

DETERMINANTS OF NON-CORE LIABILITIES IN THE TURKISH BANKING
SYSTEM

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
THE DEPARTMENT OF ECONOMICS

SEPTEMBER 2017

Approval of the Graduate School of Social Sciences

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ABSTRACT

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September 2017, 74 pages

After the 2008 global financial crises, composition of bank liabilities has begun to draw more attention due to its important role in diagnosing financial vulnerability. According to literature, non-core liabilities are amongst the best indicators of financial crises and because of the more frequent data availability, they also provide real time signaling observation. Although there are various studies about non-core liabilities, there is only a very limited number of country specific studies. Therefore, our aim is to analyze determinants of non-core liabilities in Turkey for the period 2003Q1 and 2015Q4 by considering both bank level and macro level variables. This study also aims to show effectiveness of macroprudential policies over non-core liabilities in Turkey.

Keywords: Financial stability, Non-core liabilities, Turkey, Macroprudential policy, Banking,

ÖZ

TÜRKİYE BANKACILIK SEKTÖRÜNDE ÇEKİRDEK OLMAYAN YÜKÜMLÜLÜKLERİN BELİRLEYİCİLERİ

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Tez Yöneticisi : Doç. Dr. Gül İpek Tunç

Eylül 2017, 74 sayfa

2008 küresel finansal kriz sonrası, finansal kırılganlıkların teşhis edilmesindeki önemli rolünden dolayı banka yükümlülüklerinin bileşenleri daha fazla dikkat çekmeye başladı. Literatüre göre çekirdek olmayan yükümlülükler finansal krizin güzel bir göstergesi olabilir ve daha sık data ulaşılabilirliğinden kaynaklı gerçek zaman gözlemi sağlayabilmekte. Çekirdek olmayan yükümlülükler üzerine birçok çalışma olsa da, ülkelere özel çalışmalar yetersiz. Bu yüzden bizim amacımız 2003Ç1 ve 2015Ç4 periyodunu kapsayarak Türkiye için çekirdek olmayan yükümlülüklerin belirleyicilerini hem banka düzeyindeki hem de makro düzeydeki değişkenleri göz önünde bulundurarak analiz etmek. Bunun yanı sıra bu çalışma Türkiye'deki makro-ihtiyati politikaların çekirdek dışı yükümlülükler üzerindeki etkinliğini göstermeyi de amaçlamakta.

Anahtar Kelimeler: Finansal İstikrar, Bankacılık, Çekirdek dışı yükümlülükler, Türkiye, Makro ihtiyati politika

To My Family

ACKNOWLEDGMENTS

Firstly, I would like to express my deepest gratitude to Assoc. Prof. Dr. Elif Akbostancı Özkazanç for her supervision, continuous support, and encouragement through this study, and especially for her confidence in me and Assoc. Prof. Dr. Gül İpek Tunç for her help to finalize this study. I also thank Prof. Dr. Erdal Özmen and Prof. Dr. H. Ozan Eruygur for serving as my committee members and for their invaluable comments.

The Department of Economics of METU provide me a distinguished academic environment where I can meet wonderful people who have contributed to my personal and professional improvement. I would like to thank Hakan Güneş for his comments on this study. I thank my colleagues Pınar Tat, Dilan Aydın, Fatma Taşdemir, Kemal Saygılı, Hakan Genç and Abdullah Gülcü for their continuous encouragements and endless motivation during the study. I also thank my best friend Uğur Keskin who has been a constant source of support and strength. I also thank my dearest friends Özge Özdeş, Selin Önen and Kübra Ünsay who endured this long process with me, always offering support and love. I am very grateful to all of you.

Most importantly, I deeply thank to my mother, father and sister for their unflagging love and unconditional support. They have constant source of love, concern, support and strength during my whole life. I do also want to thank my grandmother, grandfather, aunt and uncle. Without their support, I would have not completed this thesis.

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CHAPTER 1

INTRODUCTION

After the 2008 global financial crises, composition of bank liabilities has begun to draw more attention due to its important role in diagnosing financial vulnerability. In the literature, bank liabilities are divided mainly into two parts as core liabilities and non-core liabilities. While core liabilities represent the claims that are held by domestic creditors, non-core liabilities represent the other claims that are held by other banks and claims to the rest of the world. In general, the main funding sources for the banks are retail deposits, provided by domestic households and firms. Since these retail deposits are positively related to economic growth and wealth of households, in case of a credit boom this source often fails to satisfy credit demand. Therefore, banks head towards other financial intermediaries and foreign creditors for funding through non-core liabilities. Because large part of non-core liabilities are short term and foreign exchange denominated, they increase exposition of banks to risks and threaten the financial stability. This mechanism could be viewed from the risk taking channel of monetary policy as well (Bruno and Shin, 2014b).

Expansionary monetary policies in advanced countries leads to an increase in cross border capital flows. Since domestic banks in emerging market borrow in foreign currency and lend to local borrowers in domestic currency. Consequently, an increase in capital inflows leads to increase in the spread between the foreign currency funding rate and the local lending rate. Then, appreciation of the local currency causes improvements in the balance sheet of local borrowers and creates additional credit spread. In other words, monetary policy affects the economy via increasing risk taking of the banking sector. In case of sudden capital outflows, borrowing capabilities of local borrowers decreases and risk for the financial stability of domestic economy increases. In this respect credit growth and capital flows are important predictors and significant precursors of financial crises. However, recent

studies reveal that non-core liabilities could be good indicators of financial crises as well. Additionally, non-core liabilities can be more advantageous than credit growth due to real time observation and more frequent data availability (Hahm et al., 2011).

After the 2008 global financial crisis and the recognition of inadequacy of monetary policy or financial supervision, financially open emerging countries realize the importance of macroprudential policies. Turkey is one of those countries, which started to design and apply some macroprudential policies including interest rate corridor and Reserve Option Mechanism (ROM) after 2010 (Aysan et al., 2015, Kara, 2016).

However, designing the appropriate macroprudential policy for systematic risk in emerging countries is a difficult task. In order to overcome this task, policy makers of emerging countries should determine variables that affect the cross border capital flows, credit growth or non-core liabilities, which have predictive power for financial crises. Therefore, non-core bank liabilities are again crucial variable in the process of macroprudential policy making and measuring the robustness of these policies.

Our aim is to empirically analyze the determinants of the non-core liabilities for Turkey at the bank level as well as at the macro level. Following Cho and Hahm (2014), with the help of an econometric model, we also aim to investigate the impact of macroprudential policies on non-core liabilities as well as their determinants.

Although there is a growing literature about non-core bank liabilities, the number of country specific studies are extremely limited. The contribution of this thesis is that this is the first study to look into the determinants of non-core liabilities by considering both bank level factors and macroeconomic factors in Turkey.

We consider quarterly data from 2003Q1-2015Q4 for 18 public, private and foreign commercial banks operating in Turkey. We use both bank specific factors such as ratio of bank's asset to total assets, ratio of shareholder equity to assets, nonperforming loan ratio, return on assets, growth rate of financial derivative and ratio of local currency loans to deposits and macroeconomic factors such as gross domestic product (GDP) growth rate, ratio of current account balance to GDP, credit

to GDP ratio, US five-year treasury bond yield and volatility index in our model as explanatory variables. Considering the potential endogeneity of bank specific variables, we estimate panel regression equations by employing Generalized Method of Moment (GMM) methods. In addition, we discuss the effectiveness of recent macroprudential policies in Turkey.

The plan of the rest of the study is as follows. In chapter 2, we present a brief review of the literature. In this chapter, some relevant facts for the consolidated commercial banking systems and the recent macroprudential policies are also reported. In chapter 3, we provide historical background of Turkish banking system and analyze Turkish banking system with descriptive statistics. In chapter 4, we present our empirical models and results. Chapter 5 is devoted to concluding remarks and discussion.

CHAPTER 2

LITERATURE REVIEW

2.1. Background Information

In the 2008 global financial crises which is the most severe crises since the Great Depression, almost all developed countries and emerging countries experienced financial distress and decrease in economic activities. Bruno and Shin (2014b) explain this financial distress with the risk taking channel of monetary policy. They describe the risk taking channel as a loop between the increase in leverage of banks and currency appreciation which causes decrease in risks. In the case of monetary shock which leads to a decrease in dollar funding cost of the recipient banks, lending to domestic entities increases. Moreover, with the appreciation of the domestic currency, domestic borrowers' balance sheets show improvement and their loan book start to be seen less risky by banks. Therefore, this increases the ability to create additional credit which means that greater risk shows up for the banking sector. This mechanism is shown in Figure 2.1 below:

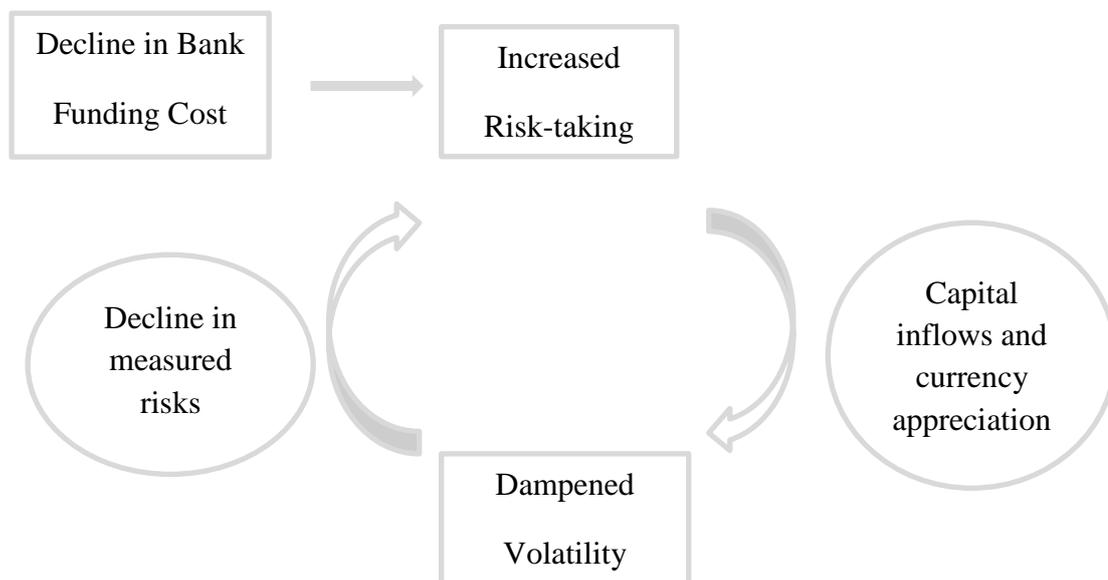


Figure 2 1: Risk Taking Channel

Sources: Bruno and Shin (2014b)

Adrian and Shin (2008) state that there is a positive relationship between leverage and balance sheet size. If leverage is high during boom periods and it is low during bust periods, it means that leverage is procyclical which affects aggregate volatility. They define leverage as the ratio of total assets to equity and give the following balance sheet as an example.

Assets	Liabilities
Securities, 100	Equity, 10
	Debt, 90

According to initial balance sheet, leverage is $100/10=10$. In case of 1% increase in the price of securities, new balance sheet will be as follows.

Assets	Liabilities
Securities, 101	Equity, 11
	Debt, 90

In this case, leverage decrease to $101/11=9.18$. Since the bank target leverage is 10, bank should take additional debt which is equal to 9. So the new balance sheet will look like:

Assets	Liabilities
Securities, 110	Equity, 11
	Debt, 99

In order to adjust for the drop in the bank leverage, the bank increases the volume of its balance sheet more by taking additional debt. This mechanism is represented in the figure 2.2.

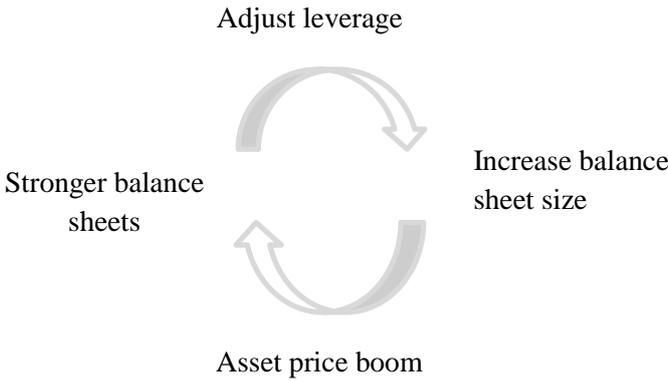


Figure 2 2: Relation between leverage and balance sheet size

Source: Adrian and Shin (2008)

On the other hand, Binici and Köksal (2012) who investigate the relation between leverage and asset growth in Turkish banking system and the determinants of the bank leverage in Turkey, show that leverage of the Turkish banking system is procyclical. This means that expansion and contraction of the bank balance sheets trigger credit cycles. Moreover, in case of an increase in leverage and expansion of balance sheets, banks provide additional funds via non-core liabilities rather than core liabilities. Therefore, non-core liabilities are significant for leverage.

Hahm et al. (2012) assert that banks are the intermediaries who borrow in order to lend and the main sources for the banks are the retail deposits of the household sector. Since there is positive relationship between deposit growth and the growth of the economy and wealth of households, in case of a credit boom, deposits may not be adequate to finance credit growth. In such a case, banks search for other sources of funding including credit from other banks through interbank money market, credit from central bank and borrowing from abroad. This mechanism is illustrated by Figure 2.3. Therefore, the ratio between credits/loans and deposits can give a hint about the vulnerability of the financial system to a shock to the economy.

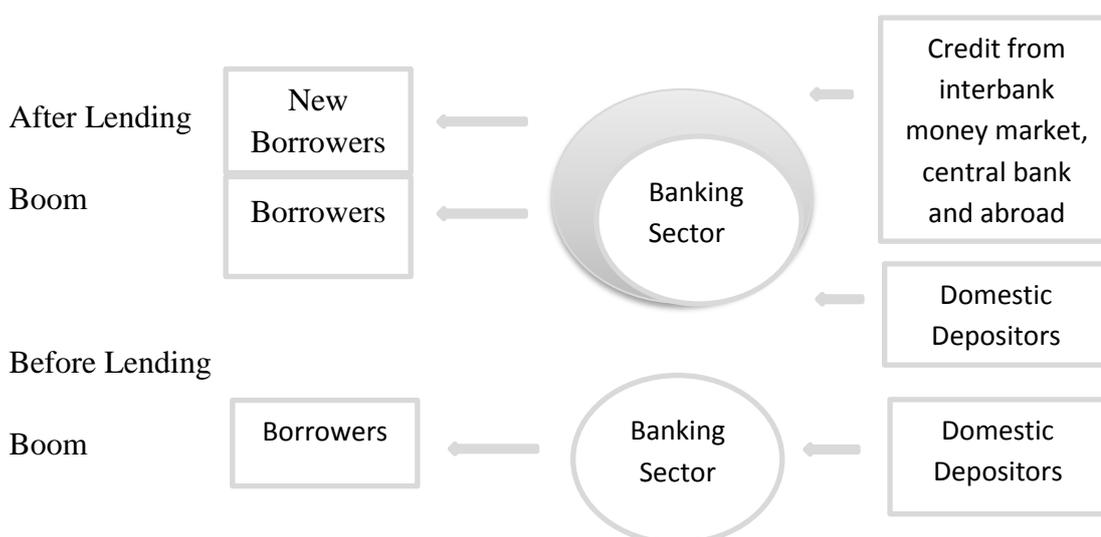


Figure 2 3: Banks' funding sources

Source: Hahm et al. (2012)

Shin and Shin (2011) has drawn attention to international capital flows which have an important role over the financial stability of the country with an open capital market. In the boom period, when the assets of banks increase rapidly, the funding is met by capital flows from international banks rather than the domestic deposit base. This causes the growth of short-term foreign currency denominated liabilities which are more volatile. Therefore, from the perspective of the ownership of the claims, liabilities should be classified as core and non-core liabilities. Core liabilities are held

by the domestic creditors and non-core liabilities are repos and other claims which are hold by other banks.

Since we analyze the determinants of the non-core liabilities for Turkey, it is crucial to understand the structure and the features of Turkish banking system and non-core liabilities. Akdoğan and Yıldırım (2014) have explored the structure of the Turkish banking system and note that bank liabilities are composed of deposits, payables to Central Bank, payables to money market, payables to security market, payables to banks, funds from repo transactions, securities issued and shareholder's equity. Among these largest part belongs to deposits which can be owned by household, financial institutions and corporate sector. According to June 2012 data, 56 % of total liabilities is deposits. When we look at the June 2017 data from the dataset of Central Bank of the Republic of Turkey (CBRT), 58% of total liabilities is deposits. While household deposits are classified as core liabilities, payables to money market, payables to banks and funds from repo and securities are referred as non-core liabilities. In terms of their size last three should be taken into consideration. Furthermore, non-core liabilities could be classified by using narrow and broad definitions. Except security issuance, all indicators in the last column of the Table 2.1 express the narrow definition of the non-core liabilities. Security is excluded because of its less of non-core liability characteristics and size. According to June 2012 data, it is only cover the 0.014 per cent of non-core liabilities. On the other hand, broad definition also includes security issuance. Among these indicators payables to bank, denominated in foreign exchange (FX) composes the largest part of the non-core liabilities with 66 % of non-core liabilities in June 2012.

Table 2 1: Classification of Bank Liabilities

	Core Liabilities	Intermediate	Non-core Liabilities
	Household	Non-financial Corp's	Financial Institutions
Short Term	Demand deposits Short-term deposits (<1 month)	Demand deposits Short-term deposits (<3 months)	Demand deposits Funds from repo transaction Short-term payables to banks
Medium Term	Medium-term deposits (1 month-1 year)	Medium and long-term deposits	Medium and long-term deposits Medium and long-term payables to banks
Long Term	Long-term deposits (>1 year)		Securities issued Other borrowings from banks

Source: Akdoğan and Yıldırım (2014)

Yılmaz and Süslü (2016) state that there is a correlation between the credit growth and non-core liabilities and the big gap between the credit and deposit is originated from the non-core liabilities in Turkey. Their results also show that there are two characteristics of non-core liabilities in Turkey. Foreign exchange denominated non-core liabilities are larger than the local currency denominated non-core liabilities and short-term non-core liabilities are greater than long term.

