Box 2.3

An Evaluation of the Effect of Demand Conditions on Inflation

As a result of monetary and fiscal measures taken to limit the negative effects of the pandemic on economic activity, credit expansion gained significant momentum leading to a rapid recovery in economic activity. This caused the disinflationary effects of the demand side to remain limited compared to previous projections, despite high unemployment rates. While evaluating aggregate demand conditions (output gap) in terms of inflation, it is important to consider the sectoral differences specific to this period. In addition to the expected effects of the pandemic (for example, the relatively limited recovery in goods and services that are strongly linked to tourism), the policy mix in place is also considered to be effective in the differentiation of growth and inflation trends in goods and services (Chart 1 and Chart 2). The effects of acceleration in credits on inflation are thought to be higher than the levels implied by national income-based output gap indicators. It is considered that this acceleration's impact on the various subgroups of CPI may have differed, testing short-term capacity constraints in some sectors.
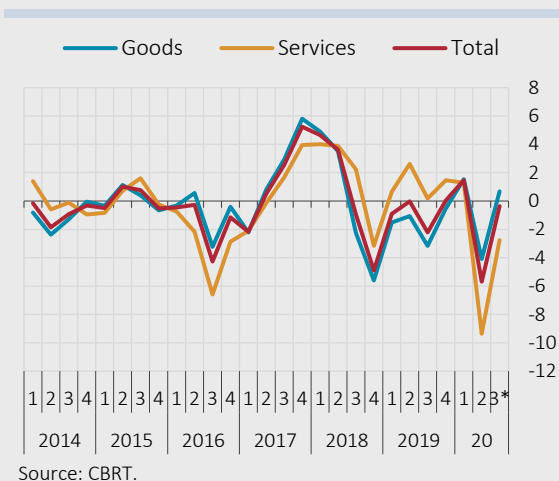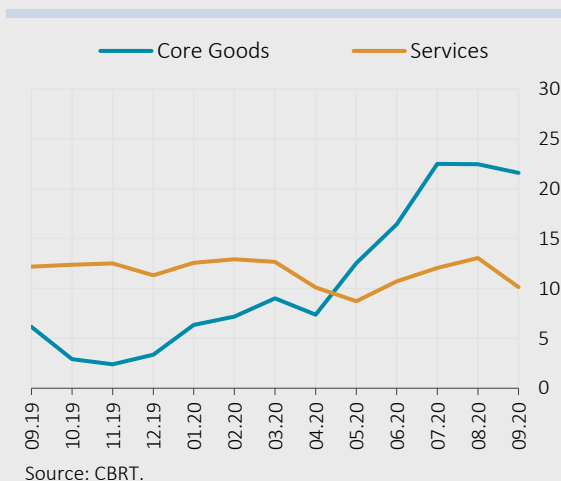
Chart 1: Sectoral Output Gap Indicators

Chart 2: Core Goods and Services Indices (Adjusted for Tax Effect and Seasonality, Annualized 3-Month Average % Change)

Source: CBRT.

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In this box, (i) the subgroups that make up the Core-B index are classified according to their sensitivity to net credit use[1] and output gap, (ii) the sensitivities of the subgroups are associated with the recent pricing behavior, and (iii) it is tested whether credit conditions provide further information, additional to national income-based output gap indicators, in explaining inflation.

A method similar to the one in Özmen and Sarıkaya (2014) is used to test the sensitivity of subgroups to credit use and output gap. Accordingly, for each of 129 five-digit price indices in the B index, equation (1) was separately estimated with the demand variables.

$$\pi_t = c + \alpha\pi_{t-1} + \beta demand_{t-i} + \sum_{k=0}^{K} \gamma_k control_{1_{t-k}} + \sum_{l=0}^{L} \delta_k control_{2_{t-l}} + \varepsilon_t \qquad i = 0, \dots 6 \qquad (1)$$

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[1] Net credit use variables are obtained by using total credits, corporate credits and consumer credits. Indicators are calculated as the ratio of the quarterly change in the seasonally- and exchange rate-adjusted credit stocks to nominal GDP.

In this equation, π shows inflation; $demand$ shows output gap or credit indicators; $control_1$ and $control_2$ show import prices in TL and wages, respectively, and ε shows error terms.[2] Price indices are classified according to the economic and statistical significance of the β coefficient.

Consistent with Özmen and Sarıkaya (2014), the results show that the output gap has a more determinant role in the services. Credit-sensitive products, on the other hand, are concentrated on the core goods group that includes items with high sensitivity to financing conditions. While 90 of 129 items in the B index are affected by the output gap or credit, 71%of the index by weight is sensitive to these variables. It is seen that 70% of durable goods are sensitive to credit use, whereas items sensitive to output gap have a lower share in this group (Table 1).

Table 1: Subgroups of B Index

	Count			Share in Group (%)		
	Sensitive to Output Gap	Sensitive to Credit	Sensitive to Output Gap or Credit	Sensitive to Output Gap	Sensitive to Credit	Sensitive to Output Gap or Credit
Services	22	25	32	74	52	77
Core Goods	21	43	43	35	73	73
Durable Goods (Exc. Gold)	7	17	17	18	70	70
Clothing and Footwear	2	5	5	21	62	62
Other Core Goods	12	21	21	69	86	86
Processed food	9	9	15	37	25	52
B Index	52	77	90	52	55	71

Source: CBRT.

