This report, which is aimed at informing the public, is based mainly on September 2017 data. Nevertheless, the Report includes developments and evaluations up to its date of publication in Turkish. The full version of this text is available on the CBRT website. The CBRT cannot be held accountable for any decisions made based on the information and data provided therein.
Foreword

The strengthening economic activity since the last volume of the Financial Stability Report have affected the financial stability indicators positively. Meanwhile, financial conditions are supporting economic activity. In this period, the Central Bank of the Republic of Turkey continued to use policy instruments effectively in order to support price stability and financial stability.

It is my hope that the 25th volume of the Financial Stability Report, which presents a discussion of the global and domestic macroeconomic outlook as well as the most recent developments regarding financial stability, will be of benefit to all readers.

Murat ÇETİNKAYA
Governor
Contents

Overview ................................................................................................................................. i
I. Macroeconomic Outlook ................................................................................................. 1
   I.1 International Developments ......................................................................................... 2
      Box I.1.I High Frequency Trading and Regulatory Approaches .............................. 6
      Box I.1.II Crowdfunding ......................................................................................... 9
   I.2 Domestic Developments ............................................................................................ 13
      Box I.2.I Financial Stress Index as an Early Warning Indicator ............................. 16
II. Non-Financial Sector ..................................................................................................... 20
   II.1 Household Developments ....................................................................................... 21
      Box II.1.I The Impact of Monetary Policy Shock on General Purpose Loan within the Framework of Macroprudential Measures .............................................. 26
   II.2 Real Sector Developments ....................................................................................... 29
      Box II.2.I Borrowing Preferences of Real Sector from Cost Perspective ............ 36
III. Financial Sector ........................................................................................................... 41
   III.1 Credit Developments and Credit Risk ................................................................. 42
   III.2 Liquidity Risk ......................................................................................................... 50
      Box III.2.I Swap Transactions ................................................................................. 56
   III.3 Interest Rate and Exchange Rate ......................................................................... 58
   III.4 Profitability and Capital Adequacy ..................................................................... 60
      Box III.4.I Decomposition of Items with Temporary Effects on Profitability ... 63
IV. Special Topics ............................................................................................................. 67
   IV.1 A New Approach to Balance Sheets: Financial Risk Rating for Real Sector Firms ................................................................................................................ 67
   IV.2 Corporate Sector Credit Risk ................................................................................... 75
   IV.3 Central Bank Policies and Maturity Management in the Banking Sector .......... 79
   IV.4 FX Risk and Banks’ Supply of Credit .................................................................... 91
   IV.5 External Debt Risks of the Banking Sector ......................................................... 98
Charts, Tables and Figures .............................................................................................. 102
Abbreviations ..................................................................................................................... 107
Overview

The recovery in global economic activity has continued since the May 2017 Financial Stability Report. In Turkey, thanks to the macroprudential policies that have been implemented in tandem with public financial incentives and support, credit growth has exhibited a stronger outlook than in previous years and economic activity has accelerated. The recent data show that the strong outlook in economic activity continued in the third quarter. In the third quarter of the year, credit growth converged to its historical average and stabilized at these levels as a result of the normalization in loan demand and the Credit Guarantee Fund (KGF) approaching its limit. In this regard, it is envisaged that the impact of the macroeconomic incentives and loans under the KGF scheme on growth will gradually decrease and the economy will start moving in tandem with its long-term trend.

The positive trend in global financial markets continues underpinned by the support from the positive outlook in the global economy, the rise in risk appetite, and the diminishing uncertainties in monetary policies of advanced economies. The Federal Reserve (Fed)’s decision announced in September to shrink its balance sheet under the monetary normalization process contributed to reducing the ongoing economic policy uncertainty in advanced economies (Chart 1). The completion of the round of elections in some European Union (EU) countries and the UK has also played an important role in the reduction of uncertainty. Even if the continued political uncertainty in Spain and the lack of a clear road map for the UK’s exit from the EU add to the external risks stemming from the Euro area, the recovery in the economic activity in the US and other advanced economies and the normalization tendency in their monetary policies have been supporting the outlook for global financial markets. Global trade volume has also increased as the recovery in advanced economies became more pronounced. In this context, capital flows to emerging economies continued to remain high thanks to the positive outlook in global financial markets and the search for yield considerations, though sensitivity to geopolitical developments persists (Chart 2). This, however, may be interrupted if the normalization process expressed by the Fed as well
as central banks of other developed countries, is reversed. These risks may heighten if the geopolitical problems, especially in Asia and the Middle East, deepen.

Corporate total financial debt to GDP ratio has remained flat since the beginning of 2017 (Chart 3). This mainly stems from the slowdown in the growth of FX credit stocks, received from both domestic and external financial institutions. The significant extension in the maturities of FX credits is one of the factors reducing exchange rate risk, and the ratio of FX non-performing loans (NPL) remains low. To monitor and analyze the exchange rate risk of the real sector The Systemic Risk Data Monitoring Model has been developed, and a comprehensive data set has been created for this purpose. On the other hand, as per the regulations in force, households cannot use foreign currency (FX) loans in Turkey and this protects households from currency risk.
Since the last quarter of 2016, credit volume has increased significantly owing to the macroprudential policies, domestic public measures and incentives, and the KGF credit support (Chart 4). Supply and demand factors have been influential in this increase. While the housing and general-purpose loans displayed a significant increase due to longer maturities and base effects, credit facilities, especially the KGF guaranteed loans, supported commercial loans. Retail loans supported by macroprudential measures coupled with credit facilities provided to the real sector have led firms to respond to revived domestic demand, increase inventory that had been postponed, and restructure their debts. In this period, FX-denominated firm credits slowed down due to exchange rate movements and weak demand for machinery-equipment investment.

The transition from FX to TL in commercial loans continued in the current Report period as a result of both exchange rate developments and increased awareness of FX risk management. The rapid increase in FX deposits and the acceleration in TL loans urged banks to find additional TL funding in international markets through currency swaps.

The banking sector preserves its strong liquidity position against possible shocks. Banks’ liquid assets in gold and foreign exchange that they hold at the CBRT in the framework of the Reserve Options Mechanism (ROM) facility have recently increased. An important part of the funding sources of the sector is composed of core liabilities, and the rise in the share of core liabilities and other domestic sources in foreign sources points to a deepening in the domestic market (Chart 5). The maturities of banks’ non-core liabilities are trending longer and this also increases the resilience of the sector to possible shocks in international markets (Chart 6). Despite the recent increase in credit growth, strong growth in deposits offers banks an additional protection for their liquidity positions and supports credit supply. Thus, banks have not faced a significant funding constraint due to the movements in credits and deposits, and they have responded to loan growth mostly with core liabilities.
The asset quality of the banking sector is strong. With the revivification of the credit channel and the pick up in economic activity, the decreasing amount of additions to NPLs and write-offs as well as the rising amount of receiving compared to the previous Report period contributed to the preservation of asset quality (Chart 7). In the period when financial support policies were implemented more intensively, there was a decrease in SME’s NPL ratios due to increased SME loans. NPL ratios differ across sectors and currencies, but NPLs have remained flat in sectors representing a significant portion of the corporate sector in terms of size (Chart 8). The preservation of the current levels of FX-denominated NPLs on company loans is an indication of the resilience of the banking sector’s asset quality against external shocks.

The profitability of the banking sector maintained its strong position despite a limited decline from the second quarter of 2017 onwards (Chart 9). This decline was mainly due to the loss of the one-
time income effect seen in 2016 and the cost of swap transactions conducted to meet the TL-loan demand. The profitability of the sector attained high levels due to the provision of a large portion of recent loans under the guarantee of the KGF scheme and exchange rate movements, which resulted in a significant increase in the capital adequacy ratios (CAR) (Chart 10).

<table>
<thead>
<tr>
<th>Chart 9</th>
<th>Profitability Indicators</th>
<th>Chart 10</th>
<th>Capital Adequacy Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on Assets</td>
<td>Return on Equities (RHA)</td>
<td>CAR</td>
<td>Core Tier 1 CAR (RHA)</td>
</tr>
<tr>
<td>2016</td>
<td>2017</td>
<td>2016</td>
<td>2017</td>
</tr>
</tbody>
</table>

The banking sector sustains its strong capital structure. In the recent period, the increase in subordinated debt issuance and the favorable outlook in profitability provided significant support to banks’ regulatory capital. In addition, some banks strengthened their capital by exchanging their subordinated debt for new issuances that are compatible with Basel III. While there is no significant change in the risk-weighted asset composition, regulations on the risk weights of FX-denominated assets and receivables and the increasing share of the KGF guarantees in the recent loan growth have reduced the calculated credit risk. The possible contribution of these developments to capital adequacy is that they will provide an additional capital buffer to the overall sector in the coming period. It is expected that the changes in corporate tax rates in the financial sector will have a limited impact on the banking sector’s CAR in the upcoming period.

Despite the positive outlook in the global economy and financial markets, risks related to the upcoming period remain intact. The developments in the monetary policies of advanced countries,
global geopolitical risks and political developments in the Euro Area are among the possible factors of fragility for the financial system. Nevertheless, it is assessed that the Turkish banking sector will remain resilient against such risks thanks to its strong capital base, stable asset quality and adequate level of liquid assets.
I. Macroeconomic Outlook

Portfolio inflows to emerging economies continue thanks to the global risk appetite that has been increasing since the beginning of 2017 and the search for high yield. Along with the increase in risk appetite and the partial decline in economic policy uncertainty in advanced economies, stock market indices have performed notably well in emerging economies and the United States since the previous Report period. The decline in economic policy uncertainty was mainly driven by the fact that the elections in several EU countries as well as the United Kingdom are over and the monetary policy normalization of the Fed has become slightly clearer in terms of balance sheet downsizing. The recovery in global economic activity is not widespread, but it continues with support from emerging economies. In the first quarter of 2017, growth rates in emerging economies, except China and India, surpassed those of advanced economies for the first time since the second quarter of 2014.

During the first half of 2017, domestic economic activity rallied through private consumption expenditures and strong exports of goods and services supported by measures and incentives. In this period, the central government budget deficit slightly increased. However, it is predicted that the current level of budget deficit will be temporary and will be close to the long-term average in the medium term. In this period, the positive contribution of foreign trade to the current account balance has continued with the strong movement in exports of goods and the recovery in tourism. The CBRT reserves have increased since the last Report period. Moreover, consumer inflation, which declined in the second quarter, rose in the third quarter. The cautious monetary policy stance continued in the third quarter.
I.1 International Developments

The downward trend in economic policy uncertainty in global financial markets that had been observed since the beginning of the year continued in the last report period (Chart I.1.1). This decline was mainly driven by policy normalization of the Fed becoming slightly clearer in terms of balance sheet downsizing and the finalization of the election process in some EU countries and the United Kingdom. Meanwhile, the uncertainty following the elections in Germany persists.

The downward deviation of the inflation in the US from the 2-percent target of the Fed has brought about the convergence of the Federal Open Market Committee (FOMC) members’ policy rate forecasts to the expectations of market participants during the normalization process in monetary policy (Chart 1.1.2). The level of unemployment rate that dropped to the lowest level since the crisis, and the recovery in leading indicators for economic activity have augmented the Fed’s likelihood of raising rates in the rest of the year. In addition, the course of the inflation level and the appointment process of some Fed members are among the factors that may affect the roadmap of the increase in Fed rates.

With respect to the monetary policies of advanced economies, at its meeting in June 2017 the Fed announced the technical details about downsizing its balance sheet and declared that it will be gradual and foreseeable until reaching a level that does not prevent the effective conduct of the monetary policy. Meanwhile, in the European Union, where low profitability of banks and the issue of non-performing loans linger, the European Central Bank is expected to maintain the expansionary monetary policy while decreasing the monthly amount of asset purchasing from early 2018 onwards. In Japan, where the inflation rate is expected to undershoot the target in the medium term, monetary policy maintains its expansionary outlook.

Portfolio inflows to emerging economies, thanks to the global risk appetite that have been high since the beginning of 2017 and the search for high yield, continue, albeit some deceleration since the third quarter (Chart I.1.3). In this quarter, strong demand for high-yield
debt instruments and capital market instruments were maintained on the back of stronger leading indicators for global economic outlook and the partial clarification of Fed’s decision to downsize its balance sheet. In emerging markets, risk premiums and portfolio inflows improved owing to global liquidity conditions and increased risk appetite (Chart I.1.4).

With the increase in risk appetite and the partial decrease in uncertainty in global financial markets, stock market indices have displayed strong performance especially in emerging markets and in the USA since the previous Report period (Chart I.1.5). Compared to the last Report period, the bond yields in advanced economies have been stable (Chart I.1.6). In emerging economies, generally, bond yields decreased in tandem with capital movements (Chart I.1.7).

Due to rapid portfolio flows towards emerging markets since January 2017, emerging market currencies have appreciated against the US dollar (Chart I.1.8). Similarly, major currencies have also appreciated against the US dollar. The decline in uncertainties arising from domestic policy developments in these countries played a role in the appreciation of these currencies against the US dollar.

The recovery in global economic activity, although it is not widespread, continues with support from emerging economies (Chart I.1.9). Leading indicators of growth and the decline in political uncertainties signal that growth in advanced economies, particularly in the EU, will continue (Chart I.1.10). It is estimated that the uncertainty about the expansionary fiscal and trade policies envisaged to be implemented in the upcoming period plays a role in the deterioration of the US purchasing managers’ index.
Since the beginning of 2017, US dollar has depreciated against major currencies and emerging market currency index.

**Chart I.1.8**
Exchange Rate Indices

<table>
<thead>
<tr>
<th>Currency</th>
<th>Index Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Dollar Index (RHA)</td>
<td>95</td>
</tr>
<tr>
<td>JP Morgan EMM Currency Index</td>
<td>97.8</td>
</tr>
<tr>
<td>Brazilian Real</td>
<td>86.1</td>
</tr>
<tr>
<td>Mexican Peso</td>
<td>108.7</td>
</tr>
<tr>
<td>Euro (8.11.16 = 100)</td>
<td>93.9</td>
</tr>
<tr>
<td>US Presidential Election</td>
<td>92.7</td>
</tr>
<tr>
<td>Emerging Economies</td>
<td>92.7</td>
</tr>
</tbody>
</table>

Source: Bloomberg (Latest Data: 13.11.17)

Emerging economies, except China and India, demonstrated a better economic growth outlook compared to advanced economies in the last period.

**Chart I.1.9**
Growth in Advanced and Emerging Economies (Percentage Change, Annual)

<table>
<thead>
<tr>
<th>Region</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Economies</td>
<td>2.0%</td>
</tr>
<tr>
<td>Emerging Economies</td>
<td>3.0%</td>
</tr>
</tbody>
</table>

Note: Advanced Economies: USA, Euro Area, Japan, I.K, Canada, 3.Korea, Switzerland, Sweden, Norway, Denmark, Israel. Emerging Economies: China, Brazil, India, Mexico, Russia, Turkey, Poland, Indonesia, 5.Africa, Argentina, Thailand, Malaysia, Czech Republic, Hungary, Korea, Romania, Philippines, Ukraine, Chile, Peru, Mexico.

Source: Bloomberg, CBRT (Latest Data: 06.17)

As of the first quarter of 2017, growth rates in emerging economies, except China and India, have surpassed those of advanced economies for the first time since June 2014. The rise in domestic demand and growth performance above expectations in China in the first half of the year supported global growth. On the other hand, shadow banking and high indebtedness in China continue to be considered as vulnerabilities. Growth rate in India has lost some pace due to structural reforms. Brazil, Russia, Turkey and ASEAN-5 countries have contributed to the growth of emerging economies.1

The upward trend in commodity prices, that had been observed since 2016, continues due to global demand. (Chart I.1.11). The rise in the general commodity index observed since the last Report period was mainly driven by domestic demand in China and in advanced economies. Oil prices also increased compared to the previous Report period. The extent of the implementation of the oil production restriction imposed by the OPEC member countries, the recovery in oil production of Nigeria and Libya, and the more-than-expected increase in shale gas production in the USA are among the factors that influence the direction and pace of oil prices.

The geopolitical developments, and the vulnerabilities, such as the uncertainty pertaining to fiscal and trade policies envisaged to be implemented in the USA, high global indebtedness, and the low profitability of banks as well as the problem of non-performing loans particularly in the EU, take place in the agenda for global financial stability. Moreover, digital currency and crowdfunding as well as high-

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1 Asean-5 countries: Indonesia, Malaysia, Philippines, Thailand and Vietnam.
frequency trading in debt securities markets (Box I.1.I and Box I.1.II) are closely monitored by the international standard setting bodies and especially by the Financial Stability Board (FSB). In this framework, it is important that countries adopt to global financial reforms. It is also highly important to closely monitor the impact of these reforms, as well as adopt effective policies in response to structural problems.

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**Chart I.1.10**
Manufacturing Industry PMI Indices

**Chart I.1.11**
Commodity Prices
(Indices, US Dollar)

Source: Bloomberg, CBRT (Latest Data: 09.17)
Source: Bloomberg (Latest Data: 10.11.2017)
High-frequency trading (HFT), a subclass of algorithmic trading, is defined as automated buying and selling transactions that are executed at speeds of one millonth of a second (microseconds) in line with pre-programmed investment strategies (BIS, 2016). HFTs, which operate via high technology connection infrastructures, are used in stock markets, foreign exchange and futures markets through organized exchanges and electronic trading platforms (Figure I.1.1.1).

The widespread use of algorithmic trading and HFTs at such markets brings about the need for the measurement of the volume of these transactions and the identification of their effects on price movements, and the regulation of them where necessary. Different methods are used to detect the trading activities originating from the HFTs which are largely being used in financial markets of developed countries. According to the findings of various academic researches, the transactions in which HFTs are used constitute 60 percent and 40 percent of total trading volumes in US and European capital markets, respectively.1 In addition, it is estimated that investment banks and investors working with brokers have electronic access to the markets or use algorithmic transactions.2

There are two main sources of profit for HFTs. The first one is to obtain revenues from small price differences through short-term buy and sell transactions and high trading volumes. In this case, price differences of securities traded in more than one market are detected, or the delay arbitrage is utilized for the disclosures of data belonging securities traded on a single market. The second major source of profit for HFTs is the liquidity-providing function. The premium between bid and ask prices is received by asking continuous quotation or cost advantages are gained through market-making function.

The Impact of HFTs on Markets

In spite of the positive contributions of HFT's search for yields such as increasing the trading volumes and liquidity in the markets and reducing the bid – ask margins, these transactions carry some risks as well. Under normal market conditions, HFTs allegedly reduce volatility in the markets and lower transaction costs;3 while they are also believed to increase the magnitude of market volatility by leading to a sudden shrink in liquidity and market depth as a result of the sale pressure they cause through cancellations of high-volume orders in the markets where prices are falling.4 The sudden

2 “Regulators Struggle to get to grips with high-frequency trading”. Global Risk Regulator, December 2016, Volume 14, Issue 11.
market fluctuations of the S&P 500 futures market on 6 May 2010 and the British pound on 7 October 2016, called the “Flash Crash”, are examples of these fluctuations. In addition, liquidity conditions deteriorated in the US treasury bond market on 15 October 2014, while on the same day it had the highest bid - ask spread and trading volumes since the global financial crisis. The decreasing share of HFTs in the “central limit order book”, which is referred to as the measure of the market depth, is considered to have played a role in the market liquidity crunch. The fact that HFTs are involved in duplicative trade activities may also cause market liquidity to appear more than its actual level.

Regulatory Approaches for HFTs

Advanced Countries

There are different approaches in advanced countries regarding the regulation of algorithmic and high frequency trading. In the USA, there is an ongoing discussion on the monitoring of software codes used by market participants in algorithmic trading via the Regulation Automated Trading (RegAT) which is envisaged to be put into practice. However, there are some uncertainties regarding the enforcement of the regulation. The regulation of the Mifid II (Markets in Financial Instruments Directive II), which will enter into force in 2018 in the European Union, also makes it possible to supervise the financial institutions involved in algorithmic trading and the market infrastructures subject to these transactions. In accordance with the Mifid II, the data on HFT transactions must be reported to local authorities, and the algorithms used must be tested. Likewise, the regulation to take effect in Japan in 2018 stipulates that the organizations involved in the HFT have an official permission and appropriate risk management measures.

On the other hand, the tightening of regulations, increased competition, and market developments indicate that the competitive advantage that HFTs have gained through high speed is not sustainable. High infrastructure investment costs and the low volatility levels in the securities markets of developed countries have reduced the profit margins in the sector. Income generated from market-making activities in the US stock markets decreased from USD 7.2 to USD 1.1 billion between 2009 and 2016. This development points to the decrease in revenues of HFTs from market-making activities.

Emerging Countries

HFTs, which are also being executed in the capital markets of emerging countries in the recent years, contribute to the increase in trading volumes and market depth. It is estimated that the HFT transactions in the Asia region, including China and India, had an average market share of 32 percent by 2015. These transactions have a share of 36 and 21 percent in the Russian and Brazilian stock markets, respectively. Nevertheless, it is agreed that there is a need for regulatory infrastructure in order to mitigate the potential risks these transactions may pose to the capital markets of emerging

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4 Tabb Group, http://tabbforum.com/
5 Aite Group, http://aitegroup.com/
countries and their adverse effects on financial stability.

In Brazil, trading orders that are considered to be in the high-speed transaction category are filtered through the "pre-trade risk tool". India and China, where more than one national securities exchange operates, have also introduced measures for HFTs. A levy of 0.017 percent is imposed on options and futures markets for buying and selling transactions in India, where various speed bumps on the securities exchanges are implemented. China has measures including a stamp duty of 0.1 percent for selling of any security, the T+1 settlement which forbids selling a purchased stock on the same day, and the restriction on intraday trading of certain products on the futures markets.
There has been an upward trend in innovative and technology-based projects triggered by Industry 4.0. However, after the 2008 global financial crisis, entrepreneurs in need of seed or start-up capital have encountered problems in accessing conventional financing instruments. The lack of financing for these kinds of entrepreneurship may hinder a potential positive contribution to economic development as well. In this context, new-generation financing methods may offer a solution to this problem. Recently, alternative funding methods like venture capital and angel investing that facilitate entrepreneurs’ access to financing have emerged in the portfolios of investors. In this sense, crowdfunding is a new-generation financing tool that enables large numbers of investors who may not otherwise be able to create a potential to fund a project in small amounts through direct funding or donation via Internet.

**Types of crowdfunding**

Crowdfunding can take place through a variety of business models. These models can be summarized as follows:

- **Equity-based:** Investor companies issue shares or equities for funders through electronic platforms.
- **Lending-based (P2P or market lending):** Investor companies obtain funding by making a loan contract with funders through electronic platforms.
- **Reward-based:** Funders donate to a project in return for a prospective non-financial benefit.
- **Donation-based:** Funders provide funding for intangible benefits, expecting nothing in return.
- **Hybrid model:** This model has the characteristics of more than one of the crowdfunding models above.

**Crowdfunding process and its effects**

At the first stage of the crowdfunding process, entrepreneurs apply to a crowdfunding platform of their choice and present their projects. If the entrepreneurs are to use the crowdfunding mechanism to raise funds for commercial purposes, then they may have to provide their potential funders with strategic information such as the target markets, value added of the project, and revenue models in order to attract them. Moreover, the amount of funds required to launch the project should be announced and the time period for the collection of this amount should be set. The return to be offered to funders for their contribution to the project should also be specified at this stage.

At the second stage, the crowdfunding platform evaluates the application and decides whether to post it on the website or not. If the application is accepted, then it is posted on the website.
and thus the project campaign gets started at the third stage of the process.

The final stage is the fundraising stage. Investors provide funding for the proposed investment opportunities at amounts they deem appropriate. Crowdfunding platforms intermediate the payments.

Crowdfunding reduces the dependence of start-ups with limited funding capability on traditional financing instruments for initial and growth capitals, and enable them to access a new investor base. The system facilitates and accelerates capital formation by such firms. On the other hand, crowdfunding removes the geographical barriers to capital formation. According to the traditional financing doctrines, as the distance between the entrepreneur and the investor increases, the probability of financing the project by the investor decreases due to the lack of interaction between the two parties, the reduced control capability, and the difficulty in collecting information and providing input. Yet, crowdfunding investors are distributed across an extensive geography, and the project owners are able to reach investors from all around the world.

Crowdfunding is one of the most efficient ways to reach large numbers of potential investors, and simplifies the time-consuming process of finding, getting into contact with, and persuading an investor. The high capability of investors to produce information through feedbacks and product modification advices is one of the appeals of crowdfunding. All these factors decrease the cost of equity for entrepreneurs using this method. Crowdfunding also offers entrepreneurs a chance to test the market potential of their product or service before putting it on the market and to create awareness among consumers.

There are elements of crowdfunding open to improvement. The process of entrepreneurship generally requires changing the plans in line with the incoming information. However, entrepreneurs who are using the crowdfunding mechanism and the budget determined at the very beginning of the entrepreneurship process lack this opportunity. Moreover, it is very important to well manage the differing expectations of shareholders as the number of shareholders joining the crowdfunding mechanism to support the projects could be very large. Investors’ decisions to fund a project through the crowdfunding mechanism depend on the information that the entrepreneurs will provide regarding the venture or the products/services. Particularly in the equity-based crowdfunding, the more detailed the information is and the better it explains the innovative side of the business model, product or service, and the revenue model, the more attractive it becomes in the eye of the investor.

