3. Inflation Developments

Consumer inflation dropped by about 0.4 points quarter-on-quarter to 7.20 percent in the second quarter of 2015, largely due to the correction in unprocessed food prices. Thus, the contribution of food price hikes to annual inflation declined to around 2.3 points. Yet, the Turkish lira depreciation was a major factor keeping a lid on disinflation. After having declined in the first four months of the year due to the waning cumulative effects from the exchange rate increases of the previous period, annual core goods inflation recorded a rise in May and June because of depreciations in this period. Meanwhile, in addition to exchange rate effects, rebounding oil prices also caused domestic energy inflation to rise. Services inflation increased slightly in the second quarter mainly owing to the high inflation and inflation expectations as well as the upsurge in labor costs. Moreover, the cumulative increases in food prices excluding fresh fruits and vegetables continued to have an adverse impact on services inflation through the prices of catering services. Thus, the underlying trend of core inflation indicators rose from the previous quarter on the back of exchange rate effects.

After surging at the strongest rate of the index's history in the first quarter of 2015, food prices were corrected significantly in the second quarter, decelerating faster than the overall index thanks to the notable drop in unprocessed food prices driven by the increased supply of fresh fruits and vegetables. In the second quarter, price hikes were above historical averages across all non-food categories (Chart 3.1). The contribution of food prices to annual inflation fell about 1.2 points quarter-on-quarter, while that of energy, core goods and services rose by 0.4, 0.3 and 0.1 points, respectively (Chart 3.2).

Chart 3.1.
CPI by Subcategories
(Second-Quarter, Quarterly Percent Change)

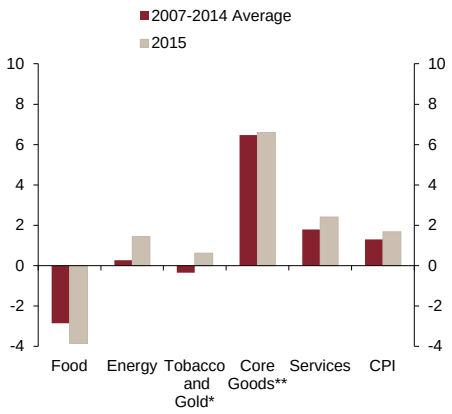
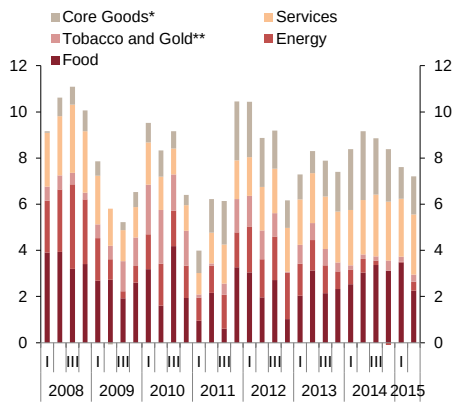


Chart 3.2.
Contributions to Annual CPI
(Percentage Points)



* Tobacco and Gold: Alcoholic beverages, tobacco and gold.
** Core Goods: Goods excluding food, energy, alcoholic beverages, tobacco and gold.
*** Food and Energy: Food, non-alcoholic beverages and energy.
Source: TURKSTAT, CBRT.

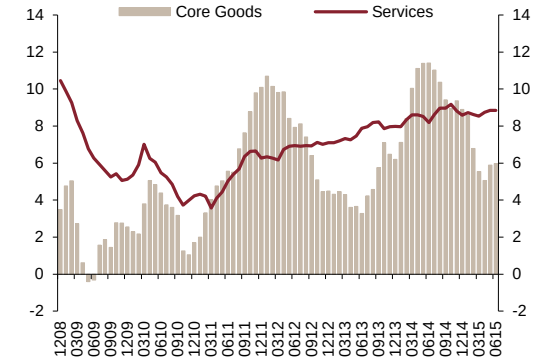
In sum, the inflation outlook lacked the desired improvement in the second quarter of the year despite the food-price-driven decline in inflation because of the Turkish lira depreciation that put a restraint on disinflation. Notwithstanding the moderate course of USD-denominated non-energy import prices, the recent exchange rate changes delayed the improvement in core inflation. Yet, the exchange rate spillover into non-energy groups appears to lag behind the historical averages given

the moderate outlook of aggregate demand conditions. In the upcoming period, the exchange rate pass-through is expected to continue to have a slight impact on inflation. However, the uncertainties over global markets and the volatility in energy and food prices pose a risk to inflation.

3.1. Core Inflation Outlook

Annual core goods inflation rose by 0.43 points to 5.97 percent in the second quarter (Table 3.1.1 and Chart 3.1.1). This increase was mostly attributed to the annual durable goods inflation that soared by about 2 points to 5 percent (Chart 3.1.2). Following the relatively high monthly hikes due to exchange rates during April-May, prices of durable goods posted a more modest outlook in June. The recent Turkish lira depreciation against the euro had a negative impact on the mostly euro-based prices of household appliances and automobiles. Overall, the moderate course of aggregate demand conditions restrained the exchange rate pass-through to core goods inflation. Among subcategories, annual clothing inflation fluctuated in the second quarter but remained unchanged from the end of the first quarter. Annual inflation in core goods excluding durables and clothing continued to decline steadily, but failed to display a more favorable outlook due to the weakening Turkish lira. Accordingly, the contribution of core goods to consumer inflation rose to 1.65 points in the second quarter (Chart 3.2). Moreover, the recent hikes in customs duties for furniture, home textiles and apparel are likely to drive prices of core goods higher in the upcoming period.

Chart 3.1.1.
Prices of Core Goods and Services
(Annual Percent Change)



Source: TURKSTAT, CBRT.

The underlying trend of core goods inflation deteriorated significantly in the second quarter largely due to exchange rates (Chart 3.1.3). In seasonally adjusted terms, prices recorded a major upsurge in April and May and a more modest rise in June.

Chart 3.1.2.
Core Goods Prices
(Annual Percent Change)

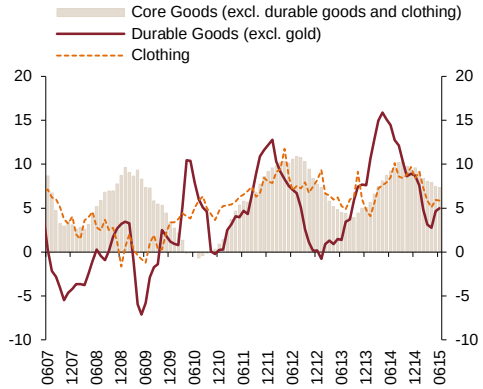
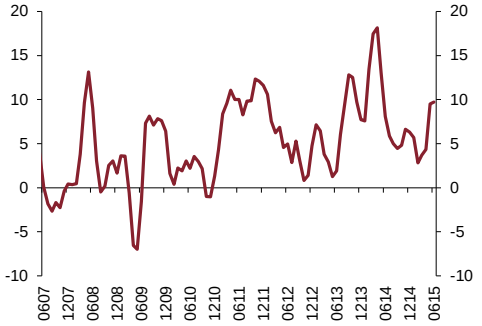


Chart 3.1.3.
Core Goods Prices
(Seasonally Adjusted, 3-Month Moving Average, Annualized)



Source: TURKSTAT, CBRT.

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

	2014				2015	
	II	III	IV	Annual	I	II
CPI	**2.06**	**0.69**	**1.63**	**8.17**	**3.03**	**1.68**
1. Goods	**2.05**	**-0.30**	**1.99**	**7.99**	**3.34**	**1.37**
Energy	**-1.12**	**0.11**	**-0.74**	**-1.54**	**1.96**	**1.44**
Food and Non-Alcoholic Beverages	**0.41**	**1.50**	**2.90**	**12.73**	**8.82**	**-3.85**
Unprocessed Food	-2.16	0.02	3.53	12.24	16.40	-9.27
Processed Food	2.82	2.82	2.36	13.16	2.30	1.45
Core Goods	**6.16**	**-2.39**	**2.98**	**8.89**	**-1.10**	**6.60**
Clothing and Footwear	22.36	-10.50	10.38	8.40	-12.43	22.37
Durable Goods (excl. gold)	-0.39	-0.08	-0.29	8.70	3.91	1.43
Furniture	4.00	-1.11	1.56	7.73	3.55	1.24
Electrical and Non-Electrical Appliances	-2.51	0.69	-0.31	1.64	2.44	0.98
Automobile	-1.24	-0.10	-1.19	13.72	5.14	1.62
Other Durable Goods	2.75	0.26	1.07	7.02	1.38	3.19
Core Goods (excl. clothing and durable goods)	2.85	1.82	1.38	9.57	1.78	2.16
Alcoholic Beverages, Tobacco and Gold	**-0.92**	**0.45**	**0.00**	**7.73**	**4.49**	**0.61**
2. Services	**2.10**	**3.05**	**0.81**	**8.59**	**2.32**	**2.40**
Rent	1.82	2.25	1.78	7.34	1.47	1.77
Restaurants and Hotels	2.81	3.95	2.02	13.98	3.42	3.59
Transport	2.68	4.05	-0.38	7.76	0.10	2.06
Communication	0.02	2.48	0.14	2.50	2.26	-0.11
Other	2.42	2.67	0.21	8.64	2.95	3.00

Source: TURKSTAT, CBRT.

