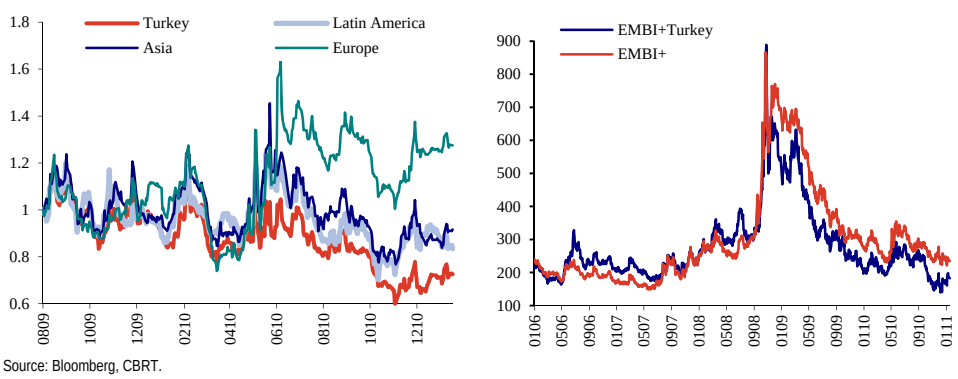
5. Financial Markets and Financial Intermediation

5.1. Financial Markets

Fourth-quarter data show that the global economy continued to recover gradually, although downside risks to advanced economies, the origins of the crisis, have yet to fully disappear. Financial institutions, firms and households in advanced economies are still undergoing balance-sheet repair, limiting the support of private consumption and investment to economic recovery. On the other hand, the steady growth in emerging economies continued into the fourth quarter. Indeed, in many emerging economies including Turkey, production surpassed pre-crisis levels and labor indicators continued to improve.

The ongoing yet decreased uncertainty about the recovery in advanced economies urged major central banks to take additional expansionary measures in the fourth quarter, causing stronger expectations for a prolonged period of low interest rates and ample liquidity in advanced economies, thus improving the global risk sentiment. As a result, emerging economies attracted more capital flows and observed lower risk premiums. However, risks to sovereign debt in EU's peripheral economies continued to weigh on financial markets during the fourth quarter. In fact, mounting concerns about European sovereign debt problem since November increased risk aversion and led to increases in risk premiums across emerging economies. During this period, despite the volatile risk sentiment, Turkey's risk premium indicators had a more benign outlook than in many other economies and continued to hover below pre-crisis levels (Graph 5.1.1). The favorable outlook for risk premium indicators has largely been owed to Turkey's credit rating upgrade following the re-evaluation of its risk in the global markets.

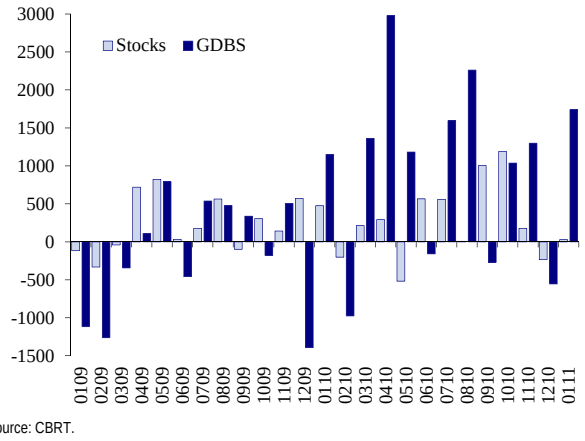
Graph 5.1.1. Risk Premium Indicators for Emerging Economies



Source: Bloomberg, CBRT.

The volatile risk sentiment in the fourth quarter also affected capital flows in the form of portfolio investments. Accordingly, the improved global risk sentiment fueled by the additional monetary measures adopted by advanced economies encouraged capital flows into emerging economies in the first part of the fourth quarter. In this period, the bonds and bills market as well as the stock market attracted capital inflows. Turkey's credit rating and the positive developments regarding the credit rating outlook contributed to increasing capital inflows. However, the renewed concerns about the sovereign debt problem in some European economies led to capital outflows from the bonds and bills market as well as the stock market. Nevertheless, capital inflows, in particular, portfolio investments which especially increased after the crisis, continued throughout the fourth quarter (Graph 5.1.2).

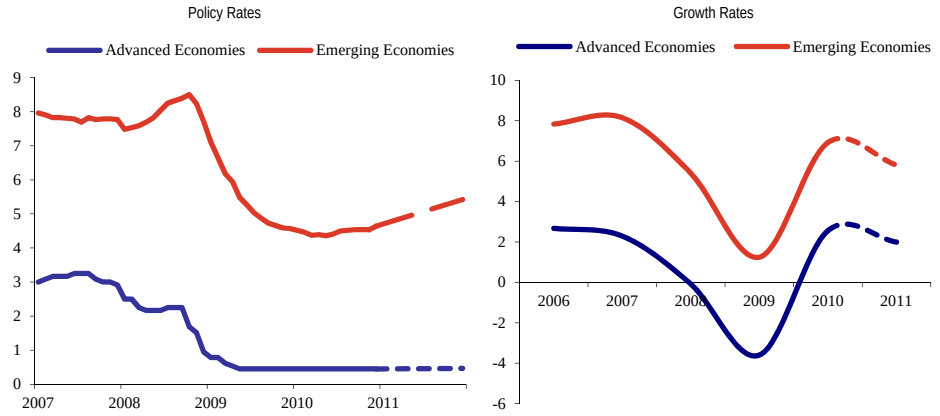
Graph 5.1.2. Net Portfolio of Non-Residents
(Adjusted for Index and Interest Rate Effect, Million USD)



Source: CBRT.

Capital flows into emerging economies are likely to accelerate over the coming period. One factor supporting capital inflows has been the improved post-crisis risk sentiment towards emerging economies. Risk premium indicators below pre-crisis levels and credit rating upgrades by rating agencies are an indication of the changes in sovereign risks of many emerging economies (Graph 5.1.1). Moreover, emerging economies recover at a faster pace than advanced economies, and this divergence in the pace of recovery is expected to spur more capital flows into emerging economies amid easing sovereign risks in coming months (Graph 5.1.3).