On the other hand, in terms of funders, the crowdfunding mechanism may involve risks such as failure of entrepreneurs or project owners to successfully realize the project or complete it on time, or investing in fictitious projects even though the platforms use various filters during the evaluation of applications. Additionally, there is the risk of money laundering through crowdfunding platforms. Inclusion of crowdfunding in the shadow banking framework was among the topics discussed in 2016 during the annual Global Shadow Banking Monitoring exercises conducted by the Financial Stability Board (FSB).
Crowdfunding on the global scale

Crowdfunding is a fast-growing mechanism in many countries. The regulations are in effect in countries like France, Italy, and the UK. The relevant European Commission decision and the regulation\(^1\) of the US Securities and Exchange Commission (SEC) have been effective since 2014 and 2016, respectively.

The total amount of funds raised through crowdfunding was USD 2.7 billion in 2012 and is estimated to have reached USD 34 billion by 2015 (Chart I.1.II.1). Of this total amount, USD 25 billion belonged to funding through the lending-based model, followed by reward, donation and equity-based crowdfunding. (Chart I.1.II.2)

A global picture of crowdfunding reveals that North America has the largest amount of crowdfunding financing with a total volume of USD 17.2 billion, followed by Asia with USD 10.5 billion and Europe with USD 6.5 billion. South America, Africa and Australia have relatively smaller crowdfunding volumes.

According to a study published by the EU Commission in May 2016, the total amount of financing through crowdfunding was 4.1 billion euros in 2015.\(^2\) According to the same study, the number of active crowdfunding platforms in the EU was 510 by the end of 2014. Of these platforms, 502 were based in the EU, and the remaining 8 were in countries like the USA, China, and Canada. The highest number of crowdfunding platforms was in the UK followed by France and Germany. The most commonly used crowdfunding models in the EU were reward-based (\(\%23\)) and lending-based (\(\%21\)) models.

On the other hand, there are also developments in the implementation and regulation of crowdfunding in emerging countries like India, Brazil, Mexico, the Czech Republic and South Africa. The first crowdfunding regulation in Brazil was introduced in 2017. However, crowdfunding has been used as a means of financing since 2011. Reward, donation and equity-based crowdfunding models

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are permitted in India while equity, lending and reward-based crowdfunding models are used in the
Czech Republic.

Crowdfunding in Turkey

Crowdfunding in Turkey has become more attractive as the number of people willing to
establish platforms, project owners, and entrepreneurs has increased rapidly. However, it is still infant in
terms of reaching the volume and effectiveness level of crowdfunding practices abroad. Currently,
reward-based crowdfunding activities can be performed in Turkey. Crowdfunding platforms are still in
the process of development due to lack of a regulatory infrastructure and the low level of awareness
in entrepreneurs and the public. Nevertheless, these platforms created a total fund amount of TRY
406,523 from 2,529 investors for different projects by the end of 2014.

The draft law that will amend the Capital Markets Law and provide a legal infrastructure for
crowdfunding was sent by the Government to the Parliament on 26 December 2016. The draft law is
expected to be brought to the General Assembly after it is discussed in the Planning and Budget
Committee.

The aim of this regulation is to provide a stable investment environment where the
entrepreneur can reach the funder and the funder can reach the entrepreneur through authorized
crowdfunding platforms. It is anticipated that with this regulation, financing problems of start-up
projects will be solved on the one hand, and investors will be able to gather and the segment of
investors who are not willing to invest will be oriented towards saving on the other hand. However, it is
very important to monitor the development and enhancement of the crowdfunding industry after the
introduction of the regulation.
I.2 Domestic Developments

In the first two quarters of 2017, economic activity grew with the favorable effect from both domestic demand and net exports (Chart I.2.1). Despite a limited decrease compared to the first quarter, growth in the second quarter was around 5 percent. In this quarter, private consumption and construction investments in domestic demand composition, and in addition to these, net exports were the main drivers of the annual growth, while machinery-equipment investments and public consumption declined compared to the same period of the previous year. Machinery-equipment investments is expected to have recovered partially.

Following the contraction in industrial production in the third quarter of 2016, the recovery in the last quarter of the same year continued increasingly in the first half of 2017 (Chart I.2.2). Thanks to the positive contribution of support and incentives, the recovery remained strong in the third quarter and helped reduce unemployment.

The unemployment rate significantly decreased compared to the beginning of 2017 (Chart I.2.3). As a result, the unemployment rate in August fell to 10.8 percent. This improvement was mainly driven by policies intended to strengthen economic activity and increase employment. However, the relatively limited recovery in non-exporting SMEs restricts the positive impact of growth on investments and the labor market. Meanwhile, the rise in population and labor participation limited any further decline in unemployment. On the other hand, a combined analysis of leading indicators, the industrial production index and the growth trend indicates that the decline in unemployment will continue in the upcoming period.

The central government budget deficit was 2 percent at the end of the second quarter (Chart I.2.4). Although the ratio of central government budget spending to GDP decelerated in the first two quarters of 2017 with the impact of consumption and investment incentives, the uptrend in 2016 continued. As a result of the aforementioned acceleration loss, it is predicted that by the third
Central government budget deficit continued to increase due to the effect of stimulus package.

Chart I.2.4
Central Government Budget Balance
(12-Month Cumulative, Billion TL, Percent)

Source: Undersecretariat of Treasury (Latest Data: 06.17)

quarter of 2017 this ratio will increase by 0.9 points compared to the same period of 2016 and will be 1.7 percent.

In the first two quarters of 2017, foreign trade contributed positively to growth (Chart I.2.5). Strengthened growth trend in the EU region and the global economy supported exports of goods, while increased tourism revenues owing to the recovery in tourism supported exports of services. Meanwhile, the import coverage ratio decreased, particularly, in the third quarter due to the limited increase in imports of goods excluding gold and significant increase in gold imports.

The macroprudential policies applied through the financial system channel and the incentives implemented to support economic activity have been effective in accelerating the economy in 2017. On the other hand, although the increase in net imports of gold and energy prices deteriorated to a limited extent in foreign trade, the same deterioration was not observed in the current account deficit in the first half of 2017 (Chart I.2.6). Moreover, despite the rise in GDP in 2017, there has not been any significant deterioration in the current account balance, and a tight monetary policy has continued to be implemented in a coordinated manner with fiscal measures and incentives.

Since the last Report period, the share of portfolio flows has increased while direct investments in current account deficit financing have remained the same despite internal and external shocks (Chart I.2.7). The main driver of rising portfolio flows was risk appetite that increased on the back of the normalization in global markets.

The gross reserves and short-term external debt stock have been following an uptrend since the turn of 2017 (Chart I.2.8). As a result, the ratio of the CBRT’s gross reserves to short-term external debt stock remains 100 percent.

Annual inflation indicators B and C, which displayed a moderate course in the second quarter of the year, increased approximately 1.5 percentage points to 10.89 and 10.98 percent,
respectively, in the third quarter (Chart I.2.9). While the CPI decreased diverged from the B and C indicators, but it showed a similar outlook as the corresponding indices as of July. Due to the rise in import prices, mainly in oil and basic metals, and the negative impact of the exchange rate movements, CPI was 11.2 percent in September and 11.9 percent in October. Annual food inflation, which rose rapidly in the first two quarters, decreased by 1.84 points in the third quarter.

The CBRT maintains its tight monetary policy stance and the average funding rate reflects this tight stance (Chart I.2.10). Nevertheless, the supportive measures and incentives provided in 2017, have delayed the impact of the monetary transmission mechanism. The normalization of credit growth is likely to enhance the effectiveness of the monetary policy.

Geopolitical developments and statements coming from advanced economies pertaining to the normalization of their monetary policies caused volatility in the exchange rate basket as of the second half of September (Figure I.2.11), breaking the horizontal course that had prevailed since the last Report period. In the period in question, the Turkish lira diverged negatively from other emerging market currencies due to the influence of geopolitical developments. On the other hand, decreasing volatility and uncertainty in the global markets as of 2017 led to a positive trend in risk perceptions for Turkish assets. However, it is observed that the CDS premiums have been increasing recently.
Box 1.2.1

Financial Stress Index as an Early Warning Indicator

The most important feature of the 2008 global financial crisis was the rapid spread of the fragility of one segment of the financial system to other segments and consequently the pressure it exerted on the real economy. Despite extensive liquidity measures introduced to the financial system, the impact of the crisis on the real economy has not been fully remedied for almost a decade now and the crisis has gained a systemic nature. Considering that systemic financial crises lead to lasting and destructive effects, the strengthening of early warning systems has emerged as an important issue. It has become more important to monitor the risks in the financial system through high frequency data, whereas until recently, early warning indicators were constructed on lower frequency data.

Early warning systems, in simple terms, are an outcome of the attempts to explain past crises with a broad macroeconomic, financial and fiscal data set. However, these systems do not foresee that the fragility emerging in one segment of the financial sector can spread rapidly, and this may have real consequences. Therefore, to foster development of early warning systems, it is worth investigating the risks that appear in the lower segments of the financial sector, their relationship to other segments, and the destructive effects of the financial system on the overall real economy. For this purpose, taking into account the unique financial structures of countries, many central banks in developed countries construct indicators by aggregating the risks of the financial sectors that could signal potential systemic risk in the economy and use these indicators as a means of policy formulation and communication. This box also aims to devise a financial stress index (FSI) that can be used for Turkey and to evaluate the performance of this index based on past fragilities.

The FSI is based on consolidating the stress of each sub-segment of the financial system using a particular aggregation method. There are a variety of methods used to measure stress representing financial fragility and aggregate the value of each segment to form a single index. In the literature, there is no consensus on the superiority of any of these methods. Therefore, the FSI to be introduced in this box was obtained by weighting 15 different FSIs that employ the most used aggregation methods in the economic literature in proportion to their relation with economic activity. This avoids any procedural dependence and the resulting index contributes to the final index in proportion to its relation to economic activity in order to better represent the overall systemic risk in the economy.

In the development of the FSI, a total of 14 data sets were defined for 5 different segments including money markets, bond markets, foreign exchange markets, stock markets and the banking sector (Table I.2.1.1). Money markets and bond markets are represented by 2 each, foreign exchange markets by 4, and stock markets and the banking sector by 3 data sets each. Since the effects of financial system risks on the real economy have a major importance in this study, high correlation with economic activity has been taken into account in the selection of the data to represent the financial

---

1 Growth of the industrial production index is used as an indicator of economic activity.
2 In this context, the most commonly used methods in the literature, namely principal component analysis, equal weighting, basic portfolio theory and dynamic factor model, are used to construct FSI.
The following steps were followed in obtaining the final FSI:

i. The raw data for each segment were standardized and made available either at their level or by making corresponding transformations and estimations (CMAX, volatility, correlation). 1

ii. These time series were collected with equal weight to obtain a single time series for each segment and this series was defined as a risk indicator for that segment. Thus, 5 different risk indicators for each segment were obtained.

iii. In order to obtain a single FSI from 5 different risk indicators, 4 different aggregation methods were used based on equal weight, principal component analysis, portfolio theory and dynamic factor analysis approaches.

iv. 15 different FSIs were obtained in the form of combinations of 4 different aggregation methods and different volatility estimations.

v. The final FSI was obtained with a final weighting based on the correlation (quarterly moving window correlation) between 15 different indices and the economic activity which is proxied by the industrial production index.

---

1 CMAX is used as a hybrid volatility-loss measure in finance literature and is expressed as \( CMAX = \max_{j=1}^{T} \left( y_j - \sum_{k=0}^{T} a_k \right) \). Volatility is calculated using the GARCH (1,1) and linear stochastic volatility models in this study. Correlation is obtained by using the DCC-GARCH model and the realized correlation calculated on the three-month windows. These methods have been used to observe how they affect the final index obtained and thus served as a robustness test.

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**Table 1.2.1**

<table>
<thead>
<tr>
<th>Financial Segment</th>
<th>Data</th>
<th>Starting Date</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Money Markets</td>
<td>3 month TRLIBOR volatility</td>
<td>05 May</td>
<td>TRULBM Index</td>
</tr>
<tr>
<td></td>
<td>TED spread</td>
<td>05 April</td>
<td>BASPTDSP Index</td>
</tr>
<tr>
<td>Bond Markets</td>
<td>Benchmark bond volatility</td>
<td>05 May</td>
<td>BENCH Index</td>
</tr>
<tr>
<td></td>
<td>EMBI+ Turkey Index</td>
<td>05 April</td>
<td>JPEMTU Index</td>
</tr>
<tr>
<td>Foreign Exchange Markets</td>
<td>Us dollar volatility</td>
<td>05 May</td>
<td>USDTRY Cumcy</td>
</tr>
<tr>
<td></td>
<td>Us dollar CMAX transformation</td>
<td>06 April</td>
<td>USDTRY Cumcy</td>
</tr>
<tr>
<td></td>
<td>Euro volatility</td>
<td>05 May</td>
<td>EURTRY Cumcy</td>
</tr>
<tr>
<td></td>
<td>Euro volatility</td>
<td>06 April</td>
<td>EURTRY Cumcy</td>
</tr>
<tr>
<td>Equity Markets</td>
<td>BIST 100 volatility</td>
<td>05 May</td>
<td>XU100 Index</td>
</tr>
<tr>
<td></td>
<td>BIST 100 CMAX transformation</td>
<td>06 April</td>
<td>XU100 Index</td>
</tr>
<tr>
<td></td>
<td>BIST100 and benchmark bond correlation</td>
<td>05 May</td>
<td>XU100 Index, BENCH Index</td>
</tr>
<tr>
<td>Banking Sector</td>
<td>Banking sector equity volatility</td>
<td>05 May</td>
<td>XBANK Index</td>
</tr>
<tr>
<td></td>
<td>Banking sector equity CMAX transformation</td>
<td>06 April</td>
<td>XBANK Index</td>
</tr>
<tr>
<td></td>
<td>Banking sector beta</td>
<td>05 May</td>
<td>XBANK Index</td>
</tr>
</tbody>
</table>

Source: Bloomberg (Latest Data: December 2016)

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When the relation between the index obtained and the economic activity is analyzed in order to examine the performance of the final FSI, the final index is found to lead economic activity from a certain period ahead. Another performance criterion for the FSI and the reason to employ the FSI as an early warning indicator is whether the index captures the major stress episodes of the past...
period. When the FED’s monetary tightening in May 2006, the Lehman Brothers bankruptcy and the subsequent financial crisis in September 2008, the Greece-based Euro Zone crisis in May 2010, and the FED tapering and domestic shocks in 2013 are accepted as the main stress episodes during the analysis period, it is observed that the FSI captures those stress episodes successfully (Chart I.2.1.1).

One criticism of FSIs is that these indices do not provide numerical information on crisis periods. In other words, for which values of the index a crisis should be expected is beyond the scope of this study. A generally valid interpretation is that financial stress increases when the index value rises. From this point of view, comparisons with past periods can give more concrete results.

The FSI proposed in this study responds most to the uncertainties that emerged during and after the Lehman Brothers bankruptcy in 2008 and reaches its highest level during this period. In 2006, 2010 and 2013, stress also increased markedly. However, the recent low levels of the FSI may be considered surprising at first glance given the exchange rate movements in that period. Since the FSI takes 5 different financial segments into account and the equity markets in emerging economies and particularly the Turkish banking sector have performed well despite recent exchange rate movements, it is evaluated that the developments in the exchange rate market have not been sufficient on their own to significantly increase stress.
II. Non-Financial Sector

The decline in the household financial leverage ratio (liabilities / assets), which began in 2013, slowed down due to the convergence of growth in liabilities to growth in assets during the reporting period. In the first quarter of 2017, the only increase in households’ FX deposit accounts was recorded in those with a balance of one million and more. However, in this reporting period, households’ FX deposits increased in other amount brackets as well. It is assessed that the moderate increase in household demand for foreign exchange stemmed from the limited deterioration in the exchange rate and inflation expectations, as the exchange rate volatility decreased in the January-September 2017 period, the exchange rate generally remained flat until the end of September, and consumer confidence did not change much in the same period. In the recent period, households played a balancing role by increasing their demand for TL deposits after the developments in exchange rates. On the other hand, the fact that households are not able to borrow in FX or at variable interest rates (other than housing loans) in the framework of the regulations in force prevents their financial liabilities from bearing market risk stemming from the exchange rate and interest rates.

Due to the pickup in economic activity, growth spread across sectors, and the corporate sector’s confidence in the economy, production volume and investment tendency recovered. The ratio of firms’ indebtedness to GDP has been flat since early 2017 as a result of the marked deceleration in FX loan utilization. The lengthening in the maturities of FX loans continues while the average maturities of TL loans also increase due to the effect of KGF loans. Firms’ increased access to loans through incentives and their strengthened liquidity positions have positively affected collection rates, and bad check and protested bill amounts have significantly dropped. Although firms’ balance sheets slightly deteriorated in the second half of 2016 and the first quarter of 2017, their profitability increased, liquidity indicators recovered and the balance sheets remained robust in the second quarter of the year.
II.1 Household Developments

Household total assets and liability growth rates, which started to increase in the first quarter of 2017, slowed down in the third quarter. (Chart II.1.1). This slowdown is attributed to the increase in deposits both in TL and FX on the asset side, and to the growing use of housing and general purpose loans on the liability side. Household financial assets and liabilities increased in the third quarter of 2017 when compared to the same quarter of the previous year.

The decline in the household leverage ratio, which began in 2013, slowed down due to the fact that the increase in liabilities in the current reporting period converged to the growth in assets (Chart II.1.1). The slowdown in the financial leverage ratio during the last reporting period largely stems from the acceleration in housing and general purpose loans. Although the greatest contribution to household savings deposits came from foreign exchange deposits, savings deposits adjusted for exchange rate effects declined until the summer months of 2017, and then began to rise (Chart II.1.2). It is anticipated that the effects of automatic enrollment into the Private Pension System (PPS), which was introduced in early 2017 and is expected to increase savings rates, will become visible in the medium and long term.
When consumer loans and savings deposit rates are analyzed, it is seen that, unlike the previous report period, the cost of consumer loans increased while the deposit rates remained flat (Chart II.1.4). Accordingly, the interest rate differential between consumer loans and savings deposits increased slightly in this period.

An analysis of the FX deposit balance in terms of US dollars as of September 2017 reveals that the foreign exchange deposit balance of the households slightly increased compared to the same period of the previous year (Chart II.1.4). There has been an increase of 28.3 percent in FX deposits since September 2016. It is thought that the increase in the share of FX savings deposits in total deposits was caused by the fluctuations in the foreign exchange rate markets affecting the household’s demand for foreign exchange. (Chart II.1.5).\(^1\)

FX savings deposits increased by 8.4 percent in terms of US dollars within the last one-year period (Table II.1.1). However, the share of FX deposits in total deposits decreased slightly in July and August 2017 with the limited increase in TL deposit interest rates that caused TL deposits to move upwards (Chart II.1.4). Balance sheet correction is also believed to have played a role in this decrease as a result of the decline in swap deposits transactions. This divergence in the household demand for foreign exchange emerges as a balancing factor facilitating the exchange rate risk management.

Two factors are significant in the 17.9-percent year-on-year increase in household financial assets (Table II.1.1). The first one is the FX-denominated savings deposits making the largest contribution with an increase of 7.6 points, and the other is the TL-denominated savings deposits with a contribution of 5.0 points.

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\(^1\) See Box II.1.1
From the beginning of 2017 until the end of September, the exchange rate volatility decreased (Chart II.1.5). When the consumer confidence index and the consumer tendency survey that explain the expectations of households about the general economy are analyzed, there is a limited deterioration particularly in the series regarding the inflation expectations (Chart II.1.6). Other determinants of the growth in household financial assets were investments in pension mutual funds, equity securities and precious metal deposits (Table II.1.1).

The increase registered in the previous Report period only in FX deposits with a balance of one million and above was also observed in other amount brackets in this period (Chart II.1.7). Similarly, compared to the same period of the previous year, the increase in foreign exchange deposits adjusted for exchange rate effects is also observed in other amount brackets, particularly in large-amount savings deposits. On the other hand, the increase in TL deposits has spread to all amount brackets and is bigger than the increase in FX deposits across all brackets. In the previous Report period, it was stated that the swap deposits were the most effective factor in the increase observed only in large-amount FX deposits. However, swap deposits decreased during this Report period. On the other hand, the currency mismatch resulting from the funding of the KGF loans-driven increase in TL loans with FX deposits led to an increase in foreign swap transactions. As a result, the increase in the high-amount FX deposits was relatively more modest compared to TL deposits.1

The increase in precious metal accounts in household assets continued from the previous reporting period through this reporting period. The amount of gold in the banking system and the price of gold, whose movements were in different directions in the previous periods, began to move together as of September 2016, and this co-movement was also observed in this reporting period. This relationship deteriorated in August 2017, and the gold prices increased while the households preferred to sell gold (Chart II.1.8). It is believed that a more accurate measurement of household precious metal savings has been achieved as a result of the inclusion

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1 For detailed information on changes in FX deposits, please see Box II.1.1.
of such gold in the system via the gold bond and gold-based rental certificate program initiated in the present period to bring the under-the-mattress gold into the economy.

Savings invested in the private pension system (PPS) continued to increase in line with the state contribution made since 2013 to boost domestic savings (Chart II.1.9). In this reporting period, there seems to be a slight slowdown in this tendency due to the decrease in the number of new enrollments in the PPS. The number of employees who have recently joined the PPS increased by 5.96 percent to 6.9 million and the total amount of funds including state contributions rose by 28.4 percent to 72.6 billion TL compared to the same period of the previous year (Chart II.1.9). As of September 2017, approximately 3.3 million people were enrolled in the system via the automatic enrollment mechanism, creating a fund size of 1.2 billion TL (Chart II.1.10).

The size of households’ equity securities portfolio exceeded 60 billion TL as of September 2017 (Chart II.1.11). The positive course of the Borsa İstanbul (BİST) Index throughout 2017 was influential in this development. When adjusted for the value increases using the stock market index, household equity securities investments decreased by 6.2 percent year-on-year as of September 2017.

### Table II.1.2

<table>
<thead>
<tr>
<th>Household Financial Liabilities</th>
<th>09/16</th>
<th>09/17</th>
<th>Percentage Change</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Liabilities (Based on Type)</td>
<td>464.4</td>
<td>541.7</td>
<td>16.6</td>
<td>16.6</td>
</tr>
<tr>
<td>Housing</td>
<td>171.4</td>
<td>204.1</td>
<td>19.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Vehicle</td>
<td>16.7</td>
<td>17.1</td>
<td>2.5</td>
<td>0.1</td>
</tr>
<tr>
<td>General Purpose</td>
<td>172.9</td>
<td>201.6</td>
<td>19.2</td>
<td>7.2</td>
</tr>
<tr>
<td>Individual Credit Cards</td>
<td>89.4</td>
<td>93.8</td>
<td>4.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Asset Management Comp't Rec.</td>
<td>14.1</td>
<td>18.7</td>
<td>32.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Total Liabilities (Based on Counterparty)</td>
<td>464.4</td>
<td>541.7</td>
<td>16.6</td>
<td>16.6</td>
</tr>
<tr>
<td>Banks</td>
<td>422.3</td>
<td>491.8</td>
<td>16.5</td>
<td>15.0</td>
</tr>
<tr>
<td>Financing Companies</td>
<td>12.3</td>
<td>15.2</td>
<td>23.6</td>
<td>0.6</td>
</tr>
<tr>
<td>TOKI</td>
<td>15.8</td>
<td>16.0</td>
<td>1.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Asset Management Comp't</td>
<td>14.1</td>
<td>18.7</td>
<td>32.7</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Source: CBRT, TOKİ (Latest Data: 09.17)
While average maturities continue to lengthen in general purpose loans, they remained unchanged in housing loans and shortened in vehicle loans.

Chart II.1.13
Average Retail Loan Maturity
(3 Month MA, Month)

Over the past few months, the unmortgaged sales rate has outpaced the mortgaged sales rate.

Chart II.1.14
Contribution to Housing Sales Growth, Housing Loan Monthly Interest Rate and Granted Loan Ratio (Percent, Percentage Points)

As in the previous reporting period, household financial liabilities also increased in this reporting period due to the easing of macroprudential measures for consumer loans since September 2016. As of September 2017, housing loans and general purpose loans, which accounted for approximately three quarters of the liabilities, were decisive in the 16.6-percent increase in the financial liabilities of households. (Table II.1.2).

Households mostly preferred banks as a source of funding in this Report period as they did in the previous Report period. However, the share of bank credits in household financing liabilities has decreased by 0.1 points in the last one-year period (Table II.1.2). The increased diversity of consumer loans due to newly opened financing companies has been effective in this decline. While consumers were using financing company loans mostly for purchases of vehicles in the past, since last year they have been also preferring financing company loans in purchases that are the subject of general purpose loans. General purpose loans provided by financing companies reached 4.5 billion TL as of September 2017. Consequently, the share of loans granted by financing companies for purchases covered by general purpose loans in total financing company loans reached approximately 30.7 percent (Chart II.1.12).

