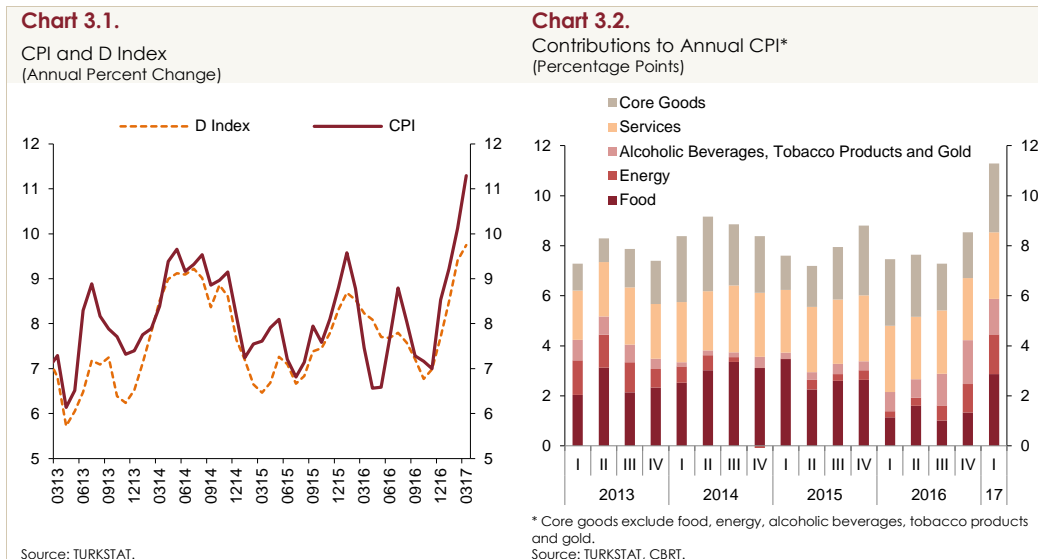


3. Inflation Developments

In the first quarter of 2017, consumer inflation increased by 2.76 points from end-2016 to 11.29 percent (Chart 3.1). This upsurge is attributed to the depreciating Turkish lira and higher import prices as well as soaring food prices. Meanwhile, annual inflation in D index¹ rose by 2.05 points to 9.75 percent. The higher increase in consumer inflation than the annual change in D index was mostly due to the base effect from unprocessed food prices.

In the first quarter, the tumbling Turkish lira had widespread effects across the CPI subcategories.² Food prices have been rising sharply since December amid harsh weather conditions, the depreciation of the Turkish lira and the recovery in exports of fruits and vegetables. The unfavorable weather conditions had a marked impact on prices of fresh fruits and vegetables, while changes in exchange rates and import prices were mostly passed through to other food products. Energy prices soared dramatically in the first quarter amid rising exchange rates and oil prices as well as the spike in administered prices of water. Despite tax reductions on certain products, core goods inflation accelerated due to the extensive exchange rate pass-through. Services inflation rose on the back of prices of transport services that reflected the lagged effects of higher fuel oil prices and prices of health services, maintenance and repair, which are sensitive to exchange rates. Thus, annual core inflation trended upward. Across subcategories, the contributions of food, core goods, energy and services to annual inflation rose by 1.5, 0.9, 0.5 and 0.2 points, respectively, while that of alcoholic beverages, tobacco products and gold was down 0.3 points (Chart 3.2). Hence, both core indicators and consumer inflation presented a widespread uptrend across subcategories.



In short, the first quarter was marked by considerable producer price pressures led by the lagged effects of the depreciating Turkish lira and soaring commodity prices as well as rising underlying trends of core indicators and the growing tendency to hike prices amid relatively improving demand conditions and higher expectations. The deteriorating inflation outlook poses additional risks for the

¹ CPI excluding unprocessed food, alcoholic beverages and tobacco products.

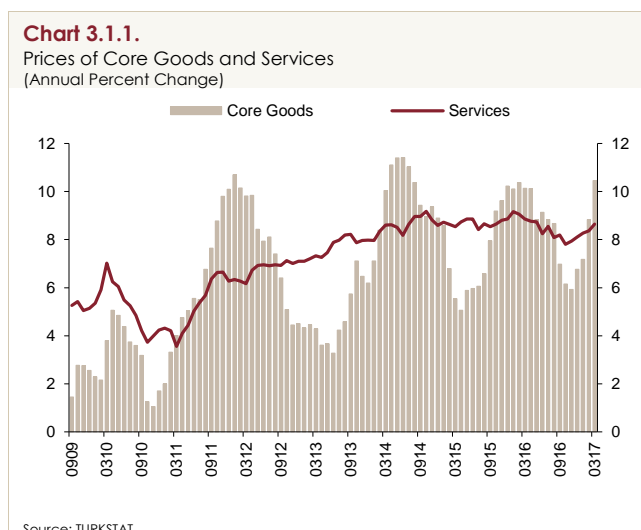
² Exchange rate changes are one of the key determinants of inflation dynamics. A historical analysis about exchange rates and other key determinants of inflation can be found in Box 3.1.

upcoming period. Moreover, the exchange rate volatility caused by international uncertainty adds to the pressure on inflation. Lastly, depending on the pace of economic recovery, inflation may also be subject to demand-driven downside risks.

3.1. Core Inflation Outlook

Annual core goods inflation increased by 3.69 points to 10.46 percent in the first quarter (Table 3.1.1, Chart 3.1.1). Thus, core goods provided the second largest contribution to consumer inflation after food prices. Prices surged across all subcategories amid the pass-through from the depreciating Turkish lira.

After a remarkable fall in the second half of 2016 due also to slowing domestic demand, clothing inflation jumped by 4.63 points to 8.54 percent in the first quarter.³ Manufacturing prices for textiles soared by about 16 percent over the last five months amid the weakening Turkish lira, which provides evidence for strong cost pressures on clothing. In this period, durable goods inflation was also on a dramatic rise despite temporary tax reductions. Meanwhile, prices of core goods excluding clothing and durables (other core goods) rose sharply due to both exchange rate effects and increased customs duties on certain goods (Table 3.1.1).



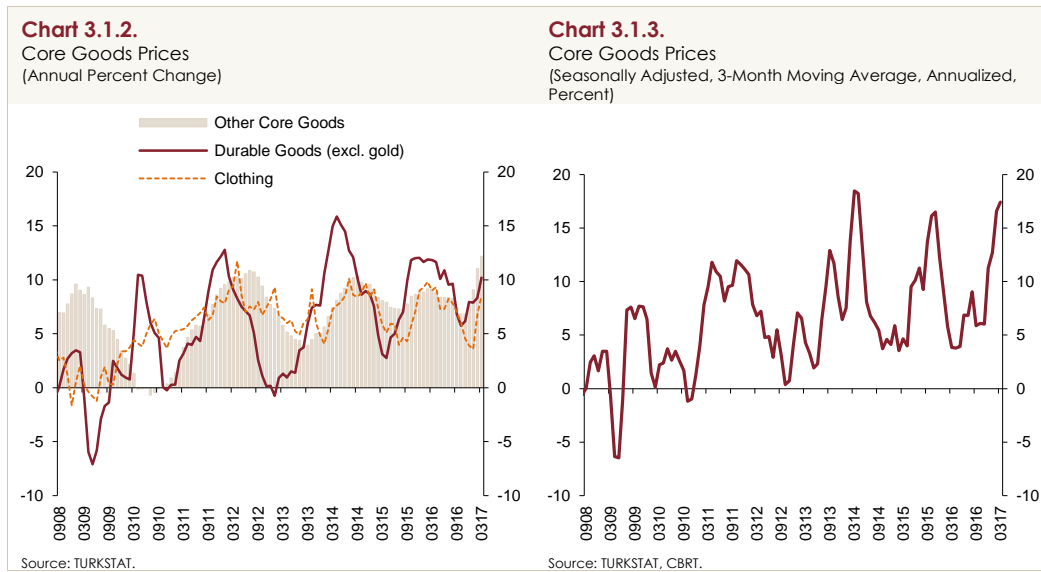
Prices of durable goods soared much faster than historical averages in the first quarter, driving annual inflation up by 2.27 points to 10.21 percent in this category (Chart 3.1.2). Prices of automobiles and other electrical and non-electrical appliances, which increased by 10.99 and 5.66 percent quarter-on-quarter, respectively, were the main drivers of price increases across durable goods. Automobile prices stood out with a 14.57 percent climb over the last five months due to the exchange rate and the end-November SCT hike. With the depletion of the 2016 model year inventory and the sale of 2017 model year automobiles, price increases may lose some momentum but will not stop. Meanwhile, the temporary tax cuts were only partly reflected on prices of furniture and home appliances owing to the Turkish lira's plunge.⁴ In fact, furniture prices dropped by 2.54 percent in the

³ The calculation of the clothing and footwear price index is based on a fixed weight as of 2017. The evaluation on the possible fluctuations that thus awaits clothing inflation throughout the year is presented in Box 3.2.

