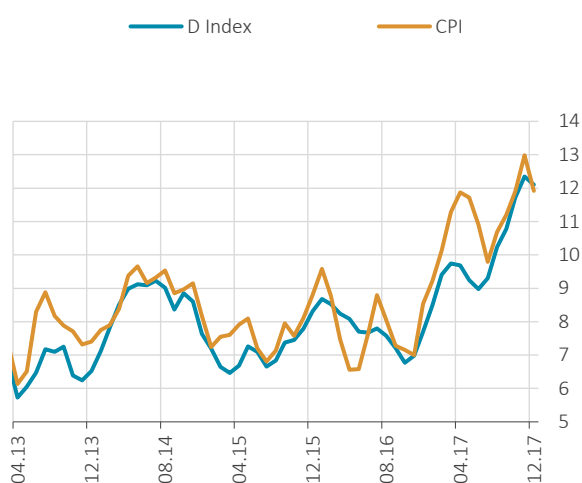


### 3. Inflation Developments

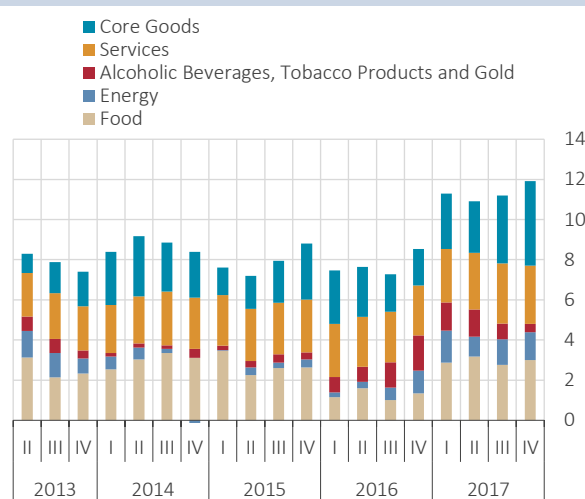
Consumer inflation ended 2017 at 11.92 percent with a quarter-on-quarter increase of 0.72 points (Chart 3.1). The increase in inflation was mainly driven by core goods amid the depreciating Turkish lira against the currency basket and higher import prices, particularly oil, while aggregate demand conditions also supported the rise in inflation. The cumulative depreciation across the year reached record highs with the Turkish lira weakening by about 10 percent against the currency basket in the last quarter. Moreover, commodity prices, especially oil, remained on an upward track in this period. Therefore, the rise in producer prices gained substantial momentum compared to the past two quarters, and cost-side pressures on consumer prices remained strong. The high level of inflation continued to weigh on subcategories with strong backward indexation, particularly in services. In addition, the methodological change in the weighting system of clothing remained an upward pressure on inflation, albeit to a lesser degree. The buoyant economic activity was another driver of increased inflation, especially in core goods.

Chart 3.1: CPI and D Index (Y-o-Y Change, %)



Source: TURKSTAT.

Chart 3.2: Contributions to Annual CPI\* (% Point)



Source: CBRT, TURKSTAT.

\* Core goods exclude food, energy, alcoholic beverages, tobacco products and gold.

Across subcategories, the rise in food inflation during the quarter was mostly driven by processed food prices led by dairy products, while unprocessed food prices followed a volatile course. Energy prices remained on the rise in tandem with the developments in international oil prices. The largest increase was observed in core goods inflation driven by durable goods, mainly on the back of the Turkish lira depreciation, the expired tax incentives for furniture and white goods, the vigorous demand in certain industries and the methodological change in the weighting system for clothing. Meanwhile, services inflation remained elevated, despite a small drop. Thus, annual core inflation hit 12.3 percent. Against this backdrop, the contribution of core goods, food and energy to annual consumer inflation increased by 0.8, 0.2 and 0.1 points quarter-on-quarter, respectively, while the contribution of services and alcoholic beverages (also including tobacco products and gold) decreased by 0.1 and 0.4 points, respectively (Chart 3.2).

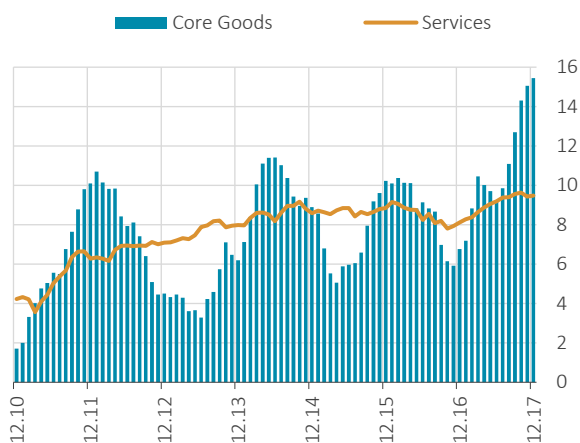
In short, the inflation outlook deteriorated in the fourth quarter due to rising food prices and elevated cost-side pressures amid depreciated exchange rate and higher commodity prices. Specifically, the further increase in the cumulative depreciation of Turkish lira stood as the main determinant of this unfavorable outlook. In addition, the upbeat economic activity strengthened the transmission of cost-side pressures on inflation. The high level of inflation had a negative impact on subcategories with strong backward indexation. On the other hand, inflationary pressures from tax hikes were below historical averages in 2017, impeding a gloomier inflation outlook. The currently high inflation and cost

developments continue to pose risks to expectations and pricing behavior. These risks may hinder the expected improvement of the inflation outlook in early 2018.

### 3.1 Core Inflation Outlook

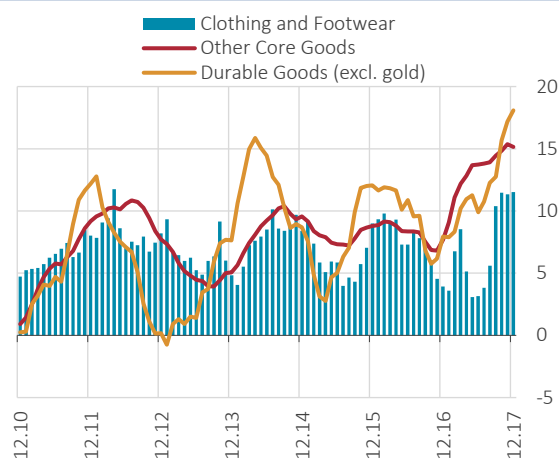
Annual core goods inflation increased by 2.75 points to 15.45 percent in the fourth quarter (Chart 3.1.1), largely due to prices of durable goods rising amid exchange rate developments and the expiration of tax incentives for white goods and furniture. The brisk demand for certain industries was another driver of higher inflation. Annual clothing inflation rose slightly, and price increases accelerated in other core goods (core goods excluding clothing and durable goods) due to cumulative exchange rate effects.

**Chart 3.1.1: Prices of Core Goods and Services (Y-o-Y Change, %)**



Source: TURKSTAT.

**Chart 3.1.2: Core Goods Prices (Y-o-Y Change, %)**



Source: CBRT, TURKSTAT.

