

IV. Special Topics

IV.1 Global Liquidity and Regional Distribution of Cross-Border Bank Loans

Abstract

This study analyzes the impacts of increasing diversification in the countries/banks that provide funds to the Turkish banking sector on the sensitivity of cross-border bank loans to the global liquidity conditions. Recently, we observe that the Turkish banking sector has not only continued to roll over its debts from traditional financial centers but also gained access to new countries and banks. As a result, banks based in non-traditional financial centers have become an important source of funding for the Turkish banking sector. Moreover, our estimation results indicate that the increasing diversification of lender origin lowers the sensitivity of cross-border bank loans to global liquidity conditions and therefore limits the spillovers of potential financial shocks that may occur in systemically important sources.

IV.1.1 Introduction

Global banks and financial institutions have significantly increased their international activities over the last twenty years. With the rise in international activities, financial integration has also deepened and gained strength globally, and capital flows from advanced countries to emerging countries have increased. The strong growth in cross-border capital flows has added to the importance of external financing structure in terms of risks that may emerge regarding the roll-over of loans in emerging countries. The transmission of financial shocks and country or bank specific events to other countries through these capital flows underlines the importance of the diversification of lender countries or banks for borrowers. In this context, we observe that the Turkish banking sector has not only continued to roll over its debts from traditional financial centers but also gained access to new countries and banks. This special topic shares the findings which suggest that the increasing diversification of lender origin lowers the sensitivity of cross-border

bank loans to global liquidity conditions and therefore limits the spillovers of potential financial shocks that may occur in systemically important sources.

Capital flows to emerging markets, including Turkey, may be in the forms of direct investment, portfolio investment, bank loans and debt securities. There was strong growth in the capital flows to Emerging Asia, Latin America and Emerging Europe until 2007 and then pronounced contractions in all fund types in these regions during the 2008 crisis. The expansion of foreign direct investment, bank loans, portfolio equity and net debt securities was followed by a steep reversal in all broad categories of inflows, with by far the sharpest decline in international bank loans (Cetorelli and Goldberg, 2011). Similarly, Lane (2014) finds that the international bank loans were affected by the global crisis more than foreign direct investments and portfolio investments. Therefore, the World Economic Outlook (WEO) report, released by the IMF in April 2009, argues that global bank linkages “fuel the fire” for the spreading of the current crisis to emerging markets.

The literature has established that the classical push and pull factors are the main determinants of cross-border bank loans, which are relatively more sensitive to global developments than other types of capital flows. The push factors are related to common external conditions that mobilize loan flows such as the global risk appetite and uncertainty, funding conditions of banks that play an important role in the allocation and intermediation of global liquidity, and monetary and liquidity policies of advanced countries. In particular, the severe impact of the 2008 global financial crisis on global financial conditions has caused significant volatility in capital flows to emerging countries, and has become a risk factor for financial stability. In this context, the transmission of financial shocks in a certain region to other countries through financial linkages led borrowing countries to take measures against the negative effects induced by the volatility in capital flows. In this period, several countries including Turkey started implementing a series of macroprudential policies to reduce the volatility stemming from the changes in global liquidity conditions and to support financial stability. Along with such policies, Cerutti et al. (2014) study a number of borrower country characteristics, specifically indexes of exchange rate flexibility, capital controls, the overall institutional environment, and bank regulation (the strength of capital adequacy

requirements, supervisory powers, and limits on foreign bank presence) and find that these factors reduce a country's exposures to changes in global liquidity.

After the global financial crisis, in an environment of macroprudential policies implemented by policy makers in Turkey, the sector has continued to roll over its debts from traditional financial centers and also gained access to new countries/banks. We evaluate that the increasing diversification of lender countries/banks lowers the sensitivity of cross-border bank loans to global liquidity conditions and therefore limits spillovers of potential financial shocks that may occur in systemically important sources. In this context, we first test the sensitivity of cross-border bank loans to global liquidity indicators, and then analyze the effects of the increasing diversification of lender countries/banks on this sensitivity.

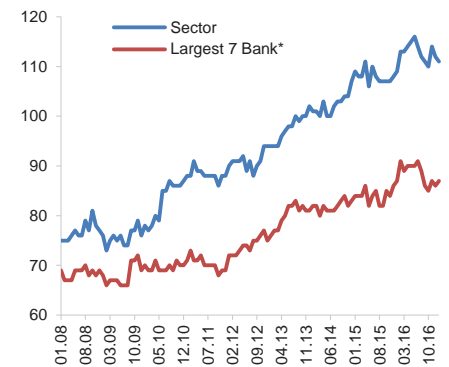
IV.1.2 Concentration of Lender Countries

The Turkish banking sector has steadily increased its cross-border loans, and rolled over its loans from a larger number of countries/banks (Chart IV.1.1). The increasing diversity of Turkish banks' external funding across countries and banks in the recent period, particularly when the amount of external debts has not changed significantly, implies that banks roll over their debts from an increasingly higher number of sources. Moreover, this situation is not specific only to large banks, but is also observed in relatively small banks in terms of asset size.

Charts IV.1.2 and IV.1.3 show the share of lender countries with the highest amount of debt in total debt of the Turkish banking sector. The increasing diversity of Turkish banks' external funding across countries and banks was also reflected in the amount of debt; due to the increase in the number of lender countries, the share of countries with the highest amount of debt in total debt decreased steadily.

The diversification of Turkish banks' external funding across countries and banks also affects the regional distribution of the cross-border bank loans. Traditionally, it is known that the banks headquartered in the Eurozone, the USA and the UK are at the forefront of the global banking network. However, the share of the Turkish banking sector's external borrowing from regions outside the Eurozone, the USA and the UK in total debt has been gradually

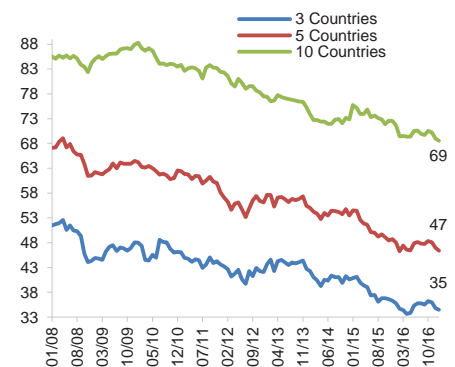
Chart IV.1.1
Number of Lender Countries¹
(Percent)



(1) Excludes external debt issuances.
(*) Represents the number of lender countries that provide funds to the 7 banks with the largest asset size in the Turkish banking sector

Source: CBRT (Latest Data: 01.17)

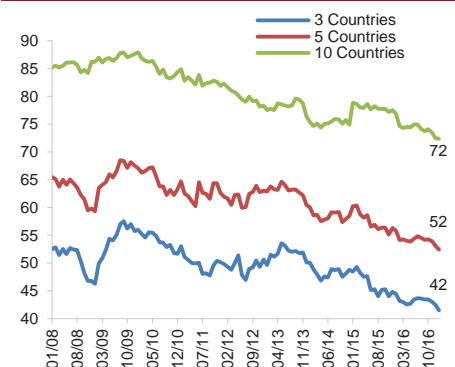
Chart IV.1.2
Share of Lender Countries with the Highest Amount of Debt in Total Debt¹ (Based on Headquarters of Lender Banks, Percent)



(1) Excludes external debt issuances.

Source: CBRT (Latest Data: 01.17)

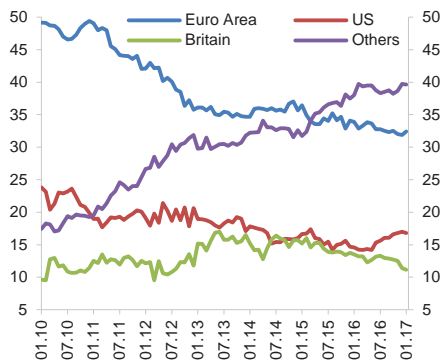
Chart IV.1.3
Share of Lender Countries with the Highest Amount of Debt in Total Debt¹ (Based on the Country of Residence of Lender Banks, Percent)



(1) Excludes external debt issuances.

Source: CBRT (Latest Data: 01.17)

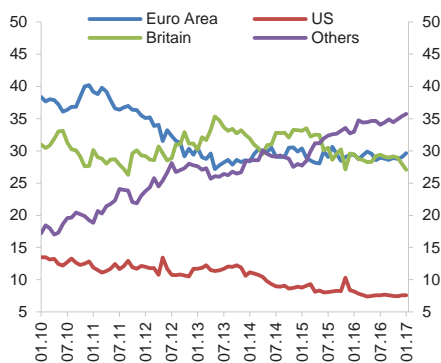
Chart IV.1.4
Regional Distribution of External Debt¹
(Based on Headquarters of Lender Banks, Percent)



(1) Excludes external debt issuances.

Source: CBRT (Latest Data: 01.17)

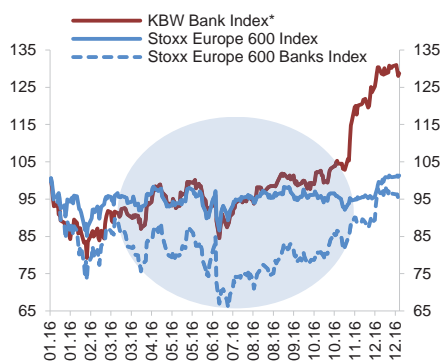
Chart IV.1.5
Regional Distribution of External Debt¹ (Based on the Country of Residence of Lender Banks, Percent)



(1) Excludes external debt issuances.

Source: CBRT (Latest Data: 01.17)

Chart IV.1.6
Bank Indexes in Euro Zone and USA¹
(Percent)



(1) Indexed to January 2016=100

(2) KBW Bank Index serves as a benchmark of the US banking sector

Source: Bloomberg (Latest Data: 31.12.16)

increasing in the recent years (Charts IV.1.4 and IV.1.5). Due to the debt crisis in the Eurozone in 2011, the share of the Eurozone-based banks, which have an important role in the sector's foreign funding, has visibly decreased over the years. Similarly, the share of the UK-based banks has been steadily declining since mid-2014. As a result, the sector continues to roll over its debts from traditional financial centers. However, banks based in non-traditional financial centers have also become an important source of funds for the Turkish banking sector as it has at the same time gained access to new countries/banks.

Recently, there have been financial problems in some regions from which the Turkish banks intensively borrow. For instance, in 2016, the profitability and the stock value of the Eurozone-based banks dropped (Chart IV.1.6). In addition, after the Brexit decision, developments in the UK-based banks, which have played an important role in the allocation and intermediation of global liquidity, are also closely monitored by international financial markets. The persistence of these problems or uncertainties has the potential to affect the intermediary capacity of the aforementioned banks negatively. It is obvious that the Turkish banking sector is not experiencing any problems in rolling over debt from either the Eurozone or the UK banks. Accordingly, it should be emphasized that the increased diversification of Turkish banks' external funding across countries and banks in recent years is a favorable development mitigating the risks that may stem from the Eurozone or the UK banking system.

In this context, we conduct an empirical analysis to understand how the increasing diversification in the external sources that provide funds to the Turkish banking sector affects the sensitivity of cross-border bank loans to global liquidity conditions. First, we test the sensitivity of cross-border bank loans to global liquidity indicators. We then analyze, using the panel data method, the effects of increasing diversification on the sensitivity of cross-border bank loans to global liquidity indicators.

IV.1.3 Data Set and Methodology

There are a number of liquidity indicators which the existing theoretical and empirical literature has found relevant in terms of their impact on global fund flows. These indicators are:

- **Uncertainty and Risk Aversion:** Uncertainty and risk appetite refer to a combination of multiple factors – macroeconomic conditions, lenders’ and borrowers’ risk appetites, and the monetary policy. In the empirical literature, uncertainty is commonly monitored through the S&P 500 VIX Index, the stock option prices-based measure of implied volatility.
- **Global Banks’ Funding Conditions:** The lending appetite and the funding conditions of banks, which play a role in the allocation and intermediation of global liquidity, constitute one of the primary indicators affecting capital flows. Although a number of measures are used for global banks’ funding conditions and lending appetite in the literature, measures such as the TED spread, the real credit growth or the ratio of private credit to GDP are particularly employed.
- **Monetary Policy:** This includes the general level of interest rates and the slope of the yield curve. Although the effect of low interest rates on banks’ risk-taking is supported by some empirical literature, its economic significance and precise causal channels remain the subject of much debate. In contrast, the effect of the term premium on banks’ risk-taking has a clearer economic implication. Banks borrow short-term and lend long-term, so their domestic investment opportunities are less profitable when the yield curve is flat. This may trigger banks’ search for yield, including in the form of cross-border bank loans.
- **Money Aggregates:** The empirical literature also points out that the growth in some components of broad money measures, such as wholesale or non-financial enterprises’ deposits, can complement leverage measures in explaining bank risk as they indicate the relative ease of funding conditions.