Annual services inflation increased by 0.32 points quarter-on-quarter to 8.85 percent in the second quarter (Chart 3.1.1). This was largely due to prices of restaurants and hotels and other services that soared at a rate well above historical averages (Charts 3.1.4 and 3.1.5). On the other hand, annual inflation was down in transport and communication and nearly flat in rents (Chart 3.1.5). Prices of restaurants and hotels that accounted for most of the increase in services inflation continued to reflect the cumulative hikes in food prices. Although food prices were corrected in this quarter, price hikes in restaurants and hotels continued to accelerate as the correction was mostly limited to fresh fruits and vegetable prices; while meat prices saw further increases. In addition, other services were largely affected by the exchange-rate-driven upturn in package holiday prices. Hence, the contribution of services to consumer inflation rose to 2.60 points.

Chart 3.1.4.
Prices of Services by Subcategories
(Second-Quarter, Quarterly Percent Change)

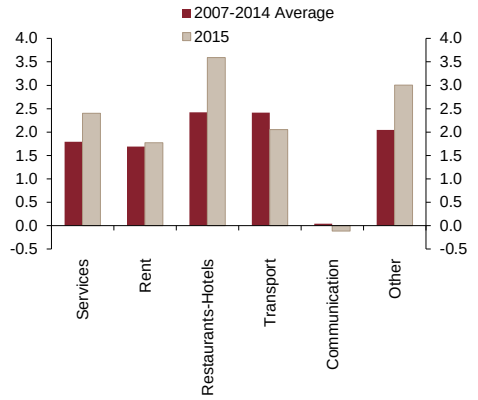
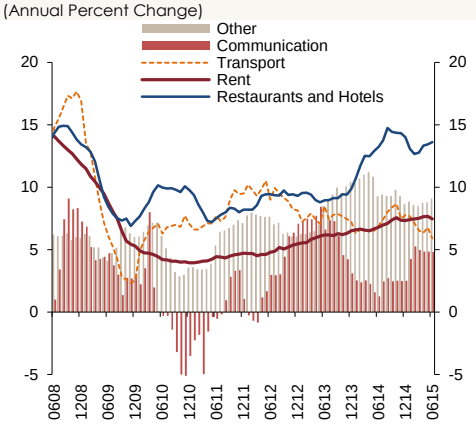


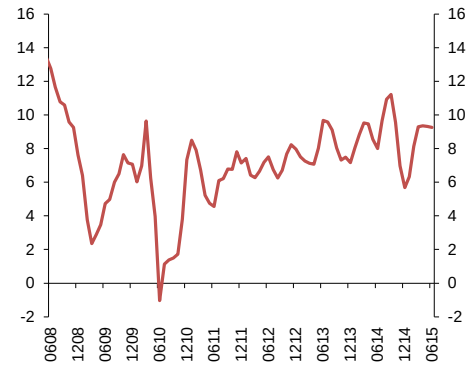
Chart 3.1.5.
Prices of Services by Subcategories
(Annual Percent Change)



Source: TURKSTAT, CBRT.

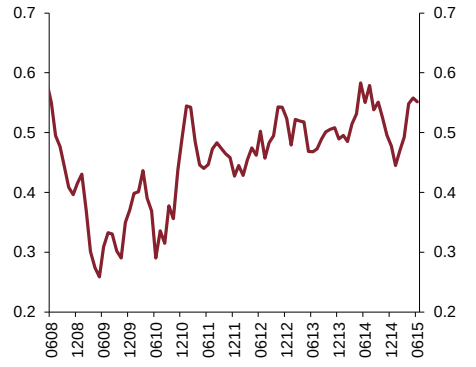
Seasonally adjusted data indicate that the underlying trend of services inflation remained horizontal and stable at its recently elevated level in the second quarter (Chart 3.1.6). The diffusion index has moved upward to a level close to historic highs as of the second quarter (Chart 3.1.7).

Chart 3.1.6.
Prices of Services
(Seasonally Adjusted, 3-Month Moving Average, Annualized)



Source: TURKSTAT, CBRT.

Chart 3.1.7.
Diffusion Index for Prices of Services*
(Seasonally Adjusted, 3-Month Moving Average)



* Diffusion index is calculated as the ratio of the number of items with increasing prices minus the number of items with decreasing prices to total number of items within a given month.

Source: TURKSTAT, CBRT.

Despite the moderate course of demand conditions, cost pressures continue to dominate prices of services. The elevated annual food inflation excluding fresh fruits and vegetables caused the annual inflation in catering services to remain on the rise in the second quarter (Chart 3.1.8). Additionally, the cumulative impact of the Turkish lira depreciation continued to affect the highly exchange-rate-sensitive other services. Another factor that contributed to the high services inflation was the fact that the annual rate of increase in hourly labor costs, a key element in the services sector, has been hovering above 10 percent in recent years (Chart 3.1.9). Thus, inflation inertia remained influential on services prices where the indexing behavior is strong.

Chart 3.1.8.
Prices of Catering Services and Food
(Annual Percent Change)

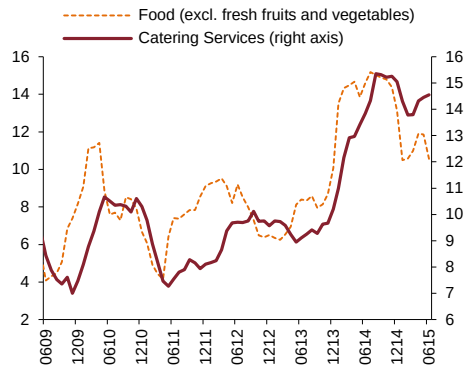
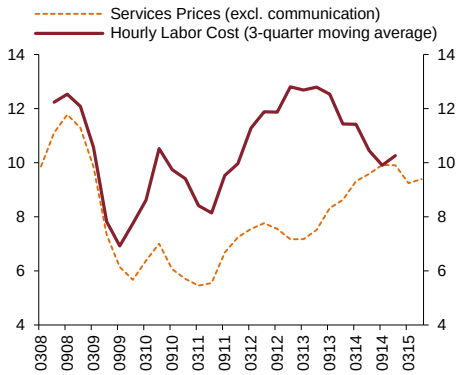


Chart 3.1.9.
Prices of Services and Hourly Labor Cost Index in the Services Sector
(Annual Percent Change)

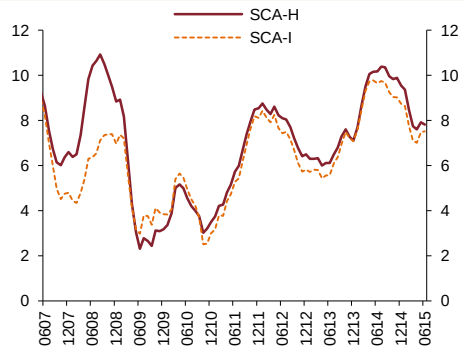


Source: TURKSTAT, CBRT.

The cautious monetary policy stance and the moderate domestic demand support the expected gradual improvement in services inflation, yet the above cost factors appear to dominate the course of services inflation. Accordingly, the cumulative cost increases driven by food prices, exchange rates and wages affect inflation expectations negatively as well and delay inflation from restoring to desired levels.

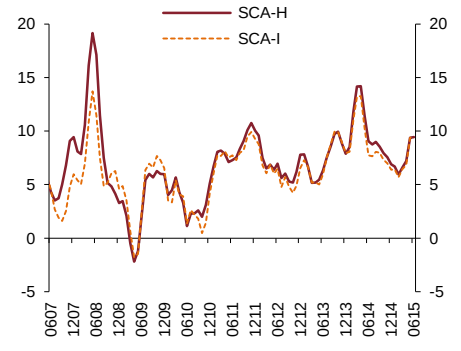
In line with the outlook for prices of core goods and services, annual inflation in SCA-H and SCA-I climbed, albeit more modestly in SCA-H, in the second quarter to 7.82 and 7.51 percent, respectively (Chart 3.1.10). Moreover, the underlying trend of core inflation indicators deteriorated notably from the end of the previous quarter (Chart 3.1.11). Unlike the first quarter, the rising core goods inflation had a negative impact on the underlying trend of inflation.