The newly extended general purpose loans are being used at longer maturities following the increase in the maturity cap for general purpose loans from 36 to 48 months and the rise in the loan-to-value ratio applied for housing loans from 75 percent to 80 percent (Chart II.1.13). Another factor affecting the increase in average maturity for general purpose loans was the facility allowing the restructuring of standardized loans with a maturity of up to 72 months. During this reporting period, while the maturities of housing loans remained flat, the maturities of vehicle loans moderately shortened.

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1 For the impact of macroprudential measures and the monetary policy on maturities, please see Box II.1.B.
As of September 2017, there was a sharp increase in unmortgaged house sales and the share of unmortgaged sales in total housing sales escalated (Chart II.1.14). Mortgaged house sales have contributed positively to the growth in house sales since September 2016. It is believed that the improvement in financial conditions for housing loans has been effective in the increase in housing sales. Since September 2016, the number of people who have been granted housing loans (acceptance rate) among persons applying for housing loans has been slightly higher than the period average.

Individual credit card balances accelerated particularly in the summer months of 2017 (Chart II.1.15). The annual change in individual credit card spending adjusted for the effects of inflation also refers to an increase, driven by the hike in package tour prices due to the slight revival of tourism compared to 2016 and the seasonal uptrends in expenditures.
The impact of monetary policy on credit growth has become more evident, especially with the macroprudential measures imposed after the 2008 global crisis. Tight monetary policy can push up market rates and reduce investment and consumption expenditures by suppressing financing conditions. On the other hand, a loose monetary policy can amplify credit conditions and that can lead to a fragility that would create more risk for the economy. The traditional monetary policy transmission mechanism assumes that financial markets are frictionless and predicts that borrowing rates depend on the short-term interest rates determined by central banks, but that maturities are not affected by the movement of this monetary policy instrument.\(^1\)

This box explores the impact of monetary policy shocks on the credit market with respect to financial stability and the extent to which these shocks and macroprudential policies affect the growth and maturity of general purpose loans. In this context, monetary policy and macroprudential measure shocks have been defined on the bank-based data using the panel-vector autoregression (PVAR) method widely used in economic literature, and the pass-through between these shocks and annual credit growth and credit maturities has been examined.

For most banking sector data of our country, the bank-based time series can be obtained starting from December 2002. Maturity data, which is not available directly, was obtained from individual data that has been reported more regularly since 2010, so the focus of the study was on developments as of 2010. Table II.1.1 shows the list of endogenous and exogenous variables used in estimation. The variables listed in the table are used in monthly frequency.

In this context, the interaction between credit growth, monetary policy rate, lending maturities, lending rate and macroprudential measures has been analyzed with the PVAR (1) model developed by Inessa and Zicchino (2006). In a dynamic panel, fixed effects estimators are inconsistent, since they are correlated with the lagged values of dependent variables. For this reason,\(^1\)

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\(^1\) Relevant to the transmission mechanism, Gertler and Karadi (2015) emphasizes the importance of adding credits and their maturities to the transmission mechanism.

<table>
<thead>
<tr>
<th>Table II.1.1</th>
<th>Variables in PVAR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MODEL</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Endogenous Variables</strong></td>
<td></td>
</tr>
<tr>
<td>Credit Growth (yoy %)(^b)</td>
<td></td>
</tr>
<tr>
<td>Maturity(^b)</td>
<td></td>
</tr>
<tr>
<td>Dummy for Macropudential Measures(^c)</td>
<td></td>
</tr>
<tr>
<td>Policy Rate(^d)</td>
<td></td>
</tr>
<tr>
<td>Lending Rate(^b)</td>
<td></td>
</tr>
<tr>
<td><strong>Exogenous Variables</strong></td>
<td></td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td></td>
</tr>
<tr>
<td>Exchange Rate (basket)</td>
<td></td>
</tr>
</tbody>
</table>

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\(^a\) Overdraft accounts\(^e\) are excluded from general purpose loans, as an interest rate cap was introduced for these accounts by the CBRT in May 2013 and thus, interest rate transmission mechanism is not observable.

\(^b\) These data are bank-based.

\(^c\) Dummy variables are designed to take the value of 1 for periods when strict macroprudential policies are implemented. For general purpose loans, this variable takes the value of 1 between January 2014 (when number of installments was limited to 36 months) and September 2016 (when number of installments was increased to 48 months).

\(^d\) WAFC is used as the policy rate. However, since this data started to be reported in 2011, the BIST interbank overnight borrowing rate was used as a proxy for previous periods.
the analysis is carried out by taking the first difference of the data in the whole panel in order to eliminate the fixed effects. All estimates are calculated using the two-stage GMM system where the lagged values of the variables are used as the instrument. The most important benefit of using the PVAR model in the analysis is that the method allows evaluation of the effect of orthogonal shocks on each other. In its simplest terms, PVAR illustrates the effect of one endogenous variable shock on another endogenous variable by removing the effects of other variables in the system. This illustration is possible with the impulse-response functions. In addition, this method is superior to other similar panel data methods used for handling the heterogeneity problem between banks.

Chart II.1.1.1 shows the impact of the monetary policy shock, derived from the PVAR(1) model, on the annual credit growth, maturity and interest rates for newly opened general purpose loans. When the transmission of monetary policy for general purpose loans is examined, it is observed that the effect of tightening monetary policy (100 basis point positive standard shock) on the growth of general purpose credits lasts for 11 months. This effect disappears at the end of 11 months and the general purpose credit growth declines by an average of 5.4 bps with the effect of the monetary policy shock. On the other hand, with the effect of the monetary policy shock, maturity is reduced by an average of 5 days during the 6 months when the shocks are significant. Finally, the transmission of monetary policy shocks to general purpose loan rates is 55 basis points, and this effect ceases at the end of 5 months.

![Image of response functions](chart)

Chart II.1.1.2 shows the impact of a macroprudential tightening shock obtained from estimated PVAR(1) for the general purpose loans on credit growth, maturity and interest rates of the newly opened loans. A macroprudential tightening causes an average of 42 bps contraction in loan growth over the first six months, but this effect disappears after six months. Meanwhile, even if the tightening shock shortens the maturity of newly opened credits to about 90 days, in the statistically significant six-month period, the mean duration of maturity falls is 23 days. Finally, it is observed that the statistical significance of the impact of a macroprudential policy shock on the loan rates is negligible.

1 Cholesky decomposition is applied to identify the VAR system. In terms of robustness, impulse-response functions were obtained with different ordering of endogenous variables and the results were unchanged.
As a result, model-based findings show that monetary policy shocks have significant effects on loan growth, loan maturities and lending rates. The transmission from policy shocks to lending rates on general purpose loans is smaller but non-negligible and this is attributed to the fact that interest margins offered by banks for these loans are higher than other types of loans. On the other hand, it has been observed that the macroprudential policy implemented has a strong influence on loan growth as well as on loan maturities with no significant influence on policy rates.

**References**


II.2 Real Sector Developments

II.2.1 Contribution to Economic Activity

The volume of real sector industrial production, which has recovered since the beginning of 2017, continues its rising trend according to the second and third quarter leading indicators (Chart II.2.1). While there is an increase in the manufacture of almost all product sub-groups, the recent upward momentum in capital goods manufacture is particularly evident. This development indicates that the investment outlook, which had a limited contribution to annual growth in the first two quarters of the year, is in recovery. The improvement in capacity utilization rates and the high level of investment appetite based on the results of the investment tendency survey provide positive signals that the long-postponed investment plans can be realized.

The loss of confidence that the real sector experienced after a series of shocks in 2016 disappeared due to the solid performance in economic activity in 2017, and expectations recovered (Chart II.2.2). In the third quarter of the year, confidence in the sector as a whole, excluding construction, continued to increase, indicating that the boost in economic activity persisted and spread across a broader range of sub-sectors. According to the information obtained from the surveys, the moderation in the housing market since the second quarter has somewhat subdued the outlook in the construction sector, but the investments in infrastructure projects have supported the sector.

According to the survey which provides information regarding the new orders received by the real sector in the past three months, the sharp increase observed in export orders since the last quarter of 2016 has continued, albeit at a decelerated rate since June 2017 (Chart II.2.3). The sectoral incentives, the flexibility and expansion in the export market diversification, the increased demand from our trading partners and the exchange rate movements have been influential on the increase in export orders. In addition, domestic market orders also accelerated particularly in the third quarter. The rise in domestic demand and the sectoral spread of economic

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**Chart II.2.1**

Industrial Production, Capacity Utilization and Investment Tendency

*Source: TURKSTAT, CBRT (Latest Data: 09.17)*

**Chart II.2.2**

Real Sector Confidence Indices

*Source: TURKSTAT, CBRT (Latest Data: 09.17)*

**Chart II.2.3**

Increase in exports and domestic orders persists.

*Source: TURKSTAT, CBRT (Latest Data: 09.17)*
activity are supporting the real sector and this situation is expected to have a positive contribution to the growth figures of the third quarter.

II.2.2 Indebtedness

The total financial debt of the real sector as a share of GDP has remained stable since the beginning of 2017 (Chart II.2.4). Despite a sharp increase in the TL-denominated debt due to the impact of KGF credits, the fall in the growth rate of both external and domestic FX-denominated loans to below 5 percent prevented a rise in firm leverage. In addition, stabilization of the exchange rate during the period from the first quarter of 2017 to July limited the rise in the TL value of FX-denominated debt, which has also positively contributed to the sector’s indebtedness.

The ratio of total corporate credits to GDP reached 68 percent in the first quarter of 2017, below the average of G20, EMEs and all countries in the data set (Chart II.2.5). As of March 2017, while the EMEs’ average increased by 12 points compared to 2015, the increase in firms in Turkey was 10 points. Much of this increase (7 points) is associated with the rise in FX loan balances as a result of the rapid increase in the foreign exchange rate in the last quarter of 2016. As a matter of fact, the annual rate of change in the loan / GDP ratio in the third quarter of 2016 was 1 percent, as mentioned in the previous report. The fact that the loan / GDP ratio has been flat since the beginning of 2017 indicates that Turkish firms have recently maintained their position in terms of indebtedness level compared to peer countries.

When we look at the distribution of loans extended recently (flow), the flow FX loans decreased by more than 20 percent annually (Chart II.2.6). The decline in the use of USD-denominated loans is more pronounced compared to euro-denominated loans. Flow FX-indexed loans, which are mostly preferred by SMEs without FX revenue, declined by nearly 40 percent. The slowdown in these loans, which are similar to other FX loans in terms of exchange rate risk, is a positive development for SMEs’ financial risk management. Due to the KGF loans that are largely TL-denominated, flow TL loans registered a positive growth during 2017. However, it has been noted that the slowdown in the pace of KGF loans extended in recent months has
been reflected in flow TL loan growth rates. Although FX funding conditions and foreign debt roll-over ratios of the banking sector are at favorable levels, this situation has not increased the FX loan supply in the domestic market. This is a positive outcome of the increased market awareness of the need to manage exchange rate risk and of the demand-side effect of recent exchange rate movements. Thanks to these developments, the FX open position of firms has not risen for some time. It is expected that the Turkish lira-settled forward FX transactions the CBRT recently launched will also support the exchange rate risk management of the real sector in the upcoming period.

As of August 2017, the maturities of TL and FX corporate loans lengthened compared to end of 2016 (Chart II.2.7). The share of short-term TL loans (0-12 months) in total TL loans sharply decreased and the share of TL loans with maturities between 3 to 5 years increased considerably. KGF loans having an average maturity of 35 months played an important role in this development. On the other hand, the share of FX loans with maturities of 5 years and longer, which make up more than half of the total FX loans, continues to increase. Compared to the end of 2015 and 2016, while the share of FX loans with less than three years of original maturity decreased, that of FX loans with a maturity of more than three years reached 70 percent as of August 2017.

II.2.3 Sectoral Developments

Sectoral distribution of corporate loans is consistent with the sectoral value added to GDP (Chart II.2.8). The vast majority of loans was concentrated in the manufacturing industry and wholesale-retail trade while the high financial leverage in the energy sector (electricity, gas and water) should also be noted. The increasing amount of energy sector investments in recent years, the long grace periods of loans used for these investments and the fact that the cash flows from these investments have not yet commenced help explain the high leverage in the sector. The TL credit stock was heavily concentrated in firms operating in domestic markets, such as wholesale-retail, agriculture and livestock sectors. Meanwhile, FX loans are concentrated in sectors with foreign exchange income and large investment projects. FX loans are extensively used in the

**Note:** Loans include domestic loans and intermediated external loans via a domestic bank. Source: BAT Risk Center (Latest Data: 08.17)
manufacturing industry, which accounts for 90 percent of FX export volume; the transportation and communication industry, which consist of large-scale airline and telecom companies earning FX revenue; and the hotels and restaurants sector, which has a natural hedge via tourism income. Due to the need for long-term financing for the infrastructure projects and large-amount investments in the energy and construction sectors, these sectors have an FX loan share above the average. In addition to sectoral distribution, firm-based distributions of FX loans are also important for FX risk management. For this reason, the Systemic Data Monitoring System initiated by the CBRT to oversee firm-level FX risk developments is of importance in terms of strengthening the surveillance mechanism for firms’ foreign exchange risk in the upcoming period.

The highest flow loan growth rates in the first eight months of 2017 were observed in the construction, agriculture, livestock and services sectors (Chart II.2.9). With the contribution of the KGF incentives, flow loans in almost all sectors in the first eight months of 2017 grew above the long-term average. The flow loans in the tourism sector, whose income had decreased in 2016 and recovered slightly in 2017, grew below the average.

The NPL ratio in corporate loans maintains its low level. When the sectoral distribution is examined, it is observed that the NPL ratios of manufacturing, wholesale-retail and construction sectors are higher than other sectors (Chart II.2.10). The NPL ratio in the tourism sector, whose contribution to economic activity slightly declined in the last two years, has remained at 2.5 percent.

The high growth rate of the loan volume which is in the denominator of the NPL ratio calculation, in 2017 may lead to the conclusion that the current level of the NPL ratio does not reflect the credit risk accurately. For this reason, removing the impact of loan growth on the NPL ratio will allow us to make a more sound analysis. The ratio of annual NPL amount changes to the 12 months prior loan volume can give a better idea about the recent NPL developments \((\frac{\text{NPL}_{t1} - \text{NPL}_{t0}}{\text{Loan}_{t0}})\). The ratio of the difference between the NPL amounts in August 2017 and August 2016 to the loan stock in August 2016 is 0.9 percent in the real sector as a whole. In other words, when the credit stock is kept constant, the increase in the NPL ratio is below
1 percent (Chart II.2.11). In almost all sub-sectors, this rate is also below 1 percent and very close to the August 2016-2015 difference. In summary, the NPL level in corporate loans is at reasonable levels, independent of loan growth, and there is no significant deterioration in the sectors’ repayments and the asset quality of banks in 2017.

II.2.4 Access to Finance

With the increase in the TL funding costs of banks since the end of 2016, the interest rates on TL loans to corporates have been rising. This trend has slowed slightly since June 2017 (Chart II.2.11). The increase in interest rates on corporate loans was observed in large and medium-sized firms as of the last quarter of 2016, and in small and micro-scale firms after March 2017. TOBB Respite Credits and interest-free KOSGEB loans, known to be used largely by SMEs, contributed significantly to keeping the average interest rate in the lower segment of the real sector low. In addition, thanks to these incentives, the disadvantages of SMEs in access to financing disappeared to some extent, and the average interest rate difference between the firms in the bottom and top segments declined to 2 percent.

According to the Loan Tendency Survey results in the second and third quarter of 2017, banks reported a slight easing of corporate loan standards (Chart II.2.12). In the last two quarters, public incentives and measures have prevented a further tightening of loan standards, which were assessed to have tightened in all survey periods since 2014. In the last one-year period, loan demand in the real sector, particularly from SMEs, has risen (Chart II.2.13). The fact that this increased demand was met by the loan market supported by public incentives has helped companies to avoid possible liquidity and collection difficulties and contributed to keeping economic activity buoyant.

II.2.5 Liquidity Position

Domestic firms’ deposits have been increasing since the last quarter of 2016 (Chart II.2.13). The FX deposits displayed a rapid increase until April 2017 due to the firms’ FX debt repayments, FX risk hedging incentives and KGF loans extended to importer firms that have payments in FX. Then they decreased slightly until August 2017.
due to the stabilization of the exchange rate. In the same period, the share of FX deposits and TL deposits in the total remained flat. The recent increases observed in deposits held by companies against possible economic, geopolitical and global shocks are considered as a sign of a strengthening in firms' liquidity positions.

Firms’ increased access to loans and the strengthening of their liquidity positions are positively reflected in their collections (Chart II.2.14). Since the first quarter of 2017, the number of protested bills reduced by 10 percent compared to the previous year, and the rate of growth in protested bill amounts also slowed considerably. Similarly, while the number and value of bad checks had a 4-percent share in the total number and value of checks by the end of 2016, this share fell below 2 percent by August 2017.

II.2.6 Analysis of Financial Statements of Borsa Istanbul Firms

An analysis of main financial indicators obtained from the balance sheets of BIST firms shows that the ratio of total liabilities to assets has been in an uptrend since 2014, but dropped slightly in the second quarter of 2017 (Chart II.2.15). Among total liabilities, while the ratio of financial debt to assets has been rising, commercial debt to assets ratio is stable. Although the total FX open position (TL value) as a share of assets rose in the first quarter of 2017 due to the exchange rate movements, the longer-term downward trend it has assumed since the beginning of 2016 continues.

Profitability of firms, which declined due to negative shocks experienced in the second half of 2016, tended upward on the back of the pick-up in economic activity in 2017 (Chart II.2.16). Financial expenses increased in 2017 due to the high level of FX and interest rates. Contrary to previous periods, the increase in financial expenses did not reduce the net profits in 2017, and net profitability increased thanks to the rise in sales and EBITDA driven by the recovery in economic activity. The recovery of firm profitability in this period, when an array of global shocks has created exchange rate and cost pressures, indicates that public measures and incentives have supported firms’ balance sheets. It is expected that the solid
performance of firms’ balance sheets will have a positive impact on the asset quality of banks.

The elevated economic growth has also been reflected in the liquidity and turnover ratios of BIST firms. In the second quarter of 2017, the time taken to collect receivables by firms shortened, while it was longer the second half of 2016 (Chart II.2.17). Similarly, the inventory turnover ratio, which was on a downward trend throughout 2016, started to increase in the second quarter of 2017. As the leading indicators suggest that the solid economic activity continues in the third quarter, it is expected that the recovery in firms’ turnover ratios and collections will persist.

Besides the analyses through single indicators in firms’ balance sheets, it is also possible to obtain more comprehensive information with an index score containing several indicators. According to the Multivariate Firm Assessment (MFA) Score, whose technical details are explained in Special Topics IV.1, there was some deterioration in firms’ balance sheets in the last quarter of 2016 and first quarter of 2017, but due to the pickup in economic activity, the balance sheets strengthened in the second quarter (Chart II.2.18). On average, the level of firms’ financial soundness is well above the financial distress threshold. How much of total debt belongs to firms under the financial distress level is an important question for the overall financial risk of the real sector. According to the classification derived from the MFA score, it is observed that the share of distressed debt in the total debt is around 10 percent, no significant increase has occurred in this share in the recent period, and most of the total debt is held by financially strong firms.
Real sector firms need to borrow to meet their working capital needs or to finance their long-term investments. Firms can borrow in TL or FX to meet this need. Although loan growth for real sector firms was driven by TL loans in 2017, there have been periods in some years when loan growth was driven by FX loans. Firms can get foreign currency funding domestically as well as externally. An analysis of firms’ total financial debts reveals that firms have 799 billion TL worth of TL-denominated and 991 billion TL worth of FX-denominated financial debt as of July 2017.

Firms state that they prefer FX borrowing as its cost is lower. This box compares firms’ TL and FX borrowing facilities and analyzes the realized costs considering interest rate and FX rate movements.

**Cost Comparison**

This section examines the effects of TL and FX borrowing on the financial statements of a fictional firm. The previous year’s balance sheet of the firm is presented in Table II.2.I.1. It is observed that this company had a high leverage on October 19, 2016. Let’s assume that on October 20, the company had a funding requirement of 1,000 TL with one year maturity. The company can acquire this funding in two different ways: a 1,000 TL loan or a 298.7 euro loan and convert to TL on the market (Euro/TL rate: 3.3478, Table II.2.I.2).

### Table II.2.I.1
The Balance Sheet of the Fictional Firm as of October 2016

<table>
<thead>
<tr>
<th>Balance Sheet as of 19 October 2016</th>
<th>Balance Sheet as of 20 October 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cash</strong> 400</td>
<td><strong>Cash</strong> 1400</td>
</tr>
<tr>
<td>Accounts R. 200</td>
<td>Accounts R. 200</td>
</tr>
<tr>
<td>Advances 300</td>
<td>Advances 300</td>
</tr>
<tr>
<td>Inventory 700</td>
<td>Inventory 700</td>
</tr>
<tr>
<td>Other 200</td>
<td>Other 200</td>
</tr>
<tr>
<td>Total Equity 100</td>
<td>Total Equity 100</td>
</tr>
<tr>
<td><strong>Total Assets</strong> 1500</td>
<td><strong>Total Liabilities</strong> 1500</td>
</tr>
<tr>
<td><strong>Total Assets</strong> 2500</td>
<td><strong>Total Liabilities</strong> 2500</td>
</tr>
</tbody>
</table>

### Table II.2.I.2
Currency and Interest Rate Indicators

<table>
<thead>
<tr>
<th>20 October 2016</th>
<th>20 October 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TL loan rate (%)</strong></td>
<td>13.59</td>
</tr>
<tr>
<td><strong>Euro loan rate (%)</strong></td>
<td>3.23</td>
</tr>
<tr>
<td><strong>Euro/TL rate</strong></td>
<td>3.3478</td>
</tr>
</tbody>
</table>

Source: CBRT

Assuming that the company prepares its income statements on October 20th, income statements of the firm for 2017 have been produced for either TL or euro-denominated loan utilization and these statements are presented in Table II.2.I.4. The development in “items other than finance expenses” in the income statement is based on assumption. As shown on the table, while the firm would have maintained its profitability if it used TL loan one year ago, it would have been in a loss position if it used the FX loan. When the exchange rate developments are taken into account, the
company would be bearing an annual cost of 33.26% for the euro loan, instead of having an annual cost of 13.59% for the TL loan (Table II.2.1.3).

Table II.2.1.3
Financing Expense Calculation

<table>
<thead>
<tr>
<th></th>
<th>Amount to be Paid Back on October 20 (TL)</th>
<th>Total Financing Cost (TL)</th>
<th>Funding Cost (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL Loan</td>
<td>1000*(1+0.1359) = 1135.9 TL</td>
<td>135.9</td>
<td>13.59</td>
</tr>
<tr>
<td>Euro Loan</td>
<td>298.7*(1+0.0323)*4.3219=1332.6 TL</td>
<td>332.6</td>
<td>33.26</td>
</tr>
</tbody>
</table>

Table II.2.1.4
Income Statement by October 20, 2017

(TL loan case) (Euro loan case)

<table>
<thead>
<tr>
<th></th>
<th>1500</th>
<th>1500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Sales</td>
<td>1300</td>
<td>1300</td>
</tr>
<tr>
<td>Cost of Sales</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Gross Profit</td>
<td>135.9</td>
<td>332.6</td>
</tr>
<tr>
<td>Financing Expense</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income before tax</td>
<td>64.1</td>
<td>132.6</td>
</tr>
<tr>
<td>Tax expense</td>
<td>12.8</td>
<td>-26.5</td>
</tr>
<tr>
<td>Net Income</td>
<td>51.3</td>
<td>-106.1</td>
</tr>
</tbody>
</table>

The impact of the income statement realizations on the balance sheet is discussed Table II.2.1.5. If both interest payment and principal of the loan are paid in cash, the balance sheet will look as follows on October 20, 2017. If the firm had used TL loan a year ago, it would have continued its activities with positive equity. On the contrary, it would have had lost its equity in case it used Euro-denominated loan.

Table II.2.1.5
The Balance Sheet as of October 20, 2017

(TL loan case) (Euro loan case)

<table>
<thead>
<tr>
<th></th>
<th>451.3</th>
<th>700</th>
<th>293.9</th>
<th>700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>Accounts P.</td>
<td>200</td>
<td>Advances</td>
<td>300</td>
</tr>
<tr>
<td>Accounts R.</td>
<td>200</td>
<td>Advances</td>
<td>300</td>
<td>Accounts R.</td>
</tr>
<tr>
<td>Inventory</td>
<td>700</td>
<td>Other</td>
<td>400</td>
<td>Total Assets</td>
</tr>
</tbody>
</table>

Note: It is assumed that the transactions affecting the Income Statement are fully cash-based and the tax is paid at the end of the period.

As illustrated by the example, firms that borrow in FX can bear higher costs than firms that borrow in TL during periods of rapid depreciation of the TL. This fictional firm, which does not have any FX income, would be able to maintain its profitability and presence if it borrows in TL and would lose its equity if it borrows in FX.

