

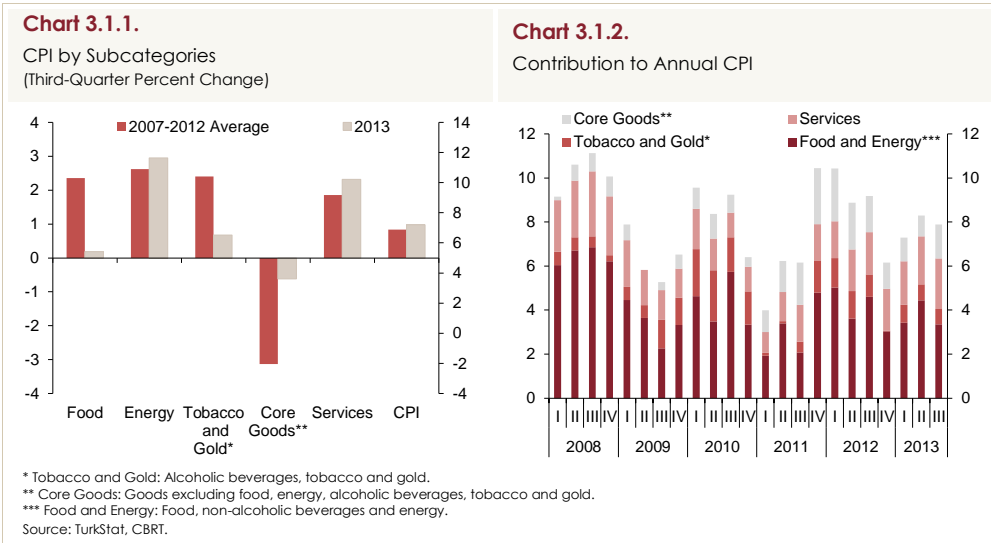
## 3. Inflation Developments

### 3.1. Inflation

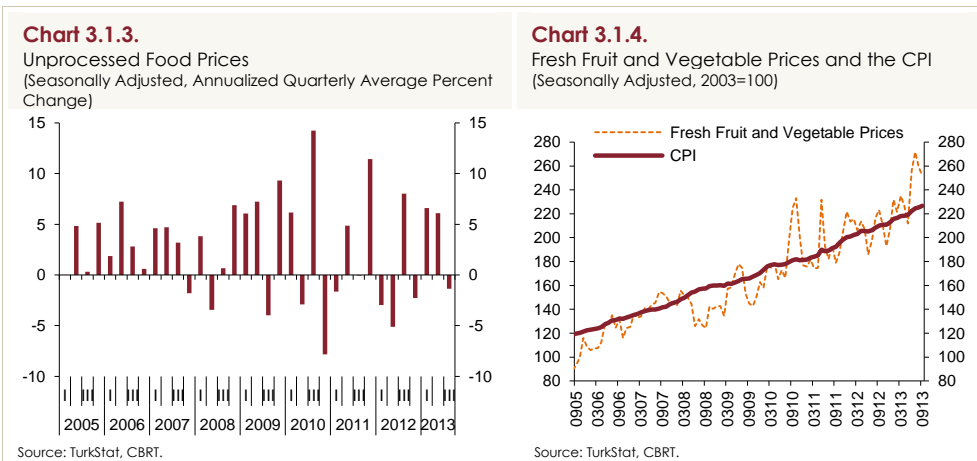
In the third quarter of 2013, annual consumer inflation went down by 0.42 percentage points from the previous quarter to 7.88 percent. The fall in inflation was mainly driven by the favorable course of unprocessed food prices. On the other hand, annual core goods inflation accelerated in this period upon the depreciation of the Turkish lira, while services inflation remained on its mild upward track. Core inflation indicators also went up against these developments. As a result, inflation stood slightly above the path projected in the July Inflation Report in the third quarter due to exchange rate developments.

Across subcategories, quarterly rates of change in the food group proved more favorable in the third quarter compared to historical averages, stemming mainly from unprocessed food prices (Chart 3.1.1). Unprocessed food prices, the determinant of the course of consumer inflation, declined by around 10 percentage points in the third quarter after seeing a surge by around 13 percentage points in annual inflation in the second quarter. Thus, the contribution of food prices to inflation fell by 1 percentage point compared to the second quarter (Chart 3.1.2). Meanwhile, core goods inflation soared in this period upon the developments in the exchange rate, and added an extra 0.6 percentage points to annual inflation.