Chart 3.1.10.
Core Inflation Indicators
(Annual Percent Change)



Source: TURKSTAT.

Chart 3.1.11.
Core Inflation Indicators
(Seasonally Adjusted, 3-Month Moving Average, Annualized)

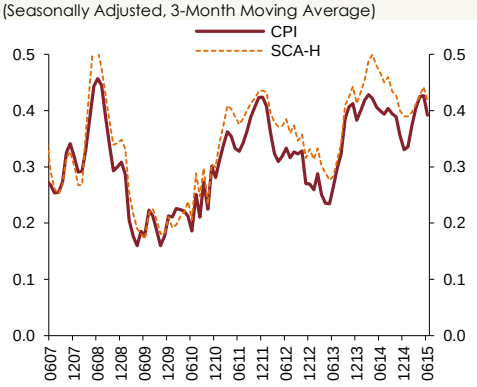


Source: TURKSTAT, CBRT.

On the other hand, according to quarter-end diffusion indices, the likelihood for prices to hike remained virtually unchanged quarter-on-quarter. However, diffusion indices were up during April-May and down at the same rate in June (Chart 3.1.12). The alternative core inflation indices monitored by the CBRT followed a similar pattern in this period (Chart 3.1.13). In sum, the exchange-rate and oil-price-induced first-quarter deterioration in the pricing behavior continued into the first two months of the

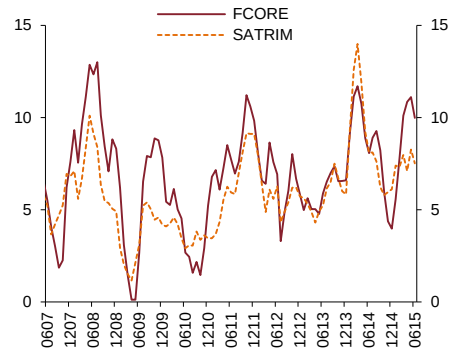
second quarter, yet have reversed to some degree as of June. The cautious monetary policy stance, the moderate domestic demand and the favorable outlook of non-energy import prices continued to partially limit spillovers from cost pressures into consumer prices. Should headline inflation continue to descend particularly amid corrected food prices, the pricing behavior might normalize more rapidly in the upcoming period.

Chart 3.1.12.
Diffusion Indices for CPI and SCA-H
(Seasonally Adjusted, 3-Month Moving Average)



Source: TURKSTAT, CBRT.

Chart 3.1.13.
Core Inflation Indicators SATRIM and FCORE*
(Annualized, 3-Month Moving Average)



* For further details, see Box 3.2, Inflation Report 2011-I.
Source: CBRT.

3.2. Food, Energy and Alcohol-Tobacco Prices

After having contracted in 2014, the agricultural value added expanded in the first quarter of 2015. Crop production forecasts also suggest a year-on-year increase for 2015 in the production of fruits, vegetables and cereals. Thus, following the increased supply of fresh fruits and vegetables, food prices were corrected substantially in the second quarter. After hovering above 14 percent in March, annual food inflation ended the second quarter down at 9.28 percent, falling slightly below the April Inflation Report assumptions (Chart 3.2.1).

The second-quarter fall in annual food inflation was mostly attributed to the outlook of unprocessed food prices (Chart 3.2.2). In seasonally adjusted terms, unprocessed food prices posted major gains in the first four months of the year when heavy rains, floods and frosts had an adverse impact on the supply of some vegetables, especially those grown in greenhouses and open fields. In May and June, unprocessed food prices were corrected amid an increased supply of fresh fruits and vegetables. Thus, annual unprocessed food inflation dropped by 8.57 points quarter-on-quarter to 9.36 percent. Meanwhile, contrary to falling prices of fresh fruits and vegetables, meat prices continued to soar due to low supply of livestock, driving the rate of increase in meat prices up to 23 percent year-on-year. This ongoing unfavorable outlook of meat prices is a key factor curbing the improvement in both food and catering services inflation. Additionally, the massive price hikes in dried fruits such as hazelnuts, peanuts and almonds continued solidly into this quarter (Chart 3.2.3).

The first-quarter slowdown in annual processed food inflation continued into the second quarter (Chart 3.2.2), largely due to bread and cereals where monthly price hikes slowed amid modest wheat prices in recent months. Apart from processed meat and oils, prices were more moderate across processed food excluding bread and cereals. Among subcategories, olive oil prices rose sharply in

2015 (Chart 3.2.3). The outlook of processed food prices in the upcoming period depends mostly on the course of wheat prices. According to the first forecasts for 2015, wheat production is expected to expand notably by 18.4 percent year-on-year to 22.5 million tons, which might put a lid on hikes in prices of bread and cereals. Yet, 2015's intervention prices for buying and selling wheat may restrain the fall in bread and cereals inflation via domestic wheat prices.

Chart 3.2.1.
Food and Energy Prices
(Annual Percent Change)

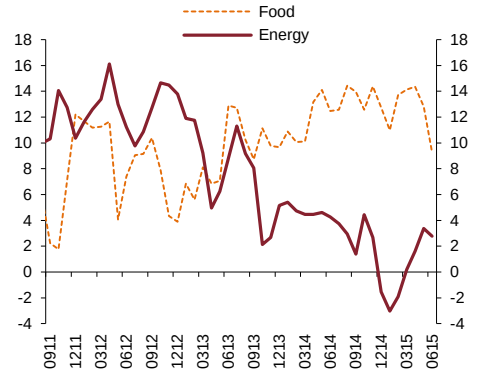
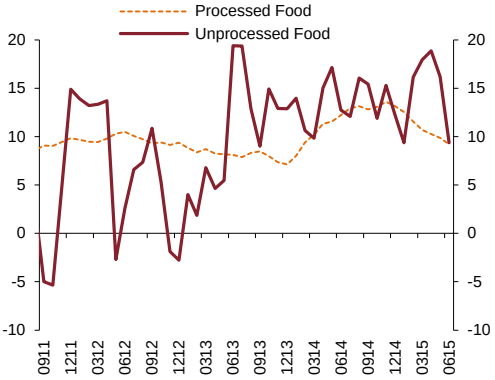


Chart 3.2.2.
Food Prices
(Annual Percent Change)



Source: TURKSTAT, CBRT.

While food inflation decelerated in the second quarter, consumer inflation excluding food and catering services went up on the April-May developments (Chart 3.2.4). Currently, annual food and catering services inflation and consumer inflation excluding food and catering services stand at 10.32 and 5.82 percent, respectively. The second-quarter correction in food prices is expected to continue into the upcoming period given the improved agricultural production outlook. In addition to this recent promising picture, the measures taken by authorities will also contribute to bringing food inflation down to levels consistent with the consumer inflation target in the medium term.

Chart 3.2.3.
Food Prices
(2005=100)

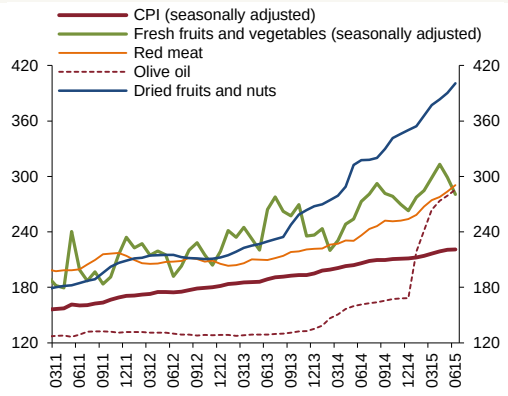
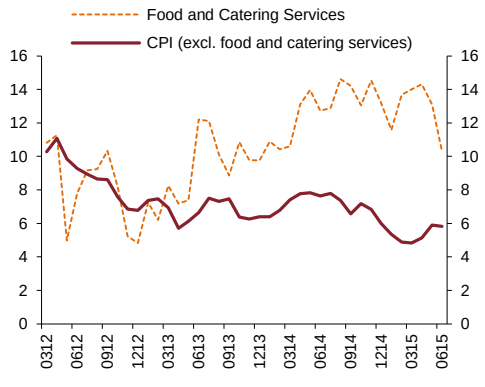


Chart 3.2.4.
Food and Non-Food Prices
(Annual Percent Change)

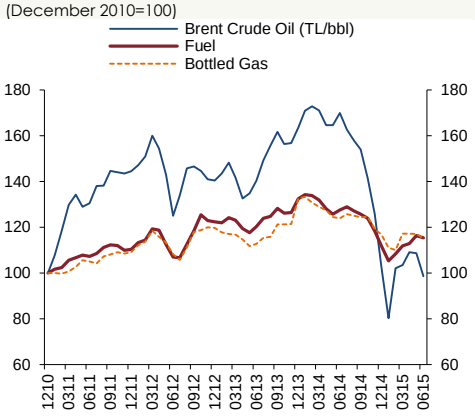


Source: TURKSTAT, CBRT.