2.2. Macprudential Policy Tools in Turkey

In 2000, Turkey adopted International Monetary Fund (IMF) backed disinflation program, which includes exchange rate based nominal anchor regime. After this year, CBRT preannounced the daily exchange rate for the next 1.5 year. However, unlike similar policies that are implemented in other developing countries, Turkish

disinflation program did not involve any measures about price and wage determination all the burden fell only on the exchange rate regime (Özatay, 2009). As a result of fiscal dominance and other macroeconomic problems combined with the fixed exchange rate regime, Turkey experienced a devastating financial crisis in 2001. The 2001 crisis destroyed many banks' balance sheets and revealed the deficiencies in Turkey's financial economic structure besides other problems. After this time, policy makers left the fixed exchange rate regime and adopted floating exchange rate regime. Turkish stabilization program was implemented under the three basic topics: budget control, recapitalization of the banking system and Central Bank independency. On April 25, 2001, The Central Bank of Turkey became instrument independent and started to apply inflation targeting. Because of the IMF-backed program, from 2002 to 2005, the Central Bank adopted a transitional policy, called implicit inflation targeting. This period was quite successful to bring inflation from double to single digit rates and in this period, the Central Bank gained confidence and credibility. Then in 2006, explicit inflation targeting policy framework was introduced (Gürkaynak et al., 2015, Kara, A.H., 2008, Kara, A.H., 2012, Özatay, F., 2009, Özatay, F., 2011).

After the global financial crisis of 2008, recovering from the initial shock of the crisis an extensive credit growth in the financial sector is observed. With the credit growth, CBRT took a new turn and added financial stability as an additional goal next to price stability. During this period, a change in the monetary policy strategy of the CBRT was observed (Özatay, 2011 and Kara, 2012).

Hahm et al. (2012) argues that monetary policy in financially open emerging markets are constrained by the policies in advanced countries. In case of low interest rates in advanced countries, an increase in interest rate in emerging countries causes capital inflows into emerging markets and worsens the domestic financial conditions in those countries. The recent studies, on the other hand, often find that an independent monetary policy is not feasible for a financially integrated economy even under a flexible exchange rate regime. Rey (2015), for instance, argues that, for small open

economies, under the emergence of a global financial cycle, “independent monetary policies are possible if and only if the capital account is managed, directly or indirectly via macroprudential policies”. Global financial and monetary conditions are amongst the important determinants of borrowing costs (Gonzales-Rozada and Levy-Yeyati, 2008; Özatay et al., 2009) and thus growth (Kose et al., 2012; Erdem and Özmen, 2015) in emerging economies. Thus, it may not be surprising to observe that monetary policies of such economies are not invariant to changes in global financial conditions and interest rates. The recent results by Erdem and Özmen (2015) and Obstfeld et al., (2017) suggest that the impacts of external real and financial shocks on domestic variables are significantly greater under managed exchange rate regimes. All these results convincingly suggest that, countries with open capital markets should create and practice the macroprudential policies even under a floating exchange rate regime.

According to Kara (2012), for the monetary authorities who consider financial stability, using the interest rate as the only policy tool is not enough. Similar arguments are reported by Rey (2013), Edwards (2015) and Obstfeld (2017). There is a need for additional tools that affect credits and exchange rate separately. Kara (2012) notes that, when the capital flows increase, both limiting credit growth and preventing deviation in value of money should be sustained at the same time. Since an increase in interest rate causes appreciation in currency, only the interest rate tool reveals opposite situation.

During and after the 2008 global financial crises, this mechanism alleviated first by sharp credit crunch and with the unconventional monetary policies of advanced economies including the US, a substantial credit expansion has been experienced by emerging countries. Consequently, policy makers of these countries, including Turkey, has realized the importance of macroprudential policies. The CBRT has started to implement a new policy framework to avoid the negative effects of volatile capital flows on the domestic economy towards the end of 2010. Main purposes of this policy framework, which is called the “policy mix”, are both price stability and

financial stability. In this policy mix, the Central Bank has used two new tools; interest rate corridor and Reserve Option Mechanism (ROM) (Aysan, et al., 2014).

Aysan et al. (2015) define ROM as a market friendly tool that decreases the fluctuations in the exchange rate by affecting demand for foreign exchange in the foreign exchange market. In this policy, banks can voluntarily hold some amount of their reserve in foreign currency. Reserve Option Coefficient (ROC) is the amount of foreign currency that is required to hold per TL required reserve. For instance, it is allowed that you can hold 50 percent of your reserve in terms of foreign currency then ROC is equal to 2 and you can hold 100 TL(50 TL * 2) worth of foreign currency and 50 TL to meet the required reserve. Therefore, when there is excess supply of FX, this extra supply is put in to the CB reserve instead of putting in to market and vice versa. When there is an inflow, banks prefer to use ROM because of the low cost of FX funds. This leads to an increase in FX reserve of the Central Bank. When there is an outflow, banks prefer to use reserves at the CBRT. Therefore, this policy helps to decrease the depreciation pressure in the market. Thanks to ROM, slope of the demand for FX decreases which means that sensitivity of demand to supply decreases. Less steep demand curve, D^1 , is obtained.

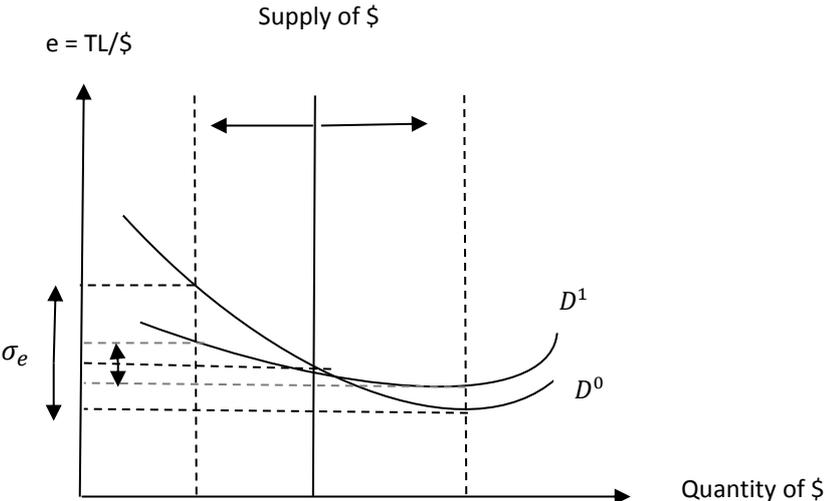


Figure 2 4: ROM’s effect on the slope of the demand for FX

Source: Aysan et al. (2015)

The other tool of the policy mix is the interest rate corridor, the wedge between the lending rate and deposit rate. The aim of this tool is to reduce the excessive fluctuation in short term capital flows. The CB can affect the capital flows by altering the width of the corridor. When it is wider, it creates uncertainty about the short term yields and inflows are discouraged. Therefore, decreasing the lower limit when there is an inflow and increasing the upper limit when there is an outflow would be helpful to reduce the volatility. Thanks to this policy tool movement of the supply of FX became smoother (Aysan et al., 2015, Kara,2012).

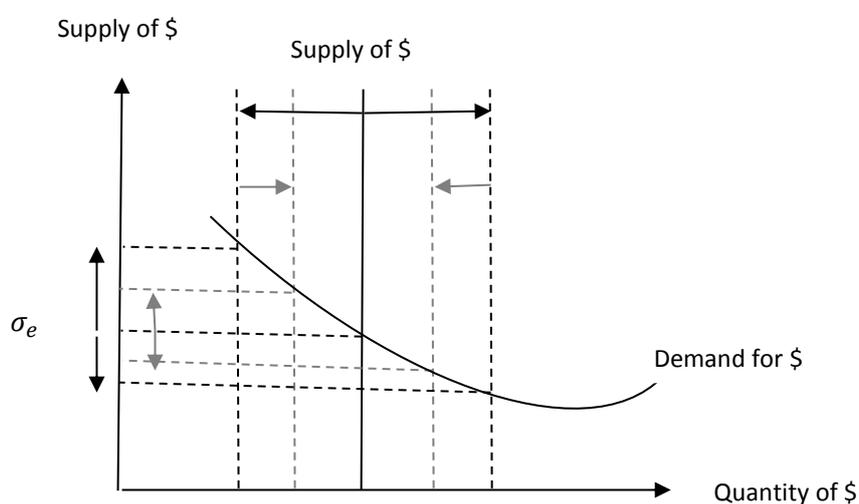


Figure 2 5: The interest rate corridor’s effect on movement of the supply of FX

Source: Aysan et al. (2015)

2.3. Empirical Literature

In the literature, there is a large and growing number of studies on capital flows for emerging, developing and developed countries. The recent studies using panel of countries include Forbes and Warnock (2012), Bruno and Shin (2012), Broner et al. (2013), Ahmed and Zlode (2014), Fuertes, Phylaktis and Yan (2016), Pham (2015) and Başkaya et al. (2017). The number of studies explicitly considering banking

system non-core liabilities, albeit providing further information in the context of financial vulnerability, is very limited.

Forbes and Warnock (2012) investigates the indicators that trigger the international waves in capital flows of 58 countries, categorize capital flows as surges, stops, flight and retrenchments. The study identifies surges and stops as sudden increase and decrease in capital inflows, flights and retrenchments as sudden increases and decreases in capital outflows. Forbes and Warnock (2012) categorizes the determinants of capital flows as push factors or pull factors considering whether they are external or internal to the country. While push factors include global or contagion effects, pull factors include domestic variables. The Chicago Board Options Exchange's equity option volatility index (VIX) is used as a proxy for global liquidity conditions, uncertainty and risk aversion. The other push/global factors include growth in the global money supply (sum of M2 in the US, Eurozone and Japan), global interest rate (interest rates of long-term government bonds in the US, core Euro Area and Japan) and global growth. The country specific variables (pull factors), on the other hand, includes the ratio of stock market capitalization to GDP (to proxy the financial system depth), capital controls, real GDP growth and public debt to GDP. Trade and financial linkages are considered as proxies for contagion. Their result suggest that the global factors are important to explain the sharp decreases in capital inflows and global growth is particularly important for capital inflows rather than by outflows. However, different from global factors, the contagion factors have an important role for driving the retrenchment episode. Although domestic growth has an impact on the decisions of foreign investment, domestic factors have weaker impact on capital flow episodes relative to other factors.

Broner et al. (2013) analyses the behavior of capital flows over the business cycle and during the recent global financial crisis. According to their results gross capital flows are procyclical. And during crisis gross capital flows collapse. Their results are consistent with a view that the behavior of domestic and foreign investors are asymmetric such that when foreign investors invest in a country, domestic investors

invest abroad, and vice versa. Ahmed and Zlode (2014) investigate determinant of capital inflows to emerging market economies during the last two decades. Growth and interest rate differentials and global risk appetite are found to be the important determinants of net private capital inflows.

Fuertes et al., (2016) investigates the relative importance of short-term (hot money) in bank credit and portfolio flows from the US to 18 emerging markets over the period 1988–2012 by deploying Kalman state-space models procedure. The analysis reveals that the importance of hot money relative to the permanent component in bank credit flows has significantly increased during the 2000s relative to the 1990s. The empirical evidence by Fuertes et al., (2016) supports the view that global banks have played an important role in the transmission of the global financial crisis to emerging markets, and endorses the use of regulations to manage international capital flows.

Bruno and Shin (2014b) investigate the effects of global factors on cross-border banking capital flows (proxied by the growth rate of the external claims of BIS reporting country banks) for 46 developed and emerging economies by employing dynamic panel GMM methods. The US broker dealer sector leverage to proxy global bank leverage and change in the equity of the largest non-US commercial bank to proxy the growth in equity of international banks are employed in the model as the global factors. Bank assets/capital, net income of commercial banks/total assets representing correspondingly domestic leverage and local equity growth, the log of real exchange rate, money supply (M2) growth, inflation rate, government gross debt to GDP, difference between the local stock volatility and the return on assets are included in the model as domestic factors. The study postulates that there is a relation between capital flows and increase in M2 since when the domestic borrowers borrow in US dollars; they deposit them in the form of local currency in domestic banking system, which is a part of M2. The results of the study reveal that global leverage, global equity growth and domestic equity growth have all significant and positive effects over capital inflows. On the other hand, real exchange rate has a significant and negative effect over capital inflows.

Bruno and Shin (2014a) investigates the sensitivity of capital flows to global factors (growth in the interoffice assets of foreign banks in the US and VIX) in S. Korea using quarterly data from 1996:1 to 2012:1. For the domestic (pull) variables, they consider real exchange rate, growth in money supply, GDP growth and change in government gross debt to GDP. The results of Bruno and Shin (2014a) suggest that after the implication of macroprudential policies in Korea, sensitivity of capital flows to global factors decreases.

Hahm et al. (2011) analyze the predictive power of non-core liabilities for currency, credit and stock market crises in both emerging and developing economies. They measure non-core bank liabilities of the banking sector in two different ways and call them non-core 1 and non-core 2. First one is sum of liabilities of banks to foreign sector and liabilities of banks to the non-banking financial sector such as insurance companies. The second one non-core 2 is sum of liabilities of banks to foreign sector and difference between M3 and M2. Hahm et al. (2011) find that both of non-core 1 and non-core 2 have a significant predictive power for currency crises. However, when the components of non-core 1 and non-core 2 are analyzed separately, it is revealed the components of non-core 1 have statistically significant and positive effect on currency crises. On the other hand, among the components of non-core 2, only foreign liabilities are statistically significant and have positive effect on currency crises. This means that foreign liabilities have much more significant effect on currency crises relative to money aggregates in emerging markets. Again, for the credit crises, both of the non-core measures have statistically significant positive coefficients. Similar to the case for currency crises, liabilities to foreign sector again have an important explanatory power over credit crises. For the case of stock market crises, both non-core 1 and non-core 2 have a positive and statistically significant coefficient. However, when credit to GDP ratio is also included as an explanatory variable, both of these variables become insignificant. After all, the authors conclude that although non-core bank liabilities have a significant predictive power for currency and credit market crises, such a result may not be the case for Stock market crisis.

Pham (2015) estimates the determinants of bank credits for the period of 1990 to 2013 by using data set for 146 countries. He chooses to use characteristics of the domestic banking system in addition to internal demand factors, external supply factors, and global factors for composing a dynamic log-linear equation estimated by using GMM method. In the equation, characteristics of the domestic banking system are represented by return on equity (ROE) and return on assets (ROA) which are measures of the profitability of a bank, total asset of the three largest banks as a percentage of total asset of all banks which is a measure of bank concentration, credit to GDP ratio which is the proxy for development level of banking system and finally bank nonperforming loans to total loans which indicates the strength of banking system. Pham (2015) finds that the coefficient of lending interest rate is statistically significant and positive. On the other hand, capital requirement negatively affects bank credit. Finally, monetary supply has statistically significant and positive effect on bank credit. Among the external supply factors, the coefficient of exchange rate is statistically significant and negative. The study finds that ROE, ROA and bank credit supply are all statistically insignificant whilst bank concentration and nonperforming loans is statistically significant and negative. Contrary to prior expectation, the lower global interest rate does not affect bank credit growth because of the decrease in bank profitability.

Hahm et al. (2012) investigate the responsiveness of S. Korean core and non-core liabilities to real GDP, domestic policy interest rate and the US policy interest rate. They conclude that non-core liabilities are more procyclical than the core liabilities since the GDP elasticity of non-core liabilities is much higher than that of the core liabilities. It is also found that the policy rate elasticity of core liabilities is high and statistically significant, whilst the policy interest rate elasticity of non-core liabilities is statistically insignificant. Therefore, it can be deduced that while domestic monetary policy is effective for the growth of core liabilities, the same cannot be said for non-core liabilities. On the other hand, when we look at the elasticity of non-core bank liabilities with respect to the US policy interest rate, it is statistically significant and negative. It is an expected result since in case of low foreign interest rate, financial intermediaries prefer to borrow in instruments with low foreign interest rate

and invest in the instruments with high domestic interest rate and this leads to a larger bank liability held by the foreign sector.

Cho and Hahm (2014) analyze the determinants of the foreign currency non-core bank liabilities in S. Korea and the effectiveness of macroprudential policies for the period of 2003 to 2013 by using both bank-level and macroeconomic data. They measure the foreign currency non-core bank liabilities by subtracting the ratio of foreign currency deposit liabilities to total foreign currency liabilities from one. They chose log of asset size, return on assets, Bank for International Settlements capital ratio, ratio of local currency loans to deposit, log of housing loans, nonperforming loan ratio and growth rate of financial derivative transactions volume as bank-level explanatory variables and GDP growth rate, ratio of current account surplus to GDP, credit to GDP ratio and the U.S five-year Treasury bond yield as macroeconomic explanatory variables. According to authors' findings, among bank-specific factors the ratio of domestic loans to deposits positively affects the foreign non-core liabilities and among the macroeconomic factors ratio of current account surplus to GDP negatively affects the foreign non-core liabilities.

There are a couple of studies about non-core liabilities and non-core liabilities in Turkey. Başkaya et al., (2017) examine the role of the international credit channel in Turkey over 2005–2013. Their results indicate that larger, more capitalized banks with higher non-core liabilities increase credit supply when capital inflows are higher. This result is found to be stronger for domestic banks relative to foreign banks and survives during the crisis period of post-2008. By decomposing capital inflows into bank and non-bank flows, Başkaya et al., (2017) show the importance of domestic banks' external borrowing for domestic credit growth.

