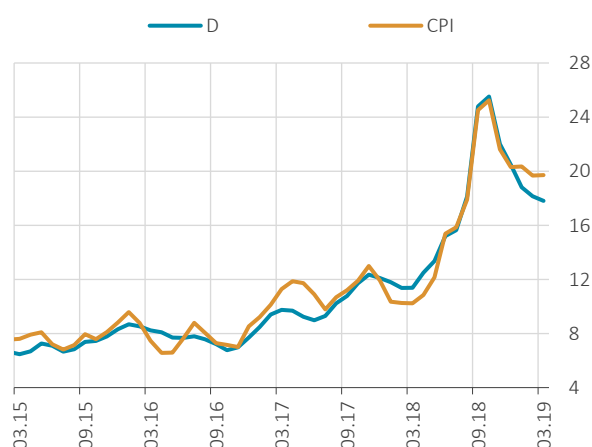


### 3. Inflation Developments

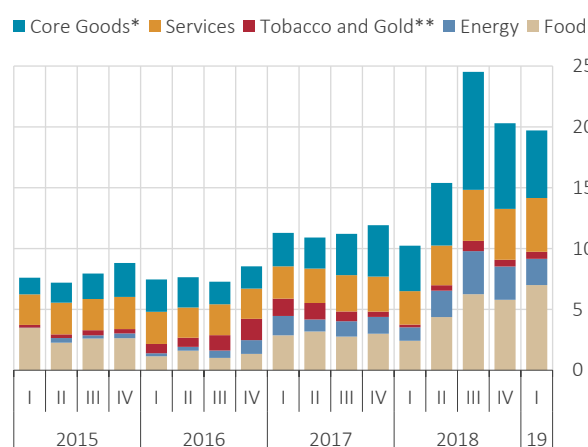
Consumer inflation dropped by 0.59 percentage points to 19.71% in the first quarter of 2019, while the decline in the annual inflation of index D was more pronounced (Chart 3.1). In this period, core goods and energy were the main drivers of the deceleration in inflation whereas food and services made a higher contribution to inflation compared to a quarter earlier (Chart 3.2). Oil and industrial metal prices drove commodity prices higher in the first quarter of 2019, while the Turkish lira remained relatively mild. The waning lagged effects of the exchange rate and the extended temporary tax cuts for durable goods, as well as the weakening domestic demand, caused annual core goods inflation to decline further. Despite the negative spillovers of higher oil prices in the first quarter of the year, energy inflation declined amid price decreases in administered energy items such as electricity, natural gas and tap water. Although the uptrend in processed food prices slowed, food inflation hit 30% due to a sharp rise in fresh fruit and vegetable prices. On the services front, despite the dampening effect of sluggish domestic demand, annual inflation rose in this quarter due to backward indexation, lagged exchange rate effects, food prices and cost pressures caused by real wages.<sup>1</sup> A fall in annual PPI inflation notwithstanding, producer-driven cost pressures on consumer prices remained strong in the first quarter.

**Chart 3.1: CPI and Index D (CPI Excluding Unprocessed Food and Alcohol-Tobacco, Annual % Change)**



Source: TURKSTAT.

**Chart 3.2: Contributions to Annual CPI (% Points)**



Sources: CBRT, TURKSTAT.

\* Core Goods: Goods excluding food, energy, alcoholic beverages, tobacco and gold.

\*\* Tobacco and Gold: Alcoholic beverages, tobacco products and gold.

In sum, although inflation indicators have recovered slightly owing to imported input costs and domestic demand developments, risks continue to cloud the inflation outlook. Elevated levels of inflation and inflation expectations, as well as uncertainties over cost factors and the pricing behavior, continue to pose risks to the inflation outlook for the upcoming period. Thus, not only a macroeconomic rebalancing that supports inflation but also reduced backward indexation ensured by well-anchored expectations are crucial to achieving a permanent decrease in inflation. Moreover, the volatility in capital flows and commodity prices fueled by the uncertainty surrounding global economic policies reduces the predictability of primary cost factors, and thus, inflation. Lastly, there is a significant base effect on inflation for the remainder of the year (Box 3.2).<sup>2</sup>

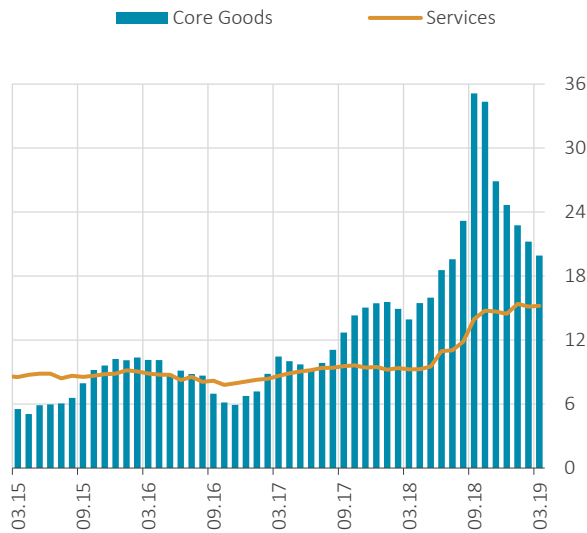
<sup>1</sup> Box 3.1 discusses the drivers of recent inflation dynamics through the contribution of key macro variables to consumer inflation.

<sup>2</sup> Box 3.2 includes an analysis of such base effects that can be factored into assessments of inflation developments.

### 3.1 Core Inflation Outlook

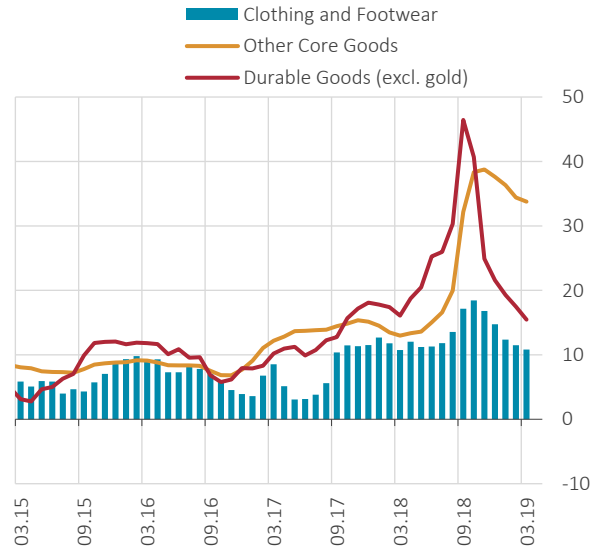
After falling dramatically in the last quarter of 2018, annual core goods inflation decreased by 4.75 points to 19.92% in the first quarter of 2019 (Chart 3.1.1). This was mainly due to a relatively milder Turkish lira and subdued domestic demand. Annual inflation was down across all subcategories, particularly in durable goods (Chart 3.1.2).

**Chart 3.1.1: Prices of Core Goods and Services (Annual % Change)**



Source: TURKSTAT.

**Chart 3.1.2: Prices of Core Goods (Annual % Change)**



Source: TURKSTAT.