Table IV.1.1

Global Liquidity Indicators

US VIX	CBOE S&P500 Volatility VIX
US TED spread	3-month TED spread (LIBOR - Treasury bill)
US slope of yield curve	10 year/3 month US Treasury yield spread
US real policy rate	Federal Funds Target Rate (deflated with CPI)
US growth rate of real credit	Annual growth rate of real private credit
US credit-to-GDP ratio	Private credit/GDP
US growth rate of M2	ABD M2 Parasal Göstergesindeki Yıllık Büyüme Oranı

In this context, we use the following model including the fixed effects panel data method to analyze the effects of global liquidity

indicators, summarized in Table IV.1.1, on the Turkish banks' cross-border loans:¹

$$L_{i,c,f,t} = \beta_0 + \beta_1(\text{Global})_{t-1} + \text{Bank}'_{i,t-1}\alpha + \text{TR}'_{t-1}\delta + \gamma_i + \mu_c + \eta_f + \theta_t + \varepsilon_{i,c,f,t}$$

where the dependent variable $L_{i,c,f,t}$ is the logarithmic value of bank i 's cross-border loans obtained from country c in type f at time t ; $(\text{Global})_{t-1}$ is the value of global liquidity indicators at time $t-1$; $\text{Bank}'_{i,t-1}$ is the balance sheet ratios of bank i at time $t-1$; TR'_{t-1} is the value of macro indicators of the Turkish economy at time $t-1$; γ_i is bank i 's fixed effects, μ_c is lender country c 's fixed effects, η_f is loan type f 's fixed effects, θ_t is the fixed effects for time t . The estimation results obtained by the said model are given in Table IV.1.2.

Then, in order to test the effect of the increasing diversification on the sensitivity of cross-border bank loans to global financial cycles, we add the interaction between global liquidity indicators and the number of lender countries that provide external funds to Turkish banks.

$$L_{i,c,f,t} = \beta_0 + \beta_1(\text{Global})_{t-1} + \beta_2(\text{Global} * \text{Country})_{t-1} + \beta_3(\text{Country})_{i,t-1} + \text{Bank}'_{i,t-1}\alpha + \text{TR}'_{t-1}\delta + \gamma_i + \mu_c + \eta_f + \theta_t + \varepsilon_{i,c,f,t}$$

$(\text{Country})_{i,t-1}$ represents the number of lender countries that provide external funds to bank i at time $t-1$. The estimation results obtained by the said model are given in Table IV.1.3.

IV.1.4 Empirical Findings

In Table IV.1.2, we test the sensitivity of the Turkish banking sector's cross-border loans to global liquidity conditions. In order to control the demand side, we add the balance sheet ratios of the borrowing banks and the macro indicators of the Turkish economy to the model.² As also identified in the existing theoretical and empirical literature, the US global liquidity factors are statistically significant drivers of cross-border bank flows when considered individually. VIX and TED spreads have the expected negative signs, indicating that cross-border flows decrease during times of uncertainty. The real credit growth and the ratio of private credit to

¹ Analysis is based on the monthly external debt data of Turkish banks for the period between December 2002 and December 2016. We add the lagged values of the explanatory variables to the regression in order to eliminate the possible endogeneity problem.

² Time-invariant and unobservable factors related to the borrower bank, lender country and loan type have also been controlled via fixed effects.

GDP in the US have the expected positive sign, showing that banks extend more cross-border loans when bank funding conditions are accommodative. Although the effect of low interest rates on cross-border lending remain the subject of much debate, estimation results suggest that low rates increase the global banks' risk-taking and accordingly the Turkish banks' external debt. The US term premium has a negative coefficient, suggesting the presence of 'search for yield' incentives in global banks: Banks borrow short-term and lend long-term, so their domestic investment opportunities are less profitable when the yield curve is flat. This triggers banks' search for yield and increases the Turkish banks' cross-border loans. The M2 growth is also positively associated with the Turkish banks' cross-border flows.

Table IV.1.2

Estimation Results

Dependent Variable:	The Logarithmic Value of Cross-Border Bank Loans										
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CBOE VIX _{t-1}	-0.00** (0.00)							-0.00** (0.00)	-0.00*** (0.00)	-0.00* (0.00)	-0.00*** (0.00)
TED Spread _{t-1}		-0.03* (0.02)						-0.01 (0.02)	-0.02 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Slope of Yield Curve _{t-1}			-0.00*** (0.00)					0.00 (0.00)	0.00 (0.00)		
Real Policy Rate _{t-1}				-0.11*** (0.03)						-0.01 (0.04)	-0.03 (0.04)
Real Credit Growth _{t-1}					0.00*** (0.00)					0.01*** (0.00)	0.00 (0.00)
Credit/GDP _{t-1}						0.03*** (0.00)		0.05** (0.02)	0.04* (0.02)		
M2 Growth Rate _{t-1}							0.01*** (0.00)	0.01 (0.01)	0.01 (0.01)	0.00 (0.01)	0.00 (0.01)
Bank-Specific Variables											
Log(Real Assets) _{t-1}	0.31*** (0.11)	0.31*** (0.11)	0.40*** (0.01)	0.29*** (0.08)	0.21*** (0.02)	0.26*** (0.02)	0.21*** (0.02)		0.30*** (0.11)		0.31*** (0.11)
Credit/Assets _{t-1}	0.01** (0.00)	0.01** (0.00)	0.02*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)		0.01** (0.00)		0.01** (0.00)
Deposit/Assets _{t-1}	-0.03*** (0.01)	-0.03*** (0.01)	-0.02*** (0.00)	-0.02*** (0.01)	-0.02*** (0.00)	-0.03*** (0.00)	-0.02*** (0.00)		-0.03*** (0.01)		-0.03*** (0.01)
Capital/Assets _{t-1}	-0.01 (0.01)	-0.01 (0.01)	0.01*** (0.00)	-0.00 (0.01)	-0.00*** (0.00)	-0.00*** (0.00)	-0.01*** (0.00)		-0.01 (0.01)		-0.01 (0.01)
Liquid Assets/Assets _{t-1}	-0.01*** (0.00)	-0.01*** (0.00)	-0.00*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)		-0.01*** (0.00)		-0.01*** (0.00)
NPL _{t-1}	0.00 (0.01)	0.00 (0.01)	-0.03*** (0.00)	0.00 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)		0.00 (0.01)		0.00 (0.01)
Profit/Assets _{t-1}	0.02 (0.01)	0.02 (0.01)	0.01*** (0.00)	0.02** (0.01)	0.03*** (0.00)	0.02*** (0.00)	0.03*** (0.00)		0.02* (0.01)		0.02 (0.01)
TR Macro Variables											
Real GDP Growth _{t-1}	0.00 (0.00)	0.00 (0.00)	0.01*** (0.00)	-0.01 (0.01)	0.01*** (0.00)	0.00** (0.00)	0.00* (0.00)		0.00 (0.00)		0.00 (0.00)
Inflation _{t-1}	0.72 (0.44)	0.61 (0.45)	-2.96*** (0.47)	-0.99* (0.51)	-1.43*** (0.48)	0.36 (0.51)	-1.80*** (0.47)		0.34 (0.43)		0.57 (0.44)
Real Effect. Exc Rate _{t-1}	-0.00 (0.00)	-0.00 (0.00)	0.01*** (0.00)	-0.00*** (0.00)	-0.00** (0.00)	-0.00** (0.00)	-0.00 (0.00)		-0.00 (0.00)		-0.00 (0.00)
Constant	6.39*** (1.43)	6.37*** (1.43)	4.16*** (0.10)	6.26*** (1.05)	7.33*** (0.34)	5.40*** (0.39)	7.20*** (0.33)	8.86*** (0.36)	6.18*** (1.41)	9.47*** (0.31)	6.48*** (1.44)
Bank / Lender Country / Loan Types Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	136,783	136,783	136,783	136,783	136,783	136,783	136,783	136,783	136,783	136,783	136,783
R ²	0.14	0.14	0.07	0.14	0.14	0.14	0.14	0.13	0.14	0.13	0.14

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

Since the correlation between individual US factors is moderate in our sample, we add most drivers simultaneously to the

model in regressions through 8 and 11.¹ According to the 9th and 11th regressions, where the demand side as well as the fixed effects of the borrower bank, lender country, loan type and time are controlled by bank-based variables and macro indicators, the VIX representing the global risk appetite has significant and robust effects on Turkish banks' cross-border loans at 1 percent level. In addition, we find a significant effect of global banks' funding conditions on the external debt of Turkish banks.²

As seen in Table IV.1.2, the aforementioned global liquidity indicators have statistically significant effects on cross-border bank loans of the Turkish banking sector. This implies that sharp movements in global liquidity indicators as a result of financial shocks in any of the lender countries or banks have the potential to create volatility in cross-border loans of Turkish banks. At this point, we test whether the increased diversification in funding sources has had a limiting effect on the mentioned volatility.

In Table IV.1.3, we include in the model not only global liquidity indicators but also their interactions with the number of lender countries that provide funds to borrower Turkish banks. When indicators are considered individually as in the first seven rows in the Table, the sensitivity of Turkish banks' cross border loans to all global liquidity indicators, except the slope of the US yield curve, is lowered by the increasing diversification in lender countries/banks. According to the 8th and 9th regressions, where all indicators are added to the model simultaneously, the sensitivity of cross-border bank loans to the global liquidity indicators, namely the VIX index, TED spread, Federal Funds Target Rate and the US credit conditions, decreases as a result of the increasing diversification in lender countries/banks. Hence, the estimation results indicate that the Turkish banking sector has not only continued to roll over its debts from traditional financial centers but also gained access to new countries and banks. Moreover, the increasing diversification of lender origin limits the risks related to the concentration of lender countries and lowers the sensitivity of cross-border bank loans to global liquidity conditions.

¹ Due to the high correlation between the real policy rate representing the monetary policy and the slope of the yield curve, we do not add them to the model simultaneously. Similarly, due to the high correlation between real credit growth, which represents the lending appetites of global banks, and the ratio of private credits to GDP, we also do not add them to the model simultaneously.

² We control the funding conditions of foreign global banks via TED spread, real credit growth and ratio of private credit to GDP. In the 9th and 11th regressions, while the effect of TED spread and real credit growth is insignificant, we find a significant and robust effect of the private credit to GDP ratio on cross-border bank loans.