Energy prices rose by 1.44 percent in the second quarter. The strong mid-second-quarter upturn in international oil prices slowed towards the end of the quarter and Brent crude oil prices ended the quarter at around 61 USD per barrel. Meanwhile, fuel prices increased by 3.13 percent due to the Turkish lira depreciation. Bottled gas prices, on the other hand, declined by 1.60 percent (Chart 3.2.5).

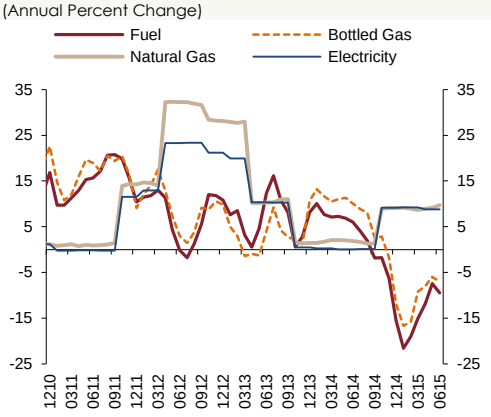
After the first-quarter jump, municipally determined tap water prices remained on the rise, increasing by 2.45 percent. Hence, annual energy inflation was up 2.60 points from the end of the first quarter to 2.78 percent in the second quarter, while energy prices continued to restrain consumer inflation, albeit to a lesser degree (Chart 3.2.1).

Chart 3.2.5.
Domestic Energy Prices and Crude Oil
(December 2010=100)



Source: Bloomberg, TURKSTAT, CBRT.

Chart 3.2.6.
Domestic Energy Prices
(Annual Percent Change)



Source: TURKSTAT.

After rising significantly in the first quarter due to SCT adjustments, prices of alcoholic beverages and tobacco products remained mostly unchanged in the second quarter.

3.3. Domestic Producer Prices

Domestic producer prices were up by 2.81 percent in the second quarter due to rising manufacturing prices, while annual D-PPI inflation surged to 6.73 percent (Table 3.3.1 and Chart 3.3.1).

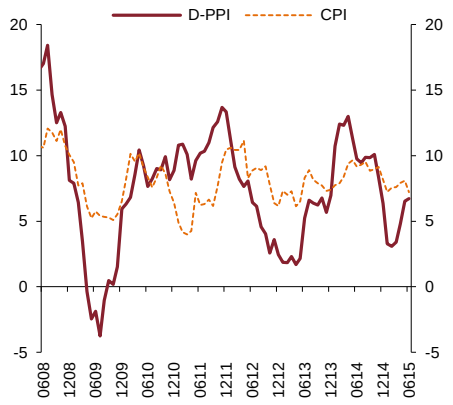
Table 3.3.1.
D-PPI and Subcategories
(Quarterly and Annual Percent Change)

	2014				2015	
	II	III	IV	Annual	I	II
D-PPI	**-0.38**	**2.02**	**-0.82**	**6.36**	**2.60**	**2.81**
Mining	-1.77	0.92	-2.86	1.02	0.33	3.59
Manufacturing	0.11	2.18	-1.01	7.63	2.64	3.45
Manufacturing (excl. petroleum products)	0.40	2.35	-0.06	8.98	2.65	3.12
Manufacturing (excl. petroleum and basic metal products)	0.70	2.37	0.16	9.56	2.70	3.22
Electricity and Gas	-4.85	1.01	1.53	-3.56	1.80	-3.33
Water	2.29	0.95	4.54	11.90	13.75	2.21
D-PPI by Main Industry Groups						
Intermediate Goods	-0.57	1.45	-0.36	6.53	1.97	2.96
Durable Goods	-1.18	-0.50	0.84	7.55	5.15	3.20
Durable Goods (excl. gold)	1.44	-0.39	1.29	7.38	2.91	2.98
Non-Durable Goods	2.18	4.79	0.49	13.82	3.24	3.31
Capital Goods	-3.76	-0.07	-5.54	-7.64	2.29	1.33
Energy	-1.04	1.18	-0.88	5.97	2.23	2.87

Source: TURKSTAT, CBRT.

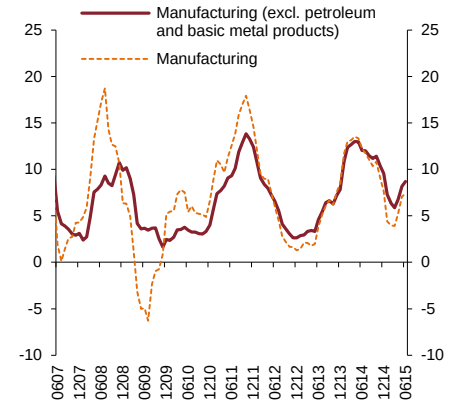
In the second quarter, manufacturing prices rose by 3.45 percent, while annual manufacturing price inflation increased to 7.39 percent (Table 3.3.1 and Chart 3.3.2). The gains in manufacturing prices were mostly attributed to rising food manufacturing prices and international oil prices as well as to the widespread hikes driven by the depreciating Turkish lira. In fact, import prices were flat in USD terms but were notably higher in Turkish lira terms during the second quarter (Chart 3.3.3).

Chart 3.3.1.
Domestic Producer and Consumer Prices
(Annual Percent Change)



Source: TURKSTAT.

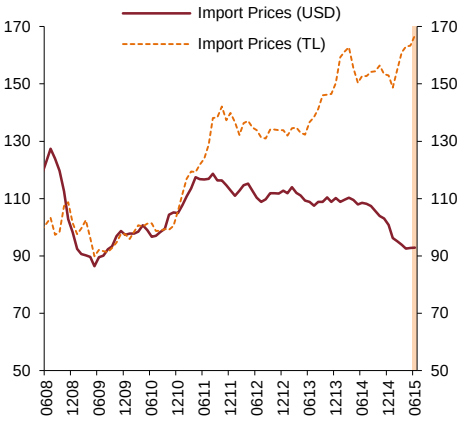
Chart 3.3.2.
Manufacturing Prices
(Annual Percent Change)



Source: TURKSTAT, CBRT.

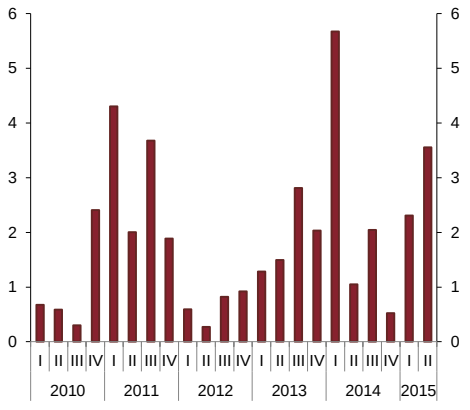
Price increases were evident across all manufacturing industry subcategories in this period (Table 3.3.1). Prices of durable goods soared by 3.20 percent due to gold and furniture prices. Prices of non-durable goods, on the other hand, posted a quarterly increase of 3.31 percent largely because of the food manufacturing industry as in the previous quarter. In particular, prices of meat, processed fruits and vegetables as well as fats and oils continued to rise without wavering. In fact, higher producer prices for meat and oils largely spilled over into consumer prices in this period. The quarterly inflation in the manufacturing industry excluding petroleum and basic metal products, which entails information on the underlying trend of producer prices, posted a quarter-on-quarter increase (Chart 3.3.4). In sum, the Turkish lira depreciation and upward pressures related to food manufacturing prices caused consumer prices to face stronger cost pressures from producer prices compared to the previous quarter.

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



Source: TURKSTAT, CBRT.