⁴ According to the Council of Ministers Decision No. 2017/9759 of 3 February 2017, the VAT applying to furniture was temporarily reduced from 18 percent to 8 percent and the SCT applying to home appliances and some small appliances was temporarily lowered from 6.7 to 0 percent until 30 April 2017. This reduced tax period is now extended until end-September.

first quarter whereas prices of home appliances increased by 0.38 percent. On the other hand, annual inflation hovered around zero for these two subcategories in the first quarter.

Furthermore, prices of other core goods saw a notable increase in the first quarter due to the exchange rate pass-through. The most pronounced price increases in this category were recorded in home maintenance and repair products, spare parts for transport vehicles, pharmaceuticals and household products. Moreover, the additional customs duty imposed on personal care products in early January put further pressure on prices in this category. Thus, annual inflation in other core goods hit an all-time high of 12.19 percent (Chart 3.1.2).



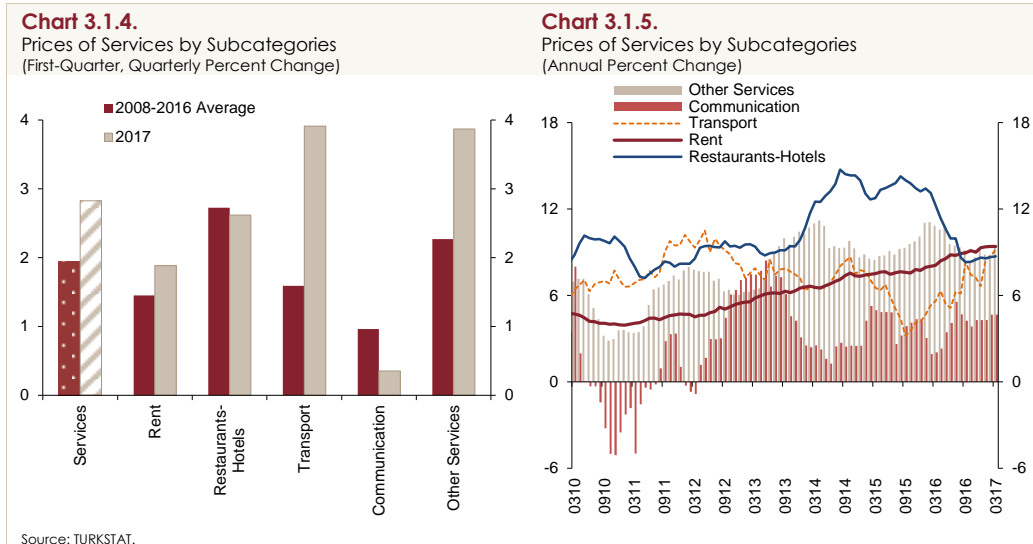
In conclusion, temporary tax reductions notwithstanding, the first quarter of the year was marked by a sharp upturn in the underlying trend of core goods prices because of the cumulative Turkish lira depreciation (Chart 3.1.3).

Table 3.1.1.
Prices of Goods and Services
(Quarterly and Annual Percent Change)

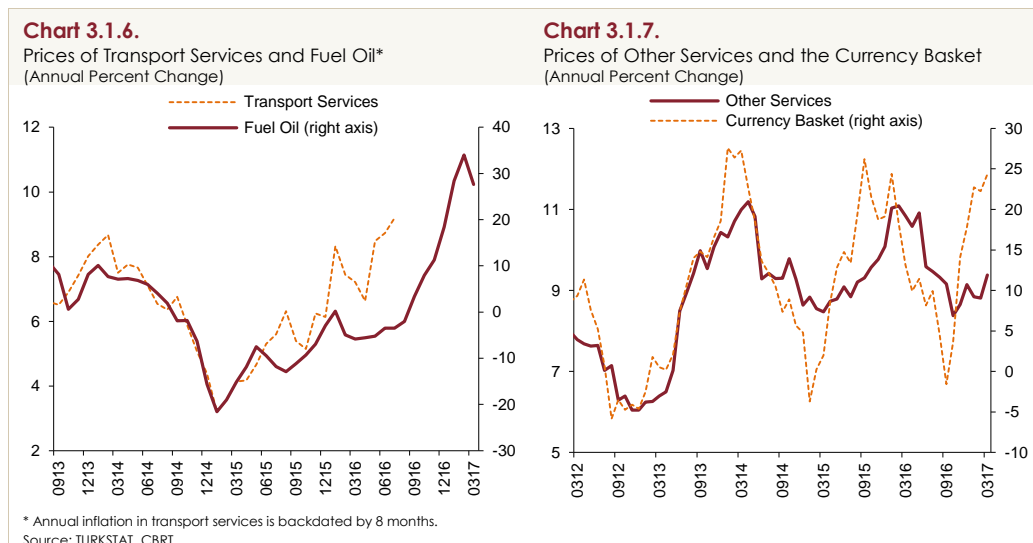
	2016					2017	
	I	II	III	IV	Annual	I	Annual
CPI	1.75	1.84	1.05	3.64	8.53	4.34	11.29
1. Goods	1.50	1.85	0.32	4.83	8.72	5.01	12.47
Energy	0.85	1.94	1.46	4.18	8.67	4.11	12.19
Food and Non-Alcoholic Beverages	2.65	-1.97	0.46	4.51	5.65	9.34	12.53
Unprocessed Food	2.49	-5.29	-0.48	8.19	4.52	15.98	18.28
Processed Food	2.80	1.00	1.25	1.46	6.67	3.39	7.28
Core Goods	-1.18	5.63	-2.54	4.95	6.77	2.23	10.46
Clothing and Footwear	-12.42	20.44	-12.06	12.02	3.92	-8.52	8.54
Durable Goods (excl. gold)	3.70	0.57	0.74	2.73	7.93	5.89	10.21
Furniture	5.72	1.03	0.98	0.38	8.27	-2.54	-0.19
Electrical and Non-Electrical Appliances	1.38	-1.04	-0.46	1.87	1.73	3.88	4.24
Automobile	4.95	1.28	1.45	4.71	12.91	10.99	19.40
Other Durable Goods	0.87	2.40	1.11	2.02	6.55	5.78	11.74
Core Goods (excl. clothing and durable goods)	2.06	1.48	1.44	2.49	7.68	6.34	12.19
Alcoholic Beverages, Tobacco Products and Gold	11.13	0.35	10.20	6.80	31.25	4.05	22.89
2. Services	2.32	1.83	2.71	1.03	8.11	2.83	8.64
Rent	1.80	2.48	2.49	2.23	9.30	1.89	9.40
Restaurants-Hotels	2.53	1.46	2.73	1.64	8.62	2.62	8.71
Transport	1.47	1.61	4.48	-1.01	6.63	3.91	9.20
Communication	0.00	1.87	1.69	0.67	4.29	0.35	4.66
Other Services	3.65	1.84	2.47	0.91	9.15	3.87	9.38

Source: TURKSTAT, CBRT.