Özen et al. (2013) indicate that because of the decrease in confidence, sudden capital outflows and deleveraging exert pressure over the domestic currency leading to depreciation of the domestic currency and increase the value of foreign currency liabilities. Consequently, real sector is affected negatively with the increase in the possibility of bankruptcies and nonperforming loans. The authors state that the high share of the FX non-core bank liabilities is a danger for the financial stability. They

analyze the behavior of the FX non-core liabilities to changes in the Volatility Index (VIX), which is used as the proxy of external financial stress in Turkey. The authors divide 1995 to 2012 period to two sub periods; 1995 to 2000 and 2004 to 2012, because of the structural change in the Turkish economy after the 2001 crises. According to their results, although for the first period FX non-core bank liabilities do not react to VIX, this situation changes in the second period and FX non-core bank liabilities decrease significantly after an increase in VIX (a decrease in the global risk appetite and liquidity).

Kılınç et al. (2013) investigate the relation between non-core liabilities and credit for Turkey for the period of 2001Q4 and 2012Q1 by using VAR. They follow basically Hahm et. (2012) and use two measures of non-core liabilities. First one is equal to the sum of the total liabilities to nonresidents and the difference between M3 and M2. Second one is equal to only the total liabilities to nonresidents. According to their impulse response functions respond of non-core liability to credits is statistically significant and positive, which means that financial institutions search for non-core liabilities in the case of increase in the demand for credit.

On the other hand, as an example of studies about capital flows, Çulha (2006) who analyze the determinants of capital flow in Turkey for the period of 1992 to 2005 prefers to use “push-pull” factors approach. The study considers interest rate on 3-month US Treasury bills and US industrial production index as push factors which are external determinants of capital flows and real rate of interest on Turkish Treasury bills, İstanbul Stock Exchange price index, budget balance and current account balance as pull factors which are domestic determinants of capital flows. For the push factors, since interest rate on 3-month US Treasury bills represent the borrowing cost of the recipient country, an increase in this variable negatively affects capital inflows into Turkey. However, because US industrial production index proxies the availability of funds for investment in abroad, increase in this variable positively affect capital inflows into Turkey. For the pull factors, real rate of interest on Turkish Treasury bills and İstanbul Stock Exchange have positive impacts over capital inflows because they indicate the investment opportunities and economic

situation in Turkey. Also improvement in budget balance which shows better public finance conditions and current account balance which proxies external fragility cause increase in capital inflows.

CHAPTER 3

TURKISH BANKING SYSTEM

3.1. Historical Background

In order to understand Turkish banking system, it is important to look at its historical development. In this part, we are going to investigate history of Turkish banking system since proclamation of the Republic of Turkey. It is beneficial to analyze this period by dividing sub periods as 1923-32, 1933-44, 1945-59, 1960-80, 1980-2000 and post 2000 (Keskin et. al., 2008).

In the period of 1923-32, İzmir Economic Congress which has an important role over the Turkish economic history was carried out in 1923. In this congress, the idea that economic development can be sustained only by national banks and it can be possible with the encouragement of government, was adopted. A number of banks which provide credit to agriculture, business and industry sectors were established in these years and number of banks that was 18 in the beginning of the period increased to 44 until the end of the period (Ayan, 2010). Among these banks, as the first private bank, İş Bank was established in 1924. In addition, Bank for Industry and Mining was established in 1925 to provide credit to Turkish businessmen and mine owners. Ziraat Bank was converted to a public bank as a joint stock corporation. However, because of the Great Depreciation, at the beginning of the 1930's, most of them had to be shut down. The Central Bank of the Turkish Republic was founded in 1930 (Kazgan, 2013).

1933-44 period attracts attention with etatist implementations. In this period, industrial production was highly supported by public sector and industrial production was funded by internal financing. Therefore, banking and financial system was constructed in a parallel way. As a result, a lot of public bank was established in this period. Denizbank(1937) and Halk Bank (1938) are two example of state banks that

were established in this era in order to support and finance the state led enterprises (Ayan, 2010, Olgu, 2014).

In the period of 1945-59, etatist policies has been replaced by policies that support private sector to expedite economic development. Stronger private sector and changes in industrialization policies affected the banking sector and in this period private banking improved. Yapı Kredi Bank (1944), Garanti Bank (1946), Akbank, Pamukbank (1955) and The Industrial Development Bank of Turkey (1950) were established in this period (Keskin et. al., 2008).

In the period of 1960-80, import substitution industrialization policies aiming the production of imported industrial good in the country, were pursued with planning. Therefore, in order to protect domestic sector, relatively more closed economy was adopted in this period. In addition, deposit and credit interest rate were determined by government and the major task of the banks was financing the investments which were included in development plans. During this period, the new establishment of only 5 development banks and 2 commercial banks were allowed. These two commercial banks were American-Turkish Foreign Trade Bank (1964) and Arabian-Turkish Bank (1977) and they were the first examples of international cooperation. American-Turkish Foreign Trade Bank is the first bank that is established with foreign capital shareholding in history of the Republic (Keskin et. al., 2008).

The period of 1980-2000 draw attention as the liberalization period which affects also the banking sector. In order to increase domestic savings, deposit and credit interest rates were allowed to be set freely and entry to banking sector was eased. However, because of the structural deficiencies and banker crisis, 6 banks had to shut down at the beginning of the period. Therefore, in 1983, interest rates were taken under control by government again. Moreover, innovations which were made in this period to expand, institutionalize and liberalize financial system became one of the factors that cause crises in the next ten years (Ayan, 2010). Because of the loosening of entry restrictions through time, 31 new banks entered the sector between 1980 and 1990 and among those banks 19 were foreign and 11 were national banks. Because of the high public sector deficits, especially after 1989, Turkey entered for high

interest rate and high inflation period. The bulk of the public sector deficits was financed through commercial banking system via domestic borrowing. In 1994, despite growing public deficit, government irrationally continued to adopt expansionary policies and decreased interest rate. As a result, this caused distress in financial sector. Additionally, with the contribution of tax on financial instruments, both domestic and foreign investors were kept away from TL denominated instruments. In order to overcome confidence crisis, government guaranteed saving deposits. In this process, three banks were shut down and credit score of Turkey was decreased. Because of these reasons, banks lost their ability to borrow from abroad (Keskin et. al., 2008). In 1998, government started to practice disinflation program which was partially effective in terms of inflation rate and fiscal imbalance but not on the pressures on the interest rates. However, because of the Russian crisis in 1998, the general elections in 1999 and two earthquakes in 1999, the fiscal balance worsened again. In 1999 with the implications of another disinflation program, new banking law was enforced and an independent Banking Regulation and Supervision Agency (BRSA) was established (Ertuğrul and Selçuk, 2001).

In the post 2000 period, especially the years after the 2001 financial crisis, some important steps were undertaken including banking sector regulation and reconstruction and attempts towards to harmonize with Basel-II criteria. With the recovery in economics and political stability, credibility of Turkish banks in international markets increased. Therefore, banks' borrowing capacity increased and growth in banking sector was observed. After the 2001 financial crisis, most of the foreign bank increased their shareholdings (Olgu, 2014).

3.2. Structure of Banking System in Turkey

Although Shin and Shin (2011) define non-core liabilities for Korea as the sum of bank liabilities to foreign creditors, bank debt securities, promissory notes, repos and certificates of deposit, this definition may change from one country to another. For Turkey, we can adopt the definition of Yılmaz and Süslü (2016) which is the sum of

payables to bank, repo, securities issued and payables to money market as a broad definition of non-core liabilities in Turkey. Figure 3.1 shows the non-core liabilities in Turkey during 2003-2015. It can be seen clearly that payables to bank composes the largest part of the non-core liabilities (around 59% of the total in 2015Q3) and repo follows this variable. Generally, non-core liabilities have an increasing trend especially after 2010Q3. After substantial increase during 2010Q3 and 2011Q3, between 2011Q3 and 2013Q1 there is a stable pattern. The effective macroprudential policy implementations of the CBRT can be the most probable reason of this stability. After this period, hike up to 2015Q4 attracts attention. This can be explained by expansionary monetary policies of developed countries. With decreasing their policy rates, and better global liquidity conditions, asset prices tend to increase. For instance, the Federal Reserve (Fed), the Bank of England (BOE), the Bank of Japan (BOJ) and the European Central Bank (ECB) set policy rate near zero. As a result, capital flows to developing countries has substantially increased (CBRT, 2010).

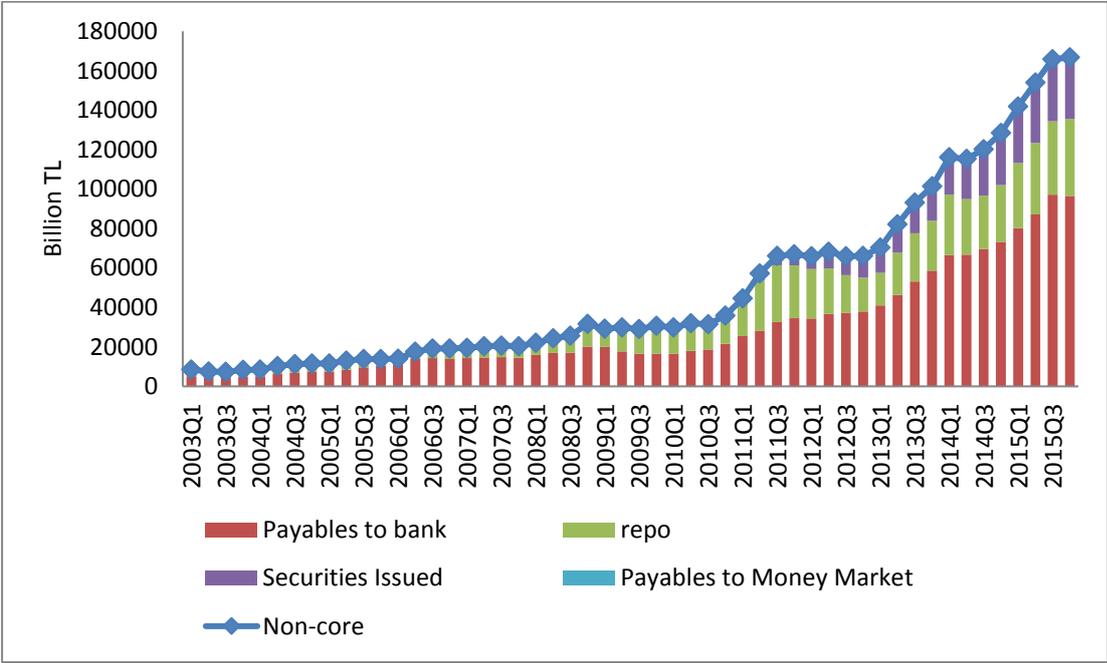


Figure 3 1: Composition of non-core liabilities

Source: CBRT

Figure 3.2 displays the ratio of non-core liabilities to GDP and Credit to GDP in Turkey. From the figure, we can observe that there is a positive correlation between these two variables. However, credit growth has always been substantially higher than the growth of deposits which are, indeed, often described as the main source of credits. During this period, it is observed that banks financed credits increasingly from other sources and non-core liabilities. Therefore, it is not surprising that these two variables have similar pattern. Moreover, it is clearly seen that there is a slight decline in both variables in the last quarter of 2008 because of the contraction in the funding ability of banks, increase in the cost of funding and slowdown in economic activity due to global financial crisis. However, with the positive improvement in global risk perceptions and easing of policy interest rate in advanced economies, revival in credits is observed (CBRT, 2009).

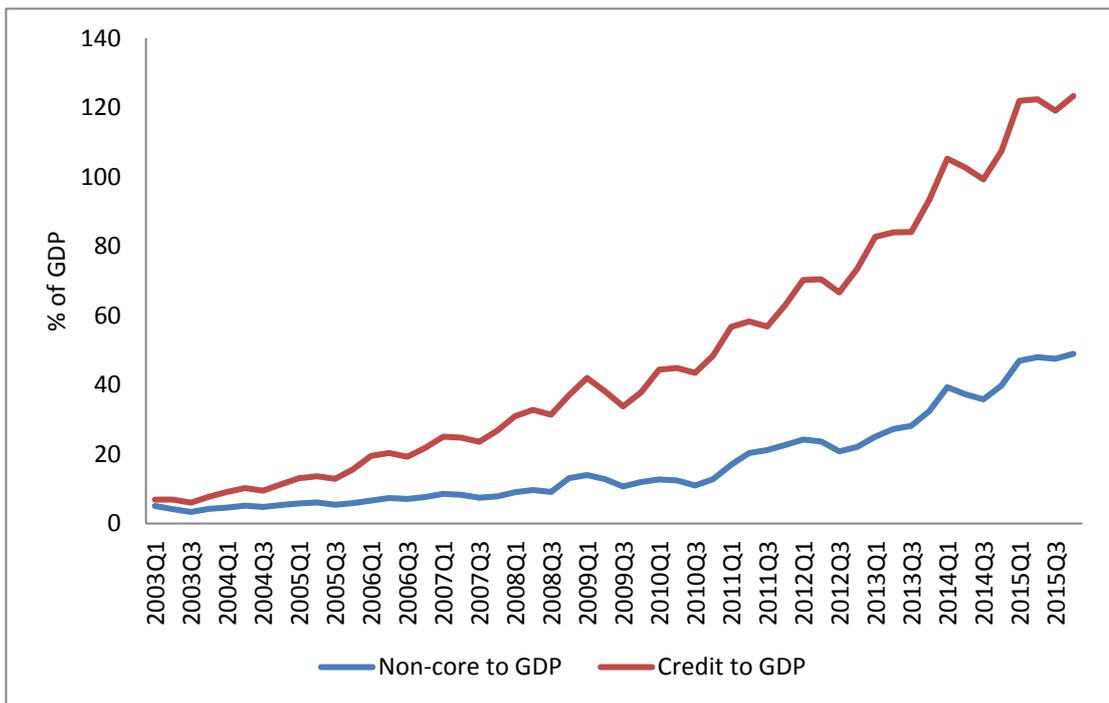


Figure 3 2: The ratio of non-core liabilities to GDP and Credit to GDP in Turkey

Source: CBRT

Figure 3.3 illustrates Credit to GDP and deposit to GDP ratios. From the figure we can observe that these two ratios move parallel to each other. So it is clear that the main source of credits is deposits. However, while deposit to GDP ratio exceeded credit to GDP ratio until 2013Q2, this situation was reversed after this year. Moreover, the gap between these two ratios has been widened continuously since then with a slight drop only in 2015Q2. We can state that the main driver of this gap is non-core liabilities which fill the deficiency of deposits. Although policy rate of developing countries was under the policy rate that is before the 2008 global financial crises, with the recovery in the global financial conditions, capital flow to developing countries accelerated especially after the second quarter of 2012. This causes an increase in foreign currency positions of developing countries. (CBRT, 2013) We can interpret the decrease in the gap in 2015Q2 as a result of the increased uncertainty about the US monetary policy which causes fluctuation in the financial markets (CBRT, 2015).

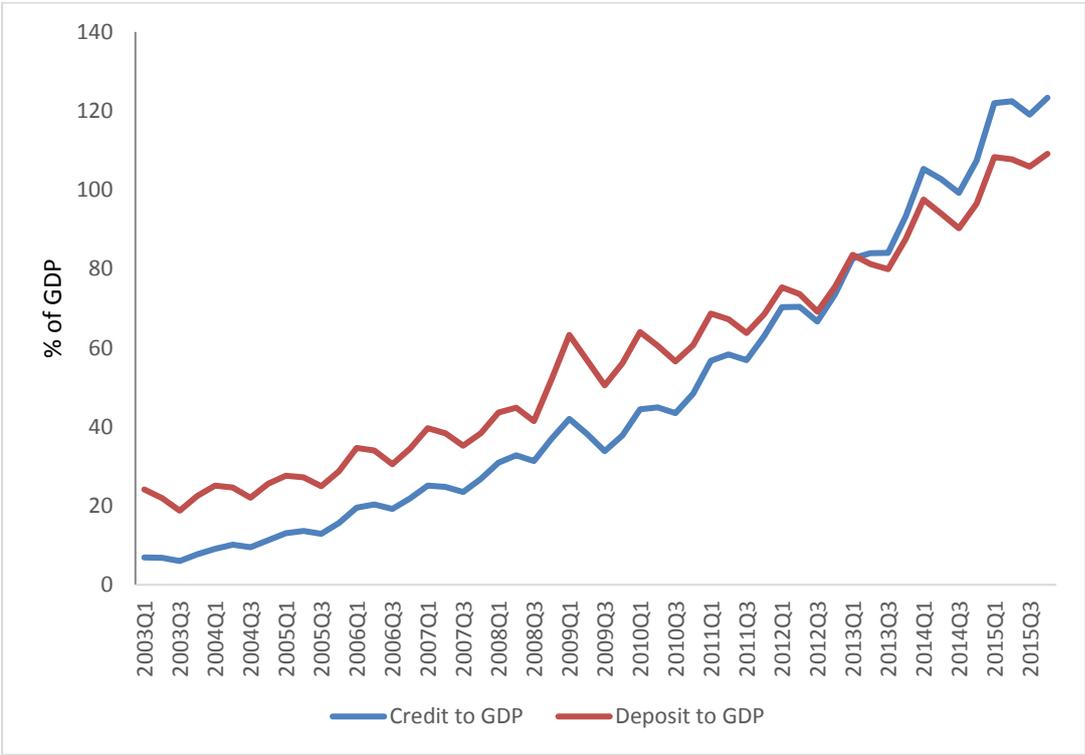


Figure 3 3: Credit to GDP and deposit to GDP ratios in Turkey

Source: CBRT

Figure 3.4 represents the ratio of non-core to total liabilities and the ratio of deposit to total liabilities. We can clearly see that the gap between these two ratio started to tighten after the 2010Q4. While deposit to liability ratio has a decreasing trend, non-core to total liability ratio has an increasing trend during the study period.