Graph 5.1.3. Growth and Policy Rates in Advanced and Emerging Economies*
(Percent)

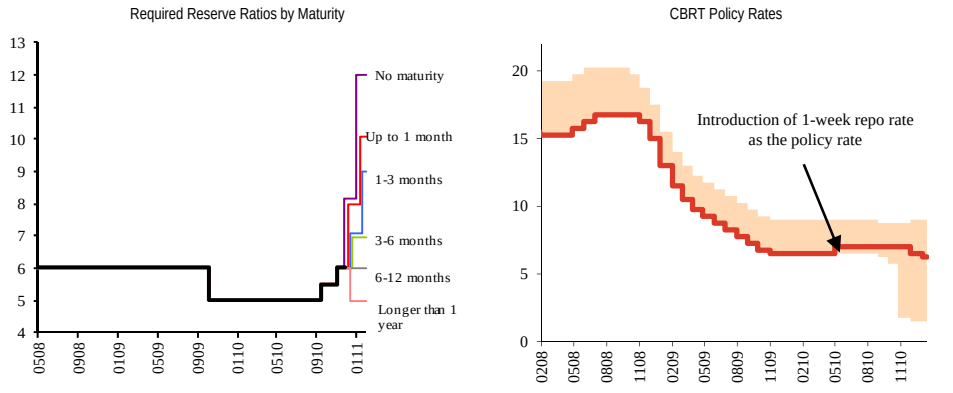


* Advanced Economies: USA, EU, Japan. Emerging Economies: China, India, Brazil, South Korea, Mexico, Russia, Turkey, Poland, Indonesia, South Africa, Thailand, Malaysia, Israel, Czech Republic, Hungary, Colombia, Philippines.
Source: Bloomberg, Consensus Forecasts, CBRT.

Another factor encouraging capital flows into emerging economies is the growing expectation of a sustained monetary easing in advanced economies. The additional liquidity measures adopted by major central banks in the fourth quarter imply a prolonged period of low interest rates and ample liquidity (Graph 5.1.3). Thus, short-term portfolio flows to emerging economies are expected to accelerate in the upcoming period.

The accelerated growth of capital inflow to Turkey poses a macroprudential risk by contributing to the widening of current account deficit fueled by the divergence between domestic and external demand growth and rapid credit expansion. This necessitates the use of a policy mix that effectively combines short-term interest rates with alternative policy instruments such as liquidity management tools and required reserves. In this context, the MPC decided at its December 2010 and January 2011 meetings to lower the 1-week repo auction rate, the main policy instrument, by 50 and 25 basis points, respectively. These decisions aim to extend the maturity of the capital inflows as well as to prevent the Turkish lira to detach from economic fundamentals. In addition to policy rate cuts, the CBRT decreased the overnight borrowing rate to 1.5 percent in order to extend the maturities in TL-denominated transactions. The corridor between overnight borrowing and lending rates was widened to allow for fluctuations in short-term interest rates when needed (Graph 5.1.4).

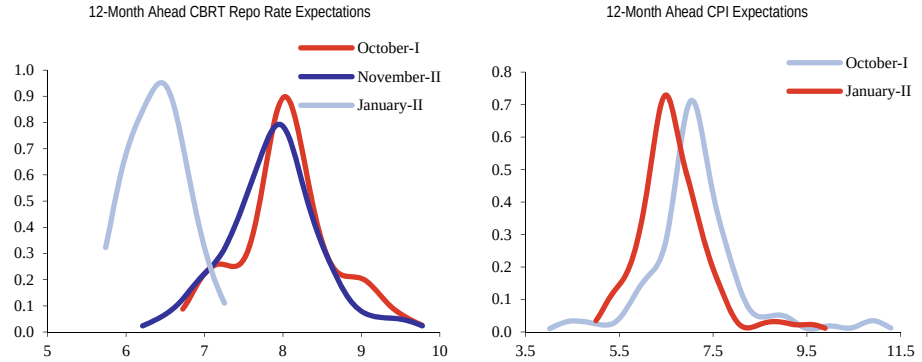
Graph 5.1.4. Required Reserve Ratios for TL Deposits and Policy Rates



Source: CBRT.

Another issue taken into consideration when formulating the new policy mix was to limit rapid credit growth, an important factor contributing to the widening of the current account deficit. In this context, the CBRT decided to use reserve requirement ratios as an active policy instrument. Accordingly, on November 12, 2010, the TL reserve requirement ratio was raised from 5.5 to 6 percent. Consequently, on December 17, 2010 and January 24, 2011, the TL reserve requirement ratios were allowed to vary across maturities, with lower ratios for longer-term maturities (Graph 5.1.4). This decision aims to slow down credit growth and increase the maturity of the banking system's liabilities, thereby reducing maturity mismatches. The CBRT emphasized that the net impact of the measures adopted within the new policy framework should result in a tighter stance. The increase in the weighted average of reserve requirement ratios is expected to be effective on credit growth through cost and liquidity channels in the upcoming period. Following the CBRT's decisions on rate cuts and reserve requirements, policy rate expectations were revised downward (Graph 5.1.5).

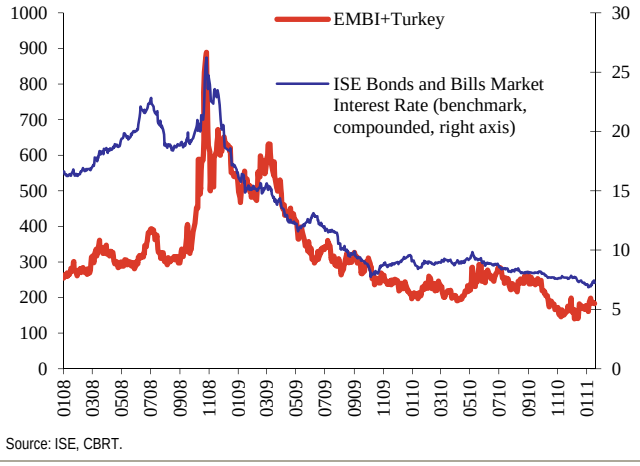
Graph 5.1.5. Distribution of Expected Policy Rates and Inflation*



* Calculated by non-parametric Kernel estimation using CBRT Survey of Expectations, first and second survey period results.
Source: CBRT.

Policy rate cuts and the consequent downward revision of policy rate expectations had an impact on market rates. Accordingly, despite the volatile global risk sentiment, market rates trended downward, especially in late 2010, pushing the benchmark interest rate down to an all-time low. The downtrend in market rates have been more pronounced by early December following the CBRT's announcement that measured rate cuts may come about (Graph 5.1.6). Furthermore, the downtrend in inflation expectations has also contributed to the fall in market rates (Graph 5.1.5).

