Inflation

A measure of *supercore* inflation for the eurozone

Global Macroeconomic Scenarios

Introduction

Core inflation measures are developed to clean headline inflation from those price items that are too volatile. Typically, they exclude energy components or fresh food as these often reflect supply factors, more prone to sudden and temporary moves, rather than demand. Historically, turning points in core inflation (excluding energy and food; HICPX hereon) have followed those of the business cycle, although with some lag. Data since 1998 show for example that turnarounds in HICPX seem to have occurred, on average, around four quarters after those in the output gap (ECB, 2014b).

Still, not all the items included in HICPX are expected to be responsive to the cycle. This might well be the case if some items present a low elasticity of demand. Hence, using all items included in HICPX to get a grasp of how inflation evolution responds to that of slack might provide an inaccurate signal of future inflation. Making use only of those items closely correlated to the cycle we might get a more accurate measure of core inflation that correlates well with the output gap or other measures of the business cycle, and therefore indicates better where demand-driven inflation forces are leading.

This watch is devoted to build a new measure of underlying inflation following the methodology proposed by the ECB (2018) to construct a *supercore* inflation measure, although broadening the scope to the country level. Only those items that co-move with the cycle are retained in the new measure. The construction of the *supercore* inflation responds to the need for giving earlier indications of turning points in the underlying inflation momentum.

Methodology

The methodology proposed by the ECB (2018) builds on the Phillips curve. For each of the items that makes up the HICPX, three Phillips curve-like reduced form regressions are specified. The annualized quarter-on-quarter growth rate of the item (adjusted for seasonality) is regressed on the output gap[1] (or the chosen measure of slack) lagged one period (quarter), two or both. Inflation of such item lagged one period is also included so as to account for inflation persistence, which might matter for the overall dynamic impact of the output gap on inflation (ECB, 2014b). The regressions to be estimated are thus the following:

$$y_{i,t} = \alpha_0 + \alpha_1 \cdot y_{i,t-1} + \alpha_2 \cdot \text{output gap}_{t-1} + \varepsilon_t \tag{1}$$

$$y_{i,t} = \beta_0 + \beta_1 \cdot y_{i,t-1} + \beta_2 \cdot \text{output gap}_{t-2} + \epsilon_t \tag{2}$$

$$y_{i,t} = \rho_0 + \rho_1 \cdot y_{i,t-1} + \rho_2 \cdot \text{output gap}_{t-1} + \rho_3 \cdot \text{output gap}_{t-2} + \epsilon_t \tag{3}$$

An extra model (an AR(1) for each of the items) is specified as a benchmark against which to compare the previous ones.

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[1] The output gap is an unobservable measure, which differs according to the source used (we used forecasts by the EC). This adds some uncertainty regarding the process of narrowing down of the output gap. Nevertheless, results do not substantially differ when using a different measure of output gap (i.e. HP filter on actual GDP).

Next, for each specification, and for horizons covering one to four quarters ahead, forecasts are calculated for 30 sample periods. For each of such forecasts the root mean square error (RMSE) is calculated as the average over one to four quarters ahead. The average RMSE (ARMSE) is then calculated across all 30 estimation samples. If either the ARMSE of specification (1), (2) or (3) improves on that of AR(1) for an item *i*, such item is included in the s*upercore* measure.

In addition, one more condition is required to be considered in such measure, i.e. the coefficient for output gap must also be statistically significant, as we have to bear in mind that it is not so difficult to improve the ARMSE with such a poor specification as AR(1) for inflation given the many factors that might have an effect on it[2].

Finally, those items deemed to be suitable to make up the s*upercore* inflation measure are then re-weighted according to their final weight in the *supercore* basket, and added up to obtain the measure of underlying inflation.

Following this methodology, the inflation measure we develop is a dynamic indicator in two ways. First, the indicator evolves following the dynamics of those items it is made of. Second, its composition varies as more data become available. As a new data point is added, the exercise is repeated and a different set of items might be deemed to co-move with the cycle[3]. Similarly, one would expect the business cycle not to be the same across countries. Items found to be correlated with slack in Germany might not in, say, Spain. Additionally, for the same reason, we might find more (less) items that co-move with the cycle in one country than in another. Therefore, we develop a *supercore* indicator for each country.