Chart 3.3.4.
Manufacturing Industry Prices Excluding Petroleum and Basic Metal Products
(Seasonally Adjusted, Quarterly Percent Change)



3.4. Expectations

Inflation expectations continued to deteriorate on the back of the Turkish lira depreciation that continued into the second quarter of the year, albeit at a slower pace, after a more rapid depreciation in the first quarter. Yet, medium-term inflation expectations remained basically unchanged in July (Chart 3.4.1). Across maturities, inflation expectations up to end-August were revised downward from the previous quarter, but 12-month-ahead expectations increased modestly. Moreover, the gap between longer-term expectations for over a year narrowed (Chart 3.4.2). Nevertheless, inflation expectations currently hover above the 5-percent year-end target set for 2015 and 2016.

Chart 3.4.1.
12-Month and 24-Month-Ahead Inflation Expectations*
(Annual Percent Change)

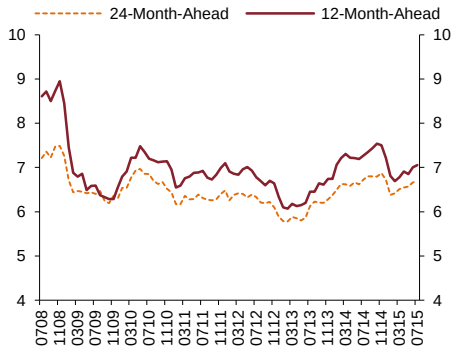
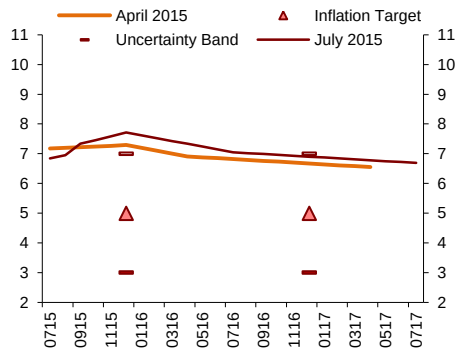


Chart 3.4.2.
Inflation Expectations**
(Annual Percent Change)



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

The dispersion of medium-term inflation expectations indicates deterioration in inflation expectations compared to April (Charts 3.4.3 and 3.4.4). Specifically, the percentage of respondents expecting 24-month-ahead inflation to be 6.5 percent or above recorded an increase.

Chart 3.4.3.
Distribution of 12-Month-Ahead Inflation Expectations*
(Percent)

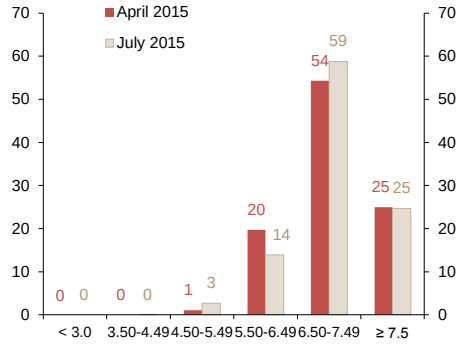
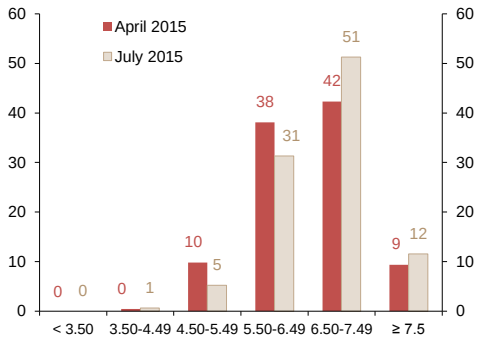


Chart 3.4.4.
Distribution of 24-Month-Ahead Inflation Expectations*
(Percent)



* CBRT Survey of Expectations, second survey period results for the pre-2013 period. Horizontal axis denotes inflation rates, while the vertical axis denotes the Kernel forecast. For further details, see CBRT website Data/Surveys/Survey of Expectations/Methodological Explanation.
Source: CBRT.

Box 3.1 Information Content of Credits in Explaining Inflation

In recent years, the role of credits as a financing tool has increased, and their implications regarding monetary policy have also changed dramatically both on a domestic and a global scale. In the post-global crisis period, most countries have based their economic policies on macroprudential measures to maintain financial stability. Likewise, credits have become increasingly more important to the conduct of monetary policy in Turkey since end-2010. In an attempt to answer the question of how effective the monetary policy is in controlling inflation when macroprudential measures are incorporated into the conventional inflation targeting scheme, this box discusses the information content of credits in explaining inflation.

In view of the fact that credits matter as much as monetary conditions as one of the key determinants of the business cycle, this study tests the statistical significance of various credit variables in Philips curve estimations.[1] Accordingly, these variables are used both instead of and in addition to the output gap. The following depicts the overall structure of the Phillips curve equation including credits:

$$\pi_t = c + \alpha\pi_{t-1} + \beta\pi_t^m + \sum_{i=0}^{1}\gamma_i \Delta e_{t-i} + \sum_{j=0}^{J}\delta_j cr_{t-j} + \varphi\Delta sct_t + \varepsilon_t\,, \quad j = 0, \dots 6$$

Here, π_t represents the CPI inflation; π_t^m denotes the USD-denominated import price inflation; e_t shows the USD/TL exchange rate; cr_t signifies the credit; sct_t stands for the ad valorem SCT on fuel products (TL/liter); and ε_t is the error term, all at time t. In the baseline model, cr_t is substituted for the output gap. The credit variables that have a statistically significant and positive δ coefficient are considered to entail information in explaining inflation.

The credit variables used in the study denote the nominal credit volume extended by the banking sector to non-financial institutions. By transforming these variables, credits are defined in three alternative ways: (i) Net credit use ($\Delta D_t/Y_t$): The ratio of the quarterly change in the credit stock (ΔD_{t_t}) to the respective quarter's seasonally adjusted nominal GDP (Y_t), (ii) Credit cycle: Cyclical component of the HP-filtered credit stock and (iii) Quarterly change in the credit stock. These three definitions are calculated for 8 different loan categories including credit cards, housing loans, automobile loans, personal loans, total consumer loans, consumer loans excluding housing, commercial loans and total loans. Accordingly, the results of the Phillips curves estimations are summarized in Table 1. The featuring findings are summarized as follows:

As an indicator of financial conditions, credit variables provide additional information in explaining inflation. Equation (1), which contains no variables regarding business cycle, explains inflation by 69 percent, whereas equations (3)-(10), which employ alternative credit measures to estimate the impact of financial factors, have an explanatory power between 73 to 76 percent. This suggests that credits entail information regarding inflation and that inflation tends to rise (slow) when credits increase (fall).

If credits are used instead of the output gap to explain inflation, the explanatory power of the equation remains intact. The Phillips curve equation, which uses the output gap as the business cycle variable, has a similar explanatory power with equations containing credit variables.

[1] For further details, see Öğünç and Sarıkaya (2015).

Net credit use stands out as a more significant indicator among other credit definitions. With its high explanatory power, net credit use is superior to the credit cycle and quarterly change. Also, this variable is better with respect to its real-time data properties as it is subject to less backward revisions compared to the HP-filtered credit cycle.

Table 1. Phillips Curve Estimations Including Credits and Excluding the Output Gap[1]
(Dependent Variable: Quarterly CPI Inflation Excluding Unprocessed Food, Alcohol and Tobacco)

2005Q1-2015Q1		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Data		No Business Cycle	BM	NCU	NCU	NCU	HP	HP	HP	QC	QC
Loan				CLEH	CL (AER)	Total (AER)	CLEH	CL	Total	CL	CL (AER)
Constant	t	0.61***	0.69***	0.14	-0.04	-0.17	0.81***	0.85***	0.82***	0.12	0.11
Inflation	t-1	0.49***	0.38***	0.50***	0.46***	0.45***	0.36***	0.36***	0.37***	0.47***	0.43***
Import Prices	t	0.16***	0.13***	0.18***	0.15***	0.15***	0.15***	0.15***	0.15***	0.15***	0.15***
USD/TL	t	0.08***	0.08***	0.08***	0.07***	0.06***	0.07***	0.07***	0.07***	0.07***	0.07***
	t-1	0.03***	0.04***	0.03***	0.04***	0.04***	0.03***	0.01	0.02**	0.03***	0.04***
SCT	t	0.05***	0.05***	0.02***	0.07***	0.07***	0.06***	0.06***	0.06***	0.05***	0.06***
Output Gap	t		0.08***								
	t-6		0.05***								
Consumer Loans	t-1						0.04***				
	t-6			0.39***							
CL	t-1				0.06***	0.04***		0.05***	0.04***	0.04***	0.05***
	t-5				0.08***	0.06***					0.05***
	t-6									0.04***	
R^2		0.73	0.79	0.79	0.80	0.79	0.78	0.78	0.78	0.78	0.78
Adjusted R^2		0.69	0.75	0.75	0.76	0.75	0.74	0.74	0.74	0.73	0.73

(1) ***, ** and * denote statistical significance at 5, 10 and 15 percent, respectively. The estimations are based on HAC (heteroscedasticity and autocorrelation consistent) standard errors and covariances. BM, NCU, CLEH, CL, QC and AER denote baseline model, net credit use, consumer loans excluding housing, commercial loans, quarterly change and adjustment for exchange rate, respectively. The table reports the estimation results pertaining to models with the highest explanatory power.

