



Economic Commentary

Price changes at different time horizons

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Price changes at different time horizons

In recent years of high inflation, more attention than before has been paid to price developments over periods shorter than 12 months. In this commentary, we take a closer look at high-frequency measures of price developments and discuss their ability to forecast future inflation.¹ The conclusion of the analysis is that when inflation is at normal levels, the information content of the more high-frequency measures is limited. Quite simply, they are too volatile. In contrast, during periods of large movements in inflation, measures at shorter horizons such as three and six months can provide useful information about where we are heading.

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Price changes measured over periods shorter than 12 months

The Riksbank's inflation target is expressed in terms of the annual percentage change in the CPIF. As monetary policy works with a certain time lag, the Riksbank needs to make forecasts of future inflation. In times of high and volatile inflation, more high-frequency measures of inflation can provide information on where inflation is heading in the future. Greater focus has therefore also been placed on these measures during the rise in inflation in recent years.³ In this commentary, we examine the usefulness of these measures by evaluating their forecasting performance both under normal conditions and in times of high inflation.

When looking at price developments over intervals other than just whole years, it is important to seasonally adjust the data. This is because prices do not develop evenly over the year but follow certain specific seasonal patterns. Figure 1 shows the monthly annualised percentage changes in the CPIF excluding energy. From the figure we can see, for example, that prices normally fall in January due to sales and low demand for certain services such as international travel. Conversely, the rate of price increase is relatively high in some months, such as February and December. If we do not seasonally adjust the statistics, this means that the inflation trend is almost always

¹ Economic Commentaries are brief analyses of issues that are relevant to the Riksbank. They can be written by individual members of the Executive Board or by employees at the Riksbank. Employees' Commentaries are approved by their head of department, while Executive Board members are themselves responsible for the content of their Commentaries.

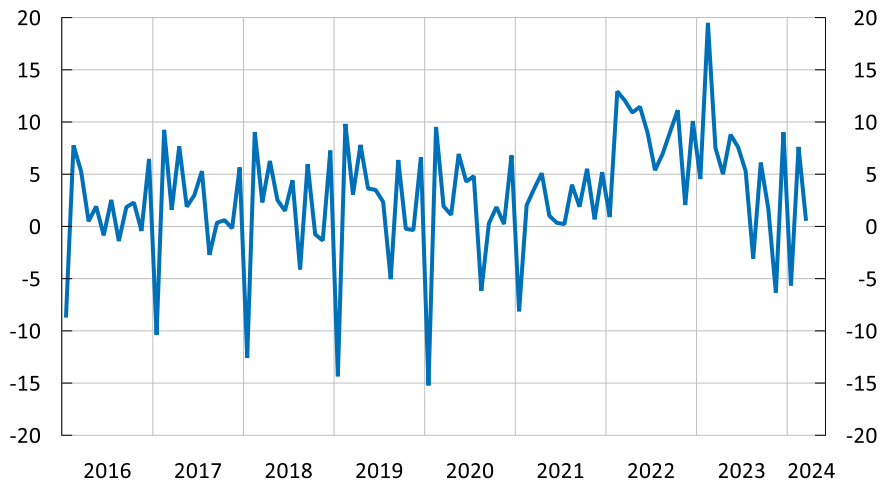
² The authors would like to thank Vesna Corbo and David Vestin for valuable comments.

³ For example, more high-frequency measures have appeared in the Monetary Policy Report since September 2022. See also the articles "What indicates that inflation will fall back next year?", September 2022 and "How quickly will inflation fall?", April 2023. Examples from other central banks include Norges Bank (2024) and from the public debate Boijje (2023).

low in January for more high-frequency measures, but it says very little about the underlying trend.

Diagram 1. Non-seasonally adjusted CPIF excluding energy

Percentage monthly change, annualised

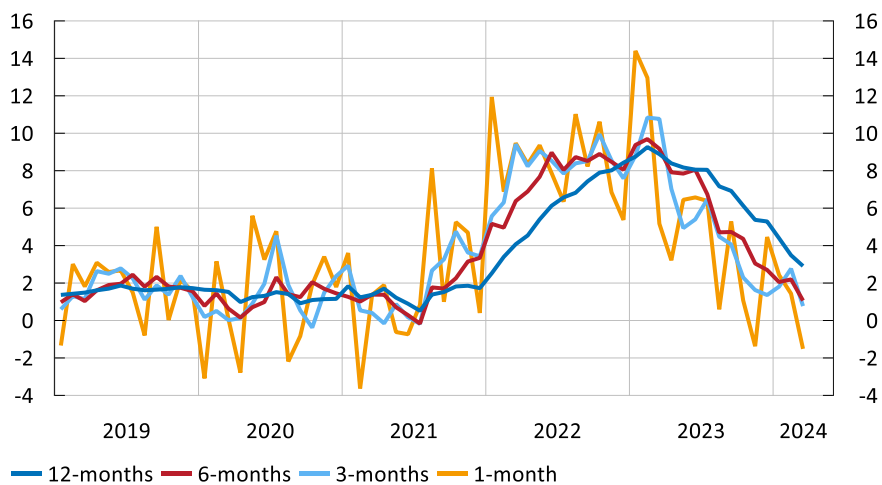


Source: Statistics Sweden

Figure 2 instead shows one, three and six-month price changes, seasonally adjusted and annualised, together with the annual percentage change. The annualisation is usually done only to keep the different measures in the same order of magnitude. We see that the measures develop in a similar way over time, but that the more high-frequency measures are significantly more volatile. During the recent years of high inflation, the more high-frequency measures also rose much faster than the 12-month change. Even in the downturn, the more high-frequency measures seem to be leading the way.

