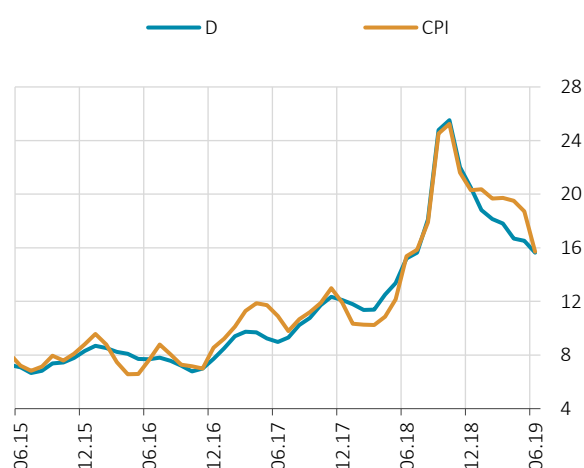


3. Inflation Developments

Consumer inflation fell by 3.99 points to 15.72% in the second quarter of 2019 (Chart 3.1). In this period, food, core goods and energy were the main drivers of the deceleration in inflation, whereas the contribution of tobacco group to inflation was higher than the previous quarter (Chart 3.2). In the second quarter, international oil and other commodity prices registered a decline, while TL-denominated import prices increased in tandem with the rising exchange rate. However, the high base from the previous year was eliminated and the weak course of domestic demand, causing both consumer inflation and annual inflation in core indicators to decelerate.

Food inflation fell to 19.20% from 30% in this period and stood out as the main driver of the fall in consumer inflation. This is attributed to the unprocessed food group that recorded lower vegetable prices resulting from the ampler product supply. On the other hand, annual processed food inflation exhibited a negative outlook due mainly to bread, cereals and dairy products. Temporary tax cuts in durable goods were sustained in this period, and the waning lagged effects of the exchange rate and weak course of domestic demand caused annual core goods inflation to decline further. Despite the depreciation in the Turkish lira, annual energy inflation went down again amid the decline in oil prices as well as administered energy prices such as municipal water. Given the upside effects of the backward-indexation, brisk tourism demand, the exchange rate and real unit labor costs, services inflation remained relatively high, despite a limited fall due to the languishing domestic demand.

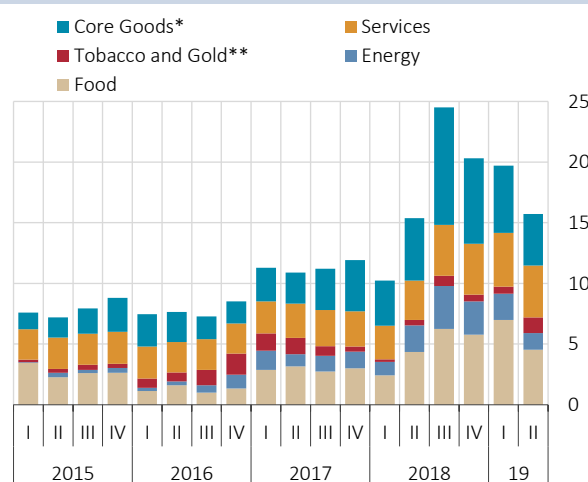
Chart 3.1: CPI and D Index* (Annual % Change)



Source: TURKSTAT.

* CPI excl. Unprocessed Food and Alcohol-Tobacco

Chart 3.2: Contribution to Consumer Inflation (% Points)



Source: CBRT, TURKSTAT.

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

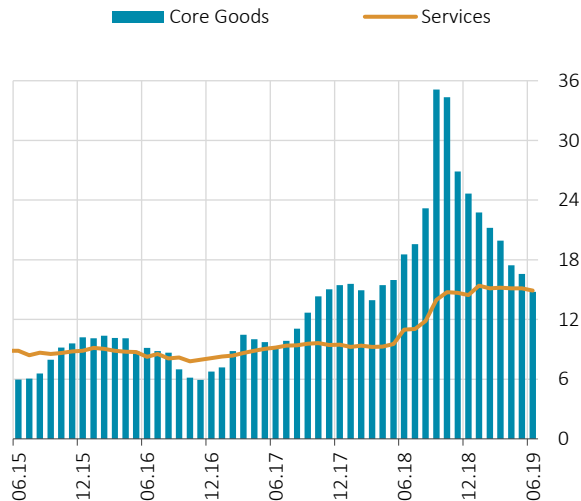
** Tobacco and Gold: Alcoholic beverages, tobacco products and gold.

In sum, despite the depreciation in the Turkish lira in the second quarter of the year, prospects for consumer inflation improved on the back of the deceleration in unprocessed food inflation, weak course of demand conditions and mild commodity prices. In July, annual inflation is projected to rise temporarily due to the expiry of temporary tax cuts in automobile, furniture and white goods sectors coupled with the price hikes in administered energy items such as electricity. Following July, the elimination of the notable base effect led by the depreciation in the Turkish lira in the previous year accompanied by the support from weak domestic demand are likely to pull consumer inflation further down. Current elevated levels of inflation expectations remain as upside risk factors to the inflation outlook, while the still languishing economic activity causes demand-driven downside risks to inflation to be manifest.

3.1 Core Inflation Outlook

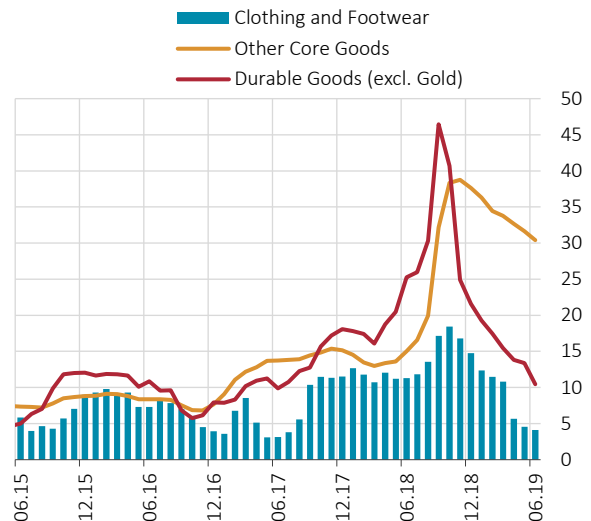
Annual core goods inflation was down by 5.13 points to 14.79% in the second quarter of the year (Chart 3.1.1). Waning cumulative exchange rate effects on annual inflation and sluggish economic activity underpinned this fall. In this period, price changes in the clothing sector lagged considerably behind seasonal averages, which stood out among subgroups, while all subgroups recorded further decreases in annual inflation (Chart 3.1.2). On the other hand, the depreciation in the Turkish lira in this period limited a more favorable outlook in annual core goods inflation.

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.