While considering TL and FX borrowing options, exchange rate developments and nominal interest rates should be taken into account as well. A firm faces same financing costs for TL and FX loans if the depreciation of TL over one year equals to the difference between TL and FX loan rates. If depreciation of TL exceeds the interest rate difference, financing costs of FX loan increase significantly. On the other hand, as opposed to the above scenario, if TL appreciates during the year,
the firm will be bearing a smaller cost for an FX loan as compared to TL loan. In this regard, FX borrowing implies a speculative meaning for a company with no FX income.

The total loan cost of firms can be calculated in a more dynamic way as a time series. In this calculation, it is assumed that companies use one-year loans in each period and these loans are rolled over at maturity. When firms use FX loans, they bear currency depreciation cost in addition to FX loan interest rate. It is observed that firms have borne higher costs for FX loans compared to TL loans most of the time over the examined period. This finding provides a clearer picture of the speculative nature of FX loan utilization (Chart II.2.1.1)

### Chart II.2.1.1
End of Period Costs of Loans (Percent)

- TL
- Dollar
- Euro

Note: FX costs are calculated by adding the currency price change to the FX loan interest rates.
Source: CBRT

#### Conclusion

The real sector’s borrowing choices are important with respect to financial stability. It is clear that the FX loan usage of companies which do not have FX income has a speculative nature. FX loan costs can significantly exceed the TL loan costs due to exchange rate developments.
III. Financial Sector

In the previous Report period, supportive fiscal policies assisted loan growth through both supply and demand channels. Loan growth rates continued to increase at an accelerated pace in the current Report period due to continuing effects of these policies and the base effect, but converged to their past averages after September. Due to the moderate increase in economic activity, strong TL credit growth, and positive developments in loan collections as well as the regulation on restructuring of loans, NPL ratios remained flat at low levels. It is expected that the growing credit use due to supportive measures and heightened economic activity will be offset by the tight monetary policy stance whose effects on credits were postponed due to the incentive schemes.

Banks remain resilient to liquidity risk. The maturity of non-core funding items has continued its high-level path thanks to measures taken, and have increased the resilience of the banking sector against possible global liquidity shocks. The fact that the roll-over ratio of syndicated loans exceeded 100 percent in the recent period and banks could borrow syndicated loans with maturities of up to two years, and the improvement in costs in 2017 indicate that there is no significant negative change in the credit supply of foreign financial institutions. During the last report period, TL liquidity needs of banks, which emerged as a result of the rapid growth in TL loans, as well as supportive market conditions led banks to use alternative funding instruments, thereby causing an increase in long-term bonds and subordinated securities issued by banks.

The banking sector’s on-balance sheet and off-balance sheet assets-liabilities positions in TL and FX of all maturities have limited sensitivity to interest rate risk via the repricing channel. However, the sector’s sensitivity to interest rate risk seems to have slightly increased in the last one-year period. This increase was triggered by the lengthening of assets’ maturities in TL positions, and by both the lengthening of assets’ maturities and the shortening of liability maturities in FX positions. The Turkish banking sector maintains its resilience to FX risk from the balance sheet channel. The sector’s
Credit growth rates continue to increase, albeit at a slower pace as supportive measures reach allocated limits, due to high demand and the base effect.

**Chart III.1.1**
Annual Loan Growth (FX-adjusted, Percent)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Loans</th>
<th>Corporate</th>
<th>Retail</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>12.12</td>
<td>0.05</td>
<td>0.10</td>
</tr>
<tr>
<td>2017</td>
<td>12.05</td>
<td>0.06</td>
<td>0.10</td>
</tr>
<tr>
<td>2018</td>
<td>12.06</td>
<td>0.09</td>
<td>0.10</td>
</tr>
<tr>
<td>2019</td>
<td>12.07</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>2020</td>
<td>12.08</td>
<td>0.11</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Note: FX-indexed loans are included in FX loans and adjusted for exchange rate using a weighted basket of 0.3 for the euro and 0.7 for the US dollar.

Source: CBRT (Latest Data: 09.17)

**Chart III.1.2**
Credit/GDP Ratio (Percent)

<table>
<thead>
<tr>
<th>Year</th>
<th>Ratio</th>
<th>Annual Difference (RHA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>12.05</td>
<td>0.05</td>
</tr>
<tr>
<td>2017</td>
<td>12.06</td>
<td>0.06</td>
</tr>
<tr>
<td>2018</td>
<td>12.07</td>
<td>0.09</td>
</tr>
<tr>
<td>2019</td>
<td>12.08</td>
<td>0.10</td>
</tr>
<tr>
<td>2020</td>
<td>12.09</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Note: The ratio takes stock of credit over the sum of monthly GDP over the past 12 months.

Source: CBRT, TURKSTAT (Latest Data: 09.17)

**Chart III.1.3**
Annual Change in Credit Stock to GDP (Percent)

<table>
<thead>
<tr>
<th>Year</th>
<th>(∆ Credit)/GDP</th>
<th>(∆ Credit)/GDP (FX-adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>-2.05</td>
<td>-2.06</td>
</tr>
<tr>
<td>2017</td>
<td>-2.06</td>
<td>-2.09</td>
</tr>
<tr>
<td>2018</td>
<td>-2.09</td>
<td>-2.10</td>
</tr>
<tr>
<td>2019</td>
<td>-2.10</td>
<td>-2.11</td>
</tr>
<tr>
<td>2020</td>
<td>-2.11</td>
<td>-2.12</td>
</tr>
</tbody>
</table>

Note: The annual change in credit is reported as a ratio of GDP. The change in corporate FX credits takes 3-month differences of stock values to calculate the flow variable. The value is then FX adjusted using a 12-month average of CBRT buying rates. Adjusted values are added to give the annual difference. FX-indexed loans are included in FX loans. The blue dashed line shows the long term average since 2004 for the FX-adjusted value.

Source: BRSB, CBRT, TURKSTAT (Latest Data: 09.17)

FX Net General Position/Equity ratio is close to zero, well below the two-way legal cap of 20 percent. The sector continues to use currency swaps as the main instrument in FX risk management. However, while the growth in volumes of currency swap transactions hedges against the FX risk, it generates at the same time a probable pressure on profitability by increasing banks’ interest rate sensitivity.

The banking sector’s profitability indicators, which have been on the rise since the last quarter of 2015, remain robust despite a limited decline since the second quarter of 2017. However, the profit generation power of the sector has outperformed the growth in credit risk as the recent loan growth mostly stemmed from the loans under the KGF guarantee and the exchange rates relatively stabilized. On the other hand, the regulatory capital has been positively affected by the growth in profitability and the increase in subordinated debt issues in the last one-year period. These developments have resulted in a remarkable increase in capital adequacy ratios.

**III.1 Credit Developments and Credit Risk**

Credit growth continued its recovery in the aggregate following various stimulus policies from the third quarter of 2016 until the third quarter of 2017, both in corporate and retail loans. As of September 2017, FX-adjusted rate of total credit growth registered at around 20 percent, and in the following period has converged down to its past average (Chart III.1.1). The revival in retail loans seen in the previous Report period triggered by the decline in housing loan interest rates, financial incentives for private consumption expenditures and the partial easing in macroprudential measures accelerated in this period. Increased maturity caps and the base effect were decisive in the developments seen in the two most important items of retail loans, namely housing and general-purpose loans. Corporate loans continued to grow in TL following the supportive incentive schemes and due to the contractionary effect of exchange rate movements on both the demand for and supply of FX loans. As a result of these developments in retail loans and TL corporate loans, credits continued to grow faster than GDP, and the annual net credit utilization from the banking system recovered in
nominal terms while the exchange rate-adjusted series exceeded the long-term average (Chart III.1.2 and Chart III.1.3)

As of the first quarter of 2017, the ratio of loans extended by banks to the non-financial sector as a share of GDP was at a moderate level in Turkey compared to peer developing countries while the annual change of this ratio was high. In this period, particularly due to the recovery in corporate loans as an effect of Treasury-backed KGF implementation, Turkey has increased its ranking among peers as expected. Turkey also diverged from its peers in terms of the two-year increase registered in this ratio (Chart III.1.4). Moreover, the accelerated corporate loan growth in the April-June period due to the KGF incentive offered since the first quarter of 2017 continued in July, but it hovered around the historical average in the rest of the year.

Both supply and demand dynamics have played a role in the recent credit developments. On the retail side, supportive changes in macroprudential regulations were effective in these developments while on the corporate side, restructuring of debts, increasing domestic consumption demand and postponed inventory increases in this period were influential. In the third quarter of 2017, banks kept their credit standards stable compared to the previous quarter for retail and corporate loans with the exception of general-purpose loans. With the waning impact of supportive measures and incentives, FX-adjusted loan growth slowed and converged to the historical average. In the upcoming period, the effects of tight monetary policy are expected to become more pronounced.

III.1.1 Corporate Loans

Corporate loan growth rates, which accelerated at the end of the first quarter of 2017 due to KOSGEB’s interest-free loan support, TOBB’s low-interest Respite Credit, and Treasury-backed KGF guarantee scheme, have continued to grow at a slower pace due to the base effect and loan issuance reaching the upper limit of the KGF scheme. The total corporate loan growth rate, adjusted for the exchange rate effect, was 20.9 percent in September, reaching levels seen two years ago (Chart III.1.1). Currency movements and

Credit growth rates registered an increase in international comparisons.

Source: CBRT (Latest Data: 03.17)

TL corporate loans continued to grow across all firm sizes.

Source: CBRT (Latest Data: 09.17)

FX corporate loan growth slowed down in tandem with rising foreign exchange rates.

Source: CBRT (Latest Data: 09.17)
the increase in TL loans were the decisive factors in this growth rate. The TL loan growth rate was 32.2 percent in total as credit growth increased across all firm sizes (Chart III.1.5). At the same time, due to the increase in exchange rates and the signaling effect of regulatory efforts in foreign exchange risk management, domestic sourced FX loans of small and medium sized firms continued to contract while large-scale firms' FX loan growth remained stable (Chart III.1.6). The decline in FX credit utilization of large-scale companies, which receive about 85 percent of FX loans, was decisive in the overall course of FX loan growth while total domestic-sourced FX loans registered a limited contraction in September.

Interest rate developments play an important role for corporate loans both in terms of aggregate demand and the currency type of the loan demand. However, in the current period exchange rate movements rather than interest rates had a dominant effect on currency preferences of firms. Previously, when firms' domestic FX loans declined due to the impact of prices or supply on loan demand, the growth rates of external FX loans had increased. As a result, firms that generally prefer to use FX loans for long-term investments met their funding needs by substituting foreign sources for domestic ones. However, in the current period, firms have reduced their use of FX loans in the aggregate, rather than exercising this substitution. The decline in the total FX loan utilization in this period when TL commercial credit interest rates increased while domestic FX loan rates remained stable is associated with increased exchange rate risk awareness and management in addition to exchange rate developments (Chart III.1.6 and Chart III.1.7).

To meet their increasing TL funding needs, banks increased TL and FX deposit rates, leading to an increase in TL loan interest rates and a narrowing in the spread between FX loans and deposits (Chart III.1.7). The sharp increase in TL loans in this period when FX deposits were strong caused banks to intensify swap transactions with the aim of obtaining funds for TL loans.

According to the Bank Loans Tendency Survey, in the third quarter of 2017, the standards that banks applied to corporate loans generally remained flat compared to the previous quarter. While
credit standards registered a limited easing in corporate loans regardless of firm size, they remained the same for both long and short term loans. Lending standards continued to tighten in FX credits while TL lending standards did not change after two quarters of easing. This development is believed to have played a role in the deceleration in FX loan growth along with the decreasing demand. While the expectations regarding the overall economic activity did not have a net effect on supply in the last two quarters, the two-year long tightening effect of industry, firm and collateral related risk factors on supply was replaced by a loosening in standards due to the ongoing positive influence of supportive policies on the risk perception for loan collaterals. (Chart III.1.8). On the demand side, while the demand for FX loans decreased, the demand for TL loans were positively affected by the loan demand related to short-term, operating cycle-dependent working capital needs such as inventory increase and restructuring of debts as well as discount opportunities in cash purchases (Chart III.1.9).

III.1.2 Retail Loans

The acceleration particularly in general-purpose and housing loans continued as a result of enhanced loan and installment facilities brought about by favorable interest rates and macroprudential policy regulations in the second half of 2016, as well as the growing demand for retail loans in 2017. Following the base effect in the summer months, retail loans grew by 18 percent in September 2017 (Chart III.1.1, Chart III.1.10 and Chart III.1.11). Growth rates in retail loans in total and in all subcomponents, excluding credit cards, have been the highest of the past three years. Increased consumption demand and base effects have been influential on the growth in credit card balances. The recent growth in retail vehicle loans despite the declining market share of the banking system is also associated with the base effect and the exchange rate developments over the past year. As a matter of

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1 According to the amendments made to the regulations regarding the credit transactions of, and credit cards issued by banks on 27 September 2016, the maturity cap for general-purpose loans, while retaining some exceptions, has been raised to 48 months and current balances on performing loans are allowed to be restructured with maturities up to 72 months. If this restructuring requires a new credit issuance, the maturity is again limited by 48 months. The loan-to-value ratio for housing loans or loans with housing as collateral other than vehicle loans has been increased from 75 percent to 80 percent. With the exclusion of various consumption items, the number of instruments in retail and corporate credit card spending and cash withdrawals has been increased from 9 to 12 months, and as in general-purpose loans, current balances on performing loans are allowed to be restructured with maturities up to 72 months.
fact, with a weaker base effect and the termination of the VAT reduction stimulus in domestic appliances and furniture expenditures in October, the weekly rate of FX adjusted consumer loan growth declined to around 17 percent.

It is noteworthy that despite rising housing loan interest rates since April 2017, the demand remained vibrant and housing loans stood as the fastest growing retail loan type. This development is evaluated in relation to the fact that the maximum loan-to-value ratio limit applied to housing loans were increased from 75 percent to 80 percent in September 2016, the favorable effects of past period consumer confidence in the housing market as reported by the Bank Loans Tendency Survey, and the base effect arising from the loan growth that decelerated due to the relatively high housing loan interest rates in the same period of 2016.

General-purpose loans are performing close to their long-term average since the beginning of 2017 (Chart III.1.12). The change in the maximum maturity cap introduced in 2016 and simultaneous interest rate developments have played a major role in the recovery of the loan growth rate to averages seen between 2008 and 2015.

In the first quarter of 2017, credit growth remained slightly below the average level due to the increase in the maximum maturity cap and incentives for furniture and domestic appliances consumption. In the second half of the year, in addition to the ongoing incentive and maturity effects, the contribution of the base effect helped push the growth rate above the said average. The strong course of credit demand despite the recent increase in interest rates is considered to be related to the reduced interest rate sensitivity of individuals due to the increasing maturity structure. As a matter of fact, the lending policies of banks as well as individuals’ demand continued to respond sensitively to the increase in the maximum maturity cap within the scope of the policy change, and loans with maturities between 25-36 months which included the old maturity cap continued to lose its share in favor of maturities between 37-48 months (Chart III.1.13). As stated in the Bank Loans Tendency Survey, in the current Report period, the competition between banks and the positive expectations regarding the overall
economic activity have resulted in an easing in credit standards, which has supported credit growth. Demand for durable goods and purchases of securities played a role in the rising demand coupled with increased consumer confidence. The extension of the incentives for the furniture and domestic appliances sector into the third quarter of the year is considered to have brought forward demand that may emerge in the remainder of the year. The demand for these items is expected to slow down in the fourth quarter of the year.

Household indebtedness and indicators for overall economic activity will be effective on the credit risk outlook of retail loans. With the revival in the economic activity since the beginning of 2017, the downtrend in the unemployment rate due to increased employment opportunities in the current period, and the extended maturity and installment facilities have produced more favorable levels of consumer debt service capacities (Chart III.1.14). It is expected that this development will have a positive effect on individuals’ credit risk outlook. As noted in Section II.1, the decline in household leverage ratios since 2014 has halted with the growth in housing and general-purpose loans. The easing in bank lending standards in the third quarter of 2017 will facilitate credit access for individuals in need of loans, while the high demand and accordingly the relatively higher interest rates on bank lending will improve the banking sector’s profitability.

III.1.3 Non-performing Loans

With the contribution of the steps to revitalize the credit channel and the increase in economic activity, NPL additions and write-offs have declined in the recent period and the collections within the period have increased. As of September, the increase in NPL provisions had a limited tightening impact on bank assets. The NPL ratio, favorably supported by these developments, remained flat at 3 percent during this period (Chart III.1.15). Demand-driven acceleration in retail loan growth and restructuring opportunities offered for existing loans supportive of debt service capacities have been effective on the falling NPL ratios. As a result of NPL sales to asset management companies, retail loan NPL ratios, which grew steadily since the beginning of 2015, fell to levels seen in 2015 (Chart
The NPL ratio is relatively moderate in an international comparison.

Corporate NPL ratios continue to diverge in terms of currencies, and the total corporate NPL largely results from TL loans (Chapter II.2). Although exchange rate developments in the last one-year period have had a dominant effect on the growth of FX loans, it is estimated that firms’ resilience against exchange rate shocks and longer-term borrowing have been effective in the horizontal course of the FX-denominated corporate NPL ratio.

Corporate NPL ratios diverge not only on a size or currency basis, but also on a sectoral basis. The NPLs in the manufacturing industry and the wholesale and retail trade sectors, which make up approximately half of the total volume of sectoral borrowing,
remained relatively flat and played a decisive role in the overall NPL ratio (Table III.1.1). It is estimated that these sectors will be positively affected by the expected domestic and foreign demand developments in economic activity in the coming periods. The NPL ratios in the construction sector continued to decline, albeit at slowing rates, following the supportive policies and interest rate movements since the last quarter of 2016 as well as the ongoing strong demand. The tourism sector, which has recovered partially, had a relatively stable share in total corporate loans, and NPL ratios in the sector remained at average levels reflecting the favorable effect of the incentives given to the sector. Incentive programs are also believed to have played a role in the flat course of NPL ratios in the energy sector which benefited from restructuring facilities.

NPL ratios continued to decline in all retail loan types as a result of the strong rebound in retail loans (Chart III.1.15 and Chart III.1.19). NPL ratios in housing loans, which have a stable outlook given their collateral structure and loan-to-value restrictions, continued to decline due to the recent credit growth. The NPL ratios in vehicle loans showed a limited decline and continued their long-standing flat course around 3 percent. Individual credit card NPL ratios stood at 7 percent, declining to the levels of about two years ago, due to the rise in the number of installments allowed and the restructuring facilities introduced for existing balances. The option to pay in installments is being used more intensively following the increase in the maximum number of installments allowed, and balances with installment sales have grown at a faster pace than non-installment sales (Chart III.1.20). As a result of this differentiation in growth rates of installment and non-installment balances, the ratio of installment balances to total credit card balances slightly increased to above 45 percent.

The NPL ratios for general-purpose loans declined to 5.1 percent in September 2017, following the changes introduced in September 2016. The fact that these changes, which lengthened maximum maturities and allowed existing loan balances to be restructured with longer maturities, reduced the likelihood of individuals to become delinquent by increasing the payment rates of current and future debts of individuals through facilitating their debt service with a reduction in their monthly credit obligations stands as a positive reflection of the change in implementation.

### Table III.1.1

<table>
<thead>
<tr>
<th>Sector</th>
<th>09/16 NPL</th>
<th>09/17 NPL</th>
<th>Percent Change in NPL</th>
<th>Credit Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Industry</td>
<td>3.5</td>
<td>3.5</td>
<td>-1.3</td>
<td>26.0</td>
</tr>
<tr>
<td>Wholesale and Retail Trade</td>
<td>4.0</td>
<td>4.0</td>
<td>0.4</td>
<td>21.1</td>
</tr>
<tr>
<td>Construction</td>
<td>3.8</td>
<td>3.5</td>
<td>-7.5</td>
<td>11.9</td>
</tr>
<tr>
<td>Energy (Electricity, Gas and Water Inc.)</td>
<td>0.6</td>
<td>0.5</td>
<td>-161.1</td>
<td>9.1</td>
</tr>
<tr>
<td>Tourism, Travel, Communication</td>
<td>1.9</td>
<td>1.9</td>
<td>0.0</td>
<td>7.1</td>
</tr>
<tr>
<td>Retail, Renting, Management</td>
<td>1.0</td>
<td>1.2</td>
<td>18.9</td>
<td>7.3</td>
</tr>
<tr>
<td>Agriculture, Livestock, Forestry</td>
<td>2.6</td>
<td>2.7</td>
<td>4.7</td>
<td>5.9</td>
</tr>
<tr>
<td>Hotels and Restaurants</td>
<td>2.4</td>
<td>2.7</td>
<td>12.5</td>
<td>4.2</td>
</tr>
<tr>
<td>Mining and Quarrying</td>
<td>2.7</td>
<td>2.4</td>
<td>-11.4</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Note: Sectoral breakdown is based on the loan purpose indicated at the time of application. The shares are calculated excluding retail loans and the financial sector, and the selected sectors represent 95% of real sector’s performing loans.

Source: BRSA (Latest Data: 09/17)

### Chart III.1.19

NPL Ratios in Retail Loans (percent)

- General-Purpose
- Vehicles
- Credit Cards
- Housing (RHA)

Source: BRSA (Latest Data: 09/17)

The share of retail credit card balances with installments has started moving around a higher average.

### Chart III.1.20

Annual Growth in Personal Credit Card Balances and Installment Share (percent)

- With Installments
- Without Installments
- Total
- CC 9 Months
- CC Inst. I
- CC 12 Months
- CC Inst. II
- CC Inst. III
- Install. Share (RHA)

Note: Highlights of the 2013 regulation are linking minimum payments to card limits and new card limits to incomes. In February 2014, the number of monthly installments was limited to 9 with some exceptions. Credit card installment regulations I, II, and III have removed the right to instalments for gift cards and cheques, through about 4 months of installments to jewels, and extended the maximum number of installments to 12, with some exceptions.

Source: CBRT (Latest Data: 09/17)
According to the Bank Loans Tendency Survey, credit standards began to ease in the third quarter of 2017, which creates a probability of an upward risk in general-purpose loans’ asset quality (Chart III.1.21).

The average loan maturity is expected to lengthen as individuals prefer to extend their debts over longer periods by using the longer-maturity and restructuring facilities. As a matter of fact, as can be seen in Chart III.1.13, following the first maturity cap introduced in 2014, average maturities began to concentrate in the bracket just below the maximum limit even then. It is therefore consistent with this expectation that the average maturities in new loans increased shortly after the latest change in implementation and the increase in maturities is higher for Retail Loan Score (RLS) groups that are more likely to be in need of credit (Chart III.1.22). However, the rapid decline in maturities following the increase in 2016 shows that these changes in implementation did not lead to a permanent shift in individuals’ consumption tendencies or in banks’ lending standards; on the contrary, the increase was a short-term development where users benefited from the new opportunities created by the implementation change. The fact that the highest increase in maturities after this change was registered in the lowest RLS group, which is most likely to have loan repayment difficulties, reveals that the change in implementation has had a positive impact on loan quality.

The rate at which performing loans turn into NPLs is determined by both banks’ lending policies at the time of credit issuance and the macroeconomic outlook in the following period. It is possible to examine the effect of these factors on credit performance by means of a vintage analysis that shows the rates at which loans become NPLs in the quarters following their issuance. According to the vintage analysis on general-purpose loans, all loans issued since the first quarter of 2015 have always performed better than the previous quarter in terms of asset quality, while loans issued in the first two quarters of 2017 have shown an initial performance corresponding to the average of the last two years (Chart III.1.23). With the improvement in macroeconomic outlook, increasing employment opportunities in the current period, higher domestic demand, and the contribution of longer maturities, the NPL outlook in retail loans is not expected to deteriorate in the period.
ahead. Since households’ access to FX loans has been restricted as part of the macroprudential measures taken in 2009, households are not exposed to exchange rate risk, which will also support this outlook.
The sector’s LCR calculated for the total is well above the legal limits. 

The share of non-core liabilities in total liabilities has decreased marginally. The strong course of TL loans during the last Report period also had a positive effect on deposit growth. Growth in deposits contributes to achieving a more stable structure in bank balance sheets. Moreover, the high profitability level of the banking sector, has led to an increase in the share of core liabilities in the funding composition of banks. The foreign resources provided via

III.2 Liquidity Risk

The banks’ short-term liquidity position is on a safe path. The Liquidity Coverage Ratio (LCR), which indicates how banks can meet 30-day net cash outflows out of their high-quality liquid asset stocks, was 125 and 196 percent for total and FX November 17, 2017 and are well above the legal lower limits (80 percent for total, 60 percent for FX) (Charts III.2.1 and III.2.2). Gold and FX liquid assets held by the banks at the CBRT in the scope of the ROM continue to support FX LCRs. In the second half of 2016, when capital inflows weakened, ROM reserves decreased due to the rise in FX costs and the increase in exchange rates. As of February 2017, there has been a rebound in the ROM reserves as a result of the accelerated capital movements and falling exchange rate volatility, which in return were reflected in FX LCRs. The distribution of banks’ LCRs according to their percentiles indicates that all banks satisfy the legal limits by a significant margin. After the amendments made to the LCR calculation by the BRSA on August 15, 2017, the LCRs of banks increased by a limited amount.\(^1\) Banks that are close to the legal lower limit may show a higher demand for deposits than alternative funding sources since deposits are a stable source of funding. In this context, it is estimated that deposit demand of banks that are close to legal lower limit may reduce by a limited amount as a result of this regulation.\(^2\)

\(^1\) According to the “Regulation on the Amendment of the Regulation on the Calculation of the Bank’s Liquidity Cover Ratio” published by the BRSA on 15 August 2017, the ratio of the reserve requirements of the banks in the CBRT has been increased from 50 percent to 100 percent. In other words, the reserve requirements held in the CBRT by banks were accepted as “high quality liquid assets”.

