3. Medium-Term Projections

3.1 Current State, Short-Term Outlook and Assumptions

Changes in Key Forecast Variables

In the third quarter of the year, the growth composition on both the production and expenditures sides was more balanced compared to previous quarters. GDP increased by 0.3% quarter-on-quarter and 5.9% year-on-year. The services sector continued to provide the highest contribution to annual growth, while the industrial sector made a positive contribution for the first time in four quarters. On the expenditures side, the highest contribution to annual growth was made by final domestic demand driven by private consumption. Data for the fourth quarter suggests that growth continued, albeit at a slower pace. Meanwhile, domestic demand remained robust. Indicators for real credit growth suggest that commercial and consumer loans converged to their long-term averages. However, the decline in personal credit cards was slower. Taken together, output gap indicators, albeit remaining in positive territory, point to a gradual decline in line with our projections (Box 3.1).

In the fourth quarter of 2023, consumer inflation and B-index inflation stood at 64.8% and 68.0%, respectively, and remained within the forecast range of the previous Inflation Report. Although domestic demand weakened in the last quarter of the year, it maintained its buoyant course. Global commodity prices declined in the last quarter of 2023 due to the fall in crude oil prices. On the other hand, domestic energy prices soared due to the exceeding of free limits amid increase in natural gas consumption, and as projected, natural gas prices made an upward contribution to annual consumer inflation in the last quarter. Similarly, at a time of falling global food prices, domestic food inflation rose by 72.0% year-on-year and ended the year above headline inflation. Tax- and administered price-driven effects on headline inflation persisted in the last quarter. Regulations announced after July to meet the additional financing needs of the public sector due to the earthquake (including fuel oil) and taxes pushed the 2023 inflation rate up by 9.1 points in total (Zoom-In 2.6). As a result, headline inflation and B-index inflation ended the year at 64.8% and 68.0%, respectively (Table 3.1.1).

In the last quarter of 2023, indicators for the underlying trend of inflation pointed to a significant slowdown. Core indicators were more favorable than projected in the previous Report, and monthly increases in the B and C indices remained below their upward trends in the first half of 2023. The improvement in the underlying trend was mainly driven by price developments in core goods. Price increases in the services sector continued, albeit at a slower pace. The stable course of the exchange rate, the completion of the pass-through of cost-side effects to inflation in the third quarter and the rebalancing in domestic demand stood out as the main drivers of the decline in the underlying trend of inflation in the last quarter of the year. Survey indicators suggest that inflation expectations were revised downwards in the last quarter of the year, more pronounced in shorter terms (Box 3.2).

Table 3.1.1: Changes in Key Forecast Variables*

	2023-IV
Consumer Inflation (Quarter-End, Annual % Change)	64.8 (65.2)
B-Index Inflation (Quarter-End, Annual % Change)	68.0 (67.2)

* Figures in parentheses are from the previous Inflation Report.

Assumptions on Exogenous Variables

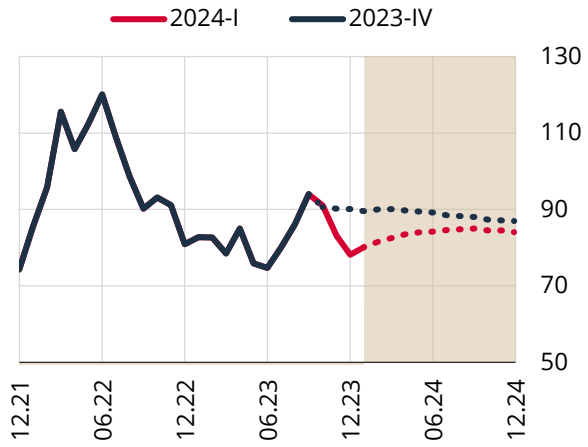
The global growth outlook remains subdued, in line with the projections in the previous Inflation Report. The impact of tighter financial conditions on the global economy became more salient in the last quarter. Having driven growth in the first half of 2023, the services sector lost momentum in the second half. The manufacturing industry followed a flatter course. Leading indicators for global growth suggest that growth continues to lose momentum. While the euro area maintained its weak outlook, the US economy diverged positively, with higher-than-expected growth figures in the third and fourth quarters. The Chinese economy also remained weak. Against this backdrop, the export-weighted global growth index forecasts for 2023 and 2024, prepared based on Türkiye's trading partners, were maintained at 1.7% and 2.0%, respectively. For 2025, a growth rate of 2.3% has been projected owing to the recovery in the euro area.

Global inflation continued to fall on the back of demand conditions and energy prices. Due to the mild course of inflation, many central banks have largely completed their tightening processes. The rapid decline in inflation rates in advanced economies in the last quarter of the year brought forward expectations for interest rate cuts. Compared to the previous reporting period, the downtrend in core inflation rates also became more evident, falling to 3.5-4%. Interest rate cuts accelerated in emerging economies, yet inflation still hovers above the targets in most of these countries. In the upcoming period, interest rate cuts are likely to become widespread in advanced and emerging economies, depending on the sustained favorable outlook for inflation. Despite the moderate normalization, the continued buoyancy in the labor market and geopolitical fluctuations in energy prices stand out as risk factors. As global inflation remains above target levels, central banks are expected to continue their rate cuts so as to maintain monetary tightness and ensure a sustainable decline in inflation. In fact, ECB and Fed officials' forward guidance on a more gradual rate cut cycle than priced in by the market has slightly tilted the expected policy rate path upwards.

Despite geopolitical developments, commodity prices followed a downward trend with the contribution of energy prices. Levels of oil stocks, financial conditions, and weak global growth led oil prices to retreat in the last quarter**.** Meanwhile, geopolitical developments, the global growth outlook, and decisions by OPEC+ countries still keep the downside and upside risks on prices alive (Zoom-In 2.1). Against this backdrop, the annual average oil price was USD 82.7 in 2023, remaining below the assumption stated in the previous reporting period. The forecasts for 2024 and 2025 were revised downwards, and oil prices were assumed to stand at an average level of USD 83.6 and USD 81.2 (Chart 3.1.1). Despite declining, the headline commodity index still hovers above its 10-year average. The quarter-on-quarter decline in the agricultural commodity index was not accompanied by industrial commodity prices, which remained flat. Having fallen by 11.6% in 2023, import prices are assumed to end 2024 with an average decline of 0.1% and 2025 with an average increase of 0.7% (Chart 3.1.2).

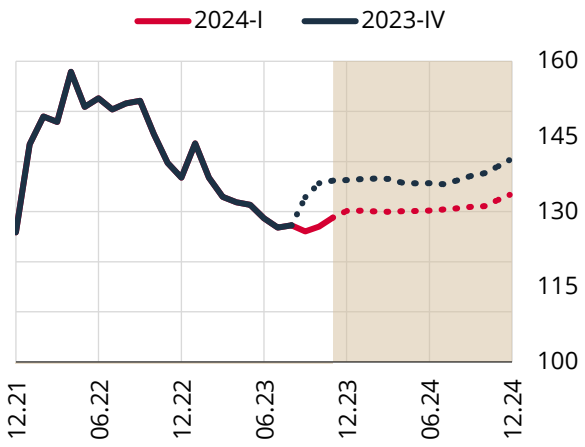
Forecasts are based on an outlook in which macroeconomic policies are determined in a coordinated manner by adopting a medium-term perspective and focusing on disinflation. In this context, it is assumed that fiscal policy within the framework of the MTP will continue to be formed in a way to contribute to the rebalancing process in the economy and that administered prices, borrowing, tax and income policies and wage adjustments will be largely determined to support the disinflation process. The outlook underlying our forecasts also implies that earthquake-related expenditures will be balanced and spread over a long period of time so as not to adversely affect budgetary discipline and macro financial stability.

Chart 3.1.1: Revisions in Oil Price Assumptions* (USD/bbl)



Source: Bloomberg, CBRT.
* Shaded area denotes the forecast period.

Chart 3.1.2: Revisions in Import Price Assumptions* (Index, 2015=100)



Source: CBRT, TURKSTAT.
* Shaded area denotes the forecast period.

The assumption for food prices was revised upwards for 2024. Annual food inflation ended 2023 at 72.0%, above headline inflation, exceeding the assumptions of the previous Report. In the upcoming period, food inflation is assumed to decline and end 2024 and 2025 at 34.6% and 15.0%, respectively (Table 3.1.2).

Table 3.1.2: Revisions in Assumptions*

	2023	2024	2025
Export-Weighted Global Production Index (Annual Average % Change)	1.7 (1.7)	2.0 (2.0)	2.3 (-)
Oil Prices (Average, USD)	82.7 (84.2)	83.6 (88.7)	81.2 (-)
Import Prices (USD, Annual Average % Change)	-11.6 (-10.0)	-0.1 (2.7)	0.7 (-)
Food Prices (Year-End % Change)	72.0 (66.7)	34.6 (31.0)	15.0 (-)

* Figures in parentheses are from the previous Inflation Report.