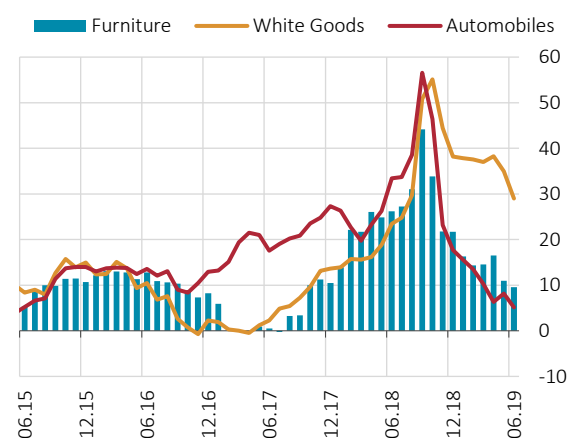
Annual inflation in durable goods receded by 5.01 points in the second quarter to 10.44%. Automobile prices surged (by 5.95%) in this period, while white goods and furniture prices recorded relatively limited increases (Table 3.1.1). Automobile sales contracted more than 40% in the first six months of 2019 year-on-year; domestic sales of white goods shrank by 9.3% in the same period. These figures suggest that domestic demand still remains sluggish. On the other hand, as the white goods sector is export-oriented, production in this sector followed a flat course, which caused the deceleration in annual white goods inflation to remain more limited compared to other durable goods items (Chart 3.1.3). At the end of June, temporary tax cuts in the automobile, white goods and furniture groups expired, which is expected to give a push to annual inflation in these groups in July. Another sub-item, the clothing group, registered price increases in the new season far below seasonal averages in April, and a similar trend appeared in the following months. In other core goods, price increases gained some pace in this period due to the weak course of the Turkish lira.

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

	2018				2019		
	II	III	IV	Annual	I	II	Annual
CPI	6.23	9.34	0.78	20.30	2.27	2.69	15.72
1. Goods	7.16	10.72	0.55	22.68	1.87	2.29	16.01
Energy	5.60	12.34	-0.25	20.82	-1.62	0.20	10.46
Food and Non-Alcoholic Beverages	7.29	6.17	3.56	25.11	10.01	-1.45	19.20
Unprocessed Food	12.50	2.68	3.10	27.09	18.98	-8.46	15.31
Processed Food	2.22	9.91	4.02	23.22	1.56	6.28	23.41
Core Goods	8.67	14.64	-0.81	24.67	-2.96	4.02	14.79
Clothing and Footwear	15.04	-0.95	10.85	14.75	-12.26	8.06	4.10
Durable Goods (excl. gold prices)	8.22	20.84	-10.69	21.57	-1.15	3.53	10.44
Furniture	5.46	18.65	-9.39	21.71	1.00	0.89	9.55
Electrical and Non-Electrical Devices	4.87	20.52	-1.00	26.87	-0.98	0.84	19.14
Automobiles	11.11	22.41	-17.09	17.72	-2.25	5.95	5.12
Other Durable Goods	5.98	14.45	4.44	31.44	1.39	2.59	24.33
Core Goods excl. Clothing and Durable Goods	4.74	17.30	7.36	37.63	1.42	2.09	30.39
Alcoholic Beverages, Tobacco Products and Gold	3.15	6.76	-2.67	8.65	1.96	14.86	21.70
2. Services	3.93	5.85	1.39	14.46	3.29	3.67	14.92
Rent	2.20	3.14	1.96	9.61	2.46	2.28	10.20
Restaurants and Hotels	4.40	9.15	2.26	19.81	2.64	5.49	20.84
Transport	4.48	7.52	-1.73	11.70	0.28	4.91	11.15
Communication	6.45	1.45	2.57	9.96	1.54	0.77	6.47
Other Services	3.51	5.55	1.27	15.56	5.86	3.32	16.91

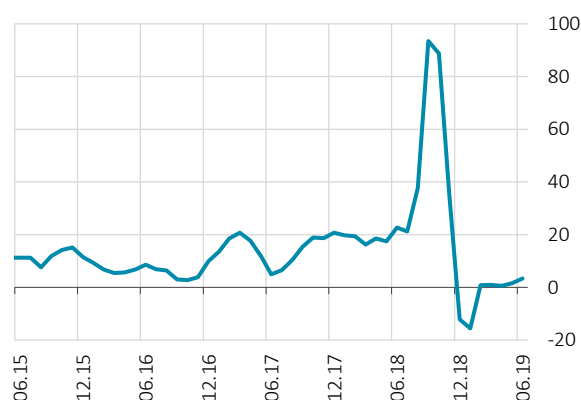
Source: TURKSTAT.

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



Sources: CBRT, TURKSTAT.

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

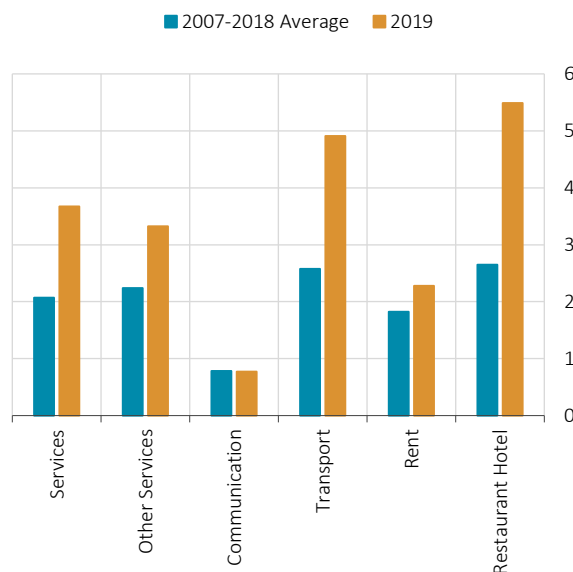


Sources: CBRT, TURKSTAT.

In this period, the underlying trend of core goods inflation registered moderate figures (Chart 3.1.4). The languishing economic activity stands out as the most significant factor to support this outlook. Probable price hikes following the expiry of temporary tax cuts are expected to pull the demand for durable goods lower still. In the upcoming period, core goods inflation accommodates strong downside base effects, yet the size of this fall will depend on the course of cost factors, primarily the exchange rate.

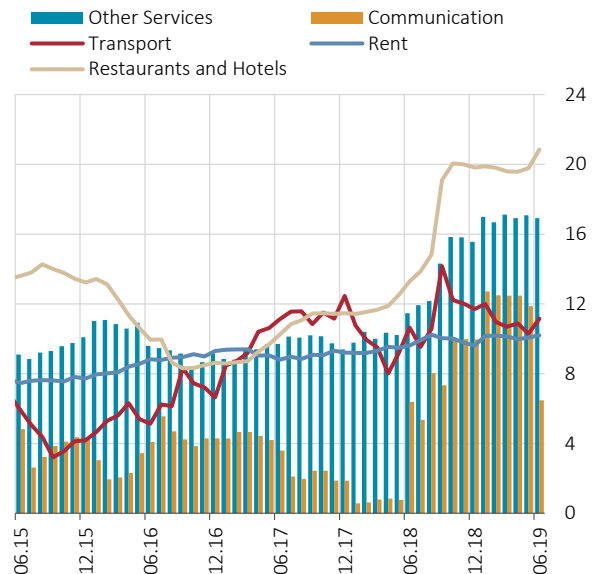
Prices of services picked up by 3.67% in the second quarter, while the group's annual inflation inched down by 0.29 points to 14.92% (Chart 3.1.1 and Table 3.1.1). Quarterly rates of price increases in services stood above past averages in subgroups other than communication services (Chart 3.1.5).

