

## 7. Medium Term Projections

This Chapter gives information about the CBRT's recent monetary policy strategy and the related policy decisions. Furthermore, it summarizes the underlying forecast assumptions and presents the medium-term inflation and output gap estimates as well as the monetary policy outlook over a three-year horizon.

### 7.1. Recent Monetary Policy Decisions

Domestic demand continued to recover steadily in the third quarter, while the divergence between domestic and external demand became more evident. Fiscal and monetary policies had strong expansionary effects on domestic demand, while external demand continued to recover modestly. However, aggregate demand conditions have yet to put upward pressure on inflation. Meanwhile, the growth discrepancy between emerging and advanced economies, with emerging economies recovering faster, was more obvious in the second half of 2010, leading to a relative decline in the risk premiums of the emerging markets. In addition, fourth-quarter developments and decisions in the US and the European economies resulted in a global monetary expansion. Reduced risk aversion and expansionary policies stimulated capital flows to emerging economies in the last quarter of 2010. In order to contain the upward pressure of quantitative easing on capital flows, and hence on current account imbalances, emerging economies have embarked on quantitative tightening.

Accelerating short-term capital inflows, the divergence between domestic and external demand growth and rapid credit expansion contributed to the widening of the current account deficit, necessitating a close monitoring of macroprudential risks to Turkey. Therefore, the CBRT follows a monetary policy framework where price stability and financial stability complement each other (Box 7.1). Thus, with the main objective of maintaining price stability in addition to the duty to observe financial stability, the CBRT adopted a new policy mix with lower policy rates, wider interest rate corridor and higher required reserve ratios in order to contain macroprudential risks in the fourth quarter of 2010.

In this context, in order to encourage long-term capital inflows and to maintain the stability of the Turkish lira, 1-week repo auction rate, the policy rate, was reduced from 7 percent to 6.25 percent in December 2010 and January 2011 MPC meetings. Moreover, the CBRT significantly widened the spread between overnight borrowing and lending rates. In this regard, the CBRT cut its overnight borrowing rate to 1.50 percent and hiked its lending rate to 9 percent. A similar adjustment was made for late liquidity window rates.

Since September 2010, the CBRT has taken important steps regarding reserve requirements, a key element of the CBRT's policy mix serving to contain macroprudential risks. Firstly, as part of the exit strategy, the TL reserve requirement ratio was raised by 0.50 points each in September and in November. Moreover, in September, the CBRT ended interest payments on TL reserve requirements in order to use required reserve ratios as an active policy instrument. In December, the CBRT adopted a more comprehensive approach and decided to differentiate TL reserve requirement ratios by maturity in order to extend the maturity of the banking system's liabilities, thereby reducing maturity mismatches, and to encourage long-term capital inflows. Accordingly, the required reserve ratio on short-term liabilities was raised and the required reserve base was expanded by including repo transactions, except Interbank and CBRT transactions. Finally, the TL required reserve ratio on liabilities excluding short-term deposits/participation funds was re-raised on January 24, 2011. The changes in required reserve ratios since October 16, 2009 are summarized in Table 7.1.1. As shown in the last column of the table, the weighted average of the reserve requirement ratios, where weights are assigned by the share of liabilities, point to a 4.4 percentage point increase since September 23.

Changes in reserve requirements are likely to affect the credit market through cost and liquidity channels (Box 7.2). As a result of the aforementioned adjustments, a total of about 22.5 billion TL is expected to be drained from the market. Based on the recent data available, this amount accounts for about 5.8 percent of the non-financial sector loans denominated in Turkish lira. The monetary tightening through cost and liquidity channels driven by the higher required reserves ratios will exceedingly offset the expansionary impact of the rate cuts. Hence, the net effect of the CBRT's recent monetary policy decisions is likely to be restrictive.

Table 7.1.1 Decisions on Required Reserve Ratio  
(Percent)

Date	Sight	<1- month	<3- month	<6- month	<1- year	≥1- year	Cumulative	Other*	Weighted Average
October 16, 2009	5	5	5	5	5	5	5	5	5
September 23, 2010	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
November 12, 2010	6	6	6	6	6	6	6	6	6
December 17, 2010	8	8	7	7	6	5	5	8	7.4
January 24, 2011	12	10	9	7	6	5	5	9	9.4

\* As of December 17, 2010 all repo transactions excluding transactions with CBRT and interbank transactions have been subject to reserve requirement.  
Source: CBRT.

In order to more effectively benefit from capital flows by boosting foreign exchange reserves while also enhancing the resilience against volatile capital flows, the CBRT decided to change the method of foreign exchange buying auctions in October. The following table summarizes the weekly additional and total amounts of foreign exchange purchases (Table 7.1.2). The CBRT decided that banks would no more hold an option at regular auctions as of January 3, 2011. In the meantime, the daily amount of purchase was raised to 50 million USD in order to avoid a significant slowdown in CBRT's foreign exchange purchases.

Table 7.1.2. Foreign Exchange Bought Through New Foreign Exchange Buying Auctions  
(Million USD)

Period	Additional Amount	Total Amount
October 2010	1,500	2,220
November 2010	1,340	1,940
December 2010	420	1,691
January 2011*	0	650
Total	3,260	6,501

\* As of January 20, 2011.  
Source: CBRT.

## 7.2. Current State of the Economy, Short-Term Outlook and Assumptions

Third-quarter national accounts data were consistent with the outlook presented in the October Inflation Report, and implied a slower recovery pace than in the first half of 2010. Domestic demand continued to recover steadily, while external demand remained weak amid the deepening debt crisis in European economies since May. Thus, the divergence between domestic and external demand growth became more pronounced. Public investments continued to make a positive contribution to annual growth, while private consumption remained on a strong uptrend. Exports fell as expected, whereas imports increased sharply, and hence, net exports made a higher negative contribution to growth quarter-on-quarter.

Consumer prices increased by 6.4 percent in 2010, undershooting the October forecasts (Box 7.3). This deviation was mainly owed to the correction in the third quarter's skyrocketing unprocessed food prices. Core inflation indicators remained on track with medium-term targets.