Table IV.1.3

Estimation Results

Dependent Variable:		The Logarithmic Value of Cross-Border Bank Loans								
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
CBOE VIX _{t-1}	-0.01*** (0.00)							-0.01** (0.00)	-0.01** (0.00)	
(Country*CBOE VIX) _{t-1}	0.00*** (0.00)							0.00** (0.00)	0.00** (0.00)	
TED Spread _{t-1}		-0.19*** (0.04)						-0.15*** (0.06)	-0.08 (0.06)	
(Country*TED Spread) _{t-1}		0.01*** (0.00)						0.01*** (0.00)	0.00 (0.00)	
Slope of Yield Curve _{t-1}			0.00 (0.00)					0.00 (0.00)		
(Country* Slope of Yield Curve) _{t-1}			-0.00 (0.00)					-0.00 (0.00)		
Real Policy Rate _{t-1}				-0.09*** (0.02)					-0.09* (0.05)	
(Country*Real Policy Rate) _{t-1}				0.00* (0.00)					0.00*** (0.00)	
Real Credit Growth _{t-1}					0.01*** (0.00)				0.01*** (0.00)	
(Country*Real Credit Growth) _{t-1}					-0.00* (0.00)				-0.00** (0.00)	
Credit/GDP _{t-1}						0.06* (0.03)		0.11*** (0.03)		
(Country*Credit/GDP) _{t-1}						-0.00** (0.00)		-0.00*** (0.00)		
M2 Growth Rate _{t-1}							0.04*** (0.01)	0.02 (0.01)	0.00 (0.01)	
(Country*M2 Growth Rate) _{t-1}							-0.00*** (0.00)	-0.00 (0.00)	-0.00 (0.00)	
Country _{t-1}	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)	-0.00 (0.00)	0.02*** (0.00)	-0.00 (0.00)	
Constant	11.34*** (0.15)	11.23*** (0.15)	9.27*** (0.17)	10.06*** (0.18)	9.31*** (0.17)	8.74*** (0.30)	6.57*** (0.34)	8.35*** (0.32)	9.54*** (0.20)	
Bank / Lender Country / Loan Types Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Bank-Specific Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
TR Macro Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Number of Observations	136,727	136,727	136,727	136,727	136,727	136,727	136,727	136,727	136,727	
R ²	0.14	0.14	0.13	0.13	0.13	0.13	0.14	0.14	0.13	

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

IV.1.5 Conclusion

With the rise in international activities, financial integration has also deepened and gained strength globally, and capital flows from advanced countries to emerging countries have increased. The high sensitivity of cross-border bank loans to global liquidity developments have the potential to create volatility in capital flows as a result of financial shocks in any of the lender countries or banks. In this context, the transmission of financial shocks in a certain region to other countries through financial linkages, and the potential macro-financial imbalances resulting from capital flow volatility have led borrowing countries to take measures against the negative effects induced by the volatility in capital flows. In an environment of macroprudential policies implemented by policy makers in Turkey, the sector continues to roll over its debts from traditional financial centers, but it has also gained access to new countries/banks. Accordingly, the number of lender sources that provide funds has increased steadily, and regions outside the traditional financial centers have also become important sources of funds for the Turkish banking sector. Estimation results indicate that the increasing diversification of lender countries/banks lowers the sensitivity of cross-

border bank loans to global liquidity conditions and therefore limits the spillovers of potential financial shocks that may occur in systemically important sources.

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IV.2 Measures on Corporate Sector's Access to Finance

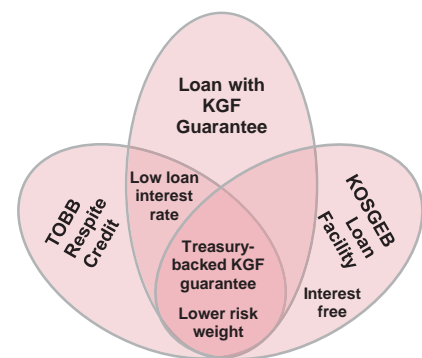
Corporate sector finance is mainly provided through domestic bank loans. Since the second half of 2015 when the banking sector tended to tighten corporate loan standards, corporate loan growth has followed a relatively weakening trend. To break the cycle of weakening economic activity, increased credit risk and tightened credit standards that emerged in the face of a series of shocks experienced in 2016, prudential measures have been taken recently to support the access of the corporate sector, and SMEs in particular, to finance. Consequently, the increase in the guarantee limit of the Treasury-supported Credit Guarantee Fund (KGF), TOBB's low-interest loan facility (Respite Credit) and KOSGEB's interest-free loan support have contributed positively to corporate loan growth and also mitigated possible risks to economic growth that may come from the credit channel. Effective implementation of the aforementioned measures, which stand out with collateral and interest support, is important in terms of limiting downside risks to economic activity. In this regard, the mechanism of these measures and their implications for credit growth and interest rates are analyzed in this study.

IV.2.1 Recent Measures Taken to Increase Corporate Access to Finance

Due to the close interaction between credit growth and economic activity, the effects of negative developments on the real economy may incrementally increase macroeconomic and fiscal vulnerabilities as a result of fiscal acceleration. In this context, prudential measures have been taken for the corporate sector, aiming to reduce risks to economic growth that may originate from the credit channel in the recent period.

The foremost measure in terms of corporate financial access was the amendment focusing on the increase in the Treasury-supported KGF guarantee limit. The KGF supports financial access of companies with insufficient collateral by providing guarantee facility. Among the sources of KGF guarantee, Treasury support seems to be the main source besides the fund's own equity and finance provided from abroad.

Figure IV.2.1
Measures to Increase Corporate Access to Finance



Treasury-Supported KGF Guarantee

The KGF guarantee limit supported by the Undersecretariat of Treasury has been increased to TL 250 billion from TL 20 billion.¹ The Treasury compensation limit to be applicable in cases where the credit is not properly paid back in full and/or on time, i.e. if the credit with KGF guarantee is classified as a non-performing loan, was increased from TL 2 billion to TL 25 billion, which corresponds to 10 percent of the KGF guarantee.² Following the publication of the Decree of the Council of Ministers regarding the increase of the Treasury-supported KGF guarantee limit to TL 250 billion, a protocol was signed between the Treasury and the KGF in March 2017. With this protocol, the guarantee volume was initially determined as TL 200 billion and the Treasury compensation limit for NPLs was set as 7 percent of guarantee.³

The maximum KGF guarantee/loan ratio for SME loans, corporate loans for exporters and companies performing foreign exchange (FX) earning activities (Eximbank and other banks) and other corporate loans has been increased to 90, 100 and 85 percent, respectively.⁴ Additionally, in order to reduce the cost of funding for KGF guarantee, guarantee commission fee was reduced to one time 0.03 percent from the 0.5 – 2 percent range, and the application fee was canceled. The Treasury-supported KGF guarantee can be used for TL, FX or FX-indexed credits. Working-capital loans can have a maturity of between 6 months and 5 years while investment loans can be used with a maturity of 6 months to 10 years⁵. On the other hand, loan interest rates are determined by banks.

While risk weights applicable in the capital adequacy calculation are 75 and 100 percent for SME loans and large scale corporate loans, respectively, the risk weight on TL loans used within the Treasury-supported KGF guarantee scheme can be taken as zero

¹ Decision No. 2017/9969 Regarding the Amendment of the Treasury Support to the Credit Guarantee Institutions

² Law on the Amendment of the Law on Retirement Fund of the Republic of Turkey, Certain Laws and Decree Laws

³ KGF news item headlined "Up to TL 200 Million KGF Guarantee to Companies", <http://www.kgf.com.tr/index.php/en/> ; newspaper item titled "KGF relieves bankers in terms of capital".

⁴ In the previous period, the guarantee / loan ratio was 85, 100, 85 and 75 percent in SME loans, export loans (Eximbank), export loans (other banks) and other corporate loans, respectively.

⁵ There is a maximum grace period of 1 year for working-capital loans and 3 years for investment loans.

percent under certain conditions. This practice positively affects the sector’s capital adequacy ratio for loans with KGF guarantee.

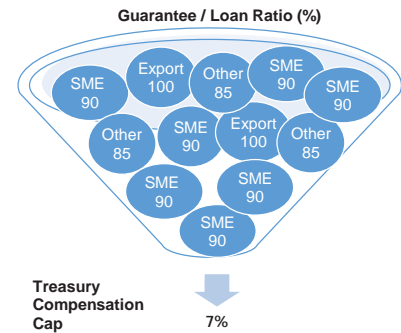
In addition to the KGF guarantee, banks may demand additional collateral from companies. The KGF, however, will be entitled to these collaterals to the extent of the guarantee/loan ratio. The additional collaterals demanded by the banks or the collections obtained through legal follow-ups are transferred to the KGF at the indemnified guarantee ratio.

Treasury support partially reduces banking sector credit risk. Following the determination of participant banks’ portfolio limit, the KGF can pay, with Treasury support, up to 7 percent of the guarantee for the NPL portion of the loans provided within this limit.

For instance, assume that Bank A has a guarantee limit of TL 10 billion. In this case, Bank A may lend up to TL 10-12 billion of credit with this guarantee depending on the segment of the credit such as SME, export etc. If one of the SME loans with Treasury-supported KGF guarantee turns into NPL, Bank A may receive from the Treasury a guarantee amount equal to 90 percent of the loan, whereas it may receive a guarantee amount as much as the loan amount when a credit extended as an export loan (both SME and large scale) turns into NPL. On a loan basis, for NPLs, banks can get compensation from the Treasury at the guarantee/loan ratio (85, 90 and 100 percent). However, this facility is valid until the NPL ratio reaches 7 percent for the loans the bank extends with the Treasury-supported KGF guarantee. If the NPL ratio exceeds 7 percent, the credit exposure above 7 percent will be borne by the bank. In short, the bank will be able to receive payment at the rate of guarantee if the NPL ratio for the bank-specific portfolio is less than 7 percent, whereas it must bear the increased credit risk if the NPL ratio exceeds 7 percent. In this context, it is important for the banking sector to perform effective credit risk management for the loan portfolio with Treasury-supported KGF guarantee.

The 7-percent upper limit of compensation urges banks to perform effective risk management. In this regard, the risk of loans with KGF guarantee to turn into non-performing loans is expected to evolve in a way similar to the existing loan portfolio.

Figure IV.2.2
Compensation Upper Limit for Treasury-Supported KGF Guaranteed Loans



Portfolio Guarantee System

The "Portfolio Guarantee System" (PGS) has been developed within the KGF to speed up the credit utilization process. With the PGS, credit applications for up to TL 12 million in SME loans and up to TL 50 million in large scale company loans within the Treasury-supported KGF guarantee scheme are directly evaluated by the bank. Following the bank's approval of the loan, the KGF only seeks compliance with the beneficiary conditions set out in the Decree of the Council of Ministers. This system contributes to getting quicker results for the loan application. For loans that exceed the abovementioned limits, in addition to the bank, the KGF also makes a credit evaluation. With the recent amendment, at least 80 percent of the total guarantee is aimed to be granted in the scope of PGS, especially as SME loans.

KOSGEB's Interest-Free Loan Support

In December 2016, a credit facility with an upper limit of TL 50,000 and with a maturity of 36 months (and a grace period of the first 12 months), in which interest payments would be paid by KOSGEB, was introduced for KOSGEB member firms. The demand for this facility was fairly high, and 15,000 companies were able to benefit from these interest-free loans in the first phase. In the second phase in March, approximately 460,000 companies that fulfilled the application requirements and requested interest-free loan support were able to benefit from this opportunity. In the latter phase, the loan amount ranged between TL 20,000 and 50,000 depending on the firm size. This support aims to create a loan volume of approximately TL 11 billion mainly for micro and small businesses. In the case of KOSGEB interest-free loan support, the KGF guarantee can also be used if the company requests.

TOBB's Low-Interest Respite Credit

The Respite Credit has been designed in consideration of the KGF guarantee facility and TOBB's deposits at Ziraat Bank and Denizbank. These two banks can grant loans to TOBB member companies with a maturity of 1 year and 9.9 percent annual interest rate. This scheme envisages creation of a loan volume of TL 5 billion and allocation of KGF guarantee of TL 4.2 billion for this project.

Currently, wholesale and retail trade, manufacturing and construction sectors are at the forefront in the use of Respite Credit.

IV.2.2 Loan Growth and Interest Rate Developments Following the Measures

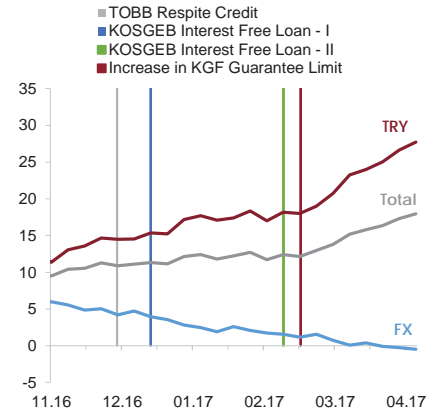
In the first four months of 2017, the acceleration in loan growth was driven by measures taken to increase corporate access to finance and support corporate loans. The strong loan growth particularly in the post-March 2017 period has mainly stemmed from the increase in the Treasury-supported KGF guarantee limit along with companies' and banks' intense interest in this facility (Chart IV.2.1).

