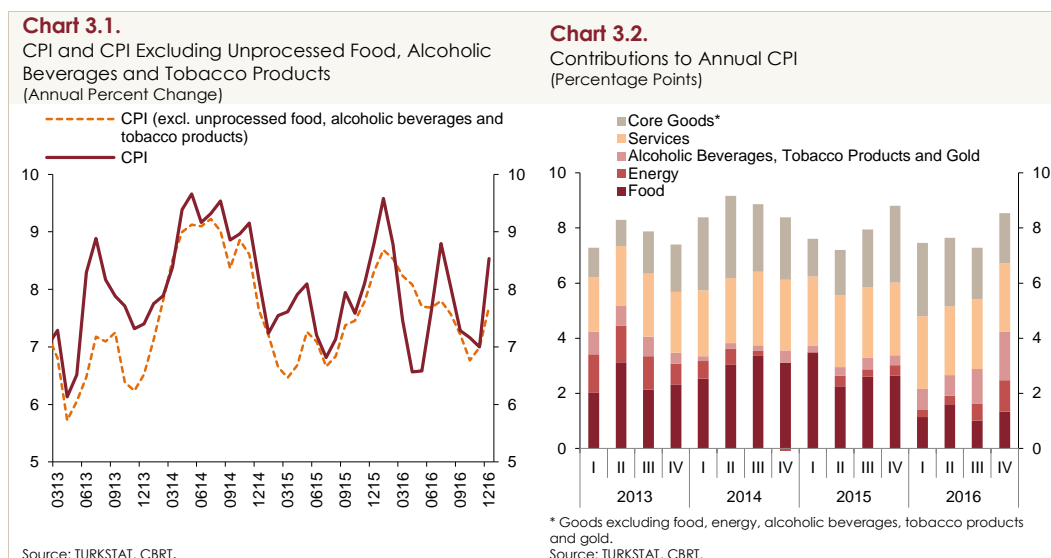


3. Inflation Developments

Consumer inflation increased by 1.25 points to 8.53 percent on a quarterly basis at end-2016 (Chart 3.1). Upon a gradual slowdown after July, consumer inflation fell to 7 percent in November, but surged in December and remained above the uncertainty band around the inflation target. This was driven by the depreciation in the Turkish lira, adjustments in taxes and the partial rise in food prices. Across subcategories, energy prices displayed marked changes over the quarter, while price developments in alcoholic beverages, tobacco products, food and core goods were remarkable in December. The post-September depreciation of the Turkish lira was first reflected in energy prices, which have a relatively faster exchange rate pass-through. Moreover, energy inflation was also spurred by the crude oil prices.

Recent tax adjustments, particularly on tobacco products, also gave a notable push to inflation. The September SCT rise in fuel products was followed by the tax adjustments in automobiles in November and the December SCT rise in alcoholic beverages and tobacco products, which was imposed for the second time in 2016 after the January hike. Thus, tax hikes within the last four months drove inflation higher by 0.7 points in total. Taking into account the January adjustments, the administered prices contributed to inflation well beyond historical averages in 2016.

After a moderate course up to November, food prices surged in December due to depreciating Turkish lira and adverse weather conditions. Despite this acceleration, food inflation completed the year with historic-lows at 5.65 percent, due both to the faltering tourism sector and the measures in effect. Core goods inflation slowed steadily until November, but increased in December amid the price developments in durable goods, which were driven by tax adjustments in automobiles and the surge in the exchange rate. Services inflation, on the other hand, remained high by not recording a noticeable change on a quarterly basis. Against this background, annual inflation in core indicators trended upwards in December. Despite subsided demand conditions, the last quarter of the year was marked by dominating cost-side pressures amid the depreciated Turkish lira and soaring commodity prices, which led to a higher tendency to increase prices.

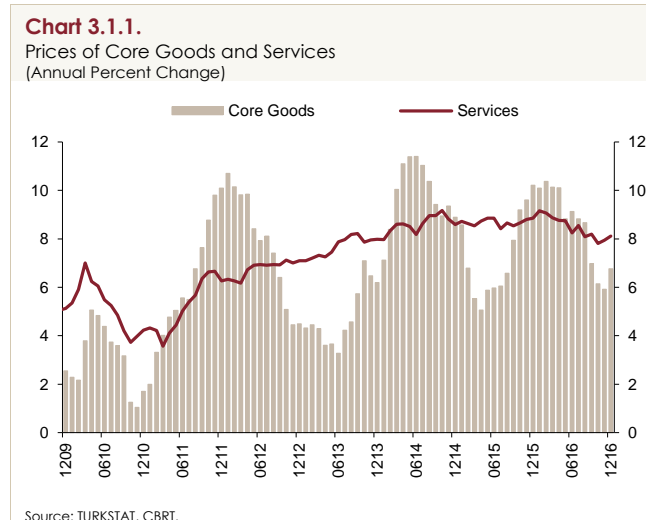


Among subcategories, contribution of energy, alcoholic beverages and tobacco products, and food increased by 0.5, 0.4 and 0.3 points, respectively, to annual inflation in the fourth quarter, while that of core goods and services was unchanged (Chart 3.2). Hence, the contribution of core items to consumer inflation remained flat quarter-on-quarter.

Overall, despite the disinflationary effect of economic activity, the inflation outlook deteriorated in the last quarter due to tax hikes, aggravating cost pressures and the partial increases in food prices. In particular, the inflation outlook has deteriorated mainly due to the depreciation in the Turkish lira. In the meantime, labor-intensive sectors, mostly services, experienced the adverse effects of the rise in real wages throughout the year, while medium-term inflation expectations remained high by deteriorating further in the last quarter. The recent exchange rate movements constitute upside risks to inflation prospects for the coming period. On the other hand, aggregate demand developments may partly contain these exchange-rate-driven effects. Leading indicators show that food prices, which increased slightly in December, rose further in January amid aggravated winter conditions. In the February-April period, annual food inflation is expected to remain high also due to the low base from the previous year. Lastly, it should be noted that inflation is subject to demand-driven downside risks as well, conditional on prospects for a further slowdown in economic activity.