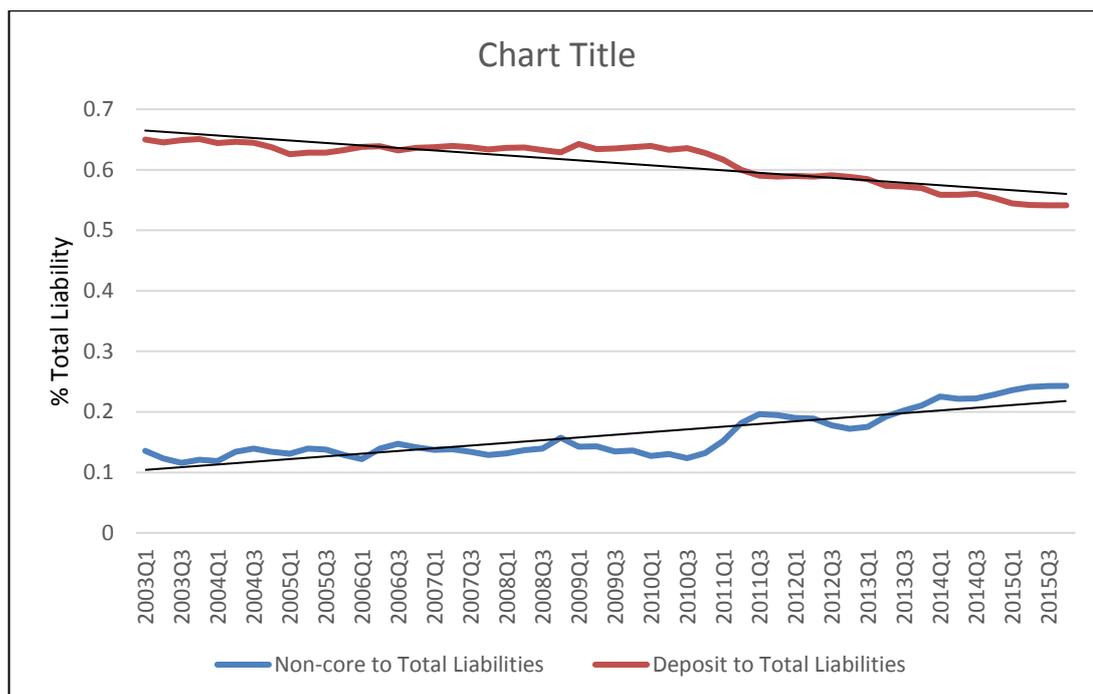


Figure 3 4: The ratio of non-core to total liabilities and the ratio of deposit to total liabilities of Turkey

Source: CBRT

Figure 3.5 plots the period average of the asset size concentration of 18 deposit banks which are used in our empirical analysis. The share of the assets of the largest bank in the overall banks asset size is around has 16 percent. The share of asset size of the second, third, fourth and fifth order banks in the overall asset size are 15.5 percent, 13 percent, 12.8 percent and 10 percent of asset size of overall banks respectively.

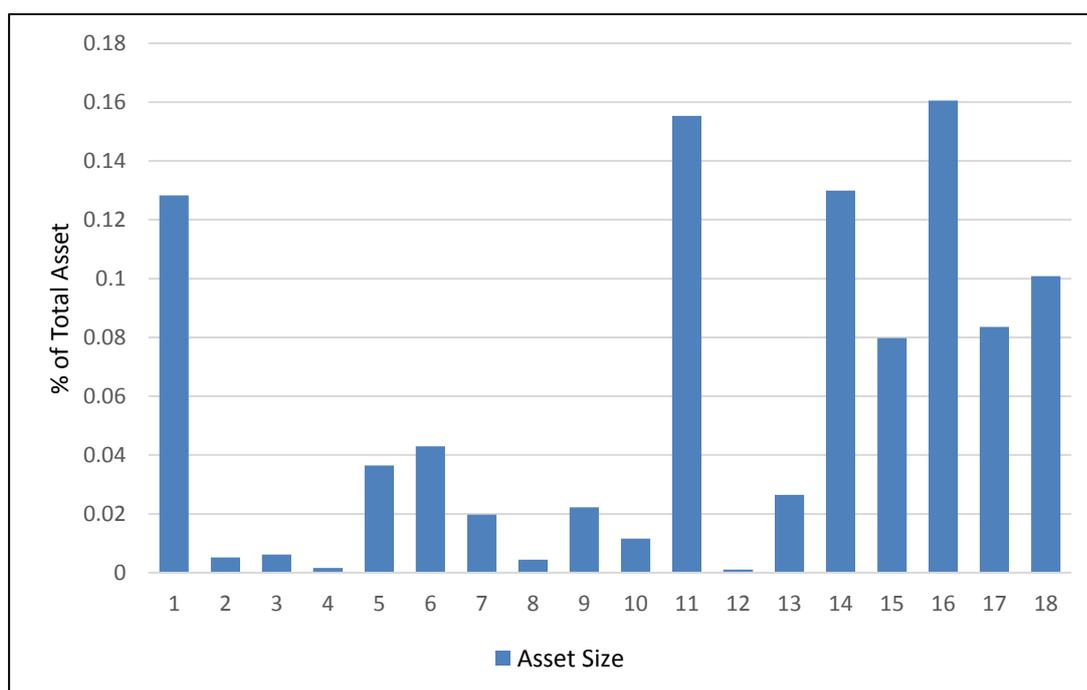


Figure 3 5: The asset size concentration of Turkish deposit banks

Source: TBB

As we can see in table 3.1, private banks have the highest share in terms of their asset size in this group for all years in the period of 2003 to 2015. The state banks have the second order and foreign banks have the lowest share. On the other hand, when we look at the beginning and the end of the period, it can clearly be seen that the shares of state and private banks decrease yet the share of foreign banks increases. Moreover, Turkish banking system concentration is high and the average share of the largest five banks in total bank assets is about 67 percent for the period of 2003 to 2015. However, in recent years this rate is lower than rate that is in beginning of the period. Therefore, Turkish banking system concentration shows a decrease between 2003 and 2015.

Table 3 1: Asset Size of state, private and foreign banks in Turkey

%	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
State Banks	37.9	36.5	37.6	31.7	30	29.4	31.4	31.8	30.5	29.4	29.6	30.4	30.9
Private Banks	44.5	40.7	49.9	0,453	44.3	43.5	42.1	42.3	42.7	43.4	42.5	41.9	42.3
Foreign Banks	23.7	22.7	26.6	25.6	25.7	27	26.4	25.3	26.6	27.1	27.7	27.5	26.7

Table 3.1 (cont'd)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Biggest Five Banks	73.9	68.1	76.7	69.4	67.8	66.9	68.2	67.9	65.9	64.6	63.7	63.2	63.7

Source: TBB

In figure 3.6, as a representative of asset quality, nonperforming loan to total loan ratio is given. According to the graph, this ratio sharply decreases until 2004Q1 and this reduction continues slightly until 2006Q4. At this point, we can refer to success of restructuring program in Turkish banking system. After this year, there is a slight increase but after the third quarter of 2008 a rapid increase is observed. This jump can be explained by the 2008 global financial crisis which caused a decrease in economic activity. After the third quarter of 2009, with the increase in global liquidity as a result of expansionary monetary policies of developed countries it once again starts to show a decreasing trend. Therefore, it can be claimed that during the study period, asset quality of banks shows an improvement.

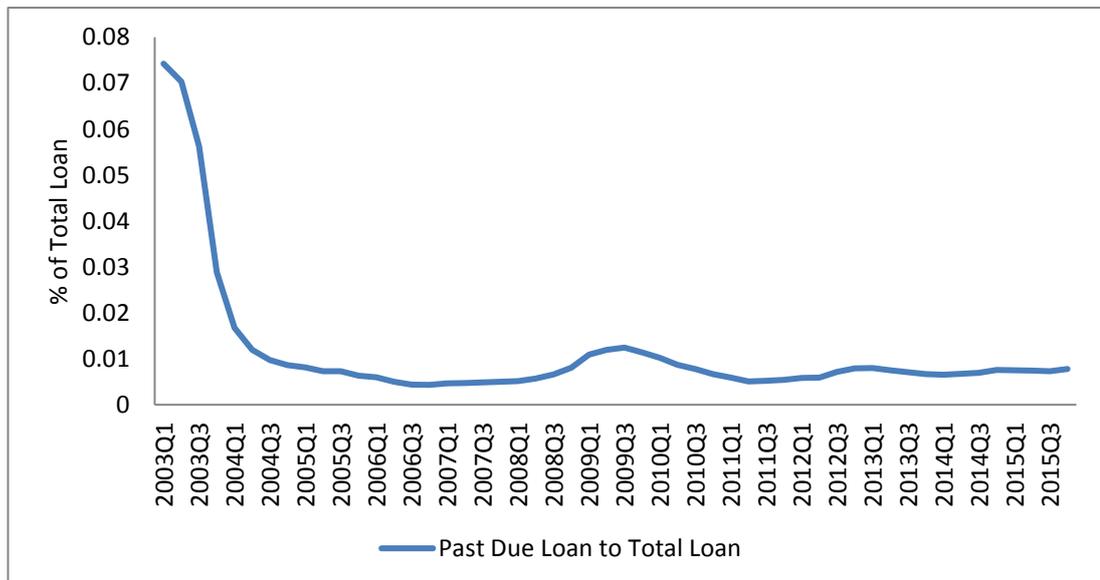


Figure 3 6: Nonperforming loan to total loan ratio of Turkish banks

Source: CBRT

In figure 3.7, equity to asset ratio, which is an indicator of capital adequacy, is presented. According to Basel III, this ratio must be at least 8 % and as we can observe from the graph that this ratio is greater than the minimum requirement ratio for all years. Moreover, in the Turkish banking system the minimum capital adequacy for the period of 2003Q1 to 2015Q4 is realized in the third quarter of 2015 with 0.104 and this ratio is even lower than the ratio of the fourth quarter of 2008 that is equal to 0.11. Therefore, this means that banks' ability to absorb reasonable amounts of losses decreases in recent years. When we look at the graph, it can be easily observed that there is also fall in the fourth quarter of 2008. In general, there is a slight declining trend for this ratio.

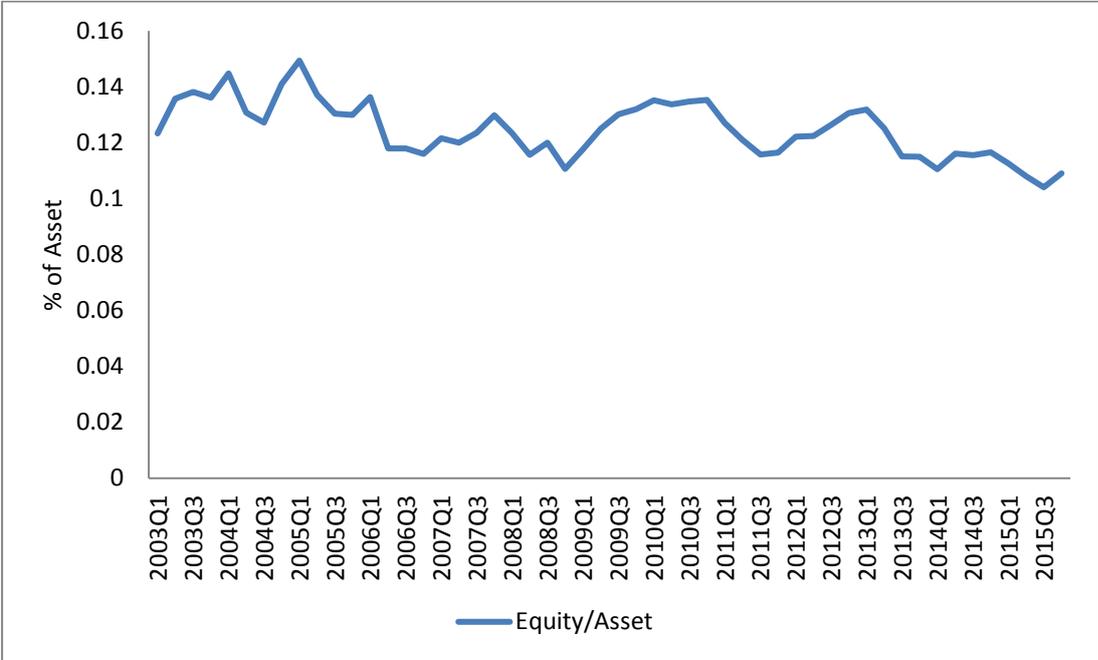


Figure 3 7: Equity to asset ratio of Turkish banks

Source: CBRT

The ratio of FX assets to FX liabilities which is the proxy for FX open position is given in figure 3.8. During 2003Q1 and 2010Q3 the minimum ratio is experienced in the second quarter of 2006Q2 which is 0.57. Between 2006Q2 and 2009Q2, generally there is an increasing pattern since in this period because of tightening

global conditions, FX liabilities shows reduction. In addition, in 2009Q2 the ratio achieved its peak point and after this quarter, it started to decline continuously. In the fourth quarter of 2010 this ratio is 0.48 which is below the ratio of 2006Q2 and continues to decrease dramatically after this year. This means that FX liabilities is more than the FX asset and gap between these two ratios has an increasing trend. Rapid increase in the non-core liabilities especially after 2010 causes this result. In recent years, non-core liabilities have a growing share in funding credit growth.

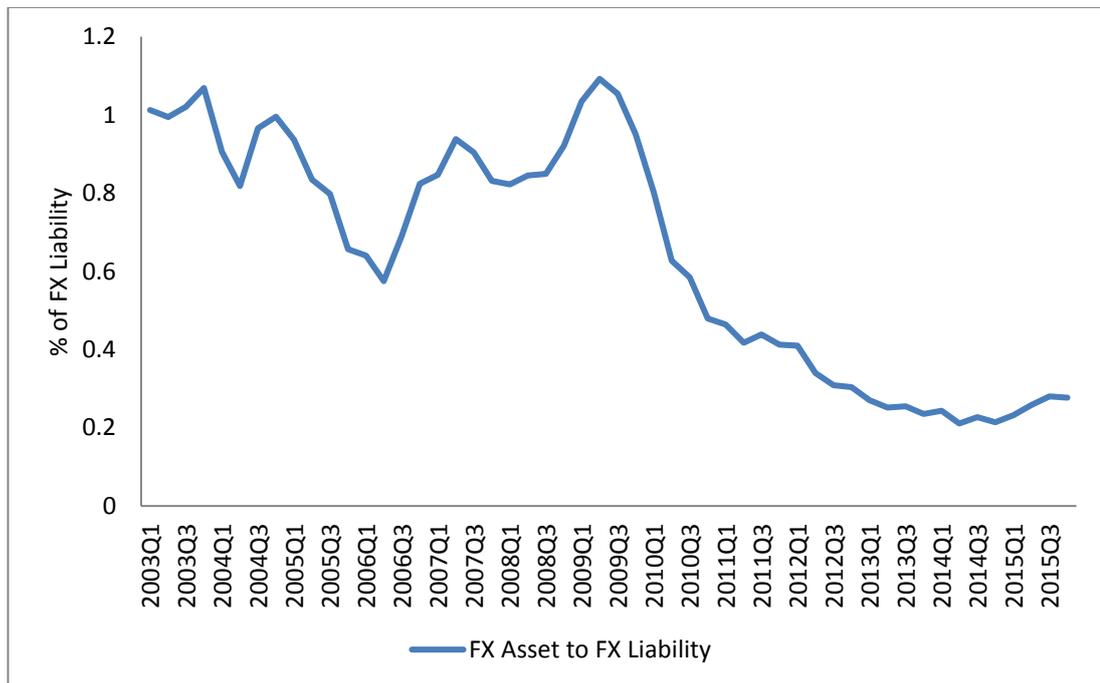


Figure 3 8: The ratio of FX assets to FX liabilities in Turkey

Source: CBRT

Figure 3.9 shows the seasonally adjusted ratio of banks' profits to total assets, which is the proxy for return on assets (ROA). According to graph, between 2005Q4 and 2007Q4 the ratio has an increasing trend. After this quarter, it starts to decline and since there is global financial crisis, which causes decrease in economic activity, and nonperforming loans, as it can be expected in 2008Q4 it reaches its through point and after this year this ratio increases again. The drop in 2005Q4, is caused by Yapı Kredi Bank which announced its loss as 3 billion TL in this year, is not considered.

(CBRT, 2006) Especially after 2010, in Turkish banking system, return on asset decrease drastically and after this fall, this ratio cannot be built up again.