Chart 3.1.5: Prices of Services by Subcategories (Q2 % Change)



Source: TURKSTAT.

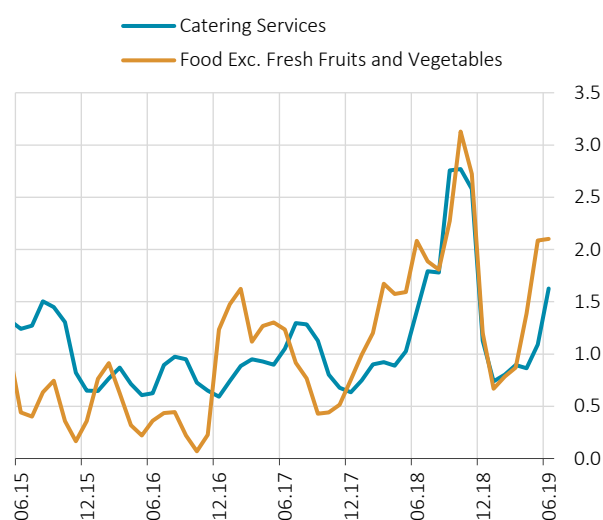
Chart 3.1.6: Prices of Services by Subcategories (YoY % Change)



Source: TURKSTAT.

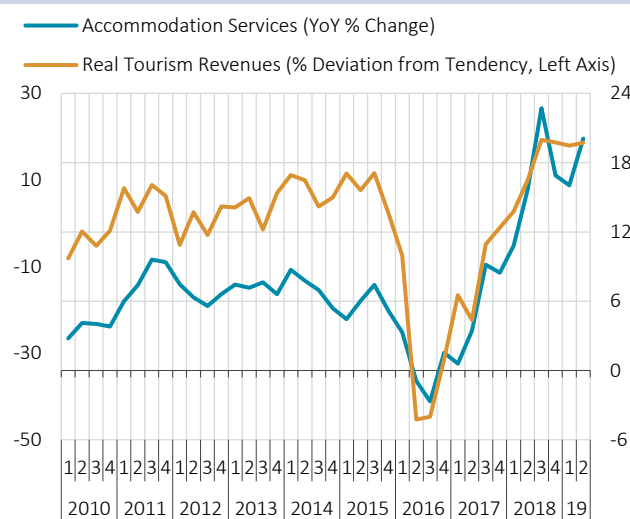
Among subcategories of services, annual inflation went down in communication services, but up in restaurants-hotels and transport services. Meanwhile, other services and rent registered almost unchanged figures in annual inflation (Chart 3.1.6). In this period, the annual communication inflation tumbled by 6.01 points to 6.47% due to the base effect. Quarterly inflation in the restaurants-hotels group stood above the average (Chart 3.1.5). This was led by demand conditions shaped by the brisk tourism, which affects prices in both the catering services and accommodation services, as well as the outlook for food prices (Charts 3.1.7 and 3.1.8). Indirect effects of price hikes led by cumulative cost pressures in certain food products proved rather evident in catering services. Quarterly price increases in transport services were driven mainly by highway intercity passenger transport fares. As for other services, price increases in items sensitive to exchange rate developments such as package tours and health services in addition to labor-intensive items (maintenance-repair, household services, barber-hairdresser etc.) remain high. Due to the backward-indexation behavior, the uptrend in education services inflation continued. In sum, despite the sluggish economic activity, prices of services in the second quarter were shaped by the effects of the cost factors such as the exchange rate, real unit labor costs and food as well as the brisk tourism demand and annual services inflation remained relatively high.

Chart 3.1.7: Catering Services and Food Prices
(3-Month Average of Monthly % Changes)



Sources: CBRT, TURKSTAT.

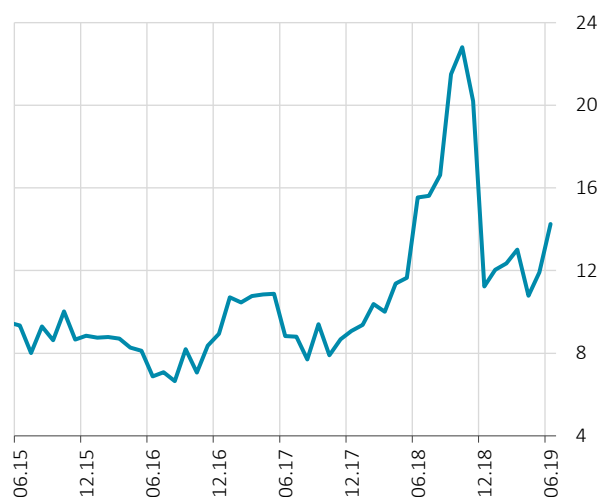
Chart 3.1.8: Prices of Accommodation Services and Tourism Revenues



Sources: CBRT, TURKSTAT.

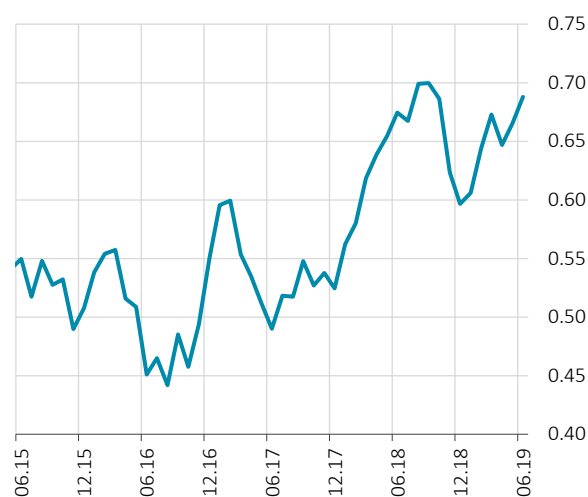
Against this background, in the second quarter of the year, underlying trend of services inflation, which is captured by the seasonally-adjusted three-month averages, sloped upwards and the tendency to increase prices, which is captured by the diffusion index, strengthened across subgroups (Charts 3.1.9 and 3.1.10). The high levels of these indicators suggest that the deterioration in the pricing behavior in the services group continued in the second quarter.

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)

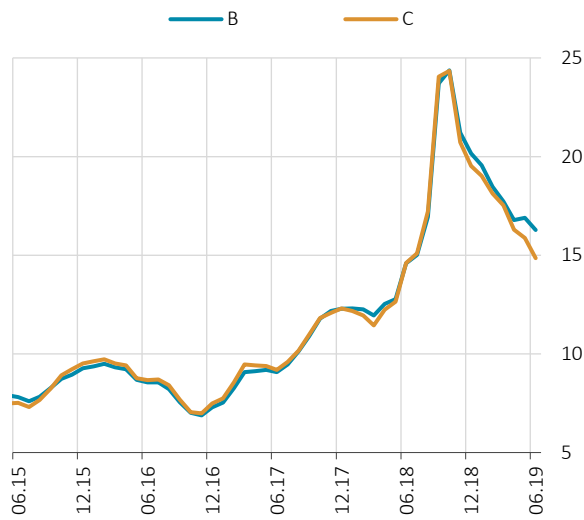


Sources: CBRT, TURKSTAT.