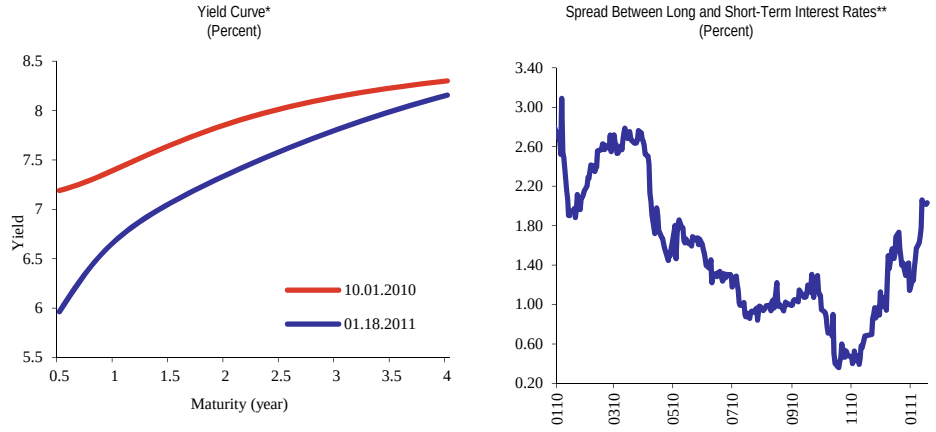
Graph 5.1.6. Interest Rates
(Percent)



Source: ISE, CBRT.

The decline in market interest rates was more pronounced at shorter maturities. The growing expectations of a rate cut and the consequent rate cut in December caused rapid declines in short-term market rates while leaving long-term interest rates essentially unchanged. The slight decline in long-term interest rates has mainly been owed to Turkey's improved risk sentiment. Despite the volatile global risk sentiment, long-term interest rates remained relatively stable at historically low levels, reflecting prospects of a prolonged period of low interest rates in Turkey. The more pronounced downturn in market rates at shorter maturities caused the yield curve to steepen quarter-on-quarter (Graph 5.1.7).

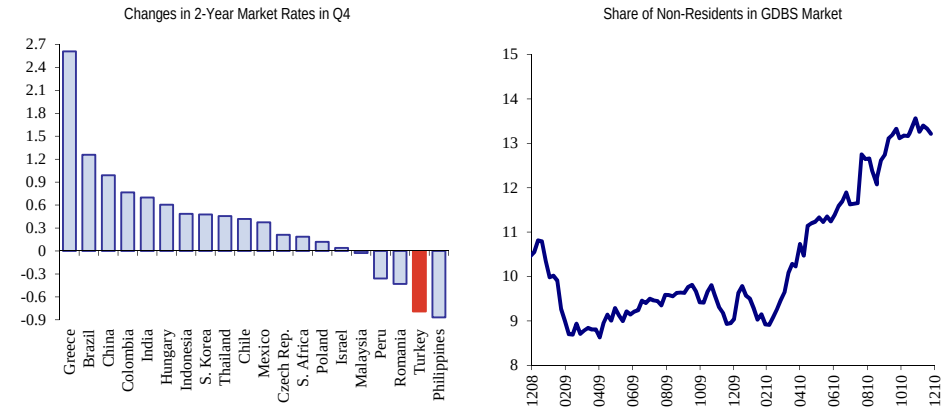
Graph 5.1.7. Term Structure of Market Interest Rates



* Calculated from the compounded returns on bonds quoted in ISE Bonds and Bills Market by using ENS method.
**Spread between 4-year and 6-month yields derived from the ENS yield curve, 5-day moving average.
Source: ISE, CBRT.

The fourth-quarter downturn in market rates in Turkey was counter to the global pattern of rising interest rates. Indeed, Turkey was among emerging economies with the highest fall in medium-term rates during the fourth quarter. On the other hand, the share of non-residents in the bonds and bills market continued to increase despite the historically low levels of market rates (Graph 5.1.8).

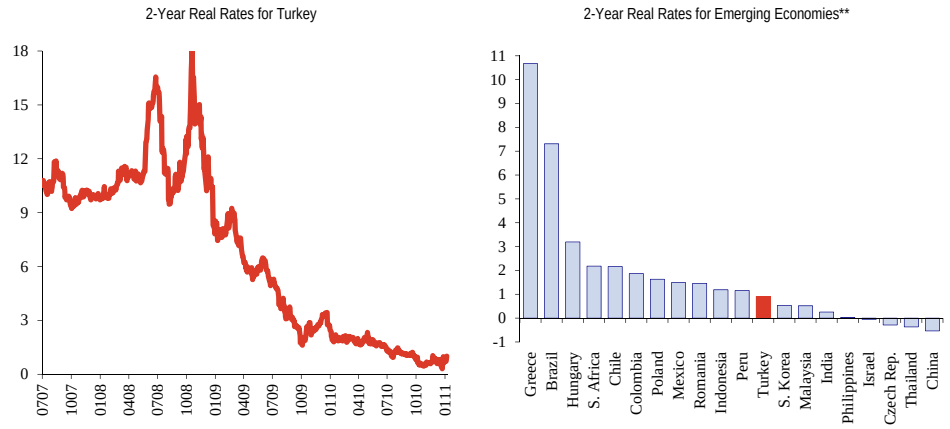
Graph 5.1.8. Market Rates and Holdings of GDBS by Non-Residents
(Percent)



Source: Bloomberg, CBRT.

The decline in market rates passed through to real interest rates, and real rates hit the historical lows preceding a slight rise. Aside from the recent decline, real interest rates in Turkey hover at a more reasonable level than in many other emerging economies (Graph 5.1.9).

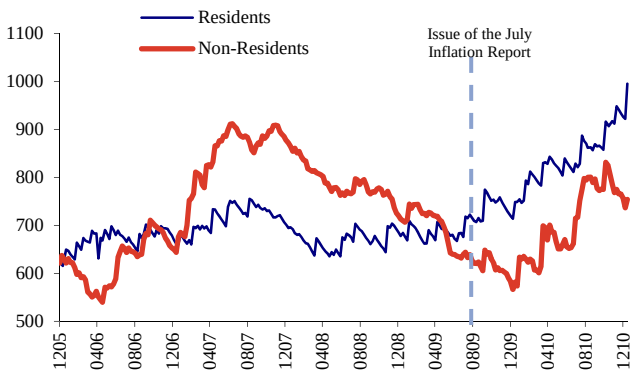
Graph 5.1.9. Medium-term Real Interest Rates Derived from Yield on GDBS*
(Percent)



* 2-year real interest rates are calculated using 2-year nominal interest rates derived from the ENS yield curve, and inflation expectations from the CBRT Survey of Expectations.
** As of January 18, 2011.
Source: ISE, Bloomberg, CBRT.

The decline in market rates was accompanied by an increase in the average number of days to maturity for government securities. The steady increase in maturities of government securities held by residents that has been more pronounced since the July 2009 Inflation Report continued into the fourth quarter, while the maturities of those held by non-residents have recently trended down. Yet, the average maturity of both non-residents' GDBS holdings as well as the total GDBS stock was up quarter-on-quarter at the end of the fourth quarter (Graph 5.1.10). The longer debt maturities in Turkey following the crisis on contrary to shorter maturities across many countries implies a permanent improvement in the risk sentiment towards Turkey and the result of implementation of a fiscal policy easing concerns about restoring fiscal discipline.