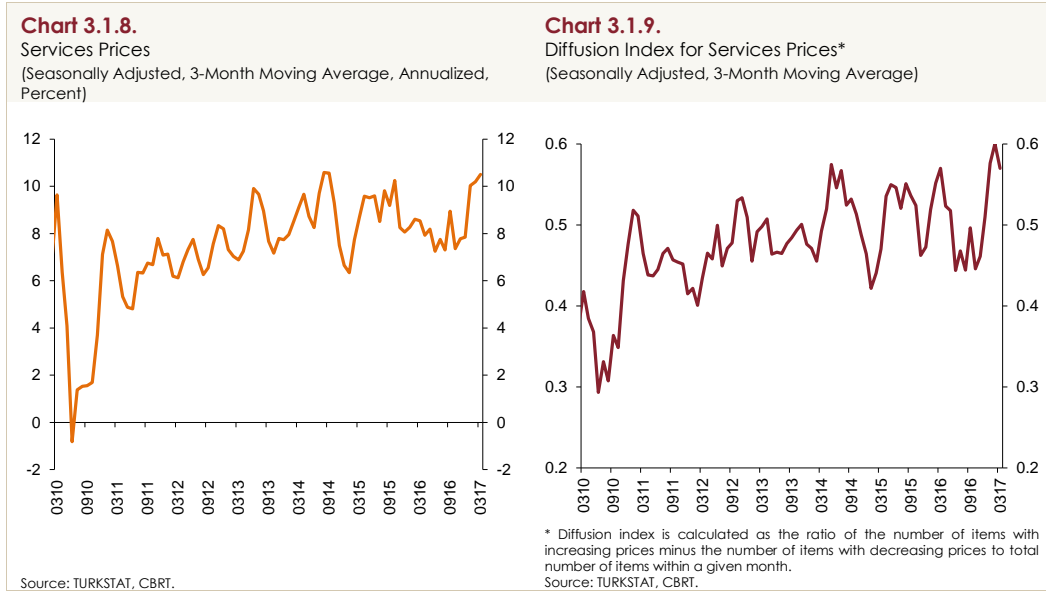
In the first quarter, prices of services increased at a faster clip than the fourth-quarter average by 2.83 percent, and annual services inflation rose to 8.64 percent (Charts 3.1.1 and 3.1.4). Price increases in transport, other services and rent were more striking than past averages. Annual inflation remained elevated across all subcategories excluding communication (Chart 3.1.5).



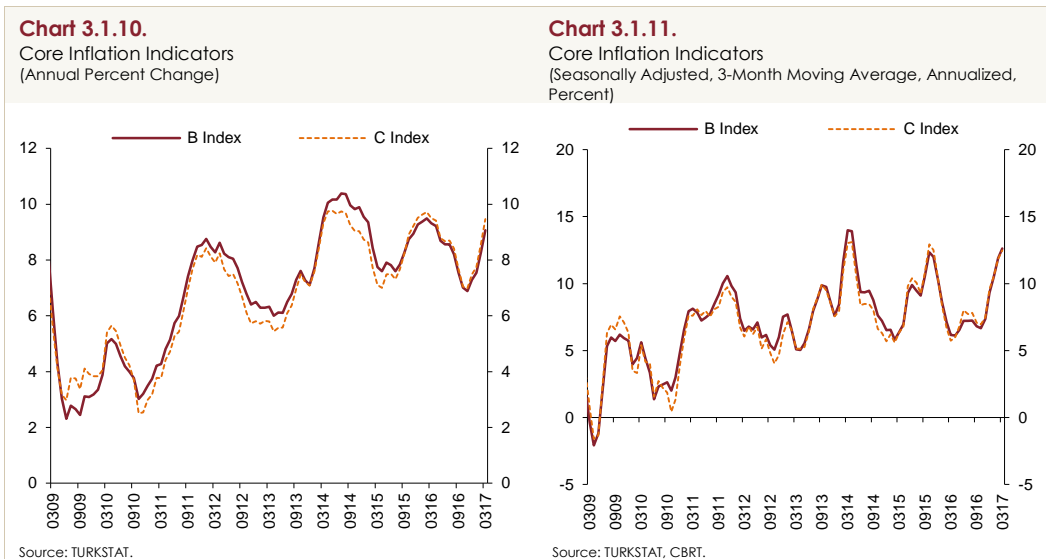
The analysis of the subcategories of restaurants-hotels shows that annual inflation rose to 9.75 percent in catering services amid soaring food prices but remained low at 0.60 percent in accommodation due to the weak demand in the tourism industry. In this period, transport services inflation increased dramatically because of the lagged effects of rising fuel oil prices (Chart 3.1.6). Meanwhile, other services inflation remained elevated, reaching 9.38 percent. In this subcategory, the largest price increases occurred in package tours, maintenance and repair and health services due to exchange rate developments, while education services inflation soared on account of the increase in headline inflation (Chart 3.1.7). Meanwhile, rent inflation, another key driver of the elevation in services inflation, continued to differ across regions, with Istanbul's annual rent inflation displaying a flat pattern in the first quarter after a long period of increase.



Accordingly, indicators for the underlying trend of services inflation saw an upturn in the first quarter. Both the underlying trend of inflation, which is captured by seasonally adjusted 3-month averages, and the price increasing tendency, which is implied by the diffusion index, recorded an increase (Charts 3.1.8 and 3.1.9). In this period, the cumulative depreciation of the Turkish lira had a negative impact on the inflation of services items, which are sensitive to the exchange rate. Hence, annual services inflation remained high due also to rising headline inflation and inflation expectations.

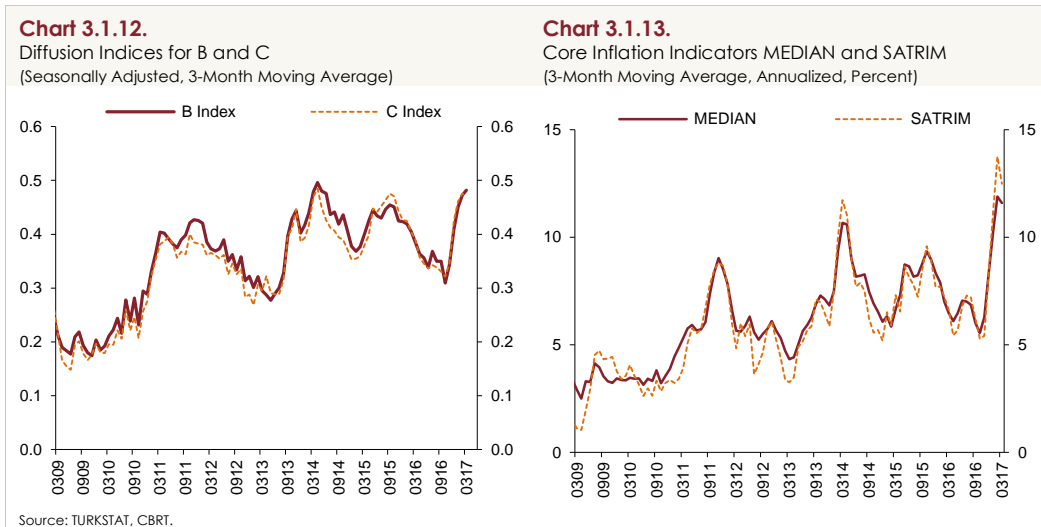


Annual inflation in core inflation indicators B and C posted a sharp quarter-on-quarter increase of 9.07 and 9.46 percent, respectively, on the back of the exchange rate pass-through to core goods and services inflation (Chart 3.1.10).⁵ Meanwhile, the uptrend of the underlying trend of core inflation indicators that started in December 2016 strengthened in the first quarter (Chart 3.1.11).