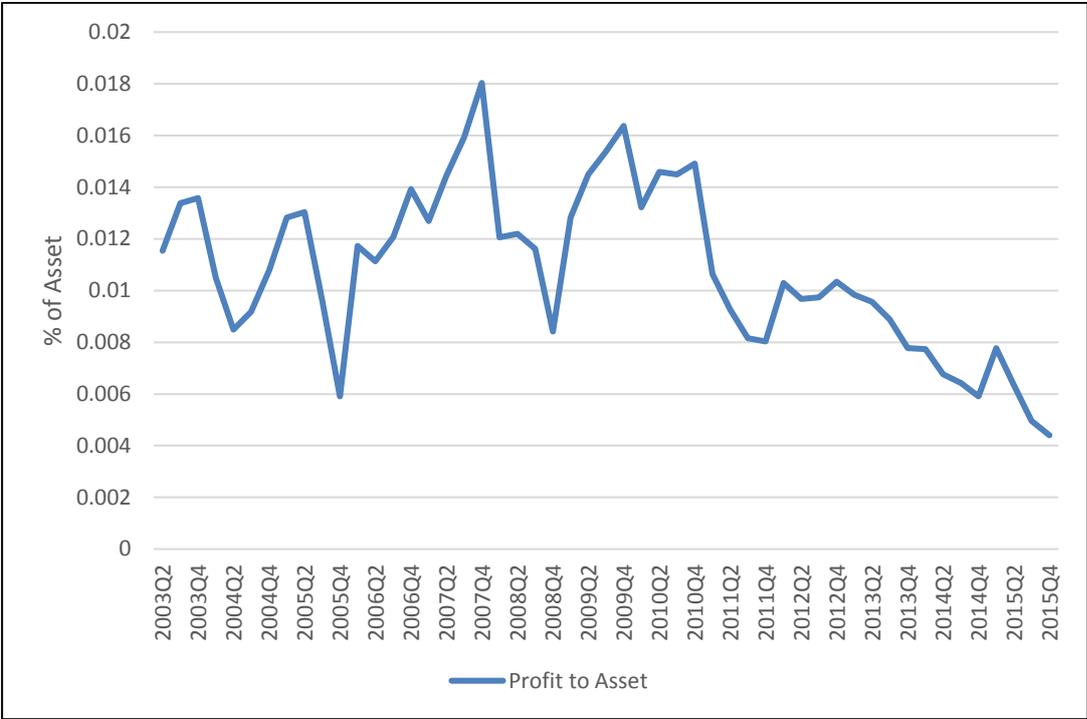


Figure 3 9: The seasonally adjusted ratio of Turkish banks’ profit to total asset

Source: CBRT

CHAPTER 4

EMPIRICAL MODELS AND RESULTS

In order to classify the non-core liability variable in our model, we use the definitions of Cho and Hahm (2014) and Hahm et al. (2011). The measure non-core liability is a bank level variable. Therefore, using the data set covering the period 2003Q1 and 2015Q4 we aim to develop a panel study at the bank level.

The baseline equation for investigating the determinants of non-core liabilities are displayed in equation (1) for the panel model.

$$NCL_{it} = \beta_0 + \beta_1 ASSET_{it} + \beta_2 EQUITY_{it} + \beta_3 NPL_{it} + \beta_4 ROA_{it} + \beta_5 DERIV_{it} + \beta_6 DLTD_{it} + \beta_7 GDP_t + \beta_8 CAB_t + \beta_9 CREDIT_t + \beta_{10} USINT_t + \beta_{11} VIX_t + u_t \quad (1)$$

The bank level variables are: NCL_{it} is non-core liability for i^{th} bank at time t , $ASSET_{it}$ is the ratio of total asset of i^{th} bank to the sum of total assets of all banks at time t which shows the bank size, $EQUITY_{it}$ is the shareholder's equity of i^{th} bank over total assets of i^{th} bank at time t , NPL_{it} is the nonperforming loan ratio of i^{th} bank at time t which shows the asset quality of bank, ROA_{it} is the return on asset of i^{th} bank at time t which shows the profitability of bank, $DERIV_{it}$ is the growth rate of financial derivative transactions volume of i^{th} bank at time t and $DLTD_{it}$ is the ratio of local currency loans to deposits of i^{th} bank at time t . The macro level variables are: GDP_t is the GDP growth rate at time t , CAB_t is the ratio of current account balance to GDP for time t , $CREDIT_t$ is Credit to GDP ratio at time t , $USINT_t$ is the US five-year treasury bond yield at time t and VIX_t is the volatility index at time t . Detailed definitions and data sources for all variables are given in the table 4.1.

It is also important to investigate the economic meanings of bank specific and macroeconomic variables separately. In the case of bank specific variables, asset size

of the banks shows the relative size of bank in the market. High asset size may indicate high funding needs of the bank. Since banks tend towards the funding alternatives beside deposit in the case of higher asset, it can cause an increase in NCL. Shareholder's equity to total asset shows the capital adequacy of the bank. High EQUITY may result in high capacity of banks to access alternative funding resources, which can also cause an increase in NCL. Nonperforming loans are the scheduled payments that are not repaid at least in 90 days. High NPL is a sign for low asset quality of the bank and it may decrease the capability of banks to create NCL. Return on asset shows profitability of banks relative to their assets and it is better to have a higher ROA for banks. It can decrease the need of banks to search for other resource to create NCL. The ratio of local currency loans to deposits shows the liquidity of banks and if this ratio is high, in case of unforeseen fund requirement, banks may not be capable to cover this requirement.

In case of macroeconomic variables, since the deposit grows parallel with economic growth and household wealth, with the development in GDP growth rate which is an indicator of economic growth, Turkish banks may need less NCL as a funding resource. Current account balance indicates the external fragility of countries. Therefore, when this variable shows improvement, because of the increase in credibility of country, credibility of this country's banks also improves. As a result, banks' access to alternative sources other than deposits increase and thereby NCL of banks are affected positively. Increase in credit to GDP ratio means that economic growth cannot keep pace with demand for credits, which causes the bank to search for other financial intermediaries, and foreign creditors for funding. Increase in USINT can attract foreign investors. Therefore, in this case NCL of Turkish banks are expected to decrease. Since VIX indicate the external financial stress in Turkey, it is expected that an increase in this variable causes a drop in NCL.

Table 4 1: Variable Definitions and Data Sources

Symbol	Variables	Sources
NCL	Non-core Liability: $(1 - \frac{DEPOSIT_{it}}{TOTAL LIABILITY_{it}})$	The Bank Association of Turkey
ASSET	Total Asset of i^{th} bank to sum of total asset of all banks: $\frac{ASSET_{it}}{\sum_{i=1}^{18} ASSET_{it}}$	The Bank Association of Turkey
EQUITY	Shareholder's Equity to total asset: $\frac{SHAREHOLDERS' EQUITY_{it}}{TOTAL ASSET_{it}}$	The Bank Association of Turkey
NPL	Nonperforming Loan Ratio: $\frac{LOANS UNDER FOLLOW UP_{it}}{TOTAL LOANS_{it}}$	The Bank Association of Turkey
ROA	Return on Asset: $\frac{NET PROFIT or LOSSES_{it}}{TOTAL ASSET_{it}}$	The Bank Association of Turkey
DERIV	Growth rate of financial derivative transactions volume	The Bank Association of Turkey
DLTD	Ratio of local currency loans to deposit	The Bank Association of Turkey
GDP	GDP growth rate	World Bank
CAB	Current account balance to GDP ratio	OECD
CREDIT	Credit to GDP ratio	CBRT
USINT	US five-year treasury bond yield	U.S. Department of the Treasury
VIX	The volatility index	Bloomberg

In addition to these variables, we also use dummy variables to capture the effects of crisis period and macroprudential policies, which are pursued by CBRT. Dummy variables for 2008 global financial crises, European Union crises and the macro prudential policies of Turkey. These dummy variables are defined as follows:

$$Wcrises_{2008Q4-2009Q4} = \begin{cases} 1, & \text{If years are between 2008Q1 and 2009Q4} \\ 0, & \text{otherwise} \end{cases} \quad (2)$$

$$EU_{2010Q1-2011Q4} = \begin{cases} 1, & \text{If years are between 2010Q1 and 2011Q4} \\ 0, & \text{otherwise} \end{cases} \quad (3)$$

$$Policy_{2010Q4} = \begin{cases} 1, & \text{After 2010Q4} \\ 0, & \text{otherwise} \end{cases} \quad (4)$$

In our panel analysis, initially we estimate the equation by employing panel fixed effect procedure. For robustness checks we also consider alternative specifications. However, fixed effect method can fail to control potential endogeneity problem and dynamic aspects. Therefore, the GMM estimation is a better candidate to overcome this problem

There are two GMM methods, which are difference GMM and system GMM. First one is developed by Arellano and Bond (1991) and the second one is developed by Arellano and Bover (1995) and Blundell and Bond (1998). Both methods could deal with issues such as; few time period and many individuals, a linear functioning relationship, regression with dynamic dependent variable, explanatory variables which are not exogenous, fixed individual effect and heteroscedasticity and autocorrelation within individuals. In the GMM estimation, the lags of dependent and explanatory variables can be used in the model for the existence of a potential endogeneity problem. However, in the first method all regressors are transformed by differencing on the other hand second one makes an additional assumption that there is no correlation between instrumenting variables and the fixed effects. Thanks to this assumption more instruments which provide augmentation in efficiency, can be introduced. Therefore, we prefer to use system GMM method in our estimations.

Table 4.2 provides the fundamental descriptive statistics of the variables, which are mean, overall, between and within standard deviation, minimum and maximum values. The overall deviation represents the variation over time and banks, between deviations represents variation across banks and within deviation represents variation over time. Since macroeconomic variables do not change bank to bank, their between standard deviations are equal to zero.

Table 4 2: Basic Descriptive Statistics of the Variables

Variable		Mean	Std. Dev.	Min	Max	Observations
ASSET	overall	0.056	0.056	0.001	0.224	N = 928
	between		0.057	0.001	0.161	n = 18
	within		0.009	0.026	0.125	T-bar = 51.5556
NPL	overall	0.049	0.056	0.003	0.505	N = 928
	between		0.023	0.019	0.094	n = 18
	within		0.052	-0.021	0.488	T-bar = 51.5556
ROA	overall	0.005	0.006	-0.099	0.070	N = 928
	between		0.002	0.001	0.011	n = 18
	within		0.006	-0,09731	0.071	T-bar = 51.5556
DERIV	overall	0.364	3.259	-1.000	68.115	N = 895
	between		0.933	0.074	4.095	n = 18
	within		3.175	-4.731	64.384	T-bar = 49.7222
DLTD	overall	0.630	0.267	0.045	1.913	N = 928
	between		0.163	0.332	0.893	n = 18
	within		0.216	-0.030	1.863	T-bar = 51.5556
EQUITY	overall	0.120	0.050	0.044	1.000	N = 928
	between		0.032	0.089	0.204	n = 18
	within		0.040	0.033	0.942	T-bar = 51.5556
GDP	overall	1.137	1.974	-5.914	4.820	N = 936
	between		0.000	1.137	1.137	n = 18
	within		1.974	-5.914	4.820	T = 52

Table 4.2 (cont'd)

Variable		Mean	Std. Dev.	Min	Max	Observations
CAB	overall	-5.299	2.167	-9.866	-0.064	N = 936
	between		0.000	-5.299	-5.299	n = 18
	within		2.167	-9.866	-0.064	T = 52
CREDIT	overall	48.661	35.726	6.019	123.335	N = 936
	between		0.000	48.661	48.661	n = 18
	within		35.726	6.019	123.335	T = 52
USINT	overall	2.550	1.278	0.670	4.990	N = 936
	between		0.000	2.550	2.500	n = 18
	within		1.278	0.670	4.990	T = 52
VIX	overall	2.907	0.344	2.401	4.071	N = 936
	between		0.000	2.907	2.907	n = 18
	within		0.344	2.401	4.071	T = 52
NCL	overall	0.395	0.120	0.141	0.901	N = 928
	between		0.087	0.249	0.665	n = 18
	within		0.085	-0.095	0.683	T-bar = 51.5556

In order to avoid multicollinearity problem, it is important to look at the correlation coefficients of the variables and table 4.3 shows these values. As we can see from the table, there are strong correlations between US five-year Treasury bond yield and credit to GDP ratio. Therefore, not all two variables can be used as explanatory variable in the regression at the same time.

Table 4 3: Correlation Coefficients

	ASSET	NPL	ROA	DERIV	DLTD	EQUITY	GDP	CAB	CREDIT	USINT	VIX	NCL
ASSET	1											
NPL	0.0754	1										
ROA	0.2092	0.0269	1									
DERIV	-0.0291	-0.0073	0.0211	1								
DLTD	-0.3567	-0.2053	-0.1271	-0.0158	1							
EQUITY	-0.1816	0.0369	0.0005	0.0951	0.1222	1						
GDP	0.0014	0.0706	0.0819	0.0335	-0.0850	0.0311	1					
CAB	0.0057	0.2336	0.0577	-0.0072	-0.2781	0.0104	-0.1071	1				
CREDIT	-0.0058	-0.2362	-0.1605	0.0064	0.4423	-0.0828	-0.1125	-0.3156	1			
USINT	0.0063	0.1028	0.1300	0.0098	-0.3131	-0.0442	0.1584	0.2593	-0.7333	1		
VIX	-0.0021	0.0316	-0.0316	0.0007	0.0197	0.1253	-0.3564	0.1863	-0.1082	-0.2899	1	
NCL	-0.1746	-0.0109	-0.1330	0.0245	0.4571	0.4036	-0.0202	-0.0623	0.1182	-0.0702	-0.0229	1

In order to decide whether applying simple OLS regression or random effect regression, we utilize Breusch and Pagan Lagrangian multiplier test for random effects. Null hypothesis is that there is no significant difference across units which means there is no panel effect. Since we reject the null hypothesis, it is better to run random effect regression. Moreover, in order to decide between fixed effect regression and random effect regression, it is important to run Hausman test where the null hypothesis is that random effect should be preferred. According to test result, since we reject the null hypothesis, it is better to run fixed effect regression.

According to Modified Wald test for group wise heteroscedasticity in fixed effect regression model, there is a heteroscedasticity problem. In addition, when we look at the result of the Wooldridge test for autocorrelation in panel data, there is also autocorrelation problem. Furthermore, when we apply Pesaran's test for cross sectional dependence, it shows that there is a cross section dependence. In order to cope with these problems, which, cause biased result, Hoechle (2007) suggest using Driscoll and Kraay (1998) covariance matrix estimator which can be used both for pooled OLS estimation and fixed effect regression. Therefore, we use Driscoll and Kraay's (1998) covariance matrix estimator in our pooled OLS and fixed effect estimations and all pooled OLS and fixed effect regression results shown in the tables are with Driscoll and Kraay's standard errors, which are robust.

Table 4 4: Diagnostic Test Results

	Breusch- Pagan test	Hausman test	Modified Wald test	Wooldridge test	Pesaran's test
χ^2	2254.93 (0.0000)	366.95 (0.0000)	3726.49 (0.0000)		8.596 (0.0000)
F				25.516 (0.0001)	

There are two important diagnostics in Dynamic panel estimation, which are the Sargan test for overidentification and instrument set validity and the Arellano-Bond tests for autocorrelation. Sargan test for the validity of GMM instruments has a χ^2

distribution under the null hypothesis. The null hypothesis is “instrument is exogenous” which means that instruments and error term are independent. Results of Sargan tests for all six GMM estimations are represented in table 4.7. As we can see from the test results, we fail to reject the null hypothesis which means that orthogonality conditions are satisfied and our GMM instruments are valid. On the other hand, the Arellano-Bond test for autocorrelation has a null hypothesis of no autocorrelation. In this one, the test for AR (2) which detect autocorrelation in levels is more important than the test for AR (1). Although the test for AR (1) usually rejects the null hypothesis, test results for AR (2) should not be significant. Table 4.7, also shows the Arellano-Bond test for autocorrelation for all six estimations. The second order autocorrelation test do not reject null hypothesis which means that there is no autocorrelation in the second order.

Table A1 in the Appendix provides pooled OLS estimation results for non-core bank liabilities of Turkey. In the first column, results for our baseline model estimation without CREDIT is shown. We prefer to put CREDIT and USINT into the model separately because of the high correlation coefficient between these two variables. Except the derivative growth, all bank specific variables are statistically and economically significant. While the asset size, the ratio of local currency loans to deposit and the equity size have positive effects on the non-core bank liabilities, the nonperforming loan has a negative effect. On the other hand, there are only two macroeconomic variables that have statistically significant effect over the non-core bank liabilities. One of them is the current account balance which has a positive effect on NCL and the other one is the volatility index which has a negative effect. When we replace US five-year Treasury bond yield with credit to GDP ratio in the second column, there are no changes in the results. In the third column, model is selected according to AIC information criteria and unlike the results in first column, this time USFYL became statistically significant and has a positive effect on NCL. On the other hand, NPL became statistically insignificant. Since the model in the third column is our final model, it is important to interpret results in terms of economic meanings. Since asset size shows the relative size of the bank, because of the high funding needs we expect a positive relation between asset size and NCL and

obtain consistent result with our expectation. On the other hand, we find out that an increase in ROA causes a decrease in NCL and it can be explained with a decrease in the need of bank to create NCL because of high profitability of banks. As another bank level explanatory variable, an increase in DLTD causes an increase in NCL. A Rise in this variable shows an increase in local currency loan more than deposit which means that banks need extra source other than deposit. Therefore, it is also consistent with the literature. Finally, positive relation between EQUITY and NCL in our model can be explained with the augmentation in the capacity of bank to access new funding sources with increase in the capital adequacy of banks.

On the other hand, when we look at the macroeconomic variables, improvement in CAB causes an increase in NCL and we can explain this result with easing banks' access to sources other than deposit via increase in the credibility of Turkish banks. However, when we look at the USINT, we obtain positive relation between USINT and NCL which is an unexpected result for us. In the fourth column, 2008 world financial crisis is added into model as a dummy variable. However, it does not have a statistically significant effect over NCL. In the fifth column, model contains European economic crisis as a dummy variable and it also does not have statistically significant effect. In the sixth column, we check the effect of macroprudential policies which are adopted by CBRT after 2010 by a dummy variable and its coefficient is also not significant. Therefore, in the model there are no structural differences between pre and post periods of the year that macroprudential policies were started to be implemented and during the crisis periods.

In table 4.5, fixed effect estimation results for non-core bank liabilities are presented. First column provides the baseline model. Among the bank specific variables, coefficients of nonperforming loans, return on asset and ratio of local currency loans to deposit are statistically significant. As it is expected, DLTD positively affect NCL yet ROA and NPL negatively affects NCL.