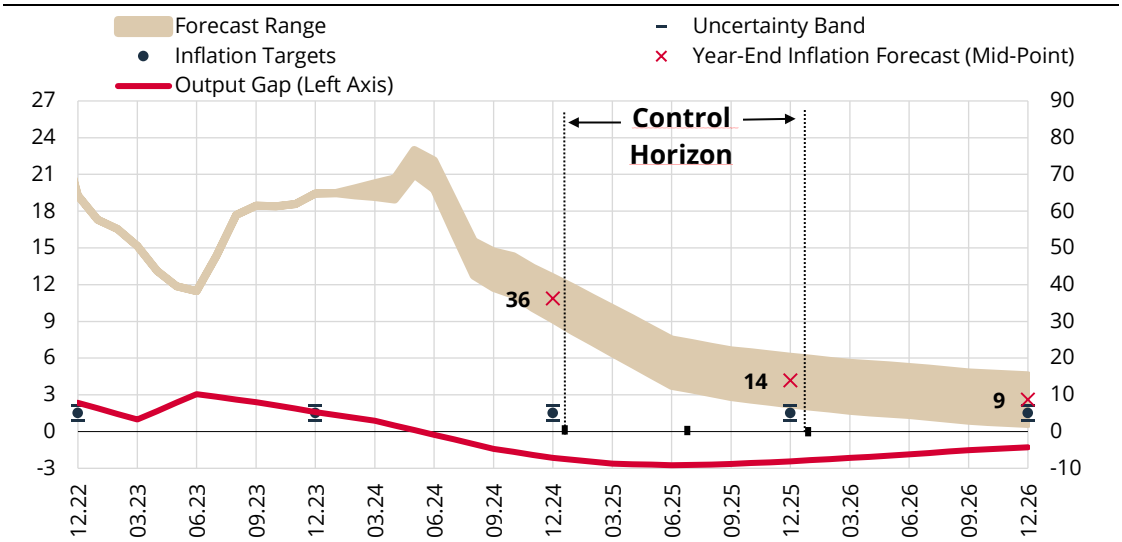
3.2 Medium-Term Outlook

Year-end inflation forecasts for 2024, 2025 and 2026 are maintained as 36%, 14% and 9%, respectively. Annual inflation stood at 64.8% at end-2023, in line with the mid-point of the forecast range presented in the 2023-IV Inflation Report. Global growth assumptions underlying inflation and forecasts were maintained at similar levels to the previous reporting period, while commodity prices were revised downwards due to the fall in energy prices. Unit labor costs drove the year-end inflation forecast for 2024 upwards due to the wage increases for 2024, while the underlying trend of inflation pulled it down. Moreover, despite the recent mild course, volatilities in oil prices to be caused by geopolitical developments keep the uncertainties over inflation forecasts alive.

Inflation is projected to fall steadily from the second half of 2024, after posting temporary increases in the first quarter. The impact of quantitative tightening and selective credit policies, both supported by the simplification of the macroprudential framework, in addition to the significant hike in the policy rate, continues to be mirrored in financial conditions. With the help of tightening steps, loan rates present an outlook consistent with the degree of the targeted financial tightness. The improvement in inflation

expectations is anticipated to continue while the indicators for the underlying trend are decelerating. Medium-term forecasts are based on an outlook in which the tight monetary policy stance will be maintained until the inflation outlook improves significantly, quantitative tightening and macroprudential policies to reduce volatilities in credit supply and deposit rates will strengthen the monetary transmission mechanism, and, if needed, the degree of monetary tightness will be adjusted on a data-driven basis. This tight monetary policy stance is expected to accentuate the rebalancing of domestic demand and the gradual improvement in the current account balance, albeit with a lag compared with the previous reporting period (Chart 3.2.3). The tight monetary policy stance will contribute to stronger growth in demand for Turkish lira assets. Accordingly, with 70% probability, inflation is projected to be between 30% and 42% (with a mid-point of 36%) at end-2024, between 7% and 21% (with a mid-point of 14%) at end-2025, and to fall to single-digit levels at 9%, before stabilizing at the 5% target in the medium term (Chart 3.2.1).

Chart 3.2.1: Inflation Forecasts* (%)



Source: CBRT, TURKSTAT.

* Shaded area denotes the 70% confidence interval for the forecast.

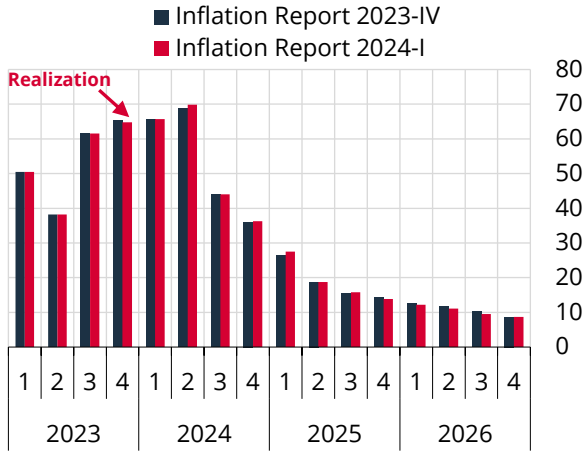
Table 3.2.1: Revisions in Year-End Inflation Forecasts for 2024 and Sources of Revisions

	2024
Inflation Report 2023-IV Forecast (%)	36
Inflation Report 2024-I Forecast (%)	36
Forecast Revision Compared to Inflation Report 2023-IV	0
Sources of Forecast Revision (% Points)	
Underlying Inflation	-3.2
Unit Labor Cost	+1.5
Turkish Lira Import Prices	+0.5
Output Gap	+0.4
Food Prices	+0.9
Administered Prices	-0.1

Source: CBRT.

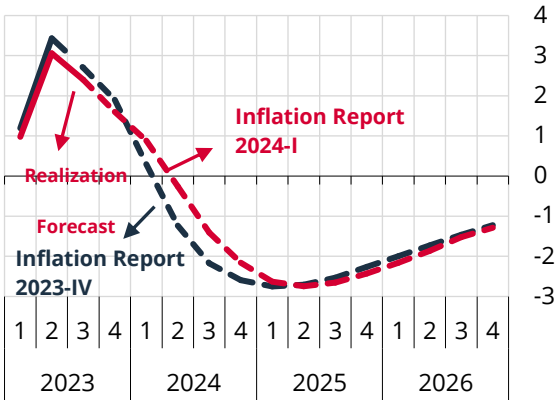
The end-2024 inflation forecast is maintained at 36% (Chart 3.2.2). An array of counterbalancing factors came into play in maintaining our forecasts. Due to wage adjustments and public spending, the output gap is projected to be higher in the first quarter of 2024 than in the previous Report. In this respect, the rebalancing process in domestic demand will continue, albeit with a lag of one quarter, with the contribution of tight monetary policy and fiscal policy coordination (Chart 3.2.3). Against this background, the revision to the output gap forecast increased our inflation forecast for 2024 by 0.4 points. In addition, unit labor costs, which increased due to higher-than-expected wage increases, pushed our forecast up by 1.5 points. The total impact of the revisions in food prices and Turkish lira-denominated import prices is 1.4 points. Administered prices brought year-end forecasts down by 0.1 points under the assumption that tobacco prices will increase less than in the previous Report on the back of the adjustment in the tax structure. Moreover, the improvement in the underlying trend of inflation had a downward effect on forecasts. First, the impact of monetary tightness on pricing behavior was stronger than we had anticipated. Additionally, the fact that the policy stance will be maintained for a longer period than envisaged in the previous Report in line with the interim targets will also affect the underlying trend positively. Therefore, the change in the underlying trend lowered forecasts by 3.2 points (Table 3.2.1).

Chart 3.2.2: Inflation Forecast (Quarter-End, Annual, %)



Source: CBRT, TURKSTAT.

Chart 3.2.3: Output Gap Forecast (%)



Source: CBRT.

Forecasts are based on an outlook in which the global growth outlook is consistent with the previous reporting period, and inflation will remain above targets despite a faster decline in global inflation. The impact of the tight monetary policy stance has recently become more discernible, but the inflation realization is still above the targets. The decline in global inflation rates and the weak economic outlook feed the expectations that the rate cuts initiated by emerging economies will spread across the board. Given the above-target inflation developments, central banks are expected to stick to their rate-cutting processes in a way that sustains the monetary tightness and the fall in inflation. In this context, global financial conditions are assumed to be slightly looser in the coming period than anticipated in the previous reporting period.

Although temporary increases are expected in inflation in the first half of 2024, the disinflation process is expected to become more pronounced in the second half of the year (Chart 3.2.2). In the current reporting period, indicators for the underlying trend have slowed down. In 2024, the contributions to inflation from factors that fall outside the scope of the monetary policy, such as unprocessed food and alcohol-tobacco, and automatic tax adjustments, are expected to decrease. However, monthly inflation is expected to see temporary rises in the first half of 2024 due to anticipated hikes in domestic energy prices and the effects peculiar to the period of free use of natural gas. Meanwhile, wage adjustments as well as the cost channel are expected to play a significant role in containing the fall in demand in the first quarter of the year. However, the fact that there will be no revision to the minimum wage for the second half of 2024 is expected to improve the effectiveness of the monetary tightness, thereby making a significant contribution to the disinflationary process. Additionally, due to the items with time-dependent pricing, monthly inflation rose in January, consistent with the forecasts. Nevertheless, it is estimated that the rise in inflation will slow

as of February and converge to the level of the underlying trend in the last quarter of 2023. As the lagged and cumulative effects of monetary tightening kick in, inflation is expected to peak in May. With the contribution of the base effect in July and August, the disinflation process will be more evident in the second half of the year.