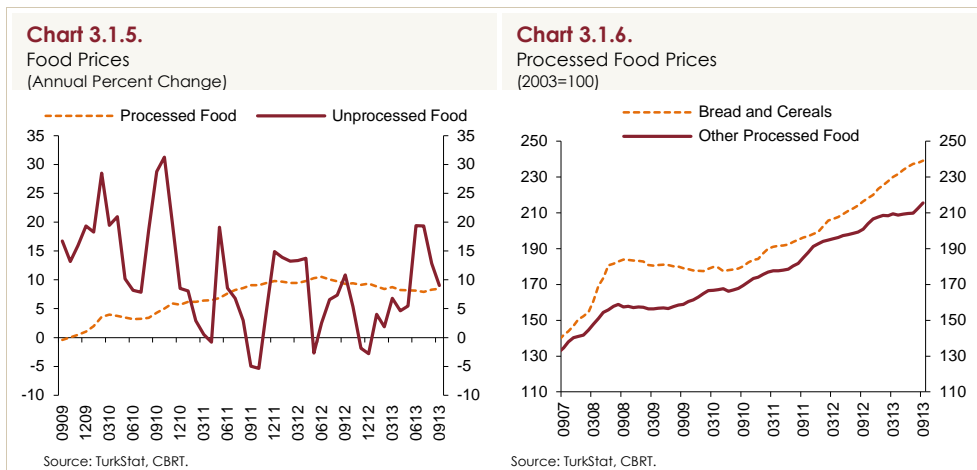
In sum, unprocessed food prices contributed favorably to the course of inflation in the third quarter, while core inflation indicators went up as envisioned in the July Inflation Report, mainly upon the exchange rate developments. Lagged effects of exchange rate developments as well as unprocessed food prices will determine the course of annual inflation the rest of the year. Annual energy inflation, on the other hand, is estimated to remain on a downward track and contribute to disinflation in the last quarter of 2013.



Seasonally adjusted unprocessed food prices went down in the third quarter (Chart 3.1.3). Thus, annual inflation in unprocessed food prices, which was 19.39 percent in June, fell by 10.4 percentage points to 9.02 in September. However, after the surge in the first half of the year, unprocessed food prices saw a lower-than-projected correction upon developments in the prices of fresh fruits and vegetables. Seasonally adjusted prices of fresh fruits and vegetables, which have hovered above the headline consumer prices throughout the year, preserve this trend despite the downward movement seen in the last two months (Chart 3.1.4). In this period, annual inflation decreased to 12.89 percent in fresh fruits and vegetables and to 6.45 percent in other unprocessed food prices. Nevertheless, given the favorable course recorded in the last quarter of 2012 in both subcategories, the deceleration in the unprocessed food inflation may be more limited in the last quarter of the year.



Processed food prices increased by 2.27 percent in the third quarter. Thus, annual processed food inflation, which has been declining since the third quarter of 2012, went up to 8.48 percent (Chart 3.1.5). In the first half of 2013, prices of bread and cereals continued with an upsurge stemming from wheat prices, whereas other processed food prices exhibited a rather limited increase. However, this outlook changed in the third quarter. As envisaged in the July Inflation Report, monthly inflation in the prices of bread and cereals decelerated largely during this quarter as domestic wheat price increases came to a halt, while other processed food products saw accelerated price increases due to the depreciation of the Turkish lira (Chart 3.1.6). Processed food prices excluding bread and cereals, which edged up by 0.9 percent in the first half of the year, increased by 2.82 percent in the third quarter. In short, food inflation, which stood at 8.73 percent as of September, hovered above the level projected in the July Inflation Report in this quarter.