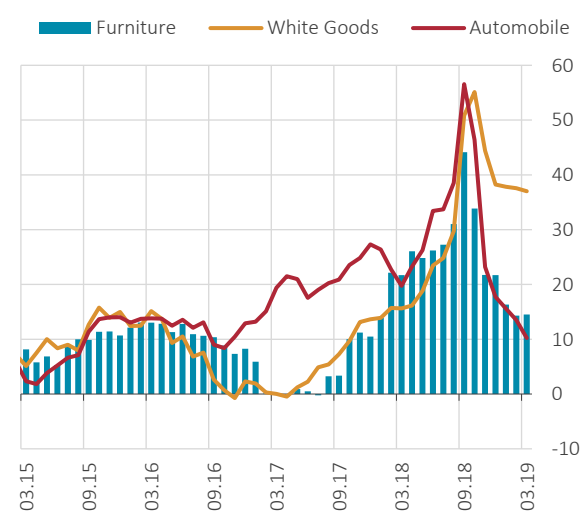
Prices of durable goods fell by 1.15% in the first quarter (Table 3.1.1). Accordingly, annual durable goods inflation decreased by 6.12 points on the back of weaker economic activity, helping core goods inflation to improve. Among subcategories, prices of automobiles fell while prices of furniture and white goods increased marginally (Table 3.1.1). Currently, with 37%, white goods have posted the highest inflation rate among subcategories of durable goods (Chart 3.1.3). As clothing prices dropped markedly in January and February and then rose at a rate below seasonal norms in March, annual clothing inflation fell by 3.93 percentage points in the first quarter (Chart 3.1.2). Annual core goods inflation excluding clothing and durable goods recorded a similar pattern.

Table 3.1.1: Prices of Goods and Services (3-Month and Annual % Change)

	2018					2019	
	I	II	III	IV	Annual	I	Annual
<b>CPI</b>	<b>2.77</b>	<b>6.23</b>	<b>9.34</b>	<b>0.78</b>	<b>20.30</b>	<b>2.27</b>	<b>19.71</b>
<b>1. Goods</b>	2.83	7.16	10.72	0.55	22.68	1.87	21.53
<b>Energy</b>	<b>2.11</b>	<b>5.60</b>	<b>12.34</b>	<b>-0.25</b>	<b>20.82</b>	<b>-1.62</b>	<b>16.41</b>
<b>Food and Non-Alcoholic Beverages</b>	<b>6.06</b>	<b>7.29</b>	<b>6.17</b>	<b>3.56</b>	<b>25.11</b>	<b>10.01</b>	<b>29.77</b>
Unprocessed Food	6.71	12.50	2.68	3.10	27.09	18.98	41.71
Processed Food	5.43	2.22	9.91	4.02	23.22	1.56	18.69
<b>Core Goods</b>	<b>0.88</b>	<b>8.67</b>	<b>14.64</b>	<b>-0.81</b>	<b>24.67</b>	<b>-2.96</b>	<b>19.92</b>
Clothing and Footwear	-9.15	15.04	-0.95	10.85	14.75	-12.26	10.82
Durable Goods (excl. gold prices)	4.09	8.22	20.84	-10.69	21.57	-1.15	15.45
Furniture	7.35	5.46	18.65	-9.39	21.71	1.00	14.51
Electrical and Non-Electrical Devices	1.39	4.87	20.52	-1.00	26.87	-0.98	23.90
Automobiles	4.39	11.11	22.41	-17.09	17.72	-2.25	10.23
Other Durable Goods	3.76	5.98	14.45	4.44	31.44	1.39	28.44
Core Goods excl. Clothing and Durable Goods	4.34	4.74	17.30	7.36	37.63	1.42	33.77
<b>Alcoholic Beverages, Tobacco Products and Gold</b>	<b>1.37</b>	<b>3.15</b>	<b>6.76</b>	<b>-2.67</b>	<b>8.65</b>	<b>1.96</b>	<b>9.30</b>
<b>2. Services</b>	<b>2.62</b>	<b>3.93</b>	<b>5.85</b>	<b>1.39</b>	<b>14.46</b>	<b>3.29</b>	<b>15.21</b>
Rent	1.99	2.20	3.14	1.96	9.61	2.46	10.12
Restaurants and Hotels	2.81	4.40	9.15	2.26	19.81	2.64	19.60
Transport	1.18	4.48	7.52	-1.73	11.70	0.28	10.70
Communication	-0.72	6.45	1.45	2.57	9.96	1.54	12.47
Other Services	4.45	3.51	5.55	1.27	15.56	5.86	17.12

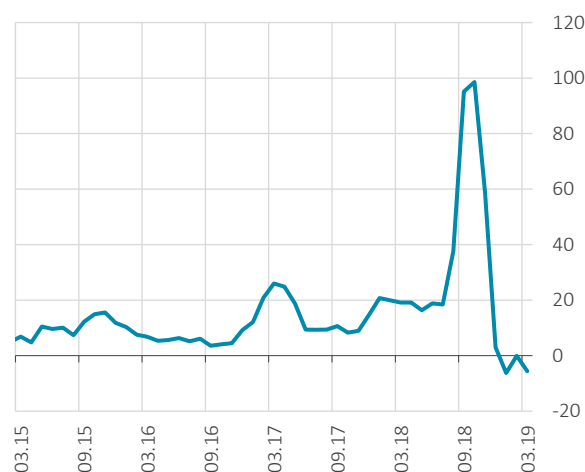
Source: TURKSTAT.

Chart 3.1.3: Prices of Selected Durable Consumption Goods (Annual % Change)



Sources: CBRT, TURKSTAT.

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

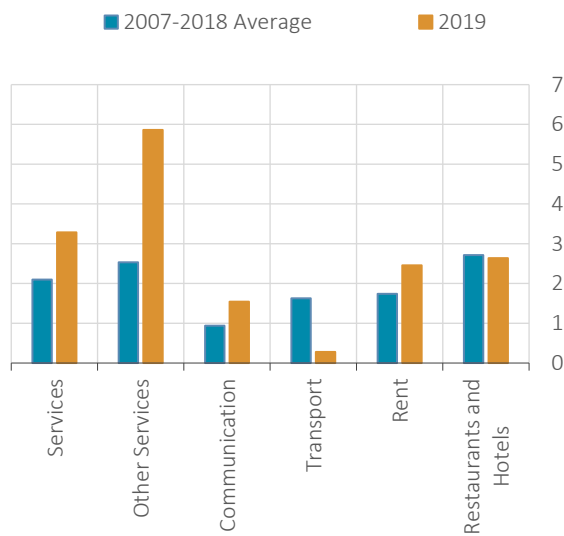


Sources: CBRT, TURKSTAT.

Hence, the contribution of core goods to consumer inflation decreased by 1.48 points to 5.56 points. In this period, the underlying trend of core goods inflation slowed from the previous quarter (Chart 3.1.4). In short, the outlook for core goods inflation improved in the first quarter of the year.

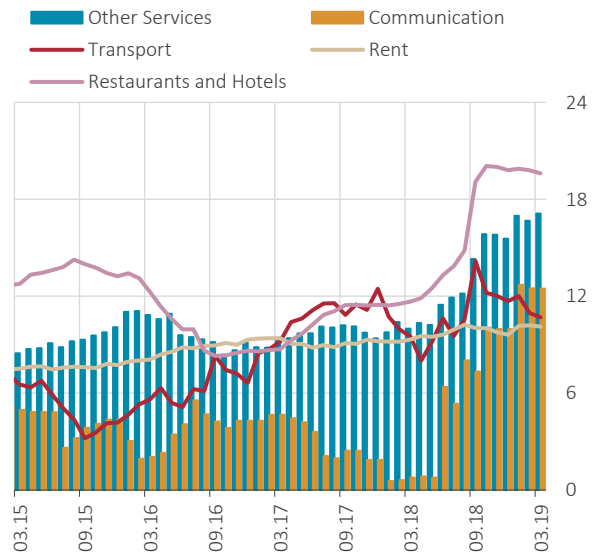
Prices of services were up 3.29% in the first quarter, and annual services inflation increased by 0.75 points to 15.21% (Chart 3.1.1 and Table 3.1.1). The quarter-on-quarter increase in prices of services, most notably in other services, communication and rent, was faster than the previous period's average (Chart 3.1.5).

**Chart 3.1.5: Prices of Services by Sub-Categories (First Quarter % Change)**



Source: TURKSTAT.

