

**ISTANBUL TECHNICAL UNIVERSITY ★ GRADUATE SCHOOL OF ARTS AND
SOCIAL SCIENCES**

ESSAYS IN MONETARY POLICY AND BANKING

Ph.D. THESIS

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Department of Economics

Economics Programme

NOVEMBER 2016

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FOREWORD

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ABBREVIATIONS

BIS	: Bank for International Settlements
BOP	: Balance of Payment
BRSA	: Banking Regulation and Supervisory Agency
CBRT	: Central Bank of the Republic of Turkey
EME	: Emerging Market Economy
FDI	: Foreign Direct Investment
FX	: Foreign Exchange
GMM	: Generalized Method of Moments
HHI	: Herfindahl Hirschman Index
IMF	: International Monetary Fund
NIM	: Net Interest Margin
ROA	: Return on Asset
ROE	: Return on Equity
TBA	: The Banks Association of Turkey
UK	: The United Kingdom

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ESSAYS IN MONETARY POLICY AND BANKING

SUMMARY

Capital inflows can provide substantial benefits for emerging countries at the expense of some risks. Capital inflows can stimulate domestic investment through lending, increase the growth rates of economies and living standards. Also, they supply necessary funds for developing countries so that they can sustain their budget deficits. On the other hand, current account deficits, monetary expansion, market bubbles, lending booms, volatile and short-run flows and exchange rate fluctuations are known to be among some of the observed risks related to capital inflows into emerging economies.

Banks, as intermediaries of financial flows between domestic and global markets, play a significant role in dealing with these benefits-risks tradeoff. Specifically, banks also act as a bridge between foreign loans (cross border liability) and domestic lending. In recent years, EMEs have witnessed a rapid growth in bank credits. Simultaneously, there has been an increasing trend toward the internationalization of EMEs banking through cross-border banking (i.e., non-core) liability. Therefore, any overuse or abuse of cross border liability by EMEs banks to meet domestic lending demand may potentially create a banking crisis or financial turbulence since cross border banking liability directly affects the level of domestic lending especially when domestic banking sector could not find enough core liability (i.e., domestic deposit).

There is also close relationship between monetary policy, bank profitability and financial system resilience. More financially sound and profitable banking industry is better able to withstand adverse shocks and hence ensures the stability of financial system. In this regard, financial stability and monetary policy are closely linked because monetary policy through interest rates and other policy tools has direct and indirect implications for bank profitability and financial system resilience. Therefore, the question of how banks' profits change in response to interest rates and the yield curve has vital importance in order to unravel this relationship.

Considering the significance of the banking profitability and performance under monetary policy and financial inflow, in this doctoral thesis, the relationship between financial inflows, interest rates and Turkish banking performance will be analysed.

In the first chapter, we will examine the developments of the Turkish banking industry in the light of financial flows, paying special attention to cross border banking liability. Domestic deposit growth has followed a strong path in the Turkish economy resulting from financial deepening and general income growth since 2002. Likewise, Turkish economy's credit growth has also pursued an increasing trend during the same time period. But the Turkish banking sector's loan to deposit ratio exceeded the critical level one in 2011 which increased the reliance of Turkish banking sector on cross border liability during the last 5 years. This higher reliance might have risen some

potential banking risks related to maturity mismatch, currency mismatch, liquidity, short/long-term FX liability, interest and exchange rate. In responses to volatile capital flows and higher access to non-core liability (banking foreign loan inflow), the Central Bank of Turkey started to implement new policy tools such as interest rate corridor, reserve option mechanism and changed its reserve requirement rate for non-deposit FX liability to deal with potential risks that the Turkish economy and banking sector might confront. As a consequence of macroprudential policies, Turkish banking sector foreign borrowing does not create any short-term risk in terms of non-deposit FX liability. However, that Turkish banking sector's loan to deposit rate exceeds the 100% would be still an issue to be addressed..

In the second chapter, we investigate how short term interest rate and slope of the yield curve affect bank profitability in Turkey from 2002Q4 to 2014Q3. We employ three different dependent variables: net interest margin, return on assets and return on equity to see the possible short run and long run impacts of the short term interest rate and slope of the yield curve. Estimation results suggest that while short term interest rate and slope of the yield curve have negative and significant impact on bank profits in the short-run, the effects of these variables turn out to be positive in the long run as expected. We try various measures of short term rates and the slope of the yield curve and various specifications for robustness check and we find that the results are very robust. Hence, overall our findings indicate that monetary policy significantly influences bank profits as well as bank capital in Turkey.

The result that in all specifications the slope of the yield curve has higher impact on profitability than short-term interest rate is consistent with the theoretical and empirical findings in the literature. More importantly, our results also indicate that bank profits in an emerging economy (i.e., Turkey) are more sensitive to the slope of the yield curve compared to the ones in an advanced economy (i.e., UK). This might result from the fact that UK banking sector can generate more trading income and engage more in hedging activities, which might potentially reduce the net effects of term structure of the interest rates on final profitability. Thus, we argue that policy makers in Turkey should be more cautious when they set interest rates that have significant impacts on bank profits and capital as well as financial system resilience. The results also suggest that banks in Turkey should increase their capacity for trading income and hedging against interest rates shocks so that they can smooth out their cash flows.

In the third chapter, we empirically examine how the banking industry financial inflows (cross-border liabilities) affect the performance of Turkish banks since 2003Q1. Overall outlook of the Turkish banking industry performance seems to be positively influenced by cross-border banking credit inflows (non-core liability). The types of credit inflows appear to have different impacts on profitability. Our estimation results show that long-term banking industry credit inflow generates more non-interest income compared to interest income while the short-term credit inflows have no significant effect on general profitability. Additionally, long-term credit inflow has more impact on ROE than ROA and NIM.

PARA POLİTİKASI VE BANKACILIK ÜZERİNE MAKALELER

ÖZET

Gelişmekte olan ülkelere yönelik sermaye girişleri önemli iktisadi faydalar sunmakla birlikte birtakım riskleri de barındırmaktadır. Krediler vasıtasıyla yatırımların artması, büyüme oranlarının ve yaşam standartlarının yükselmesi, bütçe açığının finanse edilmesi bazı pozitif etkiler arasındadır. Piyasalarda balon oluşması, aşırı kredi genişlemesi, tasarruf eğilimlerinin azalması, döviz kuru oynaklıkları, sıcak para ve cari açık sorunu ise sermaye girişlerinin gelişmekte olan ülkeler üzerindeki birtakım negatif etkileri arasında sayılabilir. Sermaye girişleri özelinde, bankacılık sektörünün doğrudan yurtiçi kredilerle yurt dışı menşeli bankacılık kredi girişleri arasında üstlendiği rol de yadsınamaz öneme sahiptir. Aracı finansal kurumlar olan bankalar yurtdışı sermaye hareketleri kaynaklı risklerin ve faydaların yurtiçi piyasalara yansımaları noktasında önemli role sahiptirler.

Özellikle gelişmekte olan ülke bankalarının yurt dışı bankacılık sektörü kredilerini kullanarak yurt içi kredi talebini karşılaması son 15 yıllık dönemde artarak yeni bir boyut kazanmıştır. Türkiye'deki bankacılık sektörünün yurt dışı bankacılık kredisi/toplam aktif kullanım oranı da son 5 yıl içerisinde %8'lerden %13'lere yükselmiştir. Başka bir ifadeyle Türkiye bankacılık sektörünün yurt dışı bankacılık kredilerine (çekirdek dışı yükümlülük) bağımlılığı artmıştır. Aynı dönemde ise Türkiye'deki bankacılık sektörünün topladığı mevduatlar (çekirdek yükümlülükler) verdiği kredi miktarını karşılayamaz seviyeye gelmiştir. Bu durum sektörün verdiği toplam kredilerle çekirdek ve çekirdek dışı yükümlülükleri arasında ilişkiyi göstermesi açısından önemlidir. Çekirdek dışı yükümlülüklerin artması yurt içi krediler üzerinden sektörün kârlılığını pozitif etkileyebilirken diğer taraftan kredi faizi geri ödemeleri ve döviz kuru oynaklığı üzerinden kârlılığı negatif etkileyebilmektedir. Çekirdek dışı yükümlülüklerin artması aynı zamanda vade uyumsuzluğu, likidite riski, kısa ve uzun vade döviz yükümlülükleri gibi çeşitli risk göstergeleri üzerinden finansal sistemin ve bankacılık sektörünün kırılganlığını artırma potansiyeline sahiptir.

Finansal sistem kırılganlığı ve bankacılık performansı ile doğrudan ilişkili diğer bir alan ise para politikasıdır. Finansal açıdan güçlü ve kârlı bankacılık sektörü şoklar karşısında daha dirençli davranarak finansal sistemin istikrarında önemli bir rol oynayabilmektedir. Faiz oranları veya diğer araçlar vasıtasıyla para politikası da banka performansını doğrudan veya dolaylı etkileyebilmektedir. Bu açıdan faiz oranlarında ve getiri eğrisinde meydana gelen bir değişiklik banka kârlılığını nasıl etkiler sorusu para politikası, kârlılık ve finansal istikrar ilişkisini anlama açısından önemlidir. Zira, eğer para politikaları bankacılık sektörü performansı veya kârlılığı üzerinde etkiye sahipse, parasal aktarım kanallarının doğrudan finansal piyasaları, bankacılık sektörü sermaye yapısını, kredi verme/borç alma ilişkisini, ikincil piyasa faiz hadlerini vs. etkilemesi söz konusudur. Özellikle para mekanizması aktarım kanallarından en önemlisi olan faizlerdeki (politika faizleri, uzun ve kısa vadeli faizler arasındaki ilişki) herhangi bir değişikliğin bankacılık sektörünü ve dolayısıyla finansal piyasaları nasıl

etkileyeceğiyle ilgili gelişmiş ülkeleri konu alan epeyce bir çalışma mevcuttur. Kısa ve uzun vadeli faiz oranlarındaki değişimler kısa ve uzun dönemde banka performansı üzerinde farklı etkilere sahiptir. Bu farklı etkiler kendi aralarında da faiz gelirleri, faiz dışı gelirler, aktif kârlılığı ve öz sermaye kârlılığı üzerinde de değişiklik sergilemektedirler. Faiz oranları özelinde kısa ve uzun vadeli faizlerdeki değişimin (getiri eğrisi ve eğimi) gelişmekte olan ülke banka kârlarını nasıl etkilediğiyle ilgili bir çalışmayla karşılaşılmamıştır. Türkiye gibi enflasyon problemi yaşayan ülkelere dönük bu tarz çalışmalar gelişmekte olan piyasalar yazınındaki boşluğu bir nebze de olsa dolduracak mahiyettedir.

Bankacılık sisteminin para politikası ve sermaye girişleri ile yurt içi finansal piyasalar arasındaki üstlendiği aracılık rolünü binaen “*Para Politikası ve Bankacılık Üzerine Makaleler*” başlıklı bu doktora tez çalışması sırasıyla “*Sermaye Girişleri ve Türkiye Bankacılık Sektörü Performansı*”, “*Gelişmekte Olan Bir Piyasada Faiz Oranları, Getiri Eğrisi ve Bankacılık Kârlılığı*” ve “*Türkiye Bankacılık Sektörü Yurt Dışı Kredi Yükümlülükleri ve Kârlılık*” başlık ve konularından oluşan 3 bölümden oluşmaktadır.

İlk bölümde, Türkiye bankacılık sektörünün özellikle 2002 yılından sonra geçirdiği değişim ve dönüşüm sermaye girişleri bağlamında ele alınmıştır. Betimleyici yönü ağır basan bu çalışmada, bankacılık sektörü ile sermaye girişleri arasındaki ilişki bankacılık sektörü yurt dışı kredi girişleri (çekirdek dışı yükümlülük) üzerinden ele alınmıştır. Doğrudan yabancı yatırım, rezerv, portfolyo, kredi ve diğer yatırımlardan oluşan finansal girişlerin 2002 sonrası değişimi, bu süreçte belirli makroekonomik göstergeler üzerindeki etkilerinden bahsedildikten sonra Türkiye’deki bankacılık sektörüyle finansal girişlerin bir türü olan bankacılık sektörü yurt dışı kredi girişleri arasındaki ilişki incelenmiştir. Özellikle 2010 sonrası dönemde Türkiye bankacılık sektörünün çekirdek dışı yükümlülüklerinde ciddi bir artış yaşanmış aynı dönemde yurt içi mevduatlar ise kredileri karşılamaz noktaya gelmiştir. Bankacılık sektörünün yurt dışı kredilerine artan bağımlılığı vade uyumsuzluğu, döviz kuru oynaklığı, kısa ve uzun vadeli döviz yükümlülükleri, likidite gibi birtakım potansiyel riskleri de ortaya çıkarmıştır. Eş zamanlı olarak TCMB’nin uyguladığı makro-ihiyati politikalar (geleneksel ve yeni) bankalar açısından çekirdek dışı yükümlülüklerin risk teşkil etmesini önlemiştir. Özellikle kısa ve uzun vadeli mevduat dışı döviz yükümlülüklerine uygulanan farklı zorunlu karşılık oranları Türkiye bankacılık sektörünün yurt dışı kredi borçlanmasını uzun vadeye yaymasını sağlamıştır.

Çalışmanın “*Gelişmekte Olan Bir Piyasada Faiz Oranları, Getiri Eğrisi ve Bankacılık Kârlılığı*” başlıklı 2. bölümünde ise 2002 4. çeyrek ile 2014 3. çeyrek arasındaki dönemde Türkiye’deki faiz oranlarındaki değişimin mevduat bankalarının kârlılığına etkisi ampirik olarak analiz edilmiştir. Çeyreklik bazda toplam 26 mevduat bankasının yer aldığı dinamik model, sabit etkili genelleştirilmiş momentler yöntemiyle tahmin edilmiştir. Kısa ve uzun vadeli faiz oranları kullanılarak getiri eğrisinin eğimi elde edilmiştir. Dinamik modelde kısa vadeli faiz oranları olarak merkez bankası haftalık faiz oranlarının (politika) çeyreklik ortalaması; uzun vadeli faiz oranları için ise ikincil piyasa 2 yıllık gösterge tahvil oranları kullanılmıştır. Bankacılık performansını ölçmek için 3 ayrı bağımlı değişken; net faiz marjı, aktif ve öz sermaye getiri oranları kullanılmıştır. Tahmin sonuçlarına göre, faiz oranları ve getiri eğrisi eğimiyle banka kârlılığı arasında kısa dönemde negatif ilişki mevcutken, bu ilişki uzun dönemde pozitif dönüşmektedir. Bu açıdan para politikasındaki değişim Türkiye bankacılık sektörü kârlılığını anlamlı bir biçimde etkilemektedir. Ayrıca Türkiye gibi gelişmekte

olan lke bankacılık sistemleri İngiltere gibi gelişmiş lke banka sistemlerine kıyasla faiz değışimlerine daha fazla duyarlılık göstermektedir. Bunun en temel nedenlerinden bir tanesi bankacılık sektörü kârlılığının kompozisyonundan kaynaklanmaktadır. Ticari kârın Türkiye’deki bankacılık sektörü toplam kârı içindeki payı düşükken İngiltere bankacılık sektörü içindeki payı yüksektir. Türkiye bankacılık sisteminin ticari gelirlerini arttırması veya riskten korunacak kazançlara yönelmesi sektörün para politikası değışimlerine karşı daha korunaklı hale gelmesini sağlayabilir.

Tezin son kısmını oluşturan “*Türkiye Bankacılık Sektörü Yurt Dışı Kredi Yükümlölükleri ve Kârlılık*” başlık ve konulu bölüm bir önceki çalışmayla model, yöntem ve bağımlı değışkenler açısından benzerlik göstermektedir. Bu çalışmada Türkiye’deki bankacılık sektörünün yurt dışı kredi kullanımının bankacılık sektörü kârlılığını nasıl etkilediğı ampirik olarak analiz edilmiştir. Tahmin sonuçlarına göre, uzun vadeli bankacılık sektörü yurt dışı kredi kullanımıyla tüm kârlılık göstergeleri arasında anlamlı ve pozitif ilişki varken, kısa vadeli girişler ile kârlılık arasındaki ilişki pozitif fakat anlamsız çıkmıştır. Merkez bankasının kısa ve uzun vadeli döviz cinsi yükümlölüklere uyguladığı farklı zorunlu karşılıklar neticesinde bankaların uzun vadeli yurt dışı borçlanmaya yönelmesi elde ettiğimiz sonuçları destekler niteliktedir.

1. INTRODUCTION

This dissertation is a collection of three essays about monetary policy and banking in the Turkish economy. That banks have an intermediation role between central banks and financial markets correspond to an important place under monetary transmission mechanism since banks might react in response to changes in monetary policies. To comprehend how the monetary transmission mechanism functions, banks should be analysed in a very detailed way since the role of banks still keep its significance in financing economic activities through lending. The possible impacts of monetary policy can be observed through various monetary transmission channels in which interest rates, exchange rates, inflation, expectations, asset prices interact with each other. One of the most influential monetary transmission channels is undoubtedly interest rate. If the monetary policy has systematic effect on banking performance and profitability then it means that monetary transmission channels have significant implications for financial systems elasticity, banking capital, banking price setting behavior and trading income etc.

Banks have also an intermediation role between domestic and global markets through financial flows. Banks function like bridge between foreign loans (cross border liability) and domestic lending. Given that there has been an increasing trend toward the internationalization of emerging market economies banking through cross-border banking liability (non-core), any overuse or abuse of cross border liability by EME banks to meet the domestic lending demand may create banking crises or financial turbulence. As an EME, the reliance of Turkish banking sector on cross border liability has also dramatically risen during the last 5 years, which may increase some potential banking risks related to maturity mismatch, liquidity, short/long-term FX liability, interest and exchange rate.

Considering the significance of the banking profitability and performance under monetary policy transmission mechanism and financial inflow, in this doctoral thesis,

the relationship between financial inflows, interest rates and Turkish banking performance will be analysed.

In the first chapter, the developments of the Turkish banking industry in the light of financial flows paying special attention to cross border banking liability will be examined. Domestic deposit growth has followed a strong path in the Turkish economy resulting from financial deepening and general income growth since 2002. Likewise, Turkish economy's credit growth has also pursued an increasing trend at the same time period. But Turkish banking sector's loan to deposit ratio exceeded the critical level one in 2011 which increased the reliance of Turkish banking sector on cross border liability during the last 5 years. This higher reliance might have risen some potential banking risks related to maturity mismatch, currency mismatch, liquidity, short/long-term FX liability, interest and exchange rate. In responses to volatile capital flows and higher access to non-core liability (banking foreign loan inflow), the Central Bank of Turkey started to implement new policy tools such as interest rate corridor, reserve option mechanism and changed its reserve requirement rate for non-deposit FX liability to deal with potential risks that the Turkish economy and banking sector might confront. As a consequence of macroprudential policies, Turkish banking sector foreign borrowing does not create any short-term risk in terms of non-deposit FX liability. However, that Turkish banking sector's loan to deposit rate exceeds the 100% would still be a problem.

In the second chapter, based on empirical specification, we investigate how short term interest rate and slope of the yield curve affect bank profitability in Turkey from 2002Q4 to 2014Q3. We employ three different dependent variables: net interest margin, return on assets and return on equity to see the possible short run and long run impacts of the short term interest rate and slope of the yield curve. Estimation results suggest that while short term interest rate and slope of the yield curve have negative and significant impact on bank profits in the short-run, the effects of these variables turn out to be positive in the long run as expected. We try various measures of short term rates and the slope of the yield curve and various specifications for robustness check and we find that the results are very robust. Hence, overall our findings indicate that monetary policy significantly influences bank profits as well as bank capital in Turkey.

The result that in all specifications the slope of the yield curve has higher impact on profitability than short-term interest rate is consistent with the theoretical and empirical findings in the literature. More importantly, our results also indicate that bank profits in an emerging economy (i.e., Turkey) are more sensitive to the slope of the yield curve compared to the ones in an advanced economy (i.e., UK). This might result from the fact that UK banking sector can generate more trading income and engage more in hedging activities, which might potentially reduce the net effects of term structure of the interest rates on final profitability. Thus, we argue that policy makers in Turkey should be more cautious when they set interest rates that have significant impacts on bank profits and capital as well as financial system resilience. The results also suggest that banks in Turkey should increase their capacity for trading income and hedging against interest rates shocks so that they can smooth out their cash flows.

In the third chapter, we empirically examine how the banking industry financial inflows (cross-border liabilities) affect the performance of Turkish banks since 2003Q1. Overall outlook of Turkish banking industry performance seems that it is positively influenced by cross-border banking credit inflows (non-core liability). The types of credit inflows appear to have different impacts on profitability. Our estimation results show that long-term banking industry credit inflow generates more non-interest income compared to interest income while the short-term credit inflows have no significant effect on general profitability. Additionally, long-term credit inflow has more impact on ROE compared to ROA and NIM.

2. CAPITAL FLOWS AND BANKING IN THE TURKISH ECONOMY

2.1 Introduction

The Turkish economy has increasingly become more and more integrated into the global economy through not just trade but also capital flows. In the aftermath of the 2001 banking and financial crises, the process of capital integration of the Turkish economy with the rest of the world has taken a new dimension supported by structural financial reforms and political stability.

Capital inflows can provide substantial benefits for emerging countries at the expense of some risks. Capital inflows can stimulate domestic investment through lending, increase the growth rates of economies and living standards. Also, they supply necessary funds for developing countries so that they can sustain their budget deficits. On the other hand, current account deficits, monetary expansion, market bubbles, lending booms, volatile and short-run flows and exchange rate fluctuations are known to be among some of the observed risks related to capital inflows into emerging economies, even those having sound economic fundamentals (Calvo et. al, 1996; Mishkin, 2009; Caballero, 2014). Emerging market economies (EMEs) have implemented several macroprudential policies to minimize the risks associated with capital flows and increase their potential benefits.

Banks, as intermediaries of financial flows between domestic and global markets, play a significant role in dealing with these benefits-risks tradeoff. Specifically, banks also act as a bridge between foreign loans (cross border liability) and domestic lending. In recent years, EMEs have witnessed a rapid growth in bank credits. Simultaneously, there has been an increasing trend toward the internationalization of EMEs banking through cross-border banking (i.e., non-core) liability (see Figure 2.1) (BIS, 2014). Therefore, any overuse or abuse of cross border liability by EMEs banks to meet domestic lending demand may potentially create a banking crisis or financial turbulence since cross border banking liability directly affects the level of domestic

lending especially when domestic banking sector could not find enough core liability (i.e., domestic deposit).