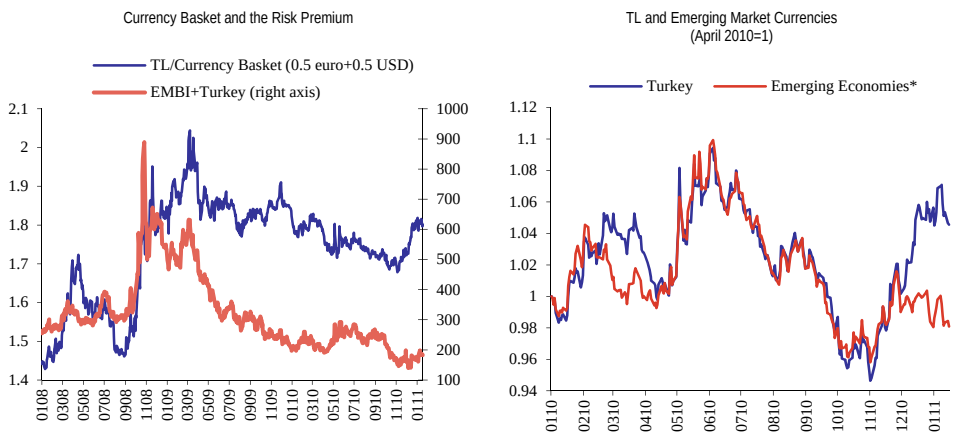
Graph 5.1.10. Day-to-Maturity of GDBS Holdings*



* Weighted by the nominal value.
Source: Treasury, CBRT.

Having followed a similar trend with emerging market currencies after the crisis, the Turkish lira has recently taken a different path and experienced a relative depreciation. It is noteworthy that this divergence started with the additional rate cut signal in the Financial Stability Report, and has become more pronounced after the actual rate cuts (Graph 5.1.11).

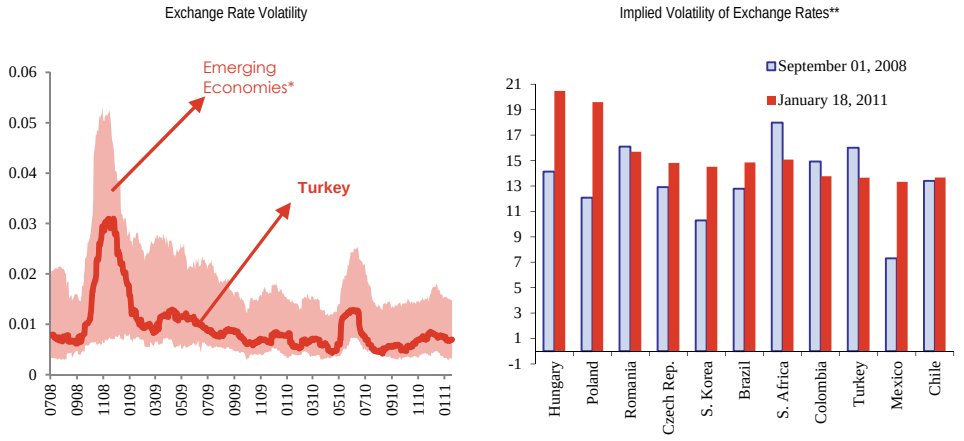
Graph 5.1.11. Performance of the Turkish Lira



* Average of emerging market currencies, including Brazil, Chile, Czech Republic, Hungary, Mexico, Poland, South Africa, South Korea and Colombia.
Source: Bloomberg, CBRT.

Meanwhile, having been historically volatile and extremely sensitive to global risk appetite, the relatively stable course of the Turkish lira during and after the crisis continued into the fourth quarter. Country-specific conditions are likely to unfold in the upcoming period, and hence, currencies of economies with lower risk ratings, positive debt dynamics, strong economic fundamentals and prospects of rapid growth are expected to be more stable. The Turkish lira is therefore likely to remain among the most stable currencies in the coming period as well. This, in fact, is confirmed by implied volatility figures obtained from currency options, a gauge of expectations for future currency swings. Owing mainly to the improved post-crisis investor sentiment toward Turkey, the Turkish lira is now among currencies with the lowest implied volatility, after being one of the currencies with the highest implied volatility before the crisis (Graph 5.1.12). On the other hand, the recent policy rate cuts indicate that the implied volatility of the Turkish lira has increased slightly (Box 5.1).

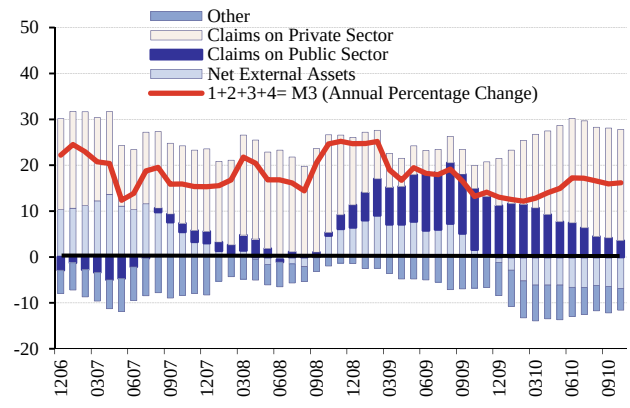
Graph 5.1.12. Exchange Rate Stability Indicators



* 50-day standard deviation of the highest and lowest values of the exchange rates of Brazil, Chile, Czech Republic, Hungary, Mexico, New Zealand, Poland, South Africa, South Korea and Colombia against USD.
** Implied volatility on 1-year currency options, in percent.
Source: Bloomberg, CBRT.

Despite the recent fluctuation in financial markets, the stable economic recovery has affected monetary indicators as well. In fact, the balance sheet entries of the broad measure of money supply, M3, showing the total consolidated liabilities of the monetary sector, including the CBRT and the banking sector, indicate that Claims on Private Sector, mostly consisting of bank loans to non-financial private individuals and institutions, are growing strongly amid increased consumer and investor confidence. On the other hand, the contribution of Claims on Public Sector to the M3 growth continues to decline. Net External Assets continue to fall due to the increase in commercial banks' external borrowing. Lastly, the negative contribution of the item Other, i.e. the monetary sector's non-deposit resources, to the M3 growth has slightly decreased amid reduced bank profitability (Graph 5.1.13).