Inflation forecasts are based on a policy framework in which the monetary tightness required to establish the disinflation course is achieved, and this level of tightness will be maintained as long as needed. The outlook underlying our forecasts envisages that the current level of the policy rate will be maintained until there is a significant decline in the underlying trend of inflation and until inflation expectations converge to the projected forecast range. On the back of the strong monetary tightening, selective credit and forward guidance policies, the convergence of inflation expectations to the Inflation Report forecasts in the short term, and to the inflation target in the medium term is critical to achieving a permanent decline in inflation. Moreover, it is also important that inflation expectations improve and the uncertainty in distribution diminishes to pull down the current levels in inflation without placing a significant weight on growth. In addition to the rate hike under the integrated policy approach, the current micro and macroprudential framework is also being simplified with selective credit and quantitative tightening steps taken to strengthen macro financial stability. These decisions aim to increase the demand for Turkish lira-denominated financial assets in a permanent and sustainable way, bring moderation to excess Turkish lira liquidity and excess consumption demand, stabilize exchange rates and enhance the effectiveness of the monetary transmission mechanism. Accordingly, forecasts are based on a policy framework in which quantitative tightening steps will continue by extending sterilization tools, and macroprudential policies will be implemented in the face of potential volatility in credit supply and deposit rates. Maintaining monetary tightness for as long as needed in line with the main objective of price stability is also expected to contribute to the improvement in the sovereign risk premium. Moreover, it is assumed that fiscal discipline will be maintained, and fiscal policies will support the disinflationary process in coordination with monetary policy during the period from 2024 to 2026.

Analyses of the impact of the monetary tightening on financial and economic conditions suggest that the banking sector will remain robust. The fact that approximately half of the banks' Turkish lira loans and securities portfolios are at floating rates, that Turkish lira fixed-rate securities are mainly accounted for at amortized cost, which is not sensitive to interest rate changes, and that the maturity of deposits is extended with the backing of reserve requirement practices reduce the sector's vulnerability to interest rate changes. The capital adequacy ratio of the banking sector, which is well above the legal limits, is considered to be sufficient to absorb losses that may stem from interest rate changes. Banks' asset quality and profitability indicators remain strong, which supports financial stability during the monetary tightening period.

3.3. Key Risks to Inflation Forecasts and Possible Impact Channels

The disinflation process may be weakened if the decelerating effects of monetary tightening on domestic demand are not seen quickly enough. On the back of the impact of the tight monetary policy on financial conditions, domestic demand conditions have been showing signs of rebalancing since the third quarter of 2023. The rebalancing in domestic demand is expected to contribute to the current account balance by weakening imports, and to the fall in inflation through the demand channel by moderating excessive consumption. On the other hand, likely risks that the elevated levels of consumer inflation expectations may pose to the consumption tendency and loan demand as well as the impact of wage and fiscal policies may cause domestic demand to gain persistence and hamper the rebalancing process.

The continued persistentence in services prices and a slower-than-anticipated deceleration in the underlying trend of inflation may keep inflationary pressures alive. Persistence in services prices continues (Inflation Report 2023-III, Box 2.3). Services prices remain sticky, which will pose an upside risk to inflation forecasts. The recent pause in the deceleration of the underlying trend is also considered as a risk to inflation forecasts.

Geopolitical developments and volatility in commodity prices pose risks to inflation forecasts. Geopolitical risks and the continued production cuts by OPEC+ countries cause volatility in oil prices. Meanwhile, global financial conditions and the weak global growth outlook, particularly in the euro area, put downward pressure on commodity prices. Although commodity prices posted broad-based declines in the previous

reporting period, volatility is likely to persist due to current downside and upside risks. Moreover, geopolitical developments may also affect risk perceptions about Türkiye.

The weak global growth outlook is expected to continue in 2024. While the effects of tightening in financial conditions on the real economy are observed clearly, leading indicators suggest that the global growth outlook remains weak, mainly due to the services sector. Moreover, recent geopolitical developments keep the risks to the global growth outlook alive.

The rate-cut cycle of central banks of advanced economies will be influential on global financial conditions. The recent decline in energy prices, the ongoing easing in supply-side pressures and the restraining effect of global financial conditions on demand have led to a decline in global inflation rates. Against this backdrop, central banks of advanced economies completed their tightening processes, while uncertainties over the timing and pace of rate cuts in advanced economies increased in global financial markets. These two factors may play a role in inflation dynamics by affecting exchange rates, aggregate demand conditions and import prices in Türkiye through capital flows, external demand and commodity prices.

The CBRT continues to support the monetary tightening process via quantitative tightening by diversifying its sterilization tools. Recently, the excess liquidity in the market has been sterilized through reserve requirements and deposit purchase auctions. These steps aim to eliminate excess Turkish lira liquidity and enhance the effectiveness of monetary policy. Accordingly, the effects of liquidity conditions on monetary transmission and the impact of the policy rate on short, medium and long-term market rates as well as loan and deposit rates are closely monitored.

Inflation expectations remain elevated. Inflation expectations of economic units (professionals, firms and consumers) play a key role in pricing behavior, wage decisions, portfolio preferences and consumption/credit demand (Box 3.2). According to the Survey of Market Participants, although medium-term inflation expectations hover above targeted levels, both the level and the dispersion of expectations have recently improved. The improvement in inflation expectations indicates that the upside risks to the inflation outlook through the pricing behavior channel have diminished.

Adjustments likely to be made in indirect taxes to finance earthquake-related public expenditures may pose risks to inflation. The amount and timing of earthquake-related public expenditures will be important for maintaining fiscal discipline. Maintaining fiscal discipline is essential for anchoring pricing behavior, rebalancing domestic demand and for the course of the sovereign risk premium. Nevertheless, a rise in the weight of indirect taxes in the tax revenues policy may not only directly increase prices but also may have indirect effects by distorting inflation expectations. In this respect, it will be important to introduce reforms in direct taxes and increase their weight in total taxes to support the disinflation process.

Minimum wages, taxes and administered prices affect inflation and inflation expectations. The level and frequency of minimum wage and public salary adjustments may affect inflation and inflation expectations through production cost and demand channels. Tax and administered price adjustments that are not in line with the projected disinflation path may put pressure on inflation. Coordination of economic policies is critical to achieve the inflation target as soon as possible.

Table 3.2.2: Key Risks to Inflation Forecasts and Possible Impact Channels*

Risk	Evaluation of Risks Compared to the Baseline Scenario and Possible Effects on Inflation (↑, ↔ , ↓)		Tracked Indicators
Risks to the course of energy prices	• Sustained underproduction by OPEC+ countries and additional cuts in production keep supply-side pressures on oil prices alive. • If the recent geopolitical developments impact a wider area, upside risks to energy prices will emerge.	↑ ↑	• Crude oil prices and demand-supply balance • OPEC+ decisions • Indicators for domestic energy market • Administered prices
Risks to global financial markets and macroeconomic outlook	• In central banks of advanced economies implementing tight monetary policy, the tightening cycles have been terminated owing to the improvement in core inflation and the underlying trend. Accordingly, expectations of policy rate cuts by central banks of advanced economies have been brought forward, while uncertainties over the timing and speed of the easing cycle remain.	↔	• Global inflation rates • Monetary policy response in advanced and emerging economies • Global risk appetite indicators • Export-weighted global economic activity index • Global trade volume and inflation developments • Import and commodity prices
Demand Conditions	• Although the projected rebalancing in domestic demand started in the third quarter and continued in the fourth quarter, aggregate demand conditions are still at an inflationary level. A delayed rebalancing in aggregate demand conditions due to wage and fiscal policies may put pressure on the targeted disinflation path.	↑	• Domestic demand indicators • Retail sales volume index • Credit card spending • White goods and automobile sales
Inflation expectations not converging to projected forecast range	• Despite the improvement in medium-term inflation expectations in terms of both the level and measures of dispersion, the elevated level of expectations keeps upside risks to inflation forecasts alive.	↑	• Key inflation indicators • Indicators for backward-indexation behavior in inflation expectations • Distribution of inflation expectations • Inflation uncertainty indicators • Survey and market pricing-based inflation and exchange rate expectations

Stickiness in services prices and underlying trend of inflation	• Continued persistence in services prices will pose an upside risk to inflation forecasts. • In January, the underlying trend of inflation posted a temporary rise due to minimum wage adjustments and items with highly time-dependent prices. General and minimum wage adjustments increase cost-side pressures, exerting risk on pricing behaviors.	↑ ↑	• Persistence in services inflation • Tax adjustments • Administered prices • Minimum wage adjustments • Real unit labor costs
Risks to efficiency of coordination between monetary, fiscal and financial policies	• Adjustments in the minimum wage and salaries of public employees may pose risks to the rebalancing of domestic demand. • The fact that the minimum wage will not be revised in the second half of 2024 is expected to enhance the effectiveness of monetary tightness and make a significant contribution to the disinflation process. • Introducing reforms in direct taxes and increasing their weight in total taxes will be important. • Possible tax arrangements for financing earthquake-related public expenditures, especially if made through indirect taxes, will keep the upside risks to inflation alive. • Insufficient coordination among monetary, financial and fiscal policies during the economic recovery process poses risks to the current account balance, inflation and the rebalancing process in domestic demand.	↑ ↓ ↓ ↑ ↑	• Adjustments in administered prices and taxes • Developments in tax revenues and public expenditures • MTP and fiscal policy measures • Budget and public debt stock indicators • Structural budget balance forecasts • Ratio of direct taxes in total taxes

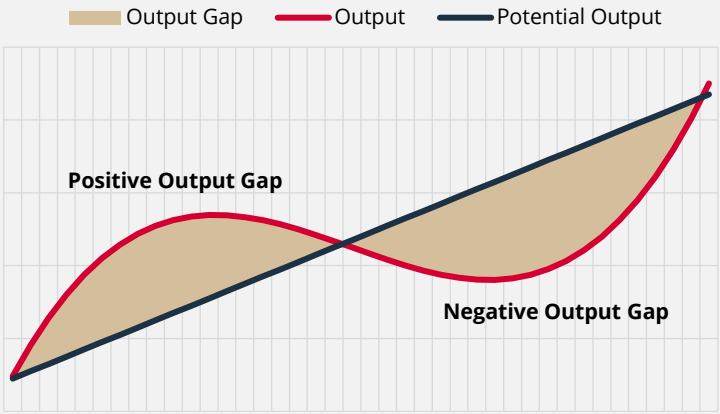
* Each risk row in the table indicates the possible channel and the direction for the change in inflation forecasts in the case that the mentioned risk materializes. The signs ↑, ↓ indicate that the risk on the inflation forecast is upward and downward, respectively. The ↔ sign is used when the net impact on the inflation forecast is not completely clear. The indicators through which the risk is monitored are also listed in the column on the right.