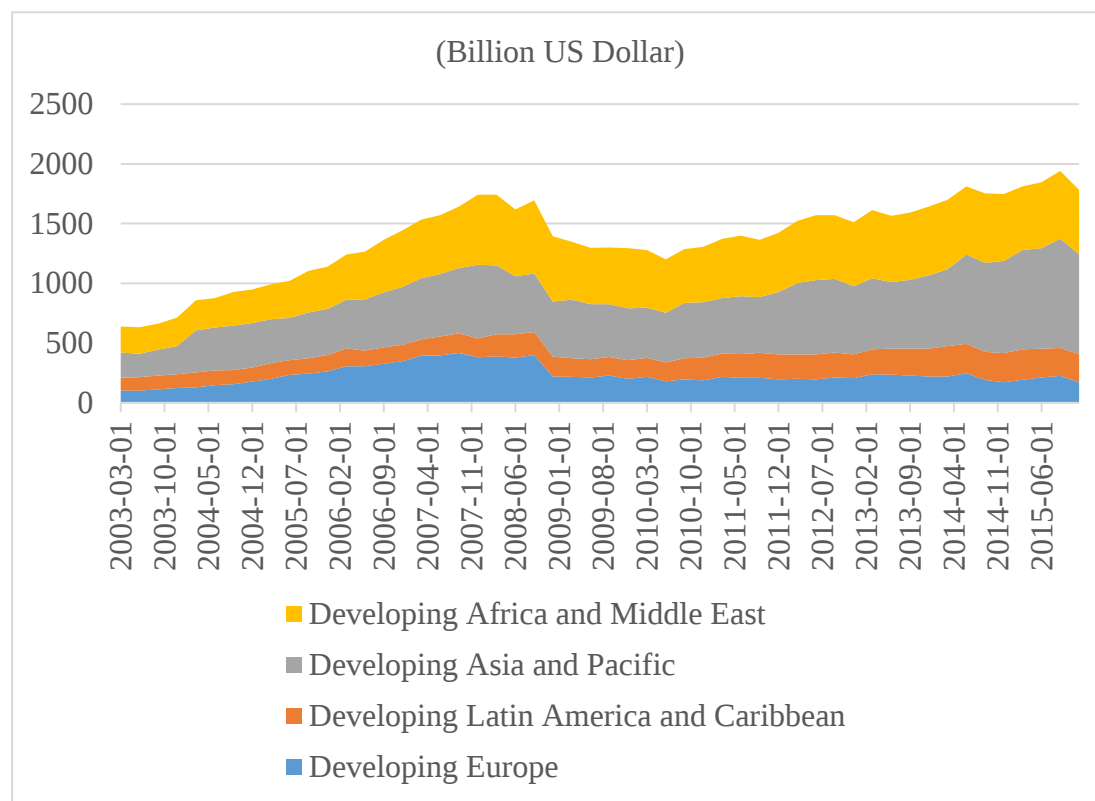


Figure 2.1 : Cross Border Total Banking Liability By Emerging Regions (BIS, 2016).

Domestic deposit growth has followed a strong path in the Turkish economy resulting from financial deepening and overall income growth since 2002. Likewise, Turkish economy's credit growth has also pursued an increasing trend during the same period. However, since loan to deposit ratio exceeded the critical level of one in 2011 the Turkish banking sector has gradually relied more and more on cross border liability.¹ This higher reliance might have increased some potential banking risks related to maturity mismatch, currency mismatch, liquidity, short/long-term FX liability, interest and exchange rate. In response to larger access to non-core liability (banking foreign loan inflow) and sudden stop/volatile financial flows, the Central Bank of Turkey started to implement new policy tools (interest rate corridor and reserve option mechanism) and changed its reserve requirement rate for non-deposit FX liability to

¹ Turkish banking sector total cross border liability has increased from 7,3 billion dollar to 103 billion dollar since 2002. Especially during the last five years total cross border banking liability to banking total asset rose on average from 8% to 13%.

deal with these potential risks. As a consequence of macroprudential policies, foreign borrowing of the Turkish banking sector does not create any short-term risk in terms of non-deposit FX liability. However, the fact that loan to deposit ratio of the sector exceeds the 100% threshold would still be a problem since higher reliance on foreign sources makes the domestic banking system more vulnerable to external shocks.

In this chapter, we examine and evaluate the developments in the Turkish banking industry in the context of capital and financial flows specifically focusing on cross border banking liability (non-core). In the first part, we briefly analyze how the Turkish economy, as an EME, has been affected by capital and financial inflows. Then, we touch upon how different types of financial inflows and banking sector are interrelated especially through cross-border liability. In the second part, the transformation of the Turkish banking sector will be described by paying special attention to post-2001 period. Then, we investigate the association between cross border liability (non-core) and the performance of Turkish banks. Afterwards, we examine the overall current outlook of the Turkish banking sector. Finally, we conclude with some policy recommendations.

2.2 Capital Inflows

2.2.1 Causes and Effects of the Capital Inflows

Assessing the economic and financial motives behind the capital inflows can contribute to our understanding of the relationship between inflows/outflows and banking. One of the reasons why capital inflows flow from developed to developing regions is lower interest rates. Any declining trend in the interest rates among developed countries pushes the investors to seek higher yields in emerging economies. Additionally, higher profit opportunities in developing countries is another reason that attract the capital inflows especially during recessions in the developed countries, boosting FDI. The rise in the number of investment and mutual funds companies in the emerging countries is another reason behind the surge in capital inflows, catalyzing the inflows and make the cooperations easier among the funds companies. The steps like market-oriented reforms and liberalization of the economy taken by emerging economies is another significant factor that stimulate the capital inflows.

Some basic macroeconomic effects of the capital inflows to developing countries can be observed in foreign exchange reserve, current account deficit, consumption boom, money supply growth, sharp rise in stock and real estate prices, real exchange rate appreciation.

Foreign exchange reserves of the developing countries had sharply risen during the surge in capital inflows and almost all developing countries followed the increasing trend in their foreign reserves. For instance, the total foreign reserves of Brazil, Turkey and South Africa (three upper middle income countries) increased by 230% from 1990 to 2000 and 740% from 2000 to 2014 (World Bank, 2016). The problem associated with capital inflows in developing countries is current account deficit, simply meaning total domestic investment exceeds national saving (Calvo and others, 1994). Countries may succeed to deal with widening current account deficit until a threshold level and if it exceeds this threshold level, then it may be a crucial negative signal for economic stability and growth. Especially countries having short-run capital inflow risk had experienced major economic difficulties such as currency devaluation, negative growth rates, interest rate hike when current account deficit has widen more. Another macroeconomic effect of the capital inflows is consumption boom driven by imported goods and services. As developing countries become more integrated into the global system, consumption choices of the market participants and households change and private savings tend to decline.

Almost all developing countries receiving higher capital inflows experience growth in money supply. Rise in stock and real estate prices are another possible macroeconomic impacts of the surge in capital inflows. Especially the stock prices can suddenly hike or decline in a very short period resulting from portfolio inflows or outflows. Lastly, the exchange rate appreciation with inflationary pressure is another vital impact of the capital inflows. The exports and imports behaviors of the countries may suddenly change in accordance with real exchange rate appreciation or depreciation.

2.2.2 Interventions Against Capital Flows

Apart from macroeconomic impacts/imbances, these risks related to financial inflows have a potential to create banking crises or financial instability since banks have an important transmission channel between domestic market and international financial flows. Therefore, the policymakers of the emerging economies have some special concerns and implement some monetary and fiscal policies to handle with risks of the financial inflows.

The most popular policy response to capital inflows in developing countries, including Turkey, is sterilization in which the central banks intervene the inflows by open market operations and increase their foreign currency reserve. The aim of such a policy is to prevent real exchange rate appreciation and increase the ability of controlling over domestic money stock that may create inflationary risks (Reinhart and Calvo, 2000). Increasing the reserve requirements is another step taken by central banks to deal with capital inflow problems since the inflows directly raise the receiver country's banking accounts. By doing so, central banks aim to limit the banking industry lending behaviors and FX liability risk. The new regulations and supervisions like capital requirement would also limit the exposure of banking institutions to the volatility in capital inflows. Imposing tax especially on short-term inflow is another policy that some countries implement. The aim of imposing tax on short-term inflow is to restrain the speculative movements of capital inflow. In Turkey, imposing such a tax on some types of financial flows were being discussed after 2001 banking and financial system crises and these discussions become popular among economists and authorities whenever country's current account deficit poses a risk.

The another vital or key policy in developing countries surrounding the issue of capital inflows is the structure of exchange rate, flexible or fixed. Under flexible exchange rate regime, appreciation or depreciation in real exchange rate is more likely to arise from ups or downs in nominal exchange rate, not from inflation and central banks have more power and authority on economy (Reinhart and Calvo, 2000). On the contrary, under floating regime, sudden stop or massive capital inflows might create higher volatility in real exchange rate which may damage the import-export structure and growth rate of economy. To minimize the possible negative impact of pure floating

exchange rate regime, some countries like Colombia, Mexico introduced crawling exchange rate bands that functions as between fixed and floating in 1994. Some countries like Malaysia and Chile were capable of well-management against the adverse effects of capital inflows. They introduced mixed policy package and did not depend on a single policy tool. For instance, at the beginning of surge in capital inflows, these countries treated the inflows as short-term and speculative and applied sterilization policy to restrict the impact of inflows on domestic currency. As the countries continued to receive inflows, sterilization policy shrank and allowed the real exchange rate to appreciate (Calvo and others, 1996).

2.3 Turkish Economy and Financial Inflow

The Turkish economy has demonstrated similar characteristics with other emerging economies. The prevailing facts regarding financial flows observed in other EMEs and the impacts of these flows specified in the literature (i.e., lower interest rate, market bubble, lending boom, monetary expansion etc.) have been true for the case of Turkey as well (Calvo et. al, 1996).

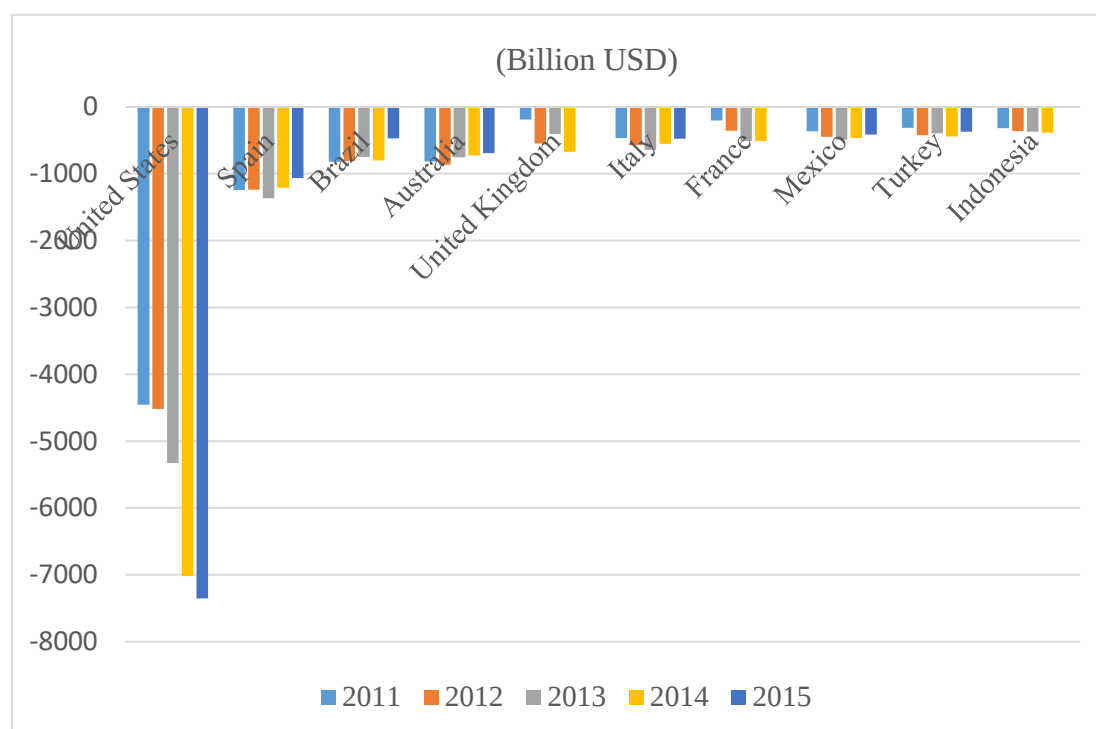


Figure 2.2 : International Investment Deficit Positions of Top 10 Economies, (IMF, BOP-2015).

We present the international investment deficit (financial assets: FDI, portfolios, loans etc.) of top 10 countries in Figure 2.2. Turkey is the 9th country having the highest international deficit in the world economy (ranked between Mexico and Indonesia). More importantly, Turkey is the 5th economy which has the highest international investment deficit to GDP ratio.²

The composition of financial flows for the Turkish economy can be seen in Figure 2.3. The total share of FDI in financial flows is smaller than others but follows a stable pattern while portfolio inflows is more volatile compared to other inflows. We observe an increasing trend in financial inflows since 2003 albeit with highly volatile patterns.

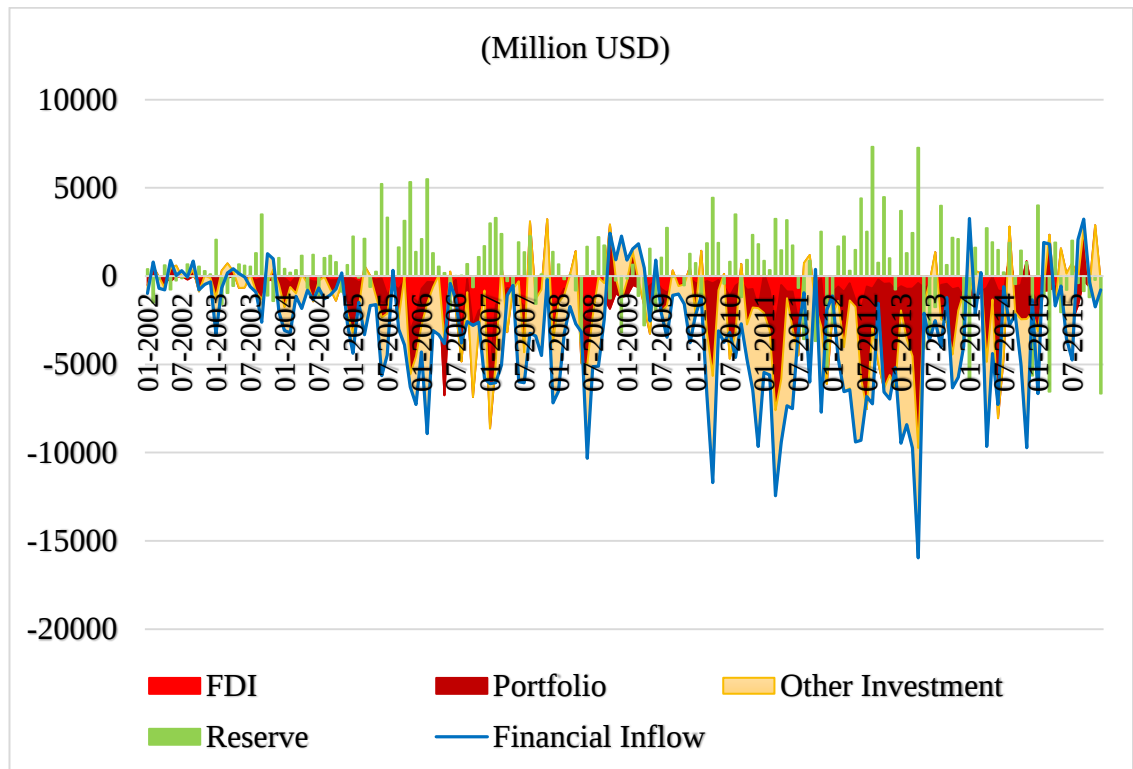


Figure 2.3 : Turkey Financial Account Composition (CBRT, 2015).

The large swings in financial inflows inevitably influence the macroeconomic environment by affecting firms' and banks' balance sheet conditions, their degree to

² We calculate the international investment deficit to GDP ratio by using a 2014 dataset of 15 countries which had the highest international investment deficit. For instance, USA's IID to GDP ratio was about 0,4 while Turkey had 0,55. Greece, Portugal and Spain were among the top three countries that had the highest IID to GDP ratio.

access to credit, lending behavior, pricing dynamics, import/export structure etc. To address potential risks created by short run/volatile financial flows which has started to rise again after 2008 financial crisis, the Central Bank of Turkey has been very actively and successfully managing the volatile and sudden stop financial flows through traditional and new macroprudential tools. Active use of interest rate corridor (widening or narrowing) and reserve option mechanism by the CBRT in 2010, for instance reducing the lower bound interest rate (borrowing rate) and increasing the reserve option coefficient during large capital inflows, restricted the supply of foreign currency and its depreciation (Aysan et. al, 2015). Moreover, the current account deficit to GDP ratio were again reduced to critical level of 5% (CBRT, 2016; Roubini and Wachtel, 1999).

During the same period, the Borsa Istanbul stock exchange's main BIST 100 index rose about 700 % from average 10.000 to around 80.000 and secondary market bond rate with two-years maturity decreased from 65% to 9%, while the USD/TL exchange rate were stable between 2002 and 2014 (also had a declining trend between 2003 and 2009) then parity increased as a result of the Fed's announcement of possible systematic interest rate hike in 2014. The real consumption doubled since 2002. M1 level money supply in the Turkish economy rose about 1700% between 2002 and 2015. One of the main characteristics of this period is very highly appreciated Turkish housing prices, especially in big cities. All these facts and data aforementioned are consistent with the financial inflow literature.

2.4 Types of Financial Flows and Banking Through Non-Core Liabilities

Financial flows are comprised by various components such as foreign direct investment, portfolio, deposit, credit and reserve that differ based on the maturity (long-short) or nature of the claim (equity-debt). Each component would create a different effect on the financial system and banking industry (Caballero, 2014). Basically, it is expected that equity type inflow is less damaging compared to debt type inflow. For instance, equity type inflow FDI is steady and usually demonstrate long-run characteristic while debt-type inflows such as deposit or credit (through banking) have short-run and sudden-stop characteristics. One crucial component of the financial inflows is cross border banking liability (bank loans, debt securities inflows). Although

the share of banking industry credit inflow (cross border loan liability) in overall financial inflow is low, it could adversely affect the financial stability because of its volatile and procyclical nature especially in emerging economies depending on the global and domestic risk perceptions (Bruno and Shin, 2015; Shin, 2014; Cowan and others, 2008).

Concerns related to cross border banking credit inflows can be observed through banks' balance-sheet transactions and they can influence banks' lending behaviors since they are directly related to how banks manage their external and internal balance sheet liabilities. The main funding source of domestic banks is domestic savings that make up the deposits part of the balance-sheet liability so called core liability. However, bank deposits heavily depend on the well-being of domestic economy, specifically on households' saving rates which constrain the size of overall internal funding source. If demand for domestic credit grows faster than supply of total domestic deposits, banks turn to foreign funds to finance the excess demand for domestic credits. Especially during the credit boom period, we observe that banks in emerging economies such as Turkey, Brazil try to increase their lending capacity by borrowing from abroad through international banking system (Figure 2.4 shows the cross border banking liability for some emerging countries).

This kind of credit inflows or wholesale funding from foreign creditors increases the non-core liabilities of banks' balance-sheets. It is important to note that, banking industry credit inflow (wholesale foreign funding) is unstable compared to domestic deposits since it depends on international capital market conditions and risk perceptions (Hermann and Mihaljek, 2010). Therefore, how banks improve their ability to lend through equity and debt (internal or external) is crucial. For example, Hahm et. al, (2013) find that non-core liabilities of banks are the most distinct indicator of the financial vulnerability or crises during lending booms since they directly affect some risk variables of the economy such as maturity mismatch, liquidity, short/long-term FX liability (non-deposit and deposit), interest and exchange rates.

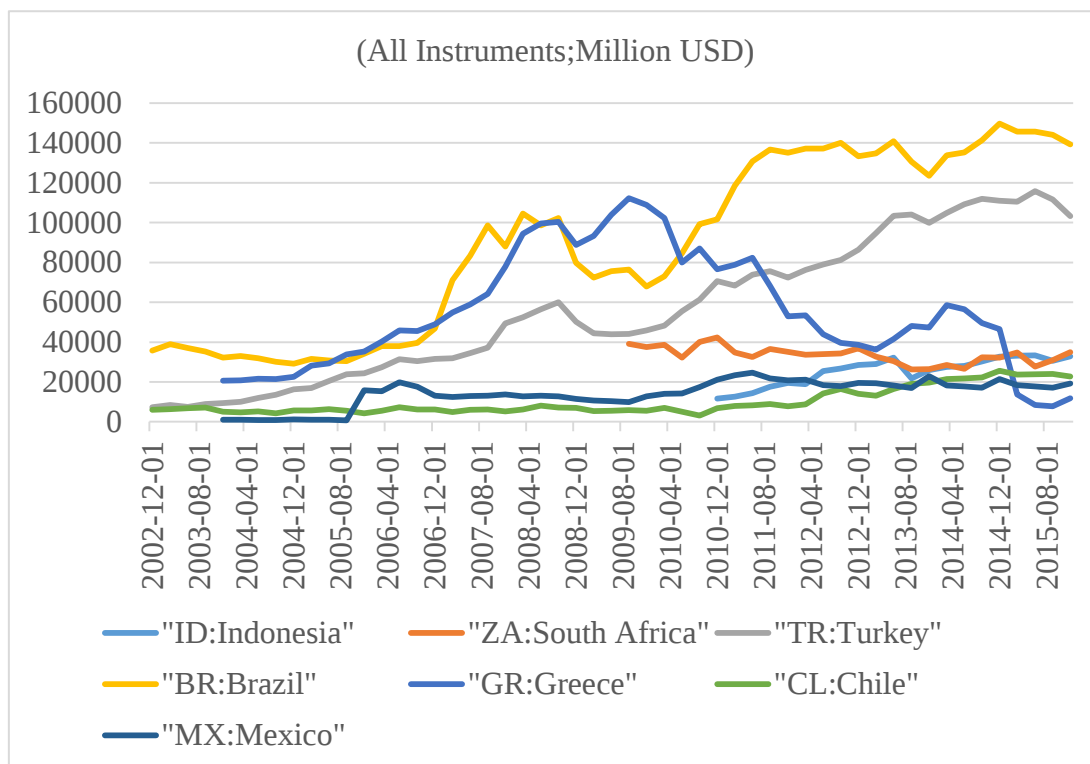


Figure 2.4 : Cross Border Banking Liability (BIS, 2016).

