Economic Commentary

Inflation dynamics in the high inflation period: insights from microdata

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S V E R I G E S R I K S B A N K

Inflation dynamics in the high inflation period: insights from microdata

In this Economic Commentary, we use a large microdata set to construct measures of the frequency and average size of price changes for products included in the Swedish Consumer Price Index (CPI) [1]. The results show that it is primarily the frequency of price changes that explain changes in the aggregate inflation rate. This was particularly evident during the recent high inflation period, when the frequency of price increases rose markedly relative to the frequency of price reductions, while the average size of price changes remained relatively stable. By early 2024, when inflation had returned to lower levels, so had the frequency of price changes.

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Introduction

The aggregate price level as measured by the Consumer Price Index (CPI) is calculated from a large number of prices collected each month. The evolution of the CPI then depends on how often and how much the prices of the different products included change. By studying price developments at the micro level, one can gain a better understanding of the underlying price dynamics and of firms' pricing behaviour. An earlier study by the Riksbank showed that it is primarily the relationship between how often prices are raised and lowered that explains price developments over time, while the variation in the size of the price changes primarily explained the seasonal pattern in the CPI.[3] However, the data in the previous study only extended up to 2018. In this commentary, we update the calculations with data up to and including April 2024 to see how the relationship between the frequency, size and aggregate evolution of price changes has evolved during the recent high inflation period.

Microdata on consumer prices

To decompose aggregate price changes into frequency and magnitude, it is necessary to be able to identify individual products in the data and follow them over time. This commentary is based on large parts of the underlying CPI data from 2010 until the

[1] Economic Commentaries are brief analyses of issues with relevance for the Riksbank. They may be written by individual members of the Executive Board or by Riksbank staff. Staff commentaries are approved by the relevant head of department, while Executive Board members are themselves responsible for the content of the commentaries they write.

[2] Thanks to Jesper Johansson, Ulf Söderström, Jens Iversen, Åsa Olli Segendorf and Tanja Lind for their valuable comments.

[3] See, Ewertzh et al. (2022)

end of April 2024. The data material covers approximately 75 per cent of the total weight in the CPI.[4] In total, the material comprises around 9 million price observations over the period covered. The material allows us to follow the prices of individual products month by month to see if they change and, if so, by how much. From there, product and product group weights can be used to create aggregate measures of the frequency of price increases and decreases, and measures of the magnitude of price changes. The reason for using weights is that otherwise there would be a relatively large bias towards those product groups that have larger samples in the CPI, such as food[5].

The collection methods for the CPI change over time, which is important to bear in mind when looking at the results. This means that some caution should be exercised in interpreting developments in the level of price change frequencies and price change sizes. For example, the switch to scanner data for food, mainly in 2013, and the introduction of web scraping for most prices of products and services for house and home maintenance, in 2021, have increased the frequency of price changes and reduced the size of price changes. The relative development between increases and decreases is less affected by these methodological changes and therefore we are focussing on them in this Economic Commentary.

As the microdata does not cover all parts of the CPI, we have also excluded the missing groups from the aggregate measure against which we compare the measures of frequency and size.

Results

The results are summarised in Figure 1 below. The figure shows that the difference between the frequencies of price increases and price decreases increased sharply during the high inflation period, but has now started to return to more normal levels. The change in the difference was mainly driven by an increase in the frequency of price increases, while the frequency of price decreases was more stable. The frequency of price changes and the aggregate price level also correlated strongly over the period 2011 to 2021. But the correlation becomes particularly significant during the high inflation period.