On the other hand, among macroeconomics variables, coefficients of the current account balance and the US five-year Treasury bond yield are statistically significant and have positive effects on NCL. When we put credit to GDP ratio instead of

USFYL as an explanatory variable, different from the results in the first column, coefficient of volatility index become statistically significant and it has a negative effect on NCL. In addition, coefficient of credit to GDP ratio is also statistically significant and has a positive effect on NCL. When we put the 2008 global crisis, European economic crisis and CBRT policy as dummy variables, respectively in the fourth, fifth and sixth columns separately, only the coefficient of macroprudential policy dummy give a statistically significant result. Therefore, we can accept that there is a structural change in the model between the years when macroprudential policies are applied and when they are not applied. In the last two columns, models with dummy and interaction dummy variables are represented. When we look at the interaction dummy with DLTD, it can be observed that the coefficient is positive and statistically significant which means that effect of DLTD on NCL increases after the application of the macroprudential policies. Similarly, the coefficient of the interaction dummy with credit to GDP ratio is positive and statistically significant which means that after the macroprudential policy implementation, the effect of credit to GDP ratio on NCL increase. However, the coefficient of interaction dummy with current account balance is negative and statistically significant which means that the effect of CAB on NCL decrease after the macroprudential policy implementation.

Table 4.6 provides system GMM estimation results for non-core bank liabilities of Turkey. In the first and the second columns only the lag of dependent variable is used in the model. However, in other columns both the lag of dependent variable and explanatory variables are used in the model. As a difference between first and second columns, in the first column ratio of credit to GDP is used in the model as an explanatory variable yet in the second column instead of ratio of credit to GDP, US five-year treasury bond yields is used as an explanatory variable in the model. When we look at the estimation results, in both first two columns, as the bank specific variables, lag of dependent variable, ASSET and DLTD are statistically significant and they positively affect NCL.

Among macroeconomics variables, CAB is statistically significant and positively affect NCL in both estimations. However, in the first model, CREDIT and VIX are statistically significant additionally and they have negative effect on NCL. Therefore, we continue to use CREDIT as an explanatory variable instead of USINT in the other estimations. When we look at the third column, among bank specific variables, coefficient of ASSET is not significant anymore. However, the lag of dependent variable, NPL, DLTD and the lag of EQUITY are statistically significant and positively affect NCL. Moreover, the lag of NPL, ROA, the lag of DLTD and EQUITY have statistically significant coefficient and they negatively affect NCL.

On the other hand, among macroeconomic variables, GDP, the lag of CAB, CREDIT, the lag of CREDIT, VIX and the lag of VIX have statistically significant coefficients and while GDP, the lag of CREDIT and the lag VIX have negative effects on NCL, others have positive effects on NCL. In the fourth, fifth and sixth column we include the 2008 global crisis, European economic crisis and CBRT policy as dummy variables in the model respectively. However, any of them has statistically significant coefficient which means that there are no structural breaks in these years.

Table 4 5: Estimation Results for Fixed Effect Model

NCL	1	2	3	4	5	6	7	8
ASSET	0.0756 (0.178)	0.0803 (0.165)						
NPL	0.167*** (0.0404)	0.146*** (0.0399)	0.298*** (0.0472)	0.287*** (0.0475)	0.300*** (0.0453)	0.278*** (0.0411)	0.156*** (0.0333)	0.151*** (0.0363)
ROA	-0.713* (0.350)	-0.881* (0.459)	-0.908* (0.489)	-0.910* (0.483)	-0.897* (0.487)	-0.856* (0.464)	-0.825 (0.493)	-0.690* (0.392)
DERIV	-0.00152 (0.00152)	-0.00147 (0.00139)						
DLTD	0.285*** (0.0292)	0.313*** (0.0330)	0.337*** (0.0381)	0.343*** (0.0407)	0.337*** (0.0382)	0.349*** (0.0376)	0.300*** (0.0314)	0.302*** (0.0303)
EQUITY	-0.00156 (0.0831)	-0.0598 (0.0836)						
GDP	0.000740 (0.00115)	0.000245 (0.00113)						
CAB	0.00373*** (0.00126)	0.00405** (0.00141)	0.00413** (0.00161)	0.00533** (0.00201)	0.00362 (0.00219)	0.00659*** (0.00173)	0.00370* (0.00183)	0.00263 (0.00189)
USINT	0.00675* (0.00345)							
VIX	-0.00979 (0.00993)	-0.0229** (0.00793)	-0.0265*** (0.00782)	-0.0172 (0.0122)	-0.0245*** (0.00785)	-0.0243*** (0.00561)	-0.00748 (0.00595)	0.00319 (0.00808)
CREDIT		-0.000434*** (0.000115)	-0.000561*** (0.000151)	-0.000567*** (0.000156)	-0.000564*** (0.000154)	-0.00102*** (0.000256)	-0.00167*** (0.000412)	-0.00191*** (0.000467)
Wcrisis				-0.0204 (0.0187)				

Table 4.5 (cont'd)

NCL	1	2	3	4	5	6	7	8
EUcrisis					-0.00476 (0.0127)			
policy						0.0389** (0.0159)	-0.379*** (0.0835)	-0.245*** (0.0357)
NPL*policy							0.0721 (0.404)	
DLTD*policy							0.225*** (0.0462)	0.219*** (0.0444)
CAB*policy							-0.00474** (0.00207)	-0.00431* (0.00227)
CREDIT*policy							0.00160*** (0.000385)	0.00170*** (0.000473)
VIX*policy							0.0405** (0.0169)	
ROA*policy							1.481 (1.110)	
Constant	0.229*** (0.0486)	0.299*** (0.0312)	0.298*** (0.0321)	0.277*** (0.0412)	0.291*** (0.0336)	0.306*** (0.0243)	0.293*** (0.0248)	0.261*** (0.0316)
Observations	895	895	928	928	928	928	928	928
Number of groups	18	18	18	18	18	18	18	18

Note: Table shows fixed effect estimation results. For robustness we use Driscoll and Kraay's standard errors in fixed effect regression. *, ** and *** indicates the rejection of null hypothesis at 10 percent, 5 percent and 1 percent significance levels, respectively.

Table 4 6: Estimation Results for System GMM Model

NCL_{it}	1	2	3	4	5	6
NCL_{it-1}	0.873*** (0.0150)	0.873*** (0.0150)	0.918*** (0.0141)	0.918*** (0.0141)	0.918*** (0.0141)	0.918*** (0.0141)
$ASSET_{it}$	0.0867*** (0.0289)	0.0811*** (0.0288)	0.347 (0.240)	0.347 (0.240)	0.347 (0.240)	0.340 (0.240)
$ASSET_{it-1}$			-0.292 (0.239)	-0.292 (0.239)	-0.292 (0.239)	-0.283 (0.240)
NPL_{it}	0.000364 (0.0388)	0.00991 (0.0386)	0.195** (0.0887)	0.197** (0.0891)	0.196** (0.0887)	0.194** (0.0888)
NPL_{it-1}			-0.200** (0.0802)	-0.202** (0.0809)	-0.201** (0.0803)	-0.202** (0.0803)
ROA_{it}	-0.222 (0.272)	-0.164 (0.271)	-0.442** (0.194)	-0.442** (0.194)	-0.441** (0.194)	-0.436** (0.194)
ROA_{it-1}			-0.281 (0.192)	-0.281 (0.192)	-0.280 (0.192)	-0.282 (0.193)
$DERIV_{it}$	0.000253 (0.000387)	0.000226 (0.000387)	2.27e-05 (0.000328)	2.10e-05 (0.000328)	2.05e-05 (0.000329)	3.84e-05 (0.000329)
$DERIV_{it-1}$			0.000474 (0.000328)	0.000471 (0.000328)	0.000472 (0.000328)	0.000500 (0.000329)
$DLTD_{it}$	0.0514*** (0.00680)	0.0480*** (0.00650)	0.328*** (0.0183)	0.328*** (0.0184)	0.328*** (0.0183)	0.329*** (0.0183)
$DLTD_{it-1}$			-0.304*** (0.0188)	-0.304*** (0.0189)	-0.304*** (0.0189)	-0.303*** (0.0189)

Table 4.6 (cont'd)

NCL_{it}	1	2	3	4	5	6
$EQUITY_{it}$	-8.24e-05 (0.0304)	0.00469 (0.0304)	-0.0749** (0.0298)	-0.0748** (0.0298)	-0.0751** (0.0298)	-0.0758** (0.0298)
$EQUITY_{it-1}$			0.104*** (0.0291)	0.103*** (0.0291)	0.103*** (0.0291)	0.103*** (0.0291)
GDP_t	-0.000308 (0.000694)	-0.000182 (0.000691)	-0.00113* (0.000646)	-0.00113* (0.000646)	-0.00115* (0.000664)	-0.00111* (0.000647)
GDP_{t-1}			1.94e-05 (0.000625)	3.56e-05 (0.000632)	7.62e-06 (0.000630)	3.46e-05 (0.000626)
CAB_t	0.00115* (0.000642)	0.00116* (0.000658)	-0.00103 (0.000997)	-0.000991 (0.00102)	-0.000969 (0.00108)	-0.000908 (0.00101)
CAB_{t-1}			0.00215** (0.00101)	0.00217** (0.00102)	0.00214** (0.00101)	0.00247** (0.00107)
$CREDIT_t$	-8.45e-05** (4.28e-05)		0.000482* (0.000286)	0.000485* (0.000287)	0.000482* (0.000286)	0.000484* (0.000287)
$CREDIT_{t-1}$			-0.000483* (0.000292)	-0.000487* (0.000292)	-0.000483* (0.000292)	-0.000545* (0.000300)
VIX_t	-0.00743* (0.00408)	-0.00503 (0.00424)	0.0132** (0.00554)	0.0135** (0.00590)	0.0130** (0.00573)	0.0144** (0.00570)
VIX_{t-1}			-0.0104** (0.00527)	-0.0102* (0.00539)	-0.0106** (0.00535)	-0.0111** (0.00533)
$USINT_t$		0.00118 (0.00114)				

Table 4.6 (cont'd)

NCL_{it}	1	2	3	4	5	6
<i>Wcrisis</i>				-0.00101 (0.00568)		
<i>EUcrisis</i>					0.000587 (0.00408)	
<i>Policy</i>						0.00528 (0.00579)
<i>Constant</i>	0.0459*** (0.0144)	0.0328** (0.0166)	0.0104 (0.0135)	0.00909 (0.0154)	0.0117 (0.0161)	0.0117 (0.0136)
Observations	882	882	867	867	867	867
Number of groups	18	18	18	18	18	18

Note: *, ** and *** indicates the rejection of null hypothesis at 10 percent, 5 percent and 1 percent significance levels, respectively.

Table 4 7: Diagnostic Test Results for system GMM

	1	2	3	4	5	6
Arellano-Bond	-6.03	-5.91	-11.36	-11.30	-11.37	-11.66
test for AR(1)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Arellano-Bond	1.70	1.70	1.51	1.50	1.50	1.48
test for AR(2)	(0.089)	(0.089)	(0.132)	(0.134)	(0.133)	(0.138)
Sargan test	786.98 (0.234)	787.56 (0.229)	849.45 (0.451)	849.42 (0.432)	849.41 (0.432)	846.97 (0.455)

CHAPTER 5

DISCUSSION AND CONCLUDING NOTES

The determinants of the composition of bank liabilities, as a vital signaling variable to diagnose financial vulnerability, have been much more crucially important especially after the recent global financial crisis of 2008-2009. In the literature, bank liabilities are divided mainly into two parts as core liabilities and non-core liabilities. While core liabilities represent the claims that are held by domestic creditors, non-core liabilities represent the other claims that are held by other banks and claims to the rest of the world. In the conventional case, retail deposits of domestic households and firms are the main sources of the bank funds. As retail deposits tend to increase with economic growth and household wealth, in case of a credit boom this source may fail to satisfy credit demand. Consequently, banks tend to seek for other resources via other financial intermediaries and foreign creditors for funding non-core liabilities. Because large part of non-core liabilities are short term and foreign exchange denominated, such a behavior, often called risk taking channel of monetary policy well (Bruno and Shin, 2014b), increases exposition of banks to risks and threaten the financial stability.

In this study, we empirically analyzed the determinants of the non-core liabilities for Turkey using not only bank level data but also domestic macroeconomic and external global liquidity/risk aversion variables. Since non-core bank liabilities represent the part of liabilities which are held by other banks, it is often short term and foreign currency denominated. The reason behind this is the behavior that banks tend to match these liabilities with their assets to compensate the remaining need for credit sources in the boom periods. The impact of macroprudential policies on non-core liabilities as well as their determinants were also investigated. To this end, we considered quarterly data from

2003Q1-2015Q4 for 18 public, private and foreign commercial banks operating in Turkey. Although there is a growing literature about non-core bank liabilities, the number of country specific studies are extremely limited. The contribution of this thesis is that this is the first study to look into the determinants of non-core liabilities by considering both bank level factors and macroeconomic factors in Turkey. We used both bank specific factors such as ratio of bank's asset to total assets, ratio of shareholder equity to assets, nonperforming loan ratio, return on assets, growth rate of financial derivative and ratio of local currency loans to deposits and macroeconomic factors such as GDP growth rate, ratio of current account balance to GDP, credit to GDP ratio and US five-year treasury bond yield in our model as explanatory variables. Considering the potential endogeneity of bank specific variables, we estimated panel regression equations by employing Generalized Method of Moment (GMM) methods.

This study also presented some mechanism resulting in financial vulnerability in the case of an increase in capital flows and non-core liabilities, macroprudential policy tools that were started to be applied by CBRT after 2010. The literature generally uses the risk-taking channel to explain the reason behind financial distress in emerging countries. In general, banks borrow in US dollar and lend in domestic currency. In case of an expansionary monetary policy in advanced countries, banks of emerging countries' ability to obtain US dollar funding which cause appreciation in domestic currency increases. Since they lend to local borrowers in terms of domestic currency, this causes improvement in their balance sheet and thus they gain more capacity to create credit.

In the Turkish banking system, non-core liabilities to GDP, deposits to GDP and credits to GDP ratios all have an increasing trend during our sample period. The movements of non-core liabilities to GDP and credits to GDP appear to have similar trends. However, deposits to GDP ratio exceed credit to GDP ratio until 2013Q2, but after this year, credit to GDP ratio start to exceed deposits to GDP ratio. Moreover, although the ratio of deposits to total liabilities is much higher than the ratio of non-core to total liabilities,

the gap between these two ratios started to tighten after 2010Q4. Therefore, based on these results, we can state that although the main sources of credits are deposit, Turkish banks' tendency to create non-core liability in order to compensate the deficiency of deposits has an increasing trend.

The results of this study also suggest that, the leverage of the Turkish banking system is procyclical and expansion or contradiction in balance sheet affect credit cycle. Furthermore, correlation between the credit and non-core liabilities is observed and the huge difference between the credit and deposit is explained with non-core liabilities.

Our results both from the panel fixed effects and system GMM procedures suggest that, among the bank specific variables, nonperforming loans (NPL), returns on assets (ROA) and DLTD are all statistically significant. In the system GMM estimation, the lags of dependent variable, EQUITY, NPL and DLTD statistically significant coefficients. Since the coefficient of NPL which indicates the asset quality of the bank, has positive sign in fixed effect estimation, we can conclude that when the nonperforming loan ratio increases, non-core bank liability ratio decreases. However, while coefficient of NPL has positive sign in time t , it has negative sign in time $t-1$. It means that in this period increase in the nonperforming loan ratio causes increase in non-core liabilities of banks yet increase in the previous period's nonperforming loan ratio leads to decrease in non-core bank liabilities of bank. Therefore, we may argue that the impact effect of NPL can be observed with delay.

The ROA which shows the profitability of the bank, has a negative sign in both fixed effect and the system GMM estimations. Accordingly, an increase in the profitability of bank causes decrease in noncore bank liabilities. As a representative of bank's capability to meet unforeseen fund requirement, an increase in DLTD leads to an increase in NCL. It can be interpreted that when the profitability of banks increase, they need to create non-core bank liability less than before and this causes decrease in

noncore bank liability ratio. The coefficient of DLTD, indicator of bank's liquidity, has positive sign in fixed effect estimation and the system GMM estimation. If the ratio is high, it means that banks may not be capable to meet unforeseen fund requirement. Therefore, an increase in this ratio causes banks to search for alternative resources and this causes an increase in non-core bank liabilities of banks. In addition to these, in the system GMM estimation, EQUITY at time t has negative sign but EQUITY at time t-1 has positive sign. Since EQUITY shows the capital adequacy of the bank, it means that in this period when the capital adequacy of bank increases, non-core bank liability of bank decreases. However, increase in previous period's capital adequacy of the bank causes increase in non-core bank liability of banks. Therefore, the actual effect of EQUITY is observed with delay.

For the macroeconomic variables, the coefficients of the CAB, CREDIT and VIX are statistically significant in both fixed effect the system GMM estimations. Similarly, the lags of CAB, CREDIT, VIX have statistically significant coefficients in the system GMM estimation and in addition to these, coefficient of GDP is also statistically significant. Coefficient of current account balance has a positive sign in fixed effect estimation which means that an increase in current account surplus causes an increase in NCL. On the other hand, when we look at the system GMM estimation, we observe that when the equation does not contain the lag of CAB, this period's CAB positively affect NCL. If the lagged CAB is included, the coefficient of this period's CAB become statistically insignificant. However, coefficient of the previous period's CAB remains positive. Since the improvement in CAB causes improvement in Turkey's credibility, finding alternative funding resources besides deposits becomes easier for Turkish banks. Therefore, this positive effect of CAB on NCL is an expected result. However, for the coefficient of credit to GDP ratio, we observe an unexpected result. Its coefficient is negative in both fixed effect and the system GMM estimation which means that when the credit to GDP ratio increase, it causes a decrease in NCL. On the other hand, if the

system GMM estimation contains the previous period's credit to GDP ratio as an explanatory variable, this time the coefficient of the lag of CREDIT becomes positive which is an expected result. In both fixed effect and system GMM estimation, coefficient of VIX is negative which means that when the market risk shows an upward movement, naturally it affects negatively the NCL of banks because of the difficulty to find funds from other financial intermediaries and foreign creditors. However, when we put the lag of VIX into the system GMM model, effect of this period's VIX become positive and the effect of previous period's VIX on NCL is negative. Therefore, an increase in previous period's market risk causes a drop in this period's NCL. Moreover, coefficient of GDP growth is negative in the system GMM. Improvement in GDP growth causes a decrease in NCL and it can be interpreted as when GDP growth shows improvement because of the improvement in deposit, banks need less alternative funding relative to previous period.