Diagram 2. Developments in the CPIF excluding energy at different horizons

Annualised three-monthly change, per cent, seasonally adjusted data



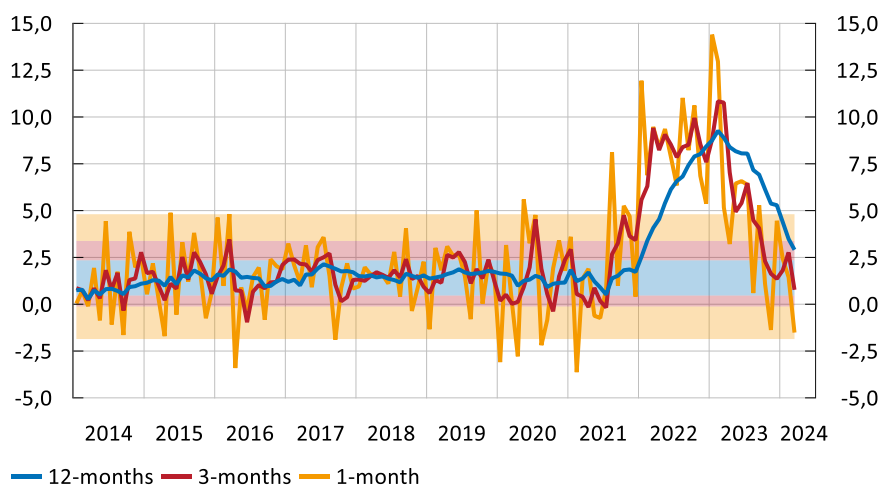
Source: Statistics Sweden and the Riksbank

While the higher frequency measures may provide a more timely description of price developments than what we get if we only look at the change over the past 12 months, it is not necessarily the case that the signal we get from these measures is useful. The higher the frequency of the measurements, the more noise they contain. This may be due to various types of measurement problems, such as difficulties in fully seasonally adjusting data as seasonal patterns may change over time, but also to sampling uncertainty in the price survey itself.⁴ In addition, prices can change quite a lot in some months, for example during sales, which can be difficult to sort out in real time from the more underlying developments.

Figure 3 shows the one-month, three-month and twelve-month movements in the CPIF excluding energy. The shaded areas show the bands within which 90 per cent of all observations for the different measures fell over the period 1997-2021. They thus illustrate approximately what is a normal range of outcomes for the different measures. The higher the frequency of the data, the larger the normal range of outcomes. A seasonally adjusted monthly movement with an annualised rate of 5 per cent is by no means an exceptional event, but something that happens from time to time even when inflation is at more normal levels. Therefore, if we put too much weight on the most high-frequency measures, there is a risk of overreacting to individual high monthly outcomes.

Diagram 3. Intervals of the normal range for measures of different frequencies

Annualised three-monthly change, per cent, seasonally adjusted data



Note: The shaded ranges show the 5-95 percentile of outcomes between 1997 and 2021

Source: Statistics Sweden and the Riksbank

Evaluation of the forecasting capacity

One way to examine more formally whether the high-frequency measures are informative or not is to look at how well they can predict future inflation. Figure 4 presents such an evaluation. The figure shows the average absolute error of the forecast

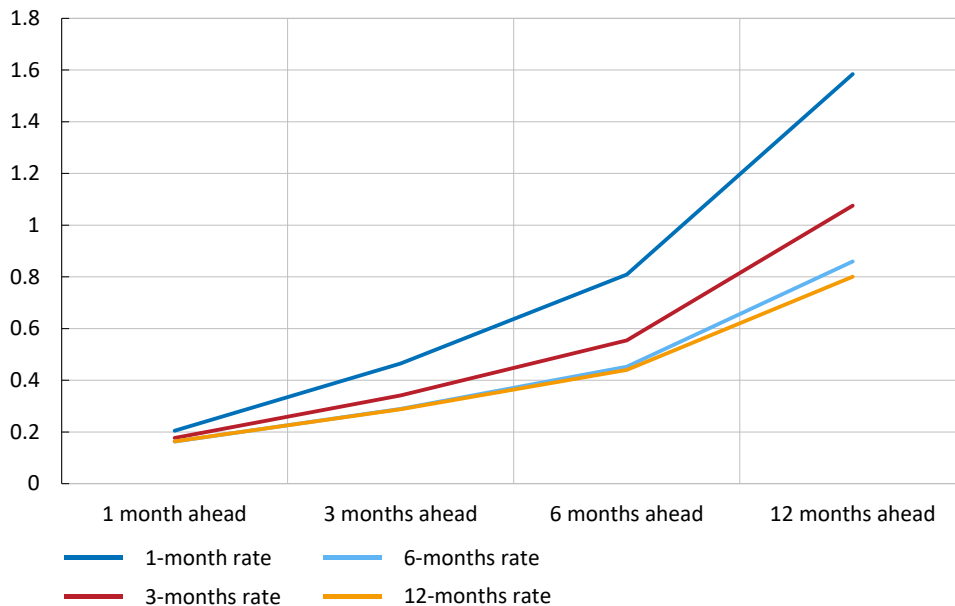
⁴ See [Quality declaration Consumer Price Index 2024](#), February 2024, Statistics Sweden.