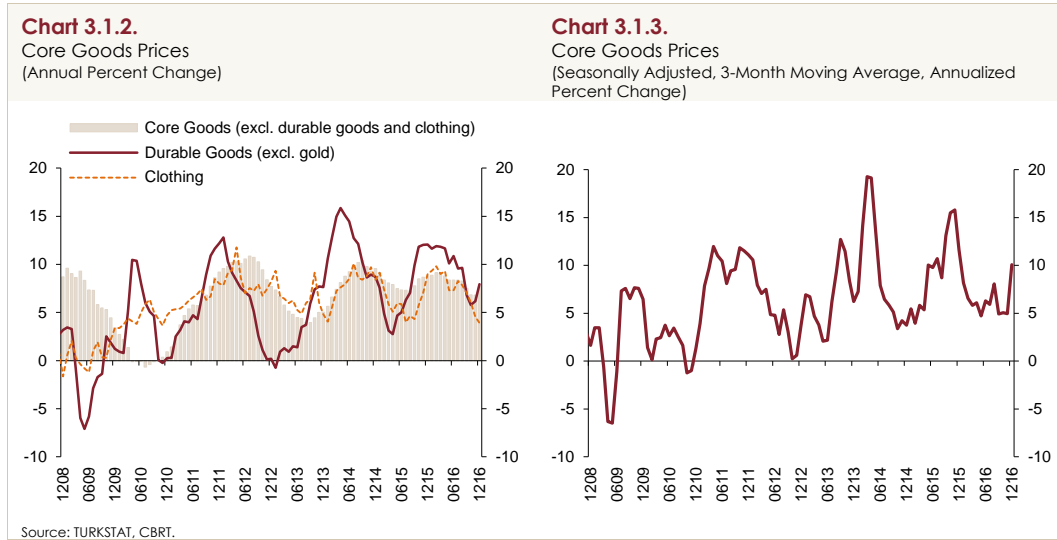
3.1. Core Inflation Outlook

Annual core goods inflation inched down by 0.21 points to 6.77 percent in the fourth quarter (Table 3.1.1, Chart 3.1.1). Given the slowdown in domestic demand, clothing prices fell beyond seasonal averages, causing annual inflation in this category to drop by 3.07 points to 3.92 percent. Inflation in durable goods surged amid the depreciated Turkish lira, while inflation in core goods excluding clothing and durables recorded a relatively minor increase in this period (Chart 3.1.2).



In the last quarter of 2016, prices of durable goods soared beyond historical averages with annual inflation rising above 1 point to 7.93 percent (Chart 3.1.2). This was caused by the depreciation in the Turkish lira, which had various effects on subcategories depending on sectoral demand conditions. Across subcategories, the most marked price increase was experienced in automobiles and white goods in this period, which registered robust domestic sales (Table 3.1.1). In addition to the

exchange rate, the hikes in automobile prices were also fueled by the change in SCT rates in motor vehicles as per the fiscal measures of late November. On the other hand, furniture prices remained almost flat amid modest demand conditions.



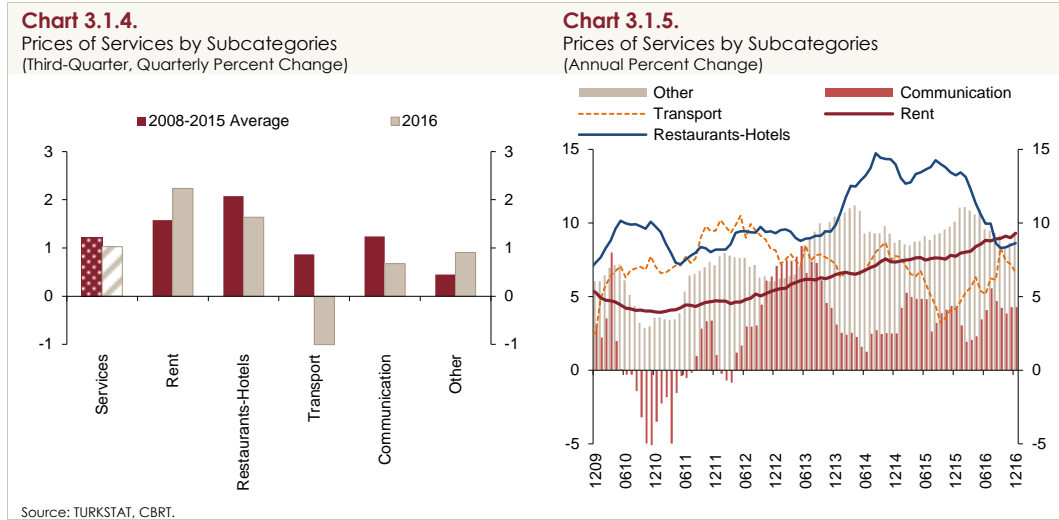
After a horizontal course in October and November, the underlying trend of core goods inflation recorded a jump in December (Chart 3.1.3). Overall, changes in core goods prices diverged across subcategories in the last quarter with inflation decelerating in clothing and furniture, but accelerating amid the depreciating Turkish lira in sectors with relatively strong domestic sales.