Across subcategories, prices of durable goods rose by a striking 7.58 percent in the fourth quarter, pushing annual inflation in this subcategory up by 5.32 points to 18.08 percent (Chart 3.1.2). The cumulative effects of the Turkish lira depreciation spread across the entire core goods group, while prices of products with high import content escalated. In fact, prices of automobiles and white goods posted upswings, pushing annual durable goods inflation upwards (Table 3.1.1). Automobile prices rose on the back of exchange rate developments and rising import prices as well as the tax adjustments. The SCT rate that was previously determined based solely on the vehicle’s engine capacity is now set according to both engine capacity and the SCT base. This prompted a rise in the effective tax rate in December 2016 and led to an increase in the automobile prices. In 2017, rising exchange rates and import prices caused certain vehicle prices to move to an upper tax bracket, thus leading to a larger increase in final sales prices than implied by import costs. In addition, the expiration of temporary tax incentives for white goods and furniture was another driver of substantial price hikes in these subcategories. The tax reduction facilitated the pass-through of cumulative cost pressures on prices of furniture and white goods to prices via increased domestic demand for most part of the year. Moreover, rising international metal prices also put upward pressure on prices of durable goods, particularly white goods.

Table 3.1.1: Inflation in Goods and Services (%)

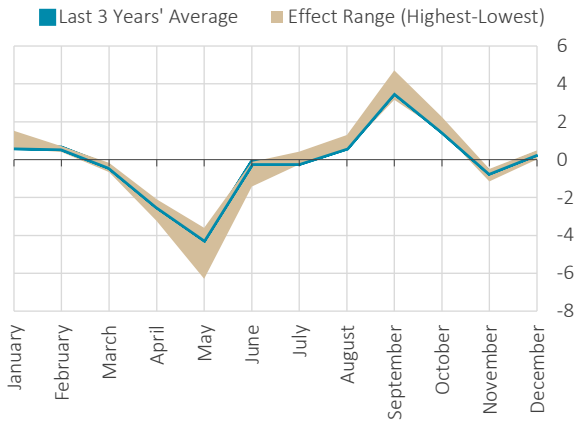
	2016		2017				
	IV	Annual	I	II	III	IV	Annual
<b>CPI</b>	<b>3.64</b>	<b>8.53</b>	<b>4.34</b>	<b>1.49</b>	<b>1.32</b>	<b>4.31</b>	<b>11.92</b>
<b>1. Goods</b>	<b>4.83</b>	<b>8.72</b>	<b>5.01</b>	<b>1.12</b>	<b>0.58</b>	<b>5.80</b>	<b>12.99</b>
<b>Energy</b>	<b>4.18</b>	<b>8.67</b>	<b>4.11</b>	<b>-2.26</b>	<b>3.46</b>	<b>4.88</b>	<b>10.41</b>
<b>Food and Non-Alcoholic Beverages</b>	<b>4.51</b>	<b>5.65</b>	<b>9.34</b>	<b>-0.39</b>	<b>-1.16</b>	<b>5.70</b>	<b>13.79</b>
Unprocessed Food	8.19	4.52	15.98	-2.95	-5.60	8.74	15.55
Processed Food	1.46	6.67	3.39	2.17	3.08	3.04	12.20
<b>Core Goods</b>	<b>4.95</b>	<b>6.77</b>	<b>2.23</b>	<b>4.44</b>	<b>0.58</b>	<b>7.51</b>	<b>15.45</b>
Clothing and Footwear	12.02	3.92	-8.52	14.46	-5.90	13.17	11.51
Durable Foods (excl. gold)	2.73	7.93	5.89	0.27	3.37	7.58	18.08
Furniture	0.38	8.27	-2.54	1.71	3.88	7.30	10.49
Electrical and Non-Electrical Appliances	1.87	1.73	3.88	-0.31	1.65	4.72	10.24
Automobiles	4.71	12.91	10.99	-0.29	4.32	10.27	27.30
Other Durable Goods	2.02	6.55	5.78	2.99	2.58	0.90	12.77
Core Goods (excl. clothing and durable goods)	2.49	7.68	6.34	2.86	2.09	3.10	15.13
<b>Alcoholic Beverages, Tobacco Products and Gold</b>	<b>6.80</b>	<b>31.25</b>	<b>4.05</b>	<b>-0.18</b>	<b>0.82</b>	<b>1.18</b>	<b>5.96</b>
<b>2. Services</b>	<b>1.03</b>	<b>8.11</b>	<b>2.83</b>	<b>2.33</b>	<b>3.06</b>	<b>0.95</b>	<b>9.47</b>
Rent	2.23	9.30	1.89	1.93	2.75	2.35	9.21
Restaurants-Hotels	1.64	8.62	2.62	2.90	3.84	1.65	11.47
Transport	-1.01	6.63	3.91	3.41	4.20	0.44	12.46
Communication	0.67	4.29	0.35	0.85	0.54	0.12	1.87
Other Services	0.91	9.15	3.87	2.14	2.93	0.17	9.39

Source: CBRT, TURKSTAT.

Annual clothing inflation rose by 1.13 points to 11.51 percent in the fourth quarter (Chart 3.1.2). The methodological change continued to affect clothing prices, albeit less strongly (Chart 3.1.3). As suggested by the average changes in inflation calculated by variable and fixed-weight methods over the past three years, the methodological change appears to have driven clothing inflation up by about 1 point in the fourth quarter.<sup>1</sup> Furthermore, the robust clothing industry and the recovery in tourism were other factors supporting the upturn in this subcategory. Accordingly, the underlying trend of core goods prices picked up in this period (Chart 3.1.4).

<sup>1</sup> The methodological change has no longer any effects on annual clothing inflation as of end-2017.

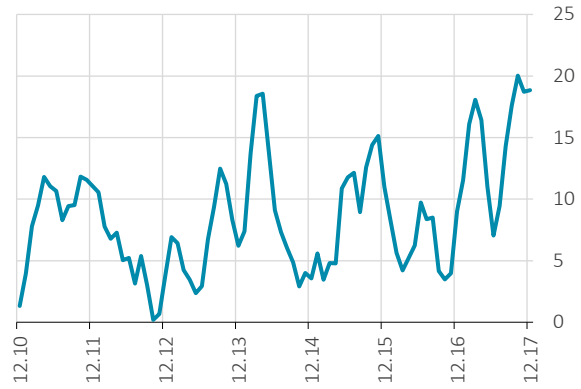
**Chart 3.1.3: Clothing Inflation by Fixed and Variable-Weight Methods\* (% Point)**



Source: TURKSTAT.

\* The effect range denotes the difference between the highest and the lowest inflation rate measured by fixed and variable weights for the respective months during 2010-2016.

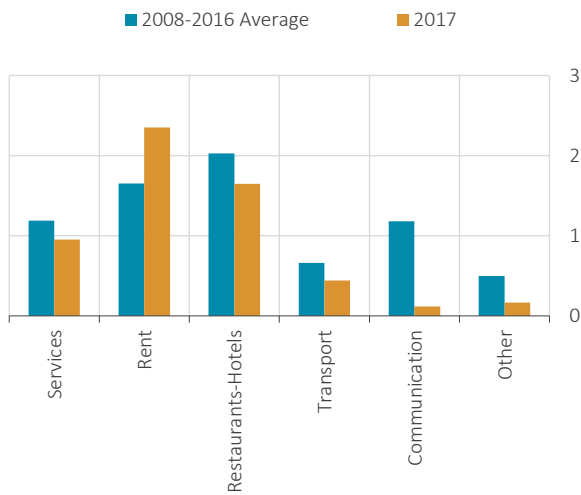
**Chart 3.1.4: Core Goods Prices (Seasonally Adjusted, Annualized Average 3-Month % Change)**



Source: CBRT, TURKSTAT.

