

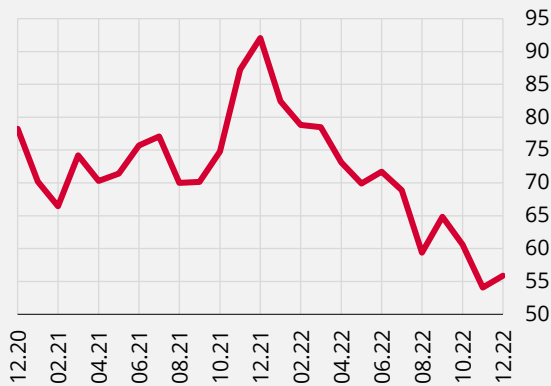
## Box 2.5

### Observations Regarding Inflation Trend Indicators

In the last quarter of the year, both consumer and producer annual inflation dropped significantly. The recent improvement in the underlying trend has been decisive in the decline in inflation. In this context, this box uses a range of data sources to examine the recent underlying trend of inflation.

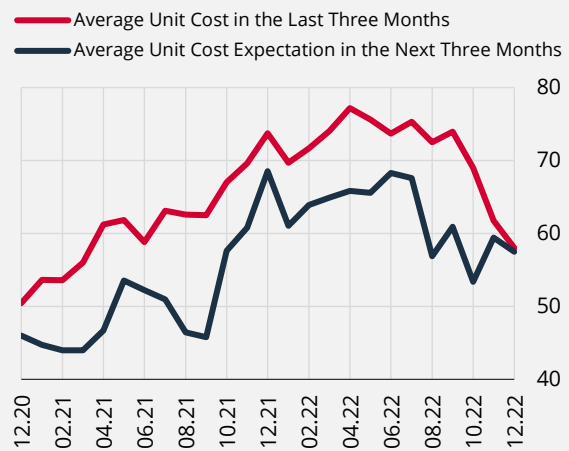
Both survey-based indicators and producer price developments indicate that cost-based price pressures have weakened. In this period the ongoing slowdown in the PMI input prices index continued. In line with this trend, according to the Business Tendency Survey data, producers' average unit cost expectations for the last three months and the next three months improved (Chart 1 and Chart 2).

**Chart 1: PMI Input Prices Index**  
(Seasonally Adjusted, Level)



Source: S&P Global.

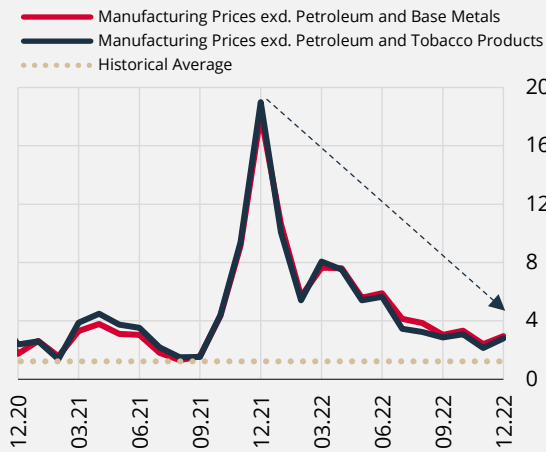
**Chart 2: BTS Unit Cost Indicators**  
(Seasonally Adjusted, Increase-Decrease)



Source: CBRT.