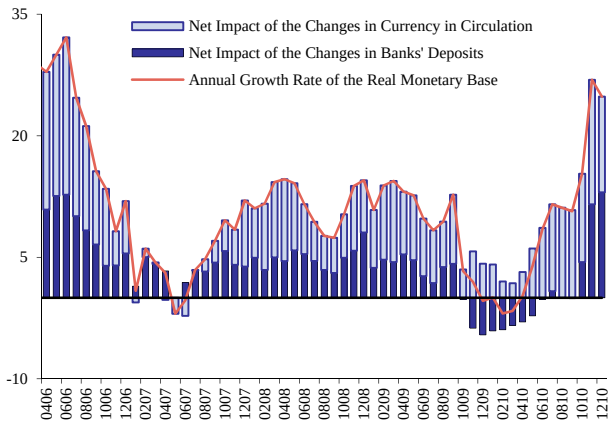
Graph 5.1.13. Balance Sheet Decomposition of M3
(Percent)



Source: CBRT.

The economic recovery also affected the monetary base in the fourth quarter. During this period, both bank deposits and currency in circulation increased sharply year-on-year in real terms. There are mainly two reasons for the increase in banks' deposits: Firstly, the TL required reserve ratio was raised from 5.5 to 6 percent in November. Accordingly, banks' deposits increased by 2.1 billion TL. In addition, the deterioration of the global risk sentiment in November and December pushed households and financial institutions towards risk-free assets, contributing to the increase in banks' deposits. Once the December 2010 and January 2011 regulations on TL reserve requirements are put into practice, there will be an additional increase in banks' deposits (Graph 5.1.14).

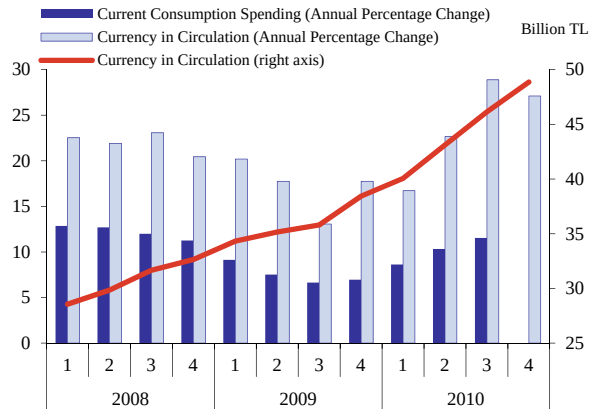
Graph 5.1.14. Annual Growth of the Real Monetary Base
(Percent)



Source: CBRT.

The uptrend of the money in circulation, another component of the monetary base, may be attributable to the increase in consumer spending amid economic recovery. The ongoing strong uptrend in the seasonally adjusted figures for money in circulation, albeit at a slower pace, suggests that consumption spending may continue to support economic recovery (Graph 5.1.15). Moreover, the steady post-crisis growth in money in circulation has also been driven by the reduced opportunity cost of holding cash due to historically low interest rates.

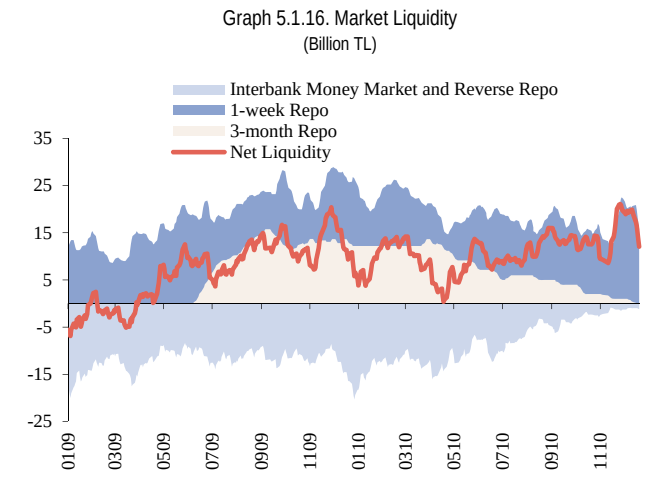
Graph 5.1.15. Currency in Circulation and Current Consumption Spending*
(Seasonally Adjusted)



*Consumption spending includes private consumption and public consumption excluding furniture, household appliances, transportation and communication at current prices.
Source: TurkStat, CBRT.

Global liquidity conditions are expected to drive capital flows into emerging economies further over the upcoming period. Maintaining a strong reserve policy in such an environment, the CBRT decided to change the method of foreign exchange buying auctions as of October 4, 2010, with the intention to take maximum advantage of capital flows boosted by ample global liquidity and to remain resilient against changes in flows. The CBRT announced that in case of improved global liquidity conditions and stronger capital inflows, additional foreign currency would be purchased provided that the weekly amount of purchase is announced on the first working day of the week. Accordingly, a total of 5.85 billion USD was bought from the market in the fourth quarter, generating a liquidity of 7.97 billion TL. In order to maintain the diversity of tools and operational flexibility, GDBS buying auctions that were resumed on December 23, 2009 has also continued into the fourth quarter and has provided a liquidity injection of 1.01 billion TL into the market, corresponding to a total nominal value of 1.1 billion TL of government bonds. Both GDBS and foreign exchange buying auctions boosted liquidity (Graph 5.1.16). The Treasury's average account balance at the CBRT decreased quarter-on-quarter, easing the liquidity shortage. Yet, the sharp increase in the monetary base caused the net liquidity shortage in the banking system to grow quarter-on-quarter (Graph 5.1.16).

Graph 5.1.16. Market Liquidity
(Billion TL)

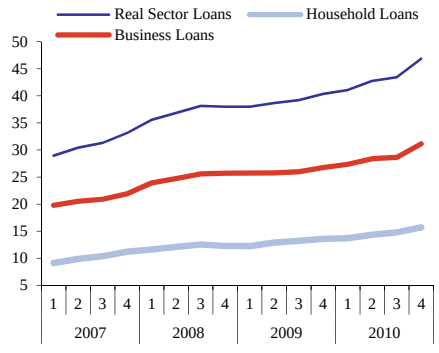


Source: CBRT.

5.2. Financial Intermediation and Loans

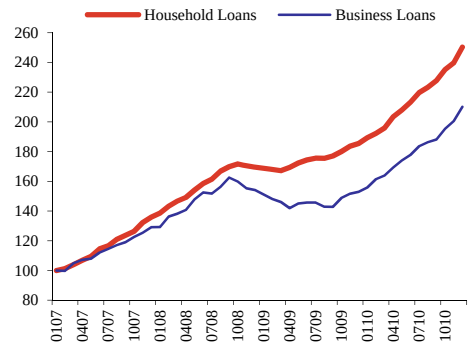
The upward trend in the credit markets continued into the fourth quarter (Graph 5.2.2). After slowing modestly in the third quarter, real sector loans by domestic banks accelerated again in the fourth quarter. Among subcategories, household loans continued to increase steadily, while business loans gained momentum. As a result, the growth rates of household loans and business loans converged again after the third-quarter divergence.[1] Against this background, real sector loans rose by 36 percent year-on-year in the fourth quarter, indicating an annualized growth rate of about 52 percent. As the loan growth exceeded the nominal GDP growth, the loans to GDP ratio continued to rise in the final quarter (Graph 5.2.1).