Box 3.1

Output Gap

Accurate measurement and timely monitoring of demand-side developments in the economy are of critical importance for central banks implementing inflation targeting regime from the monetary policy perspective. In this context, central banks closely monitor the output gap series[1], defined as the percentage point difference $((y-y^p)/y^p x100)$ of the current output level (y) relative to the potential output level (y^p) (Chart 1). Within the framework of monetary policy, potential output corresponds to the highest level of production that can be achieved without leading to an increase in inflation by using labor and capital factors efficiently, given the level of technology, and refers to the level of production that will not generate additional inflationary pressure. When the level of production is lower (higher) than its potential, in other words, when the output gap is negative (positive), it indicates that demand conditions may have a disinflationary (inflationary) effect. On the other hand, when the potential output level is taken as given, the change in the level of the output gap also provides information on the level of growth relative to potential. For instance, a decrease in the output gap indicates that growth will be below the potential growth rate corresponding to that period, while an increase in the output gap indicates that growth will be above potential. The output gap is also frequently used in the business cycle literature to distinguish between boom/overheating periods when output surpasses its potential and bust periods when output moves below its potential.

Chart 1: Potential Output and Output Gap



Output Gap Indicators Monitored by the CBRT

Since potential production or output gap figures in the economy are variables that cannot be observed directly, they are estimated with alternative methods in practice. In this respect, historical levels of the aforementioned variables can be constructed by estimation approaches such as production function and structural models, as well as by computation using various statistical filtering methods. On the other hand, survey indicators, which, by definition, directly indicate the course of demand conditions compared to their potential, such as the capacity utilization rate, are also used.

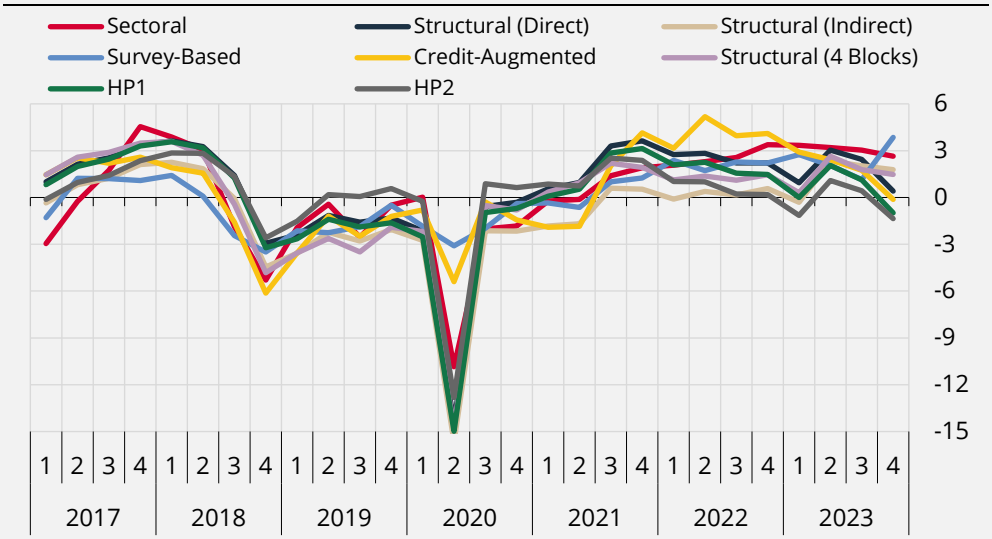
The indicators constructed by the CBRT to estimate the historical level of the output gap can be classified under three headings. The first group is based on statistical methods. There are four indicators within this group. The first two indicators are obtained by passing the GDP series through the Hodrick Prescott (HP) filter with two different smoothing parameters. The other indicator within this group is derived by enriching the output gap series obtained from the HP filter with the net credit use, employing coefficients from econometric models.

[1] The definition of output gap is sometimes confused with the difference of the growth rate between two periods from the potential growth rate, i.e. $(\Delta y/y)/(\Delta y^p/y^p)$. As explained here, the output gap is defined as the percentage point difference $((y-y^p)/y^p x100)$ between the current level of output (y) and its potential level (y^p).

The last indicator in this group is obtained by filtering out industrial production index subgroups by HP and aggregating them with the weights of their corresponding inflation series.[2] There is a single indicator in the second group. This indicator is based on the combination of survey data and leading indicator series that have an inherent output gap characteristic. In this indicator, in addition to survey data such as capacity utilization rate and backlog, series such as office occupancy rate and aircraft occupancy rate are used.[3] In the third group, there are series acquired from general equilibrium models. These models are in a New Keynesian setup and use basic equations such as the Phillips equation, Taylor's rule and dynamic IS. Models differ from each other with regard to features such as whether they have a labor block, use calibration or Bayesian estimation for parameter selection, directly estimate the output gap or aggregate components like domestic demand gap and export gap.[4] Since the output gap is an unobservable variable, the approaches discussed here are likely to have their own uncertainty ranges.

The indicators briefly introduced above vary in terms of properties such as end-sample bias, being affected by data revisions, economic consistency, and may give different signals from time to time. In this respect, the historical output gap measure is obtained from eight separate indicators. As well as the level of this measure, the extent to which the underlying series co-move with each other is of great importance in analyzing demand conditions. For instance, it is noteworthy that the divergence between the series has increased recently (Chart 2). This suggests that uncertainty regarding the level of the output gap has risen.

Chart 2: CBRT Output Gap Indicators



Indicators used to construct historical levels of the output gap measure are computed to include the quarter following the release of the latest GDP data, therefore nowcasts, and occasionally, the forecasts of the GDP for the next quarter are used. While the method based on surveys and leading indicators employ publicly available series, other series are created using the assumption set for short-term forecasts. Extending the output gap indicator for a period when there is no growth data plays an important role in providing up-to-date information on demand conditions as well as in constituting a starting point for medium-term forecasts. It should be emphasized that there is uncertainty over the value of the output gap, which is an unobservable variable, in the current quarter and in previous quarters.

The Role of the Output Gap in Forecasting and Policy Analysis System

In the previous section, the methods used to construct the historical values of the output gap were discussed, and it was emphasized that there is uncertainty over its historical values. This section will focus on the role of the output gap in the CBRT's medium-term forecasting and policy analysis system,

[2] For details, see Çelgin and Yılmaz (2019) and CBRT (2020).
[3] See Coşar Erdoğan (2018).
[4] For further details, see Gökcü (2021) and CBRT (2018).

and how it is used in practice. The CBRT constructs its medium-term forecasts using a forecasting and policy analysis system that includes semi-structural general equilibrium models. In this section, a simplified explanation of what the output gap means in terms of such models will be presented, followed by a brief discussion of the fact that the output gap, which can be explained relatively easily in the theoretical framework, is an ambiguous concept in practice.

Monetary policy is among the policies implemented to mitigate the adverse effects of business and financial cycles. When structural models are used to analyze the impact of monetary policy, many variables in the model, such as the real exchange rate and the level of output, are defined by the concept of "gap", which indicates the percentage point deviation of the level from its trend or potential, and provides more information about where the economy is in terms of business and financial cycles. In this respect, the level of output enters the model as the output gap, and the projections from the models are obtained as the output gap. In other words, the forecast result of these models is the output gap, and no direct forecast of economic growth is obtained from such models. In such structural models, the output gap indicates whether aggregate demand conditions in the economy exert pressure on inflation. In this respect, households' consumption, saving and portfolio preferences are among the determinants of aggregate demand. Other economic agents also form other components of aggregate demand according to their expectations for variables such as exchange rates, interest rates and inflation, and thus the output gap is determined by the level of aggregate demand compared to potential output. The output gap in turn affects wages, exchange rates, interest rates and inflation through the labor market, foreign trade, financial decisions and price-setting behavior.

To simplify[5] the role of the output gap in monetary transmission, we focus on how households make their consumption, saving and portfolio choices. In choosing between consumption and saving, households compare the utility they can gain by consuming now with the risk- and time-adjusted utility of the goods and services they can buy in the future by saving. Households are inclined to save more rather than consume now if the real return from saving is high enough, and the risk of waiting is low enough. In portfolio choice, economic agents will choose TL-denominated financial instruments if they believe that the risk and real return of TL-denominated instruments are more favorable than that of FX-denominated instruments. Through the transmission mechanism, monetary policy affects these two decisions by changing expectations and the returns on TL-denominated assets. Household's portfolio preferences combine with the portfolio preferences of other economic agents, including non-residents, to influence exchange rates. Exchange rates, in turn, affect economic activity and inflation through foreign trade, exchange rate pass-through and expectations.