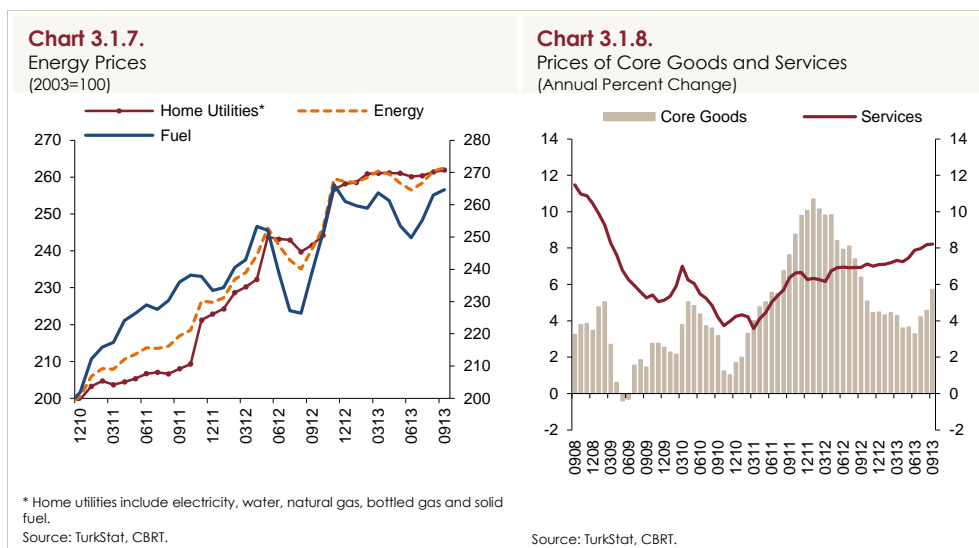


**Table 3.1.1.**  
Prices of Goods and Services  
(Quarterly and Annual Percent Change)

	2012			2013		
	III	IV	Annual	I	II	III
<b>CPI</b>	<b>1.36</b>	<b>2.74</b>	<b>6.16</b>	<b>2.63</b>	<b>1.33</b>	<b>0.97</b>
<b>1. Goods</b>	<b>1.12</b>	<b>3.25</b>	<b>5.82</b>	<b>2.95</b>	<b>0.90</b>	<b>0.46</b>
Energy	3.70	5.02	13.79	0.86	-0.92	2.95
Food and Non-Alcoholic Beverages	4.01	3.12	3.90	7.06	-1.69	0.19
Unprocessed Food	7.01	2.82	-2.78	13.87	-4.70	-2.29
Processed Food	1.92	3.35	9.37	1.63	0.99	2.27
Goods (excl. energy and food)	-2.24	2.50	3.78	0.92	3.65	-0.38
Core goods	-2.93	3.03	4.49	-1.52	4.86	-0.62
Durable Goods (excl. gold)	-0.69	-0.48	0.17	2.54	0.05	3.75
Alcoholic Beverages, Tobacco and Gold	1.03	0.04	0.57	12.41	-1.35	0.68
<b>2. Services</b>	<b>2.00</b>	<b>1.38</b>	<b>7.09</b>	<b>1.78</b>	<b>2.50</b>	<b>2.32</b>
Rent	1.59	1.61	5.46	1.25	1.59	1.70
Restaurants and Hotels	2.66	1.74	9.31	2.07	2.18	2.85
Transport	3.21	0.81	8.16	1.88	2.34	2.63
Communication	1.79	3.00	7.08	0.40	1.28	1.30
Other Services*	1.27	0.41	6.04	2.58	4.02	2.65

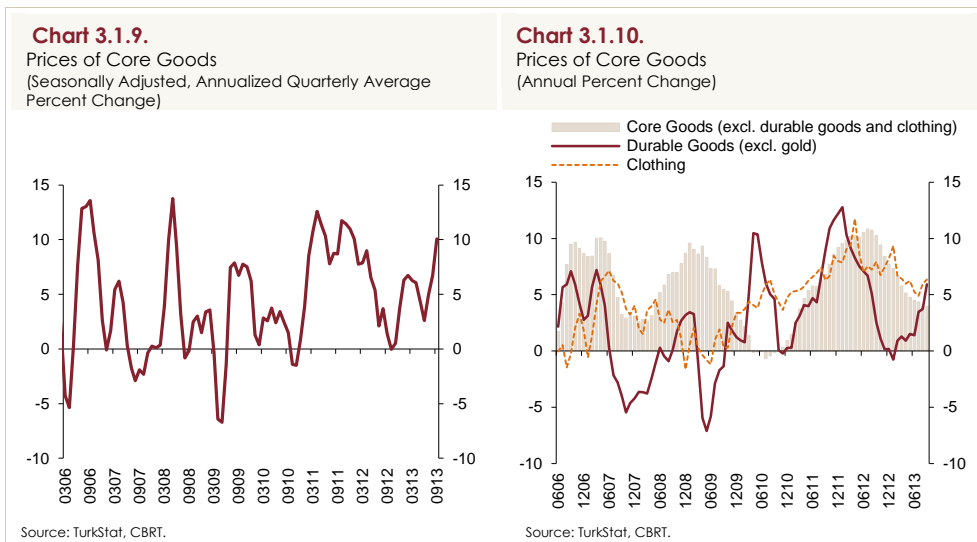
\* Services excluding rents, restaurants, hotels, transport and communication.  
Source: TurkStat, CBRT.

Energy prices increased by 2.95 percent in the third quarter (Table 3.1.1). This surge was led by domestic fuel prices that went up by 6.58 percent in this quarter amid soaring international oil prices in July and August. In addition, prices of home utilities rose amid surging bottled gas prices in this period (Chart 3.1.7). As a result, given the base effects, annual energy inflation decreased by 0.79 percentage points to 8.04 percent in the third quarter. Under the assumption that administered prices will not be subject to any adjustment in the last quarter, annual energy inflation is expected to fall to a rather low level at the end of the year due to the high base from the previous year.



Annual core goods inflation increased by around 2.5 percentage points to 5.74 percent in the third quarter (Chart 3.1.8). With this surge driven by exchange rate developments, the seasonally adjusted underlying trend of the core goods prices registered a significant hike as well (Chart 3.1.9). Prices of durable consumption goods, which experience relatively faster pass-through from the exchange rate, posted an increase by 3.75 percent, and annual inflation increased remarkably in this quarter (Chart 3.1.10). Across subcategories, hikes in automobile prices were noteworthy, while prices of furniture and white goods also recorded increases in this quarter (Table 3.1.2). The seasonal discount in the clothing group was lower than in the same period of the previous year, thereby pulling up annual inflation to 6.36 percent in the third quarter. On the other hand, annual inflation in core goods excluding clothing and durables continued to trend downwards in this period (Chart 3.1.10). To sum up, the depreciation of the Turkish lira, which has been continuing since May, affected the prices of core goods in the third quarter.

Currently, the effects of the depreciation are mostly limited to durable consumption goods. However, repercussions of this depreciation are yet to be seen in other core goods prices in the upcoming period. Therefore, the rise in core goods inflation is expected to continue for a while.