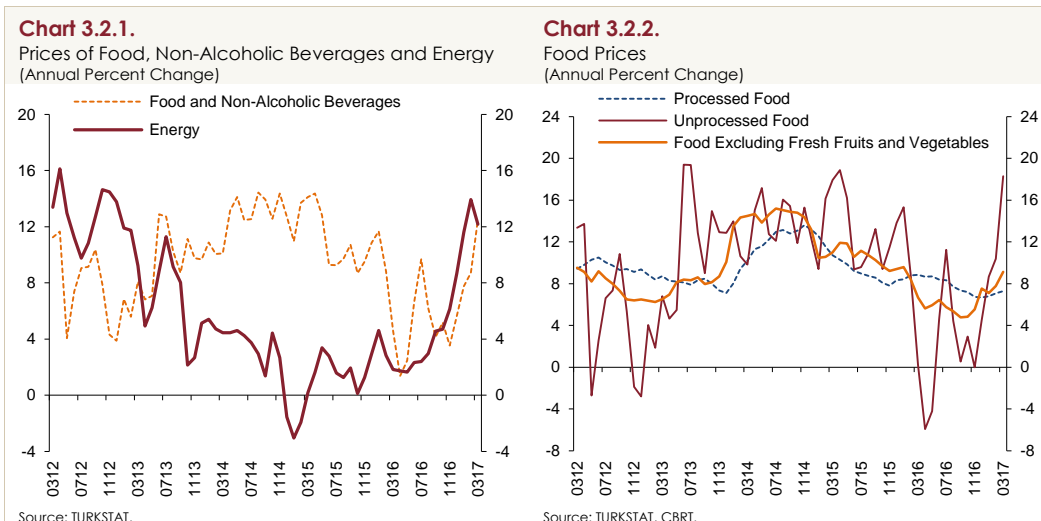
⁵ TURKSTAT's previous indices H and I were replaced with the new special indices B and C as of 2017.

The likelihood for prices to rise was significantly higher from the fourth quarter as captured by the diffusion indices for core indicators (Chart 3.1.12). SATRIM and MEDIAN, the alternative core inflation indices monitored by the CBRT, also showed a similar pattern (Chart 3.1.13). In sum, indicators for tendency and pricing behavior all pointed to an ongoing escalation in the underlying trend of inflation for the first quarter.



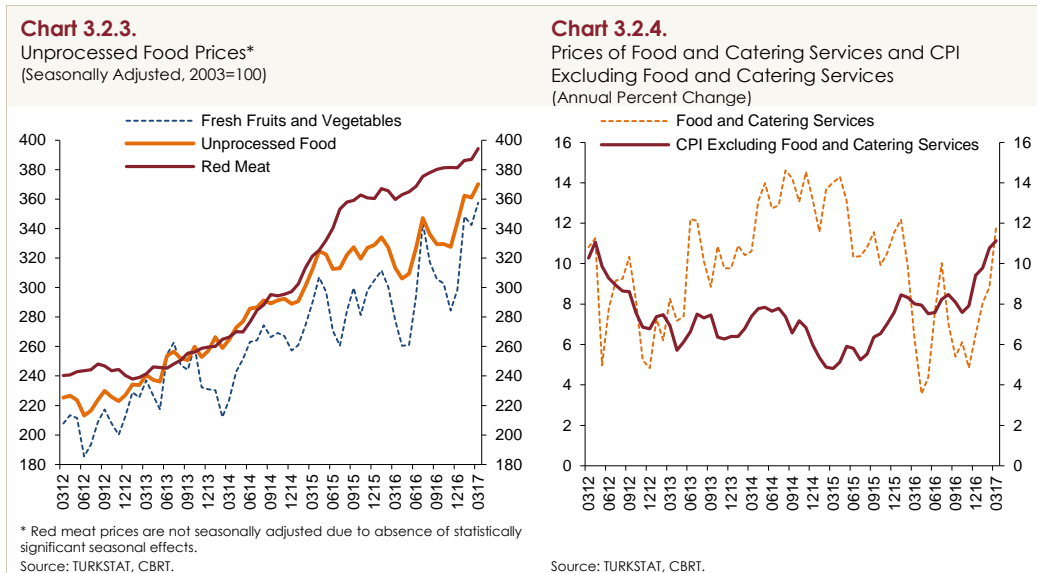
3.2. Prices of Food, Energy, Alcoholic Beverages and Tobacco Products

Annual food inflation soared by 6.88 points to 12.53 percent in the first quarter, rising slightly above January's forecast path (Chart 3.2.1). This upsurge in food inflation was mostly attributed to the low base effect from the previous year as well as to the crop loss that occurred in January across weather-stricken greenhouses (particularly around Mersin), the depreciating Turkish lira and the recently recovering exports of fruits and vegetables.



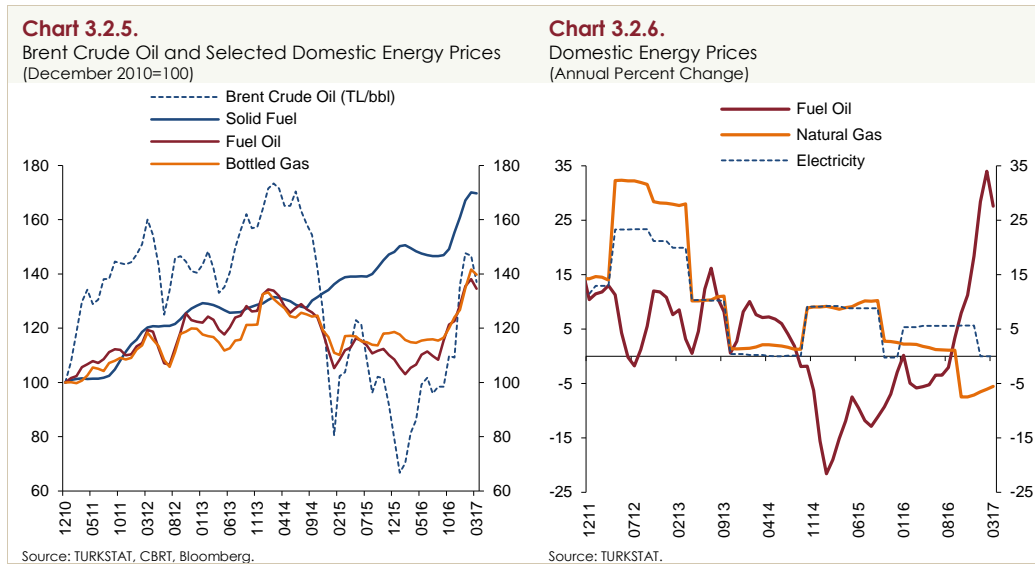
After a bright outlook in 2016, annual unprocessed food inflation jumped by 13.77 points in the first quarter of 2017 to 18.28 percent due to soaring prices of fresh fruits and vegetables and the low base effect, particularly from vegetable prices. After an acute climb in January, largely because of the

damage inflicted on vegetables by harsh weather conditions, seasonally adjusted unprocessed food prices inched down in February before returning to the upward track in March amid rising prices of fruits and vegetables. As a result, annual inflation in fresh fruits and vegetables hit 27.86 and 29.46 percent, respectively. Additionally, annual inflation in red meat amounted to 9.62 percent.



On the processed food front, annual inflation edged up by 0.61 points in the first quarter to 7.28 percent (Chart 3.2.2). Prices increased considerably across all subcategories during the first quarter. In particular, prices of oils and fats recorded a marked rise by 6.71 percent. Recent exchange rate developments had severe implications for processed food prices in the first quarter. In this period, annual inflation in food and catering services surged by 5.30 points to 11.79 percent, while consumer inflation excluding food and catering services was up 1.71 points to 11.14 percent (Chart 3.2.4). Bringing inflation down to target-consistent levels in food and food-related categories is critical. In this respect, actions taken by the Food Committee set an invaluable precedent.

Energy prices rose by 4.11 percent in the first quarter (Table 3.1.1). Having accelerated to 54 USD at the end of the fourth quarter, Brent crude oil prices remained elevated in the first two months after receding to 52 USD per barrel in March. On the other hand, bottled gas and fuel oil prices were up 10.32 and 4.69 percent, respectively, in the first quarter due to the quarterly increase in average oil prices and the depreciating Turkish lira (Chart 3.2.5). In this period, solid fuel prices rose by 5.53 percent. Among administered prices, electricity prices remained unchanged, while natural gas prices and municipal tap water prices increased by 1.95 and 6.73 percent, respectively (Chart 3.2.6). Thus, annual energy inflation soared by 3.52 points to 12.19 percent, and its contribution to consumer inflation rose by 1.35 points over the last twelve months (Chart 3.2).



