Analysis

Inflation expectations help in analysing the euro area inflation outlook

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Inflation is recovering from an exceptional decline caused by the COVID-19 crisis. For monetary policy and price stability, it is more important to assess inflation developments over the medium term rather than short-term fluctuations. According to the latest research, inflation expectations play a key role in inflation projections and thus contribute to understanding inflation developments over the medium term. At present, different measures of inflation expectations rather consistently point towards inflation remaining below the ECB's target in the coming years. Different measures of expectations should nonetheless be monitored widely; for example, during the depths of the COVID-19 crisis in 2020, market-based inflation expectations pointed towards a substantially more subdued inflation outlook than survey-based expectations.



Inflation expectations reveal information about the medium-term inflation outlook

It is typical for consumer price inflation in the euro area to fluctuate significantly in the short term—as has been the case in 2021—in response to, for example, volatility in the price of oil and food prices and changes in taxation. Yet factors such as these are temporary and their impact on inflation gradually fades. What is left is the so-called persistent component of inflation [1], which represents changes in inflation over the medium term. [2]

The medium-term inflation outlook is the most important variable for a central bank's monetary policy decision making, as the objective of monetary policy is to keep inflation at the central bank's target over the medium term. Here longer-term inflation expectations must fall in line with the central bank's inflation aim, i.e. inflation expectations must be anchored at the central bank's target. As a result of the ECB's monetary policy strategy review which concluded in July 2021, the Governing Council of the ECB changed its definition of price stability as two per cent inflation over the medium term. The target is symmetric, which means that the Governing Council considers negative and positive deviations from this target as equally undesirable.

The persistent component of inflation is unobservable; however, it can be estimated, for example by using various statistical filters, decomposing slow-moving components of inflation, or by examining measures of inflation expectations directly. New research has recently been published on the role of inflation expectations in inflation forecasting [3], which serves as the basis for this article.

Inflation expectations help predict actual inflation

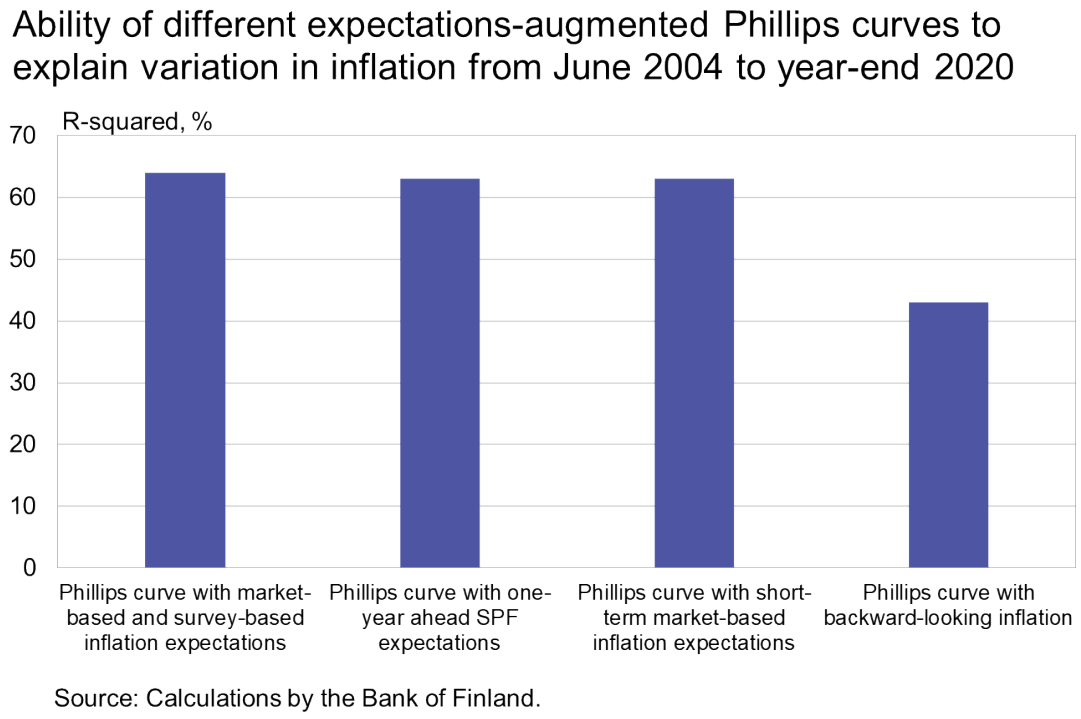
The Phillips curve is a central equation in macroeconomics. It states that current inflation is primarily determined by inflation expectations and the cost pressures faced by firms, which, in turn, are determined by the business cycle and the prices of inputs, such as commodities. The business cycle is often described in terms of the output gap, which measures the degree of capacity utilisation in the economy. When the economy is in recession, firms have spare capacity. When the economy is in an upswing, the opposite is true. [4]