After hitting a historic peak in the third quarter, unprocessed food prices registered a major correction in the fourth quarter amid falling fresh fruit and vegetable prices. Moreover, red meat prices declined after renewed import regulations. The October Inflation Report indicated that red meat prices were headed for a correction in the fourth quarter, bringing food inflation down. In fact, the larger-than-expected correction helped food prices increase by only 7 percent in 2010, undershooting the October estimate of 10.5 percent.

Core inflation slowed in the final quarter owing to the waning base effects from the tax incentives a year ago. Adjusted for tax changes, core inflation remained broadly unchanged, hovering around historically low levels. Similarly, services inflation also remained at historically low levels in the last quarter of 2010.

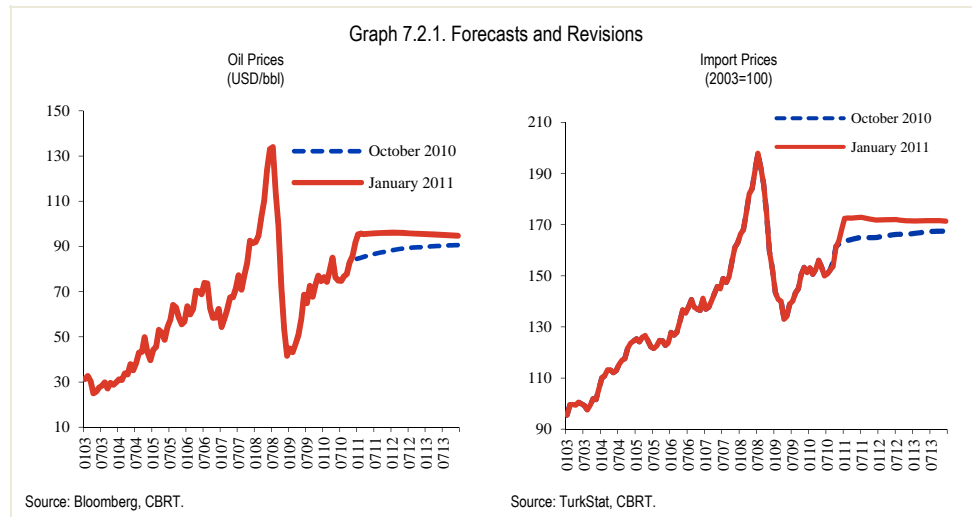
Table 7.2.1. Revisions to 2011 Assumptions

	October 2010	January 2011
<b>Food Price Inflation</b> (Annual Percentage Change)	7.0	7.5
Processed Food	5.2	6.0
Unprocessed Food	9.0	9.0
<b>Import Prices</b> (Annual Percentage Change)	6.1	10.9
<b>Oil Prices</b> (Average USD)	85	95
<b>Export-Weighted Global Production Index</b> (Annual Percentage Change)	2.56	2.60

The slump in unprocessed food inflation resulted in a lower-than-expected food inflation during the fourth quarter. However, the potential impact of the recent upsurge in agricultural commodity prices on processed food prices led to an upward revision in the food inflation assumption from 7 percent to 7.5 percent (Table 7.2.1). This revision added a 15 basis point to 2011 inflation forecasts.

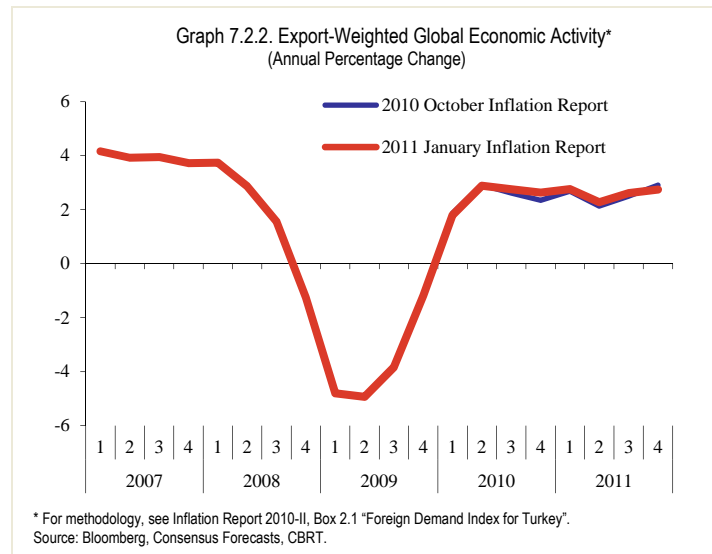
In the October Inflation Report, oil prices were assumed to be 85 USD/bbl for 2011, and 90 USD/bbl for 2012 and beyond. Moreover, in reference to futures prices for commodities, import prices were assumed to rise

gradually over the forecast horizon, increasing by an average 6.1 percent year-on-year in 2011. Commodity prices have accelerated further since the release of the October Inflation Report due to the ongoing quantitative easing in advanced economies and the strong growth in emerging economies. Although futures prices are expected to remain flat over the upcoming period, the rapid increases in commodity prices since October signal a level shift (Graph 7.2.1). In this context, in view of the futures prices as of the first half of the January, the oil price assumption for 2011 and onward is raised to 95 USD/bbl. Furthermore, again considering the futures prices, import prices are assumed to increase by about 10.9 percent year-on-year in 2011 (Table 7.2.1). These changes in assumptions led to an upward revision by 35 basis points in inflation forecasts for 2011.



Recent data releases for the fourth quarter indicate that the third-quarter slowdown in economic activity is temporary. Industrial production figures and survey data on capacity utilization and order expectations showed that manufacturing production increased sharply in the fourth quarter. In addition, given the reduced demand uncertainty and the easier access to external funds due to Turkey's relatively robust economic outlook, investment spending is likely to recover further in the upcoming period. Capacity utilization rates have climbed rapidly across manufacturing industries, particularly in the intermediate goods industry. Moreover, fiscal and monetary policies had a more significant effect on domestic demand in the fourth quarter, while consumption increased dramatically and private demand recovered at a faster pace.

However, risks to economic growth in external markets remain. Global economic activity continues to recover gradually amid the steady growth in emerging economies, while the growth outlook for advanced economies remains fragile. Accordingly, advanced economies, Turkey's main export destination, are recovering slowly. In fact, the CBRT's export-weighted global economic activity index implies that the growth rates across Turkey's export destinations will continue to hover below pre-crisis levels for a while (Graph 7.2.2).