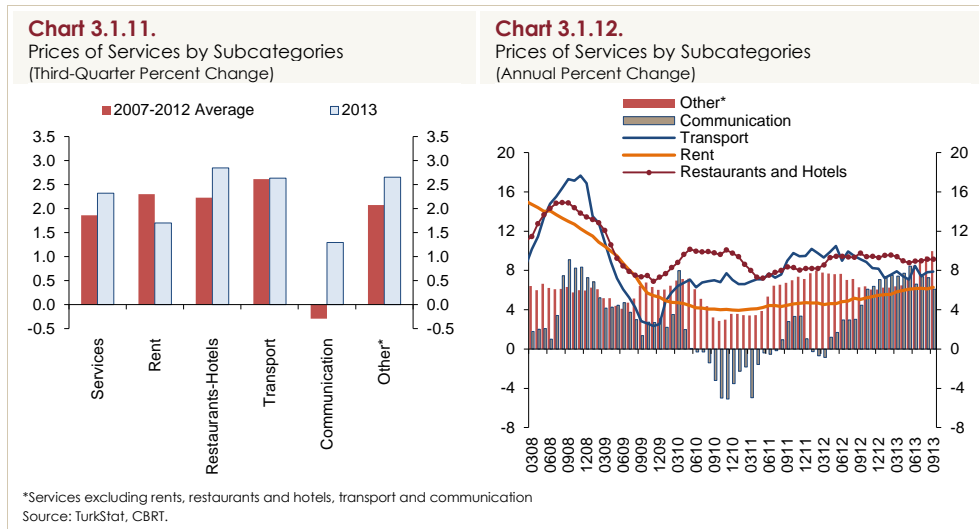


**Table 3.1.2.**  
Prices of Core Goods  
(Quarterly and Annual Percent Change)

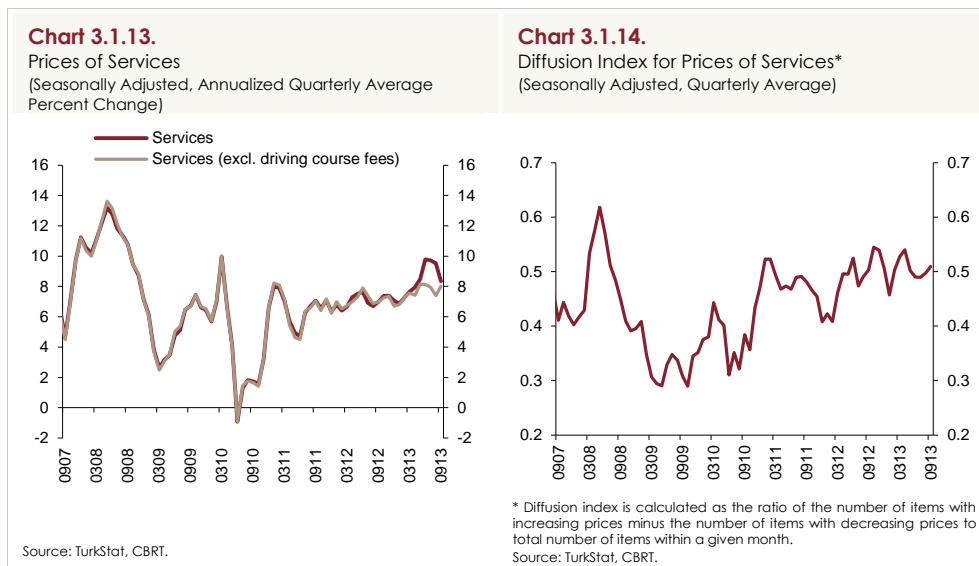
	2012			2013		
	III	IV	Annual	I	II	III
<b>Core Goods</b>	<b>-2.93</b>	<b>3.03</b>	<b>4.49</b>	<b>-1.32</b>	<b>4.86</b>	<b>-0.62</b>
<b>Clothing and Footwear</b>	<b>-11.37</b>	<b>12.00</b>	<b>8.20</b>	<b>-10.90</b>	<b>20.95</b>	<b>-10.43</b>
<b>Durable Goods (excl. gold)</b>	<b>-0.69</b>	<b>-0.48</b>	<b>0.17</b>	<b>1.41</b>	<b>0.05</b>	<b>3.75</b>
Furniture	-0.58	1.84	6.33	3.19	0.65	1.59
Electrical and Non-Electrical Appliances	-0.65	-0.96	-3.41	0.94	-2.66	0.12
Automobile	-0.82	-1.07	-0.40	1.09	0,72	5.55
Other Durable Goods	0.69	0.54	5.68	1.22	1.53	1.80
<b>Other</b>	<b>1.28</b>	<b>1.05</b>	<b>7.71</b>	<b>2.76</b>	<b>1.15</b>	<b>0.75</b>

Source: TurkStat, CBRT.

Annual services inflation posted a quarter-on-quarter increase by 0.34 percentage points to 8.22 percent (Chart 3.1.8). Thus, price increases in the third quarter proved higher than the averages of past years. This was mainly driven by the prices of communication as well as restaurant-hotel and other services (Chart 3.1.11). An analysis of annual rates of increase as of September suggests that restaurants and hotels remained flat above the overall services, while rents and other services continued with a stable uptrend (Chart 3.1.12).