In addition to aggregate demand, the level of potential output also determines the level of the output gap. In the case of households, savings have a significant impact on the potential output level. In simplified terms[6], savings are used to finance investment. Therefore, if savings decrease, investment will decrease, and the level of production that meets demand will not be reached. If households, who make decisions based on interest rates, exchange rates, inflation and expectations about the future course of these variables, choose (excessive) consumption, savings will decline and potential production will be hampered as investment expenditures necessary to sustain production will not be made. In this case, excessive consumption will heat up the economy, adversely affecting the trade balance and putting upward pressure on wages and inflation. This excessive level of demand implies a positive output gap and increases inflation. On the other hand, when there is direct capital investment, a decline in commodity prices, quantitative increases in factors of production or high productivity gains, the potential output level of the economy increases, albeit temporarily, thereby increasing the amount of demand that can be met without causing inflation. In that case, if the level of non-inflationary output

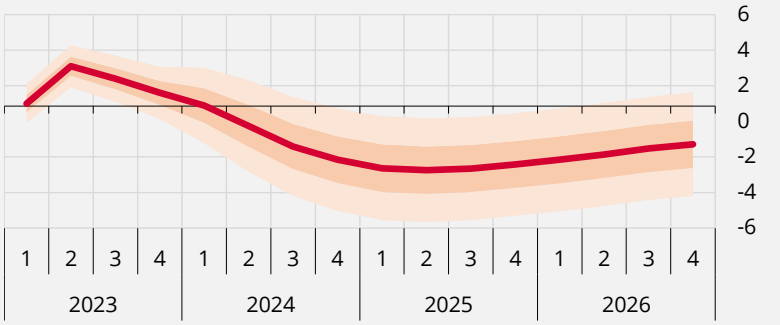
[5] In this section, the function of the output gap in structural models will be explained within the framework of the demand channel and simplified exchange rate channel, which are the main channels of the monetary transmission mechanism, based only on the basic decisions of households. The interaction between the output gap and other macroeconomic variables in structural models is much more complex than the one described here, with a multi-faceted general equilibrium concept that affects each other simultaneously. However, for pedagogical reasons, some basic channels are selected and simplified here.

[6] Simply put, in a closed economy, there is a one-to-one relationship between investment and savings. In other words, savings are the only source of investment and one of the main drivers of future growth. In an open economy, on the other hand, the difference between investment and savings can be covered by the foreign trade deficit. Therefore, household savings remain important for the sustainability of foreign trade balance and investment.

increases while the level of demand remains constant, the output gap (under the simplifying assumption that its previous value is 0) becomes negative.

Since concepts such as excess demand or the non-inflationary (potential) level of output, which are relatively easy to explain theoretically, cannot be observed in real life, uncertainties arise about both the sign and the magnitude of the output gap. Moreover, there may be discrepancies between the long-run values of the non-inflationary growth rate and its short- and medium-term values. In the long run, the potential growth rate depends on structural factors such as demographics, average productivity growth and the rate of increase in production resources, while in the short and medium term, it may depend on highly volatile cyclical productivity growth, capital flows and domestic currency denominated commodity and import prices, especially in emerging economies. In a period when capital flows are relatively high, commodity prices are moderate and productivity growth is strong, disinflation can be achieved with relatively high growth. This is because in such periods, the level of non-inflationary (potential) output may (temporarily) increase, and hence the output gap may turn negative and/or remain at negative levels. This suggests that, especially in emerging economies, the growth implied by the output gap may vary, and the inflation-growth trade-off of monetary policy may also vary over time.

Chart 3: Output Gap Estimates Uncertainty Band*



Source: CBRT, TURKSTAT.

* The probability that the output gap is within the uncertainty band is 30% for the dark shaded area and 60% for the light shaded area.

In fact, the models used by the CBRT in forecasting and policy analysis point to a wide range of uncertainty in historical data and future projections on both the non-inflationary (potential) output level and the output gap. To clarify the concepts explained in this box, Chart 3 presents an uncertainty band corresponding to the 60% significance level for output gap forecasts in the Medium-Term Projections section of the Inflation Report. When the uncertainty about the potential output level itself is added to the width of the forecast range around the output gap, the range of uncertainty about the level of growth implied by the output gap becomes so wide that its informative value decreases. Therefore, the forecasts in the Inflation Report are communicated with a baseline output gap level that symbolizes the intended/anticipated stabilizing effect of monetary policy on demand, and the high uncertainty in the output gap or the non-inflationary (potential) output level is not communicated. The output gap communication aims to express how the central bank intends to affect demand in light of monetary policy decisions and other expected economic developments. An output gap that shifts from positive to negative levels in the future should be interpreted as a sign that the central bank will stabilize demand through monetary policy, encourage households to save, and thus, achieve sustainable growth rates in the future. Central banks analyze whether the demand conditions implied by the output gap have been reached with each new data release and make monetary policy decisions in order to reach the inflation forecast path. As important as the level and change in the output gap is the evolution of private consumption and saving indicators and expectations in line with monetary policy objectives. In this respect, these indicators are closely monitored. Obviously, various unforeseen shocks that are outside the monetary policy domain may shape prices and demand unexpectedly. In that case, it is the central banks' duty to establish an accurate and effective communication and policy strategy, considering the lagged and cumulative effects of monetary policy.

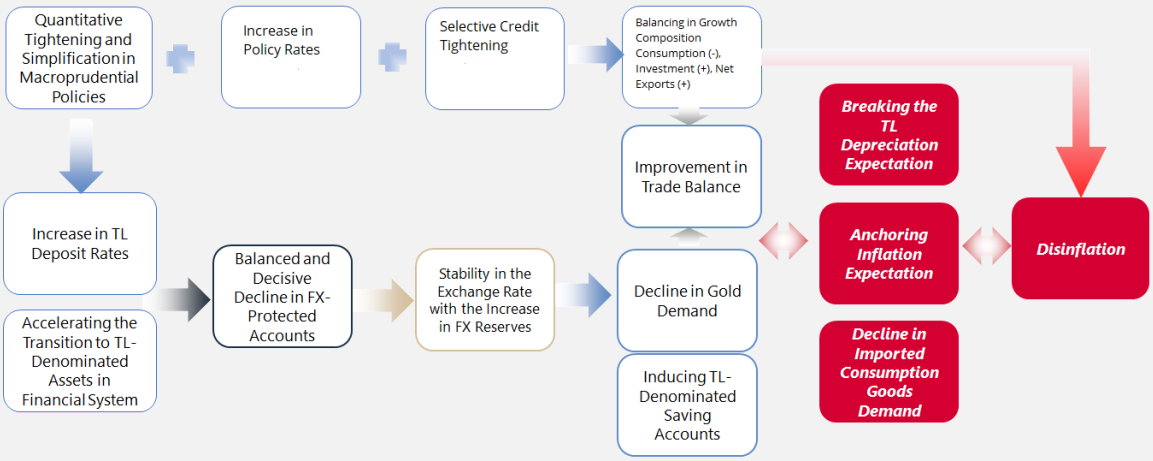
Box 3.2

Monetary Transmission Mechanism and Key Indicators of Disinflation Process

The CBRT closely monitors key indicators of inflation and the underlying trend of inflation and decisively utilizes its policy toolkit in line with the fundamental objective of price stability so as to create the economic and financial conditions that will ensure a permanent fall in inflation. Within the scope of the integrated policy approach, in addition to interest rate hikes, selective credit and quantitative tightening decisions are supported by the simplification of the micro and macroprudential framework. It is assessed that the CBRT has reached a level of monetary tightness consistent with the objectives of stabilizing excesses in consumption demand, increasing the demand for TL-denominated financial assets, anchoring inflation expectations and permanently enhancing the efficiency of the monetary transmission mechanism, which will closely determine the future course of inflation, and that the (aforementioned) monetary tightness will be maintained as long as necessary.

The monetary transmission mechanism is a concept that explains the channels through which and to what extent the monetary policy affects inflation. The disinflation process can be established through the effectiveness of the policy rate and other monetary policy instruments operating through different channels on factors such as domestic demand, exchange rates, financial markets, credit and inflation expectations. Therefore, a detailed analysis of the effectiveness of transmission channels is critical in determining the monetary policy stance required for a successful disinflation process. This box focuses on the effectiveness of the transmission channels related to demand and the financial variables shown in Figure 1, which are expected to accomplish disinflation in 2024.

Figure 1: Simplified Monetary Transmission Mechanism*



* Monetary transmission mechanism is simplified such that only transmission channels covered in this box are provided.

As monetary tightening and macroprudential policies are reflected on financial conditions, domestic demand is expected to stabilize. In addition to interest rate hikes, quantitative tightening and selective credit policies aim to shift the composition of growth from consumption to investment. The stabilized domestic demand is expected to reduce imports and lead to a growth composition in which the contribution of net exports will increase. By reducing the import demand for gold, the goal is to achieve a moderate increase in imports. Accordingly, it is possible to eliminate excessive inflation without exerting significant pressure on growth. This is expected to contribute to both improving exchange rate expectations and anchoring inflation expectations.

The tightening steps are expected to strengthen the monetary transmission mechanism by permanently increasing the demand for TL-denominated financial assets. Moreover, the current account balance and financing conditions that will improve with the decisive monetary

tightening process are expected to support the stability in the FX market and have a positive impact on exchange rate and inflation expectations. On the other hand, the demand for gold, which is considered as a store of value, is expected to decline as the demand for Turkish lira assets increases. This is expected to strengthen the improvement in the current account balance and support the rebalancing in the growth composition.

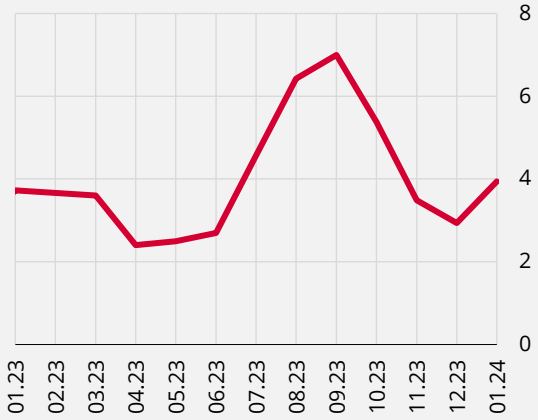
As the monetary tightening is reflected on financial conditions, the level of monetary tightness required for disinflation in 2024 is believed to have been reached. Market interest rates are in line with tight monetary policy targets, leading to an increase in Turkish lira deposits and a decline in FX-denominated and FX-protected deposits (Chart 4). Loan rates are also in line with the targeted level of financial tightness (Chart 3). Although loan growth increased in December due to the anticipated wage revisions, annual loan growth continues to normalize (Chart 5). CBRT reserves continue to increase (Chart 6).