Against this background and considering the fact that external demand remains weak while domestic demand recovers, our forecasts are based on the assumption that aggregate demand conditions would provide less support to disinflation in the final quarter, compared to the previous reporting period. Accordingly, our output gap forecasts, the starting point for our medium-term forecasts, are revised upward. However, taking into account the recent monetary tightening, the output gap is expected to close at a slower pace over 2011 (Graph 7.3.2).

Although the medium-term outlook for the global economy has improved very slightly after the October Inflation Report, downside risks to growth in external markets remain. In fact, many advanced economies constituting a substantial portion of Turkey's external demand have yet to reach their pre-crisis levels of GDP. In addition, due to the waning effects of temporary factors, the global economy is expected to grow at a slightly slower pace in 2011 than in 2010.

The leading indicators released in the fourth quarter suggest that the US economy may continue to grow while downside risks remain a major concern. In contrast to the relatively robust US economy, the euro area is likely to recover slowly and gradually amid the markedly slower pace of growth in the last quarter of 2010. The sovereign debt and banking problems across European countries, peripheral countries in particular, have been the primary drivers of the gloomy outlook for the euro area growth in 2011. Therefore, our medium-term forecasts are based on the assumption that external demand would continue to grow gradually and modestly in 2011.

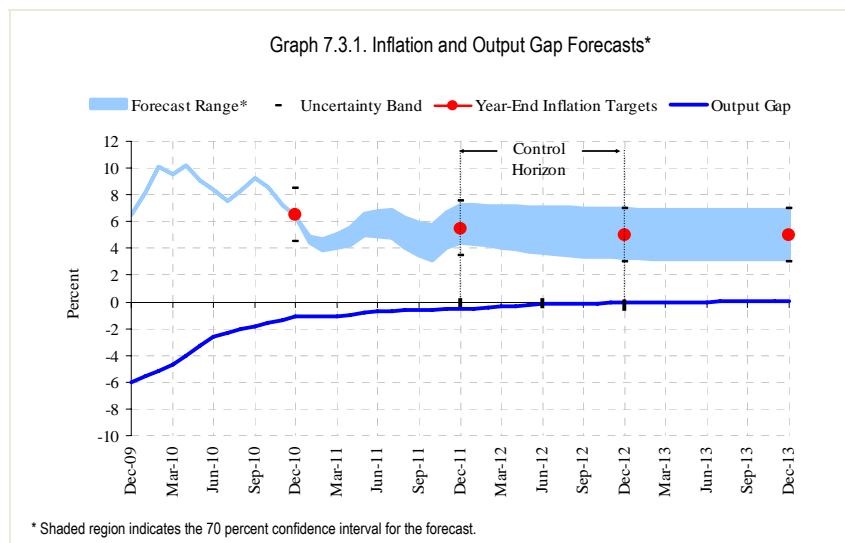
Additional easing adopted by major advanced economies in the fourth quarter of 2010 fostered expectations of a prolonged period of low interest rates and ample liquidity in advanced economies, thus stimulating capital flows into emerging economies. On the other hand, mounting concerns about the European sovereign debt crisis since November have led to an increased risk aversion, and hence, a volatile risk environment. However, Turkey's risk premium performed better than many other economies during the last quarter of 2010, and remained below pre-crisis levels. Despite the volatile risk environment across the globe, short-term market rates came down amid falling inflation and policy rate cuts. Moreover, improved loan standards and easier access to external funds boosted the ongoing rapid credit growth during the fourth quarter.

In building medium-term inflation forecasts within inflation targeting framework, the CBRT uses not only policy rates, but instead, a policy mix including required reserve ratios and other liquidity management tools. Our medium-term forecasts are based on the scenario that the net impact of the policy mix on monetary conditions would be restrictive.

Lastly, the public finance outlook is based on the MTP projections updated in October 2010. In this regard, public expenditures are assumed to make a gradually less contribution to domestic demand. In other words, the public sector is unlikely to put inflationary pressure on aggregate demand. Moreover, tax adjustments are expected to be consistent with inflation targets and automatic pricing mechanisms.

### 7.3. Medium Term Outlook

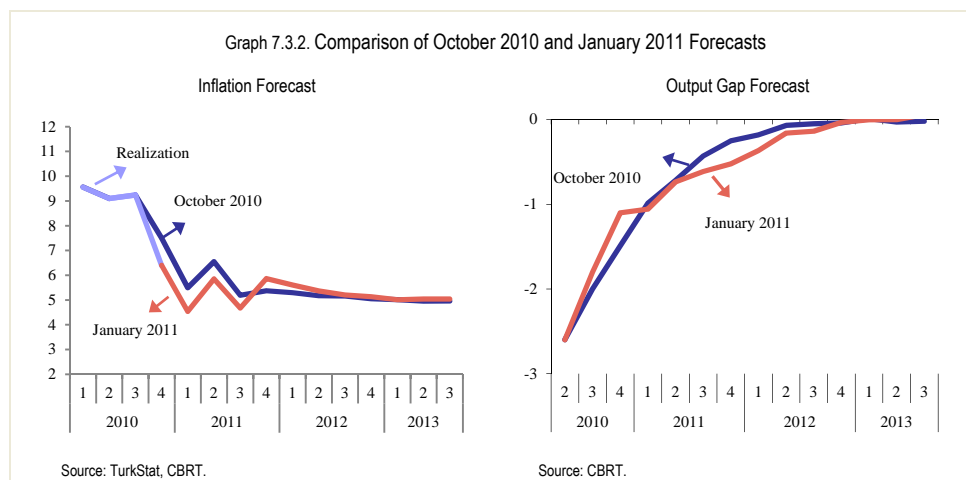
Against this background and assuming that the policy mix is adjusted to deliver a limited additional tightening in the rest of 2011, inflation will be, with 70 percent probability, between 4.5 and 7.3 percent with a mid-point of 5.9 percent at the end of 2011, and between 3.3 and 6.9 percent with a mid-point of 5.1 percent at the end of 2012. Inflation is expected to stabilize around 5 percent in the medium term (Graph 7.3.1).