* 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.

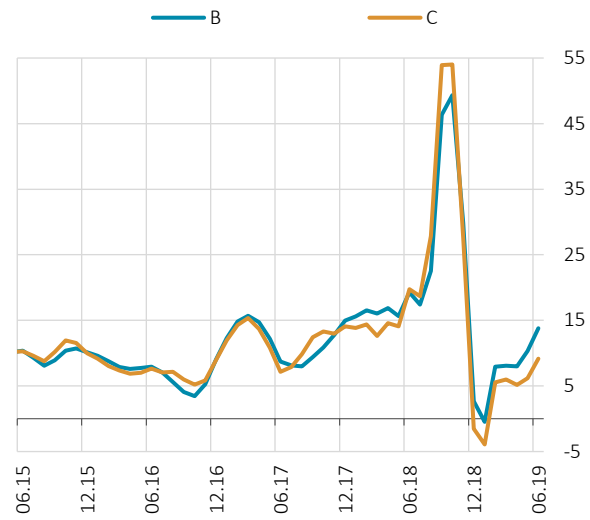
In the second quarter of the year, due mainly to the deceleration in core goods, annual inflation in core indicators B and C indices decreased by 1.44 and 2.67 points to 16.28% and 14.86%, respectively, on a quarterly basis (Chart 3.1.11). The underlying trends of core inflation indicators picked up in this period due to the depreciation in the Turkish lira and the realization of postponed price increases in certain products (Chart 3.1.12).

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



Source: TURKSTAT.

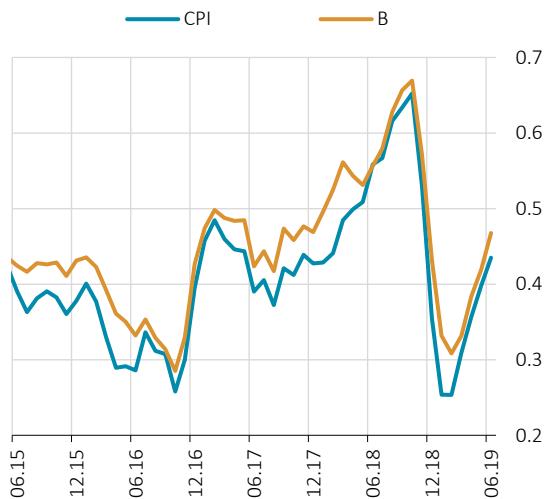
Chart 3.1.12: B and C Indices (Seasonally Adjusted, Annualized 3-Month Average % Change)



Sources: CBRT, TURKSTAT.

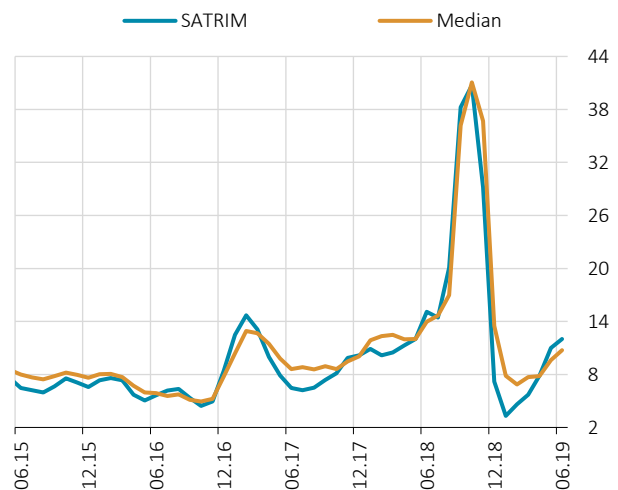
The tendency for price hikes was higher than in the previous quarter, as captured by the diffusion indices for CPI and core indicators (Chart 3.1.13). A similar pattern to that of diffusion indices appeared in the underlying trends of SATRIM and Median – alternative indicators of core inflation monitored by the CBRT (Chart 3.1.14). In sum, the indicators monitored for tendency and pricing behavior suggested some increase in the underlying trend of inflation in the second quarter, but the underlying trend remained below annual consumer inflation.

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

Annual inflation in food and non-alcoholic beverages, which was 29.77% in March, fell by 10.57 points to 19.20% in the second quarter (Chart 3.2.1). This was led by unprocessed food on account of falling prices of vegetables, while annual processed food inflation increased (Chart 3.2.2). The course of food prices was shaped by favorable supply conditions and the high base stemming from the previous year coupled with exchange rate developments and the effect of postponed cost increases in certain products on prices. In this period, annual inflation plummeted in fresh fruits and vegetables but remained flat in food excluding fresh fruits and vegetables (Chart 3.2.3).

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

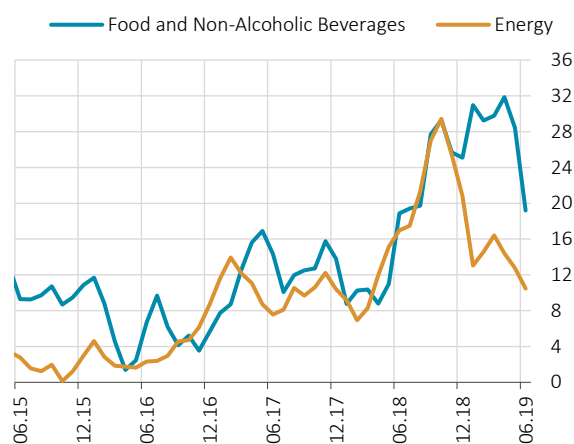
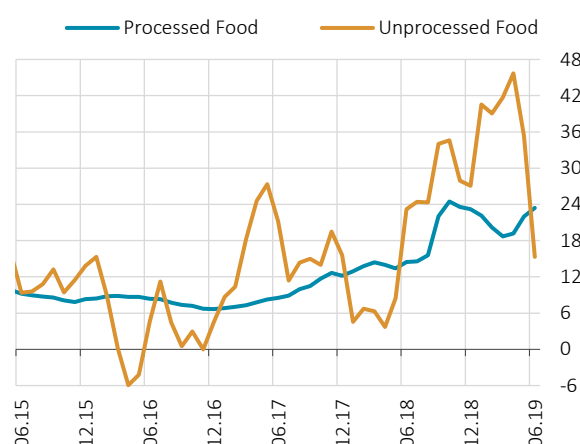


Chart 3.2.2: Food Prices (Annual % Change)



Annual unprocessed food inflation tumbled by 26.40 points on a quarterly basis to 15.31% (Chart 3.2.2). In this period, annual inflation in fresh fruits and vegetables went down to 11.48% due to the base effects as well as the decline in May and June vegetable prices that was above historical averages parallel to the supply of new products (Chart 3.2.3). Positive effects of the supply of new products spilled over into potato prices in the other unprocessed food group, while egg prices in this group declined due to increased domestic supply stemming from weak exports. On the other hand, price increases in white and red meat were notable in this period. Meanwhile, the National Dairy Council raised raw milk purchasing prices from 1.7 TL to 2 TL per liter as of May, which had instant effects on milk prices.