Results

Starting from 94 items that make up the harmonized headline inflation in the euro area economies, a total of 73 remain once we discard those series recorded under the energy and food groupings. In the case of the Eurozone, 41 items – accounting for 49% of the weighted basket – are found to be closely correlated and co-move with the output gap, according to the previously described methodology. Chart 1 displays the *supercore* inflation measure we have obtained together with the headline rate and the standard HICPX.

To start with, both underlying inflation measures depict, as expected, a smoother series than the headline one. Both also seem to have followed similar trends in recent years, although the s*upercore* has remained somewhat above the HICPX, especially since mid-2014. Unlike the ECB (2014b), we start to see some price pressures from approximately 4Q16, more than four quarters after the first signs of a closing output gap.

Nevertheless, pressures for the Eurozone as an aggregate do not seem to have widened more than 0.5pp in such time span and the *supercore* inflation rate seems to have stalled in recent quarters, potentially signalling a moderation in price pressures. This is in line with the most recent activity and confidence indicators for the region (PMIs, IPIs, industrial idle capacity, and the like). It might well be the case, as pointed by previous simulations[4], that the responsiveness of prices to economic slack has diminished with respect to previous episodes of a narrowing output gap. Thus, a larger movement in slack might be needed to see a price effect materialize.

In this regard, after the crisis adjustments of inflation to slack changes are more limited. Previous "speed limits" that translated small slack changes into relatively quick price pressures due to market frictions might have eroded now. Structural changes that lead to slow wage increases, subdued pricing power or more flexibility might be some reasons behind this phenomenon. These changes are still not well understood, and are common to other areas.

[2] The decision of whether an item should be selected to make up the final measure or not might be based on stricter criteria. But even though we might get less volatility this way, we might get rid of a non-negligible number of items that might signal important changes in the inflation trend and, thus, in the cycle, in advance.
[3] The composition of the *supercore* measure has indeed proven to be quite sensitive to the addition of new data as they are released. Although this could be regarded as a limitation, it does not prevent the indicator to provide a robust signal regarding price pressures since the trend obtained is consistent despite minor composition changes.
[4] Read ECB Monthly Bulletin July 2014 for more information https://bit.ly/2J28uml

Moreover, the literature has acknowledged a one-off price adjustment due to the so-called Amazon effect (IIF, 2018). This could be the result of e-commerce coming into play, which would limit the dispersion of prices within items. The existence of such Amazon effect would be giving rise to a one-time price decrease in some affected items, which would offset the overheating signals that some other items might be displaying. Nonetheless, once this effect is over, those items might follow the usual trend and might start revealing such signals.

Chart 1. Eurozone, Headline & Core Inflation (YoY, %)
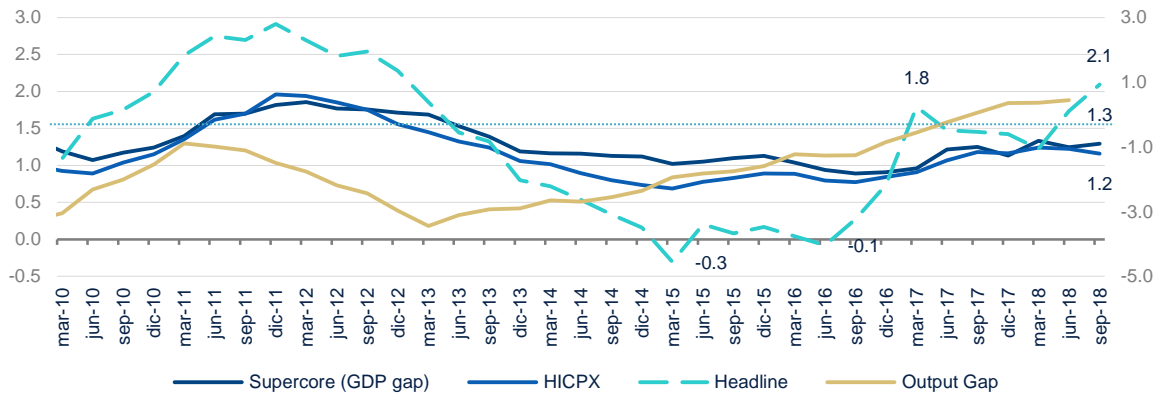
Source: Eurostat and BBVA Research

As pointed out above, the data for the Eurozone is just a weighted aggregate that does not show differences across countries. Indeed, given our country-level assessment, some divergences are found between core and periphery countries. Charts 2 and 3 depict inflation series for Germany and France, respectively. The upward trend in s*upercore* inflation that began in 2016 does not seem to have halted for these countries. Moreover, in 2018 so far price pressures seem to have been particularly acute.