Although recent price cuts and campaigns have curbed the fall in demand, the rebalancing in domestic demand indicators continues, as does the improvement in the gold balance that started in the third quarter of 2023 due to the impact of monetary tightening on financial conditions (Chart 2). On the other hand, wage hikes are likely to curb the fall in demand to some extent in the first quarter.

Seasonally adjusted data suggest that the underlying trend of inflation declined. However, the underlying trend of inflation posted an uptick in January, in line with the projections. The underlying trend indicator, which is calculated by taking the average of seven different indicators, decelerated significantly compared to the end of the previous quarter (Chart 1). On the back of these developments, inflation expectations continue to decline. In January, the median values of 12- and 24-month-ahead CPI inflation expectations shifted to the left compared to the previous reporting period, indicating a recovery in the distribution of expectations (Charts 7 and 8).

It is observed that the channels of the monetary transmission mechanism related to financial variables work more effectively. The demand channel of the transmission mechanism, on the other hand, is considered as a risk factor for the disinflation path. Therefore, it is critical to maintain monetary tightness as long as needed in order to ensure a permanent disinflation.

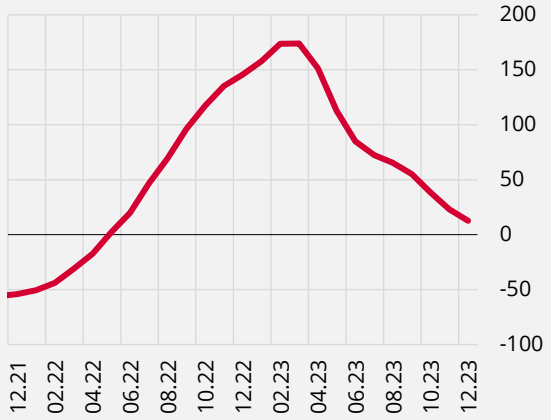
Chart 1: Average of Underlying Trend of Inflation* (Seasonally Adjusted, Three-Month Average)



Source: CBRT.

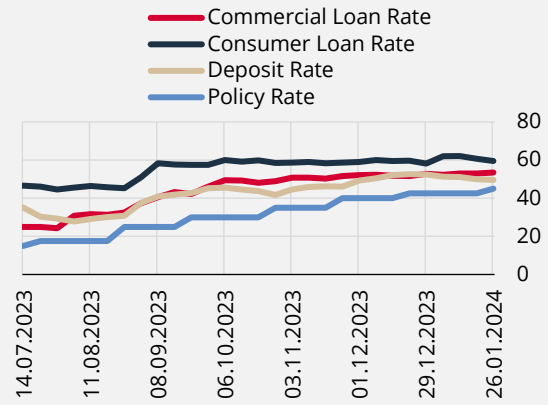
* Average underlying trend of Inflation, calculated as the average of B and C indices, SATRIM, Median, the index excluding most volatile items, indicators produced by principal component analysis and dynamic factor models.

Chart 2: Gold and Consumer Goods (Annual % Change, Three-Month Moving Average)



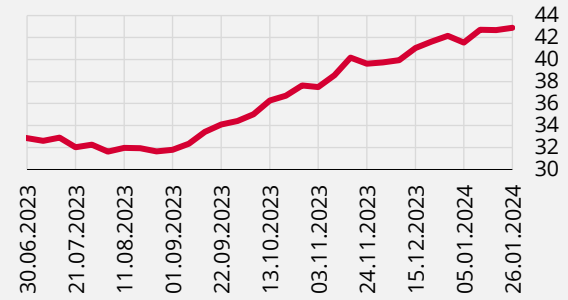
Source: CBRT, TURKSTAT.

Chart 3: Interest Rates (Annual, %)



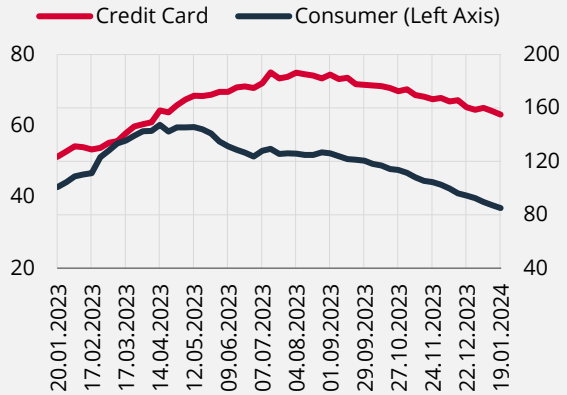
Source: CBRT.

Chart 4: Share of Turkish Lira Deposits* (%)



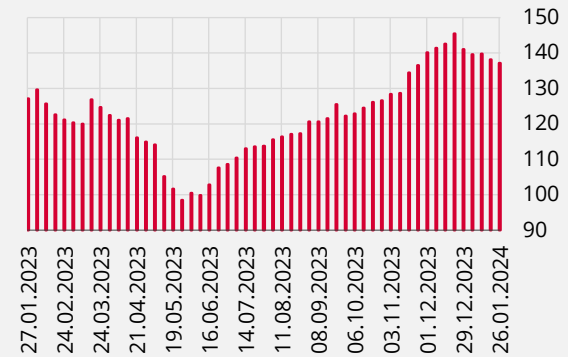
Source: BRSA.
* Share of Turkish lira deposits calculated by dividing the sum of TL deposits, FX-protected TL deposits and participation accounts to the sum of total deposits.

Chart 5: Chart 5: Credit Cards and Consumer Loans (Annual Growth, %)



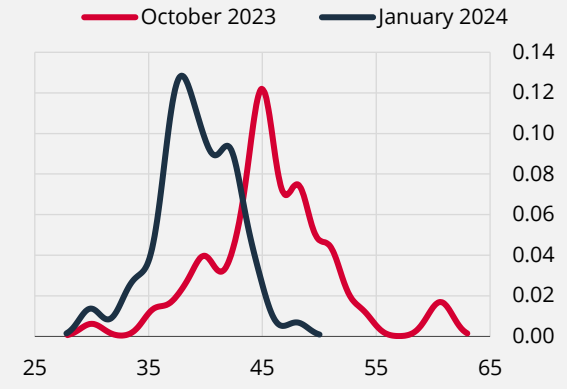
Source: CBRT.

Chart 6: CBRT International Reserves (Gross, USD Billion)



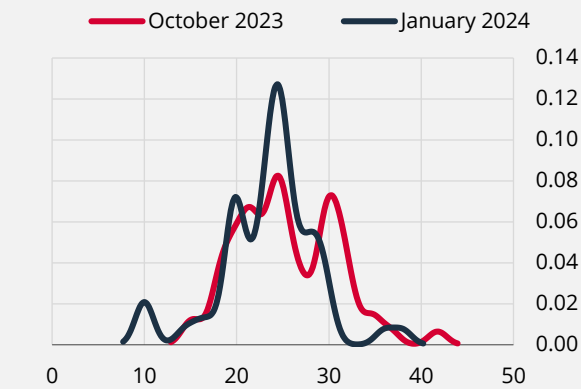
Source: CBRT.

Chart 7: 12-Month-Ahead Inflation Expectations of the Survey of Market Participants*



Source: CBRT.
* Kernel probability density functions are calculated using the responses to the CBRT Survey of Market Participants. The horizontal axis indicates the annual CPI inflation expectation, while the vertical axis indicates the probability density attributed to this level.

Chart 8: 24-Month-Ahead Inflation Expectations of the Survey of Market Participants*



Source: CBRT.
* Kernel probability density functions are calculated using the responses to the CBRT Survey of Market Participants. The horizontal axis indicates the annual CPI inflation expectation, while the vertical axis indicates the probability density attributed to this level.

Box 3.3

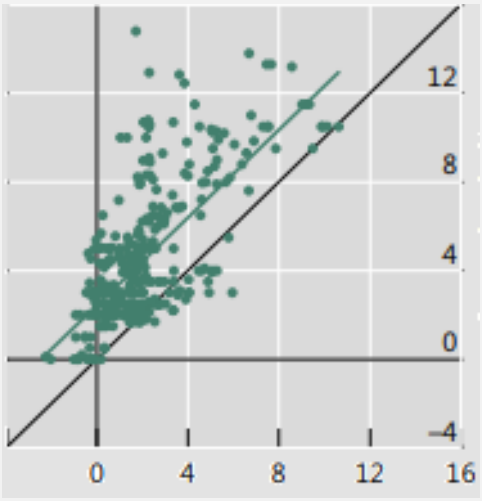
Consumer Inflation Expectations

Inflation expectations, which reflect the forecasts of economic agents about how much prices will increase or decrease in the upcoming period, play an important role in the decision-making mechanisms of these agents. Moreover, inflation expectations are of key importance for central banks in terms of their role in the monetary transmission mechanism and in determining monetary policy decisions. Inflation expectations of economic agents can be measured by conducting surveys of market participants (professionals), firms or consumers. Consumers' inflation expectations stand out because they affect a wide range of economic choices, from consumption or saving decisions, to wage and labor force participation decisions, and from investment behavior to the currency chosen to build portfolios.