Accordingly, the revised forecasts indicate that inflation would be close to the target by the end of 2011 assuming that the limited monetary tightening in 2011 brings credit growth rate down to 20-25 percent. It should be noted that the envisaged monetary tightening in 2011 may be implemented through various policy tool combinations. The monetary tightening would be induced by either required reserve ratios or policy rates, or a combination of both. Moreover, during the tightening process, both instruments could move in the same or in the opposite direction. Yet, it should be emphasized that the baseline scenario envisages the net impact of the policy mix on loans and domestic demand to be restrictive.

The rapid decline in unprocessed food prices pulled short-term inflation forecasts down, while the upward revision to oil and commodity price assumptions drove end-2011 inflation forecasts higher. The output gap is revised slightly upwards for the final quarter of 2010. In addition, considering the lagged effects of the monetary tightening, the output gap is assumed to close more slowly than in the previous reporting period (Graph 7.3.2).



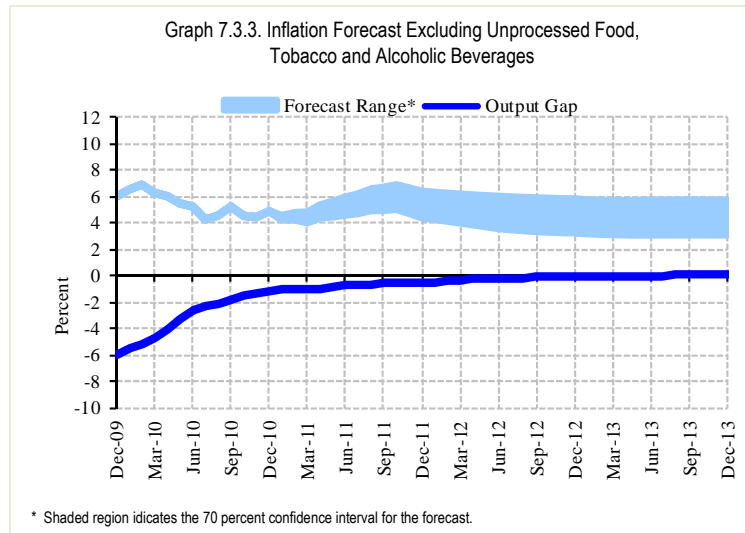


Although underlying inflation is likely to remain stable and on track with medium-term targets, base effects are expected to have major implications for inflation over the year ahead. Therefore, a clear understanding of these effects will help economic agents better interpret the inflation developments and enhance expectation management. Inflation will continue to slow markedly in the first two months of 2011 once the 1.9 percentage point contribution of early 2010 tax hikes tapers off. In the rest of 2011, food price driven base effects are likely to weigh on inflation, and therefore, annual inflation is expected to rise in the second quarter of 2011, but fall again in the third quarter. Inflation is expected to reach the medium-term target of 5 percent by mid-2012 once the effects of rising commodity prices wear off (Graph 7.3.2).

It should be emphasized that any new data or information regarding the inflation outlook may lead to a change in the monetary policy stance. Therefore, assumptions regarding the monetary policy outlook underlying the inflation forecast should not be perceived as a commitment on behalf of the CBRT.

The unforeseen fluctuations in items that are beyond the immediate control of the CBRT, such as unprocessed food and tobacco, are among the main causes of the deviation from the inflation target. Hence, starting from the previous report, the CBRT began to release the details of its inflation forecasts excluding unprocessed food and tobacco. The forecasts are based on the assumption that annual unprocessed food inflation will hit 9 percent, while the annual rate of increase in tobacco and alcoholic beverages will remain on track with inflation targets. Our inflation forecasts excluding unprocessed food,

tobacco and alcoholic beverages are shown in Graph 7.3.3. Accordingly, inflation is expected to rise gradually until the last quarter of 2011, return to a downward path thereafter and stabilize around 4.5 percent in the medium term. The slight increase from the previous Report is due to the upward revision of the annual processed food inflation (Table 7.2.1).



### Comparison of CBRT Forecasts with Inflation Expectations

It is critical that economic agents, with the awareness of the temporary factors, focus on the trend of inflation in the medium-term, and therefore, take the inflation target as a benchmark for their pricing plans and contracts. In this respect, to serve as a reference guide, CBRT's current inflation forecasts should be compared to inflation expectations of other economic agents. End-2011 and 12-month ahead inflation expectations are up around 0.8 percentage points from our forecasts for the respective periods. However, longer term inflation expectations are about 1.1 percentage points above our revised inflation forecasts (Table 7.3.1).

Table 7.3.1. CBRT Inflation Forecasts and Expectations

	CBRT Forecast	CBRT Survey of Expectations*	Inflation Target**
2011 Year-end	5.86	6.61	5.5
12-Month Ahead	5.78	6.55	5.4
24-Month Ahead	5.09	6.17	5.0

\* January 2011, second survey period results.

\*\* Calculated by linear interpolation of year-end inflation targets for 2011, 2012 and 2013.

Source: CBRT.

## 7.4. Risks and Monetary Policy

The baseline scenario for the medium-term forecasts maintains the inflation target by changing the policy rate and/or the reserve requirement ratios so that the policy mix provides a gradual monetary tightening. Such a tightening not only aims at slowing down credit and domestic demand growth, but also eases macroprudential concerns. The impact of the measures taken in December and in January in order to contain credit growth is expected to be effective over the near term. However, the time lag and the extent of the impact of the policy mix may vary depending on the developments beyond the control of the monetary policy. Therefore, the CBRT will closely monitor the effects of the policy measures, and take further actions should the rate of credit growth or the inflation rate deviate from the desired levels.

Developments regarding the global economy remain central to domestic inflation and monetary policy outlook. Under current conditions, the CBRT is utilizing several instruments in order to monitor both price stability and financial stability. Therefore, global developments, unlike past, not only affect the direction of the policy instruments, but also their combination. Accordingly, global risks will be assessed according to their effects on the pace of the aggregate demand as well as on its composition.