One of the main variables that affects the domestic banking cross border liability is exchange rate since domestic banks borrow and pay back the foreign wholesale funding in foreign currency, e.g. in USD and Euro. Among economists, there has been a big debate surrounding the financial inflows and exchange rate. For instance, Bruno and Shin (2015) show that local currency appreciation has a major impact on foreign borrowing of domestic banks. Therefore, exchange rate volatility might harm banks' balance sheets through maturity mismatch; short-term/long-term debt positions.

Apart from the cross-border liability, normally domestic currency appreciation is expected to reduce the amount of capital inflows since capital inflow would gain lower return compared to non-appreciation period. If policymakers intervene in the foreign exchange market to limit appreciation and control capital inflows, by doing so they may in turn encourage additional capital inflows and create extra market distortions in the short-run. In regard to cross border banking liability and balance sheet perspective, domestic currency appreciation is expected to affect the banking performance positively since banking credit inflow depends mainly on borrowing in foreign currency and lending in domestic currency. Therefore, policymakers should be very

careful in their attempts to control capital inflows and appreciation which may influence the real economy and financial system in a complicated way. Evidence suggest that EMEs banks have learnt how to deal with or minimize exchange rate fluctuations after 2008 financial crisis (Brunnermeier et. al, 2012). Foreign currency reserves and FX asset/liability composition (long vs short) in EME banks' balance-sheets were shelters against the exchange rate fluctuations and financial crises that minimize the damages of the external factors.

2.5 Turkish Banking Sector

2.5.1 Turkish Banking Sector Pre-2001 Period

As an emerging economy, Turkey has begun to receive first huge volume of capital inflows by the end of 1980s after transforming its economy into fully liberalized market conditions in 1980 (Agenor et. al, 1997). Significant structural economic reforms such as convertibility of the domestic currency, free capital movements, liberalization of loan, deposit rates and foreign exchange regime were implemented during the mid of 1980s and as a result Turkey has become an integral part of global financial system.

Turkey's integration into the global financial system has its own advantages as well as risks. As a result of liberalized market reforms, the Turkish financial and banking sector progressed expeditiously. With the new entrance of private and foreign banks, the share of the public banks in the total industry prominently fell. The new entry made the industry more competitive and more institutionalized. Nonetheless, hereafter the Turkish economy had a short-term capital inflow problem. In addition to the short-term capital inflows, high inflation, increasing public debt, current account deficit and dollarization were negative characteristics of the period between 1989 and 2000. For example, the annual average inflation rate was 72%, distorting the efficiency of the monetary/fiscal policy and increasing the uncertainty of the economic transactions. The average external or foreign debt (including public) to GNP ratio was about 47 % and hiked to 78 % for 2000-2001, as a result of public budget deficit financing. During this period, main objective of the private banks was to provide short-term funds to the public sector by borrowing from abroad, simply gaining the interest spread but

exposed to exchange rate risk while the public banks had poor performance mainly because of political intervention and mismanagement. Combining all these facts, Turkey experienced several crises resulting from domestic and global events. Among them were 1991 Gulf War, 1994 Mexico currency crisis, 1997 devaluation, 1997 Far East Financial Crisis, 1998 Russian Crisis, 2000-2001 banking liquidity, FX crises and devaluation (Mercan et. al., 2003). Especially, general negative outlook and disappointing performance of the Turkish banking industry along with political instability were considered to be a major consequence of the 2000 and 2001 economic crises. Consequently, the fundamental measures to repair the Turkish economy were focusing on the structural issues of the banking and financial industry.

2.5.2 Turkish Banking Post-2001 Period

With the Banking Sector Restructuring Program after the 2001 banking crisis, authorities aimed to increase the efficiency of the state banks, solve the problems of the banks transferred to the Saving Deposit Insurance Fund (SDIF), strengthen the balance-sheets of the private banks and raise the supervisory and regulatory scopes by the Banking Regulatory and Supervisory Association. Some criteria about deposit insurance, capital adequacy, non-performing loans, ownership, foreign exchange position, liquidity management were established to make the supervisory and regulatory framework function well. For instance, under FX regulation banks were not allowed to increase their FX positions more than 20% of their equity. In the following years after regulatory and supervisory steps taken, overall size of the banking industry shrank. In other words, the number of banks, branches and employees declined. The period between 2001 and 2004 is known as the recovery and stabilization of the Turkish banking sector (Akın et. al, 2009).

After the recovery and stabilization period, the Turkish banking sector entered a new phase in which political stability, economic growth and external factors such as EU full membership negotiations and global macroeconomic recovery played important roles in this development. From 2004 to 2008, the total assets in terms of USD increased by 183%, the total equity rose by about 156% (See Figure 2.5).

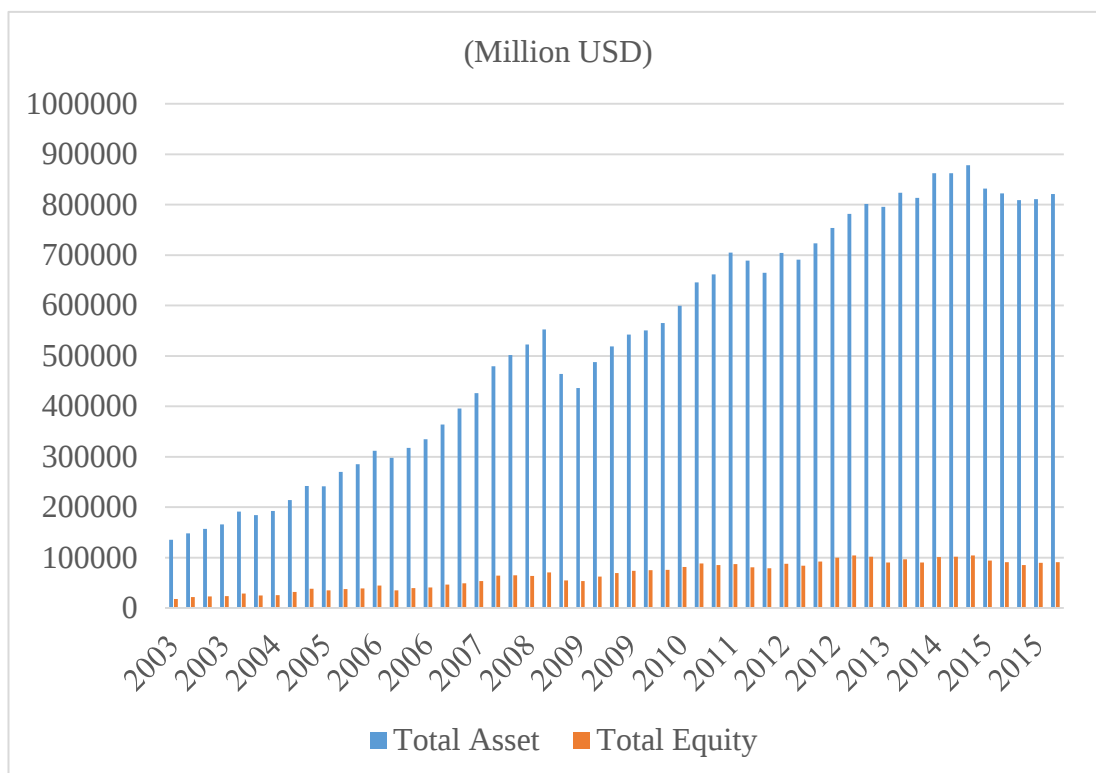


Figure 2.5 : Turkish Banking Industry (BRSA, 2016).

The number of employees in the banking industry increased by about 25%, the number of branches rose by about 80% (See Figure 2.5). During the same period, additional five foreign commercial banks entered the Turkish market and Turkish banking industry were able to borrow high amounts of credits from international financial markets through syndication and securitization loans in which the total amount of cross-border liabilities rose from 4,3 billion USD in 2004 to 27 billion USD in 2008.

Even though there appeared an increase in the number of employees and branches in the Turkish banking sector between 2008 and 2011, global economic and financial conditions depressed the banking activities and indicators such as total assets, total lending, cross-border inflows etc. The period between 2011 and 2015 has been dominated by some internal conflicts in 2013, political uncertainties resulted from governmental elections in 2015, change in Fed's interest rate policy. Also, increased risk perception towards EMEs and Chinese economy due to lower growth rates shaped this period. Moreover, tight domestic prudential regulations on credit, rise in interest rate and lower economic growth put pressure on banking activities and lending in the

last two years (CBRT, 2015). Although these internal and external factors might have short-run negative impact on the banking industry and lending activities, the Turkish banking industry is expected to progress and grow as it has been performing before. When the global economic and financial conditions get better (decrease in global risk perception), rising GDP growth rates and domestic political stability (decrease in country risk) could again foster the international financial flows towards Turkey and stimulate the domestic investment.

2.5.3 Turkish Banking Sector and Non-Core Liabilities

In recent years, EMEs have witnessed a rapid growth in bank credits. Simultaneously, emerging economies have faced an increasing trend in cross border banking credit that can be a new risk factor for financial intermediation as well as a profitable environment through interest rate spreads. Especially the share of the wholesale funding in total liabilities of some of the EMEs such as Korea, Mexico and part of Europe, including Turkey, have increased during the last decade (BIS, 2016). As an emerging economy, total syndication and securitization loans (cross border liability) in the Turkish banking industry have demonstrated an increasing and stationary pattern since 2002 (See Figure 2.6).

Between 2003 and 2008, banks were able to borrow increasingly from abroad, but global financial turbulence reversed this inflow due to changes in the global risk perception. Then, the Turkish banking industry started to receive high volume of foreign credit again from the beginning of 2013 Q2 until 2015 Q2. The year 2012 and the last two quarters of 2015 were dominated by elections and domestic conflicts which increased country's risk level and discouraged international investors' willingness to lend.

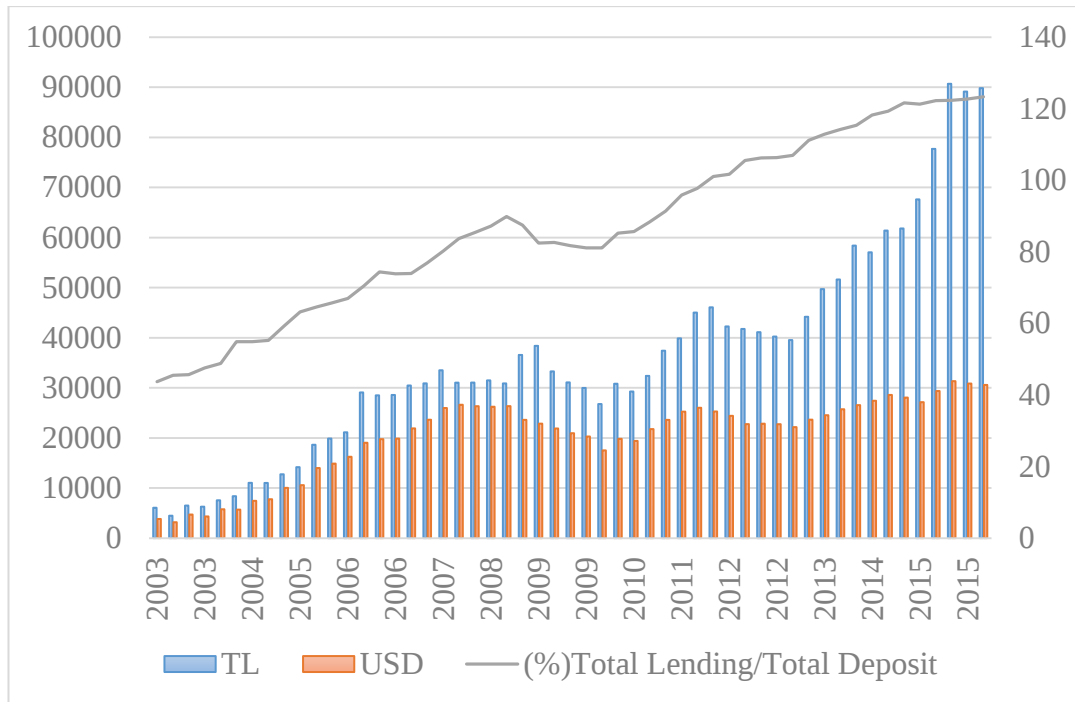


Figure 2.6 : Syndication and Securitization Loans (Million-Left Axis)
Total Lending/Total Deposit (%-Right Axis); (BRSA, 2016).

Cross border banking liability is crucial for the domestic lending especially when the banking sector could not find enough core liability (domestic deposits). Domestic deposit growth has followed a strong path in the Turkish economy resulting from financial deepening and general income growth since 2002. Simultaneously, credit growth has also pursued an increasing trend during the same period. But the sector's loan to deposit ratio exceeded the critical level of one in 2011 which in turn increased banks' reliance on foreign funding. As the domestic credit growth/level has been larger than the domestic deposit growth/level, banks have started to turn to foreign markets (external borrowing).

The high correlation between lending to deposit ratio and cross-border liability to asset ratio since 2010 might be a potential risk that should be taken into account. Increasing reliance of the Turkish banking sector on cross-border liability might create risks such as credit risk, funding risk, maturity mismatch, currency mismatch, liquidity, short/long-term FX liability, interest and exchange rate (Adrian and Shin, 2009; Hills and Hoggarth, 2013; Allen, 2011). For instance, banks expand their balance sheets through cross border liability but their borrowing has shorter maturity than lending. This might expose banks vulnerable to maturity mismatch problem.

Banking non-core liability is directly associated with liquidity risk. Concerning liquidity risk, the Turkish banking industry has two concentrations, one around TL assets and core-liabilities; another around FX and non-core liabilities. Generally, the Turkish banks seem to be successful in bringing off their liquidity risk, including TL and FX. However, it is still important to manage liquidity risk with respect to external financing (non-core liabilities). Banking industry external debt in terms of US dollars has increased since 2009 and started to decrease since the beginning of 2015 due to internal and external risks. However, growth rate of foreign debt is still positive under exchange rate adjusted effect (CBRT, 2015).

In regard to dealing with the potential risks, the monetary authorities in emerging economies implement some policies and regulations to strengthen the resilience of the banking industry against risks associated with non-core liability. Macroprudential regulations such as raising non-deposit FX reserve requirement, attracting foreign bank entry, stronger supervision are among some steps taken by the monetary authorities in EMEs (BIS, 2009). In addition, interest rate corridor and reserve option mechanism were the new policy tools that were started to be implemented in 2010 by the Central Bank of Turkey to reduce the risks related to volatile short-term capital inflows and control the currency appreciation/depreciation (Aysan et. al, 2015). These new tools were crucial in the sense that if volatile capital flows is not managed properly by the monetary authority, then sudden foreign exchange appreciation or depreciation might occur. These sudden ups and downs inevitably influence the banking balance-sheet behaviors, maturity mismatch and lending activities. Based on empirical evidence, Aysan et. al (2015) show that these new policy tools have been effective to minimize the impacts of volatile cross-border capital inflows.

The composition of the foreign financing also changed due to the new arrangement of the CBRT that aimed to foster external financing with long-term maturities. The CBRT recently increased the reserve requirement ratios for non-deposit FX liability that has maturity less than 3-years. Therefore, we observe both an increase in long-term external financing and simultaneously a fall in foreign funding with short-term maturities. For instance, the share of short-term foreign liability in total foreign liability was 58% in 2014 and decreased to 33% in September 2015. Also, the average

maturity of foreign liabilities of banks has risen to 51 months and average maturity of syndication loans has reached from 12 to 15 months (CBRT, 2015).

Interest rate and exchange rate fluctuations might create risk of maturity mismatch between banks' assets and liabilities. Since 2013, the average maturity of banks' assets has been fluctuating between 19 and 21 months while liabilities exhibit a more stable and smoother pattern at 3-months. During the same period, the maturity of loans (interest-rate sensitive) and the share of the long-term TL deposits in total deposits have been declining, whereas the share of FX assets and liabilities have been rising. The total amount of FX liabilities is higher than FX assets and the share of FX liabilities in total liabilities has been increasing. According to the CBRT 2015 Financial Report, the impact of exchange rate fluctuations on banks' balance-sheet is very limited since banks take on balance-sheet short and off balance-sheet long position simultaneously. Therefore, net FX positions of the banking industry follow a balanced trend (CBRT, 2015). Concerning interest rate fluctuations, banking industry's long-term maturity TL assets and liabilities is more sensitive to interest rate compared to maturities up to 1-year. (CBRT, 2015).

2.5.4 Overall Outlook and Some Policy Debates

By the mid of 2016, the Turkish economy has 53 banks, including 6 participations, 3 publicly owned commercials, 9 privately owned commercials with domestic holders, 15 privately owned commercials with foreign holders, 13 investment and development banks. Also, six international commercial banks have branches in Turkey (TBA, 2016). During the last 15 years, total assets of the Turkish banking industry has risen by about 505%, valued at \$821 billion and total equities increased by 416%, valued at over \$91 billion. As seen from Figure 7, general profitability of the Turkish banking sector experienced a noticeable decline in all measures, NIM (Net Interest Margin), ROA (Return on Assets) and

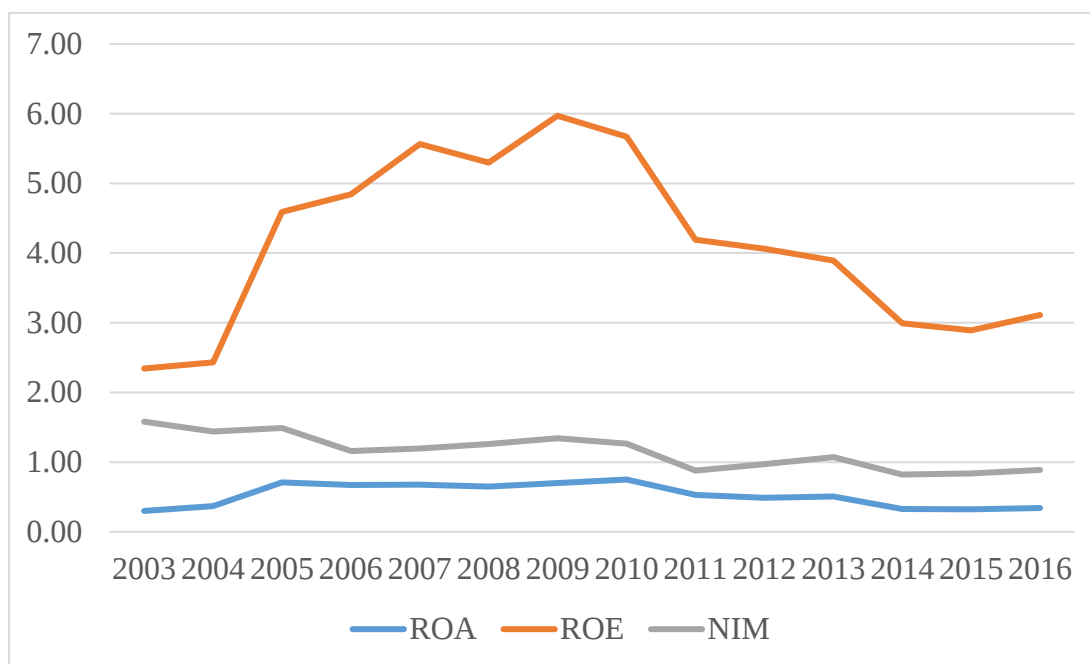


Figure 2.7 : Turkish Banking Sector Profitability (BRSA, 2016).

ROE (Return on Equity) since 2002. In this period, ROE diminished less than ROA since total banking assets grew more than total equities and steady fall in interest rates suppressed NIM down.

A closer look at the numbers show that the Turkish banking sector has gone beyond the critical threshold and potential in terms of branches, employees, loan to deposit ratios, as it is getting more and more integrated into the global financial markets. The strong supervisory and well regulated domestic framework is likely to support the banking sector's positive outlook. The risk indicators such as liquidity risk, capital adequacy and non-performing loan reflect a stable and encouraging signal for future prospects. Increasing efficiency, more utilization of technological/digital environment and cost minimizations are some of the intended steps to be taken by the banking sector in the following years to deal with declining profitability. The cross border liability (non-core) seems to be one of the main funding source for domestic lending given the fact that domestic deposits and saving rate continue to be low while domestic lending tends to rise. Although increased reliance on wholesale foreign borrowing does not create any short-term risk in terms of non-deposit FX liability, it is likely to be one of the risk factors that the banking sector might confront until they could find other funding sources, other than foreign funding, for lending activities. In fact, the Turkish

banking sector should devise a new road map, compatible with its strong appearance, to be classified as one of the top banking systems among the EMEs. In this context, we have some general and specific policy recommendations for the sector.

Aydemir and Ovenc (2016) show that interest income of Turkish banks dominates their non-interest income. One of the key features of the developed countries' banking sector is that they have higher trading income compared to interest income. Hence, we recommend that the Turkish banking sector should increase its trading income capacity through hedging, direct investment or investment partnerships. These kinds of trading activities and investment partnerships might help the sector to increase their profitability and strengthen the well-being of the sector against interest rate volatility.

Increasing the capacity of regional financial integration between Turkish and other emerging market economies' banks would definitely be beneficial. This kind of integration; with new models, cooperations, new regulations and infrastructure, has the potential to create a new momentum toward cross border liability expansion and might reduce the global risks related to advanced economies. In today's international financial system cross-border banking inflow is being dominated by advanced economies and global banks and hence the new models or instruments created by the EMEs banks toward cross border might reduce the EMEs' non-core liability risk.