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

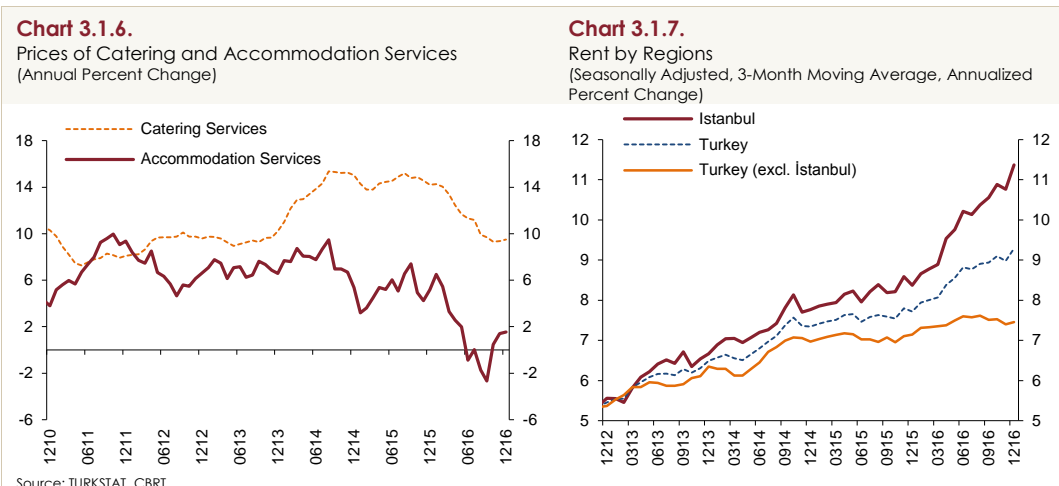
	2015		2016				
	IV	Annual	I	II	III	IV	Annual
CPI	2.44	8.81	1.75	1.84	1.05	3.64	8.53
1. Goods	3.02	8.79	1.51	1.85	0.32	4.83	8.72
Energy	0.24	2.96	0.85	1.94	1.46	4.18	8.67
Food and Non-Alcoholic Beverages	3.03	10.87	2.65	-1.97	0.46	4.51	5.65
Unprocessed Food	4.07	13.83	2.49	-5.29	-0.48	8.19	4.52
Processed Food	2.11	8.33	2.80	1.01	1.25	1.46	6.67
Core Goods	5.15	10.22	-1.18	5.63	-2.54	4.95	6.77
Clothing and Footwear	15.34	9.00	-12.42	20.44	-12.06	12.02	3.92
Durable Goods (excl. gold)	1.66	12.05	3.70	0.57	0.74	2.74	7.93
Furniture	2.32	10.70	5.72	1.03	0.98	0.38	8.27
Electrical and Non-Electrical Appliances	1.96	9.69	1.38	-1.04	-0.46	1.87	1.73
Automobile	1.07	14.01	4.95	1.28	1.45	4.71	12.91
Other Durable Goods	2.94	12.28	0.87	2.40	1.11	2.02	6.55
Core Goods (excl. clothing and durable goods)	2.32	8.79	2.06	1.48	1.44	2.49	7.68
Alcoholic Beverages, Tobacco Products and Gold	-0.94	6.56	11.14	0.35	10.20	6.80	31.25
2. Services	1.10	8.85	2.33	1.83	2.71	1.03	8.11
Rent	1.90	7.73	1.80	2.48	2.49	2.23	9.30
Restaurants-Hotels	1.34	13.23	2.53	1.46	2.73	1.64	8.62
Transport	0.56	4.17	1.47	1.61	4.48	-1.01	6.63
Communication	0.63	4.36	0.00	1.87	1.69	0.67	4.29
Other Services	0.92	10.09	3.65	1.84	2.47	0.91	9.15

Source: TURKSTAT, CBRT.

Prices of services increased below historical averages in the last quarter by 1.03 percent, while annual services inflation remained high at 8.11 percent (Charts 3.1.1 and 3.1.4). As increases in rents accelerated in this period, annual rent inflation climbed to 9.3 percent (Chart 3.1.5). On the other hand, price hikes in restaurants-hotels, communication and transport services remained below last-quarter historical averages (Chart 3.1.4).

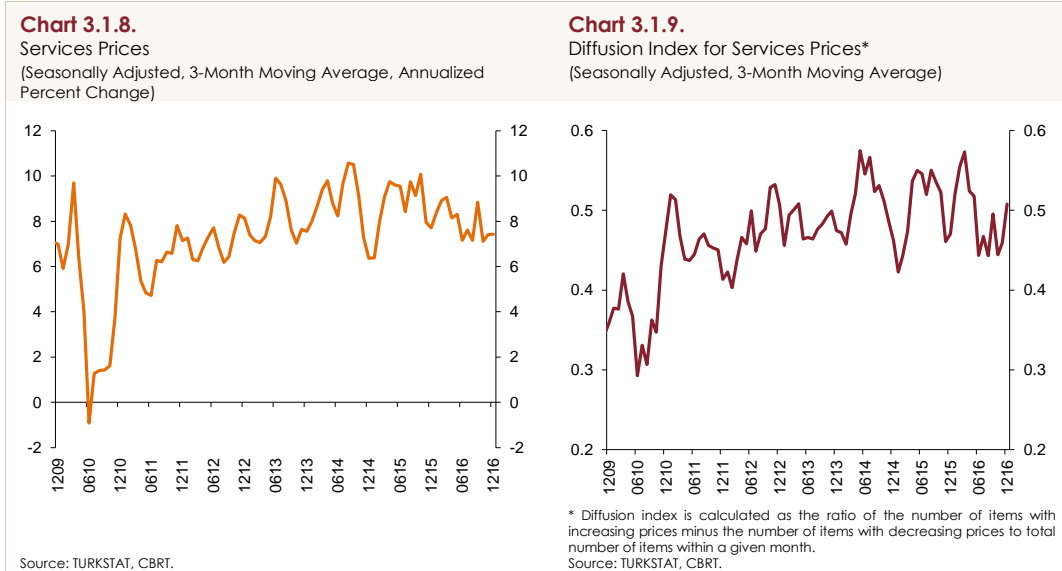


A detailed analysis of restaurants and hotels shows that annual inflation in catering services remained high at 9.50 percent with a limited slowdown, despite the relatively mild course of food prices (Chart 3.1.6). Being a labor-intensive sector, the minor fall in inflation in catering services was driven by minimum-wage-driven labor costs, which put a lid on the deceleration of inflation in other services categories as well. Unlike catering services, inflation in accommodation services remained low at 1.53 percent amid the languishing demand conditions in the tourism sector. In this period, rising fuel prices notwithstanding, transport services inflation decelerated due also to the slowing economic activity. As for other services, inflation decreased owing to package tour prices in October, while it climbed to 9.15 percent afterwards. Services inflation remained high also on the back of rents, which have been climbing since early 2011 (Chart 3.1.5). Rent inflation has recently diverged on a regional basis (Chart 3.1.7). Accordingly, annual rent inflation in provinces other than İstanbul remained relatively flat at 7.5 percent, while it boosted sharply by 11.4 percent in İstanbul.

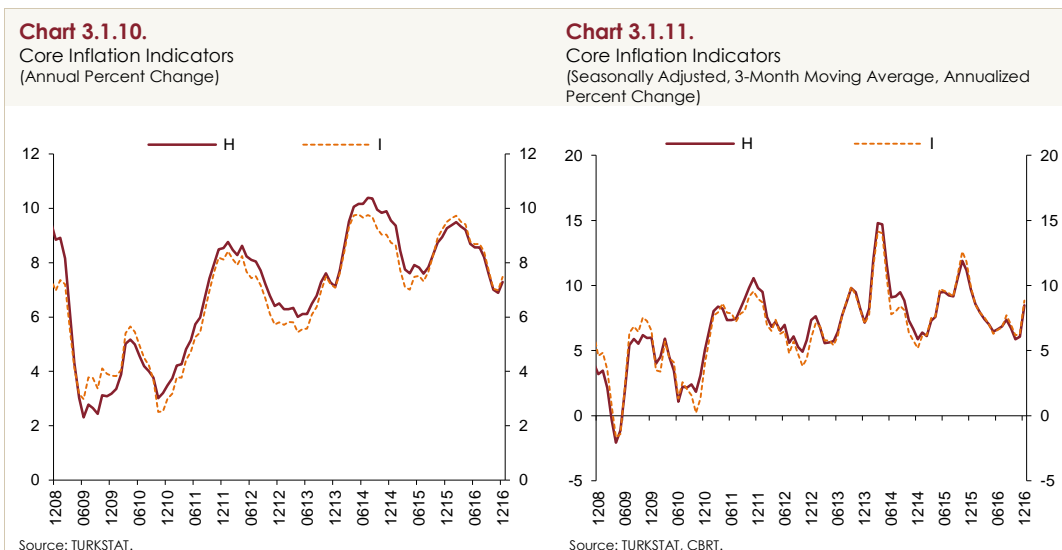


The underlying trend of services inflation inched down in this period, while the tendency to increase prices as monitored by the diffusion index displayed some acceleration as of December (Charts 3.1.8 and 3.1.9). In sum, the languishing demand conditions accompanied by the tourism slump