According to our results, an increase in current account balance positively affects non-core liabilities through the improvement in credibility of Turkey. When we look at VIX variable, we observe that an increase in market risk has a negative effect on non-core liabilities because of the difficulty to find funds from other financial intermediaries. Finally, an improvement in GDP growth negatively affects non-core liabilities because of the decrease in the need for alternative resources that are funding credit.

Our results do not suggest a structural break for non-core liabilities during the recent crises episodes (2008 global financial crisis and European economic crisis). Since macroprudential policies are implemented by central banks of emerging countries to avoid the negative effects of capital flows, we also examine macroprudential policies which are started to implement by CBRT towards the end of late 2010. However, when we put this as a dummy variable in our system GMM estimation, we cannot obtain significant coefficient. It is interesting that we cannot observe any structural difference between pre and post period of the year that these policies were started to apply.

To conclude, we find out that among the bank specific variables, nonperforming loan, the ratio of local currency loans to deposits, the shareholder's equity over total assets and the return on asset have significant effects on non-core bank liabilities and among the macroeconomics variables the GDP growth rate, the ratio of current account balance to GDP, the volatility index and the ratio of current account balance to GDP significantly affect non-core bank liabilities. Although it is not easy to change the pattern of those macroeconomic variables, in the short term, policy makers can get efficient results by using additional policy tools considering the bank specific variables as already discussed in this study.

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APPENDICES

A. TABLES

Table A1: Estimation Results for Pooled OLS Model

<i>NCL</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
<i>ASSET</i>	0.281*** (0.0699)	0.278*** (0.0714)	0.171** (0.0758)	0.175** (0.0751)	0.168** (0.0767)	0.167** (0.0761)
<i>NPL</i>	-0.221** (0.0926)	-0.222** (0.0918)	0.111 (0.117)	0.105 (0.114)	0.118 (0.113)	0.119 (0.113)
<i>ROA</i>	-2.464** (1.045)	-2.450** (1.040)	-2.057** (0.846)	-2.056** (0.843)	-2.015** (0.823)	-1.966** (0.811)
<i>DERIV</i>	0.000295 (0.00155)	0.000302 (0.00154)				
<i>DLTD</i>	0.194*** (0.0241)	0.192*** (0.0249)	0.213*** (0.0278)	0.216*** (0.0291)	0.212*** (0.0282)	0.211*** (0.0280)
<i>EQUITY</i>	0.681** (0.259)	0.678** (0.261)	0.881*** (0.301)	0.882*** (0.300)	0.890** (0.309)	0.894** (0.313)
<i>GDP</i>	-0.000760 (0.00120)	-0.000794 (0.00113)				
<i>CAB</i>	0.00329*** (0.00109)	0.00346*** (0.00114)	0.00309** (0.00125)	0.00387** (0.00147)	0.00154 (0.00191)	0.00401*** (0.00128)
<i>USINT</i>	0.00196 (0.00252)		0.00627** (0.00254)	0.00631** (0.00270)	0.00605** (0.00268)	0.0124** (0.00534)
<i>VIX</i>	-0.0268** (0.0107)	-0.0299*** (0.00935)	-0.0260** (0.00976)	-0.0196 (0.0130)	-0.0201** (0.00841)	-0.0153* (0.00740)
<i>CREDIT</i>		-2.55e-05 (8.17e-05)				
<i>Wcrisis</i>				-0.0139 (0.0143)		
<i>EUcrisis</i>					-0.0155 (0.0130)	
<i>policy</i>						0.0205 (0.0175)
<i>Constant</i>	0.281*** (0.0370)	0.298*** (0.0242)	0.226*** (0.0352)	0.211*** (0.0463)	0.203*** (0.0381)	0.175*** (0.0571)
<i>Observations</i>	895	895	928	928	928	928
<i>R-squared</i>	0.363	0.362	0.360	0.360	0.361	0.361
<i>Number of groups</i>	18	18	18	18	18	18

Table A2: Estimation Results for Random Effect Model

NCL	1	2	3	4	5
ASSET	0.198 (0.286)	0.175 (0.287)	0.212 (0.286)	0.200 (0.287)	0.204 (0.290)
NPL	0.0520 (0.0897)	0.0674 (0.0918)	0.00360 (0.0953)	0.0434 (0.0914)	0.0519 (0.0834)
ROA	-1.170* (0.606)	-1.060** (0.533)	-1.341* (0.693)	-1.199* (0.622)	-1.091* (0.572)
DERIV	-0.000968*** (0.000231)	- 0.00101*** (0.000216)	- 0.000723*** (0.000249)	- 0.000923*** (0.000231)	- 0.000939*** (0.000246)
DLTD	0.276*** (0.0551)	0.258*** (0.0447)	0.259*** (0.0506)	0.273*** (0.0542)	0.289*** (0.0576)
EQUITY	0.149 (0.179)	0.189 (0.213)	0.255 (0.228)	0.168 (0.188)	0.112 (0.162)
GDP	-0.000109 (0.000433)	0.000260 (0.000533)	-0.000270 (0.000472)	-0.000150 (0.000307)	0.000365 (0.000565)
CAB	0.00370** (0.00178)	0.00348* (0.00178)	0.00372* (0.00225)	0.00370** (0.00181)	0.00555** (0.00247)
CREDIT	-0.000313 (0.000291)		-0.000257 (0.000270)	-0.000302 (0.000287)	-0.000651* (0.000358)
VIX	-0.0243** (0.0111)	-0.0146 (0.0147)	-0.0240** (0.0108)	-0.0246** (0.0105)	-0.0215** (0.0100)
USINT		0.00517 (0.00600)			
Wcrisis			-0.00268 (0.0150)		
EUcrisis				0.000206 (0.00526)	
policy					0.0276 (0.0182)
Constant	0.297*** (0.0422)	0.245*** (0.0640)	0.293*** (0.0499)	0.297*** (0.0366)	0.300*** (0.0413)
Observations	895	895	895	895	895
Number of banks	18	18	18	18	18

Note: Values in parenthesis are robust standard errors. *, ** and *** indicates the rejection of null hypothesis at 10 percent, 5 percent and 1 percent significance levels, respectively.

Table A3: List of banks covered in the data

Name of Banks	Codes
AKBANK T.A.Ş.	1
ALTERNATİFBANK A.Ş.	2
ANADOLUBANK A.Ş.	3
ARAP TÜRK BANKASI A.Ş.	4
DENİZBANK A.Ş.	5
FİNANSBANK A.Ş.	6
HSBC BANK A.Ş.	7
ICBC TURKEY BANK A.Ş.	8
ING BANK A.Ş.	9
ŞEKERBANK T.A.Ş.	10
T.C. ZİRAAT BANKASI A.Ş.	11
TURKISH BANK A.Ş.	12
TÜRK EKONOMİ BANKASI A.Ş.	13
TÜRKİYE GARANTİ BANKASI A.Ş.	14
TÜRKİYE HALK BANKASI A.Ş.	15
TÜRKİYE İŞ BANKASI A.Ş.	16
TÜRKİYE VAKIFLAR BANKASI T.A.O.	17
YAPI VE KREDİ BANKASI A.Ş.	18

B. TURKISH SUMMARY / TÜRKÇE ÖZET

2008’de yaşanan küresel ekonomik kriz sonrası, finansal kırılganlıkların teşhis edilmesindeki önemli rolünden dolayı banka yükümlülüklerinin bileşenleri daha fazla dikkat çekmeye başladı. Literatürde banka yükümlülükleri çekirdek ve çekirdek olmayan yükümlülükler olmak üzere ikiye ayrıldı. Çekirdek yükümlülükler yerli kredi verenlerin alacaklarını temsil ederken, çekirdek dışı yükümlülükler diğer bankaların sahip olduğu alacakları temsil etmektedir. Genel olarak, bankalar için başlıca fonlama kaynakları yerli hane halkları tarafından sağlanan depozitolardır. Fakat bunlar ekonomik büyüme ve hane halkının varlığının büyümesiyle paralel olarak arttığı için kredi patlaması durumunda krediye olan talebi karşılama konusunda yetersiz kalmaktadır. Bu yüzden, bankalar fonlama için diğer mali araçlara ve yabancı kredi verenlere, diğer bir deyişle çekirdek dışı yükümlülükler yönelirler. Çekirdek dışı yükümlülüklerin büyük bir kısmının kısa vadeli ve döviz ağırlıklı olmasından dolayı bu yükümlülükler bankaların daha fazla riske maruz kalmasına sebep olarak finansal istikrarı tehdit ederler. Bu mekanizma para politikasının risk alım kanalıyla da incelenebilir. Gelişmiş ülkelerdeki genişleyici para politikalarından dolayı sınır ötesi sermaye akışında artış olur. Gelişmekte olan ülkelerdeki bankalar Amerikan Doları cinsinden borçlanıp yerli para cinsinden borç verdikleri için sermaye akışlarındaki artış Amerikan Doları fonlama oranı ve yerli borç verme oranı arasındaki marjı arttırmaktadır. Böylelikle, yerli paranın değerindeki artış yerli kredi verenlerin bilançosunun değerini arttırmasına ve ek kredi genişlemesine sebep olmaktadır. Bu bakımdan kredi büyümesi ve sermaye akışları finansal krizleri öngören önemli değişkenlerdir. Fakat son dönemlerde yapılan çalışmalar çekirdek dışı yükümlülüklerin de finansal krizlerin göstergesi olabileceğini açığa çıkarmıştır. Buna ek olarak çekirdek dışı yükümlülükler gerçek zaman gözleminden ve daha sık data bulunmasından dolayı kredi genişlemesinden daha avantajlı durumdadır. (Hahm et al., 2011)

2008’de yaşanan küresel ekonomik krizin ve para politikası ya da finansal kontrol konusundaki yetersizliğin fark edilmesinden sonra, gelişmekte olan ülkeler makro ihtiyati politikaların önemini kavradılar. Türkiye’de 2010 yılından sonra faiz koridoru ve rezerv opsiyonu mekanizması gibi makro ihtiyati politikaları tasarlamaya ve uygulamaya başlayarak, bu ülkeler arasında yerini almıştır. Fakat gelişmekte olan ülkelerin sistematik riskleri için düzgün makro ihtiyati politikalar oluşturmak zor bir görevdir. Bu görevin üstesinden gelebilmek için, politikayı belirleyenlerin finansal krizleri öngörme gücüne sahip sınır ötesi sermaye akımlarını, kredi büyümesini ve çekirdek dışı yükümlülükleri gibi faktörleri etkileyen değişkenleri belirlemesi gerekmektedir. Bu yüzden çekirdek dışı yükümlülükler makro ihtiyati politika yapım sürecinde ve bu politikaların sağlamlığını ölçmede tekrar çok önemli bir değişken olarak karşımıza çıkmaktadır.

Bu yüzden, bizim amacımız ekonometrik model kullanarak Türkiye için hem banka düzeyinde hem de makro düzeyde çekirdek dışı yükümlülüklerin belirleyicilerini incelemektir. Ayrıca makro iktisadi politikaların çekirdek dışı yükümlülükler ve bu değişkenin belirleyicileri üzerindeki etkisini de incelemeyi amaçlıyoruz.

Çekirdek dışı yükümlülükler ile ilgili büyüyen bir literatür olsa da ülkelere özel çalışmalar yetersizdir. Bu çalışma, çekirdek dışı yükümlülüklerin hem banka düzeyinde hem de makro düzeyde belirleyici faktörlerini Türkiye için inceleyen ilk çalışma olarak literatüre katkı sağlamaktadır. Generalized Method of Moment (GMM) metodunu kullanarak panel regresyon oluşturduk. Örnek dönem 2003Ç1-2015Ç4 yılları arasındaki çeyrek dataları kapsamaktadır. Türkiye’nin kamu mevduat bankalarını, özel mevduat bankalarını ve Türkiye’de kurulan yabancı mevduat bankalarını kapsayan 18 bankanın datalarını kullanıyoruz. Hem, bankanın aktifinin toplam aktiflerine oranı, öz kaynağın aktife olan oranı, geri dönmeyen kredilerin oranı, aktif getiri oranı, türev finansal araçların büyüme oranı ve yerli para cinsinden kredilerin mevduatlara oranı gibi bankaya

özel etmenleri hem de GSYİH büyüme oranı, cari işlemler dengesinin GSYİH' ye oranı, kredilerin GSYİH' ye oranı, ABD beş yıllık hazine tahvili getirisi ve oynaklık endeksi gibi makroekonomik etmenler modelimizde açıklayıcı değişkenler olarak kullanılıyorlar. Bunun yanında Türkiye'de son dönem makro ihtiyati politikaların etkinliğini tartışacağız.

Büyük buhrandan sonraki en şiddetli kriz olan 2008 küresel ekonomik krizinde, neredeyse tüm gelişmiş ve gelişmekte olan ülkeler finansal sıkıntı ve ekonomik aktivitelerinde düşüşü deneyimlediler. Bruno ve Shin (2012) bu finansal sıkıntıyı para politikalarının risk alım kanalıyla açıklıyorlar. Risk alım kanalını bankaların kaldıraçındaki yükseliş ve riskin azalmasına sebep olan paranın değer artışı arasında bir döngü olarak tanımlıyorlar. Alıcı bankaların dolar fonlama maliyetlerinde düşüşe sebep olan mali bir şok durumunda, yerli işletmelere olan borç verimi artıyor. Üstelik yerli paranın değer kazanımıyla, yerli borç alanların bilançosu gelişim gösteriyor ve bankalar tarafından kredi defterleri daha az riskli görülüyor. Bu yüzden bu bankalar açısından daha büyük bir riskin oluşması anlamına gelen fazladan kredi üretebilme kabiliyetini arttırıyor.

Hahn ve ark. (2012) bankaların borç vermek için borç alan araçlar olduğunu ve asıl kaynaklarının hane halkı mevduatları olduğunu ileri sürmekte. Bu kaynak ekonomideki ve hane halkının varlığındaki büyüme ile paralel olarak büyüdüğü için, bir kredi genişlemesi durumunda bu kaynak kredi büyümesini finanse edemiyor. Böyle bir durumda bankalar diğer banka işlemlerinden başka fonlama kaynakları için arayışa geçiyorlar. Bu yüzden kredi ve para arasındaki oran finansal sistemdeki kırılganlıklar ile ilgili ipucu verebiliyor.

Shin ve Shin (2011) açık sermaye piyasasına sahip ülkelerin finansal istikrarı üzerinde önemli bir role sahip olan sermaye akışına dikkat çekiyorlar. Banka aktiflerinin hızla arttığı yükseliş dönemlerinde fonlama yerli mevduatlardansa uluslararası bankalardan

gelen sermaye akışları ile karşılanıyor. Bu daha kırılğan olan kısa vadeli ve döviz cinsinden yükümlülüklerin büyümesine sebep oluyor. Bu yüzden hak iddiasında bulunulanların mülkiyet sahipleri perspektifinden, yükümlülükler çekirdek ve çekirdek dışı olarak sınıflandırılmalı. Çekirdek yükümlülükler yerli borç verenler tarafından tutulurken, çekirdek dışı yükümlülükler ise repolar ve diğer bankalar tarafından tutulan diğer alacaklardır.

Biz Türkiye'deki çekirdek dışı yükümlülüklerin belirleyicilerini analiz ettiğimiz için, Türk banka sistemi ve çekirdek dışı yükümlülüklerin yapısını ve özelliklerini anlamak çok önemli. Türk banka sistemini inceleyen Akdoğan ve Yıldırım (2014) banka yükümlülüklerinin mevduat, para piyasalarına borçlar, menkul kıymet ödünç piyasasına borçlar, bankalara borçlar, repo işlemlerinden sağlanan fonlar, ihraç edilen menkul kıymetler ve öz kaynaklardan oluştuğunu belirtiyor. Bunların içerisinde en büyük kısım mülkiyeti hane halkına, finansal kurumlara ve şirketler kesimine ait olan mevduatlara ait. Hane halkı mevduatları çekirdek yükümlülük olarak sınıflandırılırken, para piyasalarına borçlar, bankalara borçlar, repo işlemlerinden sağlanan fonlar ve öz kaynaklar çekirdek dışı yükümlülükler olarak adlandırılıyorlar. Büyüklükleri açısından son üç tanesi göz önünde bulundurulabilir.

Yıldız ve Süslü (2016) Türkiye'de kredi büyümesi ve çekirdek dışı yükümlülükler arasında bir ilişki olduğunu ve kredi ile mevduat arasındaki büyük açığın çekirdek dışı yükümlülüklerden kaynaklandığını belirtiyorlar. Çalışmalarının sonuçları Türkiye'de çekirdek dışı yükümlülüklerin iki özelliğinin olduğunu gösteriyor. Döviz cinsinden çekirdek dışı yükümlülükler, yerli para cinsinden çekirdek yükümlülüklerden daha fazla ve kısa vadeli çekirdek dışı yükümlülükler uzun vadeli çekirdek dışı yükümlülüklerden daha büyük.