Given the difficulties in efficiently coordinating the cross-border inflows and lack of global regulation, the CBRT and other authorities should continue to control and manage the the banking sector cross border financial inflows. The steps taken to attract long-term cross border banking liability should be continued.

Effective policies and regulations that stimulate domestic savings and long-term investment positions might reduce the reliance of the banking sector on cross-border foreign funding.

The Turkish banking sector should search for new foreign markets to enter, especially the markets where Turkey intensely trade with and have good neighborhood relationships. Opening new branches in the neighboring countries that Turkey has high level of exports could, in some degree, reduce the dependency on non-core liability.

A kind of Tobin tax might be imposed on short-term financial outflow (especially on portfolio) and foreign exchange transactions to ensure the stability of the banking and financial system that might be adversely affected by exchange rate fluctuations and outflows. After East Asia and Latin America crises Malaysia and Chile are the two countries that have implemented this policy and have benefited from it (Rajan, 1998). For instance, the Malaysian authorities imposed some controls on capital flows and exchange transactions to deal with speculative capital movements (Kim, 2003). Indeed, imposing such a tax on some types of financial flows was discussed in Turkey after 2001 banking and financial system crisis and it turns out to be a hot topic among economists and authorities whenever current account deficit creates a risk for the country. Apart from current account risk, this kind of tax might reduce speculative flows in the Turkish economy.

2.6 Conclusion

Turkish banking sector has gone beyond the critical threshold and potential in terms of branches, employees, loan to deposit ratios, being more integrated into global financial market. The strong supervisory and well regulated domestic framework is likely to support the banking sector's positive outlook. The risk indicators such as liquidity risk, capital adequacy and non-performing loan reflect a stable and non-negative signal for the future prospect. Increasing efficiency, more use of technology/digital environment and cost minimizations are some intended steps to be taken by banking sector in following years to deal with falling profitability. The high correlation between *lending to deposit ratio* and *cross-border liability to asset ratio* since 2010 might be a potential risk that should be taken into account. Accessing the cross border liability (non-core) seems to be main source for domestic lending given the facts that domestic deposit and saving rate continue to be limited while domestic lending demand tends to rise.

Although the increased reliance on wholesale foreign borrowing does not create any short-term risk in terms of non-deposit FX liability, it is likely to be one of the risk factor that banking sector might confront until they could find alternative financial sources. In fact, it is apparently and inevitably seen that Turkish banking sector should

find an updated road map, compatible with its strong appearance, to be classified as one of the top banking systems among the EMEs.

3. INTEREST RATES, THE YIELD CURVE AND BANK PROFITABILITY IN AN EMERGING MARKET ECONOMY³

3.1 Introduction

The 2008 global financial crisis has shown that financial stability plays a crucial role in financial system and particularly in banking industry both in developed and emerging economies. More financially sound and profitable banking industry is better able to withstand adverse shocks and hence ensures the stability of financial system. In this regard, financial stability and monetary policy are closely linked because monetary policy through interest rates and other policy tools has direct and indirect implications for bank profitability and financial system resilience as profitability is a major determinant of bank capital in the short run (Alessandri and Nelson, 2015). Moreover, we know that the yield curve (also known as the term structure of interest rates) predicts real economic growth and reflects the expectations of the market participants about interest rates and thereby influences banks' decisions (Estrella and Hardouvelis, 1991). Therefore, the question of how banks' profits change in response to interest rates and the yield curve has vital importance in order to unravel the relationship between monetary policy, bank profitability and financial system resilience.

The possible impacts of monetary policy can be observed through various monetary transmission channels in which interest rates, exchange rates, inflation, expectations, asset prices interact with each other (George, 1999). One of the most influential monetary transmission channels is undoubtedly interest rate. Interest rates (both short-term and long-term) might potentially affect the whole economy by determining the level of many economic variables such as investments, capital flows, credit demand, bank profitability, exchange rates. While the central bank directly controls the short term rate through its policy rate, it indirectly affects the shape of the yield curve

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(specifically, the slope of the yield curve) through its impact on market participants' expectations about the future policy rate path (Borio et. al, 2015).

As an emerging economy, Turkey has experienced a substantial decrease in interest rates (2-year government bond rates (i.e., the benchmark interest rates) fell from % 55 to % 9) since 2002 mainly due to successful financial regulations and political stability. However, during this period of falling interest rates, the Central Bank of Turkey (CBRT) has had to increase its policy rate several times. Especially, the dramatic increase in the policy rate in January 2014 flamed a big debate among market players and policy makers. Some argued that higher interest rates were necessary to sustain the economic stability, financial system resilience and prevent capital outflow, while others claimed that high interest rates might adversely affect investment and hence would be an impediment for economic growth. However, the relationship between interest rates and bank profitability has been ignored in this debate.

There are very few studies investigating the relationship between interest rates and bank profitability in Turkey and more importantly, to our knowledge, there exists no study in the literature that examines the link between the yield curve and bank profitability in emerging markets. Thus, this paper is the first one addressing the issue of how the slope of yield curve and short-term interest rate affect bank profitability in Turkey and hence emerging economies. We hypothesize that the monetary policy via its effects on the shape of yield curve might have a more significant impact on bank profitability in emerging economies than advanced ones. Emerging economies tend to have higher inflation and growth rates. We also know that banks in emerging economies enjoy higher profit margins due to higher inflationary environment among other reasons (Demirguc-Kunt and Huizinga, 1999). Because the yield curve can capture and predict future developments of the economy, it is expected to influence bank behavior and profits by shaping future expectations. Turkish banking industry, which operates in a relatively high inflationary economy at least for the last two decades, provides an important case study where the significant impact of the monetary policy on profitability through the yield curve can be seen.

Bank profits are generated through two types of income: interest and non-interest income. In Turkish banking industry interest income is significantly larger than non-

interest income. Both the levels of interest rates and the slope of the yield curve are associated with higher net interest income. In the case of the level of interest rates, Borio et. al. (2015) argue that a "retail deposits endowment effect" plays a more important role relative to other relevant mechanisms. The endowment effect occurs due to the fact that bank deposits are priced down on market rates because of oligopolistic power and transaction services. If the markdown becomes smaller as interest rate decline, then monetary policy tightening will increase net interest income. We also know that if banks have oligopolistic power, deposit rates adjust more sluggishly than loan rates (Freixas and Rochet, 1997). In other words, banks tend to make more profits when the monetary policy stance changes. Not only the level of interest rates but also the slope of the yield curve influences net interest income. For example, a steeper yield curve has a positive effect on net interest income. Market interest rates gradually catch up with those implicit in the yield curve. And since banks have oligopolistic power in retail deposits, they charge a markdown over market rates and thereby increase their net interest income. Regarding non-interest income, we know that higher interest rates could lead to lower non-interest income and therefore partially offset the positive effects discussed above. The most critical component of non-interest income is fees and commissions in Turkey. As Albertazzi and Gambacorta (2009) argue, savers may demand more professional services to manage their portfolios at low rates. Overall, despite this partial offsetting effect, higher interest rates and steepening yield curve are expected to have positive impacts on profitability (See Borio et. al. (2015) for a detailed discussion).

In this chapter, utilizing an empirical specification similar to Alessandri and Nelson (2015), we investigate how short term interest rate and slope of the yield curve affect bank profitability in Turkey from 2002Q4 to 2014Q3. We find that quarterly average of weekly repo rate (short term rate) and the slope of yield curve (defined as the difference between two-year bond rates and quarterly average of weekly repo rate) significantly affect the Turkish banks' profits both in the short run and long run. In other words, overall the results demonstrate the importance of monetary policy in determining the level of profits of the Turkish commercial banks. The effects of short-term and slope of the yield curve on profits differ based on the time horizon. While short term interest rate and slope of the yield curve have negative and significant impact on profits in the short run, the effects of these variables turn out to be positive

in the long run. The first differences of the short-term interest rates and slope of the yield curve and the levels of these variables are incorporated into our model to capture the short-run and long-run behaviors, respectively. Due to pricing frictions, banks may not adjust their loan and deposit rates properly in the short-run in response to changes in interest rates. Hence, banks' profits might be negatively affected by interest rates because of these rigidities. However, in the long run banks are able to overcome price rigidities by adjusting their prices so as to increase their profits.

Our results also indicate that bank profits in Turkey (an emerging market economy) are more sensitive to the slope of the yield curve compared to the ones in an advanced economy (e.g., the UK).⁴ This result, which confirms our hypothesis mentioned above, might be due to the fact that Turkey has experienced much higher inflation rates than the UK over the sample period. Banks are more likely to earn higher profits in higher inflation countries and during higher inflation episodes for a given country because the endowment effect constitutes a big source of profits at high inflation rates and when the banking industry has limited competition (Borio et. al, 2015). The impact of the yield curve on bank profitability might occur through its effects on future expectations, as it can be used to predict future economic activities (e.g., inflation and growth rates). This result might also be because UK banks gain more non-interest income such as fees from trading activities than Turkish banks. In other words, UK banks' hedging activities might cancel out the effects of interest rates on profitability. Overall as a policy implication, we argue that policy makers in Turkey should be more cautious when setting interest rates, which might have quantitatively more significant impact on bank profits.

The chapter is organized as follows: Section 2 briefly reviews the literature on bank profitability, interest rates and the yield curve. Section 3 presents the model and data. We discuss empirical methodology in Section 4 and results in Section 5. Finally, Section 6 concludes the chapter.

⁴ We compare our results with those of Alessandri and Nelson (2015) who focus on the UK, since it is the closest study to ours and happens to be the only paper focusing the impact of the yield curve and short rates on bank profitability when we conduct this research. We are aware that comparing banks in emerging and advanced economies requires more elaborate analysis, which we intend to conduct as a future project.

3.2 Literature Review

The empirical literature on the determinants of bank profitability can be divided into two streams: internal determinants that are related to bank-specific factors and external determinants reflecting the macroeconomic factors. Based on the purpose and sample of each study, a number of different internal and external explanatory variables have been used (Athanasoglou et.al, 2008).⁵ Studies focusing on the internal determinants of the bank profitability use variables such as capital adequacy, size of total assets, credit risk, liquidity ratio. For instance, Short (1979) finds that there exists close association between capital adequacy and size of total assets that large banks having more capacity to make more profit. Also, Smirlock (1985) shows that there is a positive and significant relationship between size and profitability. Similarly, Goddard et.al (2004) argue bank size and capital adequacy have significant impact on profitability.

Furthermore, some studies about internal determinants focus on bank expenses, risk management and market concentration. For instance, Molyneux and Thornton (1992) show that there is a significant and positive relationship between efficient management (expenses) and bank profits. The research undertaken about risk management analyzes the uncertainty, liquid holdings, credit risk and hedging. Especially, during higher uncertainty periods, banks may tend to diversify their portfolios and increase their liquid assets to decrease risk that might create an ambiguous affect on profitability. Regarding market concentration, Molyneux and Thornton (1992) discuss the relationship between deviations from competitive market structure and monopolistic competition and conclude that concentration might affect bank profitability.

Studies focusing on the external determinants of the bank profitability use variables such as GDP, business cycles, money supply, inflation, short term and long term interest rates and yield curve. Using bank-level data for 80 countries between 1988-1995, Demirgüç-Kunt and Huizinga (1999) find that differences in interest margins and bank profitability depend on variety of determinants like taxation, financial structure, regulation, bank-specific and macroeconomic factors. They also show that foreign banks have higher margins and profits than domestic banks in developing countries. Beckmann (2007) analyzes bank profitability in terms of structural and

⁵ See Athanasoglou et al. (2008) for an extensive literature review.

cyclical determinants using annual panel data from 16 Western European countries between 1979 and 2003. Applying Hausman-Taylor IV estimator method and ROA as a dependent variable for bank income, Beckmann (2007) shows that lagged GDP growth and real interest rate have significant procyclical effects on profits. Athanasoglou et. al (2008) focus on bank-specific, industry specific and macroeconomic determinants of Greece Banking profitability. They apply a GMM technique to a panel data of Greek banks covering the period 1985-2001. They find that bank-specific determinants and business cycle have positive impact on bank profits. Using panel data for Lithuanian banks, Narusevicius (2013) finds strong association between bank profitability and the real economy.

Regarding the effects of interest rates, in his classical study, Flannery (1981) develops a regression model to test the impact of the market interest rate fluctuations on profitability. He finds that there is no significant association between market interest rate fluctuations and bank profitability. He also adds that banks especially large ones hedge themselves against market interest rate risk by managing their assets and liabilities via trading activities with similar average maturities. Although Flannery (1981) concludes that there is no significant relationship between interest rate fluctuations and profitability, his main focus on bank hedging activities is important in terms of understanding complexity of the banks' income structure. Hancock (1985) examines the impact of the changes in interest rates and monetary policies on bank profitability. Based on his derived model in which he compares the loan rate and time deposit rate, Hancock (1985) demonstrates that higher interest rates result in higher bank profits. By comparing the impact of the interest rates on loan rate and deposit rate, Hancock (1985) shows that banks have different price setting behavior directly affecting profitability. Moreover, Purnanandam (2007) shows that banks facing more financial distress have more tendency to hedge by using financial derivatives.

In some circumstances, various interest rates such as long-term rate and market rate may have different impact on profitability. For instance, Albertazzi and Gambacorta (2009) study the link between business cycle fluctuations and banking sector profitability to evaluate the impact of the macroeconomic and financial factor shocks on bank profitability in 10 major industrialized countries. Their study shows that bank profits are pro-cyclical: GDP affects both net interest income (lending activity) and

loan-loss provisions. Furthermore, they find that the net interest income of banks in Italy, Spain and Portugal is less influenced by fluctuations of the long-term interest rate and more affected by those of the money market rate.

The paper by Alessandri and Nelson (2015) about bank profitability, interest rates and the yield curve is probably the closest study to ours. Using quarterly panel data set of UK banks between 1992 and 2009, they find that in the long run both level and slope of the yield curve contribute positively to profitability whereas in the short run a rise in market rates makes pressure on interest margins. They apply system-GMM method where the difference between 10-year government interest rate and 3 month government borrowing rate used as the slope of the yield curve. They incorporate bank-specific variables such as leverage rate and growth of total assets and macroeconomic variables such as real GDP growth rates and various interest rates into their model. They also look at UK banks' income generating activities and find that non-banking income reduces the sensitivity of the profitability to interest rates but does not completely compensate the traditional interest income channel in which interest rates still matter for modern and traditional banking.

Regarding the term structure of interest rates or slope of the yield curve, Estrella and Hardouvelis (1991) show that the shape of the yield curve predicts real economic growth and reflects the expectations of the market participants about interest rates. In their paper Estrella and Mishkin (1997) also find a relationship between term structure of interest rates, future real economic activity and inflation rate up to two years. Linking the banking borrowing and lending behaviors with term structure of interest rates, Adrian et.al (2010) provide an evidence that flatter yield curve decreases net interest margin of banking industry, reduces the supply of credit and restricts the real economic activities.

Similar to Alessandri and Nelson (2015), Borio et al. (2015) examine how monetary policy affects bank profitability in advanced economies. Their findings state that there exists a positive association between the level of short-term interest rates and bank profitability. Additionally, they find that the slope of the yield curve has positive influence on profitability and positive effect of the interest rate dominates the non-

interest income structure of the banks. Their study also shows that there exist a significant non-linear relationship between interest rates and profitability.

Most papers studying the role of interest rates on bank profitability in the literature find positive relationship in the long run while the impact of the short term interest rate on bank profitability is ambiguous which may be due to bank price setting behavior (Alessandri and Nelson, 2015). For instance, Hancock (1985) finds negative relationship between short-term interest rate and profitability, whereas Demirgüç-Kunt and Huizinga (1999) find positive. According to Albertazzi and Gambacorta (2009), this association is insignificant. Gambacorta (2008) explains this ambiguity by looking at the Italian banks price setting behavior for loans and deposits. To him, these two rates respond in a similar fashion to changes in short term interest rate, but in the long run loan rate rises higher than deposit rate compared to short run, which may result in higher net income for banks.

Regarding bank pricing behavior that is central in terms of comprehending the difference in bank profitability between short run and long run, Rosen (2002) establishes a model about banking price setting to examine why deposit interest rates react slowly to some permanent changes in money market rates. By studying UK banks, Hofmann and Mizen (2004) show that the pace of adjustment of deposit rates to market rates depends on their expected future path. Similarly, Gambacorta and Iannotti (2007) find that the adjustment of deposit rate and loan rate is asymmetric, in the sense that banks adjust their deposit rate faster during periods of monetary tightening and vice versa. Furthermore, Gerali et al. (2010) develops a model focusing on the relationship between policy rate and loan rate. They find that the impact of the monetary policy shocks is being attenuated by bank price setting behavior in which banks do not easily change their interest rates because of the stickiness. De Nicolo et al. (2010) analyze the short run implications of the interest rate on the profitability and show that banks protect themselves against interest rate risk by channeling lower market interest rate one to one into deposit rate but not to loan rate that increases the bank profitability. With this kind of pricing behavior, banks may not use the other hedging channels.

Regarding the literature on the determinants of bank profitability in emerging markets and specifically in Turkey, there are various studies trying to explain the effects of the bank-specific and macroeconomic determinants on banking performance. For instance, Ozkan et al. (2014) investigating the impact of banking regulations on banking performance find that banking sector regulations in Turkey have a positive effect on lending, asset quality and profitability. Also, Ozsucu and Akbostanci (2015) examine the existence of risk-taking channel of monetary policy in Turkey. Their findings suggest that low short-term interest rates reduce the risk of outstanding loans whereas any short rates under a theoretical benchmark increase the risk-taking of banks. Moreover, using annual data about 10 Turkish banks with 90 observations between 2002 and 2010, Anbar and Deger (2011) find that among macroeconomic variables only real interest rate affects the performance of banks positively. They employ a static panel data with fixed effects model, but do not take care of autocorrelation and heteroscedasticity issues, which make their estimation results inefficient. Moreover, Zhou and Wong (2008) study the determinants of Chinese commercial banks' net interest margin and find that market structure, average operating costs, managerial efficiency, implicit interest payments, opportunity cost of reserves affect net interest margins. Similarly, Claey's and Vennet (2008) investigate the determinants of interest margins in the Central and Eastern European Countries. Their findings suggest that bank interest margins are not so much determined by market structure probably due to increased competition among domestic and foreign banks whereas capital is a significant determinant of interest margins.

As the above review suggests, to the best of our knowledge, there is no study in the literature that investigates the short run and long run effects of interest rates and the yield curve on bank profitability in an emerging market context. Hence, this chapter fills an important gap in the literature.

3.3 The Model and Data

We obtain the relevant variables using balance sheet data from the Central Bank of Turkey and the Banks Association of Turkey on a quarterly basis between 2002 and 2014 for 26 commercial banks, which accounts for more than 95% of total assets in the industry.⁶ We consider three alternative measures for profitability: net interest margin (NIM), return on equity (ROE) and return on asset (ROA). We also employ bank-specific factors such as leverage rate and growth rate of real total assets as explanatory variables. To capture the real economic activity, we use quarterly growth rate of real GDP.

For the short term interest rate and the slope of yield curve, we work with several variables. In our baseline estimations, we use quarterly average of weekly interest rate (repo rate) and 2-year government bond rate. Weekly repo rate is a good proxy for the Central Bank of Turkey's monetary policy stance. Government bond rate with 2-years maturity is considered as the benchmark rate for the Turkish financial markets. Moreover, we also use yield curve data created by using Nelson and Siegel (1987) model (i.e., 3-month treasury bill rate and 10-year government bond interest rate for the purpose of robustness check). It is important to note that in the literature the yield curve slope is represented by the difference between 10-year government rates and 3-month government bond yield. Since the first 10-year Turkish government bond was issued in 2010, due to data unavailability, we prefer to use 2-year bond interest rates in lieu of 10-year bond rates.⁷ The summary statistics and definitions of the variables are reported in Table 3.1.

⁶ The sample period is constrained by data availability and reliability. Bank balance-sheet data in Turkey is considered more reliable after 2002 due to accounting standards change. (Aydin and Igan (2012); Ozsuca and Akbostanci, 2015).

⁷ For robustness check, we also include the slope of the yield curve (obtained by Nelson and Siegel (1987) model) in our estimations for the time period between 2005Q1 and 2014Q3. The estimation results support our main findings. See Tables A.9-A.11 in the appendix.

Table 3.1 : Summary Statistics.

Variables	Definitions	Mean	Std. Dev.	Min	Max
NIM	(Interest Income-Interest Expense)/Total Assets	0.0133	0.0136	-0.086	0.2303
ROA	Net Profit After Tax/Total Assets	0.0033	0.0146	-0.222	0.0921
ROE	Net Profit After Tax/Equity	0.0316	0.0642	-1.150	0.6177
Leverage	Debt/Total Assets	0.8363	0.1483	0.0839	0.9674
Assetgrowth	Quarterly growth in Real Total Assets	0.0652	0.1617	-0.634	1.7613
Gdpgrowth	Quarterly growth in Real GDP	0.0147	0.0983	-0.140	0.2166
Bond	Quarterly average of 2-year government bond rate	0.1716	0.1235	0.0615	0.6522
Repo	Quarterly average of weekly interest rate	0.1402	0.1146	0.0460	0.5490

Notes: Variables: NIM (Net Interest Margin), ROA (Return on Asset), ROE (Return on Equity), Leverage (Leverage Rate), Assetgrowth (Growth Rate of Real Total Assets), Gdpgrowth (Real GDP Growth), Bond (Government bond rate with 2-year maturity), Repo (Quarterly average of weekly interest rate)

We consider the following dynamic panel model to examine the effects of interest rates and the yield curve on bank profitability⁸:

$$\begin{aligned}
Y_{it} = & \beta_1 Y_{i,t-1} + \beta_2 L \text{Leverage}_{it} + \beta_3 L \text{Assetgrowth}_{it} + \beta_4 \text{Gdpgrowth}_t \\
& + \beta_5 L \text{Gdpgrowth}_t + \beta_6 \text{Repo}_t + \beta_7 D \text{Repo}_t + \beta_8 L D \text{Repo}_t \\
& + \beta_9 \text{Slope}_t + \beta_{10} D \text{Slope}_t + \beta_{11} L D \text{Slope}_t + \beta_{12} \text{HHI}_t \\
& + \varepsilon_{it}
\end{aligned}$$

where $\varepsilon_{it} = \eta_i + v_{it}$, η_i is the unobserved time-invariant bank effects, v_{it} is an i.i.d. random disturbance, L is the lag operator and D is the first difference operator.

