THE IMPACT OF DEPOSIT INSURANCE ON PERFORMANCE OF

TURKISH COMMERCIAL BANKS

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THE IMPACT OF DEPOSIT INSURANCE ON PERFORMANCE OF
TURKISH COMMERCIAL BANKS

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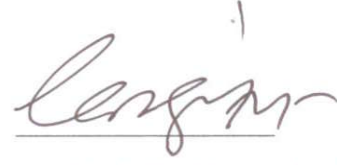IZMIR UNIVERSITY OF ECONOMICS

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