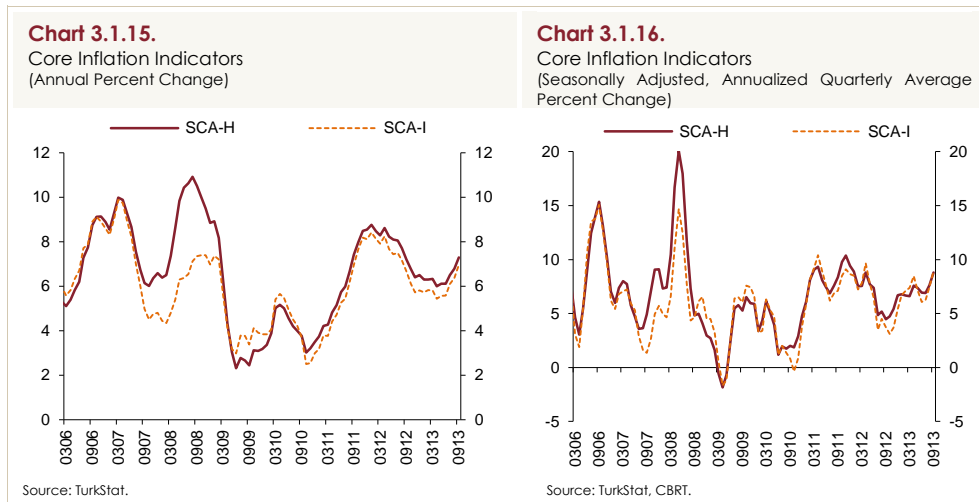
The seasonally adjusted data excluding driving course fees, which led to a temporary increase in services inflation as of June, suggest that the underlying trend remained broadly unchanged from the previous quarter (Chart 3.1.13). Similarly, the diffusion index also remained unchanged when compared to June (Chart 3.1.14). Accordingly, the underlying trend of services inflation was preserved at 8 percent.



Indicators regarding the underlying trend of services prices suggest that the inflationary effects of the recent depreciation of the Turkish lira remained limited. This is an expected outcome since the exchange rate pass-through is weak in the services sector compared to core goods and energy with high import components (Box 3.1). Considering the share of domestic cost factors in

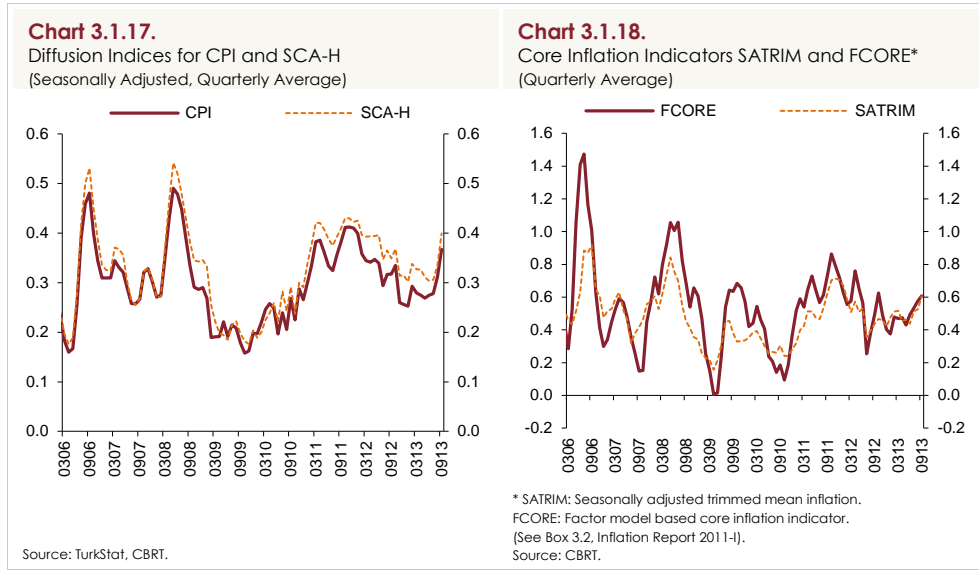
the services group, the high course of the underlying trend of inflation is attributed to wage developments.<sup>1</sup>

Annual inflation in the SCA-H and SCA-I, which are among core inflation indicators, rose to 7.29 and 6.96 percent, respectively, in the third quarter (Chart 3.1.15). This rise was driven by the hike in core goods prices. The seasonally adjusted data pointed to a quarter-on-quarter increase in the underlying trend of the SCA-H and SCA-I indices (Chart 3.1.16). In this period, the seasonally adjusted trend of increase in core goods prices registered a surge upon exchange rate developments, while the seasonally adjusted rate of increase in services prices did not record a noticeable change.



In the third quarter, diffusion indices regarding the CPI and the SCA-H indicator increased slightly (Chart 3.1.17). The diffusion index of core goods prices surged in the third quarter, while the diffusion index for services prices remained virtually unchanged. Meanwhile, FCORE and SATRIM, the alternative core inflation indicators monitored by the CBRT, trended slightly upwards compared to the second quarter (Chart 3.1.18). In sum, the analysis of core inflation indicators, diffusion indices and alternative core indicators suggests that the underlying trend of inflation is higher compared to the second quarter due to exchange rate developments. It should also be noted that the lagged effects of exchange rate developments pose an upside risk to inflation in the upcoming period.

<sup>1</sup> For an evaluation on the effect of domestic cost factors on inflation, see Box 3.1, Inflation Report 2013-III.