Consistent with the earlier literature, we incorporate a lagged value of the dependent variable (i.e., a dynamic panel model) to capture the persistency of profit measures. As dependent variables, we employ three different measures of bank profits: net interest margin (NIM), return on equity (ROE) and return on asset (ROA). Non-interest income for a bank that might be large relative to its interest income might in turn reduce or cancel out the net effects of interest rates on profitability through trading income and hedging. Therefore, comparing results using different definitions of

⁸ The model is based on Alessandri and Nelson (2015). However, note that we use a different estimator to estimate the model.

dependent variables associated with bank income is crucial in terms of assessing the net effect of short term interest rate and slope on net bank profitability.

Regarding bank-specific variables, we use quarterly growth rate of real total assets and leverage rate (i.e., debt to total asset ratio) to control for the possible effects of the balance sheet structure on bank performance. As an industry specific variable, we incorporate Herfindahl-Hirschman Index (HHI) to capture the concentration and hence the competitiveness of the banking industry (Bikker and Haaf, 2002). We also use several macroeconomic factors in the empirical specification. To control for the real activity of the overall Turkish economy, we include the growth rate of real GDP (Gdpgrowth). The key variables in this study are interest rates. For this purpose, we incorporate the quarterly average of weekly repo rate (Repo-short term) and the yield curve slope (Slope variable is defined as the difference between two-year bond rate (long term) and quarterly average of weekly repo rate). As can be seen in our benchmark model specification, in addition to short-term and slope levels (Repo and yield curve slope), we also use the first lags (L) and the first differences (D) of both short and long interest rates. It is important to note that while the level terms (Repo and Slope) enable us to measure the long run effects of interest rates, the first differences of the level terms (changes terms) control for the short run effects (Alessandri and Nelson (2015)).⁹

We expect a positive relationship between growth rate of real total assets and bank profitability since loans banks lend are part of assets. As their assets size grows, banks tend to offer more loans, which in turn lead to increase in profits. The expected effect of the leverage rate on profitability is negative. The leverage rate may increase due to two reasons: debt may rise or total assets may fall. Therefore, increase in debt limits a bank's opportunity to lend money and therefore profitability. But, this association might change depending on which variable is used as the dependent variable since higher leverage rate causes lower equity or assets, which may have different impact

⁹ We also consider nonlinearities (Repo Squared and Slope Squared) in the relationship between interest rates and bank profitability since ignoring them underestimates the effects of very low interest rates if such non-linearities are large (Borio et al., 2015). We thank one of the referees for pointing out this matter. When we incorporate nonlinearities into the benchmark model (1), we see that both quantitative and qualitative results of the paper don't change significantly. We present estimation results in the presence of nonlinearities in Tables A.3-A.8 in the appendix.

on ROA and ROE. We expect GDP growth to have a positive impact on bank profits, since as economy grows, banks tend to offer more loans and hence can earn more profits.

As we mention in the literature review section, the expected impact of interest rates on profitability is ambiguous. The relationship between NIM and interest rates depends on banks' ability to adjust their loan rates (reprice) over time and conduct hedging activities in different time horizons (i.e., short run and long run). We expect to have higher ambiguity between interest rate and profitability if we employ ROA and ROE as dependent variables. Compared to NIM, ROA and ROE are less sensitive to changes in interest rates (short term) and slope of the yield curve, since NIM consists of interest income that is directly related to the level and change of interest rates while ROA and ROE include also non-interest income and expenses such as trading fees and returns. We present the correlation matrix of the variables in the appendix (See Table A.1 and A.2).¹⁰

3.4 Empirical Methodology

In this chapter, to estimate the dynamic panel data model with fixed effects specified as equation (1), we use a quarterly data set of an unbalanced panel of Turkish commercial banks for the period 2002Q4 –2014Q3. In a dynamic panel data model such as (1), the composite error term is correlated with the lagged dependent variable even if the error term is not serially correlated (Baltagi, 2008). The within transformation of the model (1) that eliminates the individual effects results in inconsistent estimates, since the correlation still exists. However, the within estimator yields consistent estimates for the parameters associated with lagged dependent variable and explanatory variables as T (time periods) tends to go to infinity. Many studies in the literature have used a dynamic panel GMM estimator developed by Arellano and Bond (1991) to estimate the model (1). We know that this estimator would yield biased estimates if the instruments are weak and the number of moment conditions is large compared to N (cross-sections) (Baltagi, 2008). However, the within estimator is consistent when T gets larger.

¹⁰ Repo and HHI are correlated in our sample and this might cause a multicollinearity problem. As suggested by a referee, we also estimated the models without HHI and found out that the results (estimates and significance of coefficients and other test results) do not change in any significant way.

Another important assumption regarding the within estimator is that there should be no endogeneity in explanatory variables, which may not hold in general. After carrying out Davidson-MacKinnon test to formally check the endogeneity of the variables (Davidson and MacKinnon, 1993), we find none of the explanatory variables (except the lagged dependent variable) as endogenous. We also conduct autocorrelation test (Wooldridge, 2010) and heteroscedasticity test (Greene, 2008) to find out that the two statistics are highly significant.

The endogeneity of the explanatory variables along with non-spherical errors causes the within estimator to be inconsistent and inefficient. We employ the fixed effects GMM estimator to take care of these issues. It is important to note that this method differs from the two-step difference GMM and system-GMM methods suggested by Arellano and Bond (1991) and Blundell and Bond (1998), respectively, in two respects. First, it does not require the disturbances in the original model with fixed effects to be autocorrelated and homoscedastic. Therefore, taking into account the heteroscedasticity and autocorrelation would produce more efficient estimates (Schaffer, 2015). Second, it has an advantage over the two-step difference GMM and system GMM methods in that the number of instruments does not increase with the number of periods (T), since it does not use dynamic instruments (i.e, the number of instruments does not vary with time periods). Hence, as T gets larger, the problem of weak instruments mentioned above can be avoided.

In this chapter, as instruments for the lagged dependent variable, we use the lagged values of this variable and the current values of the exogenous variables. In order to test the validity of instruments used in the estimations we employ three tests: Kleibergen and Paap rank LM test (2006), Cragg-Donald F test (1993) and Hansen J statistic (1982). The first two tests examine whether the endogenous variable is correlated with instrumental variables, while the third test examines whether instruments are correlated with errors. We allow for the non-spherical characteristics of errors when testing the validity of instruments, since Kleibergen and Paap rank LM test and Hansen J test statistics are robust to non-spherical disturbances. As it is seen at bottom of the tables, the results of Kleibergen and Paap rank LM test and Cragg-Donald F test indicate that the instruments are not correlated (weakly correlated) with

endogenous variables. On the other hand, Hansen J test fails to reject over-identification restrictions. Thus, the instrumental variables used throughout the models are valid. Finally, we analyze the time series properties of the variables used in the study. The tests results reject the null hypothesis of unit root significantly for all series. Hence, we use the level of variables in estimations.

3.5 Estimation Results

We estimate the benchmark equation (1) to examine the effects of short term interest rate and the slope of the yield curve on bank profits. Three different measures of profits are utilized for dependent variables. First, we report the results associated with NIM. Then, the results about ROA and ROE are discussed.¹¹ Table 3.2 presents the estimation results when we run the model for NIM.

Regarding the short term rate and slope of the yield curve, our findings suggest that levels of both short rates (repo rate) and slope of the yield curve have significant impact on NIM. Keeping all else constant, a 100 basis points increase in the yield curve slope would raise NIM by around 2.9 percentage points and a 100 basis points rise in repo rate would increase NIM by around 0.69 percentage points per quarter. These results imply that, banks would have 51 % more income relative to sample mean as a result of a 100 basis points increase in repo rate. Similarly, banks' income would increase by 222 % relative to sample mean when the yield curve slope rises by a 100 basis points. These outcomes are economically significant.

Banks typically borrow short and lend long. An increase in short-term interest rates or a fall in long-term rates flattens the slope of the yield curve indicating a future slowdown in the economy. Slower macroeconomic conditions cause a reduction in credit demand and supply which in turn lowers bank's NIM, hence profitability. In contrast, a steeper yield curve suggests a future boom in the economy. Therefore, bank's NIM will be positively affected by a steeper yield curve as credit supply and demand will increase during booms (Estrella and Hardouvelis, 1991; Adrian et. al,

¹¹ The estimation results for the specifications such as static fixed effect model and also the benchmark model with and without nonlinearities, a crisis dummy and its interaction with yield curve slope are presented in the appendix (See Tables A.2-A.4).

2010). These findings about short term rates and slope of the yield curve are also consistent with the results and the theory outlined in Alessandri and Nelson (2015). It's important to note that Turkish banks exhibit significantly higher sensitivity to short term and slope rates than UK banks. As we point out in the introduction, this result might be because UK banks relies more on non-interest income such as fees from trading activities than Turkish banks. In other words, UK banks' hedging activities might cancel out the effects of interest rates on NIM. Or it may be due to the fact that Turkish banks operate in a relatively higher inflationary economy and a limited competitive industry where profits tend to be larger because of the higher endowment effect mentioned above.

The estimates of the variables $DRepo$ and $DSlope$ that capture the dynamic effects of interest rate changes are statistically and economically significant. These changes variables basically measure the short run impact of short term and slope rates changes. The negative estimates indicate that there exists short run repricing frictions. Unexpected rise in interest rates puts pressure on bank margins in the short run. Eventually in the long run, banks are able to overcome these frictions and reprice so that they enjoy higher profits through higher rates (Alessandri and Nelson, 2015).

Table 3.2 : Estimation Results: Net Interest Margin (NIM).

NIM	Coefficient	Conf. Interval	P-value
LNIM	0.8071***	(0.6008; 1.0132)	0.0000
LLeverage	0.0184***	(0.0077; 0.0290)	0.0010
LAssetgrowth	0.0039	(-0.0008; 0.0087)	0.1100
Gdpgrowth	-0.0021	(-0.0045; 0.0004)	0.1050
LGdpgrowth	0.0012	(-0.0011; 0.0035)	0.3250
Repo	0.0069*	(-0.0009; 0.0146)	0.0850
DRepo	-0.0347***	(-0.0569; -0.0123)	0.0020
LDRepo	-0.0189*	(-0.0410; 0.0032)	0.0940
Slope	0.0296**	(0.0018; 0.0574)	0.0370
DSlope	-0.0538***	(-0.0750; -0.0325)	0.0000
LDSlope	-0.0107	(-0.0340; 0.0126)	0.3690
HHI	-0.0204	(-0.0857; 0.0449)	0.5400
Rank LM	27.059***		0.0025
Cragg-Donald	136.554***		
Hansen	8.431		0.4913
F	29.19***		0.0000
F _m	10.85***		0.0000
LM _{HET}	6673.65***		0.0000
F _{AC}	45.534***		0.0000

Notes: ***, ** and * denote significance at 1%, 5% and 10%, respectively. Column 3 refers to 95% confidence interval. Variables: NIM (Net Interest Margin), LNIM (the lag of NIM), LLeverage (the lag of Leverage rate), LAssetgrowth (the lag of growth rate of real total assets), Gdpgrowth (Real GDP Growth), Repo (Quarterly average of weekly interest rate), DRepo (the first difference of the Repo rate), LDRepo (the lag of the first difference of the Repo rate), Slope (the slope of the yield curve), DSlope (the first difference of Slope), LDSlope (the lag of the first difference of Slope), HHI (Herfindahl Hirschman Index). F statistic tests for overall significance of the model. F_m statistic tests for absence of individual effects. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation. Rank LM, Cragg-Donald, Hansen statistics are tests for the validity of instruments.

Regarding the analysis of how short term rates and slope of the yield curve (term structure of interest rates) affect NIM, we also conduct some robustness checks using different measures of government bond yields. Specifically, we obtain series of 3-month treasury bill rates and 10-year government bond rates based on the Nelson and Siegel (1987) model in lieu of repo rates and two-year government bond yields, respectively. The data set for robustness checks spans the period from 2005 to 2014.

The slope of the yield curve is calculated as the difference between 10- year bond rates and 3-month bill rate. The results are qualitatively and quantitatively similar to Table 3.2 indicating that interest rates and the yield curve have significant impact on banks' NIM in both the short run (negative effect) and the long run (positive effect).

When we incorporate nonlinearities into our benchmark model, we find that the impact on profitability declines with the level of repo rates (i.e., $RepoSq$ is statistically significant). However, we don't see any significant relationship between the square of yield curve slope and profitability (See Table A.2). The results indicate that there are significant nonlinearities associated with short rates but not with the yield curve. Also our findings suggest that the impact of short rates when they are low is large. It is also important to note that marginal effects of repo rates on profitability in the presence of nonlinearities turn out to be similar to those in the benchmark model (1). Hence, introducing nonlinearities do not change our main conclusions significantly in both qualitative and quantitative terms.

Now that we show term structure of interest rates have significant impact on banks' NIMs, we can discuss how short term and slope rates affect net operating profitability. We know that banks hedge against interest rate risk through trading activities. We would not observe any interest rate effect on final profitability if hedging were complete. Thus, it would be important to examine banks' trading book to see this effect. However, data for trading book are not publicly available for the Turkish banking industry. Nonetheless, it would still be useful to analyze the net effects of short rate and slope on final profitability (i.e., ROA). Table 3.3 presents estimation results when ROA is used as the dependent variable. We find that short rates and slope of the yield curve have significant impact on profitability similar to NIM results. Moreover, our results suggest that hedging through trading is not complete in the Turkish banking industry. Concerning nonlinearities the results suggest that there are significant nonlinearities associated with short rates but not with the yield curve as in the case of NIM results. Besides, marginal effects of repo rates on profitability in the presence of nonlinearities turn out to be similar to those in the benchmark model.

We also run the dynamic model for ROE. However, since ROE is less persistent than NIM and ROA, we consider a more parsimonious model. Estimation results in Table

4 show that short term interest rate and slope still significantly and positively contribute to profitability. However, we don't find any significant nonlinearities in both repo rate and slope of the yield curve. Relative to the NIM and ROA results, the lagged value of leverage rate has more impact on ROE in the Turkish banking industry. As banks accumulate more debt, higher leverage allows them to make more profit. As we did for NIM, in order to do robustness check we also try different short and long-term interest rates based on Nelson and Siegel (1987) model. The results indicate that short term interest rate and the slope of the yield curve have still significant impact on ROA and ROE in both short and long run, which supports our main findings.

Overall, the estimation results suggest that short term rates and the slope of the yield curve have significant impact on NIM in both the short run and long run. This association is negative in the short run and positive in the long run meaning that Turkish banks' interest income has downward pressure in the short run in response to rise in term structure of interest rates. First, higher short term rates and steeper yield curve increase the cost of borrowing for banks in the short run which create additional loss on the interest income since banks typically borrow short and lend long. Second, this short run association might also be related to bank price setting behavior. In the short run, banks can't easily change their interest rates due to price stickiness. However, in the long run banks overcome repricing frictions and adjust their interest rates.

Table 3.3 : Estimation Results: Return on Assets (ROA).

ROA	Coefficient	Conf. Interval	P-value
<i>LROA</i>	0.3700***	(0.1072; 0.6328)	0.0060
<i>LLeverage</i>	0.0209	(-0.0078; 0.0498)	0.1540
<i>LAssetgrowth</i>	0.0021	(-0.0015; 0.0057)	0.2600
<i>Gdpgrowth</i>	-0.0056	(-0.0127; 0.0016)	0.1250
<i>LGdpgrowth</i>	-0.0087***	(-0.0129; -0.0045)	0.0000
<i>Repo</i>	0.0044	(-0.0079; 0.0168)	0.4850
<i>DRepo</i>	-0.0802***	(-0.1339; -0.0266)	0.0030
<i>Slope</i>	0.0339**	(0.0010; 0.0667)	0.0430
<i>DSlope</i>	-0.0347*	(-0.0715; 0.0022)	0.0650
<i>HHI</i>	-0.0160	(-0.1283; 0.0964)	0.7800
Rank LM	16.747*		0.0528
Cragg-Donald	29.77**		
Hansen	4.59		0.7999
F	7.41***		0.0000
F_{μ}	2.38***		0.0002
LM_{HET}	74543.47***		0.0000
F_{AC}	4.88**		0.0371

Notes: ***, ** and * denote significance at 1%, 5% and 10%, respectively. Column 3 refers to 95% confidence interval. Variables: ROA (Return on Asset), *LROA* (the lag of ROA), *LLeverage* (the lag of Leverage rate), *LAssetgrowth* (the lag of growth rate of deflated total assets), *Gdpgrowth* (Real GDP Growth), *Repo* (Quarterly average of weekly interest rate), *DRepo* (the first difference of the Repo rate), *Slope* (the slope of the yield curve), *DSlope* (the first difference of Slope), *HHI* (Herfindahl Hirschman Index). Rank LM test, Cragg-Donald and Hansen statistics test for the validity of instruments. F statistic tests for overall significance of the model. F_{μ} statistic tests for absence of individual effects. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation.

We infer that ROA has the same dynamic relationship with NIM with respect to higher interest rates. Interpreting the association between ROA and interest rates is more complex compared to NIM because ROA includes not only interest income but also non-interest income (fees), trading income (hedging activities: securities, derivatives, foreign exchange contracts) and operational cost factors. Given the fact that major income source of banks is interest income, we normally expect that interest income dominates general profitability of the Turkish banking industry. However, since we

don't have access to trading books of the Turkish banks, we don't know how trading income of Turkish banking industry reacts to interest rate changes. Alessandri and Nelson (2015) find that trading income and NIM work in opposite directions when there exists a monetary policy shock through interest rates. Therefore, during the period of decline in interest rates as a result of which banks' profits fall in the long run, banks try to utilize another income channel such as trading activities to compensate this loss. Indeed, when we look at the data, we observe that during the full sample period (2002 to 2014) in which Turkey experienced a substantial decline in interest rates level (from 55% to 9%), net interest margin decreased by 30%, but ROA fell by 16% which is less than NIM implying that banks created non-interest income via trading income or hedging activities. On the contrary, during the 2008 financial crisis (2007Q1 to 2009Q2), NIM increased by 11% (interest rate effect) while ROA remained stable, which demonstrates the different impacts of short term rate and slope on non-interest and interest income of banks.

Table 3.4 : Estimation Results: Return on Equity (ROE).

ROE	Coefficient	Conf. Interval	P-value
<i>LROE</i>	0.1903	(-0.1113; 0.4919)	0.2160
<i>LLeverage</i>	0.1089**	(0.0238; 0.1941)	0.0120
<i>LAssetgrowth</i>	0.0048	(-0.0157; 0.0254)	0.6470
Repo	0.1073***	(0.0546; 0.1598)	0.0000
Slope	0.1604***	(0.0570; 0.2637)	0.0020
HHI	-0.1893	(-0.9170; 0.5384)	0.6100
Rank LM	9.689**		0.0214
Cragg-Donald	21.696**		
Hansen	0.089		0.9565
F	4.16***		0.0004
F_{μ}	5.19***		0.0000
LM_{HET}	9611.56***		0.0000
F_{AC}	1.775		0.1953

Notes: ***, ** and * denote significance at 1%, 5% and 10%, respectively. Column 3 refers to 95% confidence interval. Variables: ROE (Return on Equity), *LROE* (the lag of ROE), *LLeverage* (the lag of Leverage rate), *LAssetgrowth* (the lag of growth rate of deflated total assets), Repo (Quarterly average of weekly interest rate), Slope (the slope of the yield curve), HHI (Herfindahl Hirschman Index). Rank LM test, Cragg-Donald and Hansen statistics test for the validity of instruments. F statistic tests for overall significance of the model. F_{μ} statistic tests for absence of individual effects. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation.

In all cases above using NIM, ROA and ROE as dependent variables, the slope of the yield curve appears to have higher impact on profitability in the long run compared to quarterly average of the weekly interest rates (repo rate-short term).¹² A steeper slope of the yield curve increases the average level of interest rates for a given short term interest rate. The endowment effect on bank profitability is expected to be more prevalent through the slope factor than through the short term rate given the characteristics (high inflation and limited competition) of the Turkish banking industry (Aydemir, 2013). The estimation results also suggest that bank profits in an emerging economy such as Turkey are more sensitive to the short term rates and slope of the yield curve (term structure of interest rates) compared to the ones in advanced economies such as UK. This might be because UK banks have higher capacity of generating trading income and conducting hedging which might reduce the net effects of interest rates on profitability. It might also be due to the endowment effect which is a big source of profits at high inflation rates and when competitive conduct in the banking industry is limited. Thus, we argue that policy makers in Turkey should be more cautious when they set interest rates that have significant impacts on bank profits and capital as well as financial system resilience. Another implication of our results is that banks in Turkey should raise their trading income capacity and hedging against the interest rate pressure to sustain targeted levels of profitability.

3.6 Conclusion

Applying fixed effect GMM estimation technique, we examine how interest rates and the yield curve affect bank profitability in an emerging economy using an unbalanced panel data for the period 2002Q4-2014Q3.

We employ three different dependent variables: net interest margin, return on assets and return on equity to see the possible short run and long run impacts of the short

¹² We know that the slope of the yield curve might change during a crisis period. We introduce a crisis dummy (it is equal to 1 when $gdp_{growth} < 0$) to control for this factor. We also incorporate its interaction with the slope variable. In models using ROA and ROE as dependent variables, both the crisis dummy and its interaction term turn out to be insignificant. However, in the case of NIM we find the coefficient of the dummy variable as significant, but the interaction term not significant. The estimation results concerning the other explanatory variables with and without the dummy variable and its interaction term are almost the same in terms of statistical significance, signs and magnitude (See Table A.3 -A.8 in the Appendice Part).

term interest rate and slope of the yield curve. Estimation results suggest that while short term interest rate and slope of the yield curve have negative and significant impact on bank profits in the short-run, the effects of these variables turn out to be positive in the long run as expected. We try various measures of short term rates and the slope of the yield curve and various specifications for robustness check and we find that the results are very robust. Hence, overall our findings indicate that monetary policy significantly influences bank profits as well as bank capital in Turkey.