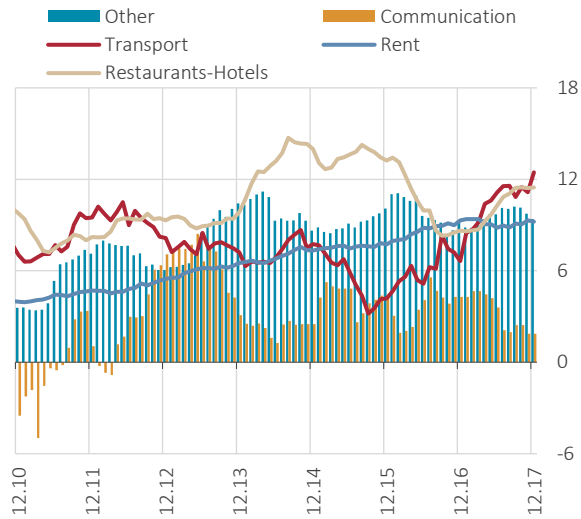
Prices of services increased by 0.95 percent, at a rate lower than historical averages in the fourth quarter, and annual services inflation fell slightly to 9.47 percent (Charts 3.1.1 and 3.1.5). In this period, annual inflation was down in communication and other services, up in transport and rent, and flat in restaurants and hotels (Chart 3.1.6).

**Chart 3.1.5: Prices of Services by Subcategories (Fourth-Quarter, Q-o-Q Change, %)**



Source: TURKSTAT.

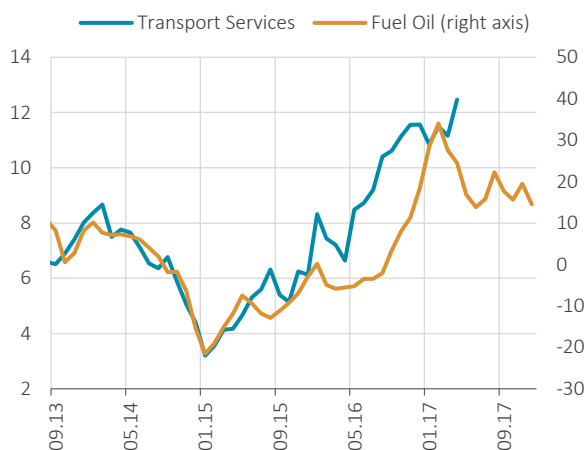
**Chart 3.1.6: Prices of Services by Subcategories (Y-o-Y Change, %)**



Source: TURKSTAT.

In the fourth quarter, services inflation was affected by cost pressures and the robust domestic demand. Fuel prices surged throughout the year amid the weaker Turkish lira and higher oil prices, pushing inflation upwards in transport services (Chart 3.1.7). The high consumer inflation had a negative impact on subcategories with a strong pattern of indexation, and annual rent inflation increased to 9.21 percent. The developments in red meat prices helped inflation remain flat in catering services (Chart 3.1.8). Meanwhile, annual inflation was down in other services amid falling prices of package tours despite price increases across exchange-rate-sensitive items such as maintenance and repair of personal transport equipment and dental services. Inflation also fell in communication services due to flat prices. Thus, annual services inflation dropped slightly compared to the previous quarter to 9.47 percent (Chart 3.1.1).

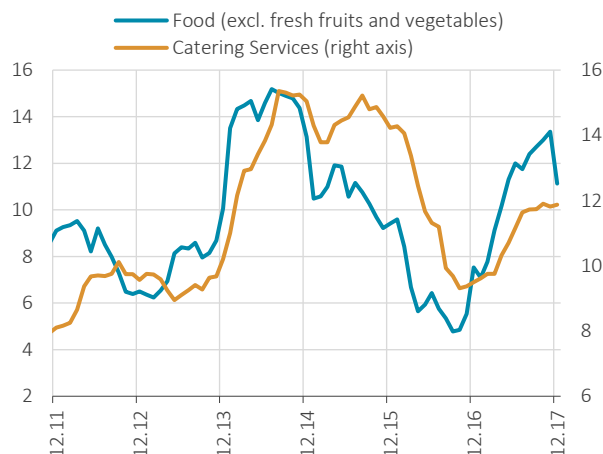
**Chart 3.1.7: Transport Services and Fuel Oil Prices\***  
(Y-o-Y Change, %)



Source: CBRT, TURKSTAT.

\* Annual inflation in transport services is backdated by 8 months.

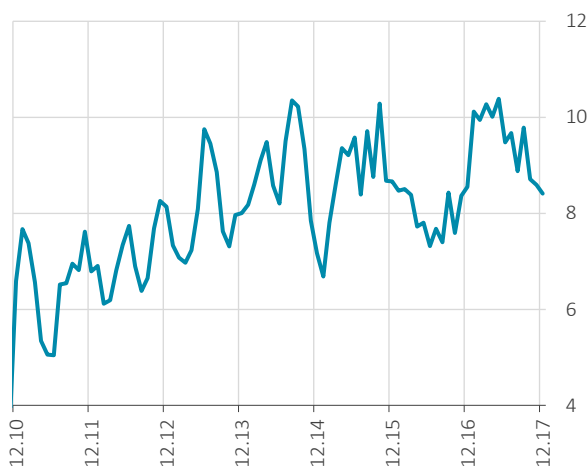
**Chart 3.1.8: Catering Services and Food Prices**  
(Y-o-Y Change, %)



Source: CBRT, TURKSTAT.

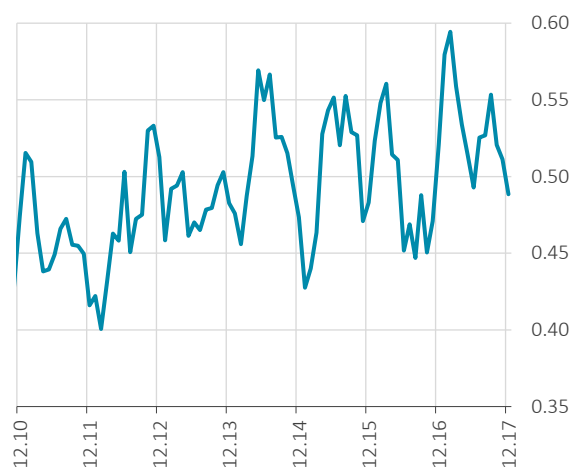
In services, the underlying inflation trend had a downward pace similar to annual inflation in this category. Both the underlying trend of inflation, which is captured by seasonally adjusted 3-month averages, and the diffusion index, which captures the tendency to hike prices, were down in this period (Charts 3.1.9 and 3.1.10).

**Chart 3.1.9: Services Prices** (Seasonally Adjusted, Annualized Average 3-Month % Change)



Source: CBRT, TURKSTAT.

**Chart 3.1.10: Diffusion Index for Services Prices\***  
(Seasonally Adjusted, 3-Month Average)



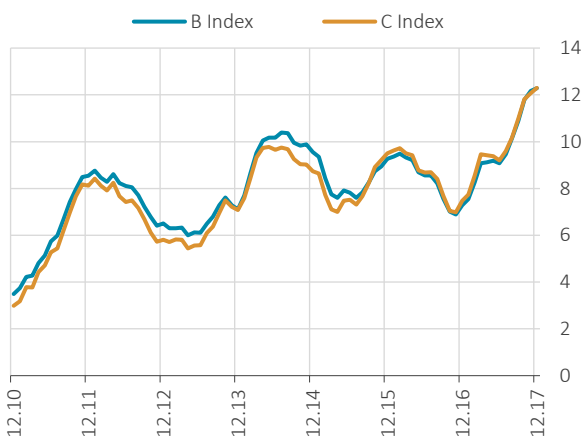
Source: CBRT, TURKSTAT.