Inflation expectations play an important role in the Phillips curve because they influence the price-setting of firms. Future price pressures affect the levels at which prices are set today. Inflation expectations can also have an impact on future cost levels, particularly through wage negotiations. In addition to expectations having an immediate bearing on prices, different measures of inflation

expectations also contain information about the future path of inflation. Inflation expectations therefore not only reveal information about the medium-term inflation outlook, but also influence price-setting today.

The Phillips curve augmented with measured inflation expectations appears to perform well at forecasting euro area inflation. In particular, the addition of inflation expectations improves the model's fit substantially.[5] Based on the study underpinning this article, it would seem that measured inflation expectations contain information about the medium-term path of inflation. The study compares the ability of different measures of inflation expectations and New Keynesian Philips curves based on these to explain actual inflation in the euro area. The measures of inflation expectations examined are the Survey of Professional Forecasters (SPF) conducted by the ECB, market-based expectations derived from inflation swaps [6], and a combination of the two. In addition, a purely backward-looking Phillips curve is included as a reference. The backward-looking Phillips curve does not contain inflation expectations and is instead based on past inflation.

Chart 1.



Source: Calculations by the Bank of Finland.

Chart 1 illustrates the Phillips curve's ability to explain variation in euro area inflation from mid-2004 to year-end 2020 when augmented with different measures of inflation expectations.

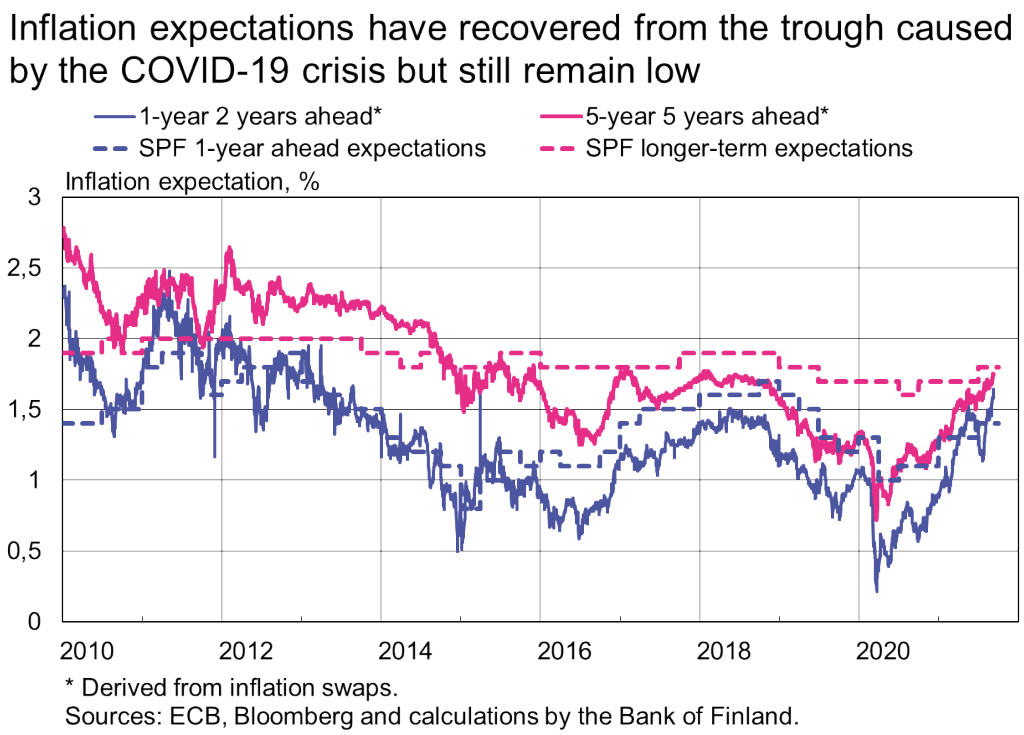
The backward-looking model in which expectations are omitted explains about 40% of the variation in inflation. By contrast, the models that include inflation expectations explain over 60% of the variation in inflation. If the unusual period spanning the COVID-19 crisis is ignored, then the expectations-augmented models explain over 70% of the variation in actual inflation.