led to disinflation in services, which, however, was hindered by accelerating rents and wage developments. Services inflation remain high also due to the inflation level as well as inflation expectations.

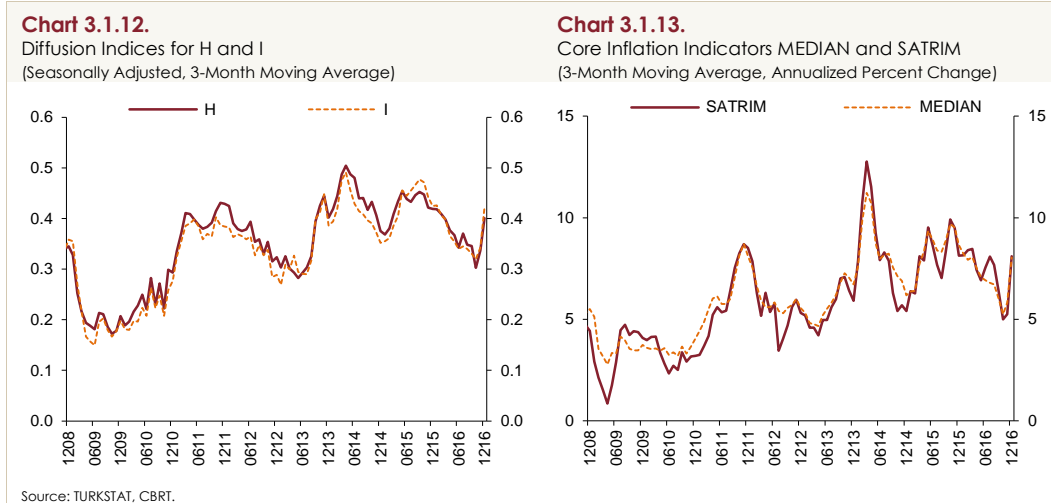


Annual inflation in H and I core inflation indicators declined slightly quarter-on-quarter to 7.29 and 7.48 percent, respectively, particularly on the back of the lower cumulative exchange rate effect on core goods inflation (Chart 3.1.10). On the other hand, the underlying trend of core inflation indicators recorded a quarterly deterioration with the pass-through of the recent depreciation of the Turkish lira to consumer prices in December (Chart 3.1.11).



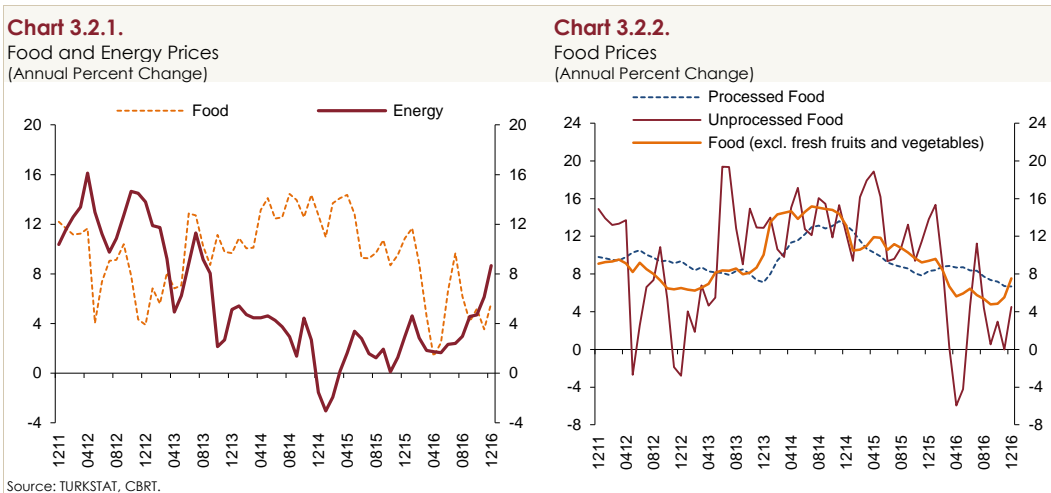
In this period, the diffusion indices for core indicators suggest a higher tendency for price increases compared to the third quarter (Chart 3.1.12). This observation can also be supported by SATRIM and MEDIAN, which are alternative core inflation indices monitored by the CBRT (Chart 3.1.13).

Hence, a joint analysis of these indicators on tendency and pricing behavior suggests that the underlying trend of inflation deteriorated remarkably compared to the previous quarter.

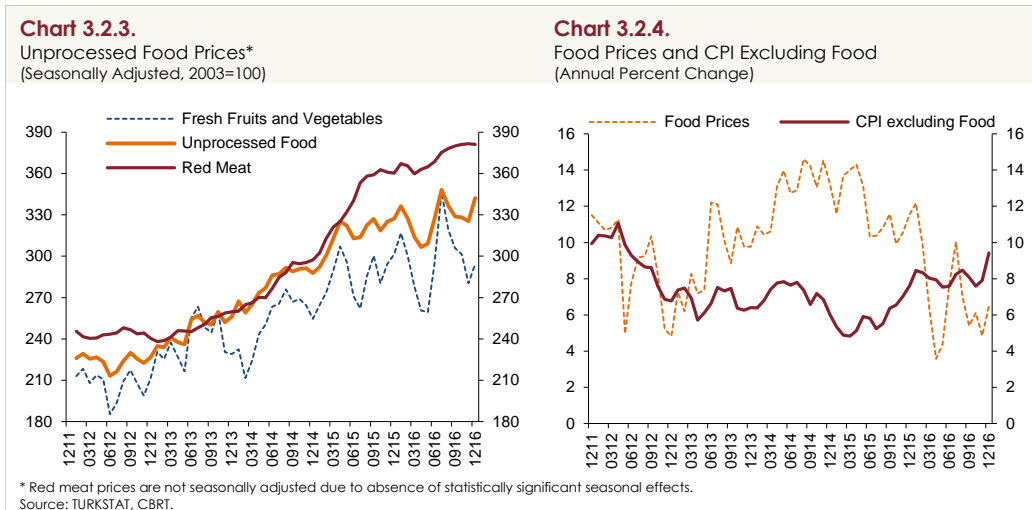


3.2. Food, Energy and Alcohol-Tobacco Prices

Upon a slight fall in the third quarter, annual food inflation increased by 1.49 points to 5.65 percent in the last quarter (Chart 3.2.1). Thus, annual food inflation remained relatively incompatible with the path projected in the October Inflation Report.