In terms of explanatory power, consumer loans excluding housing stand out among consumer loans, while commercial loans adjusted for exchange rate stick out among commercial loans. In addition, housing loans entail less information in explaining CPI inflation.

The information content appears to be similar between consumer and commercial loans. Equations (3) and (4) in Table 1 have similar R^2 values. Likewise, total loans variable, which is used in equation (5), has similar information content with consumer and commercial loans.

For an equal rise in credits, consumer loans are estimated to have a higher inflationary effect than commercial loans. Yet, based on average shares in GDP, the results hardly indicate that one loan type is more inflationary than the other. In equations (3) and (4), the total coefficient estimated for consumer loans is three times larger than the one estimated for commercial loans. Accordingly, a 1-point rise (as percentage of GDP) has a higher inflationary effect on consumer loans. On the other hand, in terms of their shares in the GDP, commercial loans are five times larger on average than consumer loans excluding housing. Thus, this variation between the magnitudes of coefficients also reflects the scale effect. For the credit cycle definition where there is no scale effect, the estimated coefficients for commercial and consumer loans are found to be similar in equations (6) and (7). However, as mentioned above, if the effect of an equal absolute rise (e.g. 100 TL each) is to be tested for both types of loans, consumer loans are more inflationary than commercial loans.

The results discussed so far suggest that credits can be an alternative to the output gap in explaining inflation. Although there is a close correlation between credits and the output gap, this correlation might

weaken depending on the type of economic shock Thus, a single indicator may not fully represent the business cycle. Here, the question might arise as to whether credits can provide additional information beyond the output gap in explaining inflation. As an answer to this question, Table 2 shows the Phillips curve estimations where the output gap and credits are used simultaneously as explanatory variables.

Table 2. Phillips Curve Estimations Including Credits and the Output Gap[1]

(Dependent Variable: Quarterly CPI Inflation Excluding Unprocessed Food, Alcohol and Tobacco)

2005Q1-2015Q1		(1)	(2)	(11)	(12)	(13)
Data		No Business Cycle	BM	NCU	NCU	NCU
Loan				Total(AER)	Total(AER)	Total(AER)
Constant	t	0.61***	0.69***	0.06	0.38	0.07
Inflation	t-1	0.49***	0.38***	0.36***	0.41***	0.54***
Import Prices	t	0.16***	0.13***	0.14***	0.13***	0.15***
USD/TL	t	0.08***	0.08***	0.06***	0.07***	0.07***
	t-1	0.03***	0.04***	0.04***	0.08***	0.07***
SCT	t	0.05***	0.05***	0.06***	0.06***	0.05***
Output Gap	t		0.08***	0.04**		
	t-1				0.15***	
	t-2				-0.07***	
	t-6		0.05***	0.05***	0.03	0.04**
Δ(Output Gap)	t-1					0.09***
Total Credits	t-1			0.05**	0.08***	
	t-2				-0.09***	
	t-5			0.04***	0.04***	0.05***
Credit Growth	t-1					0.06***
R^2		0.73	0.79	0.83	0.86	0.83
Adjusted R^2		0.69	0.75	0.77	0.81	0.78

(1) ***, ** and * denote statistical significance at 5, 10 and 15 percent, respectively. The estimations are based on HAC (heteroscedasticity and autocorrelation consistent) standard errors and covariances. BM, NCU and AER denote baseline model, net credit use and adjustment for exchange rate, respectively. The table reports the estimation results pertaining to models with the highest explanatory power.

Credits provide additional information in explaining inflation. In equation (11) where the coefficients for the output gap and credits are restricted to be positive, both variables are estimated to have economically meaningful and statistically significant coefficients. Despite the strong correlation between the two variables, the fact that credit coefficients are found significant while output gap coefficients barely differ from the baseline model and that the equation's explanatory power improves compared to the baseline model shows that credits entail additional information. This finding indicates that the output gap and credits can be complementary in explaining inflation.

According to the findings, credit impulse and credit growth as well as the change in the output gap in addition to its level may affect inflation. The secondary lag values of the output gap and credits are found to have negative coefficients in equation (12), which has the highest R^2 in explaining inflation. In order to obtain economically meaningful results, the signs of coefficients for the lagged values of the output gap and total credits are restricted in equation (13). Accordingly, the explanatory power of the equation (13) turns out to be the same with that of equation (11). Yet, the significance of credit growth indicators may be the result of the global crisis and the recovery process that caused sharp changes in these indicators.

To sum up, the main findings that might contribute to proper tool selection to control inflation and to understand monetary policy effectiveness are listed as follows: (i) Credit variables serve as an alternative to the output gap in explaining inflation dynamics. This is fulfilled without any loss of information and even with higher explanatory power in some cases. (ii) The impact horizon of credits on inflation can be as long as one and a half year. (iii) Net credit use comes forward among other definitions of credit. (iv) In addition to credits, credit growth may also be influential on inflation. (v) For an equal rise, consumer loans are estimated to be more inflationary than commercial loans. (vi) The incorporation of credits in the estimation of the output gap may enable a better representation of the business cycle.

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Öğünç, F. and Ç. Sarıkaya, 2015, Enflasyonu Açıklamada Kredilerin Bilgi Değeri (in Turkish), CBT Research Notes in Economics No. 15/12.

Box 3.2 Firm Strategy, Consumer Behavior and Taxation in the Turkish Tobacco Market

Given that the taxing of tobacco products affects many parties ranging from the fiscal authority to health officials as well as firms and policymakers, it is critical to design a tax scheme which yields predictable and sustainable revenue. Therefore, a proper tax scheme with these features should take into account firm pricing strategy, consumer behavior, and health and industry related issues besides fiscal concerns. This box discusses the effects of the tax system on consumer behavior and firm strategy, and provides insight into an appropriate tax policy.[2]

The Current Tax Scheme for Tobacco Products in Turkey

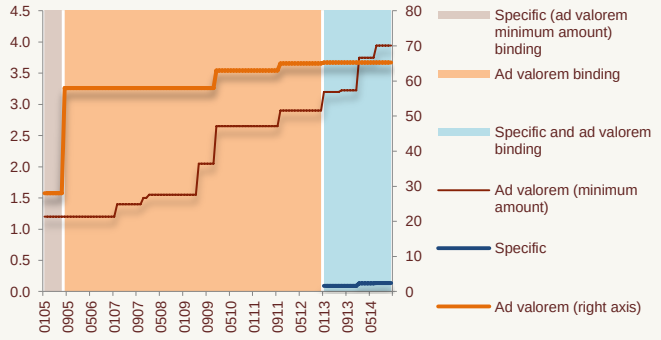
Tobacco products have a unique place in the Turkish tax system. This is because the SCT is calculated on the final sales price rather than the producer price. The VAT is also levied on both the producer price and the SCT. Moreover, the SCT is taken both in specific and in ad valorem terms. Table 1 summarizes the composition of the final sales price of tobacco products.[3]

Table.1. Components of Final Sales Price for Tobacco Products

Final Sales Price (FSP)	Y
Producer Price	X
Distributor's/Dealer's Share	Y ∗ p
Specific SCT	$Y * SCT$
Ad Valorem SCT	M
Total SCT	$Y * SCT + M$
VAT	$(X + Y * p + M + Y * SCT) * VAT$
NSF = Producer Price + Distributor's/Dealer's Share + SCT + VAT	
$Y = X + Y * p + (Y * SCT + M) + (X + Y * p + M + Y * SCT) * VAT$	
$FSP = Y = \frac{(1 + VAT) * (X + M)}{1 - (1 + VAT) * SCT - (1 + VAT) * p}$	

As shown in Table 1, when other factors are constant, the final sales price is linearly related with the producer price and the ad valorem SCT and is non-linearly related with the SCT, VAT and the distributor's/dealer's share. Chart 1 displays the developments regarding the SCT rate on tobacco products over time.

Chart 1. SCT on Tobacco Products



Source: Tobacco, Tobacco Products and Alcoholic Beverages Market Regulatory Authority.