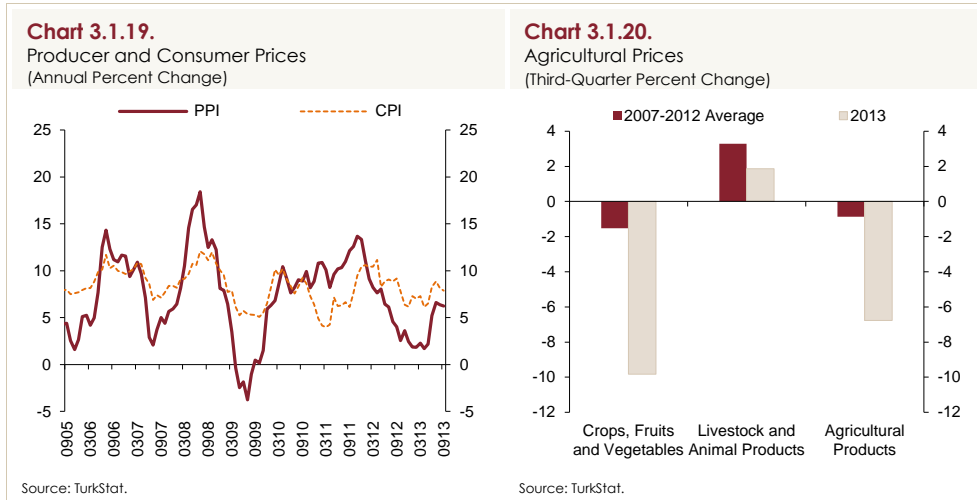
Producer prices increased by 1.95 percent on account of the hike in manufacturing prices in the second quarter of 2013, and annual PPI inflation went up by around 1 percentage point to 6.23 percent mainly due to exchange rate developments (Table 3.1.3 and Chart 3.1.19). On the other hand, having followed a more favorable course than past years, agricultural prices plummeted by 6.77 percent. This is attributed to the prices of crops, fruits and vegetables that recorded historic-lows (Chart 3.1.20).

**Table 3.1.3.**  
PPI and Subcategories  
(Quarterly and Annual Percent Change)

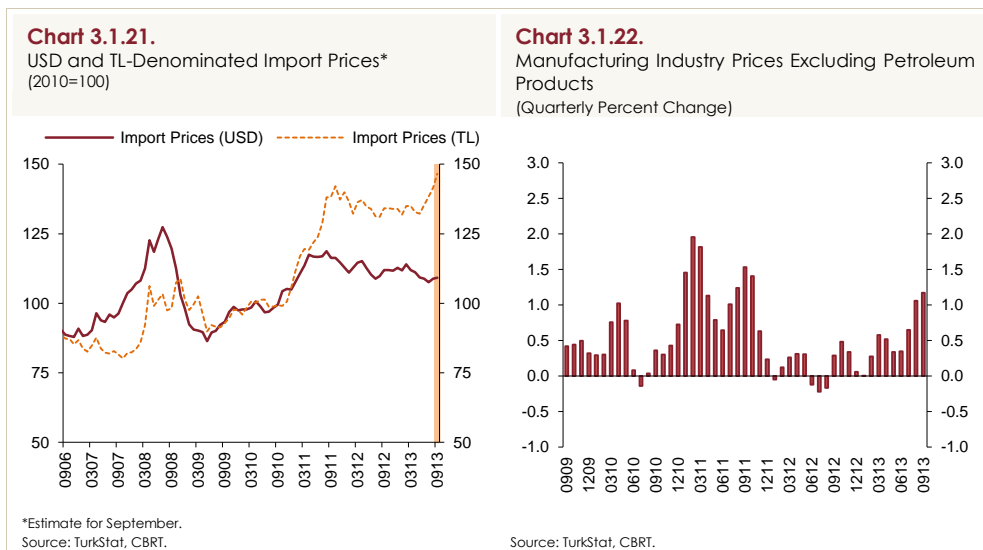
	2012			2013		
	III	IV	Annual	I	II	III
<b>PPI</b>	<b>0.97</b>	<b>1.72</b>	<b>2.45</b>	<b>0.50</b>	<b>1.95</b>	<b>1.92</b>
<b>Agriculture</b>	<b>0.91</b>	<b>-3.31</b>	<b>-4.17</b>	<b>-0.06</b>	<b>6.94</b>	<b>-6.77</b>
Crops, Fruits and Vegetables	2.82	-4.78	-5.05	2.32	10.72	-9.83
Livestock and Animal Products	-0.16	-0.29	-3.15	-8.47	-0.62	1.86
<b>Industry</b>	<b>0.98</b>	<b>2.74</b>	<b>3.83</b>	<b>0.61</b>	<b>0.98</b>	<b>3.71</b>
Mining	2.13	0.13	5.49	3.90	2.11	4.61
<b>Manufacturing</b>	<b>1.22</b>	<b>-0.17</b>	<b>1.27</b>	<b>1.87</b>	<b>0.88</b>	<b>3.97</b>
Manufacturing (excl. petroleum products)	0.87	0.18	1.48	1.75	1.04	3.56
Manufacturing (excl. petroleum and base metal products)	1.15	0.48	2.50	1.76	1.11	3.30
Electricity, Gas and Water	-1.41	28.21	23.64	-11.28	1.45	0.82

Source: TurkStat, CBRT.