Although there has been some improvement regarding the prospects for the US economy, uncertainties driven by sovereign debt problems across euro area peripheral economies still persist. Ongoing problems in credit, real estate, and labor markets across advanced economies and the uncertainties regarding the impact of the probable fiscal consolidations continue to pose downside risks regarding the pace of global growth. The possibility of a longer-than-anticipated period of anemic global growth and a prolonged period of quantitative easing by advanced economies not only creates downside risks regarding external demand but also implies that capital inflows may continue at a faster pace. Should such a scenario materialize, a policy mix of low policy rate and high reserve requirement ratios may be implemented for a long period, both for balancing the domestic and external demand and for macroprudential concerns. Moreover, an outcome whereby global economic problems intensify and domestic economic activity contracts, may require an easing in all policy instruments.

Although downside risks are critical, upside risks to global economy are also present. These risks are especially driven by the lagged impacts of the

exceptionally loose policies implemented by advanced economies during the past two years. In the period ahead, should the global economy faces a faster-than-expected recovery, global inflation may increase, thus warranting monetary tightening in advanced economies. Materialization of such a scenario would mean higher global interest rates and demand-pull domestic inflation, and thus necessitate a tightening by increasing both policy rates and reserve requirement ratios.

Oil and other commodity prices have displayed rapid increases in the recent period. The increases in commodity prices, if they persist, exert risks regarding general pricing behavior, given the strong pace of domestic demand. Should such a risk materialize and hamper the attainment of the medium-term inflation targets, stronger tightening may be warranted than envisaged in the baseline scenario. However, the policy mix may vary depending on the developments regarding external demand, capital flows, and the outlook for credit growth.

The CBRT continues to monitor fiscal policy developments closely while formulating monetary policy. Increasing public savings under current circumstances is essential in order to control the current account deficit driven by the divergence between domestic and external demand. Our inflation forecasts take the fiscal projections of the MTP as given. A revision in the monetary policy stance may be considered, should the fiscal stance deviate significantly from this framework and consequently have an adverse effect on inflation outlook.

Monetary policy will continue to focus on price stability in the period ahead. To this end, the impact of the macroprudential measures taken by the CBRT as well as by other institutions on the inflation outlook will be considered carefully. Fulfilling the commitment to fiscal discipline in the medium term and strengthening the structural reform agenda would contribute to the improvement of Turkey's sovereign risk, and thus enhance macroeconomic stability as well as price stability. Sustaining the fiscal discipline will also provide room for monetary policy maneuver and support the social welfare by keeping interest rates permanently at low levels. In this respect, timely implementation of the structural reforms required by the MTP and the European Union accession process remains to be of utmost importance.

Prior to the global financial crisis, central banks had adopted a monetary policy framework that enshrined price stability as the main objective, and responded to the developments in financial markets depending on their implications for inflation and economic activity. However, the pre-crisis and post-crisis developments urged policy makers to focus on both price stability and financial stability. This Box discusses the relationship between price stability and financial stability with regard to inflation targeting, and gives a brief account of the recent CBRT decisions.

Although there is no consensus on the definition for financial stability in the economic literature, it can be defined as the situation where effective distribution of funds is achieved by also providing a smooth functioning of the financial system and having the ability to return to a stable equilibrium in the face of temporary shocks. Among other indicators of financial stability are asset prices consistent with economic fundamentals and the absence of a sudden economic recession created by the financial system.

In countries including Turkey, where the supervision and regulation of the financial system is carried out by an independent institution, central banks, while using policy tools, observes the financial system as a whole and assesses various factors threatening the system by posing a systemic risk from a macro perspective.

Understanding the relationship between price stability and financial stability with regard to inflation targeting is very important for the correct interpretation of the CBRT's recent policy decisions. The presence of a smooth-functioning and strong financial system, a prerequisite for financial stability, not only helps to enhance the transmission mechanism, and therefore monetary policy, but also increases resilience to external shocks and thus plays a major role in maintaining price stability. Similarly, given the main objective of maintaining price stability, central banks keep inflation expectations in check by decreasing the volatility of market rates and other financial variables, and hence, price stability contributes to financial stability.

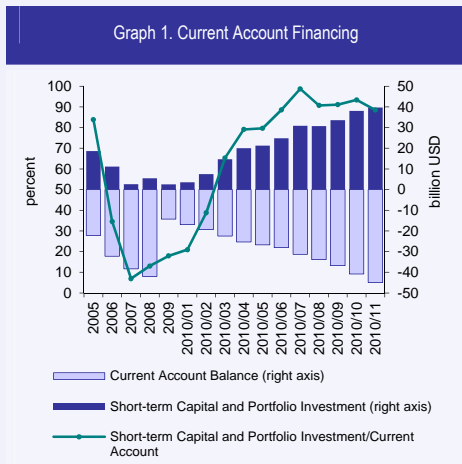
Experiences during the global financial crisis have shown that price stability is necessary but not sufficient for financial stability. For example, the pre-crisis policies, especially in advanced economies, helped to keep inflation at low levels but failed to prevent the excessive increases in debt ratios and asset prices, leading to a deterioration in financial stability, and consequently, to the deepest financial crisis ever. These developments were followed by a period where monetary policy decisions became increasingly responsive to financial imbalances, and central banks revised their duties regarding financial stability, and accordingly, modified their monetary policy approach.

The main policy tool of inflation-targeting central banks to maintain price stability and financial stability is policy rates. However, the level of policy rate to maintain price stability cannot always be consistent with the level of policy rate required for maintaining financial stability. This prompts central banks to employ additional tools and build a proper policy mix for both financial stability and price stability. The effective use of these tools for achieving macroeconomic stability helps the policy rates required for financial stability and price stability to be compatible.

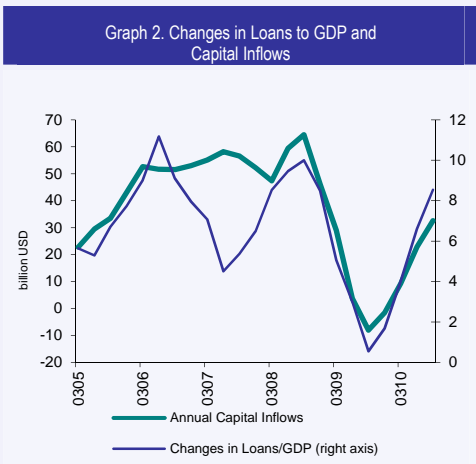
Hence, the CBRT's recent policy decisions should be assessed within this framework. With its primary objective of achieving and maintaining price stability, the CBRT is, by law, one of the institutions responsible for financial stability in Turkey. The fundamental issues followed by the CBRT regarding financial stability are debt ratios, debt maturities, foreign currency positions and risk management procedures and methods.