The KGF guarantee portfolio amount allocated to banks reached about TL 160 billion as of 30 April 2017. Of this amount, TL 106-billion credit volume (with a guarantee amount of TL 93 billion) was granted to companies.⁶ Banks extend credits within approximately one month following the credit approval by the KGF. Considering that the TL corporate loan stock increased by TL 105 billion from 30 December 2016 to 28 April 2017, it can be said that the KGF guarantee facility has been used extensively. The KGF guarantee is mainly used in TL denominated and SME loans. In terms of loan type, working capital loans that can be used with a maturity from 6 months to 5 years stand out.

Due to the fact that measures focus mainly on SMEs, TL-denominated SME loan growth may accelerate in the upcoming period. As a matter of fact, while large scale corporate loans had a determining role in TL corporate loan growth as of 2016, SME loan growth accelerated in February and March (Chart IV.2.2). Considering that loans with the KGF guarantee have been used predominantly since mid-March, the strengthening in SME loan growth is expected to continue for a while.

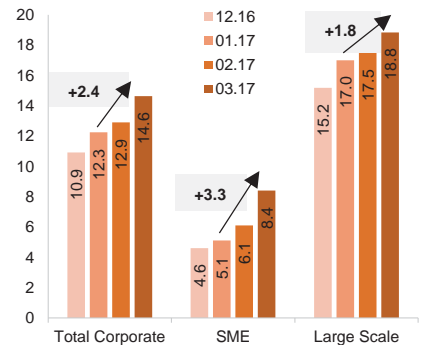
Despite the increase in the SME loan usage, interest cost for these loans remained at reasonable levels. Interest rates for large and medium-scale corporate TL loans gradually increased in 2017, while there is a more favorable structure in micro and small-scale corporate

Chart IV.2.1
Corporate Loan Growth
(Annual Percentage, FX Adj.)



Source: CBRT (Latest Data: 28.04.17)

Chart IV.2.2
Corporate Loan Growth By Scale
(Annual Percentage, FX Adj.)

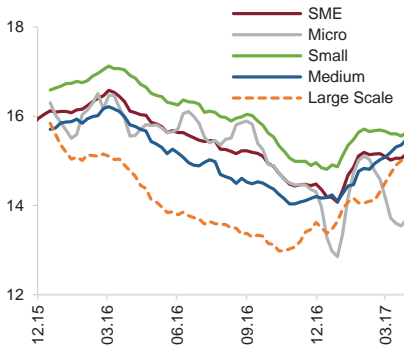


Source: CBRT (Latest Data: 03.17)

⁶ Including KOSGEB interest-free loan support (upon applicant-company's KGF guarantee request) and TOBB Respite Credits (direct).

Chart IV.2.3

Corporate Loan Interest Rate by Scale¹
(Excluding credit cards and overdraft accounts, 4-week MA, Percentage)



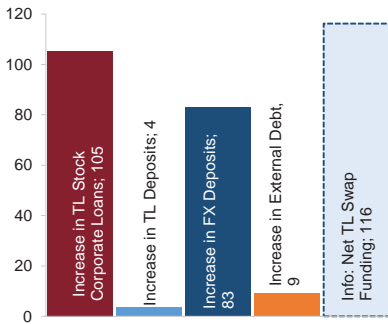
1) Excluding zero percent interest rate loans for large scale companies.
Source: CBRT (Latest Data: 28.04.17)

loan rates in which credit support is intensified (Chart IV.2.3). It is estimated that TOBB and KOSGEB credit supports were the determinant of the decline in micro-scale corporate loan rates in January and March.

While loan growth has recovered thanks to the regulatory amendments effective since 2016Q3, the KGF guarantee facility has also supported this recovery particularly from mid-March onwards. Treasury-supported KGF guaranteed loans are predominantly provided in the form of new loans, which has been influential in this development.

Chart IV.2.4

Loan Usage and Funding Structure between December 2016 – April 2017 (Billion TRY)¹



1) December 30, 2016 – April, 28 2017 period developments.
Source: CBRT (Latest Data: 28.04.17)

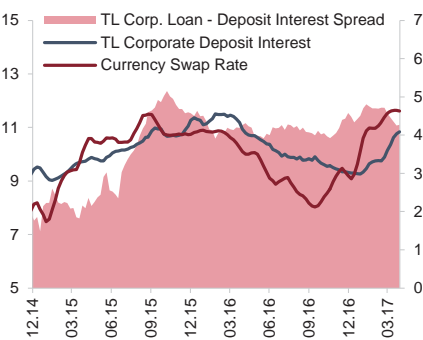
Along with the recent acceleration in loan growth, mainly FX deposits increased on the funding side. Compared to 2016 year-end, the increase in TL corporate loans amounted to TL 105 billion while TL deposits grew by TL 4 billion and FX deposits rose by TL 83 billion. The rise in FX deposits was reflected in TL currency swaps (Chart IV.2.4).

Loan interest rates for SMEs followed a flat course until the end of April and the TL commercial loan-deposit rate spread narrowed slightly, while commercial deposit and currency swap rates increased (Chart IV.2.5).

IV.2.3 Conclusion

Chart IV.2.5

Deposit and 3 Month Currency Swap Interest Rates (4-week MA, Percentage)



Source: CBRT (Latest Data: 28.04.17)

Corporate sector access to finance has been supported by the Treasury-supported KGF guarantee, the TOBB Respite Credit and the KOSGEB interest-free credit facility. Both banking and corporate sectors have intense interest in these mechanisms, and there has been a strong increase in corporate loan growth in the recent period. Following the protocol between the Treasury and the KGF, loans granted via the KGF guarantee facility accelerated also due to companies' retained loan demand. These credits' low risk weight in capital adequacy calculations and the strong collateral structure have bolstered utilization of credit with KGF guarantee. Credit utilization is expected to follow a more balanced path throughout the year after KGF-guaranteed credit demand reaches a certain degree of saturation.

IV.3 Drivers of Credit Dollarization

Abstract

While the tendency of banks to match their foreign currency (FC) assets with their FC liabilities feeds the supply side of credit dollarization, firms' stronger preference for FC credits, relying on their natural heghes (e.g. export revenues), supports the the demand side of credit dollarization. Findings of this special topic show that both (bank and firm) tendencies increase credit dollarization while the bank side effect is stronger. Among bank liabilities, non-core FC liabilities (such as FC bonds, syndications and securitization) were found to be a stronger driver of credit dollarization compared to FC deposits.

IV.3.1 Introduction

Since the global financial crisis, increased capital flows supported by the expansionary monetary policies of central banks of developed countries have steadily fed the credit dolarization in developing countries.¹ These FC credits are attractive for firms as they allow access to cheaper finance with longer maturities. However, they contain the risk of deteriorating firms' financial structures, particularly at times of high exchange rate volatility.² As a matter of fact, these negative effects can be critical for the stability of the financial system.

In this special topic, the effect of bank and firm tendencies, the two sides of the loan supply and demand relationship, on feeding credit dollarizaiton is examined. In general, concentration of deposits in FC as a result of volatility in local currency; international funds being available mostly in hard currencies (e.g., USA dollars, euros) generate significant dollarization in bank liabilities in developing countries (Hausmann et al. 2001)). Lending these FC

¹ Hake et al. (2014) provides a detailed meta-analysis of the credit dollarization and its causes. Honohan (2006) discusses dollarization trends and interaction with macro variables for Turkey. The distribution of the recent firm level credit dollarization trends in Turkey is studied descriptively in Hulağü and Yalçın (2014).

² Barajas et al. (2016) analyze the data from Colombian firms that shows that the financial structures of firms with high FX credits have deteriorated during the sudden devaluation of the local currency and their investment performance has significantly weakened. They also emphasize that only a small part of this deterioration can be recovered by the exchange rate recovery.

funds directly in local currency is restricted by regulations, as that would expose banks to currency risks.³ For this reason, banks in Turkey can only extend loans from these FC funds in TL, once they have bought protection against exchange rate risk through swap transactions. Alternatively, the banks can transfer the currency risk to borrowing firms by directly lending in FC (e.g. asset-liability matching).⁴ On the demand side, firms with natural hedges (e.g. export revenues) against exchange rate fluctuations prefer low-cost FC loans, particularly in long-term financing.⁵ Firms' tendency towards low-cost FC loans, relying on their natural hedges and banks' asset-liability matching propensity constitute the demand and supply sides of credit dollarization.

The results of this analysis show that both firms' and banks' behaviors feed credit dollarization. When the size of the effects is examined, the effect of banks' asset-liability matching tendency appears to be stronger. It is interesting and important that the effects of the above mentioned tendencies on credit dollarization are not linear. In other words, while the increase in natural hedges (FC incomes) raises the credit dollarization regressively, the increase in banks' FC liabilities supports the credit dollarization progressively. A look into the structure of banks' FC liabilities indicates that the effect of FC deposit and non-core FC liabilities on credit dollarization is different. According to our findings, while non-core FC liabilities (e.g. FC bonds, syndications and securitizations) are transformed significantly into FC loans, the effect of FC deposits with relatively low maturities on credit dollarization is considerably limited.

The results of the study are generally in line with the related literature. For example, Brown et al. (2014) concluded that the bank that was the subject of their analysis, performed asset-liability matching by increasing the FC credit acceptance rates during periods of increased FC liabilities. Luca and Petrova (2008) also support this finding with their analysis of aggregate panel data. Alp and Yalçın (2015) and Özsöz and others (2015) are the most striking

³ According to the current regulations, the net FC position (FC asset - FC liability) of banks in Turkey can not exceed twenty percent of risk weighted assets (Official Gazette No: 26333dated November 2006). Currently, this ratio is much lower than the regulated limit for many banks.

⁴ As per current regulations, real persons in Turkey can not borrow in FC. Firms with FC revenues or large firms with no FC revenues but have a capacity to borrow over 5 million USD dollars can obtain FC loans (domestic FC loans). Firms that do not have any FC income are only permitted to obtain FC indexed loans (CBRT 2009 / YB-22).

⁵ The FC financing cost here does not include the hedging cost. As a matter of fact, firms' FC revenues already provide natural protection.

ones among the papers using Turkish data. The first one, which only controls for the firm-side effects, primarily relates the credit dollarization with firms' FC revenues, while the second one only focuses on the supply side (banks) and, concludes that credit dollarization is largely backed by banks' FC liabilities. In our current work, both sides of the loan relationship are controlled for by taking into account the demand and supply sides at the same time. In this regard, it is the first study on Turkey which considers the both sides.

IV.3.2 Estimation Methodology

The model presumes that both banks and firms are risk averse and they adopt the minimum variance portfolio (MVP) method in their lending and borrowing decisions. While the basic dynamics of this method were discussed in Ize and Levy-Yeyati (2003), Luca and Petrova (2007) established an empirical application of it. In this study, following the analysis of Luca and Petrova (2007) that uses country level aggregate data, the following model is estimated by incorporating firm and bank heterogeneity:

$$\left(\frac{YP\ Credits}{Total\ Credits} \right)_{it} = \alpha' (Firm)_{it-1} + \beta' (Synthetic\ Bank)_{it-1} + \theta' (Credit\ Portfolio)_{it-1} + f_i + d_t + e_{it}$$

The dependent variable is the ratio of firm i 's FC credits (to the synthetic bank that is defined specifically for firm i) to total credits (FC + TL) in date (yyymm) t .⁶ The independent variables are the firm variables that are obtained from the annual balance sheet and income tables; the synthetic bank monthly balance sheet and income table variables, obtained by weighting bank variables using each bank's share in the credit portfolio of firm i and finally, the characteristics of the firm-synthetic bank credit portfolio. In more detail, the synthetic bank can be expressed as the sum of the multiplication of each bank's share (γ_{ijt}) in firm i 's credit portfolio at date t with its own balance sheet and income table. In this way, all bank relationships of firm i at time t are reduced to one synthetic bank, which allows our analysis to concentrate directly on the firm-level credit dollarization.

$$(Synthetic\ Bank)_{it} = \sum_j \gamma_{ijt} [Bank\ Balance\ Sheet]_{ijt}$$

⁶ Since, detailed data on the FC credits obtained from foreign financial institutions abroad (cross boarder lending) is not available, the analysis only includes domestic FC and FC indexed credits.