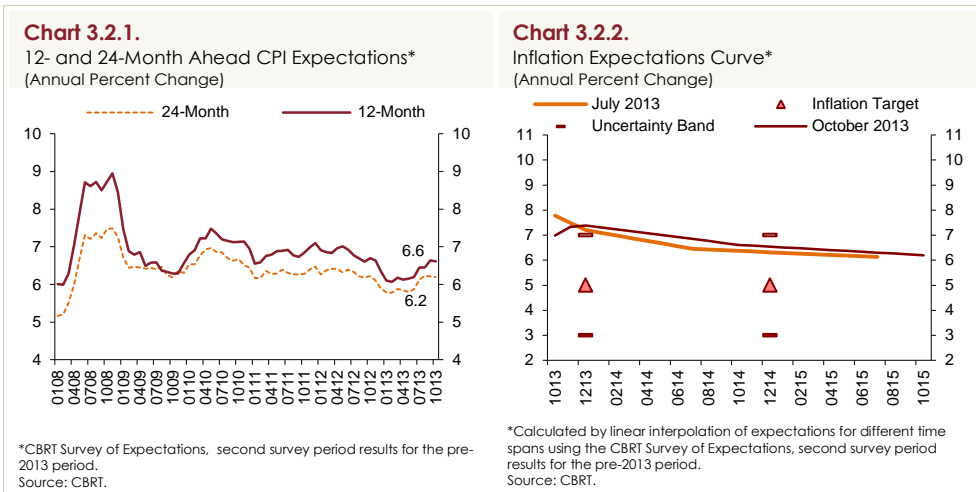


Despite the favorable course of commodity prices, manufacturing industry prices soared by 3.97 percent in the third quarter of 2013 due to the depreciation of the Turkish lira (Table 3.1.3). In this period, the USD-denominated import prices remained mild in line with the commodity prices, while TL-denominated import prices recorded an increase (Chart 3.1.21). Manufacturing industry prices excluding petroleum products surged by 3.56 percent in this quarter, and the annual inflation in this subcategory recorded a quarter-on-quarter increase by 2.78 percentage points to 6.66 percent. Producer prices witnessed wide-ranging increases in this quarter (Chart 3.1.22). To sum up, having increased parallel to the exchange rate developments, producer prices pose cost-side pressure on consumer prices, particularly on durable consumption goods, as projected in the July Inflation Report.

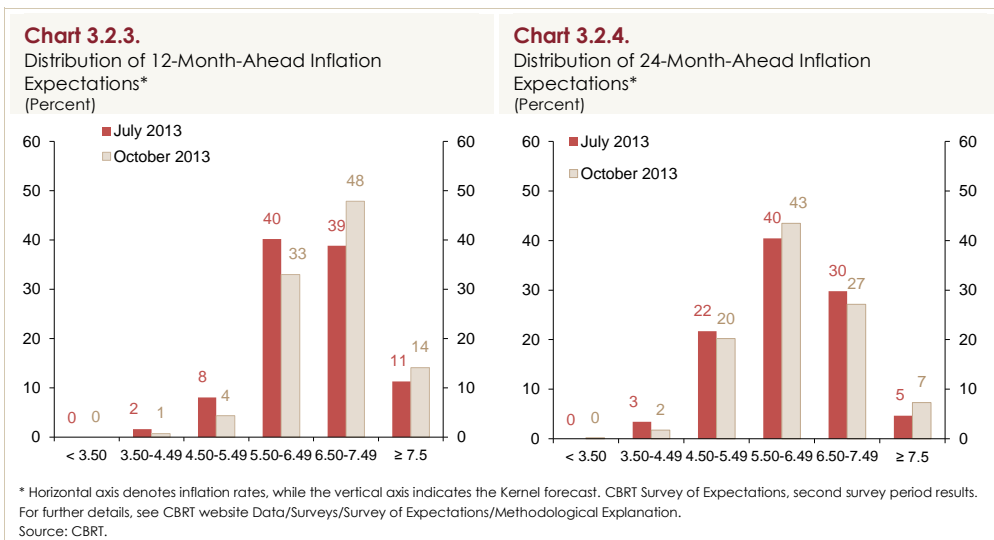


### 3.2. Expectations

Medium-term inflation expectations, which displayed a flat course in the first half of 2013, registered an increase in the third quarter upon the depreciation of the Turkish lira and its effects on core inflation indicators (Chart 3.2.1). In October, medium-term expectations remained virtually unchanged. Across maturities, inflation expectations for end-2013 were revised downwards compared to the previous quarter, while 12-month ahead inflation expectations registered a limited uptick. The spread narrowed for longer-term expectations (Chart 3.2.2). Nevertheless, inflation expectations still hover above the inflation target of 5 percent set for the end-2013 and 2014.



The dispersion of respondents' 12-month and 24-month-ahead inflation expectations deteriorated slightly in October (Charts 3.2.3 and 3.2.4).



### Box 3.1 Import Prices and Exchange Rate Pass-Through in the CPI and Subcategories

This box analyzes the effect of exchange rate and import prices on the CPI and subcategories. Changes in the exchange rate and/or import prices are among major determinants of the short-term inflation dynamics in emerging economies. Given the recent depreciation of the Turkish lira, the effect of the exchange rate and import prices on the CPI is significant both to the inflation analysis and the formation of inflation forecasts.