Charts 4 and 5 tell a different story for Italy and Spain. For the former, *supercore* inflation reveals some price pressures that lasted for just some quarters but that reverted soon after that in 2017 to depict a downward trend that still persists. For Spain, the pressures started somewhat sooner, in 2014, and have developed quite gradually. The upward trend seems to have stalled since late last year, however.

Chart 2. Germany, Headline & Core Inflation (YoY, %)
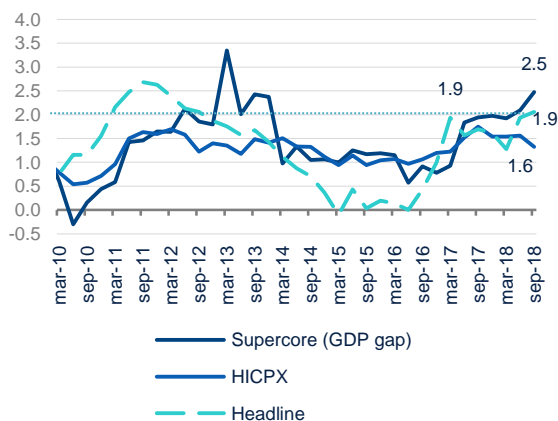
Source: Eurostat and BBVA Research
Note: 26 items (26% of the weight of the basket) make up the *Supercore* inflation for Germany.

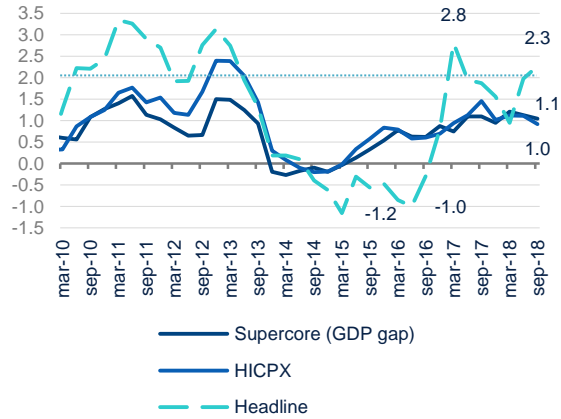Chart 3. France, Headline & Core Inflation (YoY, %)
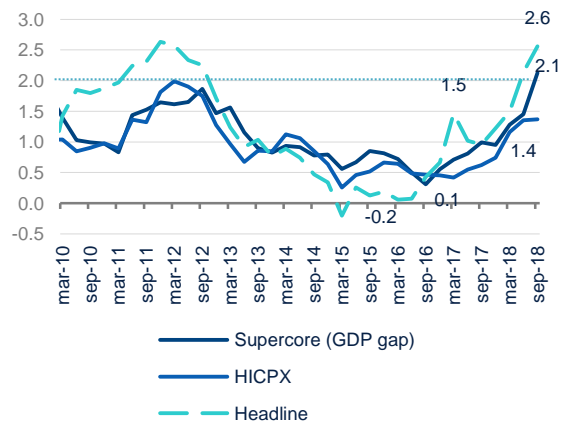
Source: Eurostat and BBVA Research
Note: 33 items (29% of the weight of the basket) make up the *Supercore* inflation for France.

Chart 3. Italy, Headline & Core Inflation (YoY, %)

Chart 4. Spain, Headline & Core Inflation (YoY, %)
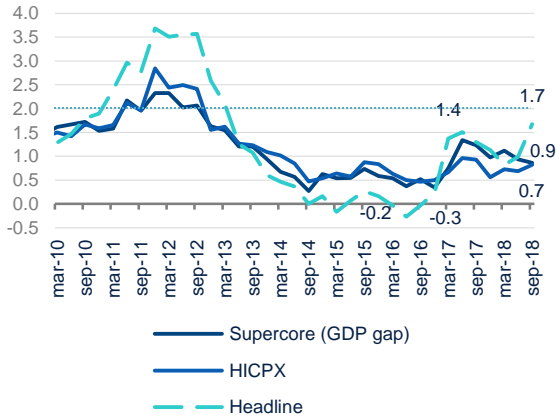
Source: Eurostat and BBVA Research
Note: 37 items (45% of the weight of the basket) make up the *Supercore* inflation for Italy.

Source: Eurostat and BBVA Research
Note: 54 items (57% of the weight of the basket) make up the *Supercore* inflation for Spain.

References

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