While forming inflation expectations, economic agents can often take the inflation they perceive as a reference. Perceived and expected inflation rates can be obtained from market data by applying various statistical methods, as well as by asking directly through surveys. Studies conducted using survey-based indicators show that there may be biases in both perceived inflation (De Fiore et al., 2022, ECB, 2023) and expected inflation (D'Acunto et al., 2019; Ehrmann et al., 2015). It has also been reported that, in the case of consumers, there may be wide differences between perceived and expected inflation and measured inflation (ECB, 2023). For example, while the eurozone inflation rate was 1.6% in the period between 2004 and 2018, the inflation rate perceived by consumers was 9% according to survey studies conducted by the European Commission (Arioli et al., 2017). De Fiore et al. (2022) study analyzed perceived and headline inflation data for Germany, Canada, the UK, Japan, New Zealand, South Korea and India after 2004. The points below the darker diagonal line in Chart 1, i.e. the 45-degree line, represent consumers who perceive inflation below the actual inflation, while the points above it represent those who perceive higher inflation than the actual inflation. The higher and farther away a point is from the 45-degree line, the higher is the perceived inflation compared to headline inflation. The fact that the points in the graph are mainly above the 45-degree line shows that the inflation perceived by consumers is higher than measured in the countries in question. Despite these biases, since inflation expectations have a subjective nature, survey-based measures of consumer inflation expectations provide important information on heterogeneity among consumers. In addition, recent studies show that the use of information on the heterogeneity of consumer inflation expectations and the distribution of expectations enhances the forecast performance of the New Keynesian Phillips curve (Coibion et al., 2018; Meeks and Monti, 2023).

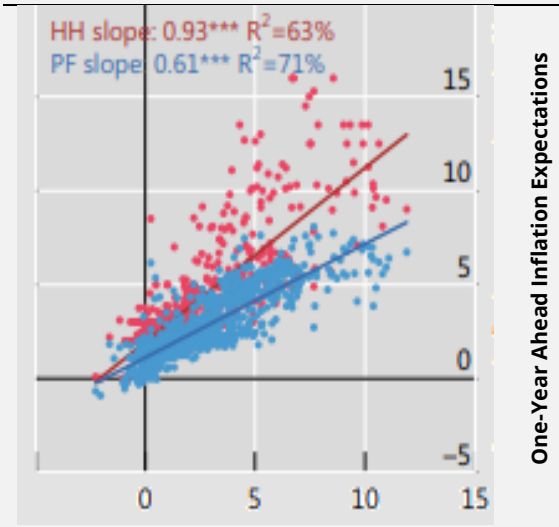
On the other hand, when the inflation expectations of consumers and market participants (professionals) are compared, the expectations of consumers are higher than those of market participants. In Chart 2, inflation realizations are compared with the inflation expectations of professionals and consumers. Consumer expectations are more sensitive to inflation realizations and are distributed over a wider range (De Fiore et al., 2022). The academic literature ascribes this situation to the fact that there is an upward bias in inflation perceived by consumers (Chart 1), and that market participants are experts in finance and economics and have professional obligations. Therefore, market participants formulate their expectations in a more forward-looking fashion, using their expert knowledge and taking into account economic conditions and central bank actions (De Fiore et al., 2022).

Chart 1: Inflation Perceptions of Consumers in Other Countries* (%)



Source: De Fiore et al. (2022).
* Perceived and actual inflation data for Canada, Germany, Japan, India, New Zealand, South Korea and UK since 2004. The dark diagonal line is the 45-degree line, the points above the line indicate that the perceived inflation is higher than the measured one.

Chart 2: Comparison of Inflation Expectations of Consumers and Market Participants in Other Countries* (%)



Source: De Fiore et al. (2022).
* Inflation expectations and actual inflation data since 2004 for Brazil, Canada, Germany, Japan, India, New Zealand, Philippines, South Africa, South Korea, Sweden, UK and USA. Blue dots indicate market participants (PF), red dots indicate consumers (HH).

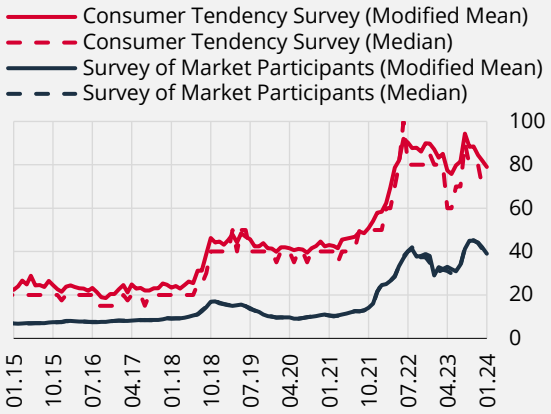
In this box, consumer inflation expectations in Türkiye are analyzed using micro data from the Consumer Tendency Survey conducted jointly by the CBRT and TURKSTAT. In this framework, firstly, aggregated data statistics such as mean and median of point estimates on the basis of participants are examined, and then the elements that may be overlooked in these aggregated statistics are shared in the light of micro data. Regarding the level of inflation expectations of consumers in the Consumer Tendency Survey, "*By how many percent do you expect consumer prices to go up/down in the next 12 months? Please give a single figure estimate*." is included. In Chart 3, the average and median values[1] of consumer inflation expectations calculated using the answers given to the question are compared with the relevant values of inflation expectations of the Survey of Market Participants. The first remarkable point is that, considering these statistics, as is also true in other countries, the average consumers' inflation expectations is systematically higher than those of market participants. The difference between the inflation expectations of market participants and consumers in Türkiye has been widening since August 2018, along with the rise in inflation.

When inflation realizations and average inflation expectations are compared, it appears that consumers always set their inflation expectations above the realization, unlike the professionals in the Survey of Market Participants (Chart 4). The course of consumer inflation expectations in the last quarters of 2018 and 2021, when inflation increased rapidly, is noteworthy. In these periods, consumers' inflation expectations increased with the rise in inflation, and expectations followed a downward course with the decrease in inflation. However, despite the recent rise in inflation, both the

[1] The Consumer Tendency Survey also asks the qualitative question about inflation expectations: "How do you expect consumer prices to change in the next 12 months compared to the last 12 months?". In the survey, "By what percentage do you think consumer prices increased/decreased in the last 12 months? Please give an estimated rate." question is also asked about the perceived inflation rate. The highest answer that can be given to these questions has been increased from 200 to 300 as of January 2023. In order to limit the effect of this change on trends, answers of 200 or more were accepted as 200. Micro data is analyzed by excluding inconsistent answers in the Survey. Finally, the remaining answers were trimmed from the right and left at the level of 2.5 percent.

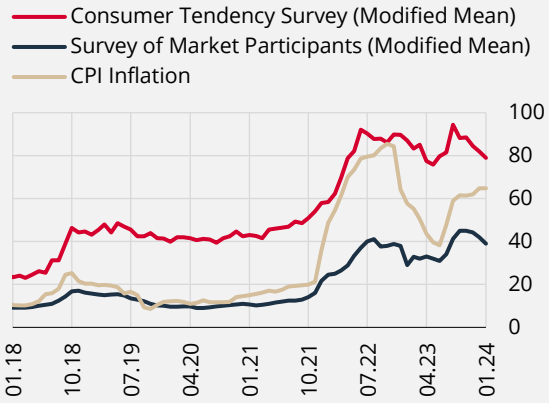
average and median values of consumer inflation expectations are declining as of September 2023. In addition, as of November, the decline in market participants' expectations began to accompany consumer expectations. Despite the favorable decline, the average and median values of consumer expectations continue to have higher values compared to market participants' expectations and Inflation Report forecasts.

Chart 3: Consumer Tendency Survey and 12-Month-Ahead Inflation Expectations of the Survey of Market Participants (%)



Source: CBRT, TURKSTAT.

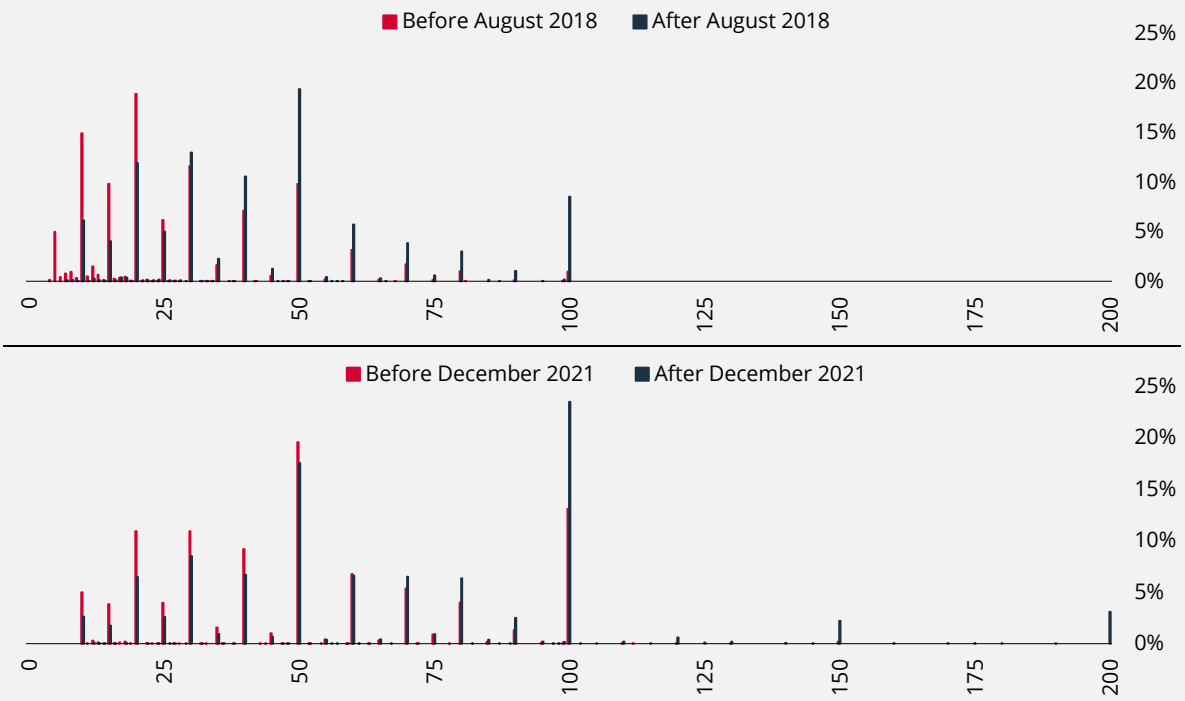
Chart 4: 12-Month-Ahead Inflation Expectations and CPI Inflation (%)



Source: CBRT, TURKSTAT.