Kara et al. (2005) showed that a notable pass-through is present from import prices to domestic prices given the intermediate inputs used in the manufacturing industry and the imported goods within the CPI, yet this pass-through declines after 2001. Moreover, Kara and Ögünç (2005) state that the pass-through from external prices was completed over a longer horizon (i.e. the pass-through has been slower) in the post-2001 period. The analysis of the size of the pass-through suggests that the pass-through of the exchange rate and import prices to the CPI excluding unprocessed food, alcohol and tobacco at the end of a year was estimated to be approximately 15 percent in the 2002-2011 period (Kara and Ögünç, 2011).

Studies on pass-through use aggregated indices. As the CPI is mostly composed of heterogeneous subcategories, the pass-through coefficient for each subcategory may vary. Such an approach may also bring about an aggregation bias. In addition to the analysis of the pass-through to the CPI, the analysis by subcategories determines the extent of the pass-through for each subcategory and aggregates the pass-through for each subcategory by the relevant weights, thus providing more detailed and comprehensive information. This study analyzes the pass-through from import prices (Import Unit Value Index) and exchange rate (USD) through the use of a VAR model for the 152 sub-indices of the CPI. The analysis uses quarterly data on five-digit sub-indices and TL-denominated import prices, and the sample period is from 2003Q1 to 2013Q2.

The basic structure for the VAR model is as follows:

$$P_{i,t}^e = c + \alpha_1 P_{i,t-1}^e + \alpha_2 P_{i,t-2}^e + \dots + \alpha_k P_{i,t-k}^e + \beta_1 P_{t-1}^{ith} + \beta_2 P_{t-2}^{ith} + \dots + \beta_k P_{t-k}^{ith} + \varepsilon_{i,t} \quad (1)$$

$$P_t^{ith} = d + \gamma_1 P_{t-1}^{ith} + \gamma_2 P_{t-2}^{ith} + \dots + \gamma_k P_{t-k}^{ith} + \theta_1 P_{t-1}^e + \theta_2 P_{t-2}^e + \dots + \theta_k P_{t-k}^e + \varepsilon_t \quad (2)$$

Here,

$P_{i,t}^e$  denotes the quarterly percent change in the price of sub-group  $i$  in period  $t$ ,

$P_t^{ith}$  denotes the quarterly change in the TL-denominated import prices in period  $t$ .

The VAR model is estimated with the optimal lag value selected for each sub-index.<sup>2</sup> Cumulative responses of each sub-index to TL-denominated import price shock at the end of two quarters are obtained through the impulse-response functions. Then, the pass-through is calculated for the selected CPI subcategories by using the size of the pass-through and relative weights of 152 sub-indices (Table 1).

**Table 1. 6-Month Cumulative Responses of CPI and Selected Subcategories to Import Price and Exchange Rate Shock\* (Percent)**

Energy	21.	Gold	89.1
Core Goods	14.	Fuel	31.2
CPI	13.	Unprocessed Food	23.2
CPI (excl. unprocessed food, alcohol and tobacco)	13.	Durable Goods (excl.gold)	21.0
SCA-H	10.	Core Goods (excl. clothing)	18.7
SCA-I	9.8	Home Utilities	16.7
Services	4.7	Processed Food	12.4

\*6-month cumulative response is reported in this study as the majority of the pass-through is completed within the first six months, as also stated in previous studies. For unprocessed food, the results of the VAR model including the exchange rate instead of import prices are reported. The CPI pass-through is calculated under the assumption that the pass-through in the alcohol and tobacco is zero.

As expected, the effects of the exchange rate and import prices are mostly visible in subcategories such as gold, fuel and durable consumption goods. Furthermore, the unprocessed food has a high pass-through, while services have the lowest pass-through. As for the aggregated indices, the pass-through at the end of 6 months is calculated as 13 percent for the CPI excluding unprocessed food, alcohol and tobacco, and 13.4 percent for the headline CPI. As the SCA-H and SCA-I indices exclude energy, they have a lower pass-through. These results are mostly consistent with the former studies, which leads one to conclude that the aggregation bias may not be high, and the results obtained for subcategories entail sound information. This study, unlike previous ones, calculates pass-through at the micro level by using the most detailed price indices and aggregates these for different subcategories. The results suggest that the pass-through from the exchange rate and import prices varies across subcategories.<sup>3</sup>

#### REFERENCES

- Kara, H., F. Öğünç, 2005, Exchange rate pass-through in Turkey: It is slow, but is it really low?, CBRT Working Paper No. 05/10.
- Kara, H., F. Öğünç, 2011, Döviz Kuru ve İthalat Fiyatlarının Enflasyona Etkisi (in Turkish), CBT Research Notes in Economics No. 11/14.
- Kara, H., H. Küçük-Tuğçer, Ü. Özlale, B. Tuğçer, D. Yavuz, E. M. Yücel, 2005, Exchange rate pass-through in Turkey: has it changed and to what extent?, CBRT Working Paper No. 05/04.

<sup>2</sup> The optimal lag value is found to be 1 for most sub-indices.

<sup>3</sup> This study can be extended to include the output gap. Moreover, for some sub-items (e.g. clothing), the lag value may be higher. Even though 6-month cumulative pass-through is reported in this study, the pass-through may last longer and be higher for some subcategories like services with inelastic prices.