\* 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 within a given month.

In line with the developments in core goods, annual inflation in the B and C indices went up quarter-on-quarter to 12.3 percent (Chart 3.1.11).<sup>2</sup> Meanwhile, the underlying trend of the B index remained high (Chart 3.1.12).

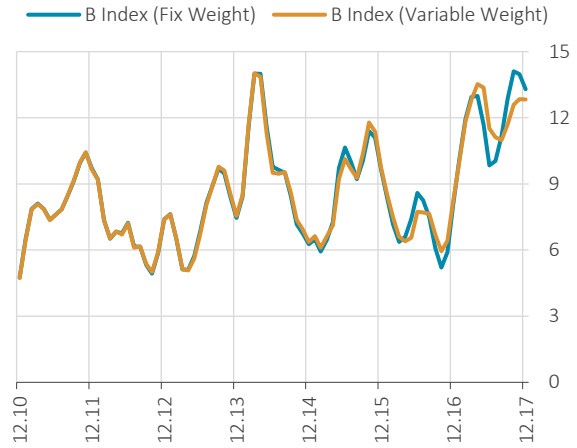
<sup>2</sup> Although inflation is high across core goods and services, pricing behavior is quite different between these two subcategories. Thus, core inflation, which is composed of these two subcategories, might change via various channels. Box 3.1 presents a study on these channels and pricing dynamics for each of these subcategories.

**Chart 3.1.11: Core Inflation Indicators**  
(Y-o-Y Change, %)



Source: TURKSTAT.

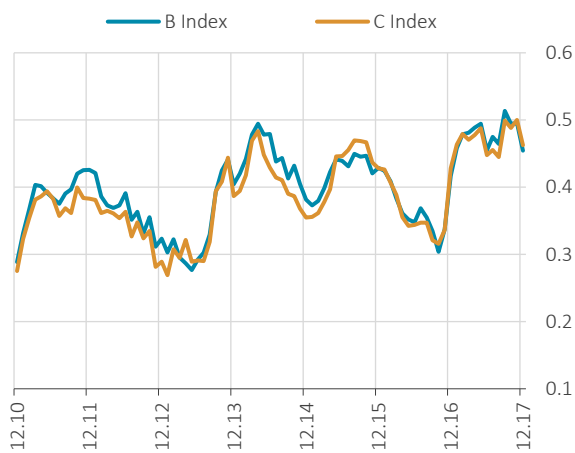
**Chart 3.1.12: The Underlying Trend of B Index**  
(Seasonally Adjusted, Annualized, 3-Month Average % Change)



Source: CBRT, TURKSTAT.

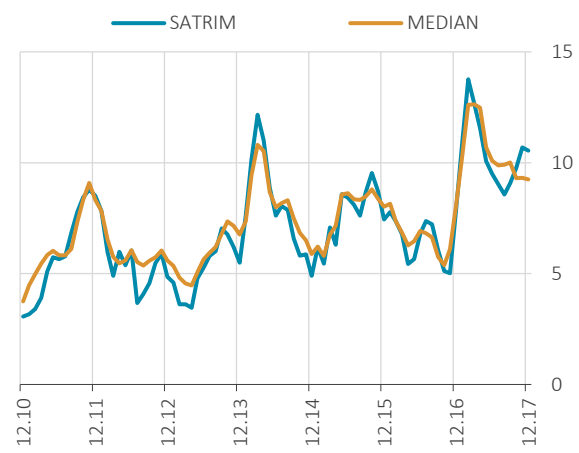
In this period, the tendency for price hikes remained strong, albeit moderating slightly, as captured by the diffusion indices for core indicators (Chart 3.1.13). SATRIM and MEDIAN, the alternative core inflation indices monitored by the CBRT, remained elevated (Chart 3.1.14). Against this background, the high underlying trend of inflation seems to have continued into the final quarter.

**Chart 3.1.13: Diffusion Indices**  
(Seasonally Adjusted, 3-Month Average)



Source: CBRT, TURKSTAT.

**Chart 3.1.14: Alternative Core Inflation Indicators**  
(Annualized 3-Month Average, %)

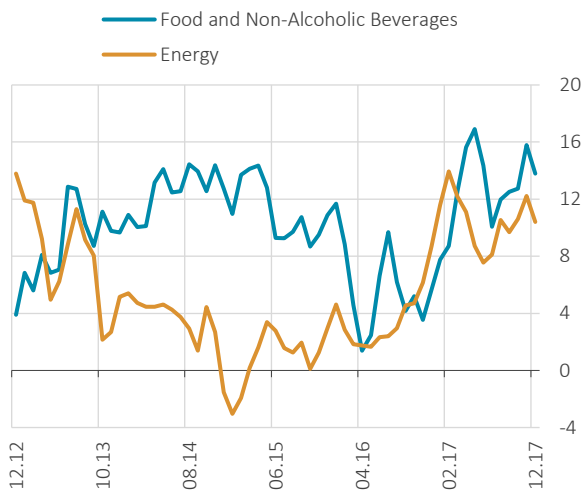


Source: CBRT, TURKSTAT.

## 3.2 Prices of Food, Energy, Alcoholic Beverages and Tobacco Products

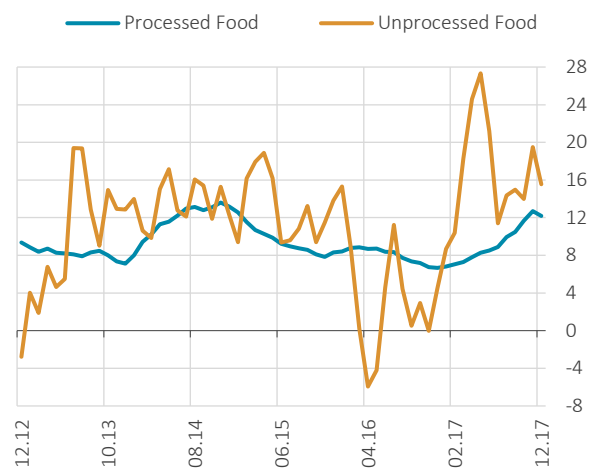
Having fallen in the third quarter, annual food inflation jumped by 1.28 points to 13.79 in the fourth quarter (Chart 3.2.1). Thus, food inflation exceeded the level projected in the October Inflation Report.

**Chart 3.2.1: Food and Energy Prices (Y-o-Y Change, %)**



Source: TURKSTAT.

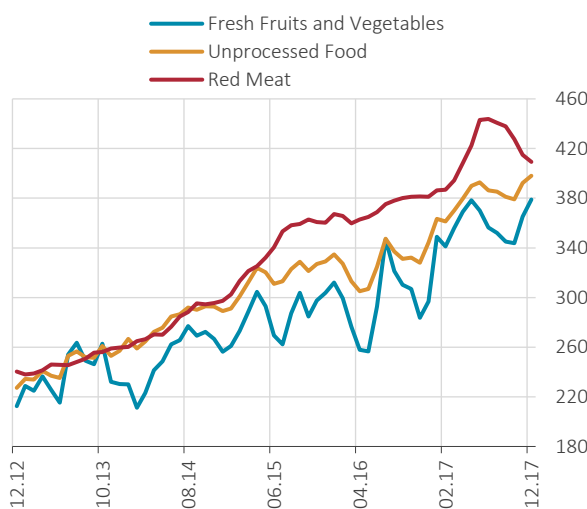
**Chart 3.2.2: Food Prices (Y-o-Y Change, %)**



Source: CBRT, TURKSTAT.