\(^2\) The special topic titled “Liquidity Position and Deposit Rates of Banks” in the Financial Stability Report released in November 2016 analyzes the relation of the deposit rates with the Liquidity Coverage Ratio (LCR) and Loan/Deposit ratio (L/D) that represent the short-term and long-term liquidity positions of banks, respectively. The estimation results suggest that the L/D ratio is an important factor in explaining the recent deposit competition, especially for the banks whose L/D ratio value is higher than the 110 percent level. Besides, it has been found that LCR, which is a short-term liquidity measure, has more limited effects than L/D ratio on deposit rates, and this effect is more evident in the banks whose LCRs are below the 100 percent level. It is foreseen that the effect of LCR on deposit rates may be strengthened somewhat by raising the legal limit to 100 percent in 2019.
bonds issued in foreign markets and the debts obtained from banks abroad constitute about 60 percent of non-core liabilities. In this period, the share of funds obtained from domestic markets in non-core liabilities increased as well. Domestic non-core liabilities are mainly composed of repo transactions, bank borrowings and bonds issued in domestic markets. In addition to the recent subordinated bonds and traditional domestic bonds issued by banks, the rise in domestic borrowing from banks led to an increase in the share of domestic funds in non-core liabilities (Chart III.2.3). The increase in both core liabilities and the share of domestic resources in the non-core liabilities points to the deepening in domestic markets.

**Despite strong loan growth, banks’ Loan/Deposit ratio (L/D) remains flat.** Being one of the key indicators of long-term liquidity position of the banking sector, the L/D ratio was approximately 115 percent by the end of 2014 and has assumed a flat course (Chart III.2.4). The flat course of the L/D ratio indicates that the rapid growth in loans due to the recent supportive incentives and macroeconomic policies has also brought about deposit growth. The growth of loans and deposits in close proximity enables banks to maintain their long-term liquidity positions on a safe path and supports financial stability. Moreover, the flat trend of total L/D ratio implies that banks do not have any constraints on total funding. The L/D ratios calculated for TL and FX continue to diverge. Depositors’ stronger preference for FX deposits continued in the last report period. Exchange rate developments and increasing awareness of foreign exchange risk management has weakened firms’ FX borrowing appetite. Depositors’ FX deposit preferences and the change in favor of the TL in the loan composition of banks led to a widening in the gap between the TL and FX L/D ratios. The difference between TL and FX L/D ratios indicates that banks need TL liquidity. As a result of depositors’ FX deposit preferences and banks’ TL liquidity needs increased FX swap transactions with foreign residents. Therefore, the amount, maturity, cost and counterparty structure of FX swap transactions have recently become important with respect to monitoring the liquidity risk of banks. The fact that

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1 Development and investment banks that grant loans but do not have the authority to collect deposits are not included in the L/D ratio calculation. When the development and investment banks are included, the L/D ratio of the sector reaches 122 percent by October 2017.

2 The amount, maturity and cost-based analysis of FX swap transactions made by the banking sector are given in Box III.2.1.
Banks are able to sustain credit growth without weakening the quality of their funding by using relatively stable funding sources.

Chart III.2.5
Loan/(Deposit+Other Stable Sources) Ratio (Percent)

<table>
<thead>
<tr>
<th>Date</th>
<th>Total</th>
<th>TL</th>
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<tbody>
<tr>
<td>01.13</td>
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</tr>
<tr>
<td>08.17</td>
<td>55</td>
<td>55</td>
</tr>
</tbody>
</table>

Note: Other includes equity, long-term issues, subordinated loans and other loans with maturities longer than one year.
Source: CBRT (Latest Data: 09.17)

Stable funding sources other than deposits contribute to the long-term liquidity position of banks. According to the perspective set out in the Basel III accord, long-term borrowings other than deposits may be a stable source of funding, provided that the maturity structure of banks are compatible with their assets. In this framework, deposits, equities, subordinated debts, long-term issuances and debt items with a maturity longer than one year are also considered as stable sources of funding. In this context, the L/(D+other stable resources) ratios of the banking sector calculated by including the mentioned resources are 82 for total and 108 percent for TL. (Chart III.2.5). Therefore, banks are can meet credit demands without weakening the quality of funding and by keeping long-term liquidity positions in a safe zone especially by extending the maturity of foreign borrowing.

There has been a moderate increase in the banking sector’s external debt in terms of US dollar. By September 2017, 67 percent of external debts were obtained in US dollar and 27 percent in euro. The amount of external debt remained flat when the effect of the increase in euro/US dollar parity during the last Report period is adjusted. The recent growth in loans has led to an increase in banks’ demand for funds. Nevertheless, banks’ demand for foreign funding remained moderate as the deposits grew in tandem with growth in loans and increased profitability rates contribute to banks’ funding sources. In this period, due to TL liquidity needs of banks and supporting market conditions, banks opted for alternative funding instruments such as domestic subordinated bond issues and TL-denominated bond issues abroad. In this context, the increase in banks’ bonds issues continued. The fixed investment appetite, which is expected to increase in the coming period, may trigger the banks’ demand for foreign sources (Chart III.2.6).

The Net Stable Funding Ratio (NSFR) has been developed by the Basel Committee in order to measure the long-term liquidity position of banks more extensively and to limit the risks arising from the maturity difference between banks’ assets and liabilities. Details of this ratio are provided in Box III.2.1 of the Financial Stability Report released in May 2017.
There was a limited decrease in banks’ cost of external debt during the last Report period (Chart III.2.7). The roll-over ratio of syndicated loans has exceeded 100 percent, banks can borrow syndicated loans with a maturity of up to two years, and there has been some improvement in costs in 2017 which altogether indicate that there is no significant negative change in the credit supply of foreign financial institutions. In this period, unlike the intensive fund flows and the increasing risk appetite for the capital markets of the developing countries including Turkey, there has been a moderate increase in the external debt of the banks. This supports the argument that the main determinant of external debt is the weak demand of domestic banks rather than supply constraints of foreign banks.

The maturity of banks’ external debt is still long. The facts that external debts are sensitive to global liquidity developments and the tendency of banks to limit the risks arising from maturity mismatch make the maturity structure important as well as the amount and costs of foreign resources. With reserve requirement policies, the CBRT encourages banks to borrow from abroad with longer maturities. The transition from short to long-term has been going on for a while (Chart III.2.8). Recently, both short and long-term foreign debt roll-over ratios of banks have exceeded 100 percent (Chart III.2.9). As a result of the tendency of the banks to roll-over their short-term debt with long-term resources, the average weighted maturity of the sector’s external debts has reached 59 months (Chart III.2.10). The longer maturities of banks’ external debt imply that there is no significant change in the conditions of banks’ access to external resources. The change in the maturities of banks’ external debts in favor of longer terms positively contributes to the “Reserves/Short-Term Debt” ratio and supports financial stability. The extension in maturities will also contribute to banks’ Net Stable Funding Ratio. Moreover, it should be noted that the positive developments in the funding composition increase the sector’s potential to bolster medium and long-term infrastructure investments.¹ Favorable developments in the maturity and cost composition of non-deposit alternative funding sources will also have

¹ The special topic IV.3 titled “Central Bank Policies and Maturity Management in the Banking Sector” finds that the CBRT has encouraged banks to borrow longer-term foreign resources by using reserve requirement policies that aim at extending the maturity of non-core liabilities, and thereby contributed to banks’ ability to offer longer-term loans to firms.
The maturity of banks’ external debt is long.

The banking sector has sufficient liquidity buffers against negative risk scenarios. The fact that the LCRs, which allow banks to keep their 30-day windowed liquidity positions in the safe zone, are well above the legal lower limits and that the indicators representing the long-term liquidity position are in the safe zone increase the resilience of the sector against possible shocks in international markets. In addition, diversification in the number of countries/banks those provide funds and the change of maturity composition of foreign debt in favor of longer term support the resilience of sector.1 Moreover, the liquid asset portfolio of the sector provides room for maneuver for banks to cover FX liquidity shocks even under the most negative scenarios within the one-year window. Developments in global markets continue to be important for domestic banks with respect to maturity, cost and limit components of external debt. The liquid asset portfolios of banks are composed of cash, free accounts at foreign banks, free Eurobonds and ROM reserves, which can cover 64 percent of foreign liabilities which will be due in one year (Chart III.2.11). Moreover, when the FX borrowing facilities allocated to the banks are included, the liquid assets of banks are at a level where they can respond to the most negative shocks (Chart III.2.12).

The revival in FX-denominated securities issued abroad by the banking sector continues. The sector’s FX-denominated security issues abroad has increased by 14 percent since the beginning of 2017 on the back of increased risk appetite in the global markets and the monetary policies of advanced countries’ central banks supporting liquidity conditions. The increase in bond issuances that are relatively sensitive to global liquidity developments is considered to be a positive factor in terms of banks’ access to foreign resources. Meanwhile, as banks prefer long-term bond issues rather than short-term, the maturity of these bonds became 70 months limiting the risks that may arise from possible volatility in the international markets (Chart III.2.13). In this period, banks issued TL-denominated and long-term bonds abroad during the last Report period as well. The

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1 The special topic titled “Global Liquidity and Regional Distribution of Cross-Border Bank Loans” in the Financial Stability Report released in May 2017 analyses the effects of diversification in the number of countries/banks those provide funds on the sensitivity of external debts to global liquidity developments.
increase in the issuance of TL-denominated long-term bonds abroad is also an indicator of the fund flows to developing countries from international markets. The fact that banks can obtain TL-denominated and long-term borrowing from abroad also suggests that supply-side conditions are favorable.

**Banks’ domestic TL-denominated bond issuance has also accelerated.** In this period, some banks issued subordinated bonds, resulting in an increase in the amount and average maturity of domestic bonds (Chart III.2.14). The maturity of the mentioned bonds is longer than the traditional issuances, thus they prolong the maturity of TL resources and increase the resource diversity of banks.
Total loan growth (FX-adjusted), standing at 10.5 percent at the end of 2016, reached 20 percent as of 27 October 2017, with the contribution of KGF-backed loans. Due to the significant improvement in TL loans within the KGF guarantee scheme, the TL funding need of the banking sector increased. However, in the same period, since the increase in TL deposits fell short of covering the TL funding need, banks substantially financed the KGF-backed loans by converting the FX funds to TL through swap transactions. As a result the increase in FX deposits since the end of 2016, banks have increased their TL swap transactions. Thus, banks’ need for TL liquidity came to the fore in 2017 (with the effect of increased FX preference of depositors), and was met by foreign investors through the swap market (Chart III.2.I.1).

On the other hand, an analysis of the maturity of TL swap transactions during the last 1-year period shows that while the share of swap transactions with a maturity of more than 1 year has decreased, the share of transactions with a maturity of 1 to 3 months has surged by nearly 5 percentage points (Chart III.2.I.2). When the flow TL swap transactions carried out in the October 2016 - October 2017 period are taken into consideration, it is revealed that about 51 percent of the transactions were concentrated in maturities of less than 3 months (Chart III.2.I.3).

![Swap Transaction Amount](chart)

Source: BRSA

![TL Swap Maturity Tranches](chart)

Source: BRSA

Latest Data: 27.10.2017
Source: BRSA
The shortening in the maturity of swap transactions is more visible when swap transactions are reviewed based on remaining maturity. As of 27 October 2017, approximately 85 percent of net TL swap transactions will be due in the coming 3 months. The weighted average remaining maturities of TL, FX and net TL swap transactions are 7 months, 9 months and 6 months, respectively (Table III.2.I.1).

<table>
<thead>
<tr>
<th>Table III.2.I.1 Swap Transactions According to Remaining Maturities (As of 27.10.2017, Billion TL)</th>
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</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Nov 17-Jan 18</td>
</tr>
<tr>
<td>Feb-Apr 18</td>
</tr>
<tr>
<td>May-July 18</td>
</tr>
<tr>
<td>Aug-Oct 18</td>
</tr>
<tr>
<td>After Oct 18</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

Source: BRSA

An analysis of the interest rates of TL swap transactions reveals that the interest rates of short and long-term swap transactions do not significantly differ. Thus, it is considered that the reason for the decrease in swap maturities cannot be explained only by the interest cost advantage. In addition, the counterparty credit risk and credit valuation adjustment (CVA) capital charges for swap transactions increase as the maturity lengthens, causing foreign banks to demand additional CVA premium from Turkish banks. In this context, it seems that the banks’ preferences based on costs criteria other than swap interest rates can have an impact on the shortening of TL swap maturities. Furthermore, when swap transactions are made in long maturities, banks may be exposed to repricing risk in the case of a decrease in TL swap rates. It is considered that the repricing risk concern can also be a possible reason for banks to prefer short maturities in swap transactions.

In the upcoming period, with loan growth returning to its historical average, it is expected that banks will reduce their funding transactions in the swap market and maturities of TL swaps will lengthen slightly.

1 Basel III imposes an obligation of capital charge for credit valuation adjustment (CVA). CVA is an adjustment to the fair value (or price) of derivative instruments to account for counterparty credit risk. The CVA capital charge can be calculated by using either the advanced method or the standard method. For instance, as the credit rating of the counterparty gets lower, the risk weight for this counterparty will be higher in the standard method. The capital charge for CVA will be higher in case of an extension in the transaction’s maturity or the deterioration in the counterparty’s credit rating.

2 As a result of the downgrades of Turkey’s credit rating to non-investment grade in September 2016 (Moody’s) and January 2017 (Fitch), the CVA premium for long term swap transactions by domestic banks increased considerably.
III.3 Interest Rate and Exchange Rate Risk

The banking sector’s in-balance sheet and off-balance sheet assets-liabilities positions in TL and FX of all maturities has limited sensitivity to interest rate risk via the repricing channel. These positions have been tested against positive interest rate shocks with magnitudes of 5 points and 2 points for TL and FX sides, respectively. The potential loss has been estimated with the economic value approach and its proportion to capital has been inspected. Accordingly, the likely loss that would arise from an interest rate shock in TL up to 5 points in the current values of interest rate-sensitive positions of banks is calculated as 17 percent of capital. On the other hand, the maturity mismatch between assets and liabilities in FX side is more limited and the associated loss with an interest rate hike up to 2 points in FX would be up to 2.3 points of capital. Nevertheless, the interest rate sensitivity of the sector via the repricing channel has slightly increased over the last one year (Chart III.3.1).

An analysis of the increase in interest rate risk sensitivity by breakdowns across all maturities reveals that the growing maturity mismatch in TL positions stemmed from extension of the maturities of assets. This lengthening was mostly driven by not only from the extension of maturities of fixed-rate installment loans but also from increasing weights of these loans on the balance sheet. Meanwhile, the effect on FX positions stemmed both from the extension of maturities of assets and from contraction in maturities of liabilities. The extension in maturities of both fixed-rate and floating rate loans is the leading cause of the changes on the asset side, whereas contraction in maturities of derivative (currency swap) positions was significant in changes on the liabilities side.

In addition to repricing, another channel through which the financial intermediation system may be affected by exogenous interest rate shocks is the revaluation channel in securities. To measure the extent of this channel, the fixed-rate securities in available-for-sale portfolio tested against positive interest rate shocks with magnitudes of 5 points and 2 points, for TL and FX respectively. Accordingly, the potential loss that interest rate hikes may exert directly on capital via securities revaluation channel is up to 3 percent of capital for TL.
securities and up to 2 percent for FX securities. This likely impact has not changed compared to the last Report period (Chart III.3.2).

The Turkish banking sector preserves its resilience against exchange rate risk directly via the balance sheet channel. Over the last year, although the in-balance-sheet open FX position significantly increased, banks prudently hedged their open positions with off-balance sheet transactions. Accordingly, the FX net open position (FXNGP/capital ratio) keeps its position well below the two-way standard legal cap of 20 percent and is close to zero level (Chart III.3.3).

Currency swap transactions continue to be used as primary tools in FX risk management, whereas the utilization of FX-options instruments is shrinking. While the growth in volumes of currency swaps supports the hedging of FX risk, it increases sensitivity to interest rate risk and generates a potential pressure on profitability. (Chart III.3.4).
The banking sector’s profitability indicators, which have an upward trend since the last quarter of 2015, remain robust, with a limited decline after the second quarter of 2017. That decline was mainly driven by the obsolescence of one-time income entries in 2016 and the increase in need for currency swap transactions to meet the TL loan demand (Chart III.4.1). The profit generation power of the industry has exceeded the credit risk growth due to effect of CGF guarantees in near-term loan expansion and relative stabilization in exchange rate. This, in return, has led to a significant increase in capital adequacy ratios (Chart III.4.2).

### III.4 Profitability and Capital Adequacy

An analysis of the factors affecting return on assets (ROA) by income statement items over the last year reveals that the increase in net interest income, the improvement in the asset quality, and the relative decrease in the non-interest expenses all positively affected profit. At the same time, the one-time entries in the non-interest income recorded in 2016 that faded in 2017 and the expenditures on derivative positions due to increasing currency swap transaction needs had a negative impact (Chart III.4.3).

Over the last 12 months, the impact of net interest income on ROA was around 9 basis points. However, interest margins started to expand as of the third quarter of 2016 and the strong contribution to this item started to be re-balanced due to the rise in the funding costs of banks. Nevertheless, the impact from the volume channel driven by loan growth stemming from the easing in financial conditions, thanks to CGF support, has been gradually increasing and helped the positive outlook in net interest income to continue (Chart III.4.4). Considering the effects of domestic economic developments and the Fed’s balance sheet reduction program on emerging economies, the outlook for interest margins is likely to remain limited for a while, as funding costs of the sector will remain high in the upcoming period.
The decline in NPL rates, caused by the rapid growth in loans, influenced profitability positively by around 7 basis points in the past one year. However, banks, preserving their prudential positions, showed a tendency to increase NPL provision rates, which in turn limited this contribution. Meanwhile, the downward trend seen for about a year in the ratio of closely-monitored loans signals that the positive effect is likely to continue in the upcoming periods. It is believed that the continuing limited performance in NPL collection rates, apart from periodic effects and independent of other indicators, may be a reflection of the change in banks’ business models for NPL collection (Chart III.4.5). Because banks increasingly transfer their NPL portfolios to asset management companies, which specialize in collections, the role of these companies in the financial sector becomes stronger accordingly.

The other non-interest income/expenses item, in which banks record their position in securities trading, derivatives and foreign exchange transactions, has had negative impact on profitability since the last Report period. The underlying reason was the increase in the utilization of FX resources in TL funding by currency swaps due to faster growth of TL-denominated loan demand than TL-denominated resource growth and weak demand for FX-denominated loans. Moreover, the rise in currency swap interest rates aggravates this effect (Chart III.4.6). Meanwhile, the convergence of the net income from securities trading to neutral level led to the disappearance of the positive effect that came from this item previously. Non-interest income reduced profitability by 8 basis points with the loss of the contribution of one-time entries in 2016 on an annual basis¹. On the other hand, despite the increase in the general provisions on the back of credit growth, the positive impact of non-interest expenses on profitability continued thanks to the sector’s efforts to reduce operational costs. The regulations raising the corporate tax rate from 20% to 22% in the financial sector in the upcoming period will have a downward impact of 4 basis points on return on assets and 36 basis points on return on equities, based on the current levels.

¹ The payment made to Turkish banks due to the transfer of Visa Europe Ltd. to Visa Inc.
III.4.2 Capital Adequacy

Over the last year, legal capital has been positively affected by escalating profitability and increasing subordinated debt issues. The subordinated debt accumulation in the sector has accelerated especially after the first quarter of 2017. In addition to the new acquisitions, some banks substituted their existing subordinated debts with new issues compliant with Basel III and strengthened their supplementary capital (Chart III.4.7). As a result, the increase in the standard CAR surpassed the increase in the core CAR (Chart III.4.2).

Although there is no significant change in the composition of the risk weighted assets, the growth in the total credit risk has slowed down due to the decrease in risk weight of some assets and receivables in terms of FX after the regulations made by the BRSA and loans granted under CGF guarantee (Chart III.4.8).

The sector’s capital adequacy ratios continued their upward trend on the back of profitability growth and subordinated debt acquisitions. Driven by these factors, the sector’s capital adequacy continued to strengthen in all banking groups in 2017 (Chart III.4.9). In the upcoming period, it is expected that the change in corporate tax rates in the financial sector will have a limited downward effect, of around 5 basis points, on the standard CAR. Given the current levels of profitability and capital adequacy, capital adequacy does not constitute a constraint in the short- or medium-term to support of the loan growth in the banking system.
Box III.4.I
Decomposition of Items with Temporary Effects on Profitability

Developments leading to temporary effects on income-expenditure items, regardless of the banks’ performance in the current year, can affect the profitability of the period. As these effects are usually transitional or can change rapidly due to regulatory changes, analyzing profitability performance of banks becomes difficult. This study provides a decomposition of items that have a temporary effect on profitability performance analysis. This allows a more meaningful analysis of the profitability performances of banks arising solely from banking activities in the related period.

Net income from the sales of assets as well as fees and commission rebates has effects on profitability that do not depend on the performance of the banking system. In addition, banks can set general and specific provisions above the minimum rates. Provisions of banks over the minimum rates may cause banks to show a profit performance different from what it actually is. Moreover, regulations regarding general provisions may also have an impact on bank profitability. The Banking Regulation and Supervision Agency (BRSA) sets minimum ratios for general provisions and the banks allocate provisions according to these ratios. Raising or decreasing general provisions or rapid credit growth can lead to significant fluctuations in period profits.

The Sale of Assets

Banks’ income from sale of assets is not a continuous flow. In some periods, fluctuations are observed in this item due to the high volume of sales. For example, the acquisition of Visa Europe by Visa Inc. was completed in June 2016. Banks generated one-off income in June 2016 as a result of the revaluation of existing shares. The sale of Visa affected the profitability of banks with shares in Visa Europe positively.

Fees and Commission Rebates

Fees and commission rebates may negatively affect the profitability performance of banks in a particular period. Financial consumers have the right to apply to consumer arbitration committees established in provinces and districts as well as to consumer courts for the fees and commission rebates. Applications made to the consumer arbitration committee are generally concluded in favor of the consumers. Although the number of such applications has been falling, it has been rising in the last 4 years and a significant part of these applications resulted in the customer’s favor (Chart III.4.I.1).

Fee and commission rebates are recorded in the "adjustment for the past years income" account, which is a sub-account of other non-interest expenses in the income statement. This account rapidly increased between 2014 and 2016. This rise is mostly attributed to the decisions made by arbitration committees and courts in favor of the consumers. Since the other transactions recorded in the "adjustment for the past years income" account, where fees and commission rebates are included, cannot be broken down into components, it has been assumed that the entire amount included in this account originated from fees and commission rebates. The amount of "adjustment for the past years income", which was 245 million TL at the end of 2013, reached 1.2 billion TL by the end of 2014 and 2.4 billion TL by the end of 2015. The fee and commission rebates started to decrease after 2015 and came down to 400 million TL in September 2017 (Chart III.4.I.2).

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1 It is calculated by subtracting costs acquired by the sale of assets from the revenues acquired by sale of the assets.
The “Regulation on Procedures and Principles Regarding the Fees to be Obtained from Financial Consumers”, which took effect in October 2014, describes the scope of banks’ fees and commission income. With this regulation, the items from which banks can earn fee and commission income have been limited while these limited items have been given legal status. Fee and commission rebates significantly declined in 2016 and 2017 with the effect of this regulation.

**General Provisions**

General provisions are expense items that are effective on the period profit but not directly related to the performance of the banking system in the related period. Regulatory authorities require banks to allocate general provisions when they extend loans in order to reflect the future possible losses of the loans to the financial statements today. The loans continue to contribute to the profitability of the bank as long as they are performing. General provisions are set aside when the loan is extended and are canceled when the loan is closed, thus they reduce the profitability of the banks during this period. General provision expenses rise in periods of rapid credit growth due to the volume effect. Meanwhile, regulatory amendments pertaining to general provisions can significantly affect the size of these provisions and their impact on profitability.

With the legal amendments made in 2011 and 2013, the general provision rates for consumer loans except vehicle and housing loans were increased by four times under certain conditions\(^1\). The amendment stated that the increased amounts in general provisions resulting from this regulatory change could be gradually reflected in the 2013, 2014 and 2015 financial statements.

In October 2013, the exemptions provided for vehicle loans were removed and these loans were also subject to the incremental general allowance scheme with the same conditions. The sum of annualized general provision expenses of banks reached 5.3 billion TL in August 2015 on the back of the amendments made in the legislation. After the incremental phase ended in 2015, this amount declined to 2.7 billion TL in August 2016. Although the regulation raising the general provision ratios by four times was abolished in September 2016, the general provision amount rose to Turkish lira 3.9 billion on an annualized basis in September 2017 owing to the rapid credit growth in 2017.