Regarding the short term rate and slope of the yield curve, our findings suggest that levels of both short rates (repo rate) and slope of the yield curve have significant impact on NIM. Keeping all else constant, a 100 basis points increase in the yield curve slope would raise NIM by around 2.9 percentage points and a 100 basis points rise in repo rate would increase NIM by around 0.69 percentage points per quarter. These results imply that, banks would have 51 % more income relative to sample mean as a result of a 100 basis points increase in repo rate. Similarly, banks' income would increase by 222 % relative to sample mean when the yield curve slope rises by a 100 basis points. These outcomes are economically significant.

Banks typically borrow short and lend long. An increase in short-term interest rates or a fall in long-term rates flattens the slope of the yield curve indicating a future slowdown in the economy. Slower macroeconomic conditions cause a reduction in credit demand and supply which in turn lowers bank's NIM, hence profitability. In contrast, a steeper yield curve suggests a future boom in the economy. Therefore, bank's NIM will be positively affected by a steeper yield curve as credit supply and demand will increase during booms.

The result that in all specifications the slope of the yield curve has higher impact on profitability than short-term interest rate is consistent with the theoretical and empirical findings in the literature. More importantly, our results also indicate that bank profits in an emerging economy (i.e., Turkey) are more sensitive to the slope of the yield curve compared to the ones in an advanced economy (i.e., UK). This might result from the fact that UK banking sector can generate more trading income and engage more in hedging activities, which might potentially reduce the net effects of term structure of the interest rates on final profitability. Thus, we argue that policy

makers in Turkey should be more cautious when they set interest rates that have significant impacts on bank profits and capital as well as financial system resilience. The results also suggest that banks in Turkey should increase their capacity for trading income and hedging against interest rates shocks so that they can smooth out their cash flows. As a future study, it would be interesting to conduct a cross-country analysis of the effects of interest rates and the yield curve on bank profits in the emerging markets. The results may provide important broader insights on the potential link between monetary policy and bank profits in emerging markets context.

4. HOW DO CAPITAL INFLOWS AFFECT BANK PROFITABILITY IN TURKEY?

4.1 Introduction

The 1990s have witnessed a huge capital inflows from developed regions to emerging market economies in which Latin America, parts of Asia and some Middle Eastern countries have been the center for those capital inflows whose impacts have been mostly observed on current account deficits, monetary expansion, stock market bubbles, exchange rate fluctuations. (Calvo et. al., 1996).

As an emerging economy Turkey started to receive first high amount of capital inflows in the late 1980s after converting its economy into fully liberalized market environment in 1980 (Agenor et. al, 1997). Some important structural economic reforms such as free capital movements, convertibility of the domestic currency, liberalization of loan, deposit rates and foreign exchange regime were implemented during the mid of 1980s and Turkey became a part of global financial system.

Integrated into global financial system has its own advantages as well as risks. As a consequence of liberalized market reforms, the Turkish financial industry and banking service management developed rapidly. The share of the public banks in the sector prominently decreased with the new entrance of the private and foreign banks. Nonetheless, Turkey experienced several crises resulting from domestic and global events. 1991 Gulf War, 1994 Mexico currency crisis, 1997 devaluation, 1997 Far East Financial Crisis, 1998 Russian Crisis, 2000-2001 banking liquidity, FX crises and devaluation (Mercan and others, 2003). These mixture of domestic and global crises negatively affected Turkish financial and banking industry and then some supervisory and regulatory adjustments have been implemented by government and monetary authorities to restructure the banking and financial systems.

Given that capital inflow is predominately intermediated by banking system, the commercial banking industry has an important transmission channel between domestic financial system and international capital flows. Therefore, capital inflows to developing economies are also known to have significant impact on the vulnerability of the financial systems as well as domestic banking industries that is directly related with liquidity boost and domestic credit boom.

Turkey has been a significant hub for capital inflows and the weight of the capital inflows in the Turkish economy has increased between 2002 and 2014. For instance, in 2003, the average of the net total financial inflow to real GDP ratio was 0,02 whereas this ratio was 0,17 for the first three quarters of 2014.

Although the weight of the financial inflows in Turkish economy has risen since 2002, the volatility of this flow has also hiked. This higher volatility increased concerns related to capital inflows and had a detrimental impact on the stability of financial systems in general and banking industries in particular.

Hence, in this context, we examine how banking industry capital inflows (cross-border liabilities) affect the performance of Turkish banks since 2003. Comprehending the impacts of capital inflows on banking profitability is important in the sense that if capital inflow have systematic effect on banking profitability, then the volatile, short-run or sudden stop capital inflow may have potential to create a banking crises that increases the financial fragility. To our knowledge, in literature there exists no study focusing on the association between cross-border banking credit inflow and bank profitability.

Specifically, we analyze the effects of banking industry credit inflow on various performance measures of banks such as net interest margin (NIM), return on asset (ROA) and return on equity (ROE). Comparing the impacts of the credit inflow among NIM, ROA and ROE is crucial in the sense that it enables us to observe the dynamics of the banking industry behaviors. For instance, NIM only gives idea about interest income and expenses while ROA has non interest revenue such as fee, trading income, securities and operational costs.

To understand the impact of the volatile financial inflows, it would be better to decompose these inflows. Net financial inflow consists of 4 different volume: foreign direct investments, portfolios, reserves and other investment (banking deposits and credits). In total or separately, these various volumes of the financial inflows might have different effects on banking profitability measures that provide interesting and useful results. In this study, we firstly use the general banking industry credit inflow (cross-border banking liability) data and then distinguish between long and short term credit inflows to have much better comprehension about banking profitability.

Our estimation results show that banking industry capital inflows (cross-border liabilities) are positively associated with bank profitability. Specifically, we find that the credit inflows have significant and positive impact on return on assets (ROA) and return on equity (ROE) while the impact on net interest margin (NIM) is statistically insignificant in the short-run. The long-term cross-border credit inflows play a more important role than the short-term inflows in explaining profitability in all specifications including NIM. Moreover, our findings are more notable in private banks compared to the whole sample. Based on our findings, it can be asserted that monetary authorities of the emerging economies should push the banks to access the long-term credit (cross-border liabilities with long-term maturity) instead of short-term. Also, the introduction of new reserve requirement ratios for banking industry non-deposit FX liabilities by Central Bank of Turkey not only reduce banking liquidity risk (CBRT, 2015) but also increase the banking profitability.

The chapter is composed of subsequent sections: Section 2 discusses the existing literature on capital inflows and banking. Section 3 shows the model and data. Section 4 presents the econometric methodology. Section 5 interprets the empirical results and Section 6 concludes the chapter.

4.2 Literature Review

There exists an extensive literature studying the impacts of capital inflows on financial stability in general and banking industry in particular. These studies emphasize the relationship between capital inflows and banking crisis paying special attentions to

lending booms, currency crisis or mismatches, current account deficits and intrinsic characteristics of the banking industry and financial liberalization (Caballero, 2014).

In their classical and important study, Calvo and others (1994) briefly examine the capital inflows related problems and emphasize the internal and external factors that drive the capital inflows. While the decrease in international interest rate and rest of the world recession are seen as an external factors, domestic policies such as price stabilization program pushed by fiscal, macroeconomic improvements, institutional reforms and credibility are among the internal factors which directly influence capital inflows. They concludes that mixed domestic policies with higher credibility would transform capital inflows into FDI and reduce the country's risk.

Reinhart and Calvo (2000) examine the various policies that emerging market economies implement to reduce the damage of the sudden stop in capital flows. They show that emerging market economies have more severe sudden stop problems. In their study dollarization and capital control are two main policies that might reduce the negative impacts of sudden stop in capital inflows.

There is also a big discussion in the literature whether lending boom and banking crisis is associated with financial liberalization and capital inflows. Mishkin (2009) thinks that financial liberalisation fosters lending boom that is raised by capital inflows. Reinhart and Rogoff (2009) also add that surge in capital inflows encourages the banking crisis. In contrast to these views, Mendoza and Terrones (2008) show that most lending booms are associated with surge in capital flows but not with financial liberalization. Broner and others (2013) also show that during crisis period there appears a high reduction in every type of gross capital flows (direct investments, portfolio, credit).

Based on empirical evidence about the determinants of cross-border bank flows to emerging economies, Hermann and Mihaljek (2010) find that international risk perception and domestic factors significantly affect the foreign borrowing of domestic banks. They show that an increase in global risk-aversion and financial volatility are the two main determinants which reduce the cross-border banking borrowing/lending. Also, they conclude that emerging countries or regions like Eastern Europe, having

sound financial and banking systems, are less affected by cross-border loans volatilities compared to developing Latin American or Asian countries.

In his capital inflows, maturity mismatches and banking profitability panel study with emerging economies, Aysun (2012) shows that banking industry maturity mismatches rise during high capital inflows. In his model, Aysun (2012) adds that banks are less profitable during crisis periods if they have higher maturity mismatches. Maturity mismatch analysis provides an important ground to notice banking industry balance sheet behaviors in response to changes in capital inflows. Banks may diversify their short and long-term liabilities and assets to gain extra profits when there appears higher capital inflows.

Covering over one hundred countries between 1978-2008, Caballero (2014) finds that surges in net capital flows are associated with systemic banking crises, even in the absence of a credit boom. Caballero (2014) adds that portfolio flows are the ones associated with the highest rise in the likelihood of a crisis compared to FDI and debt flows. This comparison is crucial in order to understand which component of the capital inflows is mostly affecting the banking indicators.

By investigating the relation between global liquidity and cross border banking capital flows, Bruno and Shin (2014) show that banking sector leverage is associated with local currency appreciation through banking sector capital flows which functions like a bridge between exchange rate and financial stability.

In the literature, the relationship between capital inflows and banking industry is mostly analysed over lending boom. The surge in capital inflows transform the commercial banks into large and cheaper credit providers. With banking industry's risk taking and other domestic and international macroeconomic developments, this lending boom may result in banking and financial market distress.

Regarding the Turkish economy and capital flows, most of the studies also emphasize the link between capital flows, lending and current account deficit risk (Yenturk, 1999; Alper, 2013). Aysan et. al, (2014) evaluate the new policy tools of the CBRT, interest rate corridor and ROM, that started to be implemented in 2010. These tools were

effective to minimize the negative effects of the volatile and short-run capital inflows and support financial stability. Additionally, in the Turkish case, there are some other studies that focus on macroprudential policies that aim to prevent the negative effects of volatile capital inflows (Akcelik and others (2013); Alper (2013)).

4.3 The Model and Data

We use panel data obtained from the CBRT, TBA and TURKSTAT on a quarterly basis between 2003 and 2014. This time period was chosen since Turkish economy had experienced a huge transformation in banking sector regulation after 2001 economic and financial crisis in which accounting standards updated. Therefore the data about banking balance-sheet covering this period is more reliable compared to before. (Aydin and Igan (2012); Ozsuca and Akbostanci, 2015).

We use quarterly data about 24 banks operating in Turkey including public, private and foreign to cover the Turkish commercial banking industry activities. Three commercial banks are state owned and the rest of them are privately owned commercial banks. Twelve of the private commercial banks in Turkey are owned by foreigners.

Based on balance-sheet information published quarterly, we gather the details of the assets and liabilities data for each bank, then we calculate net interest margin (NIM), return on equity (ROE), return on asset (ROA), leverage rate, growth rate of real total assets (For summary statistics, see the Table A.13 in the Appendix).

To capture the quarterly capital inflows, we use total net credit under financial inflows and the decomposition of this credit inflow: long and short term inflows to total banking assets ratio.

The model below shows our model specification.

$$1) \quad y_{it} = \alpha y_{i,t-1} + \beta' X_{it} + \gamma' M_t + \varepsilon_{it}; \quad \varepsilon_{it} = \eta_i + v_{it}$$

In the model, y_{it} refers to dependent variable and $y_{i,t-1}$ is lagged value of the dependent variable. X_{it} is the bank-specific variables matrix and M_t is the financial inflows variables matrix. η_i is a bank individual effect, and v_{it} refers to an idiosyncratic disturbance.

Although our main focus is to see the effects of total credit inflows and types of credit inflows on banking profitability, we can observe the impacts of bank-specific and macroeconomic variables with dynamic panel data in which the lag of dependent variable is used. Using the lag of dependent variable into dynamic model enables us to discover significant relationship by using appropriate instrumental variables and technique.

In our model specification, firstly we use net interest margin NIM ((interest income-interest expense)/total assets as a dependent variable. We include *Leverage* (debt (liabilities-equity) to total asset ratio) and *Assetgrowth* (growth rate of real total assets by obtaining net rise or fall of the total assets compared to previous period total assets) into bank-specific variables matrix. These two bank-specific variables might enable us to discover the possible effects of the balance sheet structure on banking performances. Under macroeconomic variable matrices, we use credit inflow types to total assets ratios separately.

Additionally, we calculate Herfindahl-Hirschman Index to measure the impact of competitiveness among banking industry under macroeconomic variables matrix (Bikker and Haaf, 2002). As instrumental variables, we use liquidity ratio by calculating liquid assets to debt ratio and capital adequacy ratio.

We apply the same procedure for return on assets and return on equity as dependent variables to compare the results with *NIM*. It is possible for banks to have higher non-interest income than interest income that might reduce or cancel out the net effect of the financial inflows on net profitability through trading income and hedging. Therefore, this comparison is crucial in terms of realizing the net effect of financial inflows on net banking profitability apart from net interest margin (NIM).

Normally, we expect a positive relationship between growth rate of total assets and bank profitability since main source of the loans that banks lend is assets. The expected effect of the leverage rate on profitability is negative. The leverage rate may increase due to two reasons: the debt may rise or total assets may fall. Therefore, increase in debt limits bank's opportunity to lend money and therefore profitability. But, this association might change based on which variable used as a dependent one since higher leverage rate means that lower equity or asset which may have different impact on *ROA* and *ROE*.

The expected impact of the total credit inflows on banking profitability is positive since in the literature there exists close positive relationship between capital inflows and lending. Therefore, we expect that banking profitability increases through lending channels. However, the different types of credit inflows such as long-term or short-term might have different impacts on net banking profitability measures and this may create an ambiguity between inflows and banking performances.

4.4 Empirical Methodology

To estimate the dynamic panel data model with fixed effects specified as equation (1), we use a quarterly data set of a balanced panel of Turkish commercial banks for the period 2003Q1 –2014Q3. The composite error term in a dynamic panel data model such as (1), is associated with the lagged dependent variable even if the error term is not serially correlated (Baltagi, 2008). The individual effects of the model are removed by the within transformation and this technique produces inconsistent estimates since the correlation still exists. As time dimension goes to infinity, within transformation estimator produce consistent estimation for the coefficients related with lagged dependent variable and independent variables. In literature, the dynamic panel GMM estimator by Arellano and Bond (1991) have been mostly used to estimate this kind of model. But when the number of moment conditions is large and the instruments are weak, dynamic panel GMM would produce obvious biased estimates (Baltagi, 2008). When time dimension gets larger, compared to dynamic panel GMM within transformation estimator is consistent.

Endogeneity problem in independent variables is the another significant assumption that within estimator requires. Therefore, Davidson-MacKinnon exogeneity test is conducted and it is found that there is no any endogeneity problem except the lagged dependent variable (Davidson and MacKinnon, 1993). Additionally, we carry heteroscedasticity (Greene, 2008) and autocorrelation (Wooldridge, 2010) tests. The result of these two tests can be seen at the bottom of table results of model.

Since endogeneity of the independent variables with non-spherical errors makes the within estimator to be inconsistent and inefficient, we use the GMM fixed effect estimator to consider these issues. Fixed effects GMM method is different than system (Blundell and Bond (1998)) and two-step difference GMM (Arellano and Bond (1991)) methods in two manners. First of all, it takes care of heteroscedasticity and autocorrelation and therefore would produce more efficient estimates (Schaffer, 2015). Secondly, the number of IVs does not vary with time periods (it does not use dynamic IV). Therefore, when T becomes larger, the weak IVs problem stated above can be eliminated.

In this study, we employ the lagged values of the lagged dependent variable and the current and lagged values of the explanatory variables as instruments. The validity of instruments employed in the model is checked by three tests: Kleibergen and Paap rank LM test (2006), Cragg-Donald F test (1993) and Hansen J statistic (1982). Kleibergen and Paap rank LM and Cragg-Donald F tests check whether instruments are associated with IVs while Hansen J statistic tests whether IVs are related with errors. When testing the validity of instruments, the non-spherical features of errors are allowed since these tests are robust to non-spherical disturbances. The result of these three tests can be seen at the bottom of table results of model. Kleibergen and Paap rank LM and Cragg-Donald F tests results show that the IVs are not serially correlated with lagged value of dependent variable. Therefore, IVs used in these models seem to have valid features. Additionally, time series properties of the variables used in this study are tested. HHI variable has only unit root problem and hence we only employ first difference of HHI and use the level of all other variables to estimate the model.

4.5 Estimation Results

In this part, based on our econometric model results, the impacts of the financial inflows on Turkish banking profitability and the details of these impacts will be interpreted. We present the estimation results in Table A.14 and Table A.15 in the Appendix . Since our main focus is to see the effects of credit inflows on banking profitability, other significant explanatory variables that are bank-specific will be mentioned briefly. As seen from Table A.14, the lag of the dependent variable, *lnim*, contributes positively to net interest margin as expected. One unit increase in *lnim* would raise net interest margin by 0,80 unit. The lag of *ROE* also significantly affects the *ROE* as well as there exists high association between the *ROA* and its lag variable. Based on our estimation results, net interest margin is being more affected by its previous value not only in terms of significance level but also the magnitude of the coefficient that *lnim* has. It can be inferred that interest incomes and interest expenses of the banking industry has more lag dependency compared to general profitability.

We don't find any significant relationships between bank-specific variables and *ROA* and *ROE* in all specifications under 10% significance level. However, leverage rate and growth rate of total assets significantly and negatively affect the *NIM* which means that the banking industry can not increase their interest income to the same degree that total assets grow. Note that, growth rate of total asset positively influences the *ROA* and *ROE* but it is statistically significant under % 15 level.

Regarding the banking industry credit inflows types, Table A.15 shows the details of the estimation results. The lag value of the total banking-industry cross-border credit inflow to total asset ratio has significant and positive impact on both *ROA* and *ROE* while insignificant impact on *NIM*. For instance, one unit rise in *credit inflow* is associated with 0.25 unit increase in *ROE* under 5% significant level. When we decompose the total banking-industry cross-border credit inflows into two category: *long and short-term*, the relationship between inflows and banking profitability measures become more severe.

The long-term banking industry credit inflow positively and significantly affect the all three banking profitability measures while there is no any significant relationship

between *short-term inflow* and *NIM*, *ROA* and *ROE*. For instance, one unit increase in *long-term credit inflow* has significant and positive influence on *ROE* by 0,42 unit, on *ROA* by 0.098 unit and on *NIM* by 0.031 unit. *ROE* is more affected by the *long-term credit inflow* compared to *ROA* and *NIM*. *ROA* has been influenced by *long-term credit inflow* about 3 times more than *NIM*. These associations show that *long-term credit inflow* enlarges the banking industry interest and non-interest income capacity. Also, this result indicates that *ROE* is more sensitive to the inflows.

Credit inflow creates a pressure on banking profitability through the expenses since banks pay interest expenses for their foreign borrowing and this dominates the general profitability and interest income in the short-run. However, this foreign credit borrowing can be transformed into interest and non-interest income through domestic lending or trading transactions in the long-run. That is why, it is observed positive and significant association between *long-term inflow* and *NIM*, *ROA* and *ROE*.

Additionally, we observe higher positive relationship between private banking profitability measures and credit inflows compared to whole sample since public banks are less dependent on the foreign financial sources and on average public banks have higher deposit than private banks that decrease their tendency towards foreign borrowing.

The impacts of the financial flows on banking profitability might change during the negative economic growth periods. Therefore, we introduce a GDP growth rate dummy (1 whenever quarterly GDP growth rate is negative; 0 otherwise) to control the effect of economic cycles on profitability measures and find that this GDP dummy has no significant impact in all dependent variables. Also, we generate an interaction term by multiplying the dummy with the credit inflows to observe the impact of the inflow on the inflow coefficient during the negative growth period and do not find any significant association.

Since credit inflows are form of liquid assets, profit motivation of the banking especially private banking industry dominates the negative effect of the credit inflows and transform the inflows into income-generated transactions. For instance, in our

sample we observe higher correlation between liquid assets and *long-term credit inflows* compared to *short-term inflows*.

Banking industry should borrow long-term credit to have higher profitability. Long-term inflows is also desirable for the financial system's well being in which short-term inflows can damage the banking debt to asset ratio. Based on our results, it can be inferred that banks prefer to have long-term borrowing that affects all performances positively. So why they have short-term borrowing?

Banks may have to borrow short from the abroad when they are not able to borrow long. For instance, during the 2008 financial crises period, long-term credit inflow to asset ratio decreased while the short-term inflow increased dramatically. Therefore, borrowing structure is directly related with the global and domestic macroeconomic, financial conditions and risks. As seen in our results, even banks have short-term borrowing from abroad, they are able to generate non-interest income.

Based on our findings, it can be asserted that monetary authorities of the emerging economies should push the banks to access the long-term credit (cross-border liabilities with long-term maturity) instead of short-term. Also, the introduction of new reserve requirement ratios for banking industry non-deposit FX liabilities by Central Bank of Turkey not only reduce banking liquidity risk (CBRT, 2015) but also increase the banking profitability.

4.6 Conclusion

We examine how the cross-border banking capital inflows affect banking profitability in Turkish economy using a balanced panel data for the period 2003Q1-2014Q3 by applying the fixed effect GMM technique. We employ three different dependent variables: net interest margin, return on assets and return on equity to see the possible impacts of these cross-border financial inflows.

In general, overall outlook of Turkish banking industry performance seems that it is positively influenced by cross-border credit inflows. The types of credit inflows appear to have different impacts on profitability. Our estimation results show that long-term

banking industry credit inflow generates more non-interest income compared to interest income while the short-term credit inflows have no significant effect on general profitability. Additionally, long-term credit inflow has more impact on ROE than on ROA and NIM.

Moreover, we try various measures to control economic fluctuations and find that negative economic growth dummy and interaction term have no extra significant effect in all dependent variables. As a future study, it would be interesting to conduct a cross-country analysis of the effects of cross border banking inflows on bank profits in the emerging markets. Also, combining this study with interest rate and banking lending enable us to have wider comprehension about the link between monetary policy and bank profits in emerging markets context.