3.3. Domestic Producer Prices

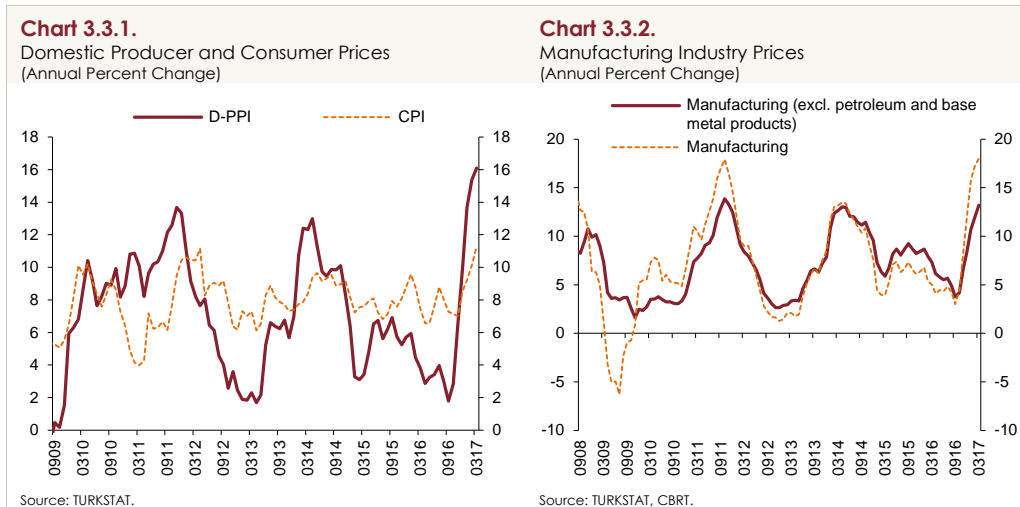
Domestic producer prices saw a manufacturing industry-induced hike of 6.38 percent in the first quarter. Meanwhile, annual D-PPI inflation rose by 6.15 points quarter-on-quarter to 16.09 percent (Table 3.3.1, Chart 3.3.1). Changes in exchange rates and import prices caused producer prices to exhibit sharp increases across all subcategories.

Table 3.3.1.
D-PPI and Subcategories
(Quarterly and Annual Percent Change)

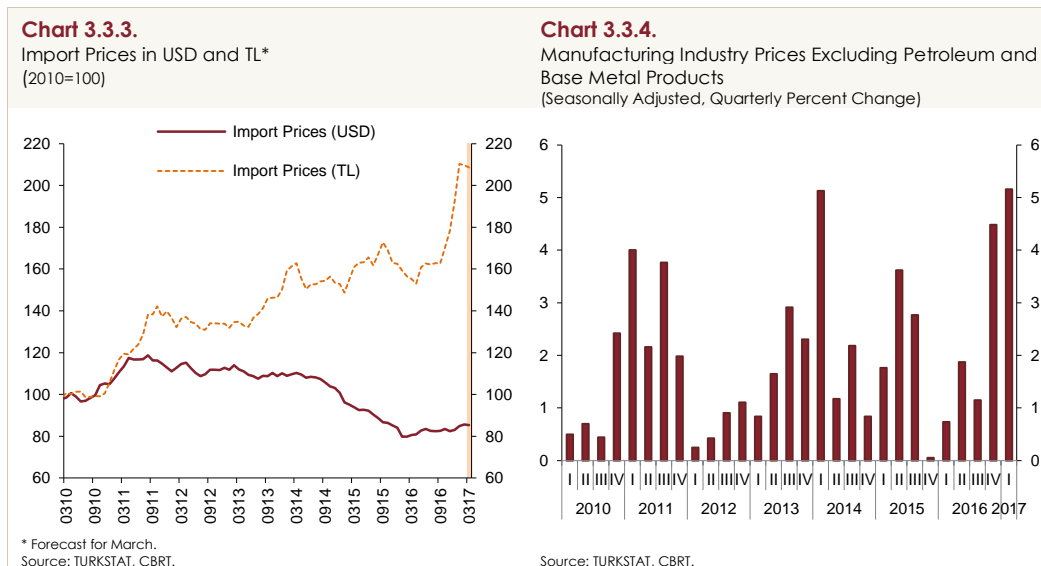
	2016					2017	
	I	II	III	IV	Annual	I	Annual
D-PPI	0.75	2.43	0.58	5.92	9.94	6.38	16.09
Mining	-1.36	6.49	-0.17	3.01	8.01	9.53	19.94
Manufacturing Industry	1.33	2.75	0.84	6.73	12.07	6.70	18.01
Manufacturing Industry (excl. petroleum products)	1.56	2.14	0.87	5.92	10.83	6.68	16.42
Manufacturing Industry (excl. petroleum and base metal products)	1.66	1.49	1.16	3.92	8.46	6.10	13.21
Electricity and Gas	-4.99	-2.96	-2.20	-2.17	-11.79	0.64	-6.56
Water	3.27	1.52	0.27	1.98	7.21	6.40	10.46
D-PPI by Main Industry Groups							
Intermediate Goods	1.19	2.59	0.43	9.17	13.83	8.21	21.73
Durable Goods	4.76	2.56	2.15	1.82	11.75	6.49	13.59
Durable Goods (excl. jewelry)	3.31	0.97	0.59	2.14	7.17	6.17	10.13
Non-Durable Goods	1.55	1.81	0.88	2.04	6.41	4.58	9.59
Capital Goods	1.59	1.03	1.61	4.82	9.32	5.96	14.01
Energy	-4.86	4.46	-1.31	6.57	4.53	4.00	14.26

Source: TURKSTAT, CBRT.

Manufacturing industry prices accelerated by 6.7 percent quarter-on-quarter, driving annual inflation up by 5.94 points to 18.01 percent in this category (Table 3.3.1, Chart 3.3.2). Similarly, manufacturing industry inflation excluding petroleum and base metal products registered a sharp rise (Chart 3.3.2). In this period, import prices posted an uptick in USD terms, but soared dramatically in TL terms amid developments in exchange rates (Chart 3.3.3).



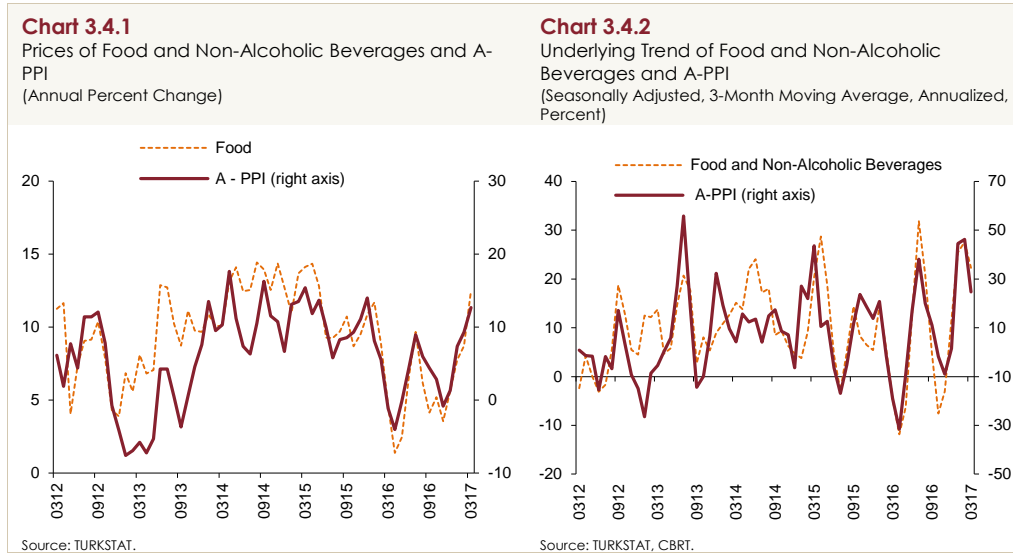
Main industrial subcategories experienced robust price hikes (Table 3.3.1). Prices of intermediate goods were mostly driven by rising prices of precious base metals, iron and steel, and threads and fibers used in textiles. Prices of durable goods rose on the back of furniture prices while prices of non-durable goods increased due to prices of textiles, apparels, meat products, oils and fats. Prices of capital goods were pushed up by prices of motor vehicles and metal construction while energy prices surged due to prices of refined petroleum products. Accordingly, the underlying inflation in manufacturing industry prices excluding petroleum and base metal products, which entails information on the underlying trend of producer prices, remained on the rise in this period (Chart 3.3.4). In sum, producer prices put strong cost pressures on consumer prices in the first quarter.