In the current economic climate of massive capital flows to safe and dynamic emerging market economies, risks to financial stability are manifested as widening current account deficits boosted by short-term capital inflows, and rapid credit expansion. Recently, there has been a significant increase in the amount of capital inflows to Turkey, in the form of lower direct investment and private sector loans and higher portfolio investments compared to the pre-crisis period (Graph 1). This creates vulnerability to possible sudden changes in the global risk sentiment, and poses risks to financial stability. In this context, in order to contain macroprudential risks, the CBRT allows short-term rates to float by reducing policy rates and widening the corridor between overnight borrowing and lending rates, in order to encourage long-term capital inflows and tie exchange rates to economic fundamentals.

Affordable and abundant funding fueled by the recent increase in the capital inflow to Turkey has led to sharp increases in the changes in the credit volume to GDP ratio (Graph 2). During a period of stable domestic demand and weak external demand, the pace of credit expansion is critical regarding its implication on the current account deficit, but more importantly, given its effect on debt ratios, the CBRT's measure for financial stability. In this respect, the CBRT uses required reserve ratios as an active policy tool to slow credit growth. On the other hand, increases in loans and short-term capital inflows cause a maturity mismatch in banks' assets and liabilities. Therefore, the CBRT varied the required reserve ratios by maturities in order to extend the maturity of the banking system's liabilities. The current policy mix is expected to restrain loans as of the first quarter.



Source: CBRT.



Source: BRSA, CBRT.

In sum, the developments during the crisis urged central banks not to ignore financial stability while focusing on price stability. The massive capital inflows to emerging market economies during the exit period pose risk to financial stability through debt ratios and current account deficit. Thus, in addition to its objective of maintaining price stability, monetary policy should also observe risks to financial stability and be shaped to address the needs of this new era. In this context, the CBRT's recent decisions should be considered as an integral part of the policy framework observing financial stability without sacrificing price stability.

Reserve requirements are monetary policy tools that require banks and other financial institutions to hold a certain portion of deposits and their other liabilities at the central bank.

The principles to govern reserve requirements in Turkey are set out in the Communique No. 2005/1 based on Paragraph II, Article 40 of the CBRT Law No. 1211. Accordingly, reserve requirements include sight and notice deposits, special current accounts, time deposits and participation accounts, and liabilities other than deposits and participation funds. With the amendment made on December 17, 2010, funds received from all domestic and external repo transactions, excluding those received from Interbank and CBRT repo transactions have been subject to reserve requirements.

#### Why Use Reserve Requirements?

Although the reasons have changed over time, reserve requirements have been used for three main purposes: Precaution, liquidity management and monetary control. The oldest of these reasons is the use of reserve requirements in order to provide precautionary reserves in case of an exceptional liquidity withdrawal from banks.

Reserve requirements play a major role in central banks' liquidity management as well. Although liquidity can also be effectively managed by open market operations, the use of reserve requirements is a more viable option for enduring structural changes.

Similarly, some elements regarding the operational structure of reserve requirements have a key influence on liquidity management. For example, the amount of reserve money that banks would voluntarily hold at the central bank for payment and clearing systems purposes can vary largely from one day to another, making it difficult for the central bank to estimate the demand for reserve money. Hence, if required reserves are set sufficiently high so that they surpass the amount that banks would voluntarily hold, the demand for reserve money will be more stable and predictable.



Moreover, in many economies, including Turkey, setting reserve requirements for quarterly averages, rather than on daily basis, helps banks to manage liquidity shocks. In Turkey, liabilities subject to reserve requirements are computed bi-weekly on Fridays, and reserve requirements are maintained over a 14-day period. This period starts on Friday after two weeks from the date when liabilities are computed, and ends at the end of the Thursday of the second week of the maintenance. Reserve requirements are held on an average basis, and the 14-day average of the daily balances of these accounts during the maintenance period should be no lower than the amount of the Turkish lira denominated reserve to be maintained.

The third reason for holding reserve requirements is the increasing importance of the reserve requirements during and after the global crisis as a *monetary control* instrument used by central banks in order to maintain macroeconomic stability.

The international economic climate in the aftermath of the global financial crisis is particularly marked by ongoing expansionary monetary policies in advanced economies and the resulting strong capital flows. In addition, domestic demand and loans are increasing rapidly in many emerging economies, including Turkey. The impact of the global economic climate on domestic demand and funding opportunities intensifies amid the appreciation pressure on emerging market currencies, widening the divergence between domestic and external demand, as in Turkey.

The divergence between domestic and external demand leads to rapid credit expansion and higher current account deficit, prompting the CBRT to closely monitor macroprudential risks. A single tool does not suffice for the monetary policy to actively monitor financial stability without sacrificing the primary objective of maintaining price stability. Therefore, the CBRT actively employs required reserve ratios and other liquidity management tools, in addition to short-term interest rates, the main policy tool.

### Transmission Channels of Reserve Requirements

Within the inflation-targeting framework, the impact of reserve requirements on the macroeconomy is transmitted through the *cost* and the *liquidity channels*. The cost channel basically operates through the impact of the changes in central bank's reserve requirements on the spread between banks' loan and deposit rates, while the liquidity channel operates through the impact of the changes in reserve requirements on the lending behavior, by changes in banks' need for central bank's short-term funding. The following discusses the functioning of these channels in detail.

#### *Cost Channel*

Changes in reserve requirements, by affecting the cost of banks' liabilities, adjust the spread between deposit and loan rates in order to offset the changes in reserve requirements. In a simple setting where the only liabilities are deposits and the only assets are loans, the extent of the impact of the changes in required reserve ratios on the spread between deposit and loan rates would basically depend on the interest rate on liabilities subject to reserve requirements and on the current required reserve ratio.