All the independent variables used in the model are presented in Table IV.3.1. Firms' natural hedge is captured by "export / total sales" and banks' liability dollarization is measured by "FC liability / total liabilities" variables. Besides, liability dollarization was examined in two different parts: deposits (FC deposit / total liabilities) and non-deposit FC liability (non-deposit FC liability / total liability) dollarization.

Table IV.3.1

Independent Variables

Firm Variables	Synthetic Bank Variables	Credit Portfolio Variables
Log (Tot. Assets)	(w) Log (Tot. Assets)	Main Financing Sector
Export/ Tot. Sales	(w) FC Liabilities/Tot. Liab.	Num. Of Credit Sector
Tengjable Assets./ Tot. Assets	(w) FC Deposits/Tot. Liab.	Share of Midterm Maturity (12-24 Months) (5)
Trade Credits/Tot. Debt (1)	(w) Deposits Excl. FC Liab /Tot. Liab.	Share of Longterm Maturity (24+ Months)
Tot. Debt/ Tot. Assets (1)	(w) Tot. Liab./ Tot. Assets	
Interest Coverage Ratio (ICR) (2)	(w) Profits/Equity	
	(w) NPL/(NPL+Tot. Credits) (3)	
	Synthetic Bank Ownership (4)	
	Main Financing Bank	
	Num. Of Financing Bank (in Sythetic Bank)	

(1) Total Debt: Sum of Financial, trade ve other credits. (2) ICR EBITA/ Finance Costs. (3) All (household and firm) credits. (4) Ownership Public, private, foreign, participation etc. (5) Contains all (TL and FC) credits blonging to firm *i*. (w) Weighted (synthetic bank) variables. Deposits Excl. FC Liab: FC assets - liabilities.

Moreover, the factors that may affect firms' FC loan demand are selected as independent variables by following the related literature. In short, these include: firm size (total assets), firm capital (investment) status (share of tangible assets in total assets), access to non-bank financial facilities (trade credits as a share of total liabilities), general leverage (total debts / total assets) and financial strength (interest coverage ratio). Likewise, the size of the (synthetic) bank, the leverage, equity profitability, the risk appetite in the credit portfolio (NPL ratio), ownership ratios (e.g. public and private), the number of banks entering the synthetic bank total and share of the bank with the highest share in the synthetic bank – main financing bank (MFB). Finally, the share of the "main credit sector (subject)" (MCS) with the largest share in terms of the subject of the loan portfolio, the total number of credit sectors obtained by firm *i* on each date and the maturity structure of the loan portfolio is controlled for the medium and long term.

In order to deal with the potential endogeneity problems in the model, yearly firm variables are lagged by one year, monthly (synthetic) bank and loan portfolio variables are also lagged for one month. Besides controlling for the firm, MFB, MCS and time fixed effects, MCS is also interacted with time fixed effects in all

specifications. In addition to these, number of different specifications are performed to test the robustness of the main results, including interacting firm and MFB fixed effects with the time dummies. Interacting firm FE with time dummies allows us to fully control for the firm (demand) side and interacting MFB FE with time dummies also allows us to control for most of the supply side effects. One potential weakness of the estimation here is that a dynamic data generating process is not considered in the model despite the fact that the dependent variable is characterized based on stock (credit balance) data instead of a flow (loan) data. In order to account for this, the model is re-estimated with quarterly and annual dependent variables. The results presented below have remained substantially robust across all these different specifications.

IV.3.3 Data and Descriptive Statistics

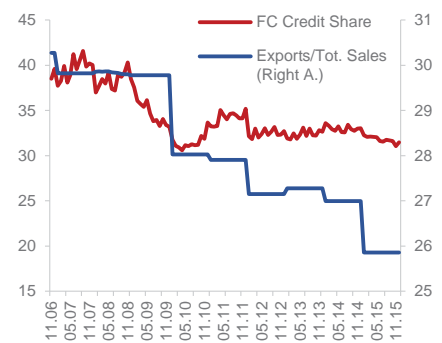
The annual company balance sheet and income tables were obtained from the CBRT's firm data base, monthly bank financial data come from the BRSA and finally, monthly firm-bank matched credit balance data was obtained from the TBB Risk Center (TBB RM). Descriptive statistics of only the variables that are of particular importance for the purpose of this special topic are presented in Table IV.3.2. In general, firms' tendency towards credit dollarization has declined over time and reached 31 percent by the end of 2015 (Chart IV.3.1). A similar trend is observed in firms' average export shares in the same chart. Although the size of the relationship has been somewhat reduced since the FC lending regulation in 2009⁷, the fact that they follow similar trends over time indicates that there is a strong relationship between credit dollarization and export sales (over 80 percent correlation).

Considering the fact that the average firm size in the sample is 96.8 million TL, there appears to be a bias towards large firms. Even though this may suggest that small firms are under-represented in the sample, it will have a limited impact on the results. This is mainly because FC credits are highly concentrated in large firms due to current regulations. In Graph IV.3.2, we compare credit balance distributions of FC loans with the corresponding population of TBB RM

⁷ With the Council of Ministers decision No: 27260 dated June 2009, large firms with no FC revenues but have the capacity to borrow over 5 million USD dollars were permitted to borrow in FC with at least one year or longer maturity. In accordance with this decision, FC loans issued under this regulation are presumably used more actively in the financing of infrastructure projects. This may weaken correlation between export revenues and FX borrowing.

Graph IV.3.1

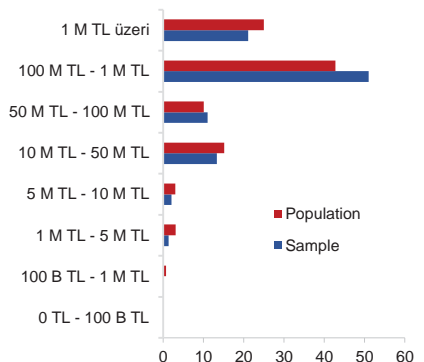
Average Firms' Export Share (Annual) and Average FC Credit Share (Monthly) (percent)



Source: CBRT (Latest Observation: 12.15)

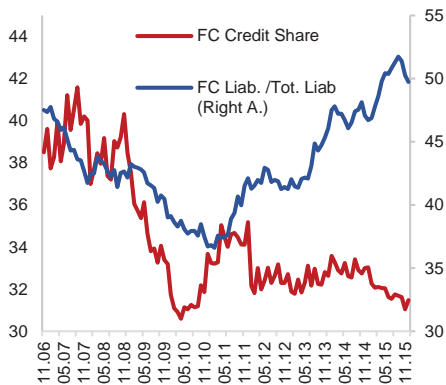
Graph IV.3.2

Amount Distribution FC Credit Balance, as of December 2015 (percent)



Source: TBB Risk Center, CBRT

Graph IV.3.3
Average Bank FC Liabilities Share and Average FC Credit Share (Yuzde)



Source: CBRT (Latest Observation: 12.15)

data for December 2015. According to the graph, the difference between the sample and the population is particularly minimal especially at and above 5 million TL.⁸

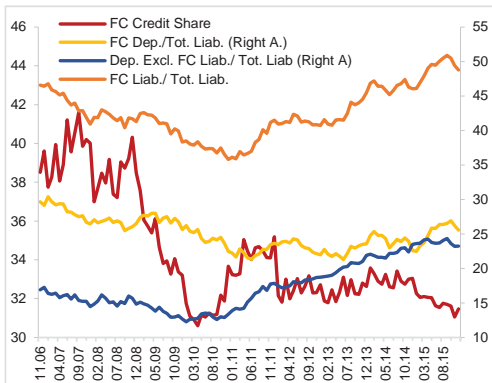
Similarly, the relation between the share of banks' FC liabilities in total liabilities and the firm level average credit dollarization is presented in Chart IV.3.3. Although the relation appears to diverge from the beginning of 2013 and on, generally a positive relationship is observed. The correlation before 2013 was around 60 percent, which becomes negative as of 2013. Considering different components of banks' FC liabilities (FC deposits, syndication, etc.), there appears to be a stronger correlation between the non-deposit FC funds and the credit dollarization (Chart IV.3.4). As a matter of fact, while FC deposits have been more stable, recently the share of non-deposit FC liabilities has significantly increased.

Table IV.3.2
Summary Statistics

Variables	Observation	Mean	Std. Deviation
Dependent Variable (Monthly)			
FC Credits/Total Credits	1,105,951	0.34	0.42
Firm Independent Variables (Annually)			
Total Assets	101,137	96,800,000	575,000,000
Export/Total Sales	99,885	0.15	0.27
Synthetic Bank Independent Variables (Monthly)			
(w) Total Assets	1,105,951	85,200,000	56,300,000
(w) FC Liabilities/Tot. Liab.	1,105,951	0.43	0.08
(w) FC Deposits/Tot. Liab.	1,105,951	0.25	0.05
(w) Deposits Excl. FC Liab./Tot. Liab.	1,105,951	0.18	0.09

IV.3.4 Empirical Findings

Graph IV.3.4
Shares of FC Liabilities in Banks' Total Liabilities and Average Firm FC Credits Share (percent)



Source: CBRT (Latest Observation: 12.15)

Summary of important empirical findings is presented in Table IV.3.3. Findings show that firms' propensity to rely on their natural protections and the banks' asset-liability matching tendencies are obvious drivers of credit dollarization (Table IV.3.3, columns (1) and (2)). According to the estimates, one standard deviation (0.27) increase in firms' export/total sales ratio results in an average increase of 1.3 percentage points in firm level credit dollarization on a monthly basis, while the same increase in the banking sector (FC liability share) results in a 2 percentage point increase in credit dollarization. Comparing the standardized coefficient estimates shows that banks' tendencies feed credit dollarization more strongly than those of firms.

⁸ For more information on the concentration of FC credits among large firms, see: Financial Stability Report May and November 2016.

The effect of one standard deviation increase in banks' FC core liabilities, share of FX deposits in total liabilities, on credit dollarization is 1 percentage point, while for non-deposit FC liabilities, this effect was estimated at 2.2 percentage points. These findings show that the non-core FC funds obtained through bond issuance, syndication or securitization from abroad feed domestic credit dollarization more than core FC funds. This can be explained by the fact that non-core FC funds have a longer maturity structure than core FC funds and thus, are preferred more strongly in FC loan financing.

Table IV.3.3

Coefficient Estimates, Dependent Variable: FC Credits/Total Credits

	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	All	All	At Least Once & Manufacturing	At Least Once & Manufacturing
Export/ Tot. Sales	0.0497*** (0.0109)	0.0497*** (0.0109)	0.127*** (0.0281)	0.127*** (0.0281)	0.0742*** (0.0148)	0.0741*** (0.0148)
(Export/ Tot. Sales) ²			-0.0919*** (0.0314)	-0.0925*** (0.0314)		
(w) FC Liabilities/Tot. Liab.	0.249*** (0.0249)		0.0505 (0.0784)		0.367*** (0.0428)	
(w) (FC Liabilities/Tot. Liab.) ²			0.206** (0.0811)			
(w) FC Deposits/Tot. Liab.		0.224*** (0.0385)		0.100 (0.162)		0.304*** (0.0722)
(w) (FC Deposits/Tot. Liab.) ²				0.263 (0.303)		
(w) Deposits Excl. FC Liab /Tot. Liab.		0.253*** (0.0263)		0.152*** (0.0444)		0.371*** (0.0434)
(w) (Deposits Excl. FC Liab /Tot. Liab.) ²				0.130** (0.0616)		
Other Firm Variables	Yes	Yes	Yes	Yes	Yes	Yes
Other (w) Bank Variables	Yes	Yes	Yes	Yes	Yes	Yes
Credit Portfolio Variables	Yes	Yes	Yes	Yes	Yes	Yes
Num of Observation	791,866	791,866	791,866	791,866	300,277	300,277
R ²	0.841	0.841	0.841	0.841	0.781	0.781

Robust (clustered) standard errors in parantheses, *** p<0.01, ** p<0.05, * p<0.1, (1) Firm variables are lagged for 12 months, and bank variables are also lagged for 1 month. (2) variable x and its square (x²) are jointly statistically significant according to all conventional levels. At Least Once: Firms that have used FC loans at least once during the sample period. Manufacturing: Main sector of credit is manufacturing sector.(w)-Weighted synthetic bank variable. Deposits excluded YP Liabilities: FC Liabilities-FC Deposits. The firm, the main financier bank, the main credit sector, the date, and the main loan, are each checked on the basis of fixed variables.