of the annual percentage change in the CPIF excluding energy, at one, three, six and twelve months ahead, when we project the development of prices in the CPIF excluding energy from each given point in time with the latest outcome for the different monthly changes. The evaluation covers the period from January 2000 to February 2024.⁵

The figure shows that, on average over the period, forecasting performance was clearly worse for the most high-frequency measures than for the annual percentage change. However, the six-month change has had broadly the same average forecasting performance as the 12-month change at all horizons.

Diagram 4. Mean absolute error

Percentage points



Note: The lines show the average absolute error of forecasts of the annual percentage change in the CPIF excluding energy on different horizons

Source: Statistics Sweden and the Riksbank

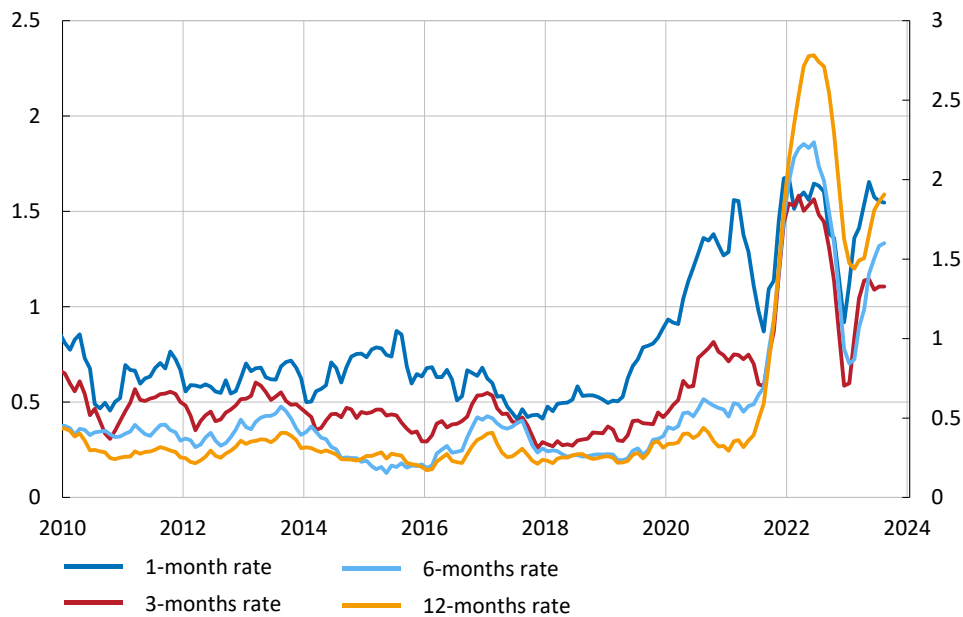
Behind the average, however, is a fairly large variation over time. Figure 5 shows a 12-month moving average of the absolute errors of the forecasts, at the six-month horizon, based on the different measures.⁶ This shows that the high-frequency measures during the period of low and stable inflation until the end of 2021 were relatively poor from a forecasting perspective. However, when prices started to rise rapidly in early 2022, it was the more high-frequency measures that captured this most quickly, and in recent years these measures, particularly the three- and six-month measures, have provided more information on where inflation has been heading.

⁵ The seasonal adjustment is redone for each new period, so only the data that were known at the time affect the adjustments.

⁶ The picture is the same if a slightly longer moving average is chosen for the absolute errors and/or forecasts at other horizons.

Diagram 5. Mean absolute error of 6-month forecasts

Percentage points



Note. Shows the average absolute error of forecasts of the annual percentage change in the CPIF excluding energy

Source: Statistics Sweden and the Riksbank

Conclusion

The results in this Economic Commentary show that, in normal times, we should not put too much weight on price changes over horizons shorter than 12 months. Such measures are too volatile to provide good guidance about the future. However, when there are large movements in inflation, the information value of these increases.

With inflation now returning to more normal levels, the most high-frequency measures are likely to be too volatile again to be useful. However, the six-month measure appears to be relatively useful at both high and more normal rates of inflation and may thus be interesting to emphasise further in the future.

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