In this framework, examination of the recent pricing behavior also provides important clues about the effect of demand conditions on inflation. Among the prices collected by the CBRT each month to follow the price developments in that month, the percentage of products that display price increases in August or September are presented in Table 2 from 2012 onwards. Due to the sharp depreciation of the TL in August and September 2018, the prices of many products, especially those sensitive to exchange rates, were revised in a short time. In other words, the exchange rate pass-through, which extends over a longer period in normal times, accelerated and was completed in a shorter time. Although the depreciation of the TL was lower in the same period of 2020, it is observed that the percentage of durable goods registering an upward revision in their prices, which are known to be highly sensitive to financing conditions, increased to levels seen in 2018. However, price increases were not as widespread in other groups as they were in durable goods. These observations suggest that while the magnitude of the exchange rate shock was the main determinant of pricing behavior in 2018, industry-specific demand shocks may have been effective in the pricing behavior in 2020.

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[2] While this general equation was tested on subgroups, some changes were made according to the internal dynamics of the groups. Raw milk prices were added to the independent variables for subgroups affected by milk prices, while wheat producer prices were added to the processed food group excluding milk. While testing the significance of the series, the criterion was that the p-value of the demand variables themselves or their lagged terms should be less than 0.10 and that the sign should be economically significant.

Table 2: Percentage of Products That Display Price Increases in August or September in Selected Groups (%)

	Other Core Goods	Durable Goods (Excluding Gold)	Processed Food (Excluding Bread)
2012	9.6	22.4	18.7
2013	13.9	31.1	24.6
2014	20.6	28.7	23.1
2015	18.8	30.3	18.8
2016	14.8	34.1	8.5
2017	18.7	54.7	21.3
2018	61.0	77.2	56.8
2019	14.0	31.5	22.5
2020	23.3	76.6	27.9
Average Product Count	941	236	1816

Source: CBRT.

Sectoral inflation dynamics and recent pricing behavior indicate that the credit expansion may have strained the limits for short-term production capacity in some sectors. Considering that output gap indicators based on national income or production data may not reflect the sectoral differences, credit conditions may provide additional information in explaining inflation besides these indicators. To test this, weighted averages of different credit indicators and the national income-based output gap have been formed using various weight combinations. The explanatory power of these composite indicators for core-D inflation has been estimated to better reflect the aggregate demand conditions. According to the findings obtained from the estimations made with a model similar to Equation (1)[3], the composite indicator with the highest explanatory power for inflation[4] consists of the current value of the output gap (64%), one-period lagged value of the output gap (6%), and total credit use (30%). This credit-augmented output gap indicator points to a more inflationary level of aggregate demand compared to the standard indicator.

Chart 3: Demand Indicators
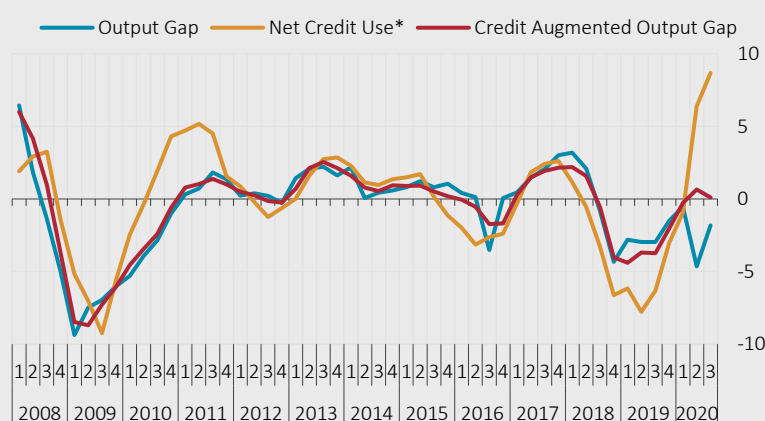
Source: CBRT (2020).
*The ratio of the change in the FX-adjusted total credit stock over the same quarter of the previous year to the sum of national income for the last four quarters.

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[3] Unlike Equation (1), the currency basket and dollar-denominated import prices have been controlled for separately instead of TL-denominated import prices.
[4] Demand indicators were selected based on the explanatory powers (R^2) of the equations.

In sum, inflation in the goods group is considered to be more sensitive to financing conditions compared to the services group, and the strong credit acceleration has been effective in the recent pricing behavior. Empirically, it is seen that net credit use provides further information, additional to the national income-based output gap indicators, in explaining inflation. In this context, the rapid recovery in the economy driven by the strong credit momentum is considered to have limited the demand-side disinflationary effects.

References

Özmen, M.U. and Sarıkaya, Ç. (2014). Sensitivity of Inflation to Output Gap and Loans. CBRT Research Notes in Economics, No: 14/17.

Çelgin, A. and Yılmaz, T. (2019). Sectoral Output Gap. CBRT Research Notes in Economics, No: 19/10.