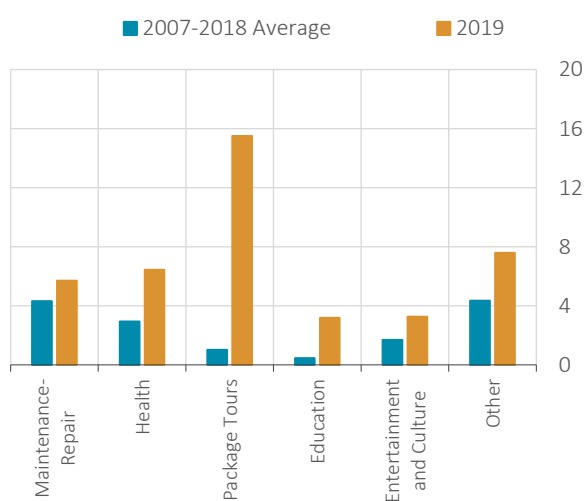
**Chart 3.1.6: Prices of Services by Sub-Categories (Annual % Change)**



Source: TURKSTAT.

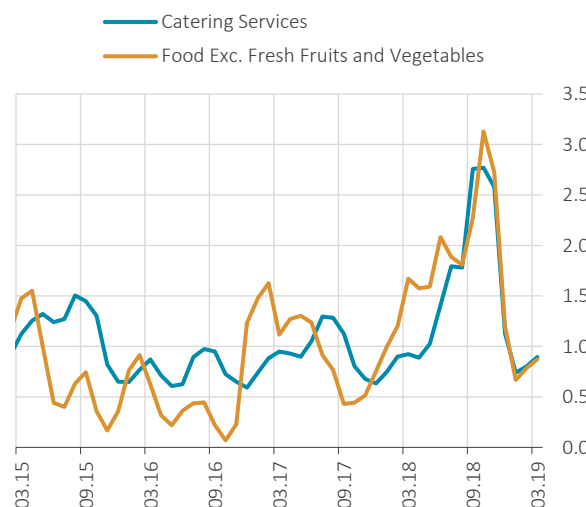
Among subcategories of services, annual inflation went down in transport but rose in communication and other services and remained virtually flat in restaurants-hotels and rent (Chart 3.1.6). Communication saw the largest increase in this period, surging by 2.51 points to 12.47% year-on-year. This upsurge was mostly driven by higher phone call and internet charges in the first two months. The quarterly increase in prices of other services was higher than the previous period's average across all subcategories, with package tours in the lead (Chart 3.1.7). Prices of package tours, healthcare and maintenance-repair rose due to the lagged effects of the depreciating Turkish lira, whereas the increase in prices of education services and other services was led by backward indexation and revaluation, respectively. Meanwhile, despite higher fuel prices, transportation inflation went down amid weak course of economic activity and effects of administered price developments in transportation. Inflation remained elevated in restaurants and hotels, while catering services posted a much faster month-on-month price increase in this quarter due to rising food prices (Chart 3.1.8). Accommodation services, on the other hand, saw inflation ease amid sluggish economic activity. In sum, despite weak domestic demand, both cost factors, such as real wages, the exchange rate and food, and the effects of high inflation and inflation expectations on pricing continued to have an adverse impact on services inflation in the first quarter of 2019.

**Chart 3.1.7: Prices of Other Services by Sub-Categories (First Quarter % Change)**



Sources: CBRT, TURKSTAT.

**Chart 3.1.8: Prices of Catering Services and Food\* (3-Month Average of Monthly % Changes)**



Sources: CBRT, TURKSTAT.

\*Food excluding fresh fruits and vegetables.

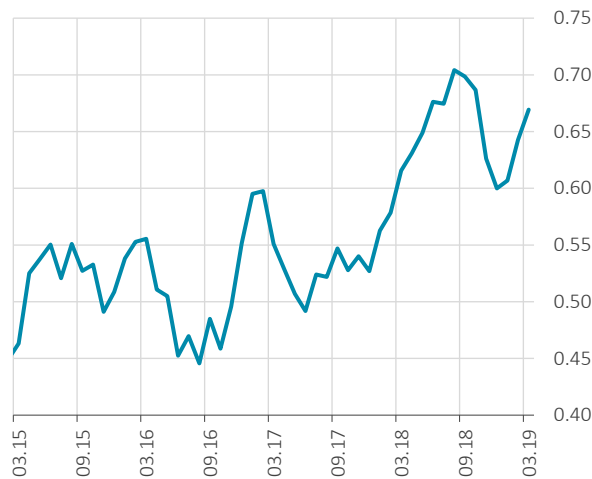
Accordingly, both the underlying trend of services inflation, which is captured by seasonally-adjusted three-month averages, and the tendency to increase prices, which is captured by the diffusion index, rose slightly in the first quarter of the year (Charts 3.1.9 and 3.1.10). These indicators suggest a deterioration in the pricing behavior in the services sector over the first quarter of the year.

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



Sources: CBRT, TURKSTAT.

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

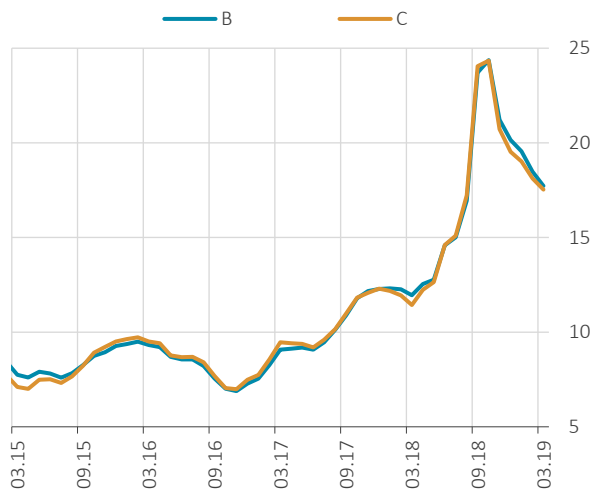


Sources: CBRT, TURKSTAT.

\* 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.

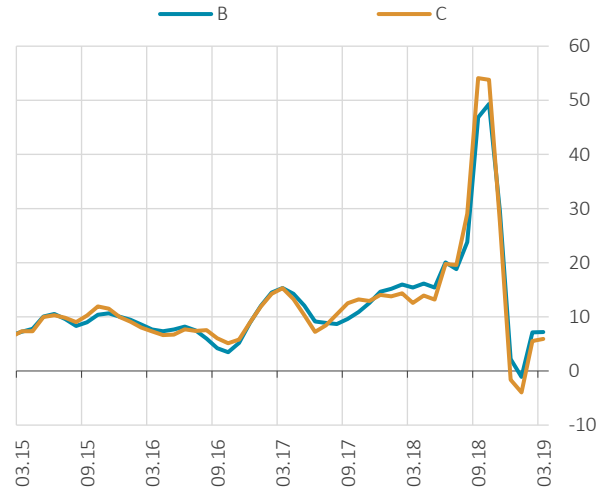
Among core inflation indicators, annual inflation in indices B and C decreased by 2.43 and 2.00 points quarter-on-quarter to 17.72% and 17.53%, respectively (Chart 3.1.11), mainly on the back of core goods inflation. Seasonally-adjusted three-month averages of core inflation indicators suggest that the underlying trend of inflation remained low (Chart 3.1.12). Inflation fell markedly in November 2018 amid temporary tax cuts on durable goods. The small first-quarter increase in the underlying trend was due to the waning effects of these tax cuts.

Chart 3.1.11. B and C Indices (Annual % Change)



Source: TURKSTAT.