In Table IV.3.3 columns (3) and (4), we add non-linear variables to our estimates and examine the increase or decrease rates of the above-mentioned effects relative to their initial levels. According to the results, the effect of firms' natural hedges on the FC borrowing is positive but at a diminishing rate, whereas the reverse is observed on the bank side. In short, although firms prefer to borrow in FC by relying on their natural protection (e.g. export revenues), this trend is weakened as export levels increase. Such differentiation in the general tendency is considered to be the result of firms needing TL financing, in order to maintain their domestic

production activities and to obtain short term financing. On the banks side, the effect of the asset-liability matching tendency on credit dollarization is generally increasing. In other words, the increase in the share of FC in total liabilities supports the credit dollarization at an increasing rate. The increasing effect of a rise in non-core FC funds (among FC liabilities) on the credit dollarization is faster than the increase in FC deposits. In sum, the (asset-liability matching) tendency of banks to issue FC loans from additional non-deposit FC liabilities is stronger when the level of non-deposit FC liabilities is high.

Another important result from the analysis is that firm and bank trends are stronger in the manufacturing industry, which holds almost all of the country's exports (Table IV.3.3, columns (5) and (6)). As a matter of fact, coefficient estimates for the variables that measure bank and firm tendencies increase significantly, when only the firms with the main credit topic of manufacturing industry are considered. The effect of one standard deviation increase in firms' natural hedges on credit dollarization reaches 2 percentage points, while a similar increase in bank FC liabilities leads to a rise of 3 percentage points. In support of the above findings, the effect of one standard deviation increase in non-deposit FX liabilities on credit dollarization is 3.2 percentage points, while the effect of a similar increase in FX deposits is 1.4 percentage points.

The robustness of the findings is tested with different specifications against endogeneity due to potential unobserved factors affecting bank and firm behavior. Macro trends that affect both firms and banks similarly (e.g., uncertainty, monetary policy and tightening/expansion of financial conditions) are already controlled in all specifications with year-month dummies. Moreover, using the interaction of firm FE with time dummies, all observable or unobservable factors influencing firm behavior are examined in different specifications. Even in such a detailed specification, no significant variation was recorded in the coefficient estimates of bank variables. With a similar approach, the bank side was controlled through the interaction of time dummies with the main financing bank in each synthetic bank. In this specification, the firm-side coefficient estimates remained largely the same. Finally, estimates have been repeated quarterly and annually to eliminate dynamic effects (instead of monthly bank variables). The results were qualitatively similar.

IV.3.5 Results and Policy Discussion

In this study, the effect of firm and bank behavior on credit dollarization is examined. Banks tend to reduce their exposures to exchange rate risk by matching FC liabilities with assets, and firms tend to prefer low cost and long term FC loans relying on their natural hedges. The analysis shows that these tendencies of banks and firms significantly feed credit dollarization. A comparison of the size of the impacts of both tendencies reveals that banks' asset-liability matching behavior feeds credit-dollarization more strongly. The core FC liabilities of banks (FC deposits) seem to have a relatively limited impact on credit dollarization compared to other foreign sources (such as FC bond issuance, syndications and securitization).

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IV.4 Effects of Retail Loan Regulations

While prudent borrowing tendency of households has been maintained, macroprudential standards have been loosened recently to some extent (Chart IV.4.1 and IV.4.2). Effective from 27 September 2016, the general installment limit for individual credit cards was raised to 12 months, whereas the general purpose loan cap was increased to 48 months. In addition, a restructuring facility, which allows for a maturity of up to 72 months for the restructuring of general purpose loans and individual credit card debt, was introduced. The loan to value ratio for housing loans was increased moderately. Meanwhile, general provision ratios for retail loans were lowered. This study elaborates on macroprudential policy changes since 27 September 2016 and their effects on retail loans.

IV.4.1 Regulations Regarding General Purpose Loan Maturities and the Individual Credit Card (ICC) Installment Limit

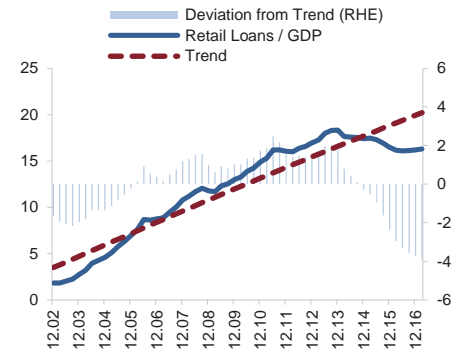
The maturity cap on general purpose loans, which had been 36 months since 2013 year-end, was raised to 48 months on 27 September 2016 (Table IV.4.1). The weighted average maturity of general purpose loans has lengthened thereafter (Chart IV.4.3). The maturity of about 75 percent of the new loans extended following this regulation is longer than 36 months. The facility of restructuring of general purpose loans with up to 72 month-maturity is also believed to have been influential in the maturity extension.

Table IV.4.1
Consumer Loan Maturity Limit
(Months)

Loan Type	Effective Date			
	Before	31.12.2013	25.11.2015	27.09.2016
General Purpose Loans (in general)	Limitless	36	36	48
-Used for financing of education	Limitless	36	Limitless	Limitless
-In the context of house modification, purchases of goods and services as an integral part of the house	Limitless	36	Limitless	Limitless
Vehicle Loans	Limitless	48	48	48
Housing Loans	Limitless	Limitless	Limitless	Limitless

Source: CBRT

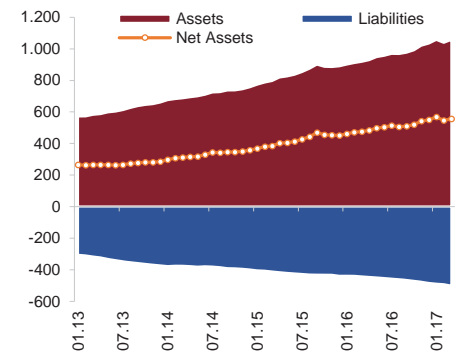
Chart IV.4.1
Retail Loans/GDP and Deviation from Trend
(Percent)



Note: HP filter method is used ($\lambda=400,000$).

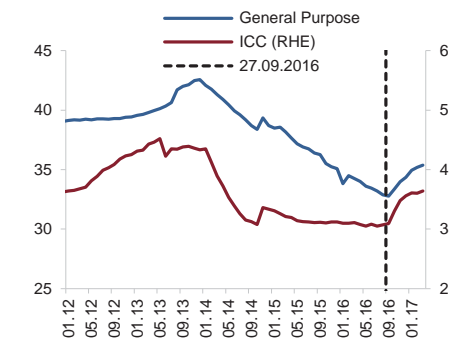
Source: CBRT (Latest Data: 03.17)

Chart IV.4.2
Household Financial Assets and Liabilities
(Billion TL)



Source: CBRT, BRSA, CMB, MKK, TOKİ (Latest Data: 03.17)

Chart IV.4.3
Average Maturity of General Purpose Loans and ICC (Stock, Months)



Source: CBRT (Latest Data: 03.17)

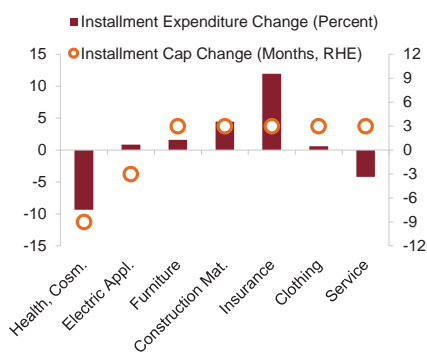
Table IV.4.2
ICC Installment Limits
(Months)

Sector	Before	Effective Date				
		01.02.2014	13.05.2014	22.10.2014	25.11.2015	27.09.2016
Goods and services purchases and cash advances	Limitless	9	9	9	9	12
Intangible goods purchases	Limitless	9	-	-	-	-
Telecommunication, meal, food and fuel	Limitless	-	-	-	-	-
Jewelry purchases	Limitless	-	-	4	4	4
White goods, furniture, education	Limitless	9	9	9	12	12
Electronic goods and computer purchases	Limitless	9	9	9	9	6
Airlines, travel agencies, transportation, accommodation, health and social services, health product purchases, club and association payments, tax payments	Limitless	9	9	9	9	9
Purchases related to direct marketing, overseas purchases and alcoholic drinks, cosmetics and office equipment expenditures	Limitless	9	9	9	9	-

Source: CBRT

While the individual credit card (ICC) general installment limit was increased from 9 to 12 months; the limit was kept at 12 months for white goods, furniture and education expenditures and 4 months for jewelry purchases. The installment limit for electronic appliances and computer purchases was lowered from 9 to 6 months, whereas the existing 9-month limit for airlines, travel agencies, transportation, accommodation, health expenditures and tax payments was preserved. While the installment ban on telecommunication, meal, food, alcohol and fuel oil expenditures remained intact, overseas and cosmetics expenditures were also classified as non-installment expenditures in the new regulation (Table IV.4.2). These changes to sectoral installment limits that contribute to the current account balance and seek a match between the periods of consumption and financing also aim to produce balanced consumption growth.

Chart IV.4.4
Change in Credit Card Installment Cap and
Installment Expenditures by Sectors
(Between September 2016-February 2017)



Note: Individual credit card makes up about 80 percent of total credit card balance. Annualized change of expenditure represents yearly change of expenditures. Positive (negative) change on installment cap represents increase (decrease) in the limit.

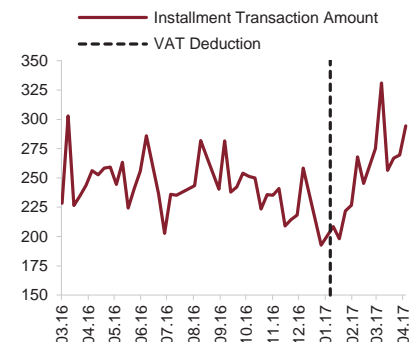
Source: BKM

It seems that the credit card installment cap regulation has had the expected impact on installment expenditures. While credit card expenditures with installments increased after September 2016 for sectors where the installment limit was raised or kept unchanged, they decreased for other sectors in which the installment limit was lowered. In February 2017, 55 percent of credit card expenditures with installments stemmed from sectors that saw their installment limits increased by the latest regulation. Furniture, construction materials and insurance sectors contributed significantly to the increase in credit card expenditures with installments. Although the

installment limit for credit card expenditures with installments was increased by 3 months in the services sector, no significant increase was observed in this sector's expenditures with installments. On the other hand, installment purchases dropped significantly in the cosmetics sector following the reduction in the installment cap (Chart IV.4.4).

The abolition of the special consumption tax on white goods purchases and the value added tax rate cut in furniture purchases in early February 2017 had positive effects on sales with credit cards. In the furniture sector, there has been a slight revival in credit card expenditures with installments in the weeks following the regulation (Chart IV.4.5).

Chart IV.4.5
Credit Card Installment Transactions in Furniture and Decoration Sectors (Million TL)

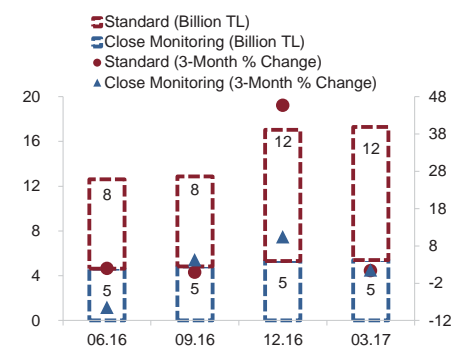


Source: CBRT (Latest Data: 28.04.17)

IV.4.2 The Restructuring Facility for General Purpose Loans and Individual Credit Card Debt

In September 2016, a restructuring facility was introduced to enable restructuring with a maximum maturity of 72 months for ICC debt and general purpose loans extended before that date. The restructuring in retail loans increased in the last quarter of 2016. The increase in the restructuring largely originated from standard loans, which indicates that the restructuring was mostly intended to lengthen loan maturity to ease the debt service rather than payment difficulties (Chart IV.4.6).