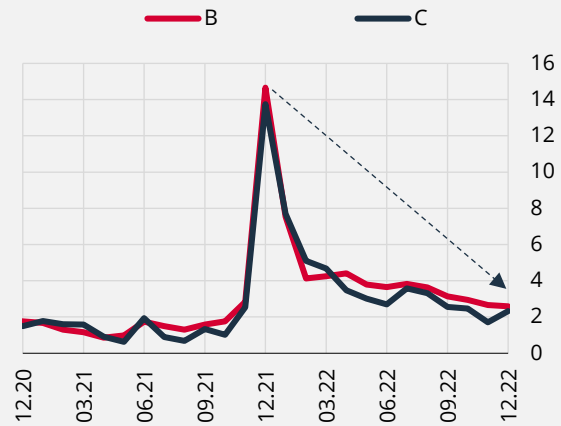
As the impact of negative global supply shocks waned to a large extent and the effect of the policies implemented took hold, the underlying trend of producer prices weakened and this was reflected as a slowdown in the monthly increase rates of core indicators on the consumer side. In this period, the Turkish lira remained stable, international energy prices, especially oil and natural gas prices, continued to decline, and the effects of the ongoing decline in international transportation costs and the alleviation of disruptions in the supply chain were felt on producer prices. Thus, the increase in producer prices slowed considerably in November and declined in December. The slowdown in monthly price increases in manufacturing industry core indicators, which exclude sub-items that are significantly affected by tax developments such as oil and tobacco, became more evident in the last quarter and converged to their historical averages (Chart 3). This development indicates that the effects of past supply shocks have disappeared to a large extent and cost-based price pressures are weakening. Similarly, according to seasonally adjusted consumer inflation, it is noteworthy that the slowdown in monthly price increases in core indicators B and C, which became evident especially in the second half of the year, continued in the last quarter (Chart 4).

**Chart 3: Underlying Trend Indicators of PPI (Monthly % Change)**



Sources: CBRT, TURKSTAT.

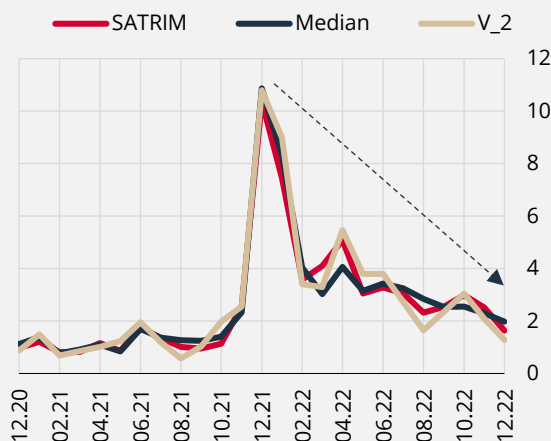
**Chart 4: Underlying Trend Indicators of CPI (Seasonally Adjusted, Monthly % Change)**



Sources: CBRT, TURKSTAT.

Alternative indicators also confirmed the slowdown in inflation, and inflation expectations declined in this period as well. SATRIM, one of the alternative indicators based on the monthly price distribution of seasonally adjusted sub-items, recorded a significant slowdown in the last quarter of the year, and a significant decline was observed in the second half of the year in Median inflation indicator and in the monthly inflation indicator V\_2, which excludes sub-items that show high volatility every month (Chart 5). When core inflation indicators are evaluated jointly, the downward course in the underlying trend of inflation is clear (Chart 6). In line with the outlook in the main trend indicators, inflation expectations continue to decline, according to the January Survey of Market Participants data (Chart 2.4.10). In addition, looking at the diffusion index, which is monitored to see to what extent price hikes are widespread, consistent with other indicators, the tendency to increase prices continued to weaken in the last quarter and converged to its historical average somewhat (Chart 7).

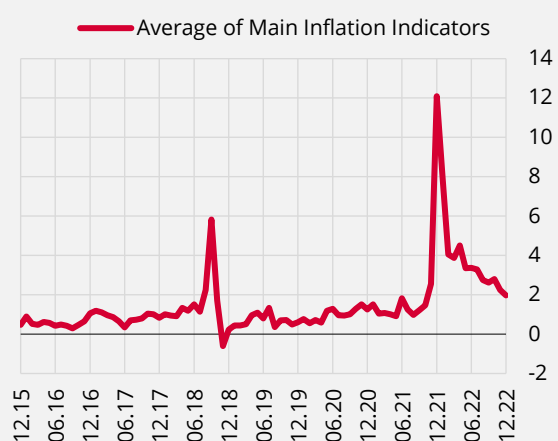
**Chart 5: Main Inflation Indicators: SATRIM\* Median\*\* and V\_2\*\*\* (Seasonally Adjusted, Monthly % Change)**



Sources: CBRT, TURKSTAT.