Graph 5.2.1. Real Sector Loans to GDP*
(Percent)



* Real sector loans are composed of household loans and business loans.
Source: CBRT.

Graph 5.2.2. Loan Index
(2007=100)

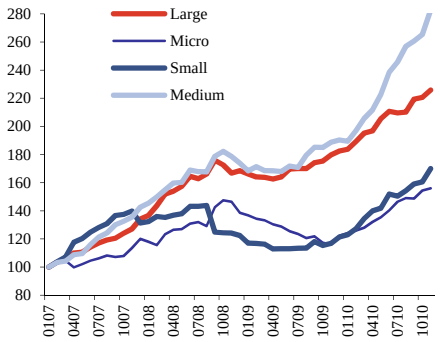


Source: CBRT.

[1] External funds received by domestic banks through resources other than their foreign branches and subsidiaries increased markedly in the third quarter, but flattened out in the fourth quarter based on November 2010 data, the latest as of the release of this Report.

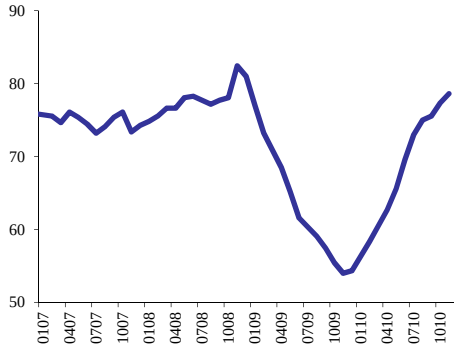
Business loan growth was not limited to a certain firm size or sector in the fourth quarter (Graph 5.2.3). Indeed, there was a strong loan growth across all firm sizes in the fourth quarter. The sectoral diffusion index also indicates that the number of sectors benefiting from loan growth remains on a steady rise and has reached pre-crisis levels (Graph 5.2.4). Loans to the slowly recovering micro and small-size businesses with higher rates of non-performing loans continued to increase steadily during this period.

Graph 5.2.3. Business Loans by Firm Size
(2007=100)



Source: BRSA.

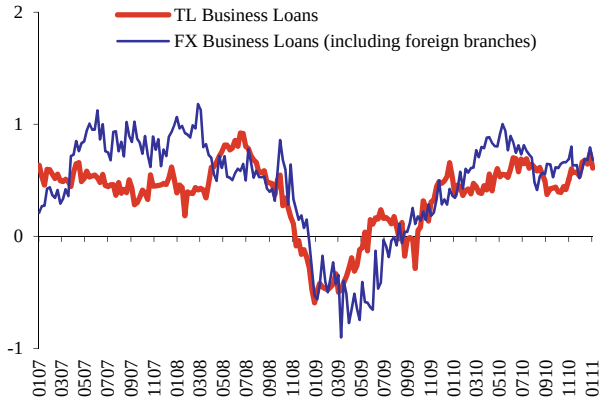
Graph 5.2.4. Loan Diffusion Index*
(2007=100)



* Derived from 12-month moving averages of the ratio of the number of sectors with increased credit volume to the total number of sectors.
Source: CBRT.

The sharp increase in business loans is evident in both Turkish lira and foreign currency denominated loans (Graph 5.2.5). In this context, foreign currency denominated loans have recently grown at a marked pace across all firm sizes.

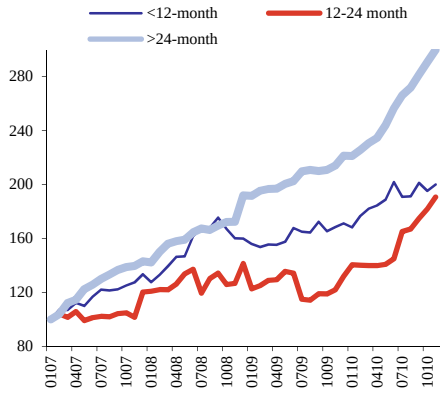
Graph 5.2.5. Weekly Growth Rates of TL and FX Business Loans
(13-Week Average)



Source: CBRT.

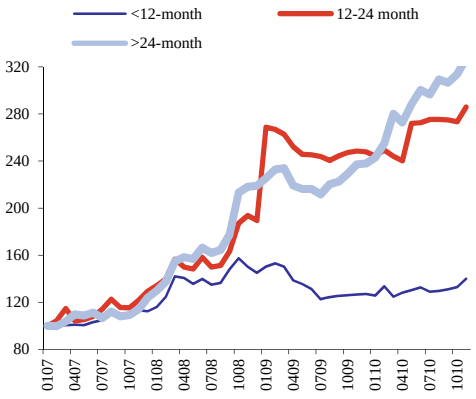
The rapid increase in business loans has recently been accompanied by significantly longer maturities. In particular, there has been a noteworthy extension in maturities of foreign currency denominated loans (Graphs 5.2.6 and 5.2.7).

Graph 5.2.6. TL Business Loans by Maturity
(2007=100)



Source: CBRT.

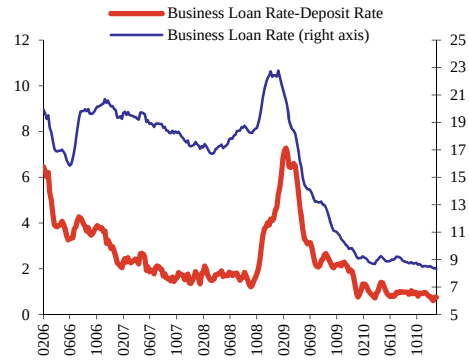
Graph 5.2.7. FX Business Loans by Maturity
(2007=100)



Source: CBRT.

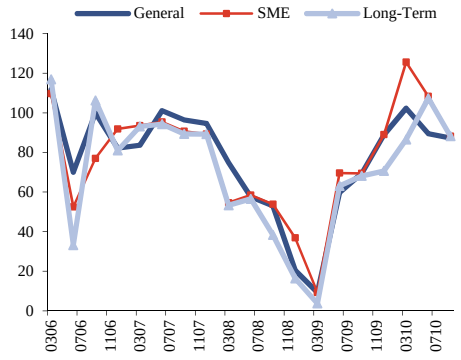
The strong growth and sectoral diffusion of loans and the apparently extended maturities are the result of both supply and demand driven dynamics. The unchanged spread between loan and deposit rates despite loan growth is a strong signal that supply dynamics have dominated the loan growth (Graphs 5.2.8).