Chart IV.4.6
Restructured Retail Loans Monitored Under Performing Loans



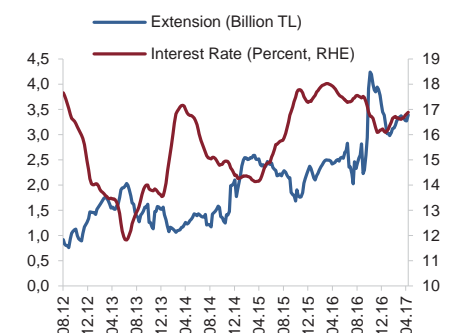
Note: Data covers 14 banks that represent 97 percent of retail loans.

Although the restructuring is not expected to have an impact on the stock of general purpose loans, it has already had a significant influence on flow extensions. Thanks to the moderate course of financial conditions, general purpose loan extensions showed a significant improvement in the last quarter of 2016 (Chart IV.4.7).

IV.4.3 Raising the Cap on Loan to Value Ratio in Housing Loans

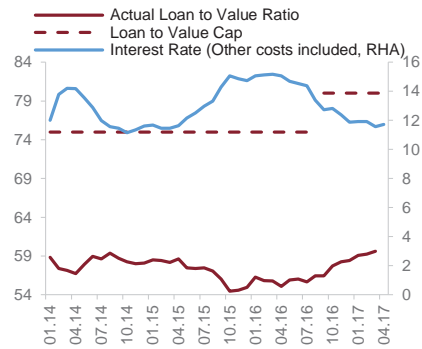
Loan financing facilities for house purchases have been extended by increasing the cap on the ratio of loan amount to the value of the property taken as collateral (LTV) from 75 to 80 percent. The fact that the actual LTV is at 55-60 percent, well below the cap of 75 percent set in 2010, implies that the impact of the change in the LTV cap on the sector may be limited. However, it would not be

Chart IV.4.7
General Purpose Loan Extensions and Interest Rates (4 Weeks Ave., Flow, Billion TL, Percent)



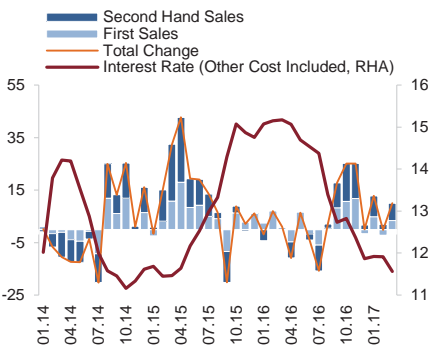
Source: CBRT (Latest Data: 28.04.17)

Chart IV.4.8
Loan to Value Ratio for Housing Loans
(Percent)



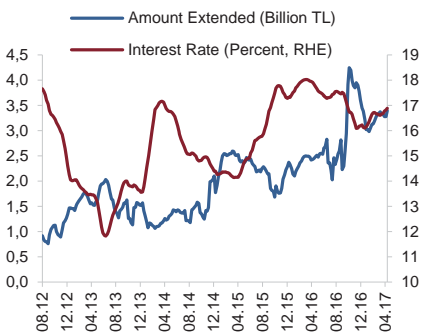
Source: CBRT

Chart IV.4.9
Contributions to Annual Change in Housing Sales
(Percent)



Source: CBRT (Latest Data: 03.17)

Chart IV.4.10
Housing Loan Extensions and Interest Rates
(4 Week-Average, Flow)



Source: CBRT (Latest Data: 28.04.17)

a realistic approach to assume that the credit demand for housing financing is homogeneous. Some customers make higher down payments while others may prefer or need to receive a loan at the legal cap. Therefore, all other things being equal, raising the LTV cap can increase the actual LTV which can be regarded as the credit financing tendency. In fact, the actual LTV has increased in the recent period in which the new regulation has been in force. In this period, interest rates declining significantly have also increased the effect of the regulation via their essential role in the rise in the actual LTV (Chart IV.4.8).

Housing loan interest rate cuts, which started with some large real estate companies in August 2016 and were followed by other companies and banks, and the VAT cut in housing sales in September 2016 led to a more positive outlook for the housing market in the second half of 2016 compared to the first half of 2016 (Chart IV.4.9). Campaigns supported the housing market through the demand channel by making house purchases more attractive and housing sales have performed better than the first half of 2016, especially with the contribution of mortgage sales. The moderate trend in housing loan interest rates in the second half of 2016 has facilitated an increase in banks' extension of housing loans.

IV.4.4 Reduction in General Provisions

The practice of allocating a general provision of four times the provision for consumer loans excluding housing loans, depending on the retail loan NPL rates and loan compositions of banks, was abandoned in September 2016. General provisions were set at 1 percent for standard consumer loans and at 2 percent for closely monitored consumer loans, regardless of the banks' loan compositions and NPL ratios (Table IV.4.3). In practice, banks have maintained a prudent provision policy although general provisions were reduced.

Table IV.4.3
General Provision Ratios for Consumer Loans
(Percent)

		Consumer Loans		Consumer Loans Except Vehicle and Housing*	
		Standard	Under Close Monitoring	Standard	Under Close Monitoring
Before 27 September 2016	Unstructured	1	2	4	8
	Restructured	5	10	5	10
27 September 2016 and after		1	2	1	2
After 1 January 2018 (Banks Not Practicing IFRS 9)		1,5	3	1,5	3

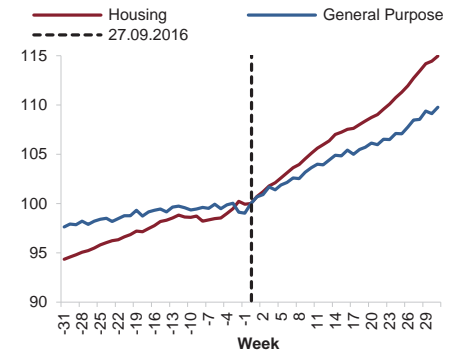
* For banks whose share of consumer loans other than housing loans in total loans exceeds 25 percent, or whose NPL ratio for consumer loans other than housing loans exceeds 8 percent.

Source: CBRT

IV.4.5 Conclusion

Comprehensive steps, including macroprudential regulations, have supported economic growth and contributed positively to the asset quality outlook of banks since the last quarter of 2016. After September 2016, the retail loan growth has strengthened on the back of housing and general purpose loans (Chart IV.4.11). Regulations regarding the general purpose loan maturities and ICC installments are believed to have provided customers with the opportunity to ease their debt service by lengthening their debt maturity. On the other hand, the moderate course of housing loan interest rates and the increase in the LTV cap have increased the tendency for loan financing in housing purchases. With the contribution of these developments, housing loans have become one of the major drivers of retail loan growth.

Chart IV.4.11
Housing and General Purpose Loans
(Indexed, September 2016=100)



Source: CBRT (Latest Data: 28.04.17)

IV.5 The Role of Bank Characteristics in the Interest Rate Transmission

Summary

In this note, we study how transmission of policy rates on corporate lending rates differs across banks. We control firm characteristics and demand side effects, and focus on the supply side. The results suggest that strongly capitalized or relatively liquid banks reflect changes in the policy rate less onto their lending rates, which overlaps with the literature for advanced economies. Moreover, we observe that banks with higher non-core foreign currency liabilities reflect policy changes less strongly. In this respect, we analyze the potential role of global liquidity cycles in the policy rate transmission.

IV.5.1 Introduction

Changes in monetary policy rate transmit to corporate lending rates directly by affecting banks' average cost of funding or indirectly by signaling future policy actions or economic activity. Changes in lending rates, in turn, affect macroeconomic aggregates such as overall demand conditions, economic activity and inflation. In this respect, it is important to quantify how much lending rates respond to changes in the policy rate.

By definition, equilibrium corporate lending rates are set depending on demand-(firm) or supply-(bank) characteristics. Not only firm characteristics (such as firm size, leverage, collateral ratio, value of relationship with a bank, cash need) but also bank characteristics and banks' supply behavior have a direct bearing on the lending rates. Moreover, macroeconomic aggregates such as overall economic activity and inflation can affect lending rates as well. Considering that monetary policy can affect firm or bank balance sheets and macroeconomic conditions, the observed pass-through of policy rates onto lending rates entails many factors. In this regard, isolating how changes in policy rates affect banks' setting their lending rates (independent from indirect effects such as the effect of policy rates on firm balance sheets or aggregate economic conditions)

is challenging. For a strict identification, two observations are in order:

- (i) Monetary policy affects banks' supply behavior at different degrees. For instance, banks reflect changes in monetary policy rates onto their loan portfolios differently depending on their capital, liquidity or access to external funds.
- (ii) Focusing on similar firms helps filter out monetary policy's indirect effects on firm balance sheets, or demand-side effects.¹ For instance, consider two banks --that differ only in terms of their capital ratios-- lending to the same firm. Following a monetary policy tightening, these banks may set different lending rates to the same firm, the difference reflecting the role of bank capital in the interest rate transmission.

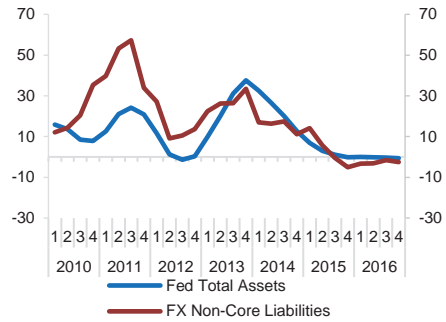
Our empirical strategy rests on (i) and (ii). To this end, we study the effect of changes in monetary policy rate (namely, the weighted average cost of funding)² on how banks set their lending rates. Note also that non-core foreign currency liability of banks operating in Turkey moves in tandem with global liquidity cycles (Graph IV.5.1 and Graph IV.5.2). Along these lines, we focus not only on bank capital or liquidity as potential determinants of how the transmission differs across banks, but also non-core foreign currency liabilities. We, therefore, quantify in a well-identified way whether global liquidity cycles matter for interest rate transmission.

The results suggest that strongly capitalized or relatively liquid banks raise their lending rates less following a monetary policy tightening. Similarly, banks with higher non-core foreign currency liabilities reflect policy tightening less onto their lending rates. The results are statistically significant and economically relevant. Following a 100 basis points-increase in the policy rate, strongly capitalized banks (the bank at the 75th percentile of capital ratio compared to the 25th percentile) raise their lending rates by 32 basis points less. Similarly, relatively liquid banks or

1 For example, monetary policy can affect asset prices, and in turn, the value of collateral pledged by firms. Similarly, monetary policy can affect exchange rates, and thus, importing firms' production costs or leverage.

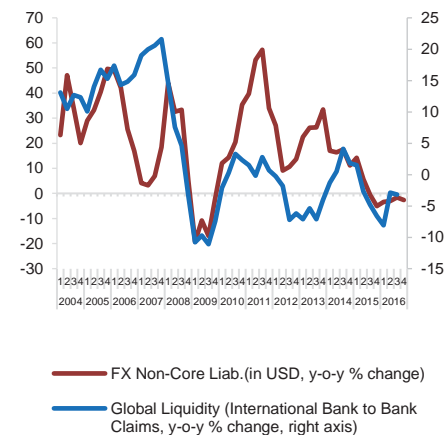
2 The Central Bank of the Republic of Turkey has implemented a multiple interest rate framework to respond, if needed, to market volatility in a timely manner, starting in late 2010. For details on the framework, see Binici, Kara and Özü (2016).

Graph IV.5.1
Global Liquidity Conditions and Banks' Non-core Foreign Currency Liabilities
(Annual Percentage Change, US dollar)



Source: CBRT, Federal Reserve.

Graph IV.5.2
Global Liquidity Conditions and Banks' Non-core Foreign Currency Liabilities
(Annual Percentage Change, US dollar)



Source: CBRT, BIS.

banks with high non-core liabilities raise their lending rates by 25 and 50 basis points less, respectively.

It has been well established that banks may react to changes in monetary policy at different strengths. For instance, Kashyap and Stein (2000) show for the US that less liquid or small banks reflect changes in Fed policy more strongly on their supply of credit. Using a stronger identification scheme, Jimenez et al. (2012) and Iyer et al. (2014) show, for Spain and Portugal, respectively that banks reflect market liquidity shocks differently depending on their capital and liquidity stance. Shedding further light on the transmission, we show whether exposure to global liquidity may matter for the transmission. As such, the main contribution of this analysis is to show in a well identified way the effect of global liquidity on the interest rate transmission.