3.4. Agricultural Producer Prices

The agricultural producer prices soared by 6.96 percent in the first quarter, pushing annual A-PPI inflation up by 11.37 points to 12.70 percent (Chart 3.4.1). This jump in A-PPI inflation was largely driven by prices of fruits and more particularly by vegetables. In legumes, annual inflation remained on an upward track, hitting 33.1 percent in the first quarter. Prices of grains were also on the rise. Wheat prices

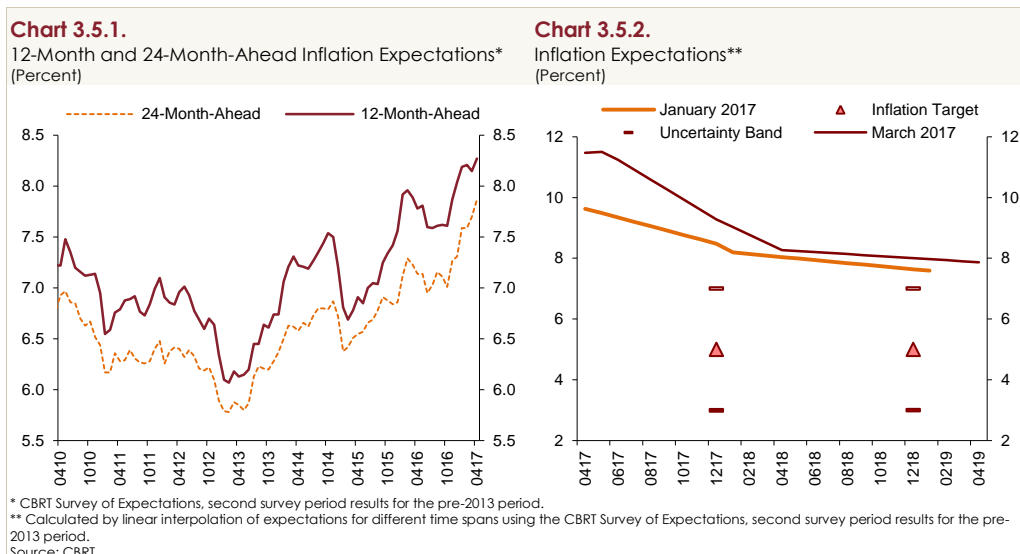
posted sharp increases in January and February before following an almost flat pattern in March. Moreover, live cattle prices remained on a solid uptrend.



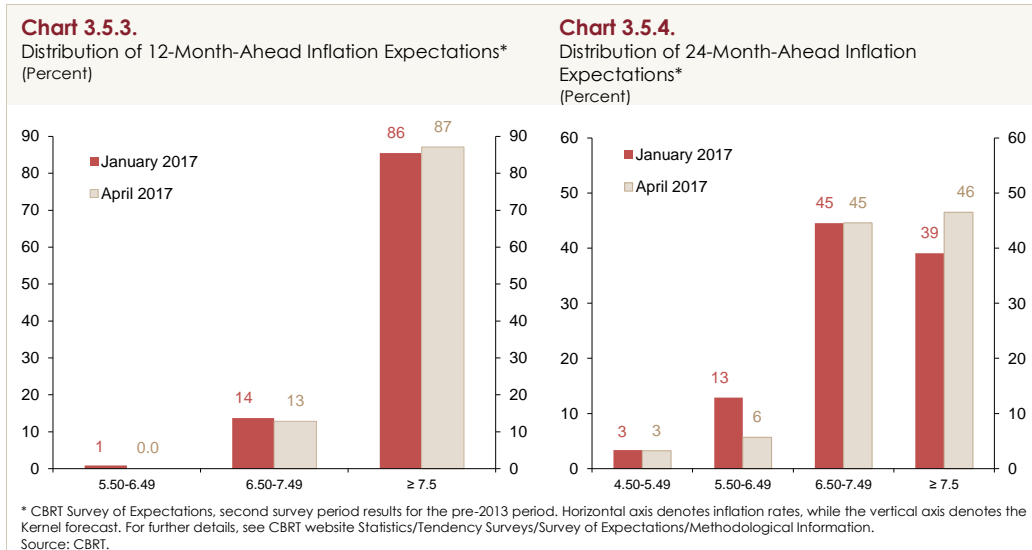
The underlying trend of A-PPI based on seasonally adjusted data in 3-month averages reveals a notable quarter-on-quarter upsurge, which was also evident in consumer prices for food and non-alcoholic beverages (Chart 3.4.2). Therefore, agricultural producer prices had a major influence on the rising consumer inflation for food.

3.5. Expectations

After a flat third quarter in 2016, medium-term inflation expectations rose in the fourth quarter due to the depreciating Turkish lira and deteriorated further amid rising inflation in the first quarter of 2017 (Chart 3.5.1). 12-month and 24-month-ahead expectations hovered substantially above the inflation target by standing at 8.27 and 7.87 percent, respectively, as of April (Charts 3.5.1 and 3.5.2). Across maturities, short-term inflation expectations were revised significantly up from the previous quarter, whereas long-term inflation expectations only edged up (Chart 3.5.2).



The dispersion of medium-term inflation expectations confirms the deterioration in inflation expectations compared to January (Charts 3.5.3 and 3.5.4). More specifically, the percentage of respondents expecting 24-month-ahead inflation to be between 5.5 and 6.49 percent is down as of April, whereas the percentage of those expecting it to be 7.5 percent or above has increased. The percentage of respondents expecting 24-month-ahead inflation to be above 6.5 percent rose to 91 percent, suggesting that the deterioration in inflation outlook was also fueled by worsening expectations (Chart 3.5.4).



Box
3.1

Changes in Inflation Dynamics

During the inflation targeting period from 2006 to 2016, annual consumer inflation remained high with an average rate of 8.2 percent exceeding the targets. Over the last three years, inflation hovered around 8.5 percent on average. An inquiry into the key drivers of the elevation in inflation is crucial to gain insight into policy options for maintaining price stability. This box shows the primary factors prevailing in inflation developments during the inflation targeting period and the changes in inflation dynamics with respect to the main determinants.^{6,7}

In order to analyze the changes in inflation dynamics over the years, a reduced-form Phillips curve is estimated with time-varying parameters. The dependent variable is the quarterly inflation rate of CPI excluding unprocessed food, alcoholic beverages, tobacco and taxes (CPIX). Explanatory variables include key macroeconomic indicators such as import prices in USD, exchange rates (USD/TL), output gap and real unit wages.⁸

A Preliminary Glance at Constant Parameter Phillips Curve Estimates

Before moving on to time-varying parameter model estimates, Table 1 presents the results of constant parameter model estimated through the least squares method.