Türk bankacılık sistemine baktığımızda ise, çekirdek olmayan yükümlülüklerin GSYİH'ye oranı, mevduatların GSYİH'ye oranı ve toplam kredilerin GSYİH'ye oranı,

örnekleme döneminde artan bir eğilimi göstermektedir. Çekirdek olmayan yükümlülüklerin GSYİH'ye ve kredilerin GSYİH'ye oranının hareketliliği benzer eğilimlere sahip görünüyor. Bununla birlikte, mevduatın GSYİH'ye oranının 2013Q2 yılına kadar kredilerin GSYİH'ye oranını aştığını ancak bu yılın ardından kredilerin GSYİH'ye oranının mevduatların GSYİH'ye oranını aşmaya başladığını gözlemliyoruz. Ayrıca, mevduatların toplam yükümlülükler oranı, çekirdekdışı yükümlülüklerin toplam yükümlülükler oranından çok daha yüksek olduğu görülürken, bu iki oran arasındaki farkın giderek kapandığı ve bu kapanışın 2010 yılının son çeyreğinden sonra daha da belirginleştiğini gözlemleyebiliyoruz. Dolayısıyla, bu sonuçlara dayanarak, ana kredi kaynakları mevduat olmasına rağmen, Türk bankalarının mevduat eksikliğini telafi etmek için çekirdek olmayan yükümlülük yaratma eğilimlerinde bir artış olduğunu söyleyebiliriz.

Bu çalışmanın sonuçları, ayrıca, Türk bankacılık sisteminin kaldırıcının konjonktürle aynı yönde hareket ettiğini ve bilançonun genişlemesinin veya küçülmesinin kredi döngüsünü etkilediğini göstermektedir. Ayrıca, krediler ve çekirdek dışı yükümlülükler arasında korelasyon gözlemlenmekte ve krediler ile mevduatlar arasındaki büyük fark, çekirdek dışı yükümlülükler ile açıklanmaktadır.

Çalışmamızda temel çekirdek dışı yükümlülüklerin belirleyenleri için yapmış olduğumuz incelemede temel denkleminiz Ampirik Model ve Sonuçlar bölümündeki denklem (1)' dir.

Banka düzeyinde değişkenlerimiz arasında NCL_{it} t zamanındaki i. banka için çekirdek dışı yükümlülükleri, $ASSET_{it}$ banka i'nin t zamanında toplam aktifinin tüm bankaların toplam aktiflerine oranını, $EQUITY_{it}$ t zamanında banka i'nin öz kaynağının yine banka i'nin toplam aktifine olan oranını, NPL_{it} t zamanında banka i'nin geri dönmeyen kredi oranını, ROA_{it} banka i'nin t zamanında aktif getiri oranını, $DERIV_{it}$ banka i'nin t zamanında türev finansal araçların büyüme oranını ve $DLTD_{it}$ banka i'nin t zamanında

yerli para cinsinden kredilerinin mevduatlarına oranı temsil etmektedir. Makro seviyedeki değişkenlere baktığımızda GDP_t t zamanında GSYİH'nin büyüme oranı, CAB_t t zamanında cari işlemler dengesinin GSYİH'ye oranı, $CREDIT_t$ t zamanında kredilerin GSYİH'ye oranı, $USINT_t$ t zamanında ABD beş yıllık hazine tahvili getirisini ve VIX_t t zamanında oynaklık endeksini temsil etmektedir.

Banka düzeyindeki ve makro düzeydeki bu değişkenlerin ekonomik anlamını incelemek de oldukça önem arz etmekte. Banka düzeyi değişkenlerimize baktığımızda bankaların aktif büyüklükleri bankanın market içerisindeki büyüklüğünü göstermektedir. Yüksek aktif büyüklüğü bankaların yüksek fonlama ihtiyacının gösterdiği için, bu değişkende artış olması durumunda, bankalar depozito dışında alternatif fonlama kaynaklarına yönelecekleri için, çekirdek dışı banka yükümlülüklerinde artış gözlemlenebilir. Bankanın öz kaynaklarının toplam aktiflerine oranı bankanın sermaye yeterliliğini göstermektedir. Yüksek EQUITY bankanın alternatif fonlama kaynaklarına ulaşma kapasitesinin artışı ile sonuçlanabilir bu da yine çekirdek dışı yükümlülüklerin artışı ile sonuçlanır. Geri dönmeyen kredi oranı ödeme tarihi sonrasında 90 gün içerisinde ödemesi yapılmamış ödemeleri temsil eder. Bu değişkenin yüksek olması banka için aktif kalitesi düşüklüğünün göstergesidir ve bankaların çekirdek dışı yükümlülük oluşturma kapasitesinin düşmesine sebep olabilir. Bankanın aktif getiri oranı, bankanın aktiflerine göre karlılığını gösterir ve bu değişkenin değeri ne kadar yüksek olursa bankalar için o kadar iyidir. ROA bankanın çekirdek dışı yükümlülükleri oluşturabilmek için alternatif kaynaklar arama ihtiyacını azaltır. Bankanın yerli para cinsinden kredilerinin mevduatlarına oranı bankanın likiditesini gösterir ve bu oran yüksekse beklenmedik fonlama gereksinimi durumunda bankanın bu gereksinimi karşılamaya gücü yetmeyebilir.

Makro düzeyindeki değişkenlere baktığımızda, depozito ekonomik büyüme ve hane halkının varlığı ile paralel olarak büyüdüğü için ekonomik büyümenin göstergesi olarak

GSYİH'nin büyüme oranındaki gelişme ile birlikte, Türk bankaları fonlama kaynağı olarak daha az çekirdek dışı yükümlülüklere ihtiyaç duyabilirler. Cari işlemler dengesi dışsal kırılmanın bir göstergesidir. Bu yüzden bu değişkenden bir ilerleme olduğu zaman, ülkenin güvenilirliğindeki artıştan dolayı, ülkenin bankalarının da güvenilirliği artış gösterir. Sonuç olarak bankaların depozito dışındaki alternatif kaynaklara ulaşılabilirliği artar ve dolayısı ile bankaların çekirdek dışı yükümlülükleri olumlu yönde etkilenir. Kredilerin GSYİH'ye oranındaki artış ekonomideki büyümenin krediye olan talepteki artışa ayak uyduramaması anlamına gelir, bu da bankaların başka mali araçlar ve yabancı borç verenler için arayışa girmesine sebep olur. ABD beş yıllık hazine tahvili getirisi ABD hükümetinin beş yıl vadedeki borçlanmasına karşılık olarak verdiği faiz ödemesini gösterir. Bu getirinin artışı ise yabancı yatırımcıları çeker ve sonuç olarak bu durumda Türk bankalarının çekirdek dışı yükümlülüklerinde düşüş gözlemlenmesi beklenir. Son olarak oynaklık endeksi Türkiye'nin dışsal finansal stresinin göstergesidir, bu değişkenden artışı çekirdek dışı yükümlülükleri düşürmesi beklenir.

Bu açıklayıcı değişkenlerin yanında, kriz döneminin ve Türkiye Cumhuriyeti Merkez Bankası tarafından uygulanan makro iktisadi politikaların etkisini yakalayabilmek için kukla değişkenler kullanıyoruz. 2008 küresel finansal krizi için 2008Ç1-2009Ç4 dönemine, Avrupa Birliği krizi için 2010Ç1-2011Ç4 dönemine ve Türkiye'nin makro iktisadi politikalar için 2010Ç4 ve sonrası için kukla değişkenleri koyuyoruz.

Panel regresyonumuzda, öncelikle sabit etki regresyonu oluşturuyoruz fakat sabit etki yöntemi potansiyel endojenite problemini kontrol etme konusunda başarısız olabilir. Bu sebeple GMM tahmin yöntemi bu problemin üstesinden gelmek için daha iyi bir aday olabilir. Fark GMM ve sistem GMM olmak üzere iki farklı GMM metodu olsa da sabit etki ve araç değişkenleri arasında korelasyon yoktur var sayımı ile sistem GMM daha fazla aracın dahil edilmesiyle verimliliği arttırdığından dolayı, sistem GMM metodunu kullanmayı tercih ediyoruz. Rastgele etkiler regresyonu ve sabit etki regresyonu

arasından hangi regresyonu kullanacağımıza karar verebilmek için Hausman test uyguluyoruz ve sonucunda sabit etki regresyonunu tercih ediyoruz. Modified Wald test ve Wooldridge testini uyguladığımızda öz ilinti ve değişen varyans sorunlarının olduğu görüyoruz. Bu problemlerle başa çıkabilmek için Hoechle'in önerisi üzerine Driscoll ve Kraay'ın kovaryans matrisi tahminini kullanıyoruz. Bu sebeple tüm sabit etki regresyonu sonuçlarımız Driscoll ve Kraay standart hatalarına sahip. Sistem GMM için çok büyük öneme sahip iki farklı hata bulma testi olarak Sargan testini ve Arellano-Bond testini uyguluyoruz. Sargan testine göre sistem GMM sonuçlarımız GMM araçlarımızın geçerli olduğunu ve Arellano-Bond testine göre de öz ilinti probleminin olmadığını gözlemliyoruz.

Sabit etki ve sistem GMM regresyonları sonuçlarına birlikte baktığımızda, banka düzeyindeki değişkenlerden NPL, ROA ve DLTD'nin sabit etki regresyonunda istatistiksel olarak anlamlı olduğunu görüyoruz. Benzer şekilde sistem GMM regresyonunda da NCL'nin bir önceki dönemi, NPL, DLTD, EQUITY'nin bir önceki dönemi, NPL'nin bir önceki dönemi, ROA, DLTD'nin bir önceki dönemi ve EQUITY istatistiksel olarak anlamlı katsayılara sahipler. Sabit etki regresyonundan farklı olarak EQUITY'nin bir önceki dönemini regresyona eklediğimizde EQUITY'nin katsayısı istatistiksel olarak anlamlı hale gelmektedir. Bankanın aktif kalitesinin göstergesi olarak NPL'nin katsayısı sabit etki regresyonunda pozitif işarete sahip. Diğer bir deyişle geri dönmeyen kredi oranındaki artış çekirdek dışı yükümlülüklerin artmasına sebep oluyor. Fakat NPL'nin katsayısı zaman t 'de pozitifken, bir önceki dönemin NPL'si negatif katsayıya sahip. Diğer bir deyişle bu dönemde geri dönmeyen kredilerdeki artış çekirdek dışı yükümlülüklerin artışına sebep olurken, bir önceki dönemin geri dönüşü olmayan kredilerindeki artış çekirdek dışı banka yükümlülüklerinde düşüşe sebep oluyor. Bu da geri dönüşü olmayan kredilerin çekirdek dışı yükümlülüklerle olan gerçek etkisini gecikmeli olarak gözlemleyebildiğimiz şekilde yorumlanabilir. Bankaların karlılığının göstergesi olan ROA değişkenine baktığımızda ise her iki regresyonda da

negatif katsayıya sahip olduğunu gözlemliyoruz. Bankanın karlılığında artış yaşandığı zaman, bankaların öncesine göre daha az çekirdek dışı yükümlülük oluşturma ihtiyacı duyduğunu ve bunun da çekirdek dışı yükümlülüklerin oranının azalmasına sebep olduğunu söyleyebiliriz. Bankanın likiditesinin gösterirgesi olarak DLTD değişkeninin katsayısı her iki regresyonda da pozitif işarete sahip. Bu oranın yüksek olması bankaların öngörülemeyen bir fonlama gereksinimini karşılama kabiliyetinin olamayabileceği anlamına gelmektedir. Bu sebeple, bu orandaki artış bankaların alternatif kaynaklar için arayışa girmesine sebep olarak çekirdek dışı yükümlülüklerde artışa sebep olmaktadır. Bunlara ek olarak system GMM regresyonunda zaman t'deki EQUITY değişkeninin katsayısı negatifken, t-1 zamandaki EQUITY değişkeninin katsayısının pozitif olduğunu gözlemliyoruz. EQUITY bankanın sermaye yeterliliğini gösterdiği için , bu dönemdeki bankanın sermaye yeterliliğindeki artış bankanın çekirdek dışı yükümlülüklerinde azalmaya sebep olurken bir önceki periyotun sermaye yeterliliğindeki artış bankaların çekirdek dışı yükümlülüklerinde artışa sebep oluyor. Bu sebepler EQUITY değişkeninin asıl etkisini gecikmeli olarak gözlemleyebiliyoruz.

Makro değişkenlere baktığımızda ise sabit etki regresyonunda CAB, CREDIT ve VIX değişkenlerinin katsayıları istatistiksel olarak anlamlı. Benzer şekilde, system GMM regresyonda bir önceki dönem CAB, CREDIT, bir önceki dönem CREDIT, VIX ve bir önceki dönem VIX değişkenlerinin katsayıları ve bunlara ek olarak GDP değişkeninin katsayısı istatistiksel olarak anlamlı. Sabit etki regresyonunda cari işlemler dengesinin katsayısı negatif işarete sahip, diğer bir deyişle bu değişkendeki herhangi bir artış çekirdek dışı yükümlülüklerde artışa sebep oluyor. Diğer yandan system GMM regresyonunda baktığımızda bir önceki, dönemin CAB değişkenini regresyona koymadığımızda bu dönemin CAB değişkeninin çekirdek dışı banka yükümlülüklerini pozitif yönde etkilediğini gözlemliyoruz. Fakat bir önceki dönem CAB değişkenini modele eklediğimizde bu dönemin CAB değişkeninin katsayısının istatistiksel olarak anlamsız hale geldiğini görürken, bir önceki dönemin CAB değişkeninin katsayısının

pozitif olduğunu görüyoruz. CAB değişkenindeki gelişme Türkiye'nin güvenilirliğinde artışa sebep olduğu için depozito dışında alternatif fonlama kaynakları bulmak Türk bankaları için daha kolay bir hal alıyor. Bu yüzden elde etmiş olduğumuz CAB değişkeninin NCL üzerindeki pozitif etki beklentimizi karşılayan bir sonuç. Fakat kredilerin GSYİH'ye oranı değişkenin katsayısına baktığımızda oldukça beklenmedik bir sonuç elde ediyoruz. Bu değişkenin katsayısı her iki regresyon içinde negatif yani kredilerin GSYİH'ye oranında bir artış olduğunda bu NCL değişkeninde düşüşe sebep oluyor. Diğer yandan, eğer system GMM regresyonumuz bir önceki dönemin CREDIT değişkenini de açıklayıcı değişken olarak kapsarsa, bu durumda bu dönemin CREDIT değişkeninin katsayısı pozitive dönüşüyor. VIX değişkeninin katsayısı hem sabit etki regresyonunda hem de system GMM regresyonunda negatif diğer bir deyişle market riski yukarı doğru bir hareket gösterdiğinde bu doğal olarak diğer finansal araçlardan ve yabancı kredi verenlerden fon bulmaktaki zorluktan dolayı NCL değişkenini negatif yönde etkiliyor. Fakat bir önceki dönemim VIX değişkenini system GMM modelimize açıklayıcı değişken olarak koyduğumuzda bu dönemin VIX değişkeninin katsayısı pozitif hale geliyor ve bir önceki dönemim VIX değişkeni NCL değişkenini negatif yönde etkiliyor. Dolayısıyla bir önceki dönemin oynaklık endeksi bu dönemin çekirdek dışı yükümlülüklerini negatif yönde etkiliyor. Son olarak GDP değişkeninin katsayısı sistem GMM modelimizde negatif çıkıyor. GSYİH'nin büyüme oranındaki artış çekirdekdışı yükümlülüklerde düşüşe sebep oluyor. Bu durum GSYİH'nin büyüme oranındaki artışın depozitodaki artış sebebi ile bankaların bir önceki döneme göre alternatif fonlama ihtiyaçlarında düşüşe sebep olması ile açıklanabilir.

Sonuçlarımız, son kriz dönemlerinde (2008 küresel mali kriz ve Avrupa ekonomik krizi) çekirdek dışı yükümlülükler için yapısal bir kırılma önermemektedir. Makro ihtiyati politikalar, gelişmekte olan ülkelerin merkez bankaları tarafından sermaye akımlarının olumsuz etkilerinden kaçınmak için uygulandığından, TCMB tarafından 2010 yılı sonlarına doğru uygulanmaya başlanan makro ihtiyati politikaları da inceliyoruz. Ancak,

bunu kukla deęişken olarak sistem GMM modelimize koyduğumuzda, istatistiksel olarak anlamlı bir katsayı elde edemiyoruz. İlginçtir ki, bu politikaların uygulanmaya başlandığı yılın önceki ve sonraki dönemleri arasında yapısal bir fark gözlemleyemiyoruz.

Sonuç olarak, banka spesifik deęişkenler arasında, geri dönmeyen kredi oranı, yerli para cinsinden kredilerin mevduatlara oranı, bankanın öz kaynaklarının toplam aktiflerine oranı ve bankanın aktif getiri oranı ve makroekonomik deęişkenler arasında GSYİH'nin büyüme oranı, cari işlemler dengesinin GSYİH'ye oranı, oynaklık endeksi ve kredilerin GSYİH'ye oranı çekirdek dışı banka yükümlülüklerini önemli ölçüde etkiliyor. Bu makroekonomik deęişkenlerin yapısını kısa vadede deęiştirmek pek mümkün olmasa da, politika yapıcıları, çalışmamızda bahsi geçen banka spesifik deęişkenleri göz önüne alan ek politika araçları kullanarak kısa vadede verimli sonuçlar elde edebilirler.

C. TEZ FOTOKOPİSİ İZİN FORMU

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YAZARIN

Soyadı : Demirölmez

Adı : Beren

Bölümü : İktisat

TEZİN ADI (İngilizce) : Determinants of Non-core Liabilities in the Turkish Banking System

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