The model's ability to explain about 70% of the variation in inflation is especially good given that the simple specification of the Phillips curve ignores numerous factors which influence inflation over the short term, including changes in taxation, weather fluctuations and other natural events, and technical, measurement-related issues, particularly during the COVID-19 crisis.

Inflation expectations must be examined comprehensively

Both market-based and survey-based measures of inflation expectations do well in predicting past actual inflation.[7] It is in fact difficult to determine whether one statistically outperforms the other. In addition to the expected rate of inflation itself, market-based measures are affected by a risk premium.[8] The risk premium is the additional return demanded by an investor for investing in a risky asset instead of a risk-free one. Risk premia are generally incorporated in all market prices, and they can often lead to market-based measures overreacting to changes in the economic environment. By contrast, survey-based measures have been demonstrated in the literature to underreact to changes in the inflation outlook.[9] This is because first, there is a lag in the collection and publication of data, and secondly because there are information rigidities.[10] For these reasons a broad range of measures of inflation expectations should be assessed when examining inflation dynamics. Chart 2 illustrates short-term and long-term inflation expectations for both market-based and survey-based measures. Market-based measures reacted more forcefully during the COVID-19 crisis than survey-based measures and, beginning from the end of last year, their recovery has also been stronger.

Chart 2.



Inflation can be forecasted with inflation expectations

The forecasting ability of the model based on the relatively simple, expectations-augmented Phillips curve is quite good (Oinonen and Vilmi, 2021). The model forecasts inflation based on oil future prices, the Eurosystem's estimate of the output gap, and different measures of inflation expectations. The exchange rate is assumed to remain constant over the entire forecast period.

The New Keynesian Phillips curve augmented with direct measures of inflation expectations appears to perform well at forecasting inflation both over the short term and the medium term. In the short term the oil price has a significant impact on inflation, whereas over the medium term inflation expectations are the main determinant of inflation. Grothe and Meyler (2015) and Banbura et al. (2021) also find that measured inflation expectations improve the forecasting ability of various models.[11] Indeed, inflation expectations appear to contain key information about longer-term inflationary pressures and the prevailing inflation trend.

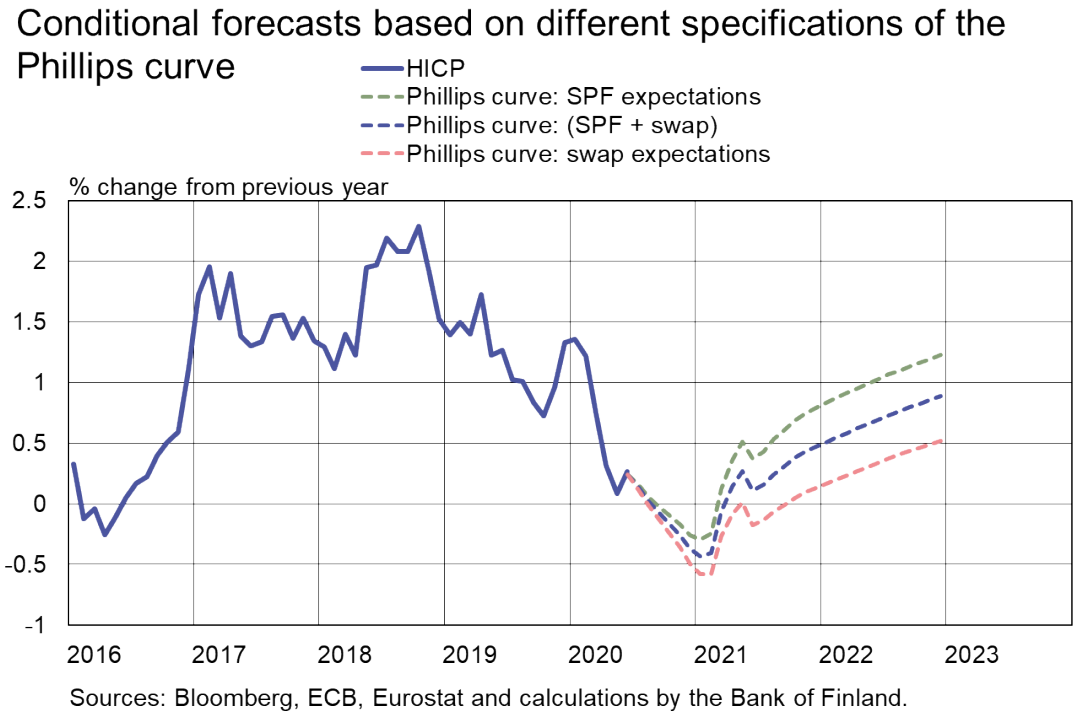
The Phillips curve can thus produce forecasts of inflation that are conditioned on the tacit information available in markets. At present different measures of short-term inflation expectations give results that are very close to one another, so they create a rather uniform picture of the medium-term inflation outlook. This has not always been the case, and in 2020, for