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

IV.5.2 Data Set and Methodology

Two different data sets are used in this study. These are data from the CBRT that include loan information at the firm-bank level and the data from the Banking Regulation and Supervision Agency (BRSA) that cover banks' balance sheets and income statements. Both data sets are at a monthly frequency. Loan information at the firm-bank level is matched with bank data. Firm-bank level data set also includes information on the loan type (for which purpose the loan is demanded, maturity etc.). For econometric analysis, loan data set is collapsed at the bank-firm-loan type level.

In the study, the following model is used to analyze how transmission of policy rates on corporate lending rates differs according to bank's capital, liquidity and funding structure:

$$i_{b,f,a,t} = \sum_{s=1}^3 \beta_{1,s} \Delta MP_{t-s} + \sum_{s=1}^3 \beta_{2,s} \Delta MP_{t-s} * X_{b,t-s} \\ + Controls + \varepsilon_{b,f,a,t}$$

$i_{b,f,a,t}$, stands for the loan rate on the credit provided by bank b at month t to firm f with loan type a . ΔMP_t , is the monthly change

in the weighted average funding cost of the CBRT funding which is taken as the monetary policy rate. One-to-three month lags (one quarter lag) of monetary policy rate is included considering that banks take into account previous funding costs while determining the loan rate. $X_{b,t}$ denotes the bank variables on capital, liquidity and funding structure of bank b . Specifically, banks' capital adequacy ratio (*Capital Ratio*), liquidity ratio (*Liquidity Ratio*) or the ratio of non-core foreign currency liabilities to total assets (*Non – core Ratio*) are used. These bank variables are included in levels as well as interactions with monetary policy rate to reveal how banks with different capital, liquidity and non-core funding ratios transmit changes in monetary policy rate to corporate loan rates.

Controls include bank balance sheet characteristics, macroeconomic indicators, variable showing strength of bank-firm relationship, and a large set of fixed effects. Bank controls are: capital adequacy ratio (*Capital Ratio*), total assets, liquidity ratio (*Liquidity Ratio*), non-performing loans ratio, return on assets, the ratio of non-core foreign currency liabilities to total assets (*Non – core Ratio*) and lastly Herfindahl by bank (bank's share of total banking loans to a particular sector). All bank controls are lagged by one month. When interactions of (*Capital Ratio*), (*Liquidity Ratio*), and (*Non – core Ratio*) with monetary policy rate are included in the model, one-to-three month lags of the corresponding variable and interactions with the policy rate are included as well.³

³ For instance, in the specification that analyses the impact of bank capital on interest rate transmission, where $X_{b,t}$ is capital ratio, control variables are one-month lags of total assets, liquidity ratio (*Liquidity Ratio*), non-performing loans ratio, return on assets, the ratio of non-core foreign currency liabilities to total assets (*Non – core Ratio*) and Herfindahl by bank (bank's share of total banking loans to a particular sector) and one-, two- and three- month lags of capital ratio.

Table IV.5.1
Summary Statistics
(January 2005 – December 2016)

	Unit	No. of observations	Mean	Minimum	Median	Maximum	St. Dev
Bank-Firm Level Variables							
Loan Rate	%	8,190,595	11.52	0.51	10.732	99.84	8.239
Strength of Bank-Firm Relationship	[0,1]	8,190,595	0.287	0	0.205	1	0.249
Bank Level Variables							
Capital Ratio	%	6,332	25.996	1.618	14.428	99.952	24.035
Total Assets (Log)	000 TL (Log)	6,332	14.965	7.915	15.053	19.677	2.395
Liquidity Ratio	%	6,332	41.566	0.267	32.188	99.699	25.009
Non-Performing Loans Ratio	%	6,031	2.138	0	0.473	363.226	11.030
Return on Assets	%	6,332	1.235	-19.376	1.266	20.751	2.323
Non-Core FX Liabilities Ratio	%	6,332	21.214	0	15.064	94.822	20.624
Herfindahl by bank	%	55,667	4.504	0	1.343	100	8.440
Macroeconomic Variables							
Δ MP (Monthly)	%	144	-0.084	-1.845	-0.015	2.567	0.579
Δ IPI (Annual)	%	131	3.796	-19.998	4.354	18.199	6.997
Δ CPI (Annual)	%	144	8.259	3.986	8.169	12.065	1.637
Δ EMBIG Turkey (Monthly)	%	144	0.004	-1.150	-0.020	2.450	0.344

Table IV.5.2

Empirical Results
Dependent Variable: Loan Rate at bank-firm-loan level (percentage point)

	(1)	(2)	(3)
$\sum_{s=1}^3 \Delta MP_{t-s}$	0.526*** (0.035)	0.992*** (0.039)	
$\sum_{s=1}^3 \Delta MP_{t-s} * Non - core Ratio_{t-s}$	-0.06*** (0.002)	-0.079*** (0.002)	-0.079*** (0.002)
Bank Controls	Yes	Yes	Yes
Macroeconomic Variables	No	Yes	-
Interaction (Macroeconomic v. with Non-Core Ratio)	No	Yes	Yes
Strength of Bank-Firm Relationship	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	-
Bank Fixed Effect	Yes	Yes	Yes
Loan Type Fixed Effect	Yes	Yes	No
Firm-Time Fixed Effect	No	No	Yes
No. of observations	8,189,665	8,108,822	7,828,395
R ²	0.428	0.447	0.579

Following 100 basis points increase in the policy rate

Difference in the lending rate (basis points)

(Banks with high non-core ratio compared to banks with low non-core ratio (p75-p25))	-21.8	-18.8	-51.8
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Note: The results are obtained using ordinary least squares. Sample period: 2005:1-2016:12. For identification, the sample is restricted to firms that work with at least two banks. All control variables are lagged by one month. Regarding the fixed effects, "Yes" indicates that corresponding fixed effects (or the variable) are included. "No" indicates that corresponding fixed effects (or the variable) are not included. "-" indicates that the respective fixed effect is inapplicable or already included in the wider set of fixed effects or variables. Robust standard errors are in parentheses. *** Significant at 1%, ** significant at 5%, and * significant at 10%.

As for macroeconomic indicators, annual growth in industrial production index (IPI), annual percentage change in consumer price index (CPI), and the monthly change in the EMBIG-Turkey are included. In line with the lag specification for the monetary policy rate, one-to-three month lags of macroeconomic variables are included in the estimation.

The strength of bank-firm credit relationship is measured by the ratio of credits a firm obtains from a particular bank in the last 12 months to the total credit the firm obtains from all banks during the same period. All specifications include firm and bank fixed effects. In some specifications, loan type and firm-time fixed effects are included as well. Descriptive statistics of the variables used in the empirical analyses are provided in Table IV.5.1.

IV.5.3 Empirical Results

Table IV.5.2 presents the main results. Column (1) presents the most parsimonious specification. As control variables, bank characteristics and the strength of bank-firm relationship are used.⁴

⁴ Strength of bank-firm relationship is defined as total loans a firm obtains from a particular bank during the last 12 months compared to total loans the firm obtains from all banks during the same period.

Column (2) further includes macroeconomics variables (in levels and in interactions) as controls. Column (3), the most general specification, includes firm-month fixed effects (thereby control for demand side effects). In all the columns, we observe that banks with high non-core ratio (with non-core ratio at the 75th percentile) raise their lending rates less (by about 50 basis points) compared to banks with low non-core ratio (with non-core ratio at the 25th percentile).

Moreover, in line with the literature, we observe that strongly capitalized or relatively liquid banks reflect policy tightening less onto their loan rates (Table IV.5.3 and Table IV.5.4). Based on the last column of Table IV.5.3 (which is the most general empirical specification), strongly capitalized banks (with capital ratio at the 75 percentile) raise their lending rates by 32 basis points less compared to weakly capitalized banks (with capital ratio at the 25th percentile). Similarly, relatively liquid banks raise their lending rates by 25 basis points less (Table IV.5.4).

IV.5.4 Conclusion

In this note, we study the transmission of policy rates onto corporate lending rates for 2005-2016 period. For better identification, we focus on the heterogeneity among banks in their responses to changes in the monetary policy rate. Results suggest that, banks have access to internal or external funds – i.e. strongly capitalized or relatively liquid banks, or banks with higher non-core foreign currency funds—raise their lending rates less following a monetary policy tightening.

It should be noted that using the surprise component of policy rate changes would give a sharper picture. Still, we would like to highlight that our exhaustive set of control variables, including macroeconomic variables in levels and in interaction with bank characteristics, are likely to make our results by and large robust. We leave the effect of changes in the policy rate on credit volume and the effect of accommodative fiscal policies on the interest transmission to future research.

Table IV.5.3

Empirical Results			
Dependent Variable: Loan Rate at bank-firm-loan level (percentage point)			
	(1)	(2)	(3)
$\sum_{s=1}^3 \Delta MP_{t-s}$	0.108*** (0.041)	0.326*** (0.046)	
$\sum_{s=1}^3 \Delta MP_{t-s} * Capital Ratio_{t-s}$	-0.043*** (0.004)	-0.055*** (0.004)	-0.05*** (0.004)
Bank Controls	Yes	Yes	Yes
Macroeconomic Variables	No	Yes	-
Interaction (Macroeconomic v. with Capital Ratio)	No	Yes	Yes
Strength of Bank-Firm Relationship	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	-
Bank Fixed Effect	Yes	Yes	Yes
Loan Type Fixed Effect	Yes	Yes	No
Firm-Time Fixed Effect	No	No	Yes
No. of observations	8,189,665	8,108,822	7,828,395
R ²	0.427	0.446	0.579

Following 100 basis points increase in the policy rate

Difference in the lending rate (basis points)

(Banks with high capital ratio compared to banks with low capital ratio (p75-p25))	-24.1	-24.8	-32.2
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Note: The results are obtained using ordinary least squares. Sample period: 2005:1-2016:12. For identification, the sample is restricted to firms that work with at least two banks. All control variables are lagged by one month. Regarding the fixed effects, "Yes" indicates that corresponding fixed effects (or the variable) are included. "No" indicates that corresponding fixed effects (or the variable) are not included. "-" indicates that the respective fixed effect is inapplicable or already included in the wider set of fixed effects or variables. Robust standard errors are in parentheses. *** Significant at 1%, ** significant at 5%, and * significant at 10%.

Table IV.5.4

Empirical Results			
Dependent Variable: Loan Rate at bank-firm-loan level (percentage point)			
	(1)	(2)	(3)
$\sum_{s=1}^3 \Delta MP_{t-s}$	0.051*** (0.048)	0.591*** (0.055)	
$\sum_{s=1}^3 \Delta MP_{t-s} * Liquidity Ratio_{t-s}$	-0.017*** (0.002)	-0.032*** (0.002)	-0.022*** (0.002)
Bank Controls	Yes	Yes	Yes
Macroeconomic Variables	No	Yes	-
Interaction (Macroeconomic v. with Liquidity Ratio)	No	Yes	Yes
Strength of Bank-Firm Relationship	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	-
Bank Fixed Effect	Yes	Yes	Yes
Loan Type Fixed Effect	Yes	Yes	No
Firm-Time Fixed Effect	No	No	Yes
No. of observations	8,189,665	8,108,822	7,828,395
R ²	0.427	0.446	0.579

Following 100 basis points increase in the policy rate

Difference in the lending rate (basis points)

(Banks with high liquidity ratio compared to banks with low liquidity ratio (p75-p25))	-17.7	-16.7	-25.1
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Note: The results are obtained using ordinary least squares. Sample period: 2005:1-2016:12. For identification, the sample is restricted to firms that work with at least two banks. All control variables are lagged by one month. Regarding the fixed effects, "Yes" indicates that corresponding fixed effects (or the variable) are included. "No" indicates that corresponding fixed effects (or the variable) are not included. "-" indicates that the respective fixed effect is inapplicable or already included in the wider set of fixed effects or variables. Robust standard errors are in parentheses. *** Significant at 1%, ** significant at 5%, and * significant at 10%.

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