy inflation contributes to a de-anchoring of inflation expectations and hence poses a risk to price stability in the medium term (Schnabel, 2022). Sustained price pressure could also come from metal prices, which are pushed up by strong demand partly related to the energy transition. Another source of structural upward pressure on prices could

come from food prices if unfavourable weather becomes the norm rather than the exception as a result of global warming and productivity of staple food crops is reduced over the coming years on a global scale (Beckmann et al., 2021).

4.3. The risks of financial and fiscal dominance

Inflation expectations could de-anchor to the upside if market participants believe that the ECB is restricted in its ability to control inflation. Long-term inflation slipped below target in recent years when the ECB seemed to be unable to lift inflation back to 2%. Similarly, a de-anchoring to the upside becomes more likely if market participants question the determination of the central bank to fight inflation due to trade-offs with other objectives of the central bank like cohesion of the monetary union and integrity of the financial system.

Sudden monetary policy tightening could be disruptive for financial markets. Due to the long period of low interest rates (and therefore a considerable decline in the reference interest rate), asset prices, including equity prices and house prices, have increased considerably. If a sudden and sharp tightening of monetary policy led financial markets to reassess their outlook for nominal and real interest rates, this could send asset prices tumbling and cause turbulences in the financial system. Wherever these assets are primarily held – e.g. insurances, pension funds, banks, households – a sizable loss of market value in financial assets may have dire consequences. Moreover, the banking system had to adapt to the persistent low interest rate environment but kept on its business model of maturity transformation. This implies that bank assets (mostly credit to firms and households) have longer duration than bank liabilities (refinancing via deposits or bonds). If refinancing costs increase sharply, while the large stock of longer-term credits continues to deliver low revenue (as low as 1-2% in the case of mortgages), already thin profit margins of banks may turn negative. Leaving the zero interest rate environment after many years is unprecedented. The ECB may face a trade-off between forceful monetary policy tightening in order to rein in inflation and financial stability issues. Moreover, as the Eurosystem is the single largest holder of government debt, the central banks' balance sheet would also be strongly affected with negative equity as a possible result.

Rising interest rates may get highly indebted governments into trouble. Due to elevated government debt and budget deficits in some Member States, monetary policy tightening can have considerable side effects. If the ECB ceased to purchase government bonds (let alone selling assets), there would likely be an increase of average returns of government bonds, and risk spreads of highly indebted periphery states like Greece and Italy could swell. This would lead investors to rethink the argument that financing conditions for governments will remain favourable for an (almost) indefinite future (Blanchard et al., 2020), raise concerns about sustainability of public debt for some Member States and put additional pressure on refinancing conditions via rising risk spreads, potentially leading into a self-fulfilling sovereign debt crisis. Therefore, the ECB will hardly ignore this "fragmentation risk" (Krauss, 2021) and balance its actions to control inflation with the need to maintain favourable financing conditions for national governments. If the inflation outlook requires a forceful and immediate response of monetary policy, financial and fiscal dominance could come into play and restrict the ECB in its policies (Fiedler et al., 2020).

5. CONCLUSION

The available measures of inflation expectations for the euro area only partly meet the needs of the ECB. Measures of inflation expectations are available for private households, firms, financial markets, and professional forecasters. These measures differ in terms of their scope, their horizon, and the way they are compiled, resulting in different strengths and limitations. Short-run inflation expectations provide information about the outlook for inflation in the near term. Long-run inflation expectations can serve as an indicator for the credibility of a central bank to achieve its inflation target. While inflation expectations of consumers and firms are most important for central banks as they ultimately matter for price setting and in turn consumer price inflation, available measures exhibit the largest gaps here. Consumer surveys are only available for short-term inflation expectations and measured expectations systematically exceed actual inflation. Firm inflation expectations are also only available for the short-term, provide information about expected prices of individual firms but not for overall inflation, and are only available in qualitative terms. As a result, inflation expectations of professional forecasters and market-based inflation expectations, which are available for the long-run in quantitative terms, are in practice more relevant for monetary policy analysis. The ECB started a pilot Consumer Expectations Survey to improve the available data for consumer inflation expectations. The Bank of Italy conducts a survey on firm expectations in Italy, which includes long-run expectations on overall inflation in quantitative terms, that provides an avenue to improve the available data on inflation expectations of firms in the euro area.

While short-run expectations indicate that inflation in the euro area will remain elevated for the time-being, long-run inflations expectations are in line with the inflation target of the ECB. All available measures for short-run expectations have increased recently reflecting the surge in actual inflation and the expectation that the factors behind will remain in place in the near-term. Current drivers of inflation include supply bottlenecks, a high willingness of consumers to pay due to extra savings built up since the beginning of the pandemic, and tight labour markets. While it is uncertain when the impact of these factors will subside, more structural developments, such as demographic change or the transition towards green energy, have the potential to put upward pressure on prices in the medium-term. Long-run inflation expectations have increased as well but are currently in line with the inflation target of the ECB. However, as there is some evidence that long-run inflation expectations have been de-anchored at least slightly in the low inflation environment before the pandemic, it is uncertain how firmly they are re-anchored at the current juncture.

If inflation remains well-above the inflation target for an extended period of time, the ECB may face difficult trade-offs. According to the modified inflation target, the ECB can tolerate inflation above its target for some time. Moreover, in practice it is easier for the ECB to deal with inflation above its target rather than with inflation below its target in particular at the zero lower bound. However, the longer inflation remains above the inflation target of the ECB, the more likely it becomes that long-run inflation expectations will rise above its inflation target. In such a scenario, the ECB may face difficult trade-offs. On the one hand, increasing long-run inflation expectations would indicate that the ECB lost credibility to achieve its inflation target and put further upward pressure on actual consumer prices. This, in turn, would require even stricter measures to keep inflation in check, increasing the economic costs of disinflation later. On the other hand, a decisive tightening of monetary policy could trigger stress in financial markets in general and in sovereign bond markets in particular, potentially leading into another sovereign debt crisis in the euro area or a return to the low-inflation environment that prevailed before the pandemic.

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Against the backdrop of the recent surge in inflation, we discuss available measures of inflation expectations and implications for monetary policy in the euro area. While long-term expectations are currently still in line with the ECB's inflation target, the risk of a further rise increases should actual inflation remain high for an extended period of time. If expectations de-anchor the ECB may face difficult trade-offs.

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