As seen in Chart 1, both ad valorem and specific SCT have increased substantially over time. Accordingly, the ad valorem tax levied on all products is binding in certain periods, while in some periods, the specific tax calculated on the final sales price is binding. These may have various implications for firm pricing behavior.

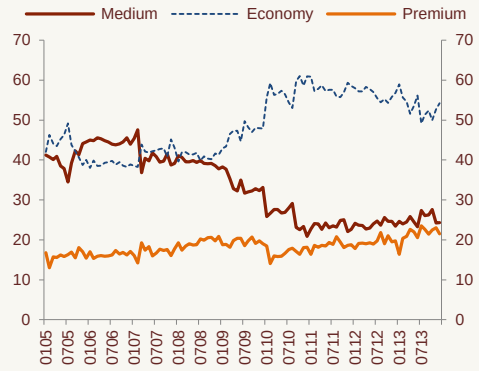
[2] For further details, see Atuk and Özmen (2015).
[3] For further details, see Atuk et al. (2011) and Box 3.1 in Inflation Report 2013-I.

Price Segments for Tobacco Products

Tobacco products can be grouped into three main categories by their price segments. In general, price segments are classified as economy, medium and premium. Sales shares for each category during the analyzed period are displayed in Chart 2.

Accordingly, the share of premium products remained almost unchanged, while consumer preferences have shifted from medium to economy products due to rising prices. Thus, it is clear that consumers are sensitive to price changes and they respond by shifting between segments when necessary.

Chart 2. Sales Shares by Segments (Percent)



Source: Tobacco, Tobacco Products and Alcoholic Beverages Market Regulatory Authority.

Firm Strategy

As the amount of SCT is determined by the final sales price and the final sales price is set by the firms, firm strategy has a direct impact on prices and tax revenues. The current taxing system may provide incentives to increase or decrease prices depending on the circumstances.

Incentive for Price Increase

Firstly, let us consider a case in which the price gap between the economy segment and the premium segment is low. This is possible in a tax scheme where the ad valorem SCT is dominant. In such an environment where the SCT collected on all products is the same, firms have the incentive to increase prices in the premium and medium segments because increases in final prices will thus raise firms' profits without being subject to any additional tax. In fact, the January-July 2005 period sets an example for such a case where all products were subject to an ad valorem tax, yet medium and premium segment prices posted an increase.[4] Apart from cost changes, it is also possible to monitor how the incentive for a price increase has changed depending on ad valorem and specific SCT rates. Chart 3 presents ad valorem and specific SCT combinations that produce the same tax revenue and the associated price gap between economy and premium segments for each combination. This price gap widens as the specific SCT is up and narrows as the ad valorem SCT is up. Therefore, in the current tax scheme, firms' incentives for a price increase are inversely related to the specific SCT and directly related to the ad valorem SCT.

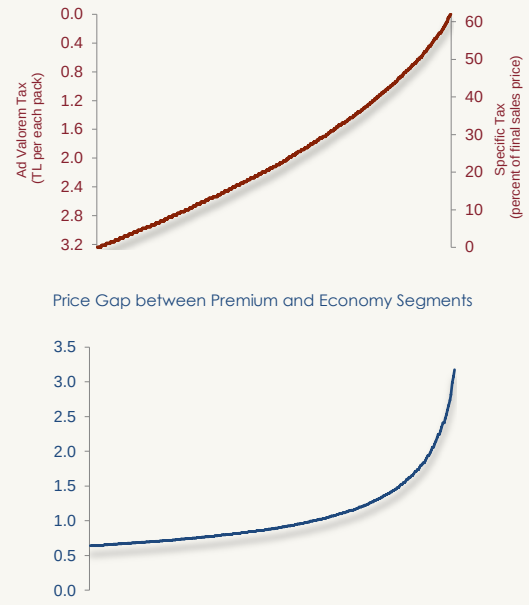
Incentive for Price Decrease

Secondly, let us consider the case in which a final sales price is too sensitive to the changes in producer prices. This is possible in a tax scheme where the specific SCT dominates the ad valorem tax. In such an environment, a small decrease in producer prices will induce larger drops in final sales prices and enable firms to seize a higher market share. On the other hand, this may cause a dramatic decline in tax revenues.

[4] In this period, the ad valorem tax in effect was the minimum amount of the specific SCT. For further details, see Atuk and Özmen (2015).

In fact, the January-December 2013 period sets an example for such a case. More specifically, this was a period when prices of all products were determined by the specific tax rate and prices were down across all segments, particularly in economy and medium.[5] It is possible to monitor how the incentive for a price decrease has changed depending on ad valorem and specific SCT rates. Accordingly, Chart 4 shows ad valorem and specific SCT combinations that produce the same tax revenue and the associated elasticity of the final sales price and tax revenues with respect to producer prices for each combination. The effect of a one-unit fall in the producer price on final sales prices and tax revenues increases when the specific SCT is up and decreases when the ad valorem SCT is up. Therefore, firms' incentive for a price decrease is directly related to the specific SCT and inversely related to the ad valorem SCT.

Chart 3. Incentive for Price Increase*



* For further details, see Atuk and Özmen (2015). Points on the upper panel denote ad valorem and specific tax combinations, while on the lower panel, each point represents price gap between premium and economy for each combination.

Chart 4. Incentive for Price Decrease*

* For further details, see Atuk and Özmen (2015). Points on the upper panel denote ad valorem and specific tax combinations, while on the lower panel, each point shows the effect of a decrease in producer's prices on tax revenues for each combination.

The main implication of this firm strategy analysis is that tax schemes in extreme cases (too high ad valorem-too low specific or too high specific-too low ad valorem) can trigger a price change in either direction, which might cause volatility in prices and tax revenues. Reducing the share of a specific tax in the current tax scheme may reduce firms' incentives to decrease prices and thus balance the pressure to hike prices without sacrificing the tax revenue target. Overall, a tax scheme with a more predictable and sustainable price structure and tax revenue is possible if specific and ad valorem SCT rates are balanced and away from the extremes.

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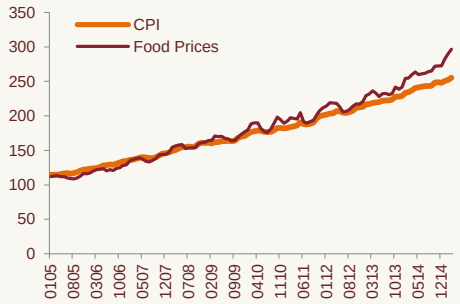
Atuk, O., C. Çebi and M.U. Özmen, 2011, Tütün Ürünlerinde Özel Tüketim Vergisi Uygulaması (in Turkish), CBT Research Notes in Economics No. 11/16.

[5] For further details, see Atuk and Özmen (2015).

Box 3.3 The Exports-Inflation Relationship in Food Products

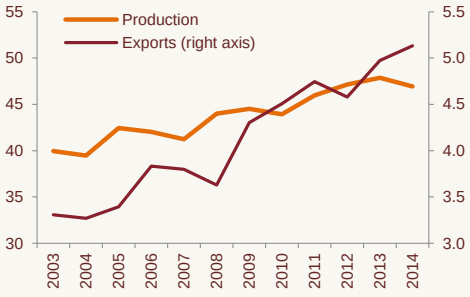
The food price index that makes up about 24 percent of the CPI has increased and fluctuated at a more rapid pace than the CPI since 2009 (Chart 1). Accordingly, the food price index soared by about 200 percent between 2005 and 2015, whereas the CPI surged by only 150 percent. The difference between the food price index and the CPI was more remarkable especially after 2009.

Chart 1. CPI and Food Prices



Source: TURKSTAT.

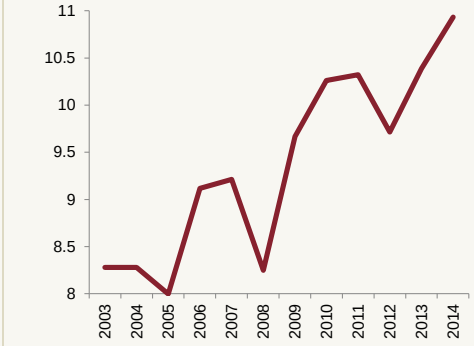
Chart 2. Production and Exports of Fruits and Vegetables
(Thousand Tons)



Source: TURKSTAT, Authors' calculations.