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\(^1\) Banks with a ratio of consumer loans to total loans above 25 percent, and banks with a ratio of non-performing consumer loans other than vehicle and housing loans to performing consumer loans other than vehicle and housing loans above 8 percent, allocate 4 percent general provision for standard loans except vehicle and housing loans, and 8 percent general provision for consumer loans under close monitoring except vehicle loans and housing loans.
Decomposing Items with Temporary Effects on Return on Equity of the Banking Sector

Banks’ return on equity was 14.3 percent in September 2017. Net income from the sale of assets made a positive contribution of 0.4 percentage points to the return on equity (Chart III.4.I.3). The biggest impact of fee and commission rebates on profitability was observed in 2015. Fees and commission rebates reduced the return on equity by 0.7 points in August 2015, and the impact fell to 0.1 points in September 2017. General provisions made the highest impact on profitability in 2015 as well. While general provision expenses reduced return on equity by 1.6 percentage points in August 2015, -when the return on equity was at its lowest level,- this effect came down to 0.8 percentage points in September 2017.

To conclude, these three items had a downward impact on return on equity by 0.6 points in total in September 2017. This effect was 1.9 percentage points in August 2015. It can be asserted that when the temporary effects are decomposed, return on equity of the banking sector in 2015 was not significantly different than other years. The recovery in profitability performance observed particularly in the third quarter of 2016 is sustained when adjusted for temporary effects.
IV. Special Topics

IV.1 A New Approach to Balance Sheets: Financial Risk Rating for Real Sector Firms

Summary

Several indicators and ratios can be obtained from the financial statements of non-financial firms to be used in financial risk analysis. Each indicator measures the firm's position such as liquidity, profitability or indebtedness, however, there is no single indicator that can test the firm's overall financial strength or financial distress level. In this study, we measure the financial soundness of non-financial firms quoted in Borsa Istanbul (BIST) with an index score that is derived as a linear function of several various singular indicators. The index score, which we call as Multivariate Firm Assessment (MFA) score, has a predictive power of over 90 percent, and is successful in catching the impacts of macroeconomic developments on the firm’s financial statements. According to the MFA-Score, although balance sheets were adversely affected by exchange rate movements in the last year, this effect is not as drastic as the turbulent times during 2008 global crisis or 2013 FED tapering.

IV.1.1 Introduction

The financial soundness of a firm is of vital importance not only for the sector in which the firm operates also for the financial system and the entire economy. A firm that cannot meet its liabilities, comes to a point of economic inactivity, has a negative equity account or is on the verge of bankruptcy is defined as a financially distressed firm. A firm experiencing financial distress can damage the financial structure of its lenders, shareholders and their lenders, and cause losses in the economy as a whole depending on the size of the firm’s operations. For this reason, analysts have been trying to measure the financial soundness of firms from financial statements for many years and anticipate the possible defaults.
For financial risk analysis, several indicators and ratios can be obtained from the financial statements of firms. Each indicator measures the firm’s position such as liquidity, profitability or indebtedness, however; there is no single indicator that can test the firm’s overall financial strength or financial distress level. For this reason, some composite index measures have been produced to rate the financial risk level of firms comprehensively (Altman Z-score, 1968, Deakin, 1972, Ohlson O-score, 1980, Zmijewski, 1984). In these rating methods; various ratios such as profitability, leverage or liquidity are weighted using statistical methods and converted into a single score. Z-score developed and updated over time by Altman (1968) using Multivariate Discriminant Analysis (MDA) is the most prevalent composite risk indicator in corporate finance literature. Following Altman (1968), many index measures have been produced using MDA for different countries. This study introduces the index score that we created using MDA for the real sector firms traded in Borsa Istanbul and defined as the MFA-score (Multivariate Firm Assessment) and analyzes the development of this score over time.

IV.1.2 Dataset and Methodology

The MDA method is a way of deriving an index score which can best distinguish two or more groups with equal number of members from each other. This index score is obtained through weighted sum of several indicators that characterize the members of each group and it is expected that the average index scores of groups are significantly different from each other (Johnson and Wichern, 1982).

In this study, one group consists of financially distressed firms and the other group consists of firms that remained financially stable. The MDA analysis is carried out by using the ratios obtained from the financial statements of these firms. As a result of the MDA, a linear index equation consisting of balance sheet ratios, which will maximize the difference between the average index scores of two groups, will be obtained. The purpose of this index, which we call the MFA-score, is to distinguish firms that have experienced financial distress from healthy firms by looking at their balance sheet ratios one year prior to distress period.
In this study, the criteria for financial distress are exiting the stock market due to financial troubles, falling into the watch list in Borsa Istanbul, making bankruptcy petition by creditors, bankruptcy declaration by firms and having negative equity in balance sheet.\(^1\) For the analysis, 361 real sector firms quoted in BIST between 2001 and 2017 were examined and our detailed research revealed that 54 firms met the financial distress criteria. These companies form the first group. For the second group, 54 financially sound firms were chosen as a match of each firm in the first group.\(^2\) In order to avoid the bias that the differences between the firm sizes and the sectors can create, firms in the second group are matched by sector and similar asset size.

After matching, 30 ratios that are commonly used in the literature were calculated from the balance sheets one-year prior \((t-1)\) to the period when the first group experienced financial distress \((t)\) and the balance sheets of firms in the second group in \((t-1)\). Seven different ratios, which best discriminate groups among 30 ratios, were selected for the MFA-Score analysis. The following criteria were applied in the variable selection:

a. The means of the ratio in two groups are significantly different from each other
b. It contains at least one ratio from liquidity, profitability, leverage and efficiency indicators.
c. Pairwise correlations are below 0.6
d. Increases the predictive power of the model.
e. The coefficient of the ratio is consistent with economic intuitions and statistically significant.

Finally, ratios to be used in the final MFA score calculation are presented in Table IV.1.1.

<table>
<thead>
<tr>
<th>Table IV.1.1</th>
<th>Financial Ratios used in MFA Score</th>
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<tbody>
<tr>
<td>(X_1) = ((\text{Cash Equivalents} + \text{Securities} + \text{Short Term Trade Receivables}) / (\text{Short Term Liabilities})):</td>
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<tr>
<td>This indicator, also known as the acid-test ratio, shows how much the short-term debt of the firm can be met with cash and cash equivalents.</td>
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<tr>
<td>(X_2) = (\text{Short Term Liabilities} / \text{Current Assets}):</td>
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<tr>
<td>It measures the firm’s ability to pay its short-term liabilities with short-term assets.</td>
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<tr>
<td>(X_3) = (\text{Total Liabilities} / \text{Equities}):</td>
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<tr>
<td>It shows how sufficient are the firm’s equities to pay its debt</td>
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<tr>
<td>(X_4) = (\text{Financial Expenses} / \text{Net Sales}):</td>
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<tr>
<td>Indicates the capacity of the company to pay the FX and interest expenses arising from its debts</td>
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<tr>
<td>(X_5) = (\text{EBITDA} / \text{Total Assets}):</td>
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<tr>
<td>It is the profitability of the firm from its main activities by asset size.</td>
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<tr>
<td>(X_6) = (\text{Net Profit (Loss)} / \text{Net Sales}):</td>
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<tr>
<td>It is the net earnings (or loss) of the firm per sale at the end of the period.</td>
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<tr>
<td>(X_7) = (\text{Retained Earnings} / \text{Total Assets}):</td>
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<tr>
<td>It is the measure of cumulative profit or loss from the past periods. It also contains information about the age of the company.</td>
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</tr>
</tbody>
</table>

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\(^1\) Firms that have strong financial ratios but fall into the watch list or exit the stock market due to judicial issues are outside the definition of financial distress.

\(^2\) Financial companies and conglomerates are excluded. 361 real sector firms having proper financial statements in 2001-2017 period are included in the data set.
For the MFA-score calculation, MDA are applied to 54 firms (treatment sample) formed by randomly selected 27 firms from distressed firms in the first group and their 27 matches from the second group. The remaining 54 firms (27 firms in the 1st and 27 firms in the 2nd group) are put aside as control sample. The coefficients obtained from treatment sample are used for performance test in control sample. Afterwards, 1000 random samples (spare samples) of 54 firms (27 firms in the 1st and 27 firms in the 2nd group) were selected from the main sample of 108 firms (54 firms in the 1st and 54 firms in the 2nd group). The performance tests are also applied to these spare samples using the coefficients obtained from the treatment sample. The control sample performance and the average performance of 1000 spare samples are noted as the performance of the coefficients obtained from the randomly selected treatment sample.

Afterwards, the above steps are repeated for 100 randomly selected treatment samples and each time, the performance of each model on the control and 1000 spare samples are noted. As a result, a matrix of 100 different coefficients, control sample performance of these matrices and average of spare sample performances for each coefficient set were obtained. From these 100 different coefficient sets, those with control sample performance over 85% are picked. Among those picked, the model with the highest average performance in 1000 spare samples is defined as the MFA-score equation. The coefficients of the variables for the final MFA model are presented below and the performances of the treatment and control samples are given in Tables IV.1.2 and IV.1.3.

\[
MFA \text{ score} = 0.24X_1 - 0.14X_2 + 3.77X_3 - 0.03X_4 - 0.73X_5 + 0.20X_6 + 1.14X_7 
\]

The signs of the coefficients are consistent with the expectations and in line with economic intuitions. When the standardized coefficients are examined, main determinants of a firm’s financial distress or overall financial strength are found to be

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3 The reason for dividing the main sample into two is to obtain coefficients from one sample and to test performance in another sample.
4 The model performance is measured as the share of firms whose financial strength or distress position was accurately predicted by looking at the previous year’s financial statements.
5 Some of the firms in control and treatment sample will take place in 1000 spare samples.
the firm’s cash position, total debt level, EBITDA and retained

IV.1.3 Model Performance

MFA-Score correctly predicted that 24 firms out of 27 firms would experience financial distress in the treatment sample one year prior to the distress period. Furthermore, 26 firms out of 27 are correctly predicted as being safe according to MFA score derived from financial statements one year earlier (Table IV.1.2). In the treatment sample, Type 1 error is 0.11 (3 / 27) and Type 2 error is 0.037(1/27). In short, MFA Score has been 92.6 percent successful in predicting the financial distress or soundness of 54 firms in the treatment sample.

Since model coefficients are obtained from the treatment sample through MDA, relying on performance result of the treatment sample may lead to biased outcomes. In order to apply MFA score to different firms later on, MFA score is expected to have a high predictive power for different samples. In this respect, the performance of control sample gives us a better measure of predictive power of the model. Type 1 error of the control sample is 14.8 percent (4 / 27) and Type 2 error is 0 percent (0/27) and hence total performance on control sample is 92.6 (50/54) percent (Table IV.1.3). The average performance of MFA score on 1000 spare samples is found to be 91.6 percent. In sum, MFA score measures the financial soundness of a firm with a correct prediction rate above 90 percent one year before.

After completing the MFA score modeling and ensuring that the performance is successful, the next step is how to interpret the value of any firm’s MFA-score. To this end, two different threshold values are determined according to the score values. The first threshold is set to separate firms that are likely to experience financial distress within a year and firms that are likely to remain financially sound. For this, ROC (Receiver Operating Curve) method, which gives a threshold value to minimize Type 1 and Type 2 error totals has been used (Engelmann et al., 2003). Accordingly, among the 108 firms in the main sample (treatment + control), the financial distress threshold of -0.02, which minimizes the sum of Type 1 and Type 2 errors, is calculated. Then, among the financially sound 54
firms in the main sample, the median MFA-score of 0.556 is selected as the second threshold value. Therefore, if a firm’s MFA-score is lower than -0.02 (distress zone), the firm is likely to experience financial distress in one year; if it is between -0.02 – 0.56 (gray zone) it is interpreted as having a low probability of experiencing financial distress and if it is greater than 0.56, the firm is financially stable (safe zone) (Table IV.1.4).

### IV.1.4 MFA-Score Developments Over Time

With the equation we obtained above, the MFA scores were calculated for the quarterly financial statements of firms that were quoted on the BİST between 2007 and 2017. The median and mean MFA-scores of the data set, in which 361 firms in total and 230 balance sheet observations per year are included, are presented in Charts IV.1.1 and IV.1.2. It is observed from the graphs that the MFA-scores move in line with GDP growth and inversely with the basket exchange rate growth. The significant correlation with these two important macro variables indicates that the model is successful in detecting the effects of macro-economic developments on the firms’ balance sheets.

An analysis of the median and mean MFA-scores over time reveals that at any time, including the global crisis, the score did not fall below the distress threshold value of -0.02 and moved within the gray zone boundaries. The MFA-score, which fell sharply during the global crisis, remained low throughout 2013 due to the slowdown in growth at the end of 2012 and volatility in the wake of the Fed tapering in 2013. MFA-score, which rose in the following period, declined somewhat from the last quarter of 2016 due to the increasing volatility in exchange rates. According to the MFA-score, although balance sheets have been adversely affected recently, this effect is not as strong as the effect of the global crisis and the fluctuation in 2013.

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4. Among firms quoted on BİST, financial companies, conglomerates and sport companies are excluded. There are 236 firms as of 2017Q1 and 214 firms as of 2007Q1. There are data of 360 firms in total. In 2017, the total annual sales of the sample constitute nearly 1.5% of GDP in Turkey.

7. The correlation between MFA score and y-o-y growth rate of annual GDP in quarterly data is 0.57 and correlation of MFA score with y-o-y growth rate of quarterly mean of FX basket rate is (-0.48)
Firms with export earnings generally have a higher MFA-score and firms with open foreign exchange positions have MFA-scores below the average (Chart IV.1.3). In addition, the reactions of firms with open positions against macro shocks are more manifest. Particularly, when the fluctuations experienced during the global crisis and the recent period are examined, it is observed that the decline in the scores of firms with open position is sharper.

When the distribution of all firms in the MFA risk zones is examined, it is observed that the majority of firms are in the safe zone (Figure IV.1.4). Even if there was a transition from the safe zone to the gray and distress zones during the global crisis and 2013, the share of the number of firms in the safe region has been stable recently.

An analysis of the distribution of firms in the MFA-score zones with respect to asset size reveals that the firms in the safe zone have the highest share in total assets and nearly 10% of the total asset size belongs to firms in the distressed zone (Chart IV.1.5). This suggests that firms with a higher likelihood of experiencing financial distress are relatively small-scale firms and that large-scale firms have greater MFA score.

How much of the firms’ debt is concentrated in companies that are more likely to experience financial distress is a critical question for the financial risk of the real sector. In the IMF reports (2016), the share of firm (risky firm) debt to total firm debt is used as the criterion of real sector financial risk (debt-at-risk). With the MFA-score, it is possible to define a broader and more comprehensive risk indicator by calculating the debt share of firms in the distress region in the total debt. According to this measure, it is observed that the share of risky firm debt is around 10 percent, and that most of the debt is concentrated in financially strong firms (Chart IV.1.6).

FX open position concentrates on firms with solid balance sheet structure and the open position of firms in the distress zone constitutes 20-25% of the total. Due to exchange rate fluctuations, there was an increase in the gray zone at the end of 2016 and in the first quarter of 2017, however; the share of the safe area increased again in the second quarter of 2017 thanks to the stabilizing

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8 The correlation between the median MFA score of firms with open position and FX basket rate is -0.52.
exchange rates (Chart IV.1.7). Transition to the distress zone has been rather limited recently.

To sum up, in this study, the MFA-score, which measures the firm’s financial soundness with a high predictive power, was developed by using the balance sheet data of the real sector firms quoted on the BIST. As a result of our analysis with MFA-score, we found that distressed firms have a small share in terms of quantity and asset size, meanwhile, the firm debt and FX open position mostly concentrate on firms that are financially sound.

References


IV.2. Corporate Sector’s Default Probability and Banking Sector Asset Quality

Asset quality of the banking sector is determined by the ability of borrowers to repay loans on time and properly as required. Analyses on banks’ asset quality should include an assessment of corporate sector financials since almost half of the banking sector’s assets are composed of corporate loans. In fact, developments such as a deterioration in corporate sector’s financials, and an increase in bad checks and protested bills might lead to a weakening in the asset quality of the banking sector and be reflected as NPLs in banks’ balance sheets.

Analyses on corporate sector credit risk mainly employ methods that focus on periodically published financial statement information ( Altman z-score, etc.) as well as other methods such as the Merton option pricing approach through which financial statement data and market data are interpreted together. In this study, firms’ market and balance sheet data are used together to estimate the probability of default and the possibility of forecasting the asset quality of the banking sector for the following periods.

The asset size of the corporate sector in Turkey is double the GDP, and about half of it belongs to large-scale firms. Financial data of these companies are publicly disclosed on a yearly basis but with a time lag via the Entrepreneur Information System platform run by the Ministry of Science, Industry and Technology. On the other hand, it is possible to access more frequent (quarterly) market data by using financial statements of mainly large-scale firms listed on the Borsa Istanbul (BIST). In this study, market data and balance sheet information of 278 corporate sector firms quoted in the BIST are used.

The probability of default is estimated via the option pricing model (Merton model) for these non-financial corporates and the relationship between the estimated probability of default and the

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1 The ratio of assets of these firms to GDP is around 19 percent.
asset quality of loans extended to large-scale firms by the banking sector is examined.

In Merton’s option pricing model, there are two main assumptions. The first assumption is that the market price of a firm’s assets \((A_t)\) is the total of the market value of shares and the firm’s liabilities which are considered as a bond (without coupon payment and with a face value of \(D\) at maturity \(T=t\)). The other assumption is that a firm’s asset value follows the geometric Brownian movement. The amount that the lenders or shareholders will receive varies depending on the value of the firm’s assets. At maturity \((t=T)\), if the firm’s asset value is greater than the value of the debt at maturity, then the lenders can receive the whole amount they lent while the potential gain by shareholders is limited to the remaining amount as lenders have precedence over shareholders. On the other hand, if the firm’s asset value is smaller than the value of the debt at maturity, the shareholders will not be able to receive anything while lenders will receive the total asset value.

Under these assumptions, the market value of the firm is priced primarily as a call option over the firm’s assets [Chart IV.2.1]. The strike price of this call option is the value of firm’s debt \((D)\). In this context, the distance to default and the default probability of the firm are calculated by estimating the capacity of the market value of the firm’s assets to cover its debt.

First, the volatility of share returns \((\sigma_E)\) is estimated by compiling share prices of BIST firms from stock market data. However, since the market value of the firm’s asset value \((A)\) and its volatility \((\sigma_A)\) cannot be observed in the market, these variables are estimated by solving equations 1 and 2 together using the firm’s total market value \((E)\), the volatility of its share return, and debt data obtained from financial statements. Equation 1 indicates the price of the call option and Equation 2 indicates the relationship between share return volatility and asset volatility.
It is assumed that the firm will default when the market value of the firm’s assets falls short of meeting the sum of short-term debt and half of long-term debt (default point). Under this assumption, the distance to default and the probability of default are estimated by equations 3 and 4.

\[(3) \quad \text{Distance to default} = DD = \frac{A_T - \text{default point}}{\sigma_A \cdot \sigma_T} \]

\[(4) \quad \text{Probability of default} = PD = N(-DD) \]

In order to be able to calculate a probability of default that will cover all the firms in the study, the estimated data for every individual firm has been weighted by the market value of that firm. The weighted average default probabilities of the firms included in the sample are compared with the credit default swap (CDS) spreads of Turkey in Chart IV.2.2. The high correlation (80 percent) between the two data indicates that the calculated probability of default captures macroeconomic fragilities. As a matter of fact, it can be seen that the default probabilities of the firms in this study increase, similar to the increase in credit default swap spreads due to the global crisis in 2008, the European debt crisis in 2011, the US tapering process in 2013, and the domestic and geopolitical developments in 2016 (Chart IV.2.2).

This study also examines the relationship between the default probabilities of firms in the sample and the NPL indicators of banks. Large-scale firm data rather than SME data are used as NPL indicators as the firms are relatively large-scale firms listed on the BIST. The correlation between the weighted average default probability and the lagged values of large-firm NPL ratios has been examined with respect to different lag periods since the effect of an increase in the probability of default on NPL ratios of banks will appear with a lag due to legal regulations. Eventually, it is seen that the highest
value of correlation for these two series is between the probability of default at period t and the NPL ratio at period t + 12 during the years from 2007 to 2016 (Chart IV.2.3). The increased correlation between the CDS and the probability of default in the 2007-2009 global crisis period significantly influences this result, and the lag period, which gives the maximum correlation between these two variables, is about 3 months longer when the crisis period is excluded.

In this context, the relationship between the probability of default of the corporate sector and the NPL ratio of large scale firms is examined. It can be said that the probability of firm default is successful in predicting the one-year-ahead increase in the NPL of large scale firms, particularly in the global financial crisis period in 2008 and the European debt crisis period in 2011 (Chart IV.2.4). The recent flat course in the probability of default may affect large-scale firms’ NPL indicators positively in the upcoming period. On the other hand, it should be noted that we should leave a margin of safety in this inference because of the inclusion of the entire firm sample in the large-scale firm NPL ratio although the probability of default in the study is calculated for a limited number of firms.

To conclude, there appears to be a correlation between the developments in the firms’ default probabilities calculated by the option pricing model, and the NPL ratios. For this reason, it is considered that it may be helpful to use the corporate sector default probabilities in credit risk analyses and in the studies to be carried out to monitor the asset quality of the banking sector.

References


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Yıldırım Güngör, G., 2012, Bankaların Kurumsal Kredi Portföyü ve Kredi Riskinin Ölçümü
IV.3 Central Bank Policies and Maturity Management in the Banking Sector

Abstract

Short-term borrowing and long-term lending are common practice in the banking sector, and maturity mismatch has a determining effect on the sector’s operations and financial results, particularly on banks’ profitability, liquidity and risk management. This study indicates that banks that have a higher share of non-core liabilities or external debt in their total liabilities tend to lend short-term loans to reduce roll-over and maturity mismatch risks. Through its reserve requirement policies that aim at extending the maturity of non-core liabilities, the CBRT has supported financial stability by increasing the long-term external borrowing tendency of the banks, contributing to the sector’s resilience to global liquidity shocks and enabling banks to offer longer-term loans to firms.

IV.3.1 Introduction

The banking sector’s liabilities are composed of equities, deposits and non-core sources. Along with equities, deposits, which constitute the main funding item of banks, are also categorized as core liabilities as they are a more stable source in terms of the roll-over risk. On the other hand, non-core liabilities are made up of domestic funds usually obtained via repo transactions, debts to banks and bond issues, and external sources obtained via various instruments at various maturities (bond issues, foreign trade financing, bilateral loans, syndication, etc.). It is a common practice in the banking sector to borrow via short-term sources and lend via long-term loans. The maturity mismatch has a determining effect on the sector, particularly on bank profitability, liquidity and risk management. The maturity mismatch between the assets and liabilities brings to the forefront the debt roll-over risk for banks. This risk falls in central banks’ area of interest as lenders of the last resort due to the possible effects on sector players, regulatory institutions, and financial stability. In this study, we analyze the maturity transformation function between assets and liabilities of the Turkish banking sector within the context of CBRT policies.

Although the average maturity of deposits, which constitute approximately 56 percent of the Turkish banking sector’s liabilities, is
short, it nevertheless creates a limited amount of roll-over/liquidity risk for banks. However, the share or maturity structure of non-core liabilities in total liabilities can play an important role in banks’ lending process. Particularly, the fact that the majority of external sources are provided in foreign currency, and the lender institutions’ return expectations and risk appetites are decisive in debt roll-over may cause banks to face a roll-over risk on the liability side. Therefore, the size of the share of non-core sources, which are considered to be less stable, within the total liabilities can have an effect on the maturity of the loans lent by banks. As a matter of fact, Paligorova and Santos (2016) find that banks with higher amounts of non-core liabilities tend to give short-term loans. However, we consider that the roll-over risk of banks is determined not only by the share of non-core liabilities in total liabilities but also by their maturity structure.

After the 2008 global financial crisis, the amount and volatility of capital flows to emerging countries increased significantly. The volatility in the exchange rate and credit growth as a result of this environment brought with it some difficulties regarding financial and macroeconomic stability. In this context, many central banks, including the CBRT, have also added financial stability to their standard set of policies targeting price stability. In addition to many macroeconomic policies implemented to safeguard financial stability, the CBRT has actively used the reserve requirement instrument to extend the maturity of non-core foreign sources and limit the liquidity risk of banks. Thanks to measures taken, the maturity composition of foreign bank debts has changed in favor of long-term, and the average maturity has extended to 59 months. The change in the maturity composition of external debt in favor of long-term has increased the resilience of the banking sector to possible volatilities in international markets, and limited the roll-over/liquidity risk of the sector. Banks whose liquidity risk is limited may be expected to increase their tendency to lend longer term loans. Therefore, in this study, we firstly analyze the effects of the CBRT’s reserve requirement policies, which are aimed at extending the average maturity of non-core foreign sources, on the maturity of banks’ liabilities. Then, we investigate the relation between the roll-over risk arising from the liabilities of banks and the maturity of loans granted by banks to firms, within the context of these policies.
IV.3.2 CBRT Reserve Requirement Policies and Maturity Structure of Banks’ External Debts

The main factors that make deposits more advantageous than other sources of funds are: i) they do not require a collateral, ii) they are relatively stable sources of funds. The maturity structure of external debt, which is sensitive to global risk appetite or liquidity developments, is important for the roll-over risk.\(^1\) External sources of the Turkish banking sector, which had been steadily increasing since 2002, shrank during the 2008 global crisis period due to the reduced risk appetites of foreign banks and the decreased demand for external sources by the Turkish banks. During the global financial crisis, we observe that the maturity of stock external debts increased rapidly due to the fact that banks rolled over their short-term debt below the 100 percent level (Chart IV.3.1).