An effective cost channel is firstly ensured by paying no interest on reserve requirements (or a payment of interest significantly below market rates) and secondly, by holding voluntary reserves not exceeding the required reserves. These conditions are necessary but not sufficient.

The extent to which reserve requirements would affect loan and deposit rates through the cost channel is directly related to the structure of the financial sector. How the widening impact of the reserve requirements on the spread between deposit and loan rates is shared between banks and customers (deposits and loans) is crucial regarding the implications of this instrument (Reinhart and Reinhart, 1999; Hein and Stewart, 2002).

The degree of substitution between deposits and central bank funds is also crucial for determining the direction of the cost due to the spread between loan and deposit rates (Vargas *et al*, 2010). When short-term central bank funds are perfect substitutes for deposits, banks would lower the interest on deposits with higher costs in response to an increase in the required reserve ratio, and thus, the increased cost would pass through to deposit rates rather than loan rates.

### *Liquidity Channel*

In a setting where monetary policy is implemented by monetary targets but with no specific target for interest rates, the central bank's decisions about market liquidity would have a strong influence on money supply. In such a context, the amount of money creation in the financial system would depend on the central bank's liquidity created through the money multiplier mechanism, thus ensuing central bank to be influential on loans. On the other hand, in a regime where the central bank sets the policy rate and market rates stabilize around the central bank's policy rate (such as inflation targeting), the central bank can only indirectly affect the amount of liquidity as the central bank has to provide the demanded liquidity to ensure that money market rates are close to the policy rate.

If the liquidity is drained from the banking system through reserve requirements, banks are able to compensate for the drained liquidity by extra borrowing from the central bank, yet, this causes banks to become more dependent on short-term central bank funds. In such a case, even though bank loans may remain the same, the maturity mismatch will increase. As a result, banks may have to pass on the additional interest risk arising from the maturity mismatch to loan rates and/or reduce loan supply to become less dependent on short-term funds. Moreover, in case there is a binding legislation on liquidity adequacy ratio, changes in reserve requirements would directly and exogenously affect banks' behavior by changing banks' liquidity positions.

The extent to which the interest risk channel would affect banks' behavior depends on to what extent short-term central bank funds would substitute other liabilities. In case of perfect substitution, borrowing more short-term funds would not heighten risks, and therefore, banks would not have to raise loan rates. The degree of substitution between short-term central bank funds and other liabilities would basically depend on the interest risk implied by these two funds. Central bank's policy stance is one of the most important factors that determine the interest risk. In case of growing uncertainty about the policy rate outlook, the increasing dependence on short-term funds would further increase the banks' exposure to interest risk.

The breakdown of liabilities subject to reserve requirements by maturity is another factor determining the interest risk of banks' funding sources. A scheme of required reserve ratios designed to lengthen the maturity of liabilities of the banking system would extend the average maturity of banks' liabilities. Thus, the degree of substitution between short-term central bank funds and deposits would decline, and hence, the effects of reserve requirements through liquidity channel would be stronger.

#### Overview

The role of reserve requirements as a monetary policy tool complementing policy rates is mainly attributable to the fact that reserve requirements only affect certain interest rates, while policy rates affect all interest rates in the same way. In an environment where strong capital flows widen the current account deficit through local currency appreciations and increased funds accessible to the banking system, central banks are urged to contain the risks of an overheating economy and inflation. However, raising policy rates to cool the economy could boost capital flows. On the other hand, a policy rate cut to reduce capital flows can aggravate overheating and inflationary pressures. However, the use of reserve requirements would slow the credit expansion through both cost and liquidity channels. In sum, reserve requirements enable a tight monetary policy without increasing capital flows, and therefore, serve as a practical tool for the CBRT in the present economic environment.

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Box  
7.3

## Sources of Revisions to Inflation Forecasts for 2010 Year-End

The extreme volatility in unprocessed food prices over the last year had a strong influence on inflation forecasts for 2010. Moreover, forecasts for the global economy remained volatile in 2010, leading to revisions on assumptions regarding both external demand and commodity prices over the year. Due to these assumption changes, 2010 inflation forecasts had to be revised. The CBRT is obliged to remain accountable to the public by releasing reports within the inflation targeting framework. This Box gives a brief account of the major revisions to end-2010 inflation forecasts and the underlying reasons.

## January Inflation Report

While the global crisis had gradually less impact, global growth indicators were revised slightly up. However, sovereign debt reaching alarming levels in advanced economies, the ongoing problems in credit markets and the elevated levels of unemployment posed downside risks to the recovery and caused external demand to remain restrictive on the economic activity. Although aggregate demand conditions continued to support disinflation, rising unprocessed food and oil prices, and the expiration of tax incentives were foreseen to be effective on the inflation outlook. Accordingly, in the January 2010 Inflation Report, inflation was estimated to be 6.9 percent at the end of 2010.

Table.1 Inflation Report Assumptions

		January Inflation Report	April Inflation Report	July Inflation Report	October Inflation Report
<u>Growth Forecasts</u>					
World	2010	3.0	3.2	3.5	3.7
	2011	-	3.3	3.3	3.1
USA	2010	2.9	3.2	3.1	2.7
	2011	3.1	3.1	3	2.4
Euro Area	2010	1.3	1.2	1.1	1.6
	2011	1.6	1.5	1.4	1.4
Food Inflation	2010	7.0	9.0	7.5	10.5
	2011	6.5	7.0	7.0	7.0
Oil Prices (Brent, USD/bbl)	2010	80	85	80	80
	2011	85	90	85	85

#### April Inflation Report

Data released in the first quarter showed that the recovery in final domestic demand was stronger than anticipated in the January Inflation Report. Despite the ongoing weak economic activity in the euro area, Turkey's main export destination, global growth forecasts were revised upwards (Table 1). In this context, aggregate demand conditions were assumed to support disinflation, albeit at a slower pace, while output gap forecasts were revised significantly upwards (Graph 1). This upward revision pushed underlying inflation forecasts up by about 0.3 percentage points.