The mean and median values of consumer inflation expectations increase significantly in August 2018, December 2021 and July 2023, when sharp increases in inflation were recorded. In order to better understand the movements in these indicators, the change in the distribution of consumer inflation expectations is shown in Chart 5 for August 2018 and December 2021, and in Chart 6 for July 2023, using micro data. With the increase in inflation, consumers update their inflation expectations upwards and the distribution shifts to the right.

Chart 5: Differentiation in the Distribution of Consumer Tendency Survey Inflation Expectations*

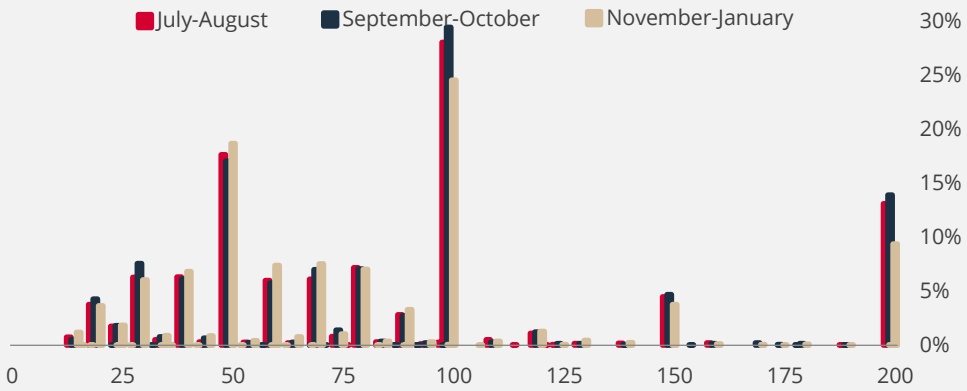


Source: CBRT, TURKSTAT.

* Distributions for the before and after periods were created using data from all months including 6 months before and after the relevant periods.

Here, it would be appropriate to place special emphasis on the July period of 2023 both because it is a more recent period and because it helps illuminate the delayed and cumulative effects of the recent tightening in monetary policy. In this regard, expectation distributions are examined in Chart 6 in three periods between July 2023 and January 2024, July-August, September-October and November-January. July 2023 was characterized by exchange rate movements, as well as minimum wage and tax hikes and administered price adjustments, which are outside the scope of monetary policy (Inflation Report 2023-III, Zoom-In 2.2). In the July-August and September-October periods, when inflation realizations also increased, a deterioration was observed in the distribution of consumer expectations, and the distribution shifted to the right, indicating higher inflation expectations. However, as the lagged and cumulative effects of the tightening in monetary policy became more evident, the distribution shifted to the left after November 2023, indicating lower inflation expectations. This is also depicted in the data aggregated in Chart 3: As of September, a decrease was observed in the mean and median values of consumer expectations.

Graph 6: Differentiation in the Distribution of Consumer Tendency Survey Inflation Expectations in the Second Half of 2023 (%)



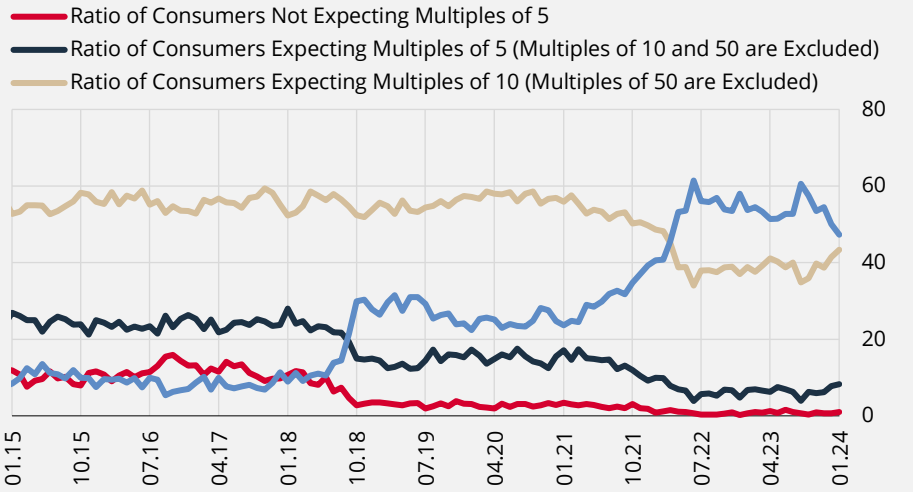
Source: CBRT, TURKSTAT.

A detailed examination of the numbers used by consumers to express their inflation expectations provides important results regarding the reliability of aggregated statistics and the perception of inflation uncertainty. The responses of the Consumer Tendency Survey participants are concentrated around certain numbers. For example, at the beginning of 2021, 25% of the participants estimated 50% and multiples for inflation expectations, while this rate increased to 60% in 2022. When determining inflation expectations, consumers use rounded values expressed as 5, 10, 50 and multiples more often than other numbers. To express predictions that they are not sure about, respondents tend to give an approximate number that is imprecise and may include other nearby numbers. This behavior is referred as the "rounding effect" in the context of uncertainty in the semantic literature, and Krifka (2002) described this behavior as round numbers imply rounded estimates. Additionally, Binder (2017) constructed an expectation uncertainty index using the proportion of consumers who rounded their survey responses and revealed that this index moves in tandem with other macroeconomic uncertainty indices.

The proportion of respondents who answered 5, 10, 50 and multiples in the Consumer Tendency Survey indicated in Chart 7 shows that the increase in inflation in Türkiye as of 2018 also increased uncertainty by affecting expectations. In addition to uncertainty, the fact that participants set their estimates in multiples of large values reduces the information value of the average and median values of inflation expectations. Expectations, which were initially stated in multiples of 5, began to be stated more frequently as multiples of 10 and above by 2018, and they began to be stated more often as multiples of 50 by the end of 2021. This trend, similar to Binder (2017), shows that the tendency to respond with multiples of large values increases in parallel with the increase in the inflation level and the increase in uncertainties. In addition, when looking at the period after July 2023, inflation

expectations started to be given in multiples of lower values again as of September 2023, in parallel with the recent improvement in expectations shown in Charts 3 and 6.

Chart 7: Ratio of Consumers Expecting Inflation in Multiples of 5, 10 and 50 (%)



Source: CBRT, TURKSTAT.

In spite of the recent rise in consumer inflation, due to the monetary tightening implemented since June 2023, both the level of inflation expectations and the tendency of respondents to respond in multiples of large values have started to decline, which became more evident as of September. Despite this favorable development, the level of consumer expectations and uncertainty indicators have not yet reached the desired levels. The CBRT will continue to closely monitor the inflation expectations of economic agents through micro data.

References

Arioli, R., Bates C., Dieden C. H., Duca I., Friz R., Gayer C., Kenny G., Meyler A., and Pavlova I. (2017). EU Consumers' Quantitative Inflation Perceptions and Expectations: An Evaluation. ECB Occasional Paper No. 186.

Binder, C. C. (2017). Measuring Uncertainty Based on Rounding: New Method and Application to Inflation Expectations. Journal of Monetary Economics, 90, 1-12.

CBRT (2023). Impact of Tax and Administered Price Adjustments on Inflation. Inflation Report 2023-III, Zoom-In 2.2.

Coibion, O., Gorodnichenko, Y., and Kamdar, R. (2018). The Formation of Expectations, Inflation, and the Phillips Curve. Journal of Economic Literature, 56: 1447-91.

De Fiore, F., Goel T., Igan D., and Moessner, R. (2022). Rising Household Inflation Expectations: What are the Communication Challenges for Central Banks? BIS Bulletin No. 55.

D'Acunto, F., Malmendier, U., Ospina, J., and Weber, M. (2019). Salient Price Changes, Inflation Expectations, and Household Behavior. SSRN Electronic Journal.

ECB (2023). Consumer Expectations Survey, available at https://www.ecb.europa.eu/stats/ecb_surveys/consumer_exp_survey/html/index.en.

Ehrmann, M., Pfajfar, D., Santoro E. (2015). Consumers' Attitudes and their Inflation Expectations. FEDS Working Paper No. 2015-015.

Krifka, M. (2002). Be Brief and Be Vague! And How Bidirectional Optimality Theory Allows for Verbosity and Precision. In Restle, D & Zaefferer, D. (eds.) Sounds and Systems: Studies in Structure and Change: A Festschrift for Theo Vennemann. Berlin/New York: Mouton de Gruyter, 439–458.

Meeks, R., Monti, F., (2023). Heterogeneous Beliefs and the Phillips Curve. Journal of Monetary Economics, 139, 41-54.