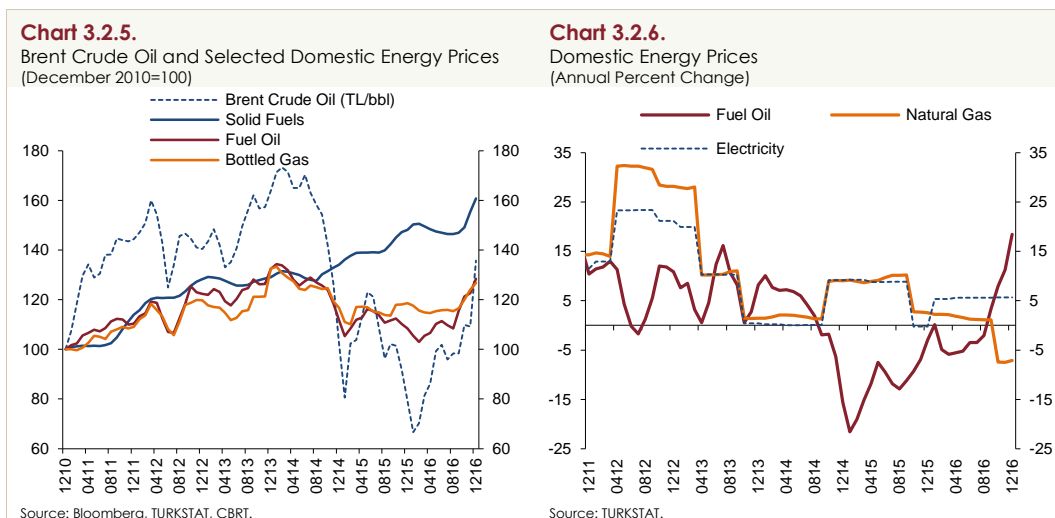


After following a favorable course at the end of the third quarter, annual unprocessed food inflation surged by 3.98 points to 4.52 percent in the last quarter (Chart 3.2.2). Seasonally adjusted unprocessed food prices point to a decline in October and November, but an upsurge in December (Chart 3.2.3). The rise in December was driven by prices of fresh fruits and vegetables, which hiked amid the adverse weather conditions. Unprocessed food inflation was also fueled by other subcategories such as white meat, legumes and eggs, the annual inflation of which climbed to 16.01, 20.31 and 35.43 percent, respectively. The annual red meat inflation, which has been declining due to the adopted measures, continued to hover mildly in the last quarter. Red meat prices are expected to remain moderate on the back of these measures.



On the processed food front, annual inflation fell by 0.68 points to 6.67 percent in the fourth quarter due to the prices of bread and cereals as well as fats and oils (Chart 3.2.2). Bread and cereals registered moderate price increases in this period, yet annual inflation remained high. On the other hand, subcategories recorded robust price hikes. Particularly, exchange rate developments had marked effects on fats and oils as well as coffee and tea. Lastly, analysis of food prices and CPI excluding food shows that the last-quarter rise in annual CPI inflation was mostly driven by non-food prices (Chart 3.2.4).

Energy prices surged by 4.18 percent in the fourth quarter due mainly to fuel, bottled gas and solid fuel prices (Table 3.1.1, Chart 3.2.5). Having stood at 46 USD at the end of the third quarter, Brent crude oil prices per barrel followed a fluctuating course and surged to 54 USD on average in December. In addition to the gradual increases in oil prices, the depreciation in the Turkish lira drove fuel and bottled gas prices up by 11.26 and 8.8 percent, respectively, on a quarterly basis. Taking the September SCT hike into account, fuel prices increased by 18.5 percent in cumulative terms in the last four months. Against these developments, annual energy inflation rose by 4.11 points to 8.67 percent in this period, despite the reduction in natural gas prices (Charts 3.2.1 and 3.2.6). Accordingly, the contribution of energy prices to consumer inflation increased markedly in this period.



Prices of alcoholic beverages and tobacco products increased by 7.33 percent in the last quarter. This was spurred by the December hike in SCT on alcoholic beverages and tobacco products and price increases introduced by firms on tobacco products above the level implied by the lump-sum SCT tax. Double SCT adjustment and price hikes imposed by cigarette producers pushed annual inflation up to 31.59 percent, which in turn, added 1.57 points to consumer inflation. The December hike will also be reflected in prices in January, albeit at relatively minor pace.

3.3. Domestic Producer Prices

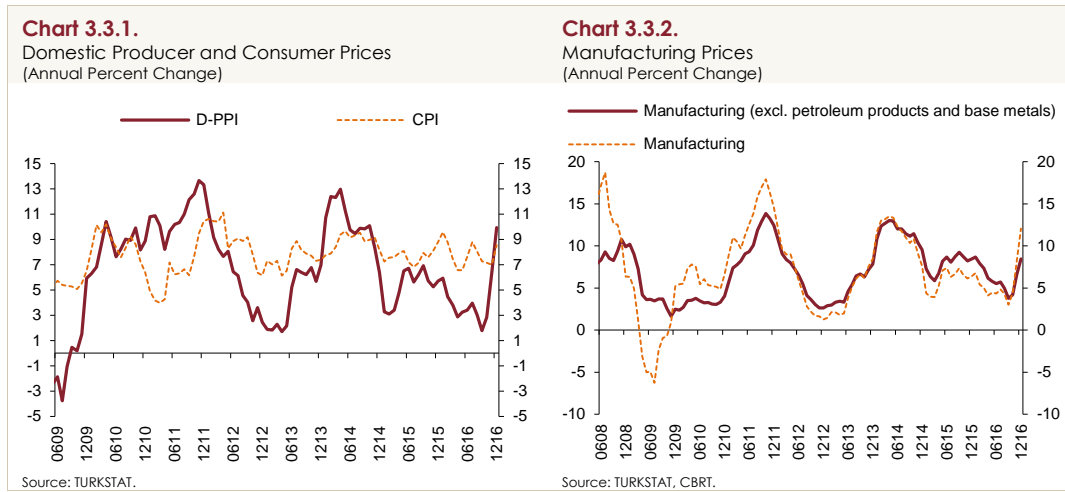
Domestic producer prices soared by 5.92 percent in the fourth quarter amid manufacturing price developments. Annual inflation in domestic producer prices posted a quarter-on-quarter increase by 8.16 points to 9.94 percent, leading to remarkably higher cost-side pressures (Table 3.3.1, Chart 3.3.1). In this period, international commodity prices, oil and metal in particular, increased and had an adverse effect on producer prices, which spilled over into D-PPI subcategories.