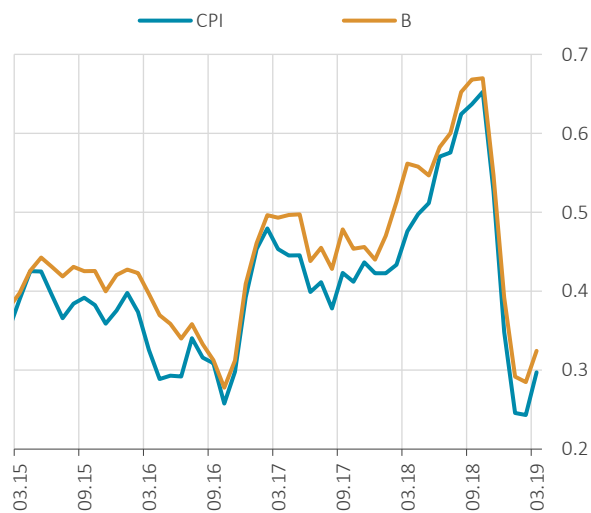
Chart 3.1.12. B and C Indices (Seasonally Adjusted, Annualized 3-Month Average % Change)



Sources: CBRT, TURKSTAT.

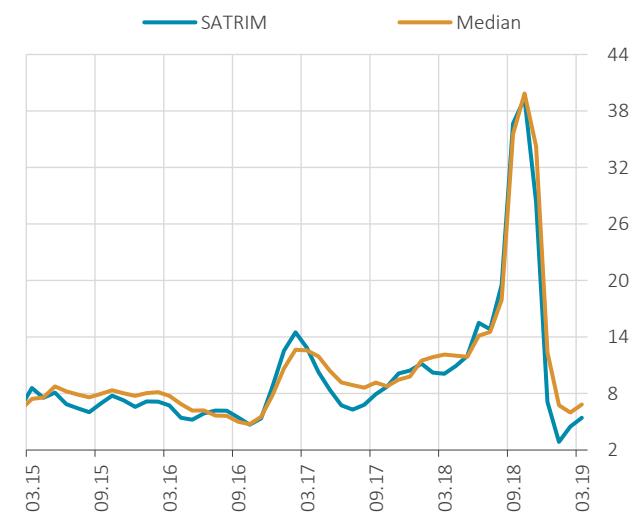
Diffusion indices for core indicators point to a reduced tendency to raise prices compared to a quarter earlier (Chart 3.1.13). The underlying trends of SATRIM and Median – alternative indicators of core inflation monitored by the CBRT – followed a pattern similar to that of diffusion indices (Chart 3.1.14).

Chart 3.1.13. CPI and B Diffusion Indices (Seasonally Adjusted 3-Month Average)



Sources: CBRT, TURKSTAT.

Chart 3.1.14. Core Inflation Indicators SATRIM\* and Median\*\* (Annualized 3-Month Average, %)



Sources: CBRT, TURKSTAT.

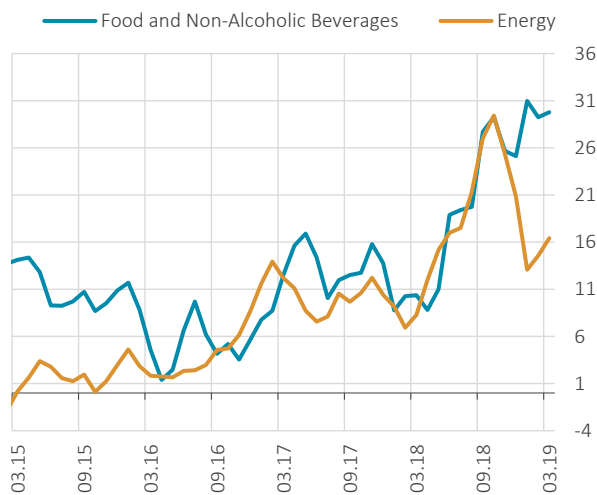
\*SATRIM: Seasonally-adjusted, trimmed mean inflation.

\*\*Median: Median monthly inflation of seasonally-adjusted 5-digit sub-price indices.

### 3.2 Food, Energy and Alcohol-Tobacco Prices

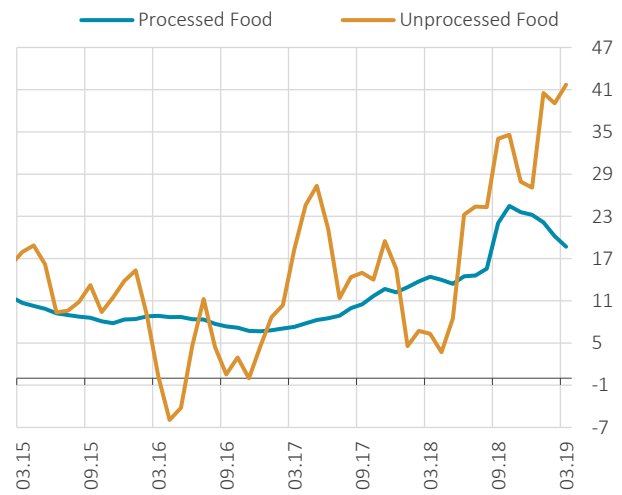
In the first quarter, annual inflation in food and non-alcoholic beverages rose by 4.66 points to 29.77% (Chart 3.2.1). This upsurge was led by unprocessed food on account of soaring prices of fresh fruits and vegetables, while annual processed food inflation declined (Chart 3.2.2). Negative supply conditions in fresh fruits and vegetables and exchange rate-driven cost pressures weighed on food prices. Thus, inflation was up in fresh fruits and vegetables but down in food excluding fresh fruits and vegetables (Chart 3.2.3).

**Chart 3.2.1: Food and Energy Prices (Annual % Change)**



Source: TURKSTAT.

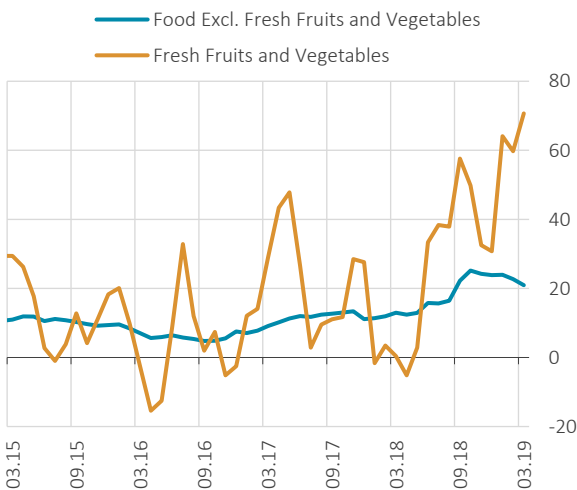
**Chart 3.2.2: Food Prices (Annual % Change)**



Source: TURKSTAT.

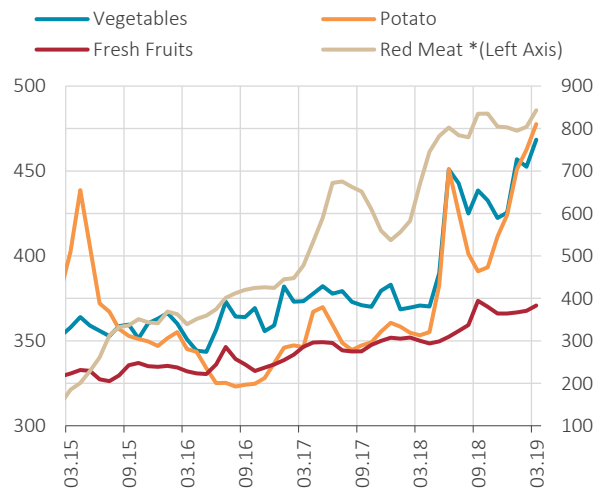
Annual unprocessed food inflation jumped by 14.62 points to 41.71% in the first quarter of 2019 (Chart 3.2.2). This increase was triggered by the fresh fruits and vegetables inflation that surpassed 70% year-on-year due to weather conditions like heavy rainfall and agricultural frost (Chart 3.2.3). Adverse weather conditions also weighed on potato prices in other unprocessed food items (Chart 3.2.4). Supplies from the new harvest are likely to facilitate some correction in prices of fresh fruits and vegetables in the upcoming period. On the other hand, the ongoing downtrend in red meat prices reversed in March (Chart 3.2.4).