Table 1. Estimation Results of Constant Parameter Model for Different Sample Periods

	(1)	(2)	(3)	(4)
Sample	2006Q2-2016Q4	2006Q2-2014Q4	2006Q2-2012Q4	2006Q2-2016Q4
c	0.90***	0.86***	0.85***	0.88***
π_{t-1}	0.28***	0.30***	0.34***	0.27***
$[gap_t + gap_{t-1}]/2$	0.09***	0.09***	0.10***	0.08***
Δe_t	0.08***	0.09***	0.08***	0.08***
Δe_{t-1}	0.02**	0.02**	0.02	0.03***
Δe_{t-2}	0.03***	0.03***	0.02**	0.04***
π_t^m	0.11***	0.11***	0.10***	0.13***
$[\Delta ruw_{t-3} + \Delta ruw_{t-4}]/2$	0.11***	0.11**	0.14***	
$D_{07:04}$	1.99***	2.00***	2.10***	1.91***
Δruw_{t-3}				0.06**
$\pi_t^m * Dum11$				-0.05**
R^2	0.88	0.89	0.94	0.90
Adjusted R^2	0.85	0.85	0.91	0.86
LM(4)	0.36	0.37	0.74	0.36
BPG	0.94	0.99	0.71	0.96

*, ** and *** denote statistical significance for 10, 5 and 1 percent, respectively. Dependent variable is the first difference of the seasonally adjusted CPIX in logarithms. Standard errors and covariances are heteroscedasticity and autocorrelation consistent. p-values are reported for serial correlation LM (Lagrange Multiplier) and BPG (Breusch-Pagan-Godfrey) heteroscedasticity tests.

⁶ This box is based on Kara et al. (2017).

⁷ Box 3.1 in October 2016 Inflation Report is updated by revised GDP series.

⁸ For estimated equation and other technical details, see Kara et al. (2017).

Equation (1) in the first column explains a significant portion (88 percent) of the variation in inflation. Equations (2) and (3) that estimate the same model for shorter sample periods suggest that coefficients may have changed over time. For example, the coefficient of lagged inflation (π_{t-1}), which indicates inflation inertia, seems to have declined over time compared to the 2006-2012 period. On the other hand, empirical results suggest that the coefficients of output gap, wages and exchange rate remained virtually constant.

Equation (4), which is an augmented form of the first column also confirms the variation in coefficients. In this specification, the coefficient of import prices is interacted with a dummy variable taking the value of 1 after 2011 and zero beforehand. The coefficient of the new variable ($\pi^m * Dum11$), which is significant at 5 percent, points to a marked decrease in the impact of import prices on inflation in recent years. This evidence is consistent with the observation that the fall in international oil prices since mid-2014 has had a smaller impact on consumer inflation compared to historical averages.

Time-Varying Parameter Model Estimates

In light of this evidence, estimating the CPIX equation using a time-varying parameter model will enable monitoring of the changes in key elasticities over time in a continuous rather than discrete fashion. In this context, the coefficient estimates for the explanatory variables of the Phillips curve are presented in Chart 1.

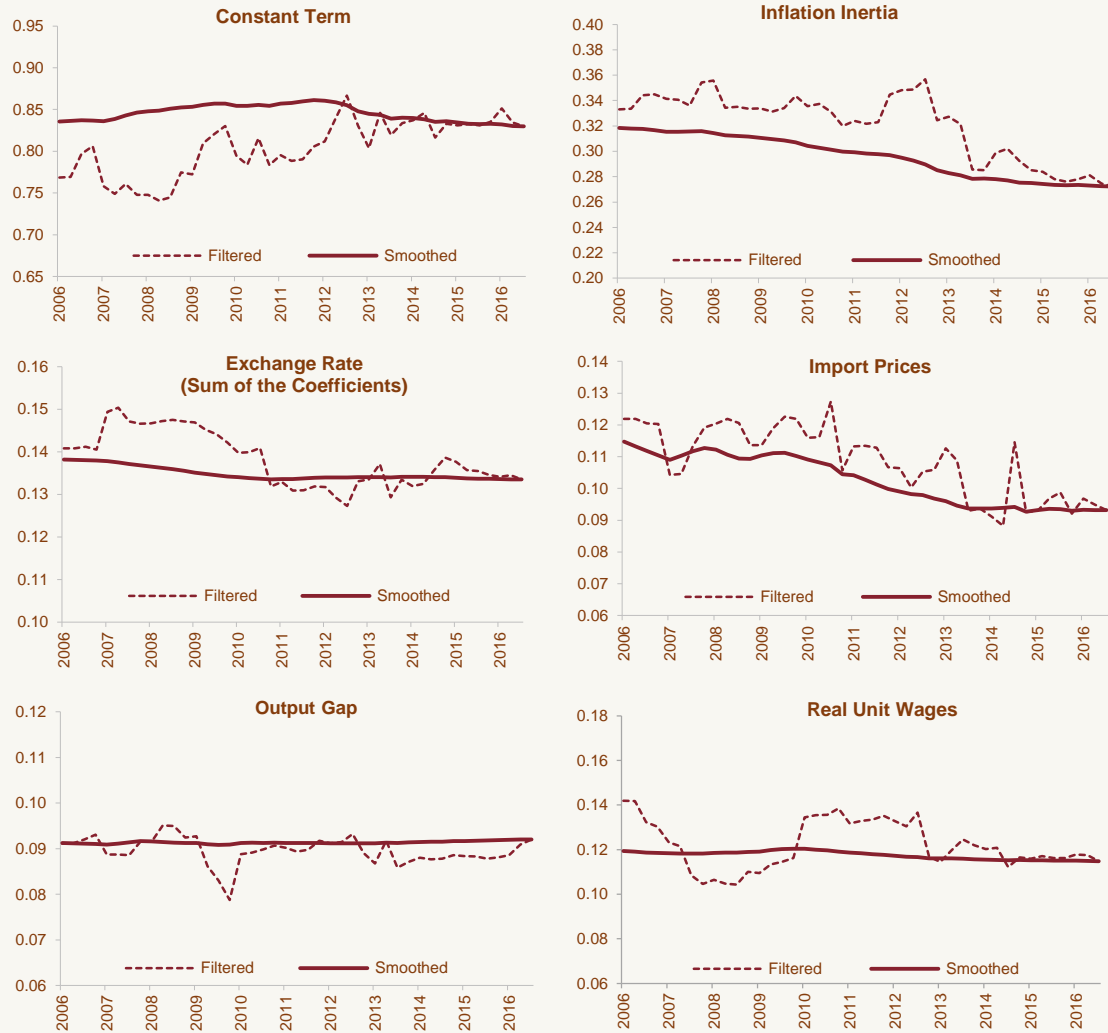
- **Constant term:** Interpreting the constant term is not as straightforward as explaining the coefficients of other explanatory variables. Yet, this term may be considered as the combination of trend inflation, which is also affected by long-term inflation expectations, and other factors not included in the model.⁹ According to filtered coefficient estimates, the gradual increase of the constant term over time may serve as a signal for a pickup in trend inflation along with deterioration in inflation expectations. On the other hand, the estimated coefficient is around 0.85, suggesting that even if other determinants stay constant, annual inflation will be around 4 percent due to the contribution of this component and that of inflation inertia. This accounts for half of the average consumer inflation, while the remaining half is determined by key macroeconomic factors such as imported and domestic costs and demand conditions.
- **Inflation inertia:** The filtered coefficient estimated for inertia, which is represented by the coefficient of the lagged inflation term in the model, appears to have been decreasing since mid-2013. It is striking that this decline coincides with the period of depreciation in Turkish lira with the beginning of the Fed's so called "tapering" period.

Exchange rate: The sum of coefficients that represents the exchange rate pass-through to inflation shows that the pass-through to consumer prices is around 13 percent in the short term and may reach 18 percent in the long run with inflation inertia.¹⁰

⁹ Derivation of the conventional version of the New Keynesian Phillips Curve (NKPC) assumes log-linearization around zero inflation at a steady state. However, as pointed out by Cogley and Sbordone (2008), it is possible to allow for non-zero inflation at a steady state, which in turn introduces the "trend inflation" concept to the model. This setup involves a reduced form model rather than a structural NKPC, therefore it should be noted that the constant term may not fully represent the fundamental measure of trend inflation.

¹⁰ Long-term effects are obtained by dividing relevant coefficient or sums of coefficients by [1-inertia coefficient].

Chart 1. Time-Varying Parameter Estimates



- Import prices:** Estimations show that there is a notable decline in the import price pass-through to inflation. In particular, the pass-through decreases from about 12 percent (17 percent in the long term) at the start of the sample to 9 percent (13 percent in the long term) as of end-2016. The pass-through starts to trend downward in 2011 but remains relatively stable in the last three years. The decline in the import price pass-through might be partly reflecting the limited response of administered electricity and natural gas prices to the fall in international oil prices. For instance, electricity and natural gas prices have seen no adjustments for two consecutive years after October 2012 and remained highly unresponsive to the falling international oil prices since 2014.