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

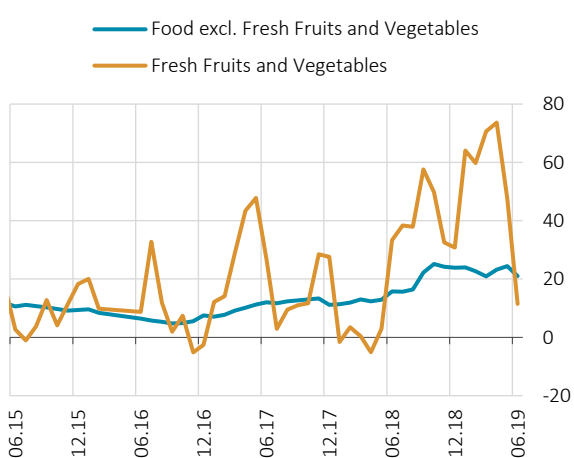
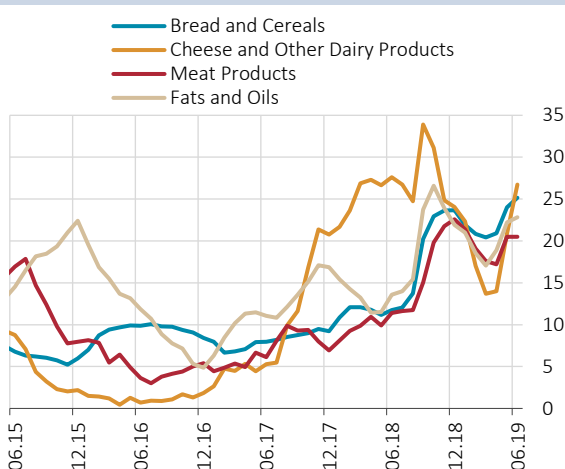


Chart 3.2.4: Selected Processed Food Items (Annual % Change)

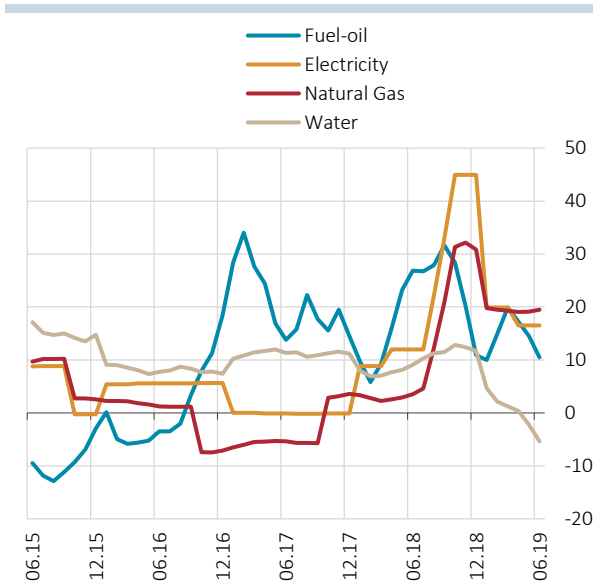


After a downtrend in the first quarter of the year, annual processed food inflation picked up by 4.72 points to 23.41% in the second quarter (Chart 3.2.2). This rise was driven by exchange rate developments and prices of unprocessed food such as milk and meat used as input. Parallel to the rise in raw milk reference prices, cheese and other dairy products experienced soaring prices, and postponed cost pressures in the bread-cereals group, chiefly bread, reflected into prices in May and June. In this period, surging meat prices pushed processed meat prices up, and developments in raw milk prices and the exchange rate stimulated the fats and oils group (Chart 3.2.4). In addition, processed tea and sugar prices were raised by 15 and 16%, respectively. These price hikes are expected to appear in consumer prices as of July through the processed food channel.

Prices of tobacco products surged by 17.88% in the second quarter due to the rising ad valorem SCT. In early July, the lump-sum and minimum lump-sum SCT on tobacco and alcoholic products increased due to the automatic adjustment that is indexed to the six-month change in D-PPI. This constitutes a risk to the prices of tobacco products.

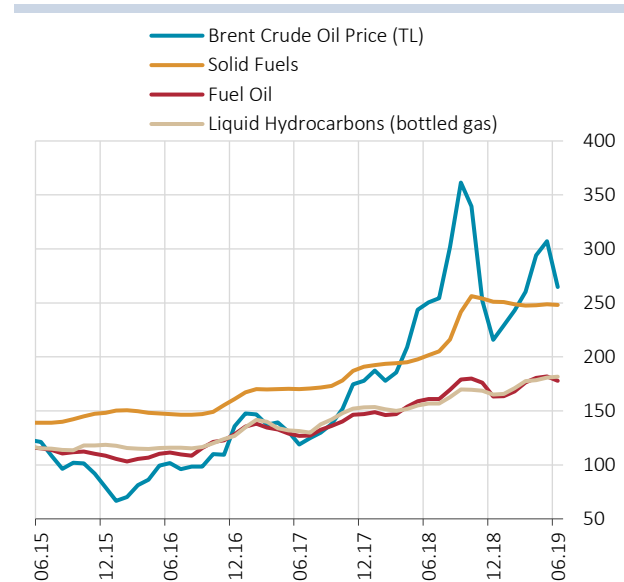
Energy prices inched up in the second quarter (Table 3.1.1). In this period, electricity and natural gas prices among administered items remained almost unchanged, while municipal water tariffs fell by 3.20% and annual inflation in this group stood at -5.37% (Chart 3.2.5). Brent crude oil for barrel, which was USD 66 at the end of the previous quarter, exceeded USD 70 in April and May and went down to USD 63 in June. On the other hand, the Turkish lira depreciated in this period. Thus, bottled gas prices rose by 2.28% quarter-on-quarter, while the rise in fuel prices remained limited due to the sliding scale tariff (Chart 3.2.6). As a result, annual energy inflation went down by 5.95 points to 10.46% in this period (Chart 3.2.1). On the other hand, to be effective from 1 July, 2019, electricity prices were raised by 15%. Soaring electricity and natural gas prices have not only direct but also indirect effects on consumer inflation. Box 3.1 entails an analysis of such effects.

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

Having risen by 5.83%, domestic producer prices (D-PPI) recorded an overall increase in the second quarter (Table 3.3.1). As for the international commodity market, developments in oil and metal prices had positive repercussions on producer prices in this quarter, while the depreciation in the Turkish lira had negative effects. On the other hand, annual producer prices inflation declined by 4.60 points from the previous quarter to 25.04% due to the base effects (Chart 3.3.1).