After a promising third quarter, annual unprocessed food inflation rose by 0.59 points to 15.55 percent in the fourth quarter on the back of fresh fruits and vegetables (Chart 3.2.2). Seasonally adjusted prices for fresh fruits and vegetables were on the rise through the entire fourth quarter (Chart 3.2.3). On the other hand, other unprocessed food prices only inched up thanks to meat prices falling in response to new measures.

**Chart 3.2.3: Unprocessed Food Prices\* (Seasonally Adjusted, 2003=100)**



Source: CBRT, TURKSTAT.

\* Red meat prices are not seasonally adjusted due to absence of statistically significant seasonal effects.

**Chart 3.2.4: Food Prices Excluding Fresh Fruits and Vegetables (Y-o-Y Change, %)**



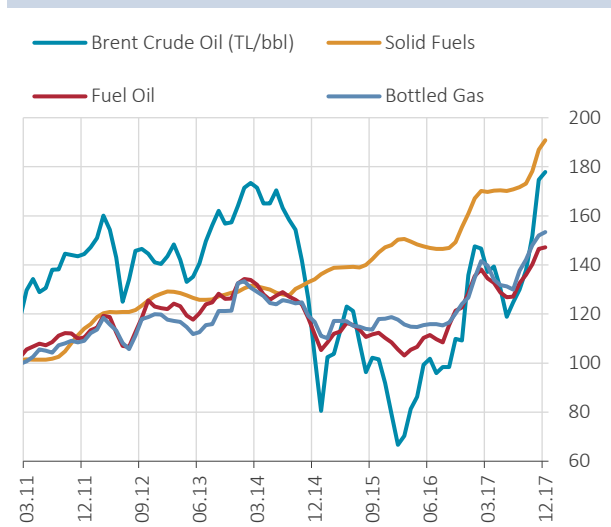
Source: CBRT, TURKSTAT.

Processed food inflation climbed by 1.71 points quarter-on-quarter to 12.20 percent, making the biggest contribution to higher food inflation in this period (Chart 3.2.2). The acceleration of processed food inflation was mostly driven by prices of cheese and other dairy products as well as fats and oils. The increased prices of raw milk affected food inflation negatively through both processed and unprocessed food prices. The depreciating Turkish lira caused prices of food products with high import content such as oils and fats to escalate. On the other hand, processed meat prices were down amid lower meat prices. Following the uptrend since the turn of 2017 due to adverse supply shocks, the weaker Turkish lira, strong domestic demand and the bounce-back in tourism, food inflation excluding fresh fruits and

vegetables stopped climbing in the fourth quarter. Thus, annual inflation dropped by 1.58 points to 11.13 percent in this category (Chart 3.2.4).

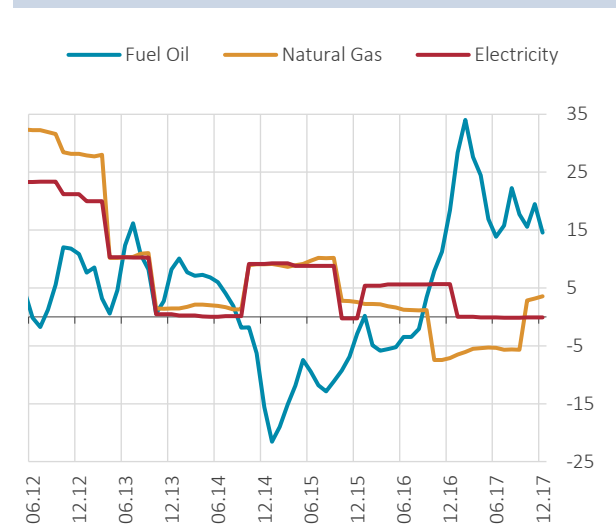
Energy prices soared by 4.88 percent in the fourth quarter (Table 3.1.1). Brent crude oil prices jumped by 16.40 percent from 55 USD per barrel at the end of the third quarter to 67 USD per barrel (Chart 3.2.5). The upsurge in oil and other input prices and the sharp TL depreciation in October and November pushed bottled gas and fuel prices up by 7.96 and 8.26 percent, respectively. In this period, solid fuel prices escalated by 10.19 percent. Among administered prices, electricity prices remained largely constant, while natural gas prices inched up (Chart 3.2.6). Municipal tap water tariffs, which are generally subject to indexation, ended the year at 11.21 percent. As a result, annual energy inflation increased by 0.73 points to 10.41 percent in this period (Chart 3.2.1).

**Chart 3.2.5: Brent Crude Oil and Selected Domestic Energy Prices (December 2010=100)**



Source: Bloomberg, CBRT, TURKSTAT.

**Chart 3.2.6: Domestic Energy Prices (Y-o-Y Change, %)**



Source: TURKSTAT.

### 3.3 Domestic Producer Prices

Domestic producer prices rose by 5.18 percent in the final quarter on the back of higher prices in mining and manufacturing (Table 3.3.1). Thus, the increase in domestic producer prices accelerated significantly compared to the last two quarters. Having remained on the rise in October and November amid a weaker Turkish lira and higher international commodity prices, particularly oil and base metals, annual D-PPI inflation recorded a small decline in December amid base effects, ending 2017 at 15.47 percent (Chart 3.3.1).



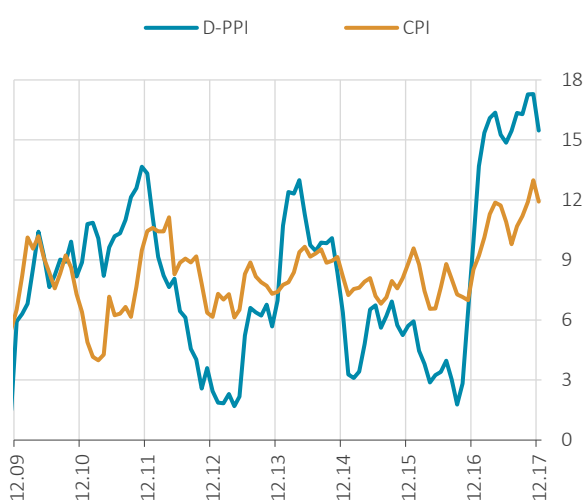
Table 3.3.1: Inflation in D-PPI and Subcategories (%)

	2016		2017				
	IV	Annual	I	II	III	IV	Annual
<b>D-PPI</b>	<b>5.92</b>	<b>9.94</b>	<b>6.38</b>	<b>1.35</b>	<b>1.82</b>	<b>5.18</b>	<b>15.47</b>
Mining	3.01	8.01	9.53	-2.60	1.85	6.88	16.13
Manufacturing	6.73	12.07	6.70	1.43	2.13	5.52	16.64
Manufacturing (excl. petroleum products)	5.92	10.83	6.68	1.76	1.86	5.04	16.16
Manufacturing (excl. petroleum and base metal products)	3.92	8.46	6.10	2.03	1.08	4.21	14.04
Production and Distribution of Electricity and Gas	-2.17	-11.79	0.64	2.27	-2.37	-0.07	0.41
Water Supply	1.98	7.21	6.40	1.71	1.26	1.56	11.30
<b>D-PPI by Main Industrial Categories</b>							
Intermediate Goods	9.17	13.83	8.21	0.90	3.15	7.21	20.75
Durable Goods	1.82	11.75	6.49	3.47	2.02	3.47	16.31
Durable Goods (excl. jewelry)	2.14	7.17	6.17	3.91	2.07	2.91	15.89
Non-Durable Goods	2.04	6.41	4.58	2.86	-0.88	1.00	7.69
Capital Goods	4.82	9.32	5.96	1.27	3.07	6.26	17.52
Energy	6.57	4.53	4.00	-1.36	1.73	6.59	11.23

Source: CBRT, TURKSTAT.