On the other hand, the faster-than-anticipated increase in food, oil and other commodity prices warranted an upward revision on assumptions for these items. Following the sharp increases in food prices during the first quarter of 2010, the food inflation assumption was revised 2 percentage points up from the January Inflation Report (Table 1), driving the year-end inflation forecast up by 0.6 percentage points (Table 2). Similarly, the assumption for crude oil prices rose from 80 USD/barrel to 85 USD/barrel, raising the end-year inflation forecast by 0.2 percentage points.

The tax adjustments on fuel, alcoholic beverages and tobacco aimed to restore fiscal balances were assumed to bring year-end inflation up by 1.5 percentage points, but actually added 1.9 percentage points, thereby causing an upward revision in inflation forecasts. Accordingly, end-2010 inflation forecasts were increased by 0.4 percentage points. As a result, our year-end inflation forecast was raised from 6.9 percent in the January 2010 Inflation Report to 8.4 percent in the April 2010 Inflation Report (Table 2).

#### July Inflation Report

The second-quarter data showed that domestic demand was recovering solidly as expected, while exports remained weak due to ongoing problems in the global economy. Growth forecasts for the euro area, Turkey's major trading partner, were revised further down and external demand continued to have a negative impact on the economic activity amid outstanding problems in European economies since May that heightened the aggregate demand uncertainty (Table 1). In this context, aggregate demand conditions were assumed to continue to support disinflation at a slightly faster pace, and output gap forecasts were revised slightly down (Graph 1). Accordingly, in view of the positive developments in services inflation, the underlying inflation forecast was revised down, bringing year-end inflation forecasts down by 0.3 percentage points.

With the sharp second-quarter decline in unprocessed food prices, food prices remained below the forecasts in the April Inflation Report. Hence, the assumption for the end-2010 food price inflation was lowered to 7.5 percent (Table 1). This revision brought the end-2010 inflation forecast down by 0.4 percentage points. Oil prices remained lower than envisioned in the previous reporting period due to mounting downside risks to the global growth outlook, bringing the crude oil price assumption for 2010 down to 80 USD/barrel from 85 USD/barrel. This revision dragged the end-2010 inflation forecast down by 0.2 percentage points. As a result, the year-end inflation forecast was lowered to 7.5 percent in the July 2010 Inflation Report (Table 2).

#### October Inflation Report

The significant GDP growth in the second quarter and other available data in the third-quarter showed that final domestic demand recovered more strongly than the July estimate, whereas, external demand conditions remained weak. In this respect, aggregate demand conditions were assumed to provide less support to disinflation, while output gap forecasts were revised up from the previous reporting period (Graph 1). However, services inflation and core inflation remained more moderate than expected during the third quarter and put significant downward pressure on the underlying inflation forecast, pushing year-end inflation forecasts down by 0.8 percentage points.

Moreover, the annual rate of increase in food prices were well above than envisioned in the July Inflation Report, mainly owing to the unprecedented increase in unprocessed food prices during the third quarter. Accordingly, the end-2010 food inflation assumption was revised up from 7.5 to 10.5 percent. This revision brought the end-2010 inflation forecast up by 0.8 percentage points. As a result, the end-2010 inflation forecast remained stable at 7.5 percent (Table 2).

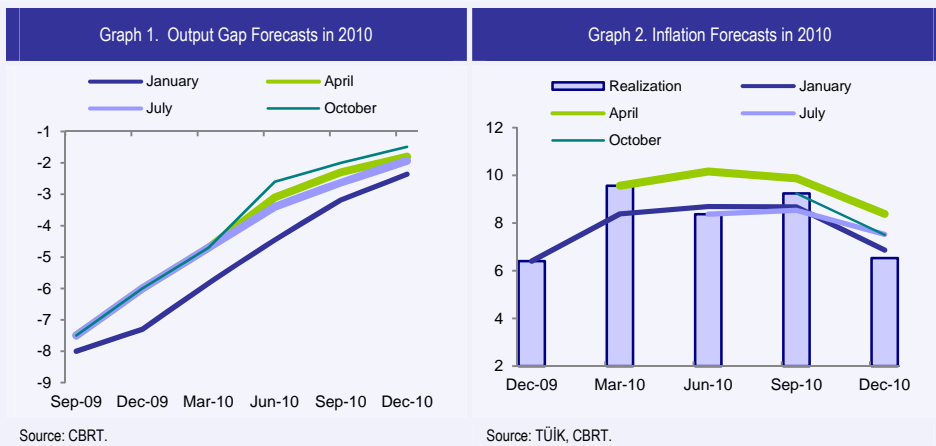
Table 2. Revisions to 2010 Year-end Inflation Forecasts and Sources  
(Percent)

	January	April	July	October
Inflation Forecasts	6.9	8.4	7.5	7.5
<b>Sources of Revisions to Inflation Report Forecasts</b>				
	April-January	July-April	October-July	December-October*
Food	0.6	-0.4	0.8	-1.0
Processed	0.1	-0.2	0.4	-0.1
Unprocessed	0.5	-0.2	0.4	-0.9
Oil Prices	0.2	-0.2	0.0	0.0
Additional Fiscal Measures	0.4	0.0	0.0	0.0
Underlying Inflation	0.3	-0.3	-0.8	-0.1

\* Difference between year-end inflation forecast as of October and year-end actual inflation. 2010 year-end inflation has been 6.4 percent.  
Source: CBRT.

## 2010 Year-end Inflation Realization

Developments in the last quarter confirmed that the factors affecting the underlying inflation were broadly consistent with the outlook presented in the October Inflation Report. However, particularly due to the larger-than-anticipated downward correction in unprocessed food prices, the end-2010 food inflation was registered as 7.0 percent, down from the October estimate of 10.5 percent. The fall in unprocessed food prices largely explains the deviation of the actual year-end inflation of 6.4 percent from October's year-end inflation forecast of 7.5 percent (Graph 2).



In sum, the trend of inflation through 2010 has broadly been consistent with the CBRT's early 2010 forecasts (Graph 2). However, the uncertainties regarding the impact of the global crisis on aggregate demand and the unforeseen movements in oil and food prices caused end-2010 inflation forecasts to remain volatile over quarters.

The CBRT will continue to transparently announce forecast revisions and their underlying reasons through Inflation Reports, and thus, will continue to regularly fulfill its commitment to accountability.