- **Output gap and real unit wages:** Demand conditions and labor costs had a relatively stable impact on inflation over time. A 1-percent increase in the output gap throughout the year causes inflation to increase by 0.5 percentage points in the long run. A 1-percent quarterly rise in real unit wages leads to a 0.16 percentage point increase in inflation in the longer term.

Historical Accounting: Decomposition of Consumer Inflation

Table 2 shows the contributions of explanatory variables to annual consumer inflation estimated by the time-varying parameter model. Among key macroeconomic factors, unprocessed food prices and exchange rates (USD/TL) provide the highest contribution to inflation in this episode, both averaging 1.3 percentage points. The contribution of unprocessed food prices fluctuates greatly from one year to another, thus accounting for most of the uncertainty in inflation.

Table 2. Average Contributions to CPI Inflation* (Percentage Point)

	Constant	Unprocessed Food	Exchange Rate	Import Prices	Output Gap	Real Unit Wage	Tax	Other	CPI
2006	3.8	1.7	1.3	1.7	1.7	-0.4	0.0	-0.2	9.7
2007	4.0	1.5	-2.5	1.7	2.0	-0.7	0.7	1.9	8.4
2008	3.9	1.1	1.2	1.5	1.5	-0.3	0.1	1.1	10.1
2009	4.0	2.4	2.1	-2.0	-2.9	1.4	0.5	0.9	6.5
2010	4.1	1.1	-0.3	1.1	-2.0	0.5	1.8	0.1	6.4
2011	4.0	1.9	2.3	1.6	0.1	-0.1	1.1	-0.3	10.5
2012	4.3	-0.3	0.9	-0.4	0.1	-0.2	0.8	1.1	6.2
2013	4.3	1.4	1.3	-0.3	0.7	0.5	0.9	-1.3	7.4
2014	4.1	1.4	1.9	-0.7	0.6	0.0	0.9	0.0	8.2
2015	4.1	1.6	4.0	-2.2	0.6	0.6	0.3	-0.1	8.8
2016	4.0	0.5	1.6	-0.5	0.0	0.6	1.4	0.8	8.5
Average	4.0	1.3	1.3	0.1	0.2	0.2	0.8	0.4	8.2

* It should be noted that contributions to CPI inflation depends on the estimated model and the sample period. The contributions in 2016 include the tax adjustments and the 0.16 point hike in electricity prices. The term "Other" includes the contribution of alcoholic beverages and tobacco products other than tax adjustments, the estimation errors and the effect of dummy variable for the last quarter of 2007.

According to estimations, the exchange rate poses a major cost pressure on consumer inflation, with an average contribution of 1.3 points and the highest contribution being recorded in 2015 with 4 points. Looking at the last decade, import prices provided a mere contribution of 0.1 point to inflation on average, which changed remarkably across the years due mostly to fluctuating oil prices.

The dampened global growth and risk aversion since 2013 affected inflation favorably through commodity prices, but exerted upside pressures through exchange rates and weaker capital flows. During 2011-2016, the contribution of exchange rates to annual inflation amounted to a marked 2.2 points on average. Thus, the inflationary pressure from the exchange rate pass-through outweighed the favorable contribution of import prices in this period (Table 2).

Another key driver of inflation in Turkey is tax adjustments that are intended to restore fiscal balances. Tax adjustments contributed to inflation by an average of 0.8 points in this period, with the highest contributions occurring in 2010 and 2016 at 1.8 and 1.4 points, respectively. The contribution of the output gap to inflation fluctuated substantially through the years and was only 0.2 points on average, since, by definition, the effects were cyclically offset by each other. Specifically, 2013 and onwards saw inflationary pressures driven up by output gap and real unit wages due to accelerated nominal wages and subdued productivity growth. The output gap confirmed the moderate economic growth in 2016, while real unit wages added only an average of 0.6 points to inflation in the last two years (Table 2).

In sum, the portion of inflation that cannot be explained by major macroeconomic variables but captured by the constant term is estimated to be around 4 points. The interpretation of the time-varying constant term in the reduced-form Phillips curve is not as straightforward as the interpretation of other factors. This term might be reflecting the effect of long-term inflation expectations or trend inflation.

Conclusion

Price stability could not be achieved completely in Turkey during the last decade where inflation targeting was implemented, and inflation fluctuated around 8.2 percent on average in this period. More recently, inflation has been largely driven by food prices and tax adjustments and increasingly more by the exchange rate and wages. The Philips curve coefficients estimated in the time-varying parameter model point to a decreasing import price pass-through and a relatively more stable exchange rate pass-through for the recent years. However, the portion of inflation that cannot be explained by main macroeconomic variables is substantially high, indicating that pricing behavior fed by long-term inflation expectations and other structural factors not captured in the model may be important in driving inflation dynamics. These results not only reveal the critical role of managing expectations effectively but also indicates the importance of adopting a comprehensive approach that integrates cyclical and structural policies to achieve price stability.

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Box
3.2

Changes in the Weighting Scheme of Clothing and Footwear

Clothing and footwear are supplied to markets depending on customer needs and seasonal factors. For instance, coats are usually in high demand in autumn and winter whereas the demand for t-shirts is higher in spring and summer. Thus, the inclusion of these strongly seasonal products into the price index is treated differently than the inclusion of other goods and services that are available in the market every season. Until 2017, CPI calculations were based on a variable-weight scheme for clothing and footwear products. Hence, the relative weight of these products varied from one month to another. However, with the recent modification in methodology effective as of 2017, fixed-weight scheme has started to be used for indexation of clothing and footwear products prices, which implies that the weights of clothing and footwear products will not change throughout the year.

The seasonality of clothing prices displays a more regular pattern than that of fresh fruits and vegetables. Therefore, annual clothing inflation is seldom affected by the base effects from seasonal products. Yet, due to the methodology change, the seasonality (month-on-month change) differs between clothing and footwear price indices based on variable and fixed weights. Thus, although annual inflation rates will face no base effects by 2018, annual clothing and footwear inflation will be subjected to notable base effects through 2017 due to the change in methodology.

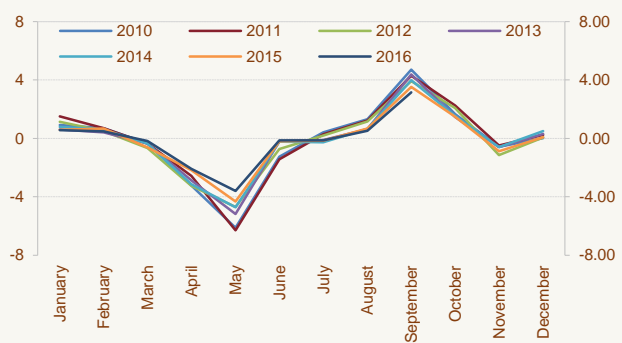
Accordingly, in order to capture the size of the potential base effects, it would help to re-calculate the monthly inflation rates of previous years with fixed weight and compare the results with variable-weight calculations for the same periods. Chart 1 shows the difference between monthly inflation rates calculated using both methodologies for the 2010-2016 period.

It is obvious that the new method produces a different seasonal pattern compared to the variable-weight method. The fixed-weight method calculates a lower monthly inflation in April and May and a higher monthly inflation in August, September and October than the variable-weight method.

Correspondingly, the base effect that will affect annual clothing and footwear inflation in 2017 will be downward in April and May and upward in September and October.

Considering the share of clothing and footwear in the CPI and the size of base effects, this impact may lead to temporary fluctuations of about 0.5 percentage points in consumer inflation. For a better evaluation of the underlying inflation trend, these temporary fluctuations driven by clothing should be monitored with respect to their effects on annual inflation over the upcoming period. It should also be noted that, by 2018, there will be no base effects stemming from the methodology change.

Chart 1. The Difference in Monthly Clothing Inflation Using Fixed vs Variable Weights (Percentage Point)



Source: CBRT.