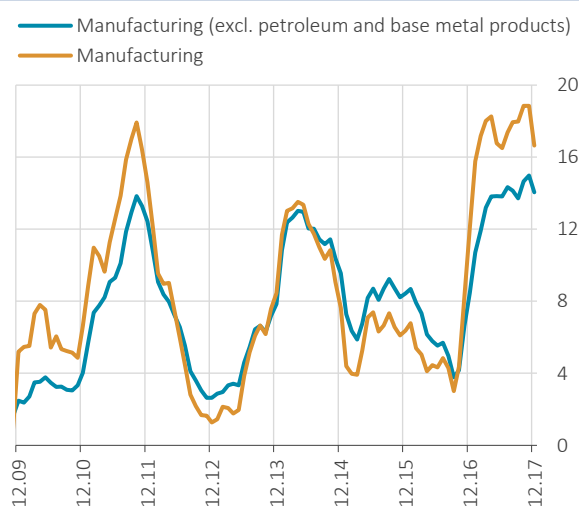
Manufacturing prices increased by a quarterly 5.52 percent to 16.64 percent year-on-year (Table 3.3.1, Chart 3.3.2). Similarly, the inflation in manufacturing prices excluding petroleum and base metal products remained high (Chart 3.3.2). Meanwhile, import prices were up in USD terms but markedly higher in TL terms due to exchange rate developments (Chart 3.3.3).

Chart 3.3.1: Domestic Producer and Consumer Prices (Y-o-Y Change, %)



Source: TURKSTAT.

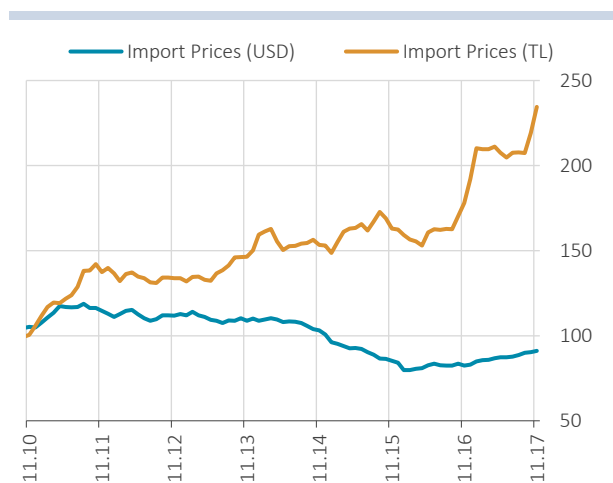
Chart 3.3.2: Manufacturing Prices (Y-o-Y Change, %)



Source: CBRT, TURKSTAT.

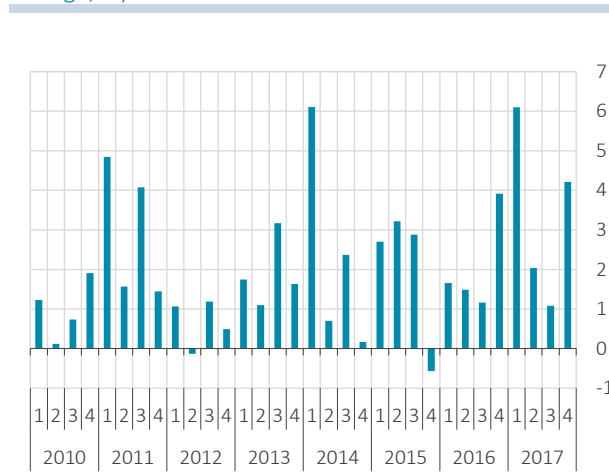
Across main industrial groupings, price hikes prevailed in all categories except non-durable goods in the fourth quarter (Table 3.3.1). Widespread price increases, especially for iron-steel, plastics, textiles, threads and fibers, were the key driver of the sharply rising prices of intermediate goods, while energy prices picked up due to prices of petroleum products and electric power generation, transmission and distribution. Meanwhile, prices of capital goods were driven higher by metal construction materials, motor vehicles, spare parts and accessories. Price increases across durable goods were led by furniture and home appliances. Accordingly, the underlying inflation of manufacturing prices excluding petroleum and base metal products, which entails information on the underlying trend of producer prices, posted a remarkable increase from the previous quarter (Chart 3.3.4). In short, cost pressures on consumer prices driven by producer prices remained strong in the fourth quarter.

Chart 3.3.3: Import Prices in USD and TL (2010=100)



Source: CBRT, TURKSTAT.

Chart 3.3.4: Manufacturing Prices Excluding Petroleum and Base Metal Products (Seasonally Adjusted, Q-o-Q Change, %)

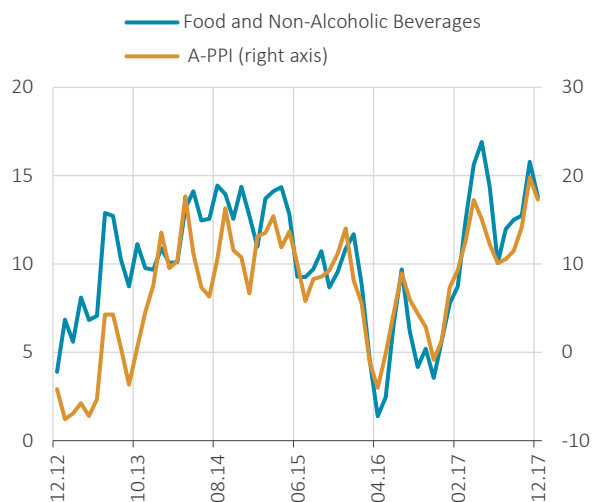


Source: CBRT, TURKSTAT.

### 3.4 Agricultural Producer Prices

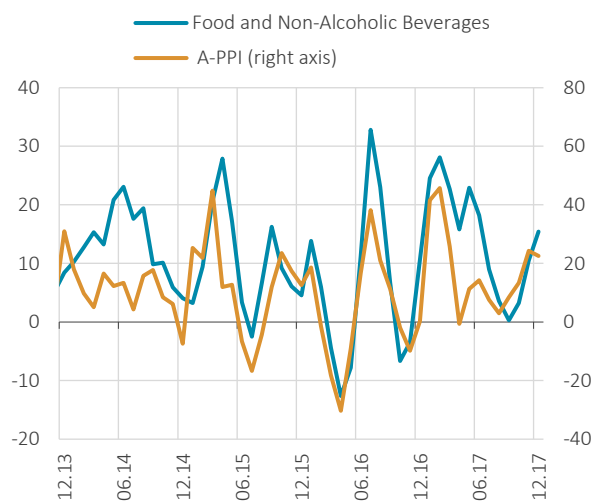
Agricultural producer prices surged by 6.23 percent quarter-on-quarter, driving annual A-PPI inflation up by 5.82 points to 17.30 percent (Chart 3.4.1). In this period, annual inflation was up quarter-on-quarter in fruits and vegetables such as tomato, lemon, carrot and banana, and in nuts such as pistachio and hazelnut, of which the annual consumer price inflation was likewise higher. Producer and consumer prices followed a similar pattern for paddy and rice prices. Rising steadily throughout 2017, producer milk prices rose by a sizeable 5.43 percent in this quarter. Therefore, consumer prices of processed dairy products such as cheese and butter displayed a continued climb. On the other hand, livestock prices rose at a more modest rate than in the previous quarter, keeping inflation subdued in this subcategory.