5. CONCLUSION

This dissertation is a collection of three chapters about the monetary policy and banking in the Turkish economy. In the first chapter, the developments of the Turkish banking industry in the light of financial flows, paying special attention to cross border banking liability, is examined. Domestic deposit growth has followed a strong path in Turkish economy resulting from financial deepening and general income growth since 2002. Likewise, Turkish economy's credit growth has also pursued an increasing trend during the same time period. But Turkish banking sector's loan to deposit ratio exceeded the critical level of one in 2011 which increased the reliance of Turkish banking sector on cross border liability during the last 5 years. This higher reliance might have risen some potential banking risks related to maturity mismatch, currency mismatch, liquidity, short/long-term FX liability, interest and exchange rate. In responses to volatile capital flows and higher access to non-core liability (banking foreign loan inflow), the Central Bank of Turkey started to implement new policy tools such as interest rate corridor, reserve option mechanism and changed its reserve requirement rate for non-deposit FX liability to deal with potential risks that Turkish economy and banking sector might confront. As a consequence of macroprudential policies, Turkish banking sector foreign borrowing does not create any short-term risk in terms of non-deposit FX liability. However, that Turkish banking sector's loan to deposit rate exceeds the 100% would be still problem.

In the second chapter, based on empirical specification, we investigate how short term interest rate and slope of the yield curve affect bank profitability in Turkey from 2002Q4 to 2014Q3. We employ three different dependent variables: net interest margin, return on assets and return on equity to see the possible short run and long run impacts of the short term interest rate and slope of the yield curve. Estimation results suggest that while short term interest rate and slope of the yield curve have negative and significant impact on bank profits in the short-run, the effects of these variables turn out to be positive in the long run as expected. We try various measures of short term rates and the slope of the yield curve and various specifications for robustness

check and we find that the results are very robust. Hence, overall our findings indicate that monetary policy significantly influences bank profits as well as bank capital in Turkey.

The result that in all specifications the slope of the yield curve has higher impact on profitability than short-term interest rate is consistent with the theoretical and empirical findings in the literature. More importantly, our results also indicate that bank profits in an emerging economy (i.e., Turkey) are more sensitive to the slope of the yield curve compared to the ones in an advanced economy (i.e., UK). This might result from the fact that UK banking sector can generate more trading income and engage more in hedging activities, which might potentially reduce the net effects of term structure of the interest rates on final profitability. Thus, we argue that policy makers in Turkey should be more cautious when they set interest rates that have significant impacts on bank profits and capital as well as financial system resilience. The results also suggest that banks in Turkey should increase their capacity for trading income and hedging against interest rates shocks so that they can smooth out their cash flows.

In the third chapter, we empirically examine how the banking industry financial inflows (cross-border liabilities) affect the performance of Turkish banks since 2003Q1. Overall outlook of Turkish banking industry performance seems that it is positively influenced by cross-border banking credit inflows (non-core liability). The types of credit inflows appear to have different impacts on profitability. Our estimation results show that long-term banking industry credit inflow generates more non-interest income compared to interest income while the short-term credit inflows have no significant effect on general profitability. Additionally, long-term credit inflow has more impact on ROE than on ROA and NIM.

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APPENDICES

APPENDIX A: Tables

APPENDIX B: Figures

APPENDIX A: Tables

Table A.1 : Correlation Matrix-I.

Correlations	LLeverage	LAssetgrowth	Gdpgrowth	LGdpgrowth
LLeverage	1			
LAssetgrowth	0.1735	1		
Gdpgrowth	-0.0061	0.0033	1	
LGdpgrowth	0.0119	0.0525	-0.2001	1
Repo	-0.0265	0.0385	0.2302	0.1392
DRepo	-0.0002	-0.0519	0.1801	-0.0698
LDRepo	0.0286	0.0035	-0.1258	0.158
Slope	0.0052	0.0807	-0.1855	0.0741
DSlope	0.0139	0.0262	-0.1069	0.0535
LDSlope	0.0006	0.014	-0.0419	-0.1901
HHI	-0.0504	0.0112	0.1199	0.1808

Table A.2 : Correlation Matrix-II.

Correlations	Repo	DRepo	LDRepo	Slope	DSlope	LDSlope	HHI
Repo	1						
DRepo	-0.13	1					
LDRepo	-0.44	0.3658	1				
Slope	-0.31	-0.133	-0.2865	1			
DSlope	-0.31	-0.421	-0.1289	0.526	1		
LDSlope	0.05	0.1499	-0.3604	0.023	-0.362	1	
HHI	0.88	-0.149	-0.4026	-0.19	-0.341	-0.038	1

Table A.3 :Estimation Results Net Interest Margin (NIM) Various Specifications-I.¹³

NIM	Static FE	Crisis Dummy	Crisis Dummy and Slope
LNIM		0.8061*** (0.0000)	0.8074*** (0.0000)
LLeverage	0.0007 (0.8910)	0.0188*** (0.0010)	0.0184*** (0.0010)
LAssetgrowth	-0.0091*** (0.0000)	0.0044* (0.0750)	0.0044* (0.0770)
Gdpgrowth	-0.0019 (0.3260)	0.0110** (0.0210)	0.0072 (0.1770)
LGdpgrowth	0.0006 (0.7710)	-0.0014 (0.3200)	-0.0006 (0.7260)
Repo	0.0220*** (0.0000)	0.0122*** (0.0020)	0.0114*** (0.0050)
DRepo	-0.0683*** (0.0000)	-0.0439*** (0.0000)	-0.0452*** (0.0000)
LDRepo	-0.0277* (0.0880)	-0.0086 (0.5150)	-0.0052 (0.6940)
Slope	0.0537** (0.0110)	0.0386*** (0.0050)	0.0225 (0.2040)
DSlope	-0.0621*** (0.0000)	-0.0558*** (0.000)	-0.0511*** (0.0000)
LDSlope	-0.0260 (0.1370)	-0.0145 (0.2010)	-0.0072 (0.5700)
HHI	0.0319 (0.4970)	-0.0295 (0.3910)	-0.0328 (0.3400)
CrisisDummy		0.0024*** (0.0040)	0.0016 (0.1140)
RepoSq			
SlopeSq			
SlopeCrisis			0.0175 (0.1070)
Rank LM		27.100***	26.703*** (Continued)
Cragg-Donald		136.543***	134.959***

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Notes: ***, ** and * denote significance at 1%, 5% and 10%, respectively. The numbers in parantheses show the P-values. Variables: NIM (Net Interest Margin), LNIM (the lag of NIM), LLeverage (the lag of Leverage rate), LAssetgrowth (the lag of growth rate of real total assets), Gdpgrowth (Real GDP Growth), LGdpgrowth (the lag of real GDP growth), Repo (Quarterly average of weekly interest rate), RepoSq (Repo Squared), DRepo (the first difference of the Repo rate), LDRepo (the lag of the first diffence of the Repo rate), Slope (the slope of the yield curve), SlopeSq (Slope Squared), DSlope (the first difference of Slope), LDSlope (the lag of the first difference of Slope), HHI (Herfindahl Hirschman Index), CrisisDummy (1 when gdpgrowth<0), SlopeCrisis (Interaction term: Slope*CrisisDummy). F statistic tests for overall significance of the model. F_u statistic tests for absence of individual effects. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation. Rank LM, Cragg-Donald, Hansen statistics are tests for the validity of instruments.

Hansen		8.401	8.296
F	12,79***	28.55***	27.02***
F _μ	10,85***	10.85***	10.87***
LM _{HET}	6673.65***	7098.92***	2.1e+35***
F _{AC}	45.534***	47.102***	47.457***

Table A.4 : Estimation Results Net Interest Margin (NIM) Various Specifications-II.¹⁴

NIM	Non-Linearity and Crisis Dummy	Non-Linearity, Crisis Dummy and Slope	
LNIM	0.8189*** (0.0000)	0.8220*** (0.0000)	
LLeverage	0.0187*** (0.0010)	0.0185*** (0.0010)	
LAssetgrowth	0.0045* (0.0780)	0.0045* (0.0780)	
Gdpgrowth	0.0092* (0.0590)	0.0037 (0.5220)	
LGdpgrowth	0.0005 (0.7660)	0.0021 (0.2930)	
Repo	0.0540*** (0.0080)	0.0497** (0.0150)	
DRepo	-0.0405*** (0.0000)	-0.0401*** (0.0000)	
LDRepo	-0.0056 (0.6710)	0.0001 (0.9960)	
Slope	0.0412*** (0.0080)	0.0240 (0.1730)	
DSlope	-0.0509*** (0.0000)	-0.0425*** (0.0000)	
LDSlope	-0.0072 (0.5620)	0.0026 (0.8570)	
HHI	-0.0423 (0.2270)	-0.0445 (0.2020)	
CrisisDummy	0.0021** (0.0120)	0.0009 (0.3890)	
RepoSq	-0.1724* (0.0530)	-0.1543* (0.0840)	
SlopeSq	-0.1406 (0.5360)	-0.3467 (0.2250)	
SlopeCrisis		0.0253* (0.0720)	
Rank LM	26.754***	26.703***	(Continued)

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Notes: ***, ** and * denote significance at 1%, 5% and 10%, respectively. The numbers in parantheses show the P-values. Variables: NIM (Net Interest Margin), LNIM (the lag of NIM), LLeverage (the lag of Leverage rate), LAssetgrowth (the lag of growth rate of real total assets), Gdpgrowth (Real GDP Growth), LGdpgrowth (the lag of real GDP growth), Repo (Quarterly average of weekly interest rate), RepoSq (Repo Squared), DRepo (the first difference of the Repo rate), LDRepo (the lag of the first diffence of the Repo rate), Slope (the slope of the yield curve), SlopeSq (Slope Squared), DSlope (the first difference of Slope), LDSlope (the lag of the first difference of Slope), HHI (Herfindahl Hirschman Index), CrisisDummy (1 when gdpgrowth<0), SlopeCrisis (Interaction term: Slope*CrisisDummy). F statistic tests for overall significance of the model. F_μ statistic tests for absence of individual effects. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation. Rank LM, Cragg-Donald, Hansen statistics are tests for the validity of instruments.

Cragg-Donald	135.494***	134.665***
Hansen	8.595	8.625
F	25.29***	24.11***
F_μ	10.86***	10.86***
LM_{HET}	4.6e+34***	6720.54***
F_{AC}	44.881***	48.185***

Table A.5 : Estimation Results: Return on Assets (ROA) – Various Specifications-I.

ROA	Static FE	Crisis Dummy	Crisis Dummy and Slope
<i>LROA</i>		0.3698*** (0.0060)	0.3766*** (0.0050)
<i>LLeverage</i>	0.0333*** (0.0000)	0.0209 (0.1550)	0.0220 (0.1360)
<i>LAssetgrowth</i>	-0.0005 (0.8550)	0.0021 (0.2540)	0.0021 (0.3010)
<i>Gdpgrowth</i>	-0.0064 (0.1380)	-0.0032 (0.7880)	-0.0005 (0.9620)
<i>LGdpgrowth</i>	-0.0068 (0.1320)	-0.0090*** (0.0010)	-0.0095*** (0.0000)
<i>Repo</i>	0.0128 (0.1590)	0.0048 (0.5100)	0.0043 (0.5740)
<i>DRepo</i>	-0.1308*** (0.0000)	-0.0803*** (0.0030)	-0.0790*** (0.0020)
<i>Slope</i>	0.0618* (0.0590)	0.0337** (0.0460)	0.0454* (0.0840)
<i>DSlope</i>	-0.0728** (0.0190)	-0.0344* (0.0710)	-0.0353* (0.0690)
<i>HHI</i>	-0.0795 (0.3380)	-0.0205 (0.7280)	-0.0245 (0.6820)
<i>CrisisDummy</i>		0.0004 (0.8140)	0.0012 (0.4580)
<i>RepoSq</i>			
<i>SlopeSq</i>			
<i>SlopeCrisis</i>			-0.0218 (0.4610)
Rank LM		16.820**	17.389**
Cragg-Donald		29.750**	29.883**
Hansen		4.553	4.590
F	4.76	6.75***	6.05***
F _μ	2.38	2.38***	2.38***
LM _{HET}	74543.47***	73047***	73906.69***
F _{AC}	4.875**	4.341**	4.239**

Notes: ***, ** and * denote significance at 1%, 5% and 10%, respectively. The numbers in parantheses show the P-values. Variables: ROA (Return on Asset), *LROA* (the lag of ROA), *LLeverage* (the lag of Leverage rate), *LAssetgrowth* (the lag of growth rate of real total assets), *Gdpgrowth* (Real GDP Growth), *Repo* (Quarterly average of weekly interest rate), *RepoSq* (Repo Squared), *DRepo* (the first difference of the Repo rate), *Slope* (the slope of the yield curve), *SlopeSq* (Slope Squared), *DSlope* (the first difference of Slope), *HHI* (Herfindahl Hirschman Index), *CrisisDummy* (1 when *gdpgrowth*<0), *SlopeCrisis* (Interaction term: *Slope***CrisisDummy*). F statistic tests for overall significance of the model. F_μ statistic tests for absence of individual effetcs. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation. Rank LM, Cragg-Donald, Hansen statistics are tests for the validity of instruments.

Table A.6 : Estimation Results: Return on Assets (ROA) – Various Specifications-II.

ROA	Non-Linearity and Crisis Dummy	Non-Linearity, Crisis Dummy and Slope
<i>LROA</i>	0.3736*** (0.0050)	0.3801*** (0.0040)
<i>LLeverage</i>	0.0222 (0.1350)	0.0229 (0.1210)
<i>LAssetgrowth</i>	0.0025 (0.1790)	0.0024 (0.2410)
<i>Gdpgrowth</i>	-0.0053 (0.6790)	-0.0020 (0.8600)
<i>LGdpgrowth</i>	-0.0058* (0.0830)	-0.0064** (0.0290)
<i>Repo</i>	0.0657** (0.0300)	0.0758** (0.0430)
<i>DRepo</i>	-0.0742*** (0.0010)	-0.0743*** (0.0010)
<i>Slope</i>	0.0656** (0.0380)	0.0730** (0.0430)
<i>DSlope</i>	-0.0312* (0.0660)	-0.0331* (0.0610)
<i>HHI</i>	-0.0199 (0.7290)	-0.0253 (0.6550)
<i>CrisisDummy</i>	0.0002 (0.9180)	0.0010 (0.5840)
<i>RepoSq</i>	-0.2280* (0.0650)	-0.2729* (0.0890)
<i>SlopeSq</i>	-0.8278 (0.1700)	-0.6619 (0.2990)
<i>SlopeCrisis</i>		-0.0200 (0.5700)
Rank LM	16.976**	18.314**
Cragg-Donald	29.436**	29.407**
Hansen	4.397	4.474
F	6.53***	5.83***
F _μ	2.39***	2.39***
LM _{HET}	5.10E+31***	5.00E+31***
F _{AC}	4.542**	4.645**

Notes: ***, ** and * denote significance at 1%, 5% and 10%, respectively. The numbers in parantheses show the P-values. Variables: ROA (Return on Asset), *LROA* (the lag of ROA), *LLeverage* (the lag of Leverage rate), *LAssetgrowth* (the lag of growth rate of real total assets), *Gdpgrowth* (Real GDP Growth), *Repo* (Quarterly average of weekly interest rate), *RepoSq* (Repo Squared), *DRepo* (the first difference of the Repo rate), *Slope* (the slope of the yield curve), *SlopeSq* (Slope Squared), *DSlope* (the first difference of Slope), *HHI* (Herfindahl Hirschman Index), *CrisisDummy* (1 when *gdpgrowth*<0), *SlopeCrisis* (Interaction term: *Slope***CrisisDummy*). F statistic tests for overall significance of the model. F_μ statistic tests for absence of individual effctcs. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation. Rank LM, Cragg-Donald, Hansen statistics are tests for the validity of instruments.

Table A.7 : Estimation Results: Return on Equity (ROE) – Various Specifications-I.

ROE	Static FE	Crisis Dummy	Crisis Dummy and Slope
LROE		0.1822 (0.2240)	0.1755 (0.2540)
LLeverage	0.1040*** (0.0010)	0.1066** (0.0120)	0.1079** (0.0120)
LAssetgrowth	0.0060 (0.5880)	0.0050 (0.6340)	0.0066 (0.5260)
Repo	0.1038*** (0.0000)	0.1082*** (0.0000)	0.1003*** (0.0020)
Slope	0.1379** (0.0440)	0.1609*** (0.0030)	0.1163 (0.1140)
HHI	-0.2299 (0.4940)	-0.1906 (0.6260)	-0.0888 (0.8410)
CrisisDummy		0.0019 (0.5990)	0.0018 (0.6350)
RepoSq			
SlopeSq			
SlopeCrisis			0.0995 (0.2400)
Rank LM		9.936**	9.794**
Cragg-Donald		21.815**	21.481**
Hansen		0.143	0.015
F	6.840	3.56***	4.240***
F _μ	5.190	5.19***	5.200***
LM _{HET}	9611.56	9629.05***	10050***
F _{AC}	1.775	1.748	1.591

Notes: ***, ** and * denote significance at 1%, 5% and 10%, respectively. The numbers in parantheses show the P-values. Variables: ROE (Return on Equity), LROE (the lag of ROE), LLeverage (the lag of Leverage rate), LAssetgrowth (the lag of growth rate of real total assets), Repo (Quarterly average of weekly interest rate), RepoSq (Repo Squared), Slope (the slope of the yield curve), SlopeSq (Slope Squared), HHI (Herfindahl Hirschman Index), CrisisDummy (1 when $gdp_{growth} < 0$), SlopeCrisis (Interaction term: Slope*CrisisDummy). F statistic tests for overall significance of the model. F_μ statistic tests for absence of individual effetcs. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation. Rank LM, Cragg-Donald, Hansen statistics are tests for the validity of instruments.

Table A.8 : Estimation Results: Return on Equity (ROE) – Various Specifications-II.

ROE	Non-Linearity and Crisis Dummy	Non-Linearity, Crisis Dummy and Slope
<i>LROE</i>	0.2071 (0.2530)	0.2002 (0.3320)
<i>LLeverage</i>	0.1123** (0.0160)	0.1117** (0.0190)
<i>LAssetgrowth</i>	0.0056 (0.6040)	0.0060 (0.5650)
<i>Repo</i>	0.0095 (0.8900)	0.0162 (0.8740)
<i>Slope</i>	0.1618*** (0.0020)	0.1454 (0.2800)
<i>HHI</i>	-0.0564 (0.8570)	-0.0390 (0.9190)
<i>CrisisDummy</i>	0.0042 (0.4190)	0.0039 (0.5740)
<i>RepoSq</i>	0.1685 (0.2820)	0.1524 (0.5280)
<i>SlopeSq</i>	0.0277 (0.9580)	-0.0032 (0.9950)
<i>SlopeCrisis</i>		0.0278 (0.8850)
Rank LM	6.818*	6.113*
Cragg-Donald	18.801**	17.779**
Hansen	0.192	0.186
F	4.630***	4.830***
F _μ	5.190***	5.190***
LM _{HET}	9387***	9751***
F _{AC}	2.224	2.667

Notes: ***, ** and * denote significance at 1%, 5% and 10%, respectively. The numbers in parantheses show the P-values. Variables: ROE (Return on Equity), *LROE* (the lag of ROE), *LLeverage* (the lag of Leverage rate), *LAssetgrowth* (the lag of growth rate of real total assets), *Repo* (Quarterly average of weekly interest rate), *RepoSq* (Repo Squared), *Slope* (the slope of the yield curve), *SlopeSq* (Slope Squared), *HHI* (Herfindahl Hirschman Index), *CrisisDummy* (1 when *gdpgrowth*<0), *SlopeCrisis* (Interaction term: *Slope***CrisisDummy*). F statistic tests for overall significance of the model. F_μ statistic tests for absence of individual effctcs. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation. Rank LM, Cragg-Donald, Hansen statistics are tests for the validity of instruments.

Robustness

The estimation results reported in Tables A.3.7, A.3.8 and A.3.9 below are obtained by using the yield curve data created by Nelson and Siegel (1987) model for the sample period 2005Q1-2014Q3.

Table A.9 : Estimation Results: Net Interest Margin (NIM) – Nelson & Siegel (1987).

NIM	Coefficient	Conf. Interval	P-value
LNIM	0.8467***	(0.5620, 1.1314)	0.0000
LLeverage	0.0124	(-0.0042, 0.0291)	0.1400
LAssetgrowth	-0.0013	(-0.0065, 0.0039)	0.6200
Gdpgrowth	-0.0003	(-0.0030, 0.0023)	0.7900
LGdpgrowth	0.0014	(-0.0013, 0.0041)	0.3100
Bill	0.0196***	(0.0048, 0.0344)	0.0100
DBill	-0.026***	(-0.0470, -0.0052)	0.0100
LDBill	0.0003	(-0.0222, 0.0230)	0.9700
Slope	0.0215**	(0.0016, 0.0415)	0.0300
DSlope	-0.0241**	(-0.0461, -0.0021)	0.0300
LDSlope	-0.0087	(-0.0308, 0.0133)	0.4400
HHI	-0.0312	(-0.0806, 0.0180)	0.2100
Rank LM	34.2***		0.0000
Cragg-Donald	86.87***		
Hansen	3.98		0.5500
F	35.67***		0.0000
F _μ	4.70***		0.0000
LM _{HET}	4.9e+33***		0.0000
F _{AC}	6.867***		0.0150

Notes: *** (significant at % 1 level); ** (significant at % 5 level); * (significant at % 1 level). Column 2 refers to 95% confidence interval. Variables: NIM (Net Interest Margin), LNIM (the lag of NIM), LLeverage (the lag of Leverage rate), LAssetgrowth (the lag of growth rate of total assets), Gdpgrowth (Real GDP Growth), Bill (treasury bill interest rate with 3-months maturity obtained by Nelson-Siegel Model), DBill (the first difference of Bill), LDBill (the lag of the first difference of Bill), Slope (the slope of the yield curve), DSlope (the first difference of Slope), LDSlope (the lag of the first difference of Slope), HHI (Herfindahl Hirschman Index). Rank LM test, Cragg-Donald and Hansen statistics test for the validity of instruments. F statistic tests for overall significance of the model. F_μ statistic tests for absence of individual effects. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation.