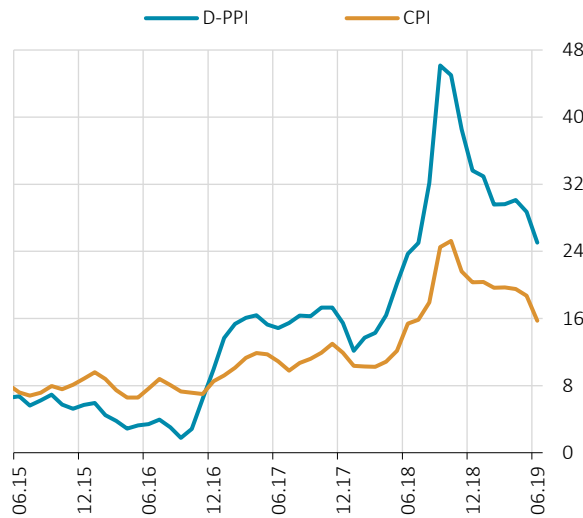
Table 3.3.1: D-PPI and Sub-Categories (3-Month and Annual % Change)

	2018				2019		
	II	III	IV	Annual	I	II	Annual
D-PPI	9.72	20.29	-3.83	33.64	2.14	5.83	25.04
Mining	7.02	12.62	-3.14	24.34	5.72	5.92	22.15
Manufacturing	9.68	19.15	-4.44	31.11	2.68	5.34	23.15
Manufacturing excl. Petroleum Products	9.04	18.50	-3.48	30.95	2.42	5.51	23.60
Manufacturing excl. Petroleum and Base Metal Products	8.58	17.41	-2.16	30.81	2.61	5.49	24.34
Production and Distribution of Electricity and Gas	12.35	39.90	1.75	75.02	-5.24	14.30	54.20
Water Supply	3.17	3.65	2.02	9.13	-7.65	-1.74	-4.04
D-PPI by Main Industrial Groupings							
Intermediate Goods	10.24	22.02	-5.37	34.14	2.04	4.87	23.57
Durable Consumption Goods	6.69	14.90	-1.61	24.92	1.39	2.97	18.03
Durable Consumption Goods (excl. jewelry)	6.56	13.91	-1.08	24.31	1.19	2.72	17.12
Non-Durable Consumption Goods	7.61	12.56	-0.69	25.49	3.26	7.79	24.41
Capital Goods	8.39	19.63	-3.11	32.92	3.76	3.67	24.67
Energy	15.58	34.48	-6.06	57.13	-1.23	8.54	35.44

Source: CBRT, TURKSTAT.

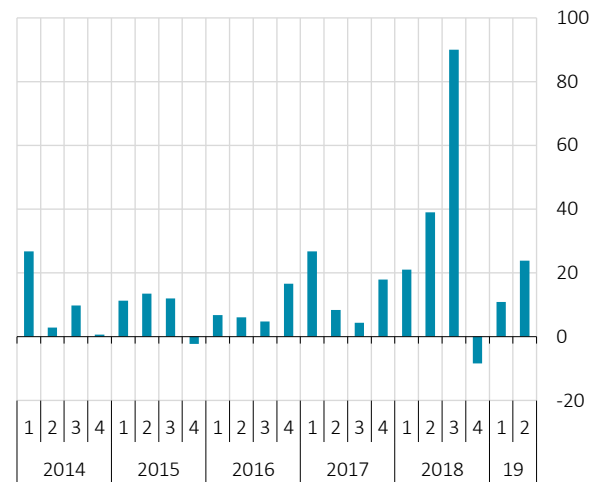
According to main industrial groupings, prices increased in all subgroups in this quarter, chiefly in the energy, non-durable consumption goods and intermediate goods groups (Table 3.3.1). Intermediate goods saw price increases mainly in iron-steel, textiles, plastic products, paper products, basic chemicals and prepared animal feeds. Prices of capital goods picked up due mainly to motor vehicles as well as parts and accessories, machines and metal construction products. Energy prices registered a strong increase in this quarter owing to gas manufacturing and electricity production, transmission and distribution. Durable consumption goods rose due to home appliances and furniture, while non-durable consumption goods recorded higher prices due mainly to the manufacture of processed food products. This increase in processed food manufacturing prices appeared also in consumer prices. Against this background, the underlying trend of manufacturing prices excluding petroleum and base metal, which entails information on the underlying trend of producer prices, continued to accelerate (Chart 3.3.2). All in all, producer-led cost pressures on consumer prices grew stronger quarter-on-quarter, yet the annual inflation in producer prices lost some pace on account of the base effect.

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



Source: TURKSTAT.

Chart 3.3.2: Manufacturing Prices excl. Petroleum and Base Metals (Seasonally-Adjusted, Annualized QoQ % Change)

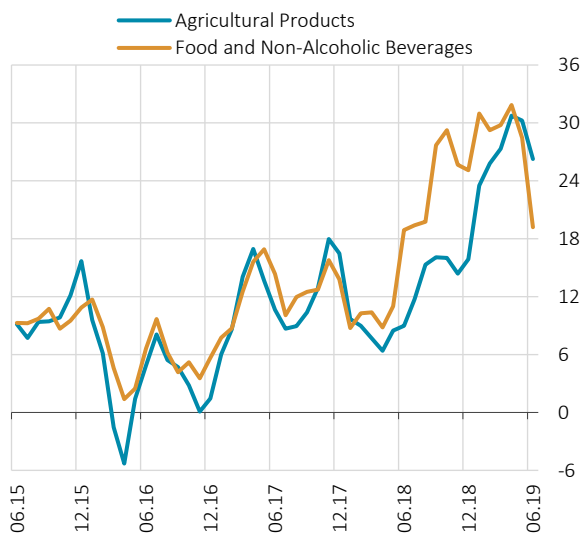


Source: CBRT, TURKSTAT.

3.4 Agricultural Producer Prices

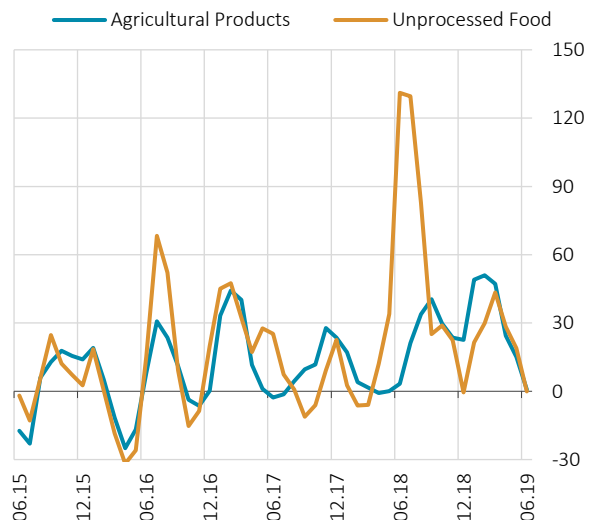
Annual inflation in agricultural producer prices receded by 1.07 points from the previous quarter to 26.26% in the second quarter of 2019 (Chart 3.4.1). This was led by falling prices across vegetables. Prices of tomato, eggplant, pepper, cucumber, potato and onion plummeted. Falling prices in vegetables reflected into consumer unprocessed food prices as well in this period. On the other hand, in the second quarter of the year, the fresh tea purchasing price was up 25%, and producer prices of milk trended upwards in tandem with the outlook for raw milk reference purchasing prices. Seasonally-adjusted three-month averages reveal that the underlying trends of both agricultural producer prices and unprocessed food prices declined to a large extent due to the developments in vegetable prices in this period (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 Unprocessed Food (Seasonally Adjusted, Annualized 3-Month Average % Change)