In general, the total production of fruits and vegetables grew by 17 percent between 2003 and 2014, while the exports of fruits and vegetables expanded by 51 percent (Chart 2). In other words, domestically produced fruits and vegetables attracted increasingly more buyers abroad. As a result, the share of exports in total production of fruits and vegetables went up from 8 to 11 percent (Chart 3). During 2003-2014, the production of fruits and vegetables increased by a mere 1.55 percent annually on average, while the average yearly rate of export growth was 4.64 percent.

Chart 3. Share of Exports in the Production of Fruits and Vegetables (Percent)

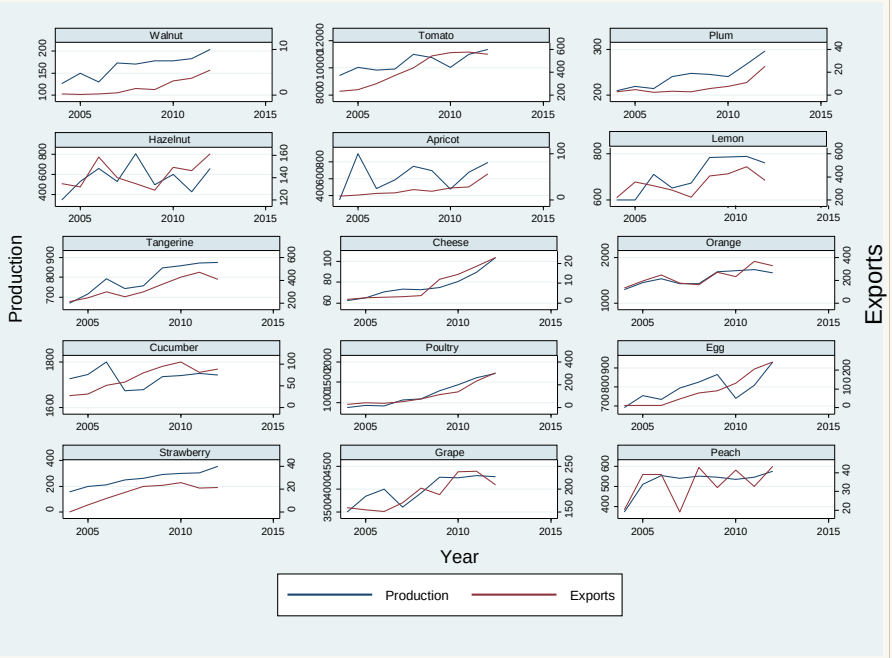


Source: TURKSTAT.

Analyzing the production and export developments across selected food items reveals that the production and exports of cheese, chicken, eggs, walnuts, tangerines and peaches grew relatively higher between 40 to 200 percent by the early 2000s (Chart 4). Moreover, the joint analysis of the share of exports in production with the product price over the same period shows that prices of walnuts, tomatoes, apricots, chicken, cheese and eggs nearly doubled while their share of exports in production grew at an almost similar rate (Chart 5).

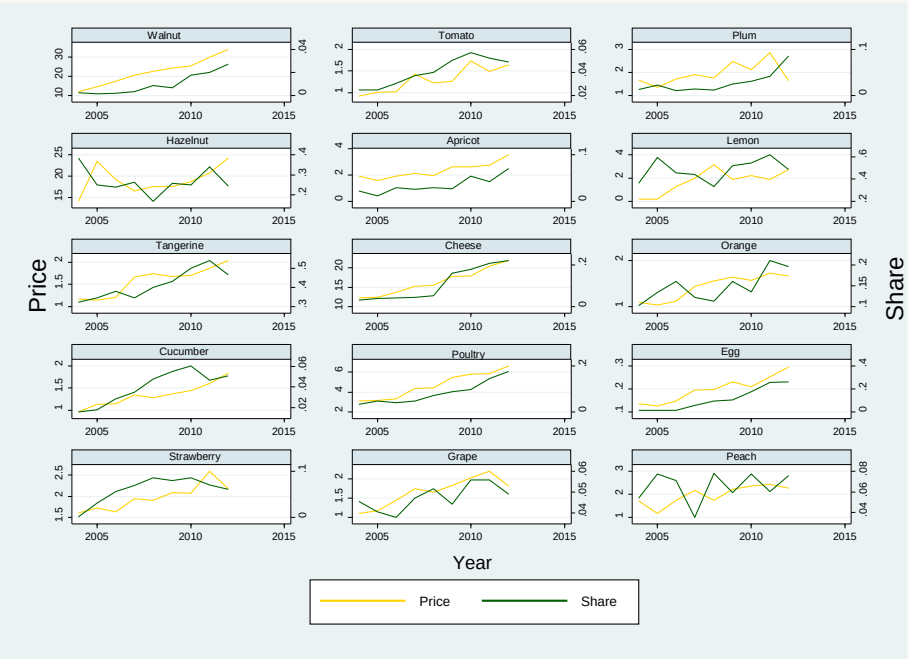
The findings summarized above indicate that a strong export growth in an environment of relatively low annual growth rates of food production (i.e. when supplies grow only slightly) may put upward pressure on food prices. In addition, the significantly faster post-2009 growth in the food price index relative to the CPI appears to be driven also by the food export growth. However, an econometric analysis is needed in order to justify this argument in quantified terms. Obviously, such an analysis is also necessary for a better understanding of the price dynamics in Turkey.

Chart 4. Production and Exports of Selected Food Items (Thousand Tons)



Source: FAO, TURKSTAT.

Chart 5. Price(TL) and Share of Exports in Production (%) for Selected Food Items



Source: FAO, TURKSTAT.

Food prices are affected by supply and demand-side factors. Production volume, production costs and fuel prices are among the most important supply-side factors, which affect food prices. Demand-side factors include the GDP, which captures domestic demand; the output gap that gauges cyclical factors; and exports, which seize external demand that has become increasingly more influential on food prices as explained above. Another factor to be considered is the exchange rate pass-through.

In this respect, TURKSTAT's data on price dynamics for 36 selected food items including fruits, vegetables, legumes, cereals, meat, milk and dairies were analyzed econometrically by taking into account these supply and demand-side factors. Using panel data estimation techniques, food prices were modelled according to the following equation employing the fixed effects model:

$$lnPrice_{i,t} = \alpha_0 + \alpha_1 lnPrice_{i,t-1} + \alpha_2 lnCost_{i,t} + \alpha_3 lnProduction_{i,t} + \alpha_4 lnExports_{i,t} + \alpha_5 OutputGap_t + \alpha_6 lnExchange_t + \alpha_7 lnFuel_t + \epsilon_{i,t}.$$

Data on *Price* and *Fuel* were obtained from the TURKSTAT, while the data on *Cost*, which shows production cost; *Production*, which denotes the production volume; and *Exports*, which represents the export volume, were retrieved from the FAO website. All data are annual. The *OutputGap* is estimated using an HP filter, and the TL/USD parity is obtained from the CBRT website. All the series are in logarithms except for the *OutputGap*.

The model above is estimated using the Arellano and Bond (1991) 2-stage dynamic panel difference GMM estimator and assumes that the relation among price, production and exports is not unidirectional. According to the results shown in Table 1, there is a statistically significant negative relation between production volume and prices as expected. Accordingly, a 1-percent growth in production volume causes a 0.29 percent drop in prices. There is also a statistically significant positive relation between production costs and prices. Each 1-TL rise in production costs causes prices to increase by 0.41 TL. The relation of exports, output gap, exchange rates and fuel prices to food prices is also statically significant and positive. Accordingly, a 1-percent growth in exports drives prices 0.05 percent higher; a 1-TL rise in output gap causes prices to increase by 0.0032 percent; a 1-percent increase in the exchange rate brings prices up by 0.13 percent and a 1-TL rise in fuel prices causes a 0.17 increase in prices. The model explains 75.91 percent of the price change, which is statistically significant.

Table1. Estimation Results

Variable	Coefficient	Standard Error	T-Stat	P>t
Price (t-1)	0.4093	0.0317	12.92	0.000
Production	-0.2916	0.1040	-2.80	0.008
Cost	0.4135	0.04917	8.41	0.000
Exports	0.0497	0.0143	3.46	0.001
Output Gap	3.24e-06	1.62 e-06	2.00	0.053
TL/USD	0.1263	0.0659	1.92	0.03
Fuel	0.1649	0.5342	3.09	0.004
R^2	0.7591			
F(6,32)	262			0.000

Overall, this study shows that food prices in Turkey are determined by supply-side factors such as production volume and production costs as well as exchange rates and demand-side factors such as exports and the output gap. The biggest and most significant impact comes from costs and the production volume, but it is also evidenced that there is a notable upward pressure from exports that have been growing in recent years.

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