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

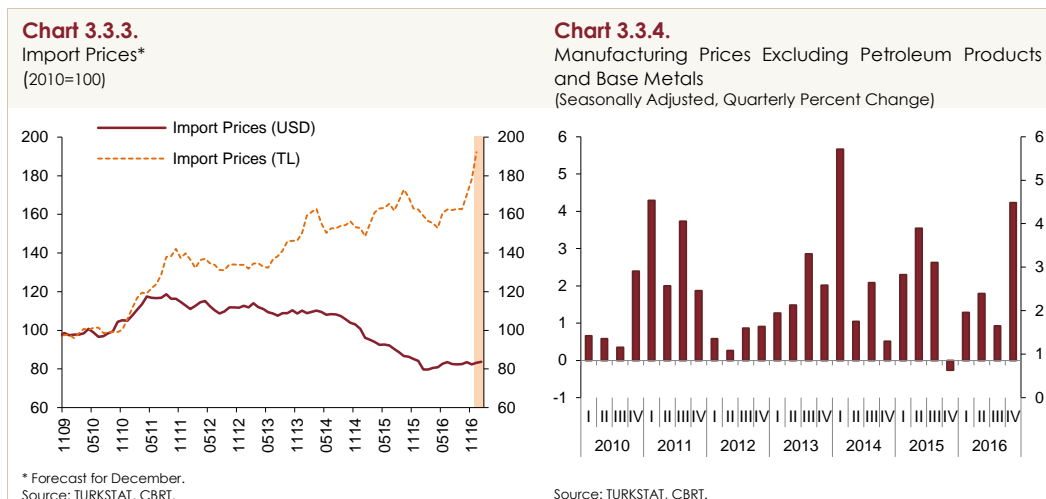
	2015		2016				
	IV	Annual	I	II	III	IV	Annual
D-PPI	-1.94	5.71	0.75	2.43	0.58	5.92	9.94
Mining	-1.08	-0.69	-1.36	6.49	-0.17	3.01	8.01
Manufacturing	-1.89	6.38	1.33	2.75	0.84	6.73	12.07
Manufacturing (excl. petroleum products)	-1.32	7.28	1.56	2.14	0.87	5.92	10.83
Manufacturing (excl. petroleum products and base metals)	-0.57	8.44	1.66	1.49	1.16	3.92	8.46
Electricity and Gas	-3.39	0.19	-4.99	-2.96	-2.20	-2.17	-11.79
Water	2.89	19.95	3.27	1.52	0.27	1.98	7.21
Main Subcategories of D-PPI							
Intermediate Goods	-2.30	5.69	1.19	2.59	0.43	9.17	13.83
Durable Goods	-0.40	12.48	4.76	2.56	2.15	1.82	11.75
Durable Goods (excl. jewelry)	2.54	11.78	3.31	0.97	0.59	2.14	7.17
Non-Durable Goods	-0.52	6.73	1.55	1.81	0.88	2.04	6.41
Capital Goods	-0.45	10.08	1.59	1.03	1.61	4.82	9.32
Energy	-5.54	-2.57	-4.86	4.46	-1.31	6.57	4.53

Source: TURKSTAT, CBRT.

Manufacturing prices surged by 6.73 percent quarter on quarter, while annual inflation climbed to 12.07 percent (Table 3.3.1, Chart 3.3.2). Similarly, manufacturing prices excluding petroleum products and base metals recorded an upsurge (Chart 3.3.2). In this period, import prices remained relatively flat in USD terms, but increased in TL-denominated terms amid exchange rate developments (Chart 3.3.3).



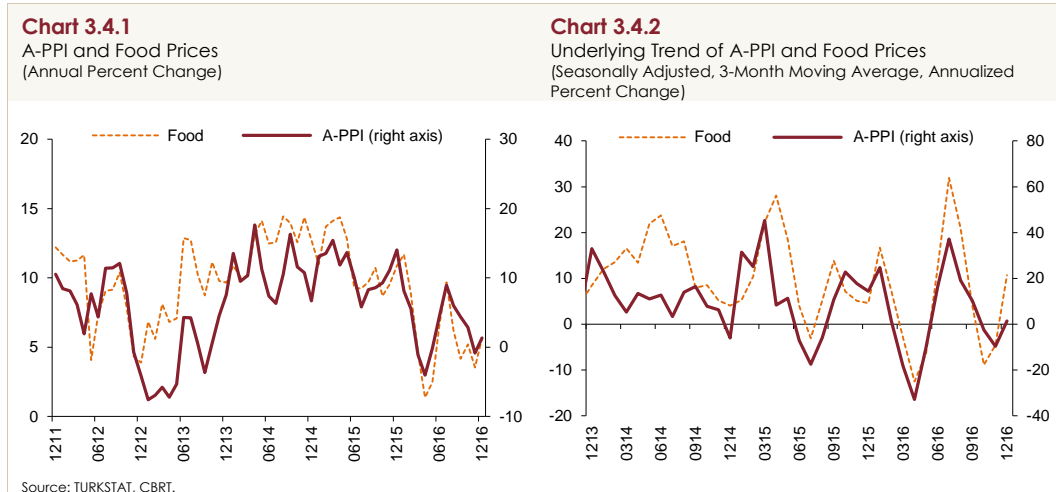
Across major categories, quarterly increases in prices were significantly higher in intermediate goods, energy and capital goods (Table 3.3.1). Price increases in intermediate goods were mostly driven by precious metals, iron-steel and ferroalloys as well as other products that are used in steel processing. Energy prices rose owing to prices of petroleum products. On the capital goods front, prices increased due to metal construction products and motor vehicle accessories. Against this background, the underlying inflation in manufacturing prices excluding petroleum products and base metals, which entails information on the underlying trend of producer prices, recorded a quarterly upsurge (Chart 3.3.4). All in all, cost pressures on consumer prices driven by producer prices remained robust in the last quarter.