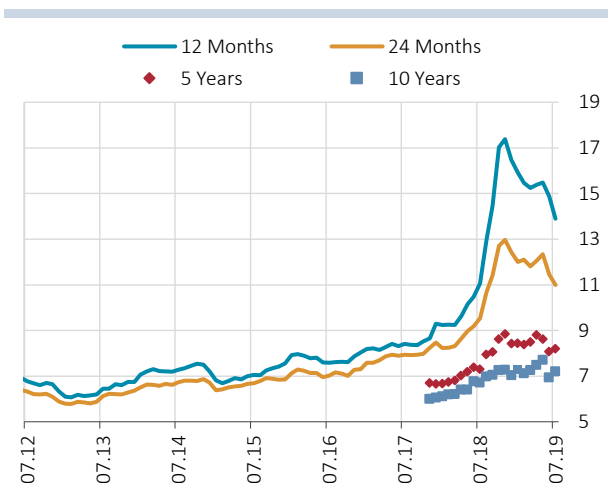


Sources: CBRT, TURKSTAT.

3.5 Expectations

Amid falling inflation in the second quarter of 2019, inflation expectations maintained the downtrend. The year-end inflation expectation was 15.01% in July. Inflation expectations for the next 12 and 24 months were 13.90% and 11.00%, respectively (Chart 3.5.1). Meanwhile, 5-year and 10-year-ahead inflation expectations inched down, yet continued to hover above the medium-term inflation target. For the short term, inflation expectations were revised downwards from the previous quarter, but the downward revision for the medium term remained limited (Chart 3.5.2).

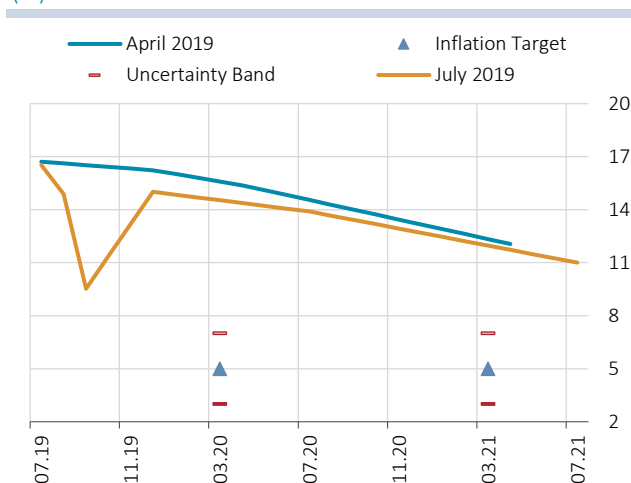
Chart 3.5.1: CPI Inflation Expectations* (%)



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* (%)

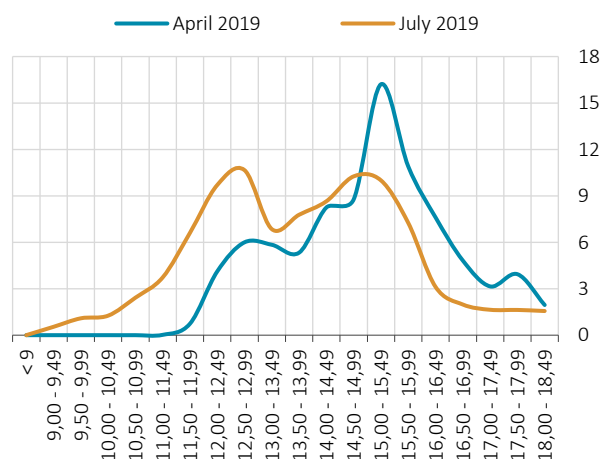


Source: CBRT.

* 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.

Probability distributions of inflation expectations suggest that 12-month inflation expectations diverged further and both 12-month and 24-month-ahead inflation expectations remain uncertain (Charts 3.5.3 and 3.5.4).

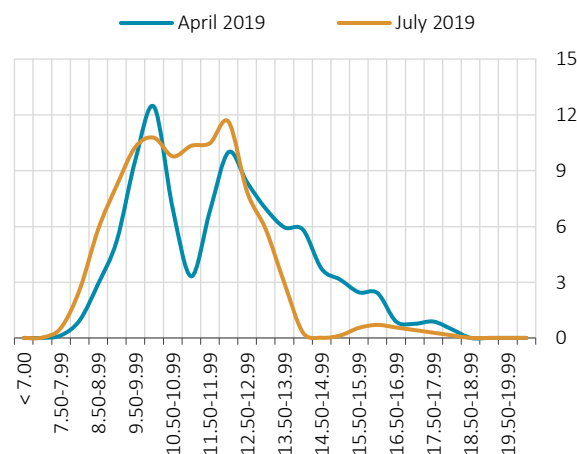
Chart 3.5.3: Probability Distribution of 12-Month-Ahead Inflation Expectations* (%)



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.

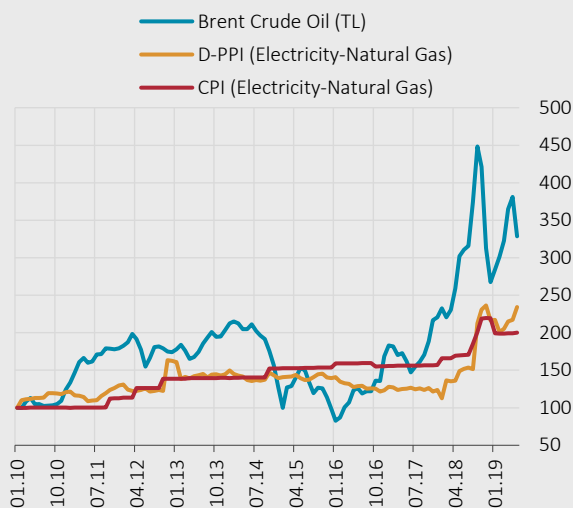
* Horizontal axis denotes the expected inflation rate, while the vertical axis denotes the respective probability. For further details, see Statistics/Tendency Surveys/Survey of Expectations/Metadata on the CBRT website.

Box 3.1

Indirect Effects of Electricity and Natural Gas Price Increases on Consumer Prices

As Turkey is a net energy importer, energy prices determined in international markets are considerable cost factors for domestic energy prices. Moreover, fluctuations in foreign exchange rates put additional pressure on the pass-through of these costs to domestic prices (Chart 1). Furthermore, energy prices have a significant share both in household expenditures and in the costs of the manufacturing industry and services sector firms (Chart 2).¹ In this respect, pricing of energy items differs from that of other goods and services to some extent. Looking at the general energy pricing policies in many countries we see that either the prices are directly determined - partly or fully- by the state or the state has an active role through tax policy in a fully-privatized energy market. In Turkey, for example, although fuel prices are determined in the free market, tax adjustments on final sales prices have a significant weight on fuel prices, or electricity prices are determined with the approval of the Energy Market Regulatory Authority (EPDK).