\* SATRIM: Seasonally adjusted trimmed mean inflation. \*\* Median: Median monthly inflation of seasonally adjusted 5-digit-sub-price indices. \*\*\* V\_2: For each month, monthly inflation calculated by excluding goods and services that fall outside the range of  $\pm 2$  deviations from the average of monthly price changes in all items from that month's index.

**Chart 6: Average of Main Inflation Indicators\* (Seasonally Adjusted, Monthly % Change)**

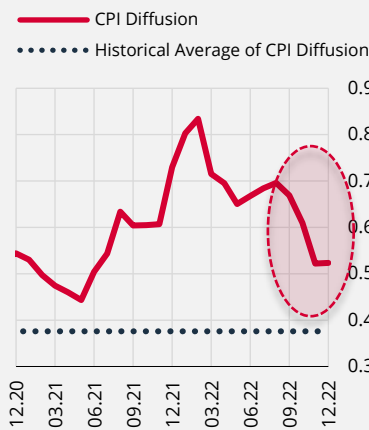


Sources: CBRT, TURKSTAT.

\* Seasonally adjusted and average of monthly % change of B, C, Satrim, Median and V\_2 values.

When the sub-components of the diffusion index are analyzed, in addition to the decrease in the ratio of the sub-items with increasing prices, the increase in the ratio of the items with decreasing prices is an important indicator in terms of the continuity of the disinflation process (Chart 8). The share of items with decreasing prices in the total of all the sub-components of the diffusion index has increased over time and approached its historical average. When analyzed by main expenditure groups, the diffusion index in the core goods group, which has a high rate of exchange rate pass-through and imported input use, has reached its historical averages due to the stable course of the Turkish lira in the recent period and the declining international commodity prices compared to the first half of the year. On the other hand, in the services sector, which has a relatively labor-intensive nature with its relatively closed structure to international trade and whose pricing dynamics differ from the core goods, the diffusion index has declined but remains above historical averages (Chart 9). The service sector is more affected by wage developments due to its labor-intensive structure. It also includes sub-items where backward indexation behaviors are strong, such as rent, education, health and administered service items. These may cause the services inflation to react with a lag to macroeconomic variables and its decline to spread over time.

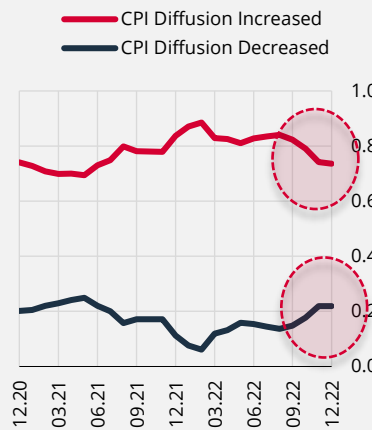
**Chart 7: Diffusion Index of CPI\***  
(Seasonally-Adjusted, 3-Month Average)



Sources: CBRT, TURKSTAT.

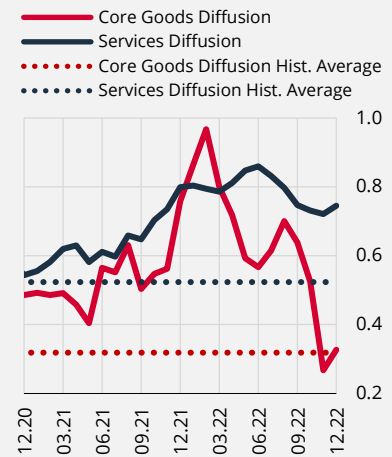
\* The diffusion index is calculated as the ratio of the number of items with increasing prices minus the number of items with decreasing prices to total number of items.