Graph 5.2.8. TL Business Loan and Deposit Rates
(4-Week Average, Annual, Percent, 2007=100)



Source: CBRT.

Graph 5.2.9. Business Loan Standards*
(2007=100)



* Positive/negative values denote easing/tightening in standards.
Source: CBRT.

The growth and sectoral diffusion of loans have largely been attributable to improved loan standards amid economic recovery, easier access to Turkish lira and foreign currency liquidity, and increased predictability of interest rates on Turkish lira and foreign currencies. In fact, Lending Survey reflecting the

banking sector's views on the credit market also supports this proposition (Graph 5.2.9). The latest survey reports that banks expect loan standards to slightly improve in the fourth quarter after remaining largely unchanged in the third quarter. Meanwhile, economic recovery continued to have a positive impact on loan standards during the third quarter, albeit slightly, amid the remarkably slower GDP growth due to weak external demand. In this context, loan standards seem to have increased loan supply during the fourth-quarter amid the rebound in the pace of the economic recovery. Moreover, according to the Survey, in addition to the improvement in standards, credit conditions improved as well in terms of interest margins, fees and commissions. In fact, the third-quarter improvement in interest margins was maintained in the fourth quarter, despite increases in required reserve ratios.

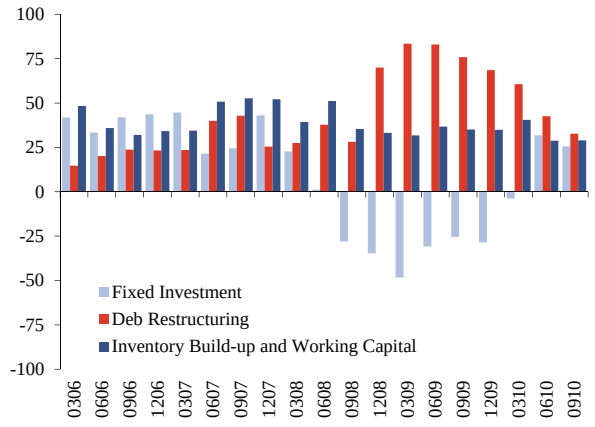
According to the Lending Survey, another factor affecting the improvement in supply conditions is competition. Country experiences suggest that intense competition urge banks to take more risk. Therefore, some supply-side improvements are led by positive developments in risk sentiment and access to funds, while some are fueled by the intense competition that push banks to take more risks.

Aside from supply-side factors, demand-side factors that are not directly related to financing conditions also contributed to the rapid credit expansion. Despite the fast economic recovery, the investment spending to GDP ratio currently remains below historical averages, indicating that investment demand and therefore credit demand would remain strong in the upcoming period. Indeed, the 2010 fall-term results of CBRT's Investment Survey show that the improvement in financing conditions has an effect on investment, but factors such as demand and high profit expectations and also technical factors play a more dominant role. Meanwhile, aside from investment funds, funds demanded for working capital are also expected to increase in line with the economic recovery.

The Lending Survey also contains important information about loan demand. Loan demand increased robustly across all sizes and maturities in the third quarter, and survey participants expect this increase to continue into the fourth quarter with a stronger pace for longer term loans. In fact, the demand for investment and business funds had a further increased weight in the third

quarter (Graph 5.2.10). On the other hand, the share of loans for restructuring debt decreased compared to previous periods.

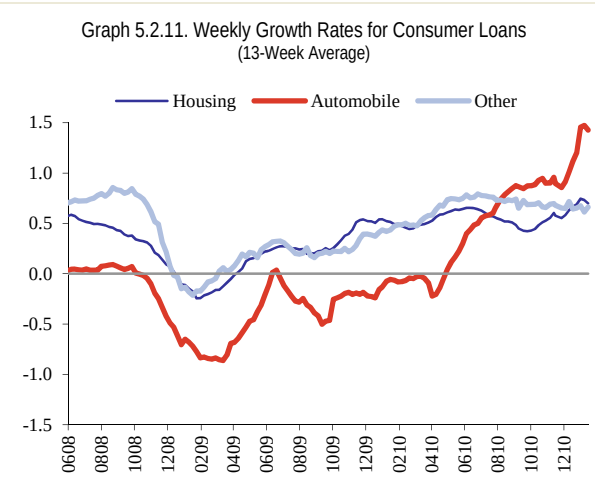
Graph 5.2.10. Loan Demand Factors*



* Positive/negative values denote easing/tightening in standards.
Source: CBRT.

In addition to business loans, the growth of consumer loans also accelerated in the last quarter. Among subcategories, housing and automobile loans increased rapidly, while the rate of increase in other loans slowed (Graph 5.2.11). However, all subcategories registered annualized growth rates exceeding 40 percent on quarterly basis. In particular, automobile loans rose dramatically by an annualized 86 percent at the end of the fourth quarter. According to credit card balances, installment credit cards accounted for a larger share of balances, indicating that credit cards are more increasingly being used as a means of credit.

Graph 5.2.11. Weekly Growth Rates for Consumer Loans
(13-Week Average)



Source: CBRT.

Similar to business loans, the growth in consumer loans was driven by supply and demand developments. The Lending Survey indicate that standards for consumer loans excluding automobile loans remained tight in the third quarter. Yet, participants expect an easing in the standards for personal and housing loans in the next quarter. The downturn in long-term interest rates since the third quarter seems to have affected consumer loan rates. The Survey shows that not only profit margins but also fees and commissions were down across consumer loan rates in the third quarter. This decline continued into the last quarter, pointing to a decrease in the cost of consumer loans. Among other drivers of loan demand growth are the improved financing conditions as well as the improved labor indicators and consumer confidence.

In sum, growth of loans accelerated in the final quarter. The rapid credit expansion has been driven by demand-side, but more significantly, by supply-side factors, owing mainly to improved risk sentiment. However, the intense competition also urges banks to take more risk, leading to an increase in loan supply. Therefore, in the upcoming period, close monitoring of the risk pricing in credit markets is critical for maintaining financial stability.

One of the other factors to affect credit developments in the upcoming period is the adopted measures for addressing both price stability and financial stability. In this context, required reserve ratios were changed in order to limit the rapid credit expansion. Accordingly, the CBRT ended interest payments on reserve requirements and reserve requirements were raised in view of the maturity mismatch between assets and liabilities of the banking system. All these measures are intended to increase the cost of loans and to extend the maturities of liabilities. Moreover, as mentioned in the Monetary and Exchange Rate Policy for 2011, the net liquidity position of the financial system is also an important indicator for the monetary policy stance. Hence, in addition to its direct impact on the cost of loans, the increase in reserve requirement ratios is expected to affect banks' credit behavior in the forthcoming period by decreasing the system's net liquidity (Box 7.2).