3.4. Agricultural Producer Prices

In the fourth quarter of the year, agricultural producer prices increased by 0.95 percent, while annual inflation in this category fell by 3.06 points to 1.33 percent (Chart 3.4.1). Despite soaring prices of cereals and legumes, inflation in agricultural producer prices remained low in 2016 on the back of falling prices of fresh fruits and vegetables, vegetables in particular. Meanwhile, cereal prices followed a moderate path in the last quarter. Following the decline in October, wheat prices rebounded in the last two months, catching up with the third-quarter readings. On the other hand, legumes, particularly

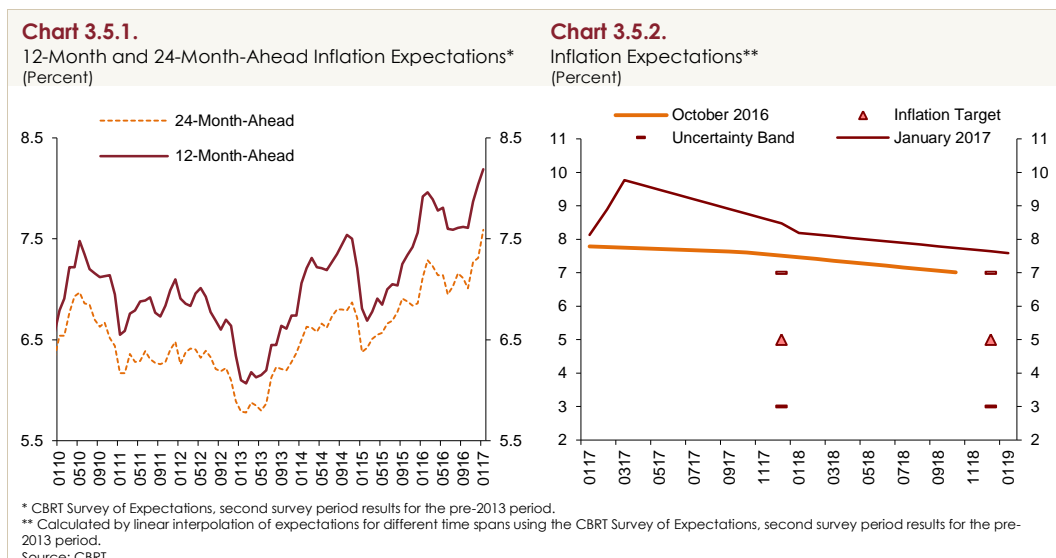
chickpeas and white beans, saw further price hikes, while live cattle prices remained on an uptrend in this period.



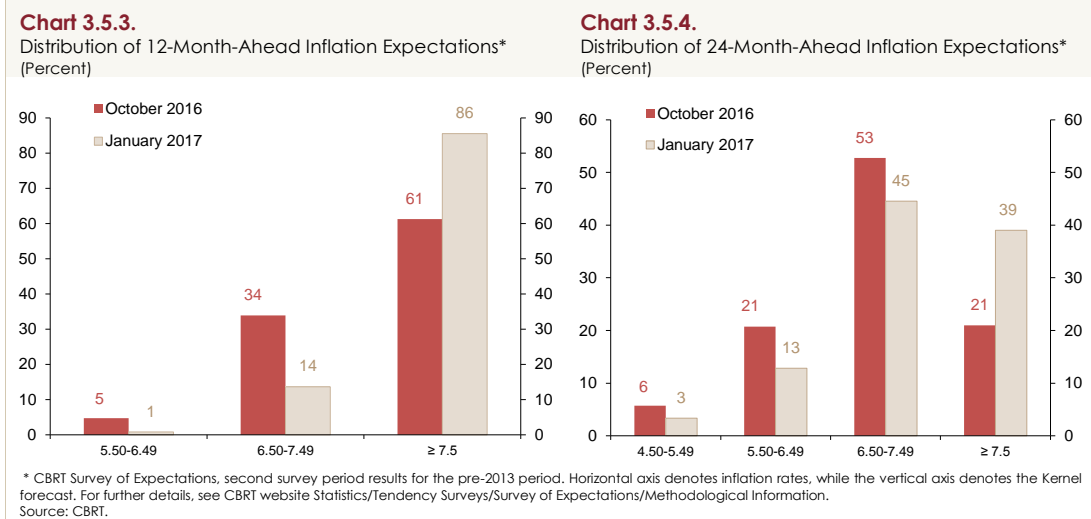
In seasonally adjusted 3-month moving average terms, the underlying trend of agricultural producer prices reveals a notable downturn in the first two months of the fourth quarter, but a slight rise in December. Consumer prices for food moved similarly, however, at a more accelerated pace than agricultural producer prices (Chart 3.4.2).

3.5. Expectations

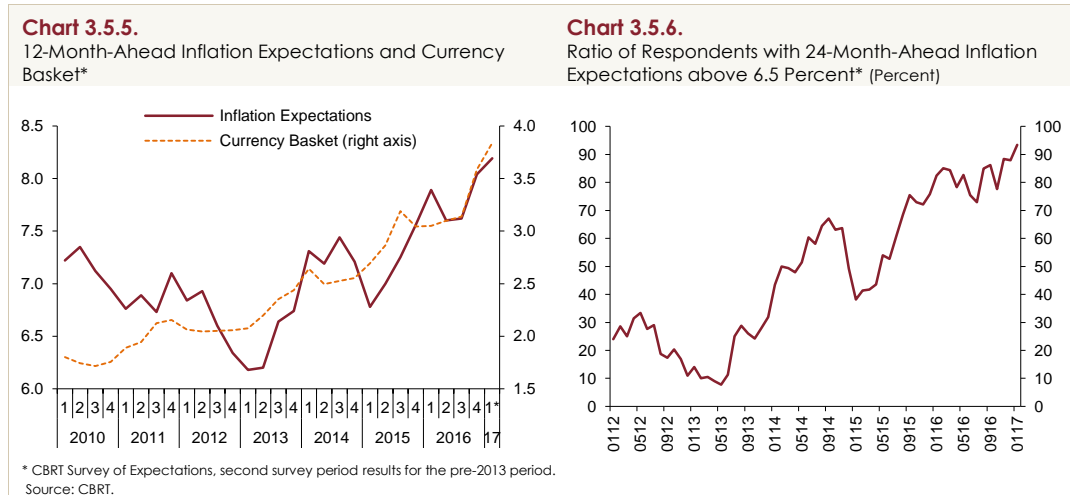
Upon an improvement in the first half of 2016 amid the favorable course of consumer inflation, medium-term inflation expectations remained flat in the third quarter. However, expectations deteriorated due to the depreciation of the Turkish lira in the last quarter (Charts 3.5.1 and 3.5.5). Medium-term expectations worsened further owing to the recent exchange rate developments as well as the higher-than-expected inflation realization in December 2016. 12-month and 24-month-ahead expectations hit 8.2 and 7.6 percent, respectively, in January (Chart 3.5.1). Across maturities, inflation expectations were revised considerably upwards quarter-on-quarter for the short-term, but were raised relatively mildly for the longer term (Chart 3.5.2).