**Chart 3.2.3: Prices of Fresh Fruits and Vegetables and Other Food (Annual % Change)**



Sources: CBRT, TURKSTAT.

**Chart 3.2.4: Selected Unprocessed Food Items (Seasonally-Adjusted Index, 2003=100)**



Sources: CBRT, TURKSTAT.

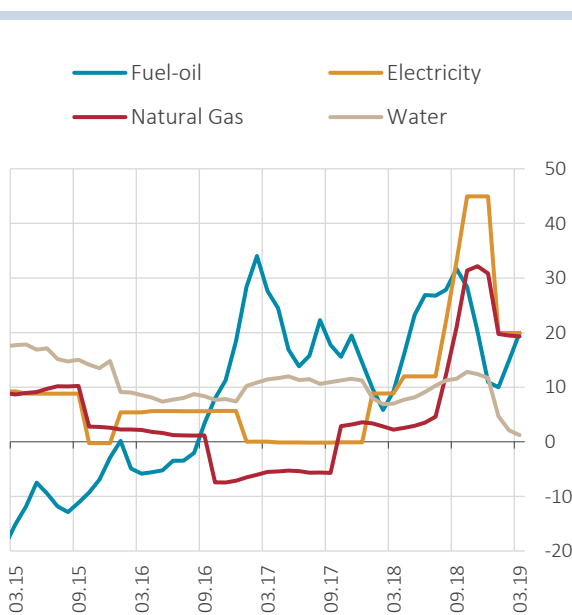
\* Prices of red meat are not seasonally adjusted as they do not show any statistically significant seasonal effect.

Annual inflation in processed food subsided in the first quarter, falling by 4.53 points to 18.69% (Chart 3.2.2), largely on the back of weakening domestic demand. The raw milk subsidy program that aimed to ensure sustainable production and a supply-demand balance ended at the end of March and the reference price for raw milk increased from TRY 1.7 to TRY 2 per liter as of May. This increase is expected to affect inflation through prices of cheese and dairy products.

Prices of alcoholic beverages and tobacco products were up 0.74% in the first quarter of 2019. On the other hand, the ad valorem SCT rate on tobacco products was raised from 63% to 67%, while the minimum specific SCT was zeroed out. This change brought tobacco prices up in April.

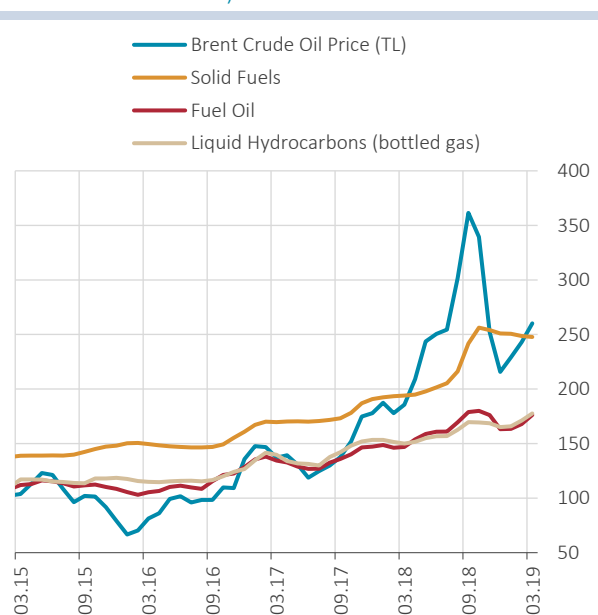
Energy prices declined by 1.62% in the first quarter of the year (Table 3.1.1), largely due to the January adjustments in administered prices. In this period, prices for electricity, natural gas and water were down 10.00%, 8.15% and 6.91%, respectively, and their annual inflation declined (Chart 3.2.5). On the other hand, international oil prices drove fuel and bottled gas prices higher (by 7.98% and 7.58%, respectively) (Chart 3.2.6). While Turkish lira was on a moderate track, the Brent crude oil price rose to USD 66/bbl at the end of March from USD 56/bbl at the end of the fourth quarter. Thus, the Turkish lira-denominated Brent oil price rose by 20% from the previous period. Consequently, despite rising oil prices, price drops in administered energy items brought annual energy inflation down by 4.41 points to 16.41% in this period (Chart 3.2.1).

**Chart 3.2.5: Domestic Energy Prices (Annual % Change)**



Source: TURKSTAT.

**Chart 3.2.6: Oil and Selected Domestic Energy Prices (December 2010=100)**



Sources: Bloomberg, CBRT, TURKSTAT.

### 3.3 Domestic Producer Prices

Domestic producer prices (D-PPI) rose by 2.14% in the first quarter (Table 3.3.1). This upsurge was driven by both the course in Turkish lira and the quarter-on-quarter rise in prices of commodities such as oil and metal. Annual PPI inflation, on the other hand, decelerated by 4.00 points from the previous quarter-end to 29.64% amid base effects (Chart 3.3.1).



**Table 3.3.1: D-PPI and Sub-Categories (3-Month and YoY % Change)**

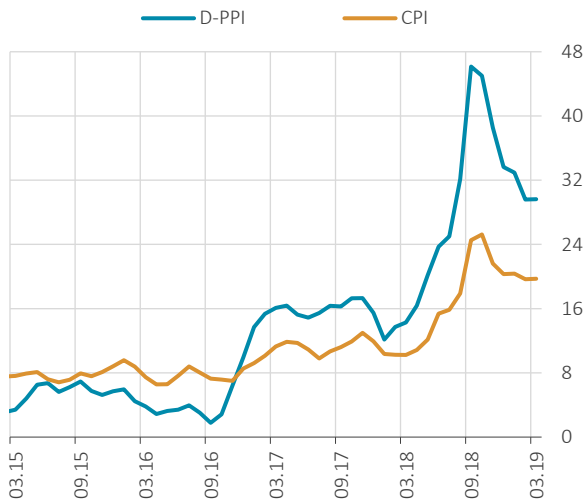
	2018					2019	
	I	II	III	IV	Annual	I	Annual
<b>D-PPI</b>	<b>5.29</b>	<b>9.72</b>	<b>20.29</b>	<b>-3.83</b>	<b>33.64</b>	<b>2.14</b>	<b>29.64</b>
Mining	6.52	7.02	12.62	-3.14	24.34	5.72	23.42
Manufacturing	4.98	9.68	19.15	-4.44	31.11	2.68	28.23
Manufacturing excl. Petroleum Products	5.01	9.04	18.50	-3.48	30.95	2.42	27.73
Manufacturing excl. Petroleum and Base Metal Products	4.88	8.58	17.41	-2.16	30.81	2.61	27.98
Production and Distribution of Electricity and Gas	9.43	12.35	39.90	1.75	75.02	-5.24	51.56
Water Supply	0.02	3.17	3.65	2.02	9.13	-7.65	0.76
<b>D-PPI by Main Industrial Groupings</b>							
Intermediate Goods	5.38	10.24	22.02	-5.37	34.14	2.04	29.89
Durable Consumption Goods	3.57	6.69	14.90	-1.61	24.92	1.39	22.28
Durable Consumption Goods (excl. jewelry)	3.53	6.56	13.91	-1.08	24.31	1.19	21.50
Non-Durable Consumption Goods	4.32	7.61	12.56	-0.69	25.49	3.26	24.20
Capital Goods	5.81	8.39	19.63	-3.11	32.92	3.76	30.34
Energy	7.61	15.58	34.48	-6.06	57.13	-1.23	44.23

Sources: CBRT, TURKSTAT.

According to main industrial groups, prices were slightly down in energy but up in other subcategories (Table 3.3.1). The rise in prices of intermediate goods was led by cabling products, stone-sand-clay, and concrete and cement products, while prices of capital goods rose due to metal construction products, parts and accessories of motor vehicles, and agricultural machinery. Prices of durable goods were driven higher by furniture, while prices of nondurable goods were largely pushed up by price hikes in pharmaceutical products, fruits and vegetables, and meat products.

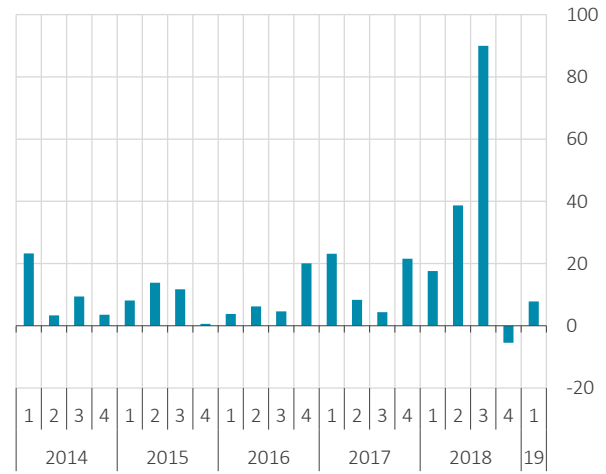
After slowing in the fourth quarter of 2018, the underlying trend of manufacturing prices excluding petroleum and base metals recorded a small increase in this quarter (Chart 3.3.2). As a result, despite the first quarter's decline in annual PPI inflation, consumer prices have continued to face strong cost pressures from producer prices.

**Chart 3.3.1: Domestic Producer and Consumer Prices (Annual % Change)**



Source: TURKSTAT.

**Chart 3.3.2: Manufacturing Prices Excluding Petroleum and Base Metal Products (Seasonally-Adjusted, Annualized Q-o-Q % Change)**

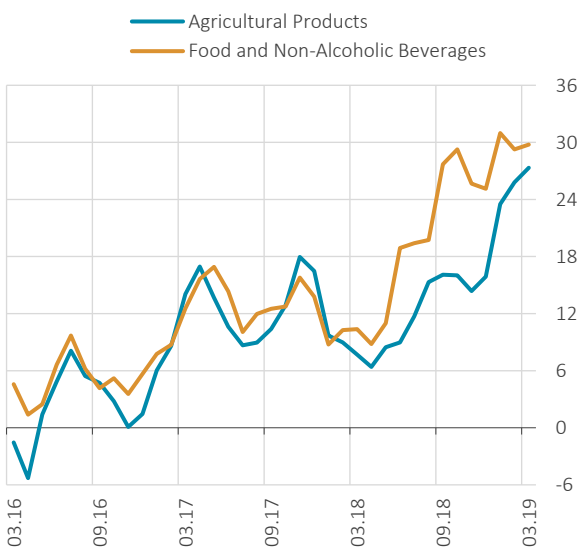


Sources: CBRT, TURKSTAT.

### 3.4 Agricultural Producer Prices

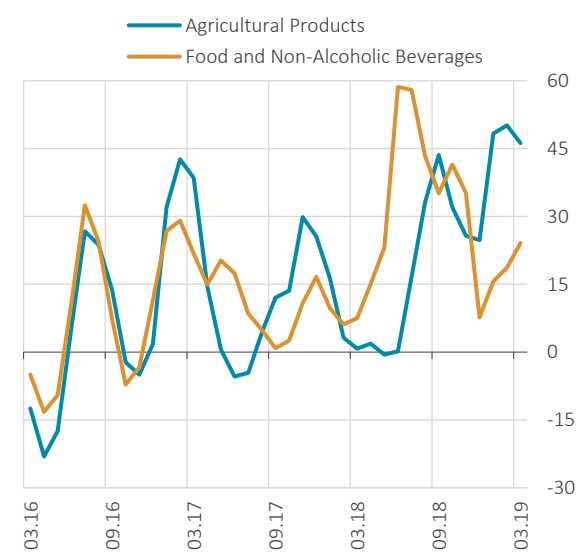
Annual inflation in agricultural producer prices soared by a quarterly 11.44 points to 27.33% in the first quarter of 2019 (Chart 3.4.1). This jump was driven by widespread price hikes across vegetables. These hikes were more marked for eggplants, peppers, tomatoes, lettuce, carrots, leeks, potatoes and onions. In this period, the rates of increase in agricultural producer prices and consumer food prices showed a pattern of convergence compared to the previous quarter. Seasonally-adjusted three-month averages reveal that the underlying trend of agricultural producer prices accelerated, causing consumer food inflation to remain on an uptrend (Chart 3.4.2).

**Chart 3.4.1: Prices of Agricultural Products and Food (Annual % Change)**



Source: TURKSTAT.

**Chart 3.4.2: Prices of Agricultural Products and Food (Seasonally-Adjusted, Annualized 3-Month Average % Change)**

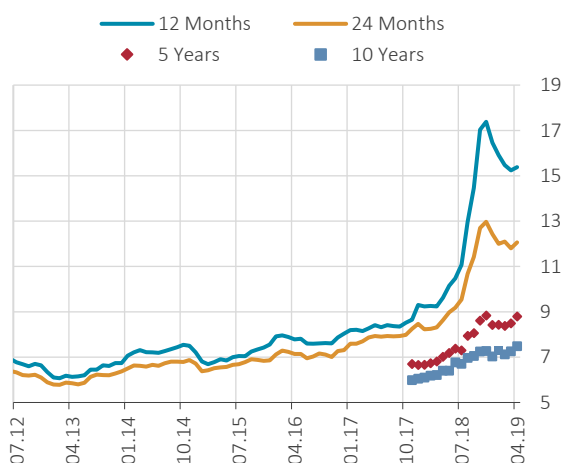


Sources: CBRT, TURKSTAT.

### 3.5 Expectations

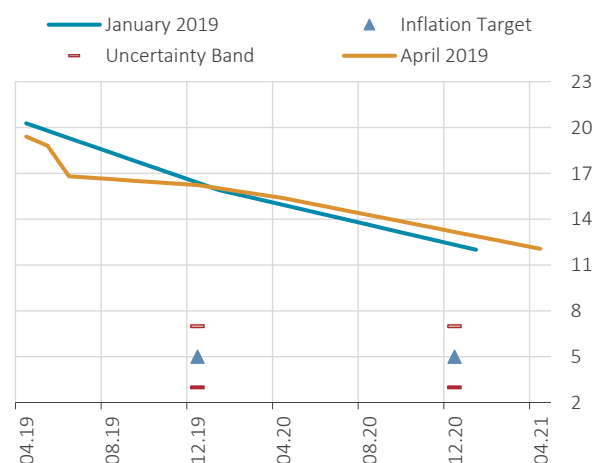
Amid falling inflation, inflation expectations decreased slightly in the first quarter of 2019, yet remained elevated. As of April 2019, 12-month and 24-month-ahead inflation expectations remain at 15.38% and 12.06%, respectively (Chart 3.5.1). Meanwhile, 5-year and 10-year-ahead inflation expectations increased slightly and continued to hover above the medium-term inflation target. For the short term, inflation expectations have been revised downwards from the previous quarter but have seen a slight upward revision for the medium term (Chart 3.5.2).

Chart 3.5.1: CPI Inflation Expectations\* (%)



Source: CBRT.  
 \* Second survey period results for the pre-2013 period derived from the CBRT Survey of Expectations that polls corporate sector and financial sector representatives as well as professionals.

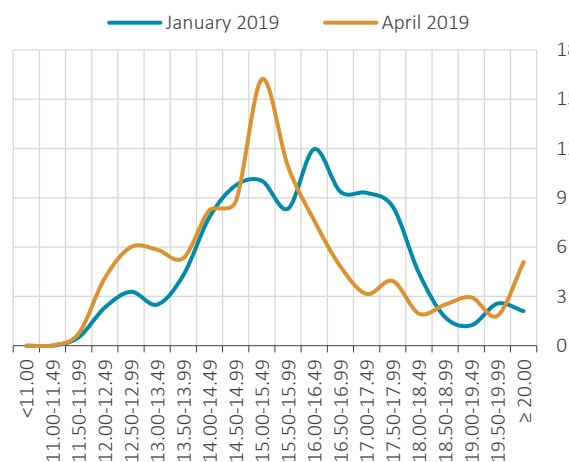
Chart 3.5.2: Medium-Term Inflation Expectations Curve\* (%)



Source: CBRT.  
 \* Calculated by linear interpolation of expectations for different time spans using the CBRT Survey of Expectations that polls corporate sector and financial sector representatives as well as professionals.

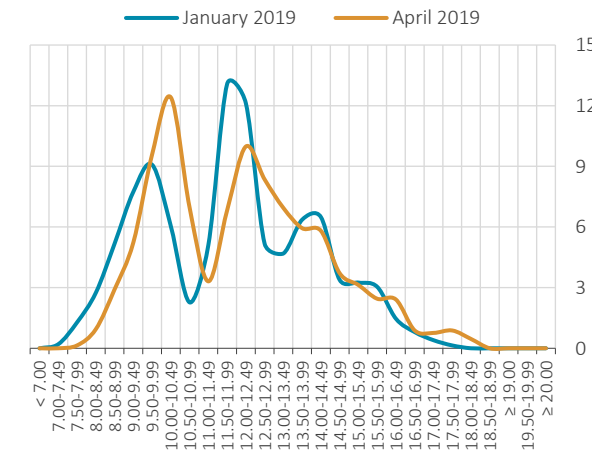
Despite some improvement, particularly for 12-month ahead inflation expectations, probability distributions of medium-term inflation expectations suggest that there is still uncertainty over the course of inflation (Charts 3.5.3 and 3.5.4). The lack of a notable improvement in inflation expectations fuels upside risks to the inflation outlook through pricing behavior channel.

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



Source: CBRT.  
 \* Horizontal axis denotes the expected inflation rate, while the vertical axis denotes the respective probability. For further details, see Statistics/Tendency Surveys/Survey of Expectations/Metadata on the CBRT website.

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



Source: CBRT.  
 \* Horizontal axis denotes the expected inflation rate, while the vertical axis denotes the respective probability. For further details, see Statistics/Tendency Surveys/Survey of Expectations/Metadata on the CBRT website.

## Box 3.1

### Drivers of Inflation Dynamics in the Recent Period

Consumer inflation in Turkey declined to 19.7% in the first quarter of 2019 (Chart 1). In this box, a reduced-form Phillips curve with time-varying parameters is estimated and contributions of fundamental macroeconomic variables to consumer inflation are examined for the recent period<sup>1</sup>. Examining the macroeconomic determinants of disinflation may provide insight into policy options in the upcoming period.

**Table 1: Contributions to Consumer Inflation (% Points)**

	CPI	Constant Term <sup>(1)</sup>	Unprocessed Food <sup>(2)</sup>	Exchange Rate	Import Prices	Output Gap	Real Unit Labor Cost	Taxes	Other <sup>(3)</sup>
<b>2018</b>	20.3	5.5	2.0	8.6	0.2	0.5	-0.2	-1.0	4.7
<b>2019-I</b>	19.7	5.5	3.6	8.0	0.0	-0.6	0.2	-1.0	3.9

<sup>(1)</sup> This is the part of inflation that cannot be explained by fundamental macroeconomic variables (import prices, exchange rate, output gap, unit labor cost, food prices and tax adjustments) and is therefore estimated as a constant term. It should be emphasized that contributions to consumer inflation, particularly the size of constant term, can differ depending on the model specification and sample size.

<sup>(2)</sup> This represents only the exchange rate-adjusted contribution of unprocessed food inflation. The exchange rate effect on unprocessed food prices is included under the “exchange rate” column in the table.

<sup>(3)</sup> The term “Other” includes the contribution of non-tax price changes in tobacco and alcoholic beverages as well as the effect of the residual term.

Model results reveal that the main driver pushing consumer inflation to levels around 20% in the recent period was exchange rate developments (Table 1 and Chart 1). These affect consumer inflation directly through imported final goods in the CPI basket and also indirectly through the use of imported intermediate and capital goods in the production process as well as through the expectations channel. In particular, the depreciation of the Turkish lira in 2018 had a considerable impact on the CPI. In the third quarter of 2018, in which the exchange rate volatility was quite high, the pass-through to prices was higher and faster than historical averages.<sup>2</sup> Furthermore, the strengthened backward-indexation behavior was also effective in the recent rise in long-term exchange rate pass-through, which was historically around 18%.

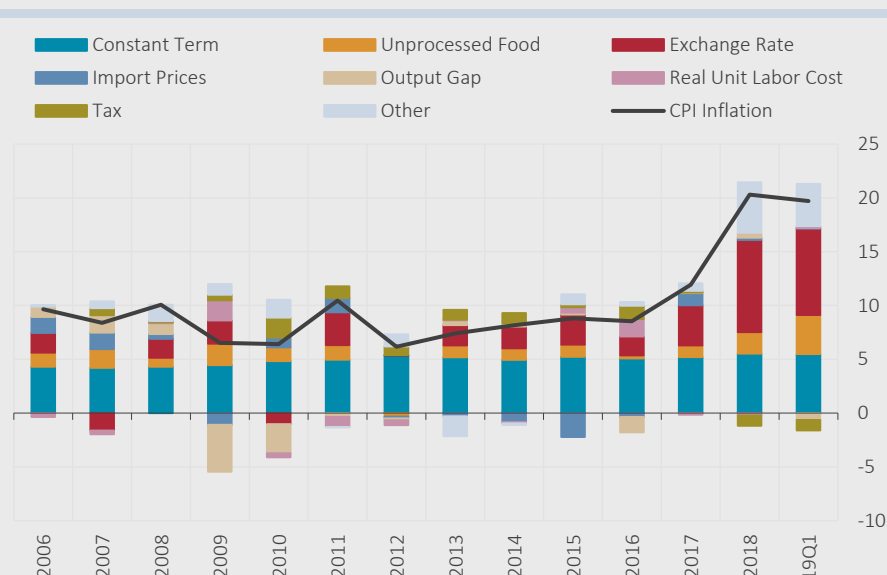
Consumer inflation, which went up due to exchange rate developments, has distorted the pricing behavior and expectations, thus leading to an increase in the constant term. The constant term refers to the part of inflation that cannot be explained by the macroeconomic variables in the model and can be ascribed to structural reasons. This term may also be said to be related with long-term inflation expectations and “trend inflation”.

<sup>1</sup>This method was previously used in Kara, Ögünç and Sarıkaya (2017) and Koca and Yılmaz (2018). The D index (CPI excluding unprocessed food and alcohol-tobacco) is employed as a dependent variable whereas lagged value of inflation, import prices in US dollar, basket exchange rate (US \$ / TL and EUR / TL average), output gap and real unit labor cost are used as independent variables. The equation is estimated using quarterly data. In addition, the direct impact of changes in taxes on consumer inflation is also taken into consideration. Quarterly contributions to consumer inflation are calculated by multiplying the value of the relevant variable with the value of its time-varying coefficient at the respective period. The annual contributions are obtained via the aggregation of quarterly contributions.

<sup>2</sup> Box 3.1, Inflation Report 2018-IV.

Unprocessed food prices constitute another significant variable that has recently had an increased inflationary effect (Table 1). In this group, annual inflation reached 41.7% in March 2019 due to soaring prices of fresh fruits and vegetables. The weak course of the Turkish lira was also effective in this development, but it is noteworthy that annual food inflation has been on an upward trend even when adjusted for the exchange rate effect. This points to the effect of adverse supply conditions on the rise in fresh fruits and vegetables group inflation, and there was no correction in prices as of the first quarter of 2019.

**Chart 1: Contributions to CPI Inflation (% Points)**



Source: CBRT, TURKSTAT.

The impact of import prices, demand conditions and real unit labor costs on the recent acceleration in consumer prices is relatively limited in terms of annual figures. Also, a close look at the year-by-year contribution of output gap and unit labor cost variables that reflect demand conditions and labor costs reveals that the contributions are in the opposite direction in periods when the economy is shrinking (Chart 1). While the contribution of the output gap to inflation was negative in 2009 and 2016 when the economic activity contracted, there was a positive contribution from real unit labor costs. In such periods, production per capita decreases as a result of the contraction in economic activity. This decrease negatively affects the measured partial labor productivity due to lack of flexibility in the labor market, and results in a rise in unit production costs. Thus, in periods when the economic activity contracts, the output gap makes a downward contribution to inflation whereas the upward impact of real unit labor costs on inflation increases due to the decline in partial labor productivity.

Another factor highlighted in Table 1 is the recent downward contribution of the tax adjustment to inflation. Temporary tax reductions in furniture, white goods and automobiles were effective in this development. On the other hand, it is noted that the term “Other”, which includes the part of inflation dynamics not captured by the model, has been high in the recent period. It is considered that in 2018, some part of the term “Other” reflected indirect effects of electricity and natural gas price adjustments. The remaining part is assessed to be determined by the deterioration in the pricing behavior.

By the first quarter of 2019, the high contribution of constant term was preserved, while the contribution of economic activity, exchange rate and import prices to inflation was downward compared to 2018 year-end.<sup>3</sup> On the other hand, the pressures on inflation exerted by unprocessed food prices and real unit labor costs increased.

In sum, the sharp depreciation in the Turkish lira and the accompanying deterioration in inflation expectations and pricing behavior have been the main drivers of the recent rise in inflation. The upward impact of unprocessed food prices on inflation has become more evident. In addition, the part of inflation that cannot be explained by fundamental macroeconomic variables and is rather attributable to general rigidities has also remained high. In this context, while the CBRT maintains a policy stance that focuses on price stability, other relevant authorities' support for expectation management is crucial for the success of the disinflation efforts.

### References

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Kara, H., Ögünç, F. and Sarıkaya, Ç. (2017). "Inflation Dynamics in Turkey: A Historical Accounting", CBRT Research Notes in Economics, No. 17/03, May 2017.

Koca, Y. K. and Yılmaz, T. (2018), "A Closer Look at Core Inflation Dynamics with a Historical Perspective", CBRT Research Notes in Economics, No. 18/07, October 2018.

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<sup>3</sup> The disinflationary effect of the weakening economic activity has become more evident in the last two quarters. However, due to the lagged upward effects from 2018, the total contribution of the output gap to annual consumer inflation as of the first quarter of 2019 was relatively limited at -0.6 points.

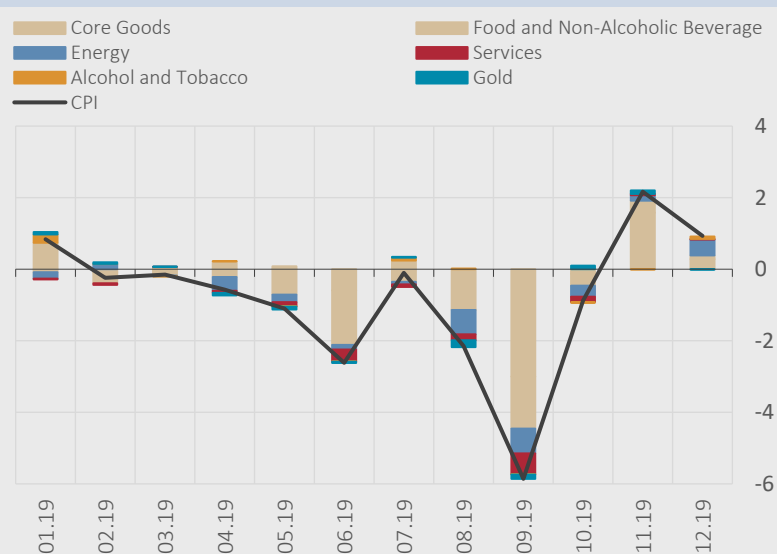
## Box 3.2

### Reflections of Base Effects on Consumer Price Inflation

By the end of 2018, consumer price inflation reached 20.30% following a series of adverse shocks led by exchange rates and food prices. Since the second quarter of 2018, food prices, led by unprocessed food prices, have increased significantly mainly due to negative supply conditions. The effects of the depreciation of the Turkish lira throughout the year, caused by the volatility in international financial markets and domestic uncertainties, diffused across all subgroups, primarily the core goods and energy groups, through the channels of cost and expectations. This sharp loss of value in the Turkish lira pushed inflation up to high levels in September and October by both affecting pricing behavior negatively and causing front-loaded price increases. On the other hand, monthly inflation figures for the last two months of 2018 posted significant declines on the back of the monetary tightening as well as temporary tax cuts on durable goods. In sum, in 2018, the monthly inflation followed a visibly different path during certain periods in comparison to its typical course. Accordingly, this box analyzes the base effects of 2018 monthly inflation figures on the 2019 consumer price inflation.

The base effect stems from the deviation of the month-on-month change in the previous year from the typical monthly change in the respective month. Thus, in addition to the current price developments, annual inflation may also be affected by the base effect.<sup>1</sup> As a matter of fact, base effects will have a significant impact on the course of inflation in 2019.

**Chart 1: Monthly Contribution of Base Effects on Annual Consumer Price Inflation (by Subgroups, % Points)**



Source: CBRT, TURKSTAT.

<sup>1</sup> For details, see Inflation Report 2016/1, Box 3.1. In this work, the average monthly inflation recorded in the 2014-2017 period is defined as “typical” monthly change for each subcategory in order to capture the recent dynamics of inflation better. While calculated base effects are slightly higher, main results hold even when a longer period is considered for calculations of typical monthly changes.

The base effects in annual CPI inflation in 2019 by subcategories are given in Chart 1. Accordingly, the food, core goods and energy groups proved to be the largest contributors of disinflation throughout the year. Despite having had an upward effect in the first month of the year, the food group-driven base effect is expected to exert mostly downward pressures on annual inflation in the rest of the year. This downward effect is particularly noticeable during May and June, mainly due to unprocessed food prices. Following the sharp depreciation in the Turkish Lira in 2018, prices of core goods increased significantly. It is therefore expected that core goods-driven base effects, recorded in the June-September period in particular, will pull annual inflation down. Similarly, the base effect driven by the energy group will put downward pressure on annual inflation until November. Due to temporary tax cuts and the slowing economic activity, the consumer prices registered a decline in the last two months of 2018. Therefore, base effects will push inflation up in November and December 2019. In sum, while the inflation is expected to be pushed significantly downwards by the base effects in June, August and September, an opposite effect is expected to be observed in November.

To sum up, understanding the contribution of base effects to annual consumer inflation is important in order to accurately evaluate the trend of inflation. Since base effects are expected to make a significant downward contribution to annual consumer inflation in certain months of 2019, keeping a close eye on the underlying trend of inflation becomes even more important. Therefore, rather than the decline in inflation to be observed due to the base effects, the outlook in underlying trend of inflation, depending on inflation expectations, exchange rate, import prices, aggregate demand conditions and food prices outlook will be closely followed.