**Chart 3.4.1: Prices of Food, Non-Alcoholic Beverages and A-PPI (Y-o-Y Change, %)**



Source: TURKSTAT.

**Chart 3.4.2: The Underlying Trend of Food and Non-Alcoholic Beverage Prices and A-PPI (Seasonally Adjusted, Annualized 3-Month Average % Change)**



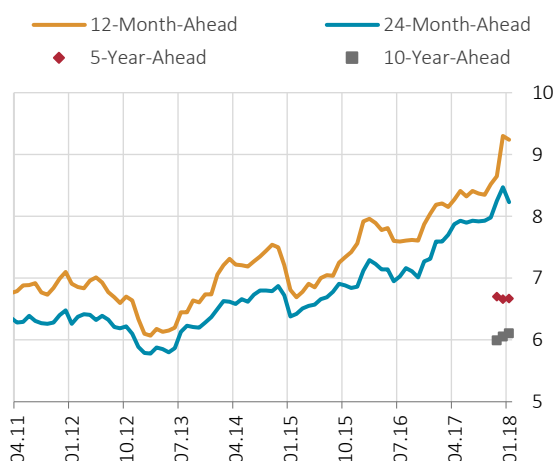
Source: CBRT, TURKSTAT.

The underlying trend of A-PPI based on seasonally adjusted data in 3-month averages reveals a quarter-on-quarter uptick (Chart 3.4.2). This gloomy A-PPI outlook spilled into CPI inflation, causing the underlying trend of food inflation to accelerate in this period.

### 3.5 Expectations

Cost shocks and the general inflation outlook caused expectations to deteriorate in the fourth quarter of 2017. As of January 2018, 12-month and 24-month-ahead inflation expectations remain high at 9.24 and 8.23 percent, respectively, while 5-year and 10-year-ahead inflation expectations hover also above the inflation target (Chart 3.5.1).

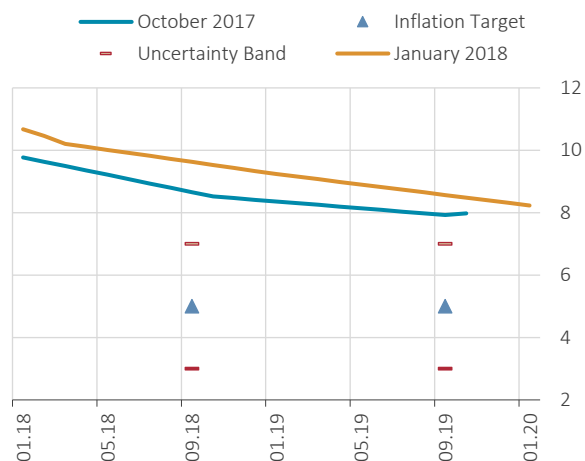
**Chart 3.5.1: Inflation Expectations\* (%)**



Source: CBRT.

\* CBRT Survey of Expectations, second survey period results for the pre-2013 period.

**Chart 3.5.2: Medium-Term Inflation Expectations\* (%)**

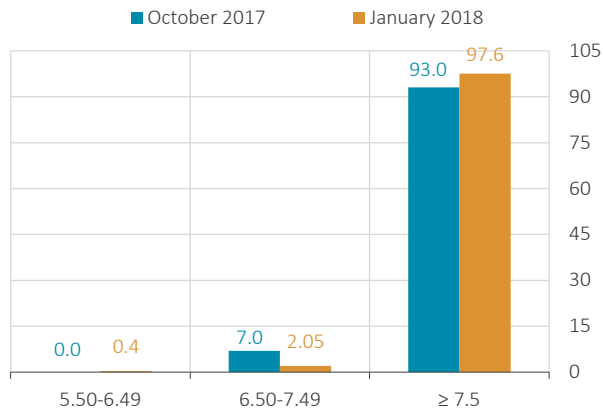


Source: CBRT.

\* Calculated by linear interpolation of expectations for different time spans using the CBRT Survey of Expectations, second survey period results for the pre-2013 period.

Inflation expectations were revised markedly upwards for all maturities on a quarterly basis (Chart 3.5.2). Thus, the distribution of inflation expectations deteriorated compared to October (Charts 3.5.3 and 3.5.4). Medium-term inflation expectations have yet to improve, which poses upside risks to the inflation outlook through wage adjustments and pricing behavior.

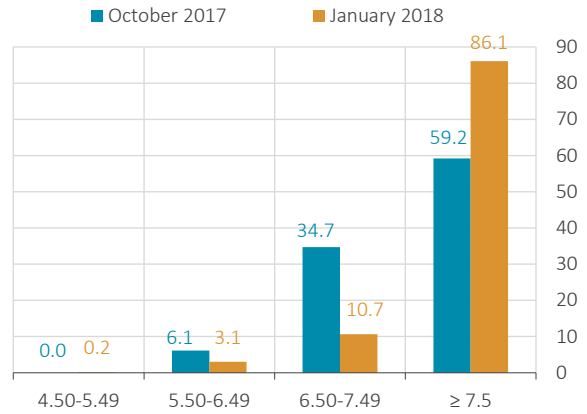
**Chart 3.5.3: Distribution of 12-Month-Ahead Inflation Expectations\* (%)**



Source: CBRT.

\* CBRT Survey of Expectations, second survey period results for the pre-2013 period. Horizontal axis denotes the inflation rate, while the vertical axis denotes the Kernel forecast. For further details, see <http://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Statistics/Tendency+Surveys/Survey+of+Expectations/>.

**Chart 3.5.4: Distribution of 24-Month-Ahead Inflation Expectations\* (%)**



Source: CBRT.

\* CBRT Survey of Expectations, second survey period results for the pre-2013 period. Horizontal axis denotes the inflation rate, while the vertical axis denotes the Kernel forecast. For further details, see <http://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Statistics/Tendency+Surveys/Survey+of+Expectations/>.

## Box 3.1

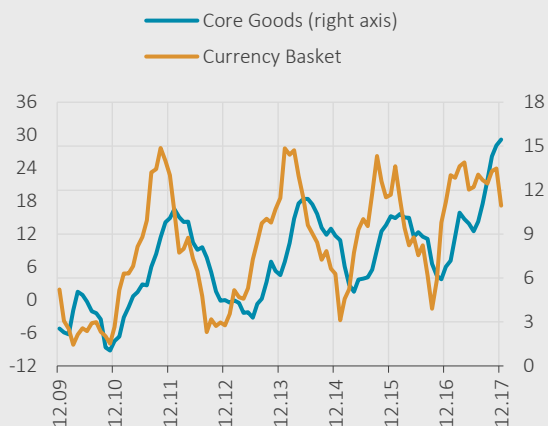
### A Look at Core Inflation Dynamics

The C index, one of the special CPI aggregates, is a measure of core inflation that excludes food, energy, alcoholic beverages and tobacco products. The index consists of two subcategories, the core goods and services, and the dynamics of C index inflation varies substantially across these subcategories. This box presents a numerical estimation of core goods and services inflation based on key determinants and identifies core inflation dynamics. To capture the differences in pricing pattern between these two categories, one should analyze how each key macroeconomic variable contributes to the respective inflation rates. Previously, Kara et al. (2017) analyzed the contribution of macroeconomic variables, such as exchange rates, import prices, output gap and real unit wages, to headline inflation by using a Phillips curve with time-varying parameters. On the other hand, this box estimates the contribution by using a fixed-parameter model in order to perform a historical analysis of the two main components of core inflation, core goods and services.