The dispersion of medium-term inflation expectations confirms the deterioration in inflation expectations compared to October Inflation Report (Charts 3.5.3 and 3.5.4). In January, the percentage of respondents expecting 12-month-ahead inflation to be between 6.5 and 7.49 percent decreased, whereas those expecting it to be 7.5 percent or above increased (Chart 3.5.3).



In January, the deterioration in 24-month-ahead inflation expectations, which hit the historic-high, is more remarkable. Particularly due to the recent plunge in the Turkish lira, the ratio of respondents with 24-month-ahead inflation expectations above 6.5 percent climbed above 90 percent in January.



Box
3.1

Pass-Through from Import Prices and Exchange Rate to CPI and Subcategories

Import prices and exchange rates are major determinants of inflation. Particularly in periods in heightened volatility driven by global uncertainties, exchange rates and import prices have an increased impact on consumer prices. Import prices and the exchange rate affect domestic consumer prices indirectly through producer prices owing to the use of imported inputs, and directly via the prices of imported consumption goods. Thus, the effect of import prices and the exchange rate on inflation is first observed through the cost channel. For aggregated indices, this effect is estimated usually by VAR models and impulse-response functions. However, since the CPI is composed of heterogeneous subcategories, the pass-through coefficient for each subcategory may vary. Therefore, this box analyzes the pass-through from import prices and the exchange rate to the CPI and subcategories by using detailed price indices.¹

Accordingly, pass-through from import prices and the exchange rate is analyzed individually for 152 sub-indices. In the spirit of Ögünç et al. (2017), a VAR model is constructed comprising of import prices (USD-denominated import unit value index), exchange rate (currency basket), output gap, price index (CPI subcategories) and wages (non-farm real unit wage) as endogenous variables. The output gap is in levels, while other variables are in terms of quarterly percentage changes. The model also includes global growth, the global risk appetite, unprocessed food excluding fresh fruits and vegetables and the tax on energy products as the exogenous variables. The sampling period is 2005Q1-2015Q2.

CPI subcategories were selected on the basis of the statistical and economic significance of their impulse responses to shocks in import prices and exchange rates. Cumulative pass-through to the main CPI subcategories is calculated by the pass-through coefficients measured for each selected subcategory and their share in the CPI. The main results are presented in Table 1.

Table 1. Pass-Through from Import Prices and Exchange Rate to CPI and Subcategories
(Cumulative Effect at the end of 2 years, Percent)

	CPI	CPI*	CPI**	Core Goods	Services	Processed Food	Unprocessed Food	Energy
Cumulative response to exchange rate shock	17.4	17.5	19.1	24.8	11.5	27.1	23.5	7.5
Cumulative response to import price shock	14.0	14.8	15.3	17.0	4.2	15.4	12.8	30.5

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

** CPI excluding fresh fruits and vegetables, alcoholic beverages and tobacco products.

As illustrated, the effect of import prices and the exchange rate can vary widely across main subcategories. In particular, both import prices and the exchange rate have a significant effect on core goods prices. This is not surprising as this category includes mostly imported items like automobiles, televisions and mobile phones. Moreover, pass-through from the exchange rate to core goods can be completed within a shorter time than that from import prices. As for energy, pass-through from import prices is considerably higher than the exchange rate, which is also expected given that Turkey is an energy-importing country.

This box is mostly concerned with services and food categories. In this regard, the pass-through from the

¹ For further details, see Özmen and Topaloğlu (2017).

exchange rate is estimated to be quite high (above 10 percent) for services, which is dominated by domestic cost factors (e.g. wages) and mostly not subject to trade. In particular, the exchange rate pass-through is stronger in some services priced in foreign currency (hotels, package tours, etc.) and those using imported inputs (maintenance-repair, dentistry services, etc.). On the food front, both processed and unprocessed food are subject to high pass-through from import prices and the exchange rate. The pass-through in the food category can mostly be observed through imported products (oils, etc.), the use of imported inputs (coffee, cocoa, etc.), and goods subject to international trade (dried fruits, eggs, etc.). Exchange rate pass-through is rather unexpected in food — a category that is more sensitive to domestic supply conditions. However, pass-through becomes plausible when the use of imported inputs and the export potential of certain products are taken into account.

In aggregated terms, the cumulative pass-through from import prices and the exchange rate to the CPI is estimated to be 14 and 17.4 percent, respectively, (Table 1, Chart 1). These results seem to comply well with earlier findings², which help to conclude that results obtained for subcategories are also reliable.

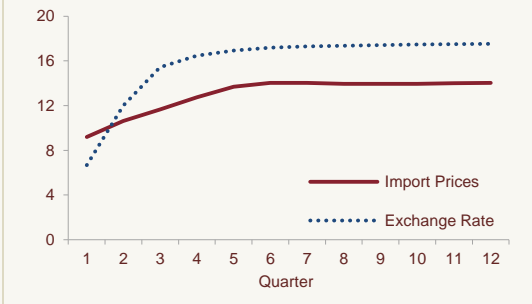
In sum, this study finds that pass-through from import prices and the exchange rate varies widely across

CPI subcategories. In addition to expected pass-through to core goods and energy, the study also finds significant pass-through to services and food prices. This suggests that the inflationary effects of especially the exchange rate have spilled over across CPI subcategories.

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Chart 1. Import Prices and Exchange Rate Pass-Through to CPI (Cumulative Effect, Percent)



² Ögünç et al. (2017) estimate pass-through coefficients for more recent periods. Also, using alternative models for 2002-2011, Kara and Ögünç (2012) estimate exchange rate pass through to be 15 percent within one year and 17 percent within two years.