Chart 1: Oil, CPI and D-PPI Electricity-Natural Gas Prices (January 2010=100)



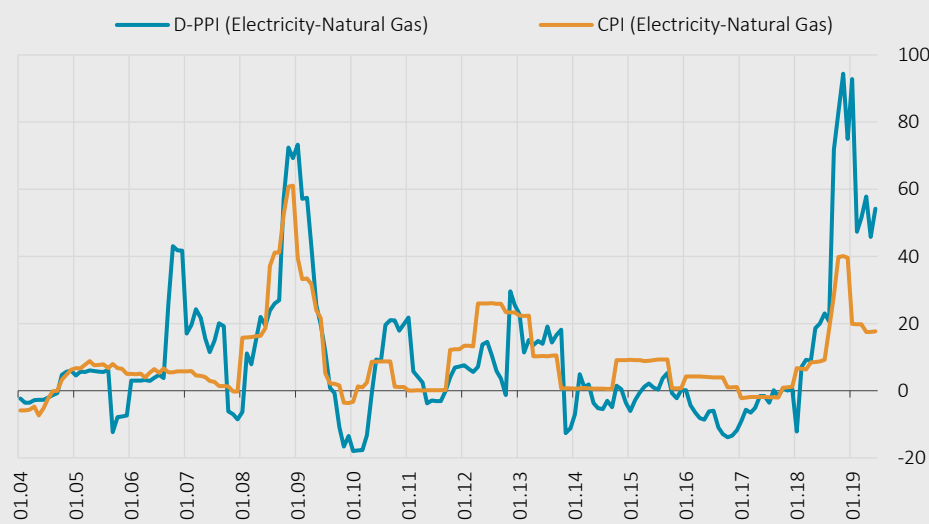
On the other hand, increases in electricity prices in industry affect manufacturing industry prices through the production costs channel, which in turn translates into consumer prices indirectly.

Secondly, increases in electricity and natural gas prices in the CPI may also have indirect effects on consumer prices. Even though the CPI includes only electricity and natural gas prices used in housing, for example, similar to price adjustments in housing, adjustments in energy prices in commercial establishments can be seen. Through this channel, indirect reverberations on the prices of groups such as services, core goods or processed food can be observed.

In this box, various Vector Autoregression (VAR) models are used to estimate the indirect effects of electricity and natural gas prices on consumer inflation. Indirect effects of the adjustments in energy prices on inflation are examined via the impulse response functions generated from these models. To estimate the indirect effects through the producer prices channel, a VAR model including TL-denominated crude oil prices, gas production prices, electricity production prices, output gap and manufacturing sector prices of the domestic producer index (D-PPI) respectively, is estimated. For an accurate identification of the effects, changes in the US dollar / Turkish lira exchange rate (with lagged values) are added to the model as exogenous variables. This model is expanded to include the prices of a different core consumer subgroup (processed food, core goods and services) each time, so that indirect effects of producer price adjustments on the main sub-groups of consumer prices can be calculated.

With the aim of estimating the indirect effects of changes in consumer prices of electricity and natural gas on the main groups of CPI excluding energy group, price indices including electricity and natural gas items are constructed for producers and consumers.³ In general, electricity and natural gas price adjustments for the industry and the consumers coincide (Chart 3). Therefore, it would be preferable to control producer prices while looking into the indirect effects of energy price adjustments for consumers.

Chart 3: CPI and D-PPI Electricity – Natural Gas Price Indices (Annual % Change)



Source: CBRT, TURKSTAT.

³ The use of aggregate indices was preferred both to keep the number of variables in VAR reasonable and to eliminate possible pass-through between these items. This implies that the size of indirect effects relative to direct effects is identical for these two items. Additional analysis indicates that this assumption is reasonable. In the calculation of the indirect effects of electricity and natural gas, the relative shares of these items in the aggregated index are taken into account.

To this end, we estimate VAR models which include crude oil prices in TL, producer electricity-natural gas prices, consumer electricity-natural gas prices, output gap and a sub-group of headline consumer index (processed food, core goods and services) at each time.⁴ The change in the US dollar/Turkish lira exchange rate again stays as an exogenous variable. Accordingly, indirect effects on consumer prices are obtained considering the main groups and the effects are then aggregated.

Indirect effects of producer and consumer price increases in electricity and natural gas on processed food, core goods and services are calculated by using the impulse responses from the models and are reported in Table 1.

Table 1: Impact of Electricity and Natural Gas Price Adjustments on Consumer Inflation (% Points)

<i>Response to a 10% Price Increase</i>		
Price increase in:	Direct Impact on CPI	Indirect Impact on CPI*
D-PPI Natural Gas	--	0.12 (0.10-0.13)
D-PPI Natural Electricity	--	0.15 (0.12-0.16)
CPI Natural Gas	0.18	0.12 (0.09-0.18)
CPI Natural Electricity	0.30	0.20 (0.15-0.29)

* Indirect effect shows the cumulative response at the end of one year. Values in parenthesis can be evaluated as lower and upper bands reflecting estimation and model uncertainty.

Accordingly, while the direct effects of a 10% increase in electricity and natural gas prices in CPI are 0.30 and 0.18 percentage points, respectively; the indirect effects of these increases on consumer prices are calculated as 0.20 and 0.12 points on average, respectively. However, based on estimation and model uncertainty, the indirect effect of adjustments in electricity prices could be between 0.15 and 0.29 points; adjustments in natural gas prices may also be in the range of 0.09 and 0.18 points.⁵ Meanwhile, the indirect effect a 10% increase in electricity and natural gas prices in D-PPI on consumer prices, through the production costs channel, is estimated to be in the range of 0.10-0.13 and 0.12-0.16, respectively. In sum, it is assessed that the indirect effect of electricity and natural gas price adjustments in CPI can amount to at least half of their direct effect.

References

Yüncüler, H.B. G. & Ögünç, F. (2015). “Firma Maliyet Yapısı ve Maliyet Kaynaklı Enflasyon Baskıları (Firm Cost Structure and Cost-Push Factors of Inflation)”, CBRT Working Paper, No. 15/03.

⁴ In some VAR models, the changes in producer electricity-natural gas prices are included as exogenous variables. All the models are estimated for the post-2010 period and models include stationary forms of the variables.

⁵ When estimating the indirect effects of electricity-natural gas increases in CPI, inferences regarding model and estimation uncertainty were made by introducing changes in producer prices in VAR models in different ways. In this box, core goods, services and processed food sub-groups, which fall within the scope of a core indicator -index B-, are taken into consideration to examine the indirect effects on consumer prices. However, indirect effects of electricity-natural gas on other energy items such as water and solid fuels; or on unprocessed food may also be observed. Considering such concerns as well as the model and estimation uncertainty, it may be argued that as an upper limit, the indirect effects of electricity and natural gas price increases on consumer inflation can be as strong as the direct effects.