Core goods inflation is closely linked to exchange rates (Chart 1). Average contributions between 2009 and 2017 reveal that the change in the exchange rate added 5.1 points to core goods inflation, recording the largest contribution (Chart 2). The studies carried out by the CBRT show that there is significantly higher pass-through of exchange rates to prices of core goods than to consumer prices. In fact, the cumulative Turkish lira depreciation played the greatest role in core goods inflation, hitting as high as 15.5 percent at the end of 2017. Another driver of the escalating core goods inflation in this period was higher import prices. Although the sizeable exchange rate contribution in 2015 was partially offset by falling import prices, especially of oil, both import prices and the exchange rate put upward pressure on core goods inflation in 2017. In fact, import prices and the exchange rate added a total of about 10 points to core goods inflation in 2017.

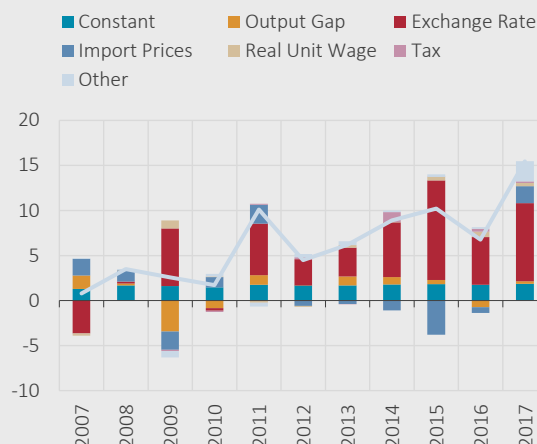
The output gap had no significant impact on inflation as, by definition, its long-term average nears zero. Nevertheless, real unit wages provided a boost to core goods inflation, particularly because of massive wage hikes unwarranted by productivity (Chart 2). After putting downward pressure on core goods inflation due to subdued economic growth in 2016, the output gap turned supportive of inflation amid stronger aggregate demand in 2017. On the other hand, having added an average contribution of 0.2 points during the period under examination, tax adjustments pushed core goods inflation up by 1.1 points in 2014. Among macroeconomic variables, exchange rates, import prices, wages and the output gap seem to explain most of the fluctuations in core goods inflation. Thus, core inflation inertia is estimated to be quite low at 1.7 percent in the absence of cost and demand shocks.

**Chart 1: Core Goods Inflation and Currency Basket**  
(Y-o-Y Change, %)



Source: CBRT, TURKSTAT.

**Chart 2: Contributions to Core Goods Inflation**  
(% Point)



Source: TURKSTAT, Authors' calculations.

However, it should be noted that the variables in the estimation model fail to fully explain the dynamics of core goods inflation in 2017. This pattern, which can be captured by the error term, might be attributed to certain factors that are not included in the model but had cyclical effects on core goods inflation. These can be listed as the excluded effects of customs duty adjustments and the deteriorated pricing behavior caused by mounting expectations for a weaker Turkish lira and higher inflation. In addition, it is also possible that demand conditions in certain industries such as white goods, furniture and clothing are stronger than implied by the output gap used in the above calculations that reflects the overall economy.

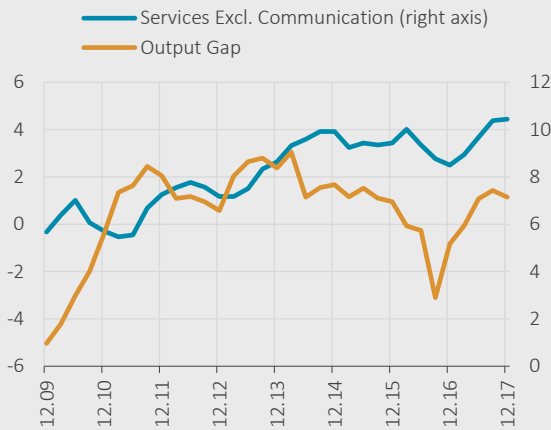
In order for a better description of the pricing dynamics, clearer picture might be obtained by excluding communications, whose pricing behavior and inflation rate differ from the rest of the services industry. Accordingly, the inertia in services inflation is estimated to be as high as 5.2 percent, which cannot be explained by key macroeconomic variables but probably by structural factors. In other words, even when key macroeconomic determinants exert no upward or downward pressure, inflation can only fall to as low as 5 percent. One of the reasons for this high inertia is the absence of competitiveness in services due to its relatively insulated and non-tradable nature. The sticky services inflation can also be explained by the wage-inflation spiral and the backward indexation mechanism in services like rents and education. These create a persistence in inflation and also lead to a higher inflation-output trade-off.

Another variable that put significant upward pressure on services inflation in the analyzed period was food inflation, which stood at 1.7 percentage points on average. Food prices are major determinants of prices in restaurants and hotels via many items associated with catering services (meat, tea, bread, beverages, etc.). The exchange rate pass-through to services inflation is historically much lower than that to core goods. Major exchange-rate-sensitive subcategories include transport, maintenance and repair services and package tours. The output gap and real unit wages are much likelier to affect the pattern of services inflation than core goods as the services industry is more labor intensive (Chart 3). In fact, according to historical averages, these two components provide a higher contribution to services inflation. In addition, with nominal wage increases accelerating and the partial labor productivity slowing in recent years, services inflation has been facing more pressure from unit wages.

In 2017, food prices and exchange rates pushed services inflation up by 2.4 and 1.4 points, respectively, above historical averages. Meanwhile, output gap and real unit wages made a historically higher contribution of 0.9 points in total, with the output gap providing a much larger

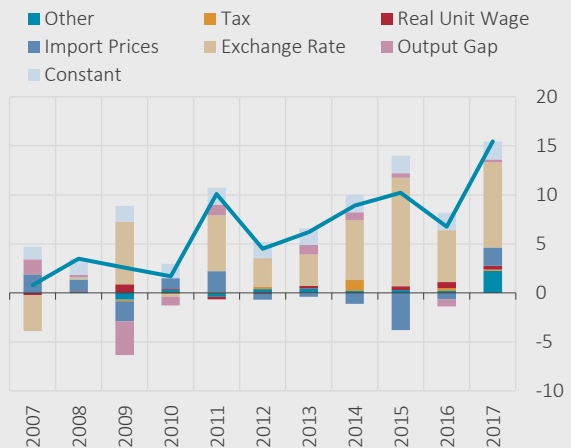
inflationary boost than the previous year (Chart 4). Accordingly, services inflation excluding communications hit 10.4 percent, ending the year at a much higher level than historical averages, which stand at 8.4 percent.

**Chart 3: Annual Services Inflation Excluding Transport and Output Gap (%)**



Source: TURKSTAT, Authors' calculations.

**Chart 4: Contributions to Services Inflation (% Point)**



Source: TURKSTAT, Authors' calculations.

In conclusion, there is a major difference between core goods and services, the two key components of core inflation, in terms of pricing dynamics. In core goods, which mostly consist of tradable goods, exchange rates and import prices are the major determinants, and inflation inertia is relatively small. However, in services, which is rather insulated due to absence of tradability, the pass-through from exchange rates and international prices is somewhat lower, yet wages and sensitivity to business cycles are significantly higher. Additionally, inflation inertia is strikingly high for services due to the relatively isolated nature of the industry, the wage-price spiral and the presence of strong indexation behavior.