Table A.10 : Estimation Results: Return on Assets (ROA) – Nelson & Siegel (1987).

ROA	Coefficient	Conf. Interval	P-value
<i>LROA</i>	0.3258	(-0.0838, 0.7353)	0.1200
<i>LLeverage</i>	0.0123	(-0.0219, 0.0465)	0.4800
<i>LAssetgrowth</i>	0.0006	(-0.0043, 0.0056)	0.8100
<i>Gdpgrowth</i>	-0.0054	(-0.0153, 0.0044)	0.2800
<i>LGdpgrowth</i>	-0.006***	(-0.0100, -0.0026)	0.0000
<i>Bill</i>	0.0279**	(0.0000, 0.0558)	0.0500
<i>DBill</i>	-0.0240*	(-0.0501, 0.0022)	0.0700
<i>LDBill</i>	-0.0039	(-0.0340, 0.0262)	0.8000
<i>Slope</i>	0.0543*	(-0.0047, 0.1132)	0.0700
<i>DSlope</i>	-0.0382**	(-0.0709, -0.0055)	0.0200
<i>LDSlope</i>	-0.0308	(-0.0610, -0.0005)	0.0500
<i>HHI</i>	-0.0055	(-0.1421, 0.1310)	0.9400
Rank LM	8.62**		0.0300
Cragg-Donald	23.20**		
Hansen	1.59		0.4500
F	5.43***		0.0000
F_{μ}	1.44*		0.0763
LM_{HET}	1.1e+34***		0.0000
F_{AC}	82.898***		0.0000

Notes: *** (significant at % 1 level); ** (significant at % 5 level); * (significant at % 1 level). Column 2 refers to 95% confidence interval. Variables: ROA (Return on Asset), *LROA* (the lag of ROA), *LLeverage* (the lag of Leverage rate), *LAssetgrowth* (the lag of growth rate of total assets), *Gdpgrowth* (Real GDP Growth), *Bill* (treasury bill interest rate with 3-months maturity obtained by Nelson-Siegel Model), *DBill* (the first difference of Bill), *LDBill* (the lag of the first difference of Bill), *Slope* (the slope of the yield curve), *DSlope* (the first difference of Slope), *LDSlope* (the lag of the first difference of Slope), *HHI* (Herfindahl Hirschman Index). Rank LM test, Cragg-Donald and Hansen statistics test for the validity of instruments. F statistic tests for overall significance of the model. F_{μ} statistic tests for absence of individual effects. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation.

Table A.11 : Estimation Results: Return on Equity (ROE) – Nelson & Siegel (1987).

ROE	Coefficient	Conf. Interval	P-value
<i>L</i> ROE	.4770***	(.1284, .8257)	0.0000
<i>L</i> Leverage	.1770**	(-.0056, .3596)	0.0500
<i>L</i> Assetgrowth	-.0025	(-.0281, .0230)	0.8400
Bill	.1133**	(-.0029, .2296)	0.0500
Slope	.1928	(-.0623, .4480)	0.1300
HHI	.0430	(-.7174, .8036)	0.9100
Rank LM	10.40**		0.0300
Cragg-Donald	21.44**		
Hansen	0.67		0.8700
F	8.00***		0.0000
F_{μ}	3.21***		0.0000
LM_{HET}	10805.72***		0.0000
F_{AC}	152.100**		0.0150

Notes: *** (significant at % 1 level); ** (significant at % 5 level); * (significant at % 1 level). Column 2 refers to 95% confidence interval. Variables: ROE (Return on Equity), *L*ROE (the lag of ROE), *L*Leverage (the lag of Leverage rate), *L*Assetgrowth (the lag of growth rate of total assets), Bill (treasury bill interest rate with 3-months maturity obtained by Nelson-Siegel Model), Slope (the slope of the yield curve), HHI (Herfindahl Hirschman Index). Rank LM test, Cragg-Donald and Hansen statistics test for the validity of instruments. F statistic tests for overall significance of the model. F_{μ} statistic tests for absence of individual effects. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation.

Table A.12 : Formula of the Variables.

Variables	Formula
NIM	$(\text{Interest Income} - \text{Interest Expense}) / \text{Total Assets}$
ROA	$\text{Net Profit After Tax} / \text{Total Assets}$
ROE	$\text{Net Profit After Tax} / \text{Equity}$
LevRate	$\text{Debt} / \text{Total Assets}$
GrowthAsset	Change in Real Total Assets compared to previous quarter
GDPgrowth	Real GDP growth rate with respect to previous quarter
CreditInf	$\text{Cumulative Banking Sector Credit Inflow} / \text{Cumulative Total Assets}$
LongCreditInf	$\text{Cumulative Banking Sector Credit LongTerm Inflow} / \text{Cumulative Total Assets}$
ShortCreditInf	$\text{Cumulative Banking Sector Credit Short-Term Inflow} / \text{Cumulative Total Assets}$
HHI	Share of Bank _i 's Asset in Total Assets

Notes: Variables: NIM (Net Interest Margin), ROA (Return on Asset), ROE (Return on Equity), LevRate (Leverage Rate), GrowthAsset (Growth Rate of Real Total Assets), GDPgrowth (Real GDP growth rate compared to previous quarter), CreditInf (Banking industry credit inflow/total banking assets), LongCreditInf (Long-term CreditInf), ShortCreditInf (Short-term CreditInf), HHI (Herfindahl-Hirschman Index).

Table A.13 : Summary Statistics.

Variables	Mean	Std. Dev.	Min	Max
NIM	0.012	0.009	-0.086	0.078
ROA	0.003	0.014	-0.222	0.092
ROE	0.029	0.056	-1.500	0.272
LevRate	0.836	0.147	0.083	0.948
GrowthAsset	0.062	0.156	-0.634	1.763
GDPgrowth	0.017	0.100	-0.140	0.600
CreditInf	0.084	0.017	0.052	0.122
LongCreditInf	0.050	0.015	0.017	0.073
ShortCreditInf	0.034	0.014	0.008	0.058
HHI	0.108	0.007	0.097	0.126

Notes: Variables: NIM (Net Interest Margin), ROA (Return on Asset), ROE (Return on Equity), LevRate (Leverage Rate), GrowthAsset (Growth Rate of Real Total Assets), GDPgrowth (Real GDP growth rate compared to previous quarter), CreditInf (Banking industry credit inflow/total banking assets), LongCreditInf (Long-term CreditInf), ShortCreditInf (Short-term CreditInf), HHI (Herfindahl-Hirschman Index).

Table A.14 :Estimation Results-Banking Credit Inflow.

ROE		ROA		NIM	
Explanatory Variables	Coefficients	Explanatory Variables	Coefficients	Explanatory Variables	Coefficients
LROE	0.6648*** (0.000)	LROA	0.6378*** (0.000)	LNIM	0.7986*** (0.000)
LLeverage	-9.55e-10 (0.221)	LLeverage	5.01e-11 (0.668)	LLeverage	-5.95e-10*** (0.000)
LAssetgrowth	0.0047 (0.664)	LAssetgrowth	0.0046 (0.155)	LAssetgrowth	-0.0077** (0.050)
GDPgrowth	-0.0084 (0.716)	GDPgrowth	-0.0051 (0.189)	GDPgrowth	0.0016 (0.317)
CreditInf	0.1235* (0.065)	CreditInf	0.0414** (0.041)	CreditInf	-0.0038 (0.700)
HHI	-0.9388 (0.341)	HHI	0.3403 (0.206)	HHI	0.1649 (0.247)
Rank LM	9.206** (0.026)	Rank LM	9.002** (0.029)	Rank LM	18.162*** (0.001)
Cragg-Donald	21.484**	Cragg-Donald	77.276***	Cragg-Donald	139.034***
Hansen	3.271 (0.194)	Hansen	0.963 (0.617)	Hansen	1.912 (0.590)
F	3.04*** (0.006)	F	3.640*** (0.001)	F	23.27*** (0.000)
Fm	4.78*** (0.000)	Fm	2.44* (0.000)	Fm	4.02*** (0.000)
LM_{HEC}	7665.92*** (0.000)	LM_{HEC}	75685.66*** (0.000)	LM_{HEC}	15821.32*** (0.000)
F_{AC}	78.431*** (0.000)	F_{AC}	1041.083*** (0.000)	F_{AC}	37.078*** (0.000)

Notes: *** (significant at % 1 level); ** (significant at % 5 level); * (significant at % 1 level). The numbers in parentheses show the P-values. Variables: NIM (Net Interest Margin), LNIM (the lag of NIM), ROA (Return on Assets), LROA (the lag of ROA), ROE (Return on Equity) LROE (the lag of ROE), LLeverage (the lag of Leverage rate), LAssetgrowth (the lag of growth rate of real total assets), GDPgrowth (Real GDP growth rate), CreditInf (Banking industry credit inflow/total assets), HHI (Herfindahl Hirschman Index). F statistic tests for overall significance of the model. F_μ statistic tests for absence of individual effects. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation. Rank LM, Cragg-Donald, Hansen statistics are tests for the validity of instruments.

Table A.15 : Estimation Results-Banking Credit Inflow.

Explanatory Variables	NIM	Explanatory Variables	ROE	Explanatory Variables	ROA
	Coefficients		Coefficients		Coefficients
LNIM	0.8008*** (0.000)	LROE	0.6383*** (0.000)	LROA	0.6301*** (0.000)
LLeverage	-6.23E-10*** (0.000)	LLeverage	-1.23E-09 (0.148)	LLeverage	1.10E-11 (0.930)
LAssetgrowth	-0.0076** (0.058)	LAssetgrowth	0.0051 (0.632)	LAssetgrowth	0.0050 (0.122)
GDPgrowth	0.0013 (0.426)	GDPgrowth	-0.0079 (0.719)	GDPgrowth	-0.0058 (0.158)
LongInf	0.0316* (0.086)	LongInf	0.4226** (0.013)	LongInf	0.0982** (0.023)
ShortInf	0.0073 (0.486)	ShortInf	0.1712 (0.191)	ShortInf	0.0357 (0.242)
HHI	0.0761** (0.012)	HHI	0.5773 (0.170)	HHI	0.0844 (0.377)
Rank LM	17.834*** (0.001)	Rank LM	9.337** (0.025)	Rank LM	9.134** (0.027)
Cragg-Donald	137.270***	Cragg-Donald	19.763**	Cragg-Donald	73.494**
Hansen	2.016 (0.569)	Hansen	3.080 (0.214)	Hansen	0.898 (0.638)
F	38.45*** (0.006)	F	7.80*** (0.000)	F	4.18*** (0.001)
Fm	20.73*** (0.000)	Fm	10.28*** (0.000)	Fm	7.28*** (0.000)
LM_{HEC}	23005.74*** (0.000)	LM_{HEC}	10301.45*** (0.000)	LM_{HEC}	1.30E+05*** (0.000)
F_{AC}	3.306* (0.082)	F_{AC}	5.227** (0.031)	F_{AC}	38.546*** (0.000)

Notes: *** (significant at % 1 level); ** (significant at % 5 level); * (significant at % 10 level). The numbers in parentheses show the P-values. Variables: NIM (Net Interest Margin), LNIM (the lag of NIM), ROA (Return on Assets), LROA (the lag of ROA), ROE (Return on Equity) LROE (the lag of ROE), LLeverage (the lag of Leverage rate), LAssetgrowth (the lag of growth rate of real total assets), GDPgrowth (Real GDP growth rate), LongInf (Banking industry long-term credit inflow/total assets), ShortInf (Banking industry short-term credit inflow/total assets), HHI (The first difference of Herfindahl Hirschman Index). F statistic tests for overall significance of the model. F_m statistic tests for absence of individual effects. LM_{het} and F_{AC} statistics test for homoscedasticity and absence of serial correlation. Rank LM, Cragg-Donald, Hansen statistics are tests for the validity of instruments.

APPENDIX B: Figures

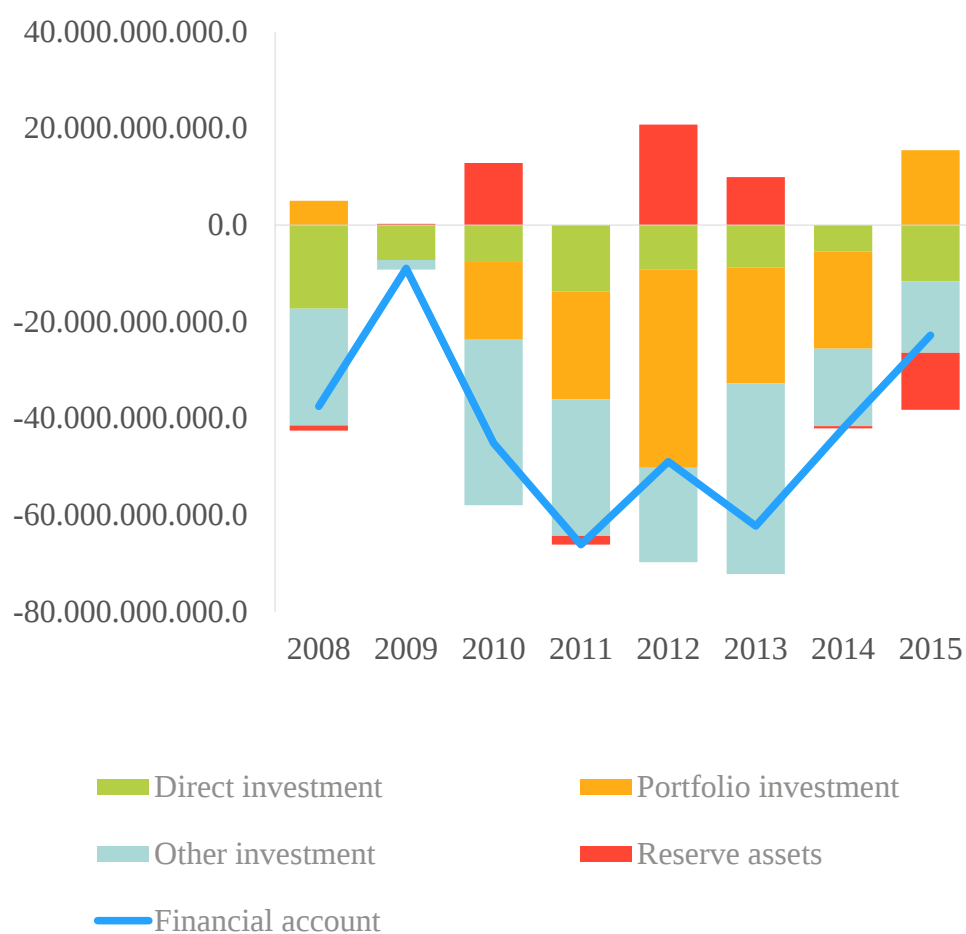


Figure A.1 : Turkey-Financial Account Composition-Dollar, (IMF; 2016).

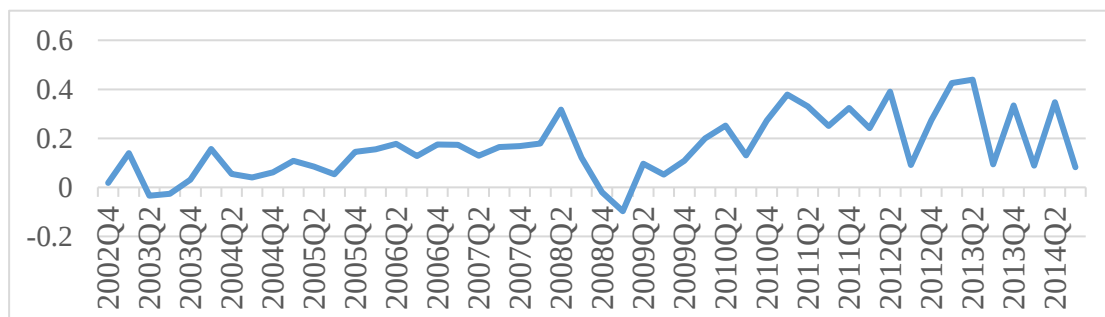


Figure A.2 : Financial Inflow/GDP, Turkish Economy, (CBRT, 2015).

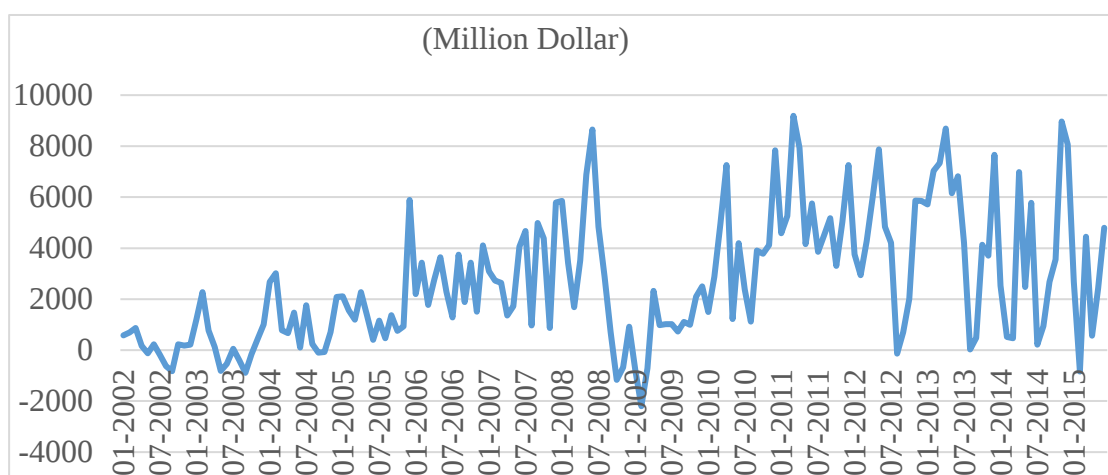


Figure A.3 : Financial Inflow, Turkish Economy (CBRT, 2015).

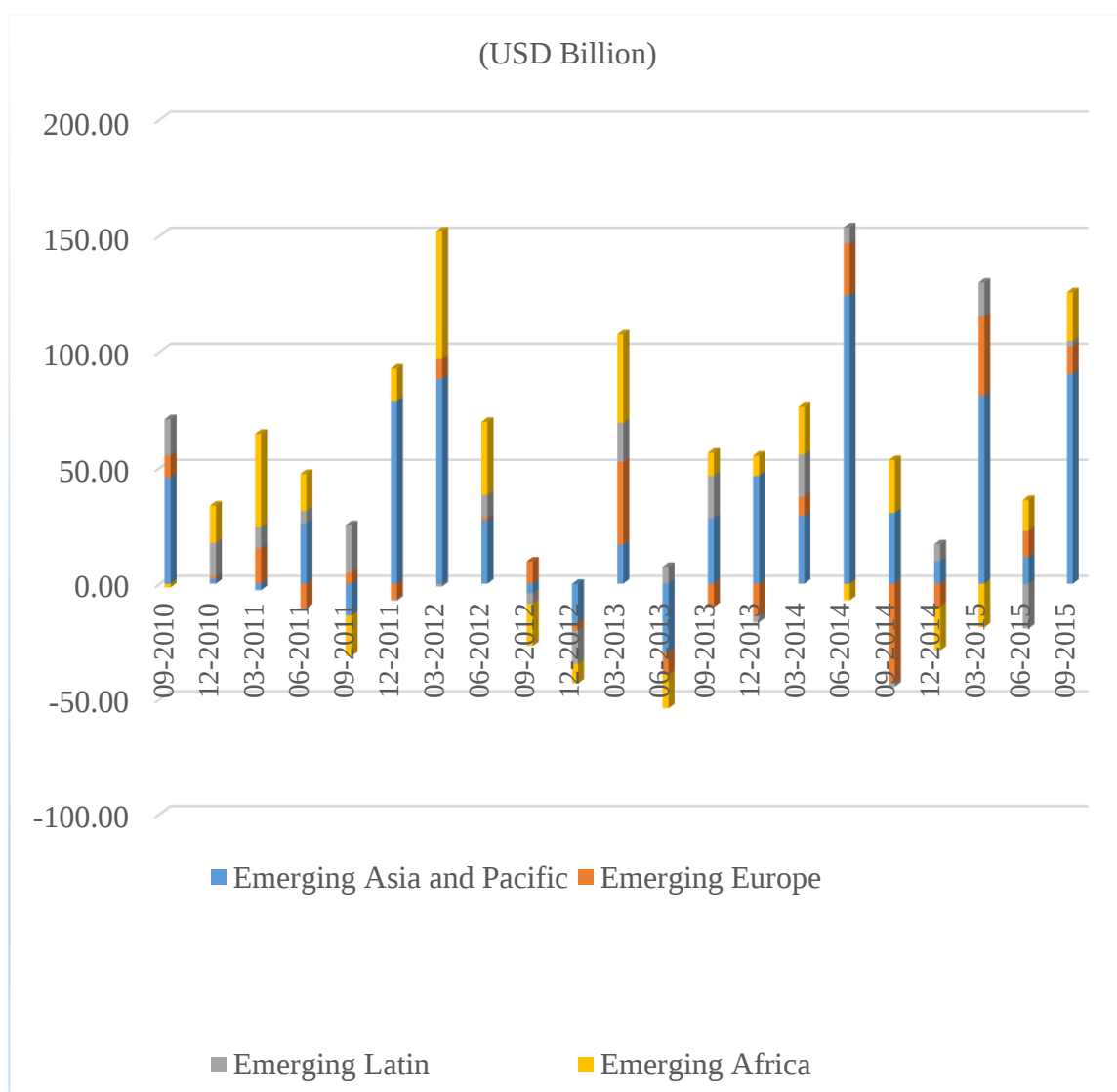


Figure A.4 : Cross Border Liabilities of EMEs Banking Industry, (BIS, 2016).

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PUBLICATIONS/PRESENTATIONS ON THE THESIS

Ovenc G., Aydemir R., 2016: Cross Border Banking Liability and Profitability in an Emerging Economy. *International Academic Business Conference*, July 31-August 4, 2016 San Francisco, California, USA.

Aydemir, R., & **Ovenc, G.** (2016). Interest rates, the yield curve and bank profitability in an emerging market economy. *Economic Systems*.
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