example, survey-based and market-based measures of inflation expectations deviated substantially from one another. The COVID-19 crisis had already demonstrated its force and markets faced powerful uncertainty at the time. This was also reflected in inflation expectations, as is illustrated in Chart 2. Short-term and longer-term market-based expectations reacted quickly and fell to very low levels. Survey-based expectations also declined, but much more moderately, and longer-term expectations in particular declined only by relatively little.

The significance of inflation expectations for assessing the medium-term inflation outlook is illustrated in the paths of inflation estimated by the model for June 2020. In Chart 3 the blue dotted line represents inflation in the immediate years ahead when expectations are calculated by taking the mean of the survey-based and market-based measures. The other two lines represent inflation when expectations are based separately on market-based expectations (pink dotted line) and survey-based expectations (green dotted line).

The paths of inflation estimated by the model clearly diverge over the medium term depending on which measure of inflation expectations is chosen. Different inflation expectations can thus have a significant role in inflation projections. For this reason, it is important that different measures of inflation expectations are examined and considered when assessing the future path of inflation.

Chart 3.



Notes

1. The literature refers to this as trend inflation, and it can be measured by different indicators of underlying inflation. ↑
2. For further information on the definition and measuring of trend inflation, see Ehrmann M., Ferrucci M., Lenza, M. and O'Brien, D. (2018). Measures of underlying inflation for the euro area. ECB Economic Bulletin, published 4/2018 ↑
3. Oinonen, S. and Vilmi, L. (2021). Analysing euro area inflation outlook with the Phillips curve. BoF Economic Review 5/2021. ↑
4. The Phillips curve can be derived from microfoundations and is thus consistent with economic theory. See, for example, Mavroeidis, S., Plagborg-Møller, M. and Stock, J. (2014). Empirical Evidence on Inflation Expectations in the New Keynesian Phillips Curve. Journal of Economic Literature, Vol. 52 No. 1 March 2014, 124–188. ↑
5. For the specifics of the model and its results: Oinonen, S. and Vilmi, L. (2021). Analysing euro area inflation outlook with the Phillips curve. BoF Economic Review 5/2021. ↑
6. Inflation swaps are financial instruments traded by market participants to hedge against future inflation. Inflation expectations derived from inflation swaps are a commonly used measure of markets' inflation expectations. ↑
7. In addition to survey-based and market-based measures of inflation expectations, assessments of inflation should also draw on other measures of expectations, such as consumer and business survey data. These indicators however have two shortcomings when modelling and forecasting inflation dynamics: short forecast horizons, and their being based on balance figures instead of a quantitative figure of inflation. ↑
8. Cœuré, B. (2019). Inflation expectations and the conduct of monetary policy. Speech, 11 July 2019. ↑
9. See, for example, Coibion, O. and Gorodnichenko, Y. (2012). What can survey forecasts tell us about information rigidities? Journal of Political Economy Vol. 120, No. 1 (February 2012), pp. 116-159; Coibion, O. and Gorodnichenko, Y. (2015). Is the Phillips Curve Alive and Well after All? Inflation Expectations and the Missing Disinflation. American Economic Journal: Macroeconomics 7(1), 197 – 232 and Angeletos, G.-M., Huo, Z. and Sastry, K., A. (2020). Imperfect Macroeconomic Expectations: Evidence and Theory. NBER Working Paper 27308. ↑
10. For example, collecting and compiling economic data incurs economic costs that survey respondents may lack the incentive to fully commit to. ↑
11. Grothe, M. and Meyler, A. (2015). Inflation Forecasts: Are Market-Based and Survey-Based Measures Informative? Working Paper Series 1865, European Central Bank and Bánbura, M., Brenna, F., Paredes, J., and Ravazzolo, F. (2021). Combining Bayesian VARs with survey density forecasts. Does it pay off? Working Paper Series 2543, European Central Bank. ↑

Keywords

euroarea inflation, forecast, inflation expectations