**Chart 8: Sub Components of CPI Diffusion Index** (Seasonally-Adjusted, 3-Month Average)



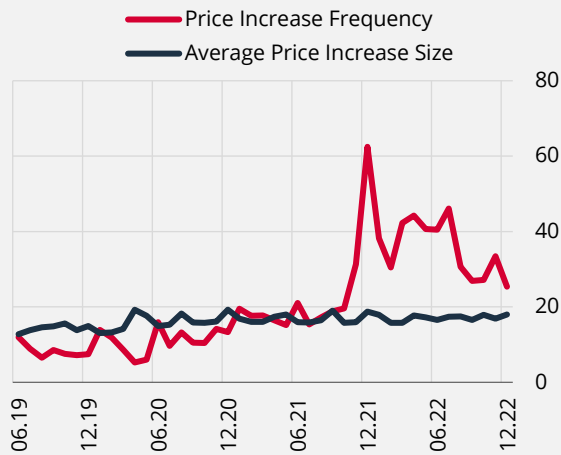
Sources: CBRT, TURKSTAT.

**Chart 9: Diffusion Indices of Core Goods and Services Group** (Seasonally-Adjusted, 3-Month Average)

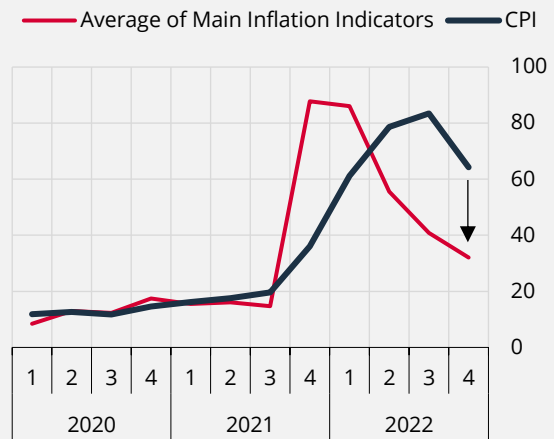


Sources: CBRT, TURKSTAT.

Signs of improvement are also observed in microdata from food related services items. Food group prices that have a high weight in the CPI basket are crucial in terms of inflation dynamics. In addition to their direct impact on consumer inflation, food prices are an important determinant of restaurant-hotel prices through many items (meat, tea, bread, soft drinks, etc.) that are used by catering services in the service group. Micro restaurant data provide useful information on pricing behavior in catering services and timely detection of any changes. The data indicate that there has been no change in the average price increase size over the period, and the rise in inflation in this group is driven by the changes in the number of firms that update their prices. In this group, signs of normalization in pricing behavior have appeared and the frequency of price increases of firms was slowing at the end of the year (Chart 10). In terms of maintaining this trend, the course of developments in food prices in the upcoming period is important.

**Chart 10: Micro Data: Food Services Price Increase Frequency and Size (% Points)**

Source: CBRT, Authors' calculations.

**Chart 11: The Average of Main Inflation Indicators\* and CPI (Yearly % Change)**

Sources: CBRT, TURKSTAT.

\* The average of the main inflation indicators is calculated by the arithmetic average of the annualized seasonally adjusted 3-month averages of B, C, Satrim, Median and V\_2 values, which are the main trend indicators.<sup>1</sup>

The underlying trend of inflation increased significantly in the first quarter of 2022 and recorded a gradual slowdown in the following period. Annual consumer inflation, on the other hand, reacts to developments with a delay as it reflects the effects of the last twelve months' developments. The average of annualized main trend indicators hovered around 32 points below annual consumer inflation as of December, due to both the policies implemented and the waning impact of shocks (Chart 11).

To sum up, the weakening in the global supply constraints and the effectiveness of the implemented policy mix reflected on the headline CPI and core indicators as a slowdown. The deceleration in inflation is confirmed by different core indicators, diffusion indices, inflation expectations and microdata on sectoral pricing behavior. Moreover, different survey-based indicators and PPI trend indicators point to a weakening trend in cost pressures. Under the current outlook for the underlying trend of inflation, the strong slowdown in annual consumer inflation will continue.

## References

Atuk, O. and Özmen, M. U., (2009). "Design and Evaluation of Core Inflation Measures for Turkey", BIS IFC Working Papers.

<sup>1</sup> For detailed information on indicators, see Atuk and Özmen (2009).