Box 5.1 The Derivative Markets and the Recent Developments in the Foreign Exchange Markets

Derivatives are financial instruments reflecting market sentiment on the future value of a financial asset and the uncertainty perception. Options, the most common type of derivatives, traded in both organized stock markets and over-the-counter markets are useful for deriving information on market sentiment. Option quotes available in high frequency, in addition to findings obtained from different sources, enable more accurate and timely estimates of market sentiment.

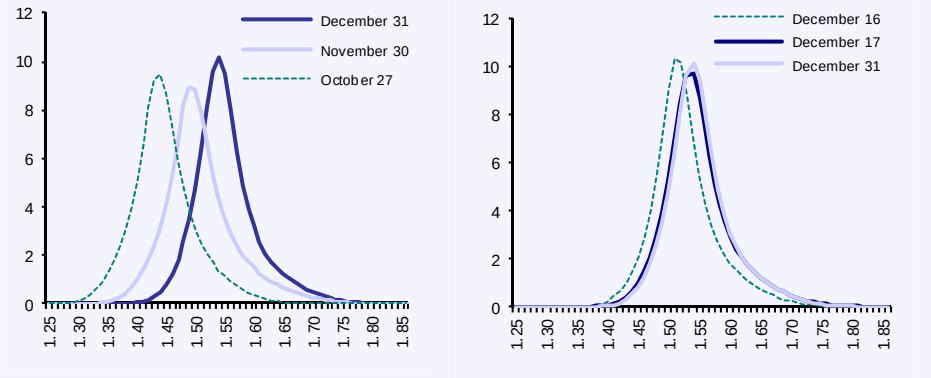
Option contracts are financial contracts that allow the owner to buy and sell an asset in the future at a price (strike price) set now. The market value of option contracts with different strike prices gives information about market expectations about the price of an asset at the date of expiration. One of the most widely used methods to obtain this information is to extract the implied risk-neutral probability density function, i.e. the implied exchange rate distributions.

The various studies in the academic literature show that these exchange rate distributions reveal market sentiment, which could be useful for the policy-stance of a central bank.[2] Such distributions contain information on how market expectations about future interest rates or exchange rates are affected by monetary policy decisions. Most central banks track the changes in market sentiment after a major economic event or following a policy decision by using implied exchange rate distributions. In this context, Aydın *et al* (2010) show that implied exchange rate distributions can be used to measure expectations about the TL/USD rate. This Box analyzes recent exchange rate expectations in light of the above study.

[2] BIS (1999), Countant *et al* (2001).

Implied exchange rate distributions provide information about the direction and the overall uncertainty regarding the exchange rate. Indicating the most probable value of the exchange rate at the expiration, the peak of the distribution shows the expected value. In this respect, recent exchange rate developments show that the expected value of the exchange rate increased during the last quarter owing to the sovereign debt crisis in Europe. The December decision of the MPC also placed upward pressure on the expected value. The relatively negative performance of the Turkish lira became more pronounced after the CBRT's rate cut of 50 basis points, which is evident in the distribution graphs for December 17 and 31. The 1-month expected value of the exchange rate was up from December 16, before the MPC decision (Graph 1).

Graph 1. Implied Volatility of 1-Month Options



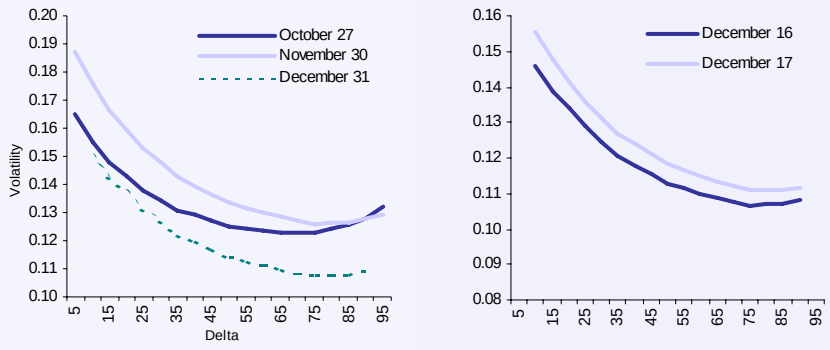
Source: Bloomberg, CBRT.

Another graph obtained from exchange rate options is the volatility curve. Similar to exchange rate distributions, volatility curves provide information on the direction and overall uncertainty for exchange rates. Unlike organized markets such as Turkdex (Turkish Derivatives Exchange), over-the-counter markets offer quotes in terms of delta and implied volatility. Delta, a sensitivity parameter derived from Black-Scholes model measures the strike price (value at expiration), while volatility measures the option price. Using the Black-Scholes formula, it is easy to derive the strike price from delta and option price from implied volatility. A decrease in delta means an increase in strike price, and conversely, an increase in delta means a decrease in strike price.

In light of this information, the right bound of the curve in Graph 2 denotes the risk of a decrease in the exchange rate, while the left bound denotes the risk of an increase. If the current exchange rate level is assumed to be 1.5, the left bound of the curve indicates the risk of an increase in exchange rate (up from 1.5), while the right bound indicates the risk of a decrease (down from 1.5). In emerging economies such as Turkey, the risk of an increase is higher than the risk of a decrease, therefore the left bound is expected to be above the right bound. However, the bending of the left and right bounds can change over time depending on the market sentiment.

The volatility curve contains two different information about the direction and overall uncertainty for exchange rate. The bending of the curve reflects the direction risk, while the shift of the curve reflects expectations about overall exchange rate uncertainty. The right bound of the 1-month volatility curve on October 27, 2010 bended upward, while the right bound of the volatility curve on November 30 and December 31, 2010 remained horizontal. Accordingly, market participants expected a risk of decrease in exchange rate at the end of October and expected no risk of decrease at the end of November and December. Similarly, the bending of the left bound of the curve continued into November and December, which suggests that the market continued to expect a risk of increase in exchange rate during November and December. Moreover, the entire curve shifted down in December. This means that both upside and downside risks decreased. In other words, expectations of an increase in exchange rate were stronger in December. Similarly, after the MPC decisions on December 16, the volatility curve shifted upward (Graph 2). Accordingly, the expected level of uncertainty for the exchange rate increased slightly after the rate cut decision.

Graph 2. Exchange Rate Volatility and Policy Rate Decisions



Source: Bloomberg, CBRT.

In sum, option values available in high frequency give information on how the market sentiment changes after a major economic event or an adopted policy measure by a central bank. Implied exchange rate distributions indicate that the CBRT's policy rate decision in December was effective on much of the recent developments in the foreign exchange market.

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