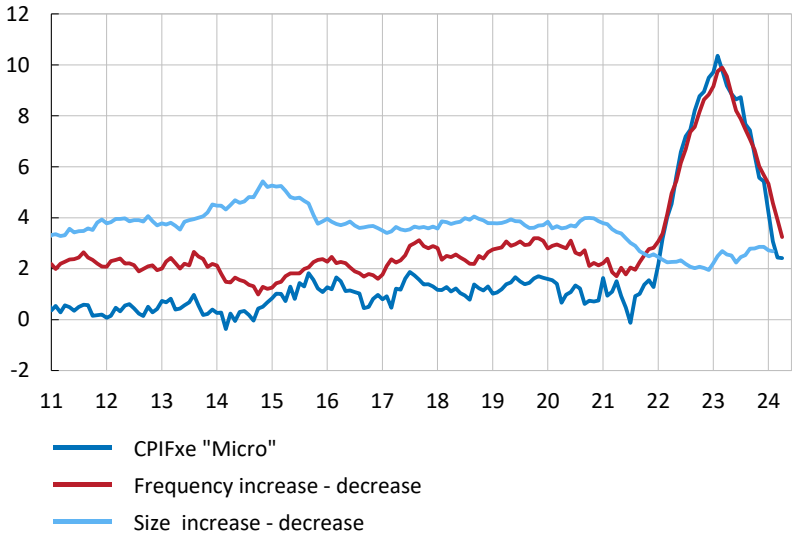
If we look instead at the development of the average size of price changes, however, they are relatively stable both during the high inflation period and historically.

[4] Some elements, such as rents and some other housing-related items, are missing.

[5] For further details on how this is done, see Ewertzh et al. (2022).

Diagram 1. Aggregate price change rate over 12 months and relative price change frequency and size

Annual percentage change and percentage points



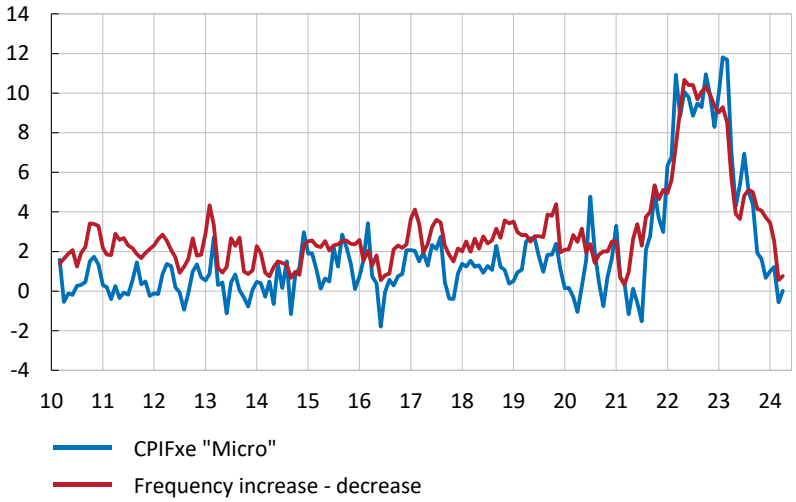
Note. CPIFxe "Micro" is based on the CPIF excluding energy, where the components not included in the microdata have been excluded. The relative frequency and magnitude of price changes are expressed as 12-month moving averages to match the frequency of the aggregate measure.

Sources: The Riksbank and Statistics Sweden

In Figure 1, we show the development as an average over 12 months. Figure 2 instead shows changes over 3 months to better illustrate the dynamics of the changes. This clearly shows that the frequency of price increases rose rapidly in relation to the frequency of price decreases in early 2022. The frequency of price increases then remained at the higher level for about a year, after which it decline again. By the beginning of 2024, the frequency of price change is back to around the same level as prior to the upturn in inflation.

Diagram 2. Three-month aggregate price change rate over three months and relative price change frequency

Seasonally-adjusted three-month change, annualised, and percentage points



Note. CPIFxe "Micro" is based on the CPIF excluding energy, where the components not included in the microdata have been excluded. The relative frequency of the price changes is seasonally-adjusted and expressed as 3-month moving averages to match the frequency of the aggregate measure.

Sources: The Riksbank and Statistics Sweden

These results are well in line with similar studies by the Bank of Canada and the Federal Reserve, which also find that it is the variation in the frequency of price changes that explains most of the dynamic in the development of inflation. [6]

Conclusion

In this Economic Commentary, we have used a large micro dataset to calculate measures of the relative frequency and magnitude of price changes. The results clearly show how this aspect of firms' pricing behaviour changed during the recent high inflation period. Firms raised prices more frequently, while the average size of price changes remained relatively unchanged. As inflation has normalised, so has the frequency of price changes, and now, at the beginning of 2024, price-setting behaviour appears to be more in line with how it was before the high inflation period.

[6] See Bilyk et al. (2024) and Montag and Villar (2023).

References

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