Global liquidity conditions that eased following the quantitative easing policies introduced in the aftermath of the global crisis period have triggered banks’ risk-taking behaviors in both advanced and emerging economies (Rey, 2013). Particularly, the continued implementation of quantitative easing policies through the second and third stages has reduced the banks’ perception of external debt roll-over risk and strengthened their search for yield. The weakening of the external debt roll-over risk in a supportive global liquidity environment has boosted the banks’ tendency to borrow at the short-term end and lend at the long-term end of the yield curve. Consequently, the average maturity of external debts has shortened (Charts IV.3.1 and IV.3.2).

The CBRT has taken a series of measures to support financial stability in the face of the sector’s shortened external debt maturities and the liquidity conditions that tightened due to the Fed’s normalization steps. It was stated in the Financial Stability Report released in November 2014 that measures encouraging prudent borrowing and supporting financial stability would be employed when deemed necessary, due to the increased volatility in global capital flows triggered by the normalization process in monetary policies. Throughout 2015, the reserve requirement ratios for new FX liabilities excluding deposits/participation funds were significantly raised for maturity tranches shorter than three years. Thus, the

\(^1\) Banks’ external debts account for approximately 60 percent of non-core liabilities.
difference between the upper and lower bands of reserve requirement ratios increased (Table IV.3.1). As a result of the policies aiming to encourage banks to borrow from abroad with longer maturities and thus limit the external debt roll-over risk arising from increased volatilities in global capital flows, the maturities of banks' external debts started changing in favor of the long term. Accordingly, the share of short-term debt in total debt dropped to 24 percent as of September 2017 from 52 percent in November 2014.

IV.3.3 Liquidity Risk and Maturity Transformation Function of Banks

Firms prefer long-term loans to be less affected by the changes in credit standards originating from business cycles and to limit their roll-over risk (Diamond, 1991). Banks that entirely rely on insured deposits can extend longer-term loans without exposing themselves to the maturity transformation risk (Paligorova and Santos, 2016). However, banks that rely on non-deposit uninsured funding, in particular short-term wholesale funding, to expand their funding become exposed to roll-over risk. This may lead banks to shorten the maturity of their loans in order to align the maturities of assets and funding instruments. Chart IV.3.3 shows the relationship between the share of Turkish non-core sources in total liabilities (wholesale funding rate) and the maturity of newly originated commercial loans. We observe that banks with a higher wholesale funding rate tend to give shorter-term commercial loans. Similarly, banks with a higher share of foreign resources in total liabilities tend to offer shorter-term commercial loans (Chart IV.3.4). Besides the liquidity risk arising from the liabilities of banks, the maturity structure of external debts may also have an effect on the maturity of the loans granted by banks to firms. In this context, Chart IV.3.5 implies that banks having longer-term external debt are more likely to grant longer-term loans to firms. Therefore, the CBRT’s reserve requirement policies aimed at extending the maturity of non-core liabilities may also affect the maturity of loans granted by banks to firms. In addition, Chart IV.3.6 points out that those banks with a higher share of savings deposits, which are considered to be more stable, in total deposits are more likely to take the risk of maturity mismatch.

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1 Since 2011, the CBRT has also been taking into account the maturity of liabilities in the reserve requirement ratios and has set rates as a function of maturity. In this context, the upper and lower bands represent the highest and lowest reserve requirement ratios applied on the specified date, respectively.
Black and Rosen (2016) find that monetary policy can affect not only the amount but also the maturity of banks’ lending, suggesting the existence of the maturity channel in monetary policy. They find that a 1-percentage-point increase in the federal funds rate reduces the average maturity of loan supply by 3.3 percent. The results of this study are also in line with the hypothesis of Diamond and Rajan (2006) that “long-term loans are more sensitive to monetary policy, as the funding structure of banks is short-term”. The negative relation between the maturity of newly originated loans and the monetary policy rate is noticeable in Turkey as well. (Chart IV.3.7). In other words, we observe that banks tend to further reduce long-term loans during the monetary policy tightening or when the CBRT marginal funding rate is relatively high. In this context, besides the roll-over risk, the effect of the monetary policy on loan maturity is one of the fundamental questions that this study seeks to answer.

Graphical analyzes and the related academic literature imply that the liquidity risk arising from the liabilities of banks and the monetary policy rates have a significant impact on the maturity of loans granted by banks to firms. In this context, we make an econometric analysis to control for economic activity, exchange rate developments and other balance sheet variables of the banking sector. In the study, we firstly examine the effect of the reserve requirement policy, which is implemented by the CBRT in order to extend the maturity of non-core external liabilities, on the amount and maturity of banks’ external debts. Then, we analyze the effects of the roll-over/liquidity risk of the Turkish banking sector on the maturity of commercial loans within the context of the CBRT’s monetary policy. Finally, considering that an improvement in the maturity structure of banks’ non-core liabilities will also limit the
liquidity risk of the banks, we focus on the impact of the reserve requirement policies implemented by the CBRT on the maturity of commercial loans.

IV.3.4 Data Set and Methodology

We use the following model based on the panel fixed effects method to test the effect of the reserve requirement policy implemented by the CBRT on the maturity and amount of banks’ external debt:¹

\[
D_{i,c,f,t} = \beta_0 + \beta_1 (VDZK)_{t-1} + Bank_{i,t-1}^t \alpha + TR^t_{t-1} \delta + Global^t_{t-1} \gamma + \mu_c + \eta_f + \theta_t + \epsilon_{i,c,f,t}
\]

\(D_{i,c,f,t}\) takes two values: i) natural logarithmic value of maturity (day) and ii) monthly change in the natural logarithmic value of amount of the external debt borrowed by bank \(i\) from country \(c\) at time \(t\), \((VDZK)_{t-1}\) is the difference between the upper and lower bands of the reserve requirement ratios applied for non-core FX liabilities at time \(t-1\), \(Bank_{i,t-1}^t\) is the balance sheet ratios of bank \(i\) at time \(t-1\),² \(TR^t_{t-1}\) is the value of macro indicators of Turkish economy at time \(t-1\),³ \(Global^t_{t-1}\) is the value of global liquidity indicators at time \(t\),⁴ \(\gamma_i\) is fixed effect for bank \(i\), \(\mu_c\) is fixed effect for lender country \(c\), \(\eta_f\) is fixed effect for loan type \(f\), \(\theta_t\) is fixed effect for the year of time \(t\).

In order to monitor the roll-over/liquidity risk of banks, we constitute four different indicators: i) The share of non-core liabilities in total liabilities (wholesale funding ratio), ii) The share of external debts in total liabilities, iii) The share of savings deposits in total deposits, and iv) Weighted average original maturity of external debts. We also use the weighted average funding rate of the CBRT for the monetary policy. Hence, we use the following model based on the panel fixed effects method to examine the relationship between the roll-over/liquidity risk and the maturity of commercial

¹ In the analysis, we use the monthly data of the 19 largest banks having external debt for the January 2007-June 2017 period.
² Bank-based variables used in the model: Real asset size, loans/assets, deposits/assets, equity/assets, liquid assets/assets, NPL ratio and return on assets ratio.
³ Macro indicators used in the model: growth rate of industrial production index, inflation rate and real effective exchange rate.
loans within the context of monetary policy implemented by the CBRT:\(^1\)

\[
V_{it} = \alpha_0 + \beta_1(Liquidity)_{i,t-1} + \beta_2(MP)_{t-1} + Bank_i'_{i,t-1} + \alpha + TR_i'_{t-1} + \gamma_i + \theta_t + \epsilon_{it}
\]

\(V_{it}\) represents the natural logarithm of the maturity (day) of commercial loans granted by bank \(i\) at time \(t\), \((\text{Liquidity})_{i,t-1}\) is the indicators representing the roll-over/liquidity risk of bank \(i\) at time \(t-1\), \((\text{MP})_{t-1}\) is the CBRT weighted average funding rate at time \(t-1\), \(Bank_i'_{i,t-1}\) is the balance sheet ratios of bank \(i\) at time \(t-1\), \(TR_i'_{t-1}\) is the value of macro indicators of Turkish economy at time \(t-1\), \(\gamma_i\) is fixed effect for bank \(i\), and \(\theta_t\) is fixed effect for the year of time \(t\).

In order to test how the reserve requirement policy implemented by the CBRT to extend the maturity of banks’ external debt affects the maturity structure of commercial loans originated by banks to firms, we add the interaction of liquidity risk indicators with the \((\text{VDZK})_{t-1}\) and the maturity of external debts to the model separately. The coefficients of these interactions indicate the marginal effects of a 1-percentage-point increase in the difference between the upper and lower bands in the reserve requirements or a 1-percent increase in the maturity of the external debt on the sensitivity of commercial loan maturity to the relevant liquidity risk indicators.

### IV.3.5 Empirical Findings

In Table IV.3.2, we test the effects of the reserve requirement policy, implemented by the CBRT to extend the maturity of non-core liabilities, on banks’ external debts. In the first two regressions, we analyze the impact of the reserve requirement ratios on the maturity of external debts, while for the other two regressions we focus on impact on the amount of external debts. Estimation results indicate that a 1-percentage-point increase in the difference between the upper and lower bands of the reserve requirement ratios applied to non-core FX liabilities leads to an increase in the maturity of banks’ external debt by approximately 1.5 percent. The increase in the reserve requirement ratios applied to FX non-core liabilities can be expected to have a decreasing effect on the external debt amount.

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\(^1\) The analysis is based on the monthly data of the largest 19 banks having commercial loans for the period January 2007-June 2017.
However, the results suggest that the change in the reserve requirement ratios does not create any significant effect on the amount of banks’ external debt. This is considered to be a consequence of the banks being able to quickly roll-over their short-term debt with long-term sources in order to be less affected by the increase in the difference between the upper and lower bands.

In Table IV.3.3, we test the effects of the composition of banks’ liabilities on the maturity of loans newly originated by banks to firms. In the model, we use four different measures representing the roll-over/liquidity risk of the banks to test the robustness of the results. In addition to the monetary policy variable, we also include bank-specific variables and macro variables related to the Turkish economy. According to regressions 5 and 6 in Table IV.3.3, banks with a higher share of non-core resources or external debt in their total liabilities tend to extend commercial loans with a shorter term. Similarly, we observe that banks having shorter-term external debts tend to lend short-term commercial loans to firms. Contrary to the positive relation in Chart IV.3.6, we could not find a significant and robust effect of the ratio representing the share of savings deposits in total deposits on the maturity of banks’ commercial loans.

In regressions 7 and 8, we find that widening of the spread between the upper and lower bands of the reserve requirement ratios applied to FX non-core liabilities leads to a lengthening in the maturity of commercial loans, thus limiting the effects of the roll-over/liquidity risk on the maturity of commercial loans.

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**Table IV.3.2**

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<td><strong>Year Fixed Effects</strong></td>
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***, **, * indicate statistical significance at 1 percent, 5 percent and 10 percent, respectively. Values in parentheses refer to robust standard errors.
Table IV.3.3
Estimation Results

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<tr>
<td>Maturity of External Debt</td>
<td>0.084***</td>
<td>0.076***</td>
</tr>
<tr>
<td>MP</td>
<td>-0.060**</td>
<td>-0.059***</td>
</tr>
<tr>
<td>External Debt Ratio*VDZK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VDZK</td>
<td>0.145***</td>
<td></td>
</tr>
<tr>
<td>External Debt Ratio*Maturity of External Debt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dummy*MP</td>
<td>0.094**</td>
<td>0.093**</td>
</tr>
<tr>
<td>Dummy</td>
<td>0.947**</td>
<td>0.937**</td>
</tr>
<tr>
<td>Constant</td>
<td>2.803***</td>
<td>2.314***</td>
</tr>
<tr>
<td>Bank-Specific Variables</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>TR Macro Variables</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bank Fixed Effects</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year Fixed Effects</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>3,333</td>
<td>3,265</td>
</tr>
<tr>
<td>R²</td>
<td>0.476</td>
<td>0.534</td>
</tr>
</tbody>
</table>

***, **, * indicate statistical significance at 1 percent, 5 percent and 10 percent, respectively. Values in parentheses refer to robust standard errors.

Diamond and Rajan (2006) emphasize that long-term loans are more sensitive to monetary policy, as the funding structure of banks is short-term. Similarly, Black and Rosen (2016) find that an increase or tightening of the Fed policy rate by 1 percent leads to an 8-percent reduction in the amount and a 3.3-percent shortening in the maturity of banks’ loans. The estimation results in Table IV.3.3 point to the fact that after the 100 basis points increase in the policy rate in Turkey, the maturity of commercial loans have shortened by approximately 6 percent, suggesting the existence of the maturity channel of the monetary policy. In the 9th and 10th regressions in Table IV.3.3, we test the impact of the Credit Guarantee Fund (KGF) policy, which has been implemented intensively since the beginning of 2017, on the monetary policy transmission mechanism in terms of maturity.

Chart IV.3.7 implies that long lasting inverse relationship between the policy rate and the maturity of loans disappeared in this period, and the maturity of loans continued to lengthen despite the tightening in monetary policy. In order to test whether the efficiency of the maturity channel of the monetary policy has changed or not, a dummy variable has been created, and the interaction between the dummy variable and the policy rate has...
been included in the model. The estimation results indicate that the effect of the monetary policy on the maturity composition of commercial loans is suppressed by the KGF policy. Despite the fact that the roll-over risk of banks did not change significantly in this period and the tight monetary policy implemented by the CBRT, the maturity of commercial loans continued to lengthen. We consider that this lengthening is a consequence of the decrease in the concerns about banks’ asset quality-driven maturity mismatch due to the public guarantee policy applied under certain conditions.

IV.3.6 Conclusion

Non-core liabilities are the main liquidity risk sources for banks. In addition to the share of non-core liabilities within total liabilities, their composition is also important in terms of the liquidity risk of banks. The amount and maturity of external debts in open economies having current account deficit, such as Turkey, are decisive on the liquidity risk. In particular, obtaining short-term debt from abroad makes banks sensitive to global liquidity developments and may increase the roll-over risk. Estimation results of our study indicate that banks with a higher roll-over/liquidity risk tend to lend short-term commercial loans to firms.

The share of external sources in Turkish banks’ total sources and banks’ tendency to get short-term debts both increased, and the maturity of external debts shortened under the liquidity conditions that eased following the quantitative easing policies implemented in the aftermath of the global crisis. However, banks’ long-term borrowing tendency has strengthened due to the measures introduced by the CBRT. The change in the maturity composition of external debts in favor of the long-term has increased the sector’s resilience to liquidity shocks and supported financial stability by enabling firms to obtain longer-term loans from banks.

References


IV.4 FX Risk and Banks' Supply of Credit

Abstract

This special topic analyzes the effect of banks’ exposure to exchange rate risk --on the asset side of their balance sheets-- on their credit supply behavior. The results suggest that banks with a higher exposure to risky FX (foreign currency) borrowers prior to a depreciation shock reduce their supply of credit to an average firm more strongly after the shock (compared to a bank with a lower exposure). Moreover, such highly exposed banks are less likely to establish a new lending relationship with an average firm after the depreciation. In this regard, the results highlight the importance of monitoring where the supply of FX credit is channeled and the indirect FX risk of banks’ loan portfolio.

IV.4.1 Introduction

Capital flows can deliver sizable benefits to emerging market economies, e.g. financing productive investment, fostering financial market deepening and economic growth. Potentially, however, they may also sow the seeds of a subsequent sudden reversal by contributing to a build-up of systemic vulnerabilities. Among various channels, one has received considerable attention in the literature and policy circles: risks emanating from foreign currency borrowing by unhedged borrowers (Ostry et al., 2012; IMF, 2017).

A sudden and sharp currency depreciation may make it increasingly difficult for unhedged FX borrowers to service their FX debts. Banks, in turn, even if they are hedged against fluctuations in the exchange rate --e.g. by using off-balance sheet derivative instruments--, may experience eroding capacity to lend following the depreciation shock to the extent they were exposed to risky FX borrowers. Therefore, firms in general and even those that are hedged against exchange rate fluctuations or hold no FX debt, may be affected adversely in accessing to credit following the depreciation, and in this regard, they are indirectly exposed to exchange rate risk due to their credit relationship with banks.

This special topic focuses on a particular currency depreciation episode, namely the period of global financial crisis
Note that banks in Turkey are obliged to hedge themselves against exchange rate risk. Indeed, their net FX position was close to zero during this period (Figure IV.4.1). In this regard, the effect of currency depreciation on bank balance sheets, and on bank lending behavior, is primarily due to their supply of FX credit to risky borrowers and such borrowers’ finding it more difficult to service their debts following the depreciation.

To address how a sharp currency depreciation may affect an average firms’ access to credit and whether this differs across different banks, this paper uses bank-firm level credit registry and firms’ balance sheet and income statements databases. First, the firms’ ability to cover their FX liabilities with their foreign-currency revenues (export revenues), and second, the ratio of short-term FX liabilities to total FX liabilities have been calculated as firm FX risk indicators. Then, based on these alternative firm riskiness measures, the exposure of each bank to exchange rate fluctuations has been calculated (by multiplying weighted average exposure of each bank to the riskiness of firms in their loan portfolio with the share of FX credit in the bank’s total credit). Using these metrics, a difference-in-difference economic specification is used for the period Oct ‘08 – Oct ‘09, to address how banks with different levels of exposure to risky FX borrowers in Oct ‘08 adjusted their supply of credit to an average firm in the following year. In doing so, several bank variables and firm-side effects are controlled for.¹

The results suggest that banks with a higher ex-ante exposure to risky FX borrowers cut their supply of credit more strongly after the depreciation shock. Moreover, such highly exposed banks appear to be less likely to establish a new lending relationship with a firm that they had not been working with previously. In sum, an average firm experience harder time in accessing to credit after the currency depreciation due to banks’ ex-ante exposure to risky FX borrowers.

The note proceeds as follows. Section 2 presents the data and the methodology. Section 3 presents the empirical results. Section 4 concludes.

¹ For details, see Fendoğlu ve Gülşen (2017).
IV.4.2  Data and Methodology

Three databases have been utilized in this study. The credit registry database collected by Banking Regulation and Supervision Agency (BRSA) providing bank-firm level details on credit transactions (such as volume, currency of denomination, or other credit account types), bank balance sheets and income statements, and the CBRT’s firm balance sheets and income statements databases. The first two databases are at monthly frequency and the last one is at annual frequency. These databases are matched with each other. In the econometric specification, the credit registry is aggregated at a bank-firm-loan type level.

To calculate the extent to which banks supply credit to risky firms prior to the depreciation (Oct’08), and in this regard their exposure to exchange rate risk on the asset side of their balance sheets, we use the formula

\[ \text{FX Risk}_b = \frac{\sum \text{FX Credit}_b}{\sum \text{Credit}_b} \sum_f w_{bf} \text{Risk}_f, \]

where \( \text{FX Risk}_b \) denotes the FX risk of loan portfolio of bank \( b \), \( w_{bf} \) denotes the share of FX credit provided by bank \( b \) to firm \( f \) in total FX credit that bank \( b \) provides, \( \text{Risk}_f \) denotes riskiness of firm \( f \) in meeting its FX debt obligation. Therefore, \( \text{FX Risk}_b \) depends on (i) the share of FX credit in total credit \( \frac{\sum \text{FX Credit}_b}{\sum \text{Credit}_b} \); and (ii) weighted average riskiness of firms in bank \( b \)’s loan portfolio.

We use two alternative measures of firm riskiness: (i) the ratio of change in short-term FX credit from October 2007 to October 2008 to total exports revenues in 2008 \( \frac{\Delta \text{Short-term FX Credit}_{Oct’07-Oct’08}}{\text{Export Revenues}_{2008}} \); (ii) the ratio of short-term FX credit total FX credit \( \frac{\sum \text{Short-term FX Credit}_{Oct’08}}{\sum \text{FX Credit}_{Oct’08}} \). A higher measure would imply that it would be increasingly difficult for the firm to honor its FX debt. In sum, \( \text{FX Risk}_b \) reflects the fact that a higher tendency of a bank to supply credit primarily in FX and providing FX credit to riskier firms would increase a bank’s exposure to FX risk.

---

1 Maturities less than one year are taken as short-term.
Table IV.4.1
Summary Statistics

<table>
<thead>
<tr>
<th>Bank-Firm Level Variables</th>
<th>Unit</th>
<th>No. of observations</th>
<th>Mean</th>
<th>Minimum</th>
<th>Median</th>
<th>Maximum</th>
<th>St. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan Growth</td>
<td>Δ Log</td>
<td>395673</td>
<td>-0.358</td>
<td>-4.642</td>
<td>-0.162</td>
<td>3.313</td>
<td>1.194</td>
</tr>
<tr>
<td>Bank-Firm Relationship</td>
<td>%</td>
<td>395673</td>
<td>33.087</td>
<td>0</td>
<td>24.57</td>
<td>100</td>
<td>28.493</td>
</tr>
<tr>
<td>New Lending</td>
<td>0 or 1</td>
<td>570091</td>
<td>0.161</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0.367</td>
</tr>
<tr>
<td>Termination</td>
<td>0 or 1</td>
<td>454570</td>
<td>0.179</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0.383</td>
</tr>
</tbody>
</table>

Table IV.4.2
Empirical Results
Dependent Variable: Loan Growth (Δ Log)

<table>
<thead>
<tr>
<th>FX Risk (1)</th>
<th>FX Risk (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX Risk (1)</td>
<td>0.168***</td>
</tr>
<tr>
<td>Capital Ratio</td>
<td>-0.021***</td>
</tr>
<tr>
<td>Size (Log)</td>
<td>-0.017***</td>
</tr>
<tr>
<td>Liquidity Ratio</td>
<td>0.007***</td>
</tr>
<tr>
<td>Non-Performing Loans Ratio</td>
<td>0.013**</td>
</tr>
<tr>
<td>Return on Assets</td>
<td>0.034***</td>
</tr>
<tr>
<td>Non-Core FX Liabilities Ratio</td>
<td>-0.007***</td>
</tr>
<tr>
<td>Bank-Firm Relationship</td>
<td>-0.005***</td>
</tr>
</tbody>
</table>

| No. of observations | 395673 |
| Difference in the loan growth (percentage point) | -2.71 |

Notes: The table reports estimates from ordinary least squares regressions, for identification, the sample is restricted to firms that work with at least two banks. All control variables are measured ex ante (October 2008). In all specifications, firm and loan-type fixed effects are included. FX Exposure (1) is based on Short FX Exposure (2) is based on the sample of firms included in the banks’ loan portfolio. FX Risk (1) is an indicator for bank’s exposure to risky FX borrowers that is based on the sample of firms included in the banks’ loan portfolio. FX Risk (2) is an indicator for bank’s exposure to risky FX borrowers that is based on the sample of firms included in the banks’ loan portfolio.

To analyze how the sharp currency depreciation in 2008-2009 period affected banks’ supply of credit to an average firm and whether this differs according to bank’s ex-ante exposure to exchange rate risk in its loan portfolio, the following model is estimated:

\[ \Delta L_{b,f,a} = \beta FX \text{Risk}_b + Bank \ Controls_b + \nu_{b,f} + \mu_i + \eta_a + \epsilon_{b,f,a} \]

\( \Delta L_{b,f,a} \) is the change in the natural logarithm of loan outstanding provided by bank \( b \) to firm \( f \) in loan type \( a \) from Oct’08 to Oct’09. Loan growth is calculated in real terms. \( FX \text{Risk}_b \) shows FX risk in bank \( b \)’s loan portfolio in Oct’08. \( Bank \ Controls \) include bank capital ratio, size, liquidity ratio, return on assets, non-performing loans, and bank’s non-core FX liabilities to total assets ratio. All bank control variables are measured ex-ante (Oct’08). \( \nu_{b,f} \) captures the strength of bank-firm relationship in Oct’08, namely, by how much firm \( f \) relies on bank \( b \) (the ratio of credit provided by bank \( b \) to the firm’s total bank credit) during the preceding 12 months (Oct’07 to Oct’08). In all specifications, in order to control for unobserved firm characteristics and loan-types, firm fixed effects (\( \mu_i \)) and loan-type fixed effects (\( \eta_a \)) are included respectively.
The study also examines how banks’ loan relationship with the firms is affected during the sudden stop of capital flows. Banks may prefer establishing a new lending relationship with a firm that they had not worked before, or terminating their relationships with some of the firms that had taken a loan from the bank before. In this regard, two dummy variables named New Lending and Termination are generated. New Lending is a dummy variable that takes value of 1 if a bank establishes a new lending relationship with a firm that it has not worked before in Oct’09 and 0 otherwise. Similarly, Termination is a dummy variable that takes value of 1 if a bank terminates an existing relationship with a firm in Oct’09 and 0 otherwise. By regressing these dummy variables on the explanatory variables defined above, impacts of banks’ FX risk on banks’ loan relationship with the firms is analyzed. In all specifications, we restrict the sample to firms that have at least two banking relationship. Table IV.4.1 provides the definition and summary statistics of all the variables used in the estimation.

### IV.4.3 Empirical Results

Key findings are presented in Table IV.4.2. In the first column, the FX exposure of banks is calculated by taking into account how much of the change in FX debt between Oct’07-Oct’08 was met by the export revenues in 2008. In the second column, the share of FX short-term debt in the total FX liabilities of the firm prior to a depreciation shock was taken into account while calculating the FX exposure of banks.

Columns (1) and (2) show that a bank highly exposed to risky FX borrowers (banks with the FX exposure at the 90th percentile) cuts back its supply of credit to an average firm about 1.95% to 2.71% more strongly compared to a lower exposed bank (banks with the FX exposure at the 10th percentile). Moreover, in line with the related findings in the literature, banks with higher ex-ante liquidity, non-performing loans and return on assets ratio reduce their credit supply less. We also find that strongly capitalized banks and stronger bank-firm relationship reduce their supply of credit more after the depreciation shock.

Table IV.4.3 presents findings on how banks’ credit relationship with firms changed during the sudden stop period. In columns (1a) and (1b), the dependent variable is New Lending, and in columns...
(2a) and (2b), the dependent variable is $\text{Termination}$. In specifications (1a) and (2a), $\text{FX Risk}(1)$ and in specifications (1b) and (2b), $\text{FX Risk}(2)$ are used as banks’ FX risk.

Columns (1a) and (1b) show that banks, which supply more FX loans to risky firms before the depreciation shock (banks with FX exposure at the 90th percentile compare to the ones at the 10th percentile), appear to be less likely to establish a new lending relationship with a firm that they had not worked before after the shock is realized. Similarly, highly exposed banks prefer not to terminate their existing relationships with firms after the depreciation shock (columns (2a) and (2b)).

**IV.4.4 Conclusion**

This note studies how banks with higher exposure to risky FX borrowers prior to a depreciation shock change their supply of credit behavior after the depreciation.

The results suggest that banks with a higher exposure to risky FX borrowers prior to a depreciation shock reduce their supply of credit to an average firm more strongly after the shock (compared to a bank with a lower exposure). Moreover, such highly-exposed banks are less likely to establish a new lending relationship with an average firm after the depreciation. In other words, firms, even if they happen to be completely hedged against fluctuations in the exchange rate, are affected adversely. Namely, they experience more difficulty in accessing to credit at usual terms. In this regard, the results underline the importance of monitoring where the supply of FX credit is channeled and the indirect FX risk of banks’ loan portfolio.
References

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IV.5 External Debt Risks of the Banking Sector

External liabilities are the most important funding source after deposits. The share of the Turkish banking sector’s external liabilities in non-equity liabilities is 22 percent and it has followed a steady course at this level for a long time. Loans have the largest share among the types of external borrowing (35 percent). Syndication, securitization loans and bond issuances are the other important instruments for external borrowing (Chart IV.5.1). Banks’ external debts increased rapidly until 2015 but the annual growth rate of external debt has been negative since then. External debt has a strong relation with FX loans. In this respect, it is assessed that the weaker external borrowing is related to the decline in FX loan utilization, and in fact banks have decreased the demand for external debt in this period (Chart IV.5.2).

As of September 2017, 24 percent of banks’ external liabilities are short-term and 76 percent are long-term, based on original maturities. The share of short-term external debt declined from 50 percent in December 2014 to 24 percent in September 2017 (Chart IV.5.3). The regulations in the first quarter of 2015 which introduced higher reserve requirement ratios for short-term liabilities were effective in this decline (Table IV.5.1). An analysis of external debt structure as of September 2017 shows that 42 percent of short-term external debt is composed of loans, 34 percent is of deposits and 18 percent is of repo transactions (Chart IV.5.4).
When the share of short-term external debt in total external debt is examined, it emerges that the share of short-term external loans has decreased to 29 percent from 48 percent. On the other hand, the share of short-term syndicated loans in total syndicated loans has declined from 94 percent to 7 percent (Chart IV.5.5).

After the changes in reserve requirement ratios, the average maturity of external debt has increased by 11 months since the end of 2014, reaching 59 months. The increase in average maturity is more visible in repo transactions (12 months), bond issuances (12 months), loans (9 months), and syndicated loans (7 months) (Chart IV.5.6). The average maturity of syndicated loans is calculated as approximately 20 months, heavily influenced by one bank’s data. In fact, it is observed that the banks generally get syndicated loans with a maturity of 367 days.

Although there is a significant hike in the average maturity, the FX external debt of banks which will be due within one year is USD 80 billion as of September 2017, accounting for 48 percent of the total external debt (Chart IV.5.7). The ratio of short-term external debt to total external debt based on remaining maturity is 53 percent on average for the 2012-2017 period.

---

1 Commercial loans decreased from 60 percent to 47 percent, development and investment loans decreased from 11 percent to 4 percent, and loans for foreign trade financing dropped from 30 percent to 20 percent.

2 When this bank is excluded, the average maturity of syndicated loans decreases to 13 months.
As external debt is a key component of banks’ funding sources and short-term external debt constitutes almost half of the total external debt based on remaining maturity, banks’ liquidity buffers become important.

The coverage ratio of banks’ FX liquid assets, which consist of cash, free external accounts, ROM reserves and unencumbered Eurobonds, to FX external debt due within one year dropped to 64 percent as of September 2017 from 80 percent in December 2012. On the other hand, the FX deposit facility amounting to USD 50 billion provides an additional buffer for the banking sector. Taking this facility into account, the coverage ratio increases to 126 percent. Besides, the CBRT has the option to provide additional liquidity to the sector by changing the FX reserve requirement ratios. The FX liquid assets of banks declined from 2014 until the end of 2016 but have showed some recovery in 2017. A significant portion of banks’ FX liquid assets is composed of ROM reserves (Charts IV.5.8 and IV.5.9).

While the Turkish banking sector continues to borrow from traditional financial centers, there has also been an increase in the number of lending countries. The share of external debt from European Union countries has decreased by about 9 percentage points since the end of 2014, whereas the shares of Asian, Middle East and North Africa (MENA) and other countries have increased. This diversity limits the funding risk of banks by reducing concentration in lending countries.

According to the latest data, FX liquid assets of the sector meet the liquidity needs of banks up to the point where external debt rollover ratio decreases to 40 percent. Considering the fact that the external debt rollover ratio of banks did not fall below 75 percent even in the global crisis period, this threshold is deemed a highly pessimistic scenario (Chart IV.5.10).

Based on the near-term payment plan of banks, the external debt due within six months is USD 45.5 billion as of 17 November 2017. The amount of payment in December is approximately USD 12 billion, the majority of which consists of other loans (USD 4.4 billion), deposits (USD 4.1 billion), and repo (USD 2.7 billion) (Chart IV.5.11).
To conclude, the increase in the average maturity of external debt following the macroprudential measures in 2014, the decrease in the amount of external debt due within one year, and the external borrowing of the banking sector proportional to the FX loan demand contributed positively to the FX liquidity and external debt rollover outlook of the sector. In addition, it appears that the sector has sufficient FX liquidity buffers thanks to the ROM mechanism, and it is foreseen that these buffers will provide adequate protection for the banks even if the external debt rollover ratio declines to 40 percent. While banks are not expected to have problems in covering the external debt at maturity, the costs of external borrowing may increase under the negative scenario. In this case, the relative cost of FX assets used by the sector in ROM may increase, depending on the hike in the cost of FX loans.
Charts, Tables and Figures

Overview
Chart 1 Economic Policy Uncertainty Indices ................................................................. ii
Chart 2 Weekly Capital Flows to Emerging Economies .................................................... ii
Chart 3 Share of Real Sector Financial Debt in GDP and Annual Growth of FX Loans ........ ii
Chart 4 Annual Loan Growth ......................................................................................... ii
Chart 5 Ratio of Non-Deposit Funding to Funding Sources .............................................. iv
Chart 6 External Debt Roll-Over Ratio and Its Average Maturity ........................................ iv
Chart 7 NPL Ratios ........................................................................................................... iv
Chart 8 Corporate NPL Ratios ......................................................................................... iv
Chart 9 Profitability Indicators .......................................................................................... v
Chart 10 Capital Adequacy Indicators .............................................................................. v

I. Macroeconomic Outlook

I.1. International Developments

Chart I.1.1 Economic Policy Uncertainty Indices ............................................................... 2
Chart I.1.2 FOMC Members’ Median Policy Interest Forecasts and Market Expectations ........ 2
Chart I.1.3 Weekly Capital Flows to Emerging Economies ................................................. 2
Chart I.1.4 CDS Premiums in Emerging Economies ......................................................... 3
Chart I.1.5 Stock Market Indices ....................................................................................... 3
Chart I.1.6 10 Year Treasury Bond Yields in Advanced Economies ..................................... 3
Chart I.1.7 10 Year Treasury Bonds Rate in Emerging Economies ....................................... 3
Chart I.1.8 Exchange Rate Indices .................................................................................... 4
Chart I.1.9 Growth of Advanced and Emerging Economies ................................................ 4
Chart I.1.10 Manufacturing Industry PMI Indices .............................................................. 4
Chart I.1.11 Commodity Prices ......................................................................................... 4

Figure I.1.1.1 Trading Methods in Securities Exchanges .................................................... 5
Chart I.1.1.1 The Global Volume of Crowdfunding ........................................................... 10
Chart I.1.1.2 Crowdfunding Models ............................................................................... 10

I.2. Domestic Developments

Chart I.2.1 Contribution to Annual Growth from the Expenditure Side ............................. 12
Chart I.2.2 Industrial Production Index ............................................................................ 12
Chart I.2.3 Labor Force .................................................................................................... 12
Chart I.2.4 Central Government Budget Balance .............................................................. 13
Chart I.2.5 Foreign Trade ................................................................................................. 13
Chart I.2.6 Current Account ............................................................................................ 13
Chart I.2.7 Current Account Deficit Financing Items ......................................................... 14
Chart I.2.8 Short-term External Debt Stock and CBRT Gross FX Reserves ....................... 14
Chart I.2.9 Price Indices .................................................................................................. 14
Chart I.2.10 Interest Rates ............................................................................................... 14
Chart I.2.11 Exchange Rate Basket and CDS ................................................................. 14

Table I.2.1.1 Data Definitions .......................................................................................... 16
Chart I.2.1.1 Final Index ................................................................................................. 17
II. Non-Financial Sector

II.1. Household Developments

Chart II.1.1 Household Financial Assets’ and Liabilities’ Growth Rates and Financial Leverage Ratio .......................... 19
Chart II.1.2 Household Loans and Deposits Growth ......................................................................................... 19
Chart II.1.3 Savings Deposits and Consumer Loans Interest Rates .............................................................................. 19
Table II.1.1 Household Financial Assets .............................................................................................................. 19
Chart II.1.4 Savings Deposits of Resident Households by TL and FX Breakdown ........................................................................... 20
Chart II.1.5 Implied Volatility for USD/TL ............................................................................................................. 20
Chart II.1.6 Consumer Confidence Index and Consumer Tendency Survey Questions ................................................. 20
Chart II.1.7 Change in Household Deposits in a Breakdown of Amounts .............................................................................. 21
Chart II.1.8 Households’ Gold Portfolio in the Banking System and Gold Prices ......................................................... 21
Chart II.1.9 Private Pension System in Turkey ........................................................................................................ 21
Chart II.1.10 Automatic Enrolment in the Private Pension System ......................................................................................... 22
Chart II.1.11 BİST All Index and Household Equity Securities Portfolio ................................................................. 22
Chart II.1.12 Consumer Loans Extended by Financing Companies Based on Type ......................................................... 22
Table II.1.1.2 Household Financial Liabilities ........................................................................................................... 22
Chart II.1.13 Average Retail Loan Maturity .............................................................................................................. 23
Chart II.1.14 Contribution to Housing Sales Growth, Housing Loan Monthly Interest Rate and Granted Loan Ratio .............................................................................................................................................. 23
Chart II.1.15 Individual Credit Card Balance ........................................................................................................ 23

Table II.1.1.1 Variables in PVAR .......................................................................................................................... 24
Chart II.1.1.1 Response Functions to WAFI in General Purpose Loans ................................................................. 25
Chart II.1.1.1 Response Functions to Macroeconomic Policy in General Purpose Loans ................................................. 26

II.2. Real Sector Developments

Chart II.2.1 Industrial Production, Capacity Utilization and Investment Tendency .............................................................. 27
Chart II.2.2 Real Sector Confidence Indices .............................................................................................................. 27
Chart II.2.3 Exports and Domestic Orders ................................................................................................................. 27
Chart II.2.4 Real Sector Financial Debt to GDP Ratio and Annual Growth Rate of FX Loans ................................................. 28
Chart II.2.5 Real Sector Credit / GDP Ratio in Selected Countries .................................................................................. 28
Chart II.2.6 Breakdown of Flow Loans by Currency Type .......................................................................................... 28
Chart II.2.7 Maturity Breakdown of Domestic TL and FX Loans ...................................................................................... 29
Chart II.2.8 Sectoral Breakdown of Stock Corporate Loans and Share of FX Loans in Sectors .................................................. 29
Chart II.2.9 Annual Growth of Flow Credits Extended in the First Eight Months of the Year ................................................. 30
Chart II.2.10 Standard NPLs and NPL Ratios Adjusted for Credit Growth in Sectors ....................................................... 30
Chart II.2.11 Average TL Funding Costs of SMEs and Large Firms .................................................................................. 31
Chart II.2.12 Loan Standards and Loan Demand ......................................................................................................... 31
Chart II.2.13 Deposits of Domestic Firms .................................................................................................................. 31
Chart II.2.14 Bad Checks and Protested Bills .............................................................................................................. 32
Chart II.2.15 Leverage Ratios of BİST Firms .............................................................................................................. 32
Chart II.2.16 Profitability Ratios of BİST Firms ........................................................................................................ 32
Chart II.2.17 Liquidity and Turnover Ratios of BİST Firms ........................................................................................... 33
Chart II.2.18 MFA Score and Debt Share of Each Risk Categories ................................................................................... 33

Table II.2.1.1 The Balance Sheet of the Fictional Firm as of October 2016 ................................................................. 34
Table II.2.1.2 Currency and Interest Rate Indicators ................................................................................................. 34
Table II.2.1.3 Financing Expense Calculation ........................................................................................................... 35
Table II.2.1.4 Income Statement by October 20, 2017 ............................................................................................... 35
Table II.2.1.5 The Balance Sheet as of October 20, 2017 ............................................................................................ 35
Chart II.2.1.1 Length of Period Costs of Loans ........................................................................................................ 36
III. Financial Sector

III.1. Credit Developments and Credit Risk

Chart III.1.1 Annual Loan Growth ................................................................. 38
Chart III.1.2 Credit/GDP Ratio ................................................................. 38
Chart III.1.3 Annual Change in Credit Stock to GDP .................................. 38
Chart III.1.4 International Comparison of Credit/GDP .................................. 39
Chart III.1.5 Annual Growth in TL Corporate Loans by Firm Size ............... 39
Chart III.1.6 Annual Growth in FX Corporate Loans by Size and the Exchange Rate .................................. 39
Chart III.1.7 Corporate Loan Interest Rates and Spreads ............................ 40
Chart III.1.8 Factors Contributing to Corporate Loan Supply ....................... 40
Chart III.1.9 Factors Contributing to Corporate Loan Demand .................... 40
Chart III.1.10 Annual Growth in Retail Loans ............................................ 41
Chart III.1.11 Retail Loan Lending Rates .................................................... 41
Chart III.1.12 General Purpose Loan Weekly Growth Rates ......................... 42
Chart III.1.13 General-Purpose Loan Maturities ......................................... 42
Chart III.1.14 Credit Standards and the Economic Outlook ......................... 42
Chart III.1.15 NPL Ratios ........................................................................ 43
Chart III.1.16 Components of NPL .......................................................... 43
Chart III.1.17 Corporate NPL Ratios ........................................................ 43
Chart III.1.18 International Comparison of NPL Ratios and Differences ......... 44
Table III.1.1 Sectoral Breakdown of NPL Ratios ......................................... 44
Chart III.1.19 NPL Ratios in Retail Loans .................................................. 45
Chart III.1.20 Annual Growth in Personal Credit Card Balances and Installment Share .................................. 45
Chart III.1.21 New General Purpose Loans and the Survey ......................... 45
Chart III.1.22 General-Purpose Loan Maturities by RLS ............................. 46
Chart III.1.23 General-Purpose Loan Vintage Curves ................................ 46

III.2. Liquidity Risk

Chart III.2.1 Quantities of Banks by Total Liquidity Coverage Ratio .......... 47
Chart III.2.2 Quantities of Banks by FX Liquidity Coverage Ratio ............... 47
Chart III.2.3 Ratio of Non-Deposit Funding to Funding Sources ................. 48
Chart III.2.4 Loan/Deposit Ratio ............................................................... 48
Chart III.2.5 Loan/(Deposit+Other Stable Sources) Ratio ......................... 49
Chart III.2.6 Amount and Growth Rate of Banks’ External Liabilities ......... 49
Chart III.2.7 Cost of Syndicated Loans with a Maturity of 367 days ............ 50
Chart III.2.8 Change in Banks’ Short Term and Medium-Long Term External Liabilities .................................. 50
Chart III.2.9 External Debt Roll-Over Ratio ............................................. 50
Chart III.2.10 External Debt Roll-Over Ratio and its Average Maturity .......... 51
Chart III.2.11 FX Liquid Assets and FX External Liabilities Due Within 1 Year ... 51
Chart III.2.12 ROM Reserves + FX Borrowing Facility and External FX Liabilities Due Within 1 Year .......... 51
Chart III.2.13 FX Issues Abroad ............................................................... 52
Chart III.2.14 Domestic TL Security Issues ............................................. 52
Chart III.2.1.1 Swap Transaction Amount .................................................. 53
Chart III.2.1.2 TL Swap Maturity Tranches .............................................. 53
Chart III.2.1.3 TL Swap Maturity Tranches .............................................. 53
Table III.2.1.1 Swap Transactions According to Remaining Maturities .......... 54

III.3. Interest Rate and Exchange Rate Risk

Chart III.3.1 Interest Rate Risk via Repric ing Channel Measured with Economic Value Approach .............. 55
Chart III.3.2 Interest Rate Risk on Securities with Fixed Interest Rate in Trading Portfolio ....................... 55
Chart III.3.3 FX Position in the Banking Sector ........................................ 55
Chart III.3.4 Shares of Gross Positions of Off-Balance Sheet FX Transactions .................................. 56
III.4. Profitability and Capital Adequacy

Chart III.4.1 Return on Assets and Return on Equities .................................................. 57
Chart III.4.2 CAR and Core Tier I CAR ........................................................................ 57
Chart III.4.3 Effects of Income Statement Items on ROA ............................................. 57
Chart III.4.4 Contribution to Changes in the Net Interest Income ................................. 58
Chart III.4.5 Additional NPL Indicators ......................................................................... 58
Chart III.4.6 Currency Swap Transaction Costs and Interest Rates .............................. 58
Chart III.4.7 Changes in Items Affecting Capital ......................................................... 59
Chart III.4.8 Risk and Assets Developments .................................................................. 59
Chart III.4.9 CARs According to Bank Types ................................................................. 59

Chart III.4.11 The Results of Applications to BAT Customer Complaints Arbitration Committees ........................................ 61
Chart III.4.12 Adjustment for Past Years Income Account ............................................ 61
Chart III.4.13 The Impact of Selected Items on Return on Equity of the Banking Sector ........................................................................................................ 62
Chart III.4.14 Existing Return on Equity and Return on Equity Adjusted for Temporary Effects ................................................................. 62

IV. Special Topics

IV.1 A New Approach to Balance Sheets: Financial Risk Rating for Real Sector Firms

Table IV.1.1 Financial Ratios used in MFA Score .................................................................. 65
Table IV.1.2 Predictive Power of Treatment Sample ......................................................... 66
Table IV.1.3 Predictive Power of Control Sample .............................................................. 66
Table IV.1.4 Risk Zones According to MFA-Score ............................................................ 67
Chart IV.1.1 MFA-Score of BIST Firms and GDP Growth ................................................ 67
Chart IV.1.2 MFA-Score of BIST Firms and FX Basket Growth ...................................... 68
Chart IV.1.3 MFA-Score of Exporters and Firms with FX Open Position ....................... 68
Chart IV.1.4 Distribution of Quantity of Firms in MFA Risk Zones ................................. 68
Chart IV.1.5 Distribution of Asset Sizes in MFA Risk Zones ............................................. 69
Chart IV.1.6 Distribution of Total Debt in MFA Risk Zones ............................................. 69
Chart IV.1.7 Distribution of FX Open Position Amount in MFA Risk Zones .................... 69

IV.2 Corporate Sector's Default Probability and Banking Sector Asset Quality

Chart IV.2.1 Relationship Between the Value of Call Option and the Market Value of the Firm .............................................................. 72
Chart IV.2.2 Probability of Default (PD) of the Corporate Sector and Credit Default Swap .............................................................. 73
Chart IV.2.3 Correlation between PD and Large-Scale Firm NPL Ratios ......................... 73
Chart IV.2.4 Probability of Default and Large-Scale Firm NPL Ratio .................................. 74

IV.3 Central Bank Policies and Maturity Management in the Banking Sector

Chart IV.3.1 Amount and Maturity of Banking Sector’s External Debt ............................... 77
Chart IV.3.2 Change in Short Term and Medium-Long Term External Debt ........................ 77
Table IV.3.1 Reserve Requirement Ratios for Non-Core FX Liabilities ............................. 77
Chart IV.3.3 Relation Between the Maturity of Commercial Loans and the Wholesale Funding Ratio ...................................................... 78
Chart IV.3.4 Relation Between the Maturity of Commercial Loans and the External Debt Ratio ...................................................... 78
Chart IV.3.5 Relation Between the Maturity of Commercial Loans and the Maturity of External Debt ...................................................... 78
Chart IV.3.6 Relation Between the Maturity of Commercial Loans and the Savings Deposits Ratio ...................................................... 79
Chart IV.3.7 Relation Between the Weighted Average Funding Rate (MP) and the Maturity of TL Commercial Loans ...................................................... 79
Table IV.3.2 Estimation Results (Effects of Reserve Requirements on Maturity and Amount of Banks’ External Debt) ...................................................... 82
Table IV.3.3 Estimation Results ......................................................................................... 83
IV.4 FX Risk and Banks’ Supply of Credit

Chart IV.4.1 On-Balance and Off-Balance Sheet FX Position of Banks ................................................. 86
Table IV.4.1 Summary Statistics .................................................................................................................. 88
Table IV.4.2 Empirical Results Dependent Variable: Loan Growth ............................................................... 88
Table IV.4.3 Empirical Results Dependent Variable: New Lending or Termination Dummy Variables .......... 89

IV.5 External Debt Risks of the Banking Sector

Chart IV.5.1 Composition of Banks’ External Liabilities ............................................................................. 92
Chart IV.5.2 External Debt and FX Loan ........................................................................................................ 92
Chart IV.5.3 Short and Long Term External Debt Shares .............................................................................. 92
Table IV.5.1 Reserve Requirement Ratios for Non-Core Liabilities ............................................................... 93
Chart IV.5.4 Composition of Short Term External Debt .............................................................................. 93
Chart IV.5.5 Share of Short Term Debt by Debt Types ............................................................................... 93
Chart IV.5.6 Average Maturities by Debt Types ......................................................................................... 93
Chart IV.5.7 FX External Debt Stock According to Remaining Maturity ................................................. 94
Chart IV.5.8 External Debt due within 1 year and FX Liquid Assets ............................................................ 94
Chart IV.5.9 Composition of FX Liquid Assets ............................................................................................ 94
Chart IV.5.10 Thresholds for External Debt Rollover Ratios ................................................................... 95
Chart IV.5.11 Near-Term Payment Plan .................................................................................................... 95
<table>
<thead>
<tr>
<th>Abbreviation</th>
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</tr>
</thead>
<tbody>
<tr>
<td>BAT</td>
<td>The Banks Association of Turkey</td>
</tr>
<tr>
<td>BIS</td>
<td>Bank for International Settlements</td>
</tr>
<tr>
<td>BIST</td>
<td>Borsa Istanbul</td>
</tr>
<tr>
<td>BRSA</td>
<td>Banking Regulation and Supervision Agency</td>
</tr>
<tr>
<td>CBRT</td>
<td>Central Bank of the Republic of Turkey</td>
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<tr>
<td>CDS</td>
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<td>CGF</td>
<td>Credit Guarantee Fund</td>
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<td>Middle East and North Africa</td>
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<td>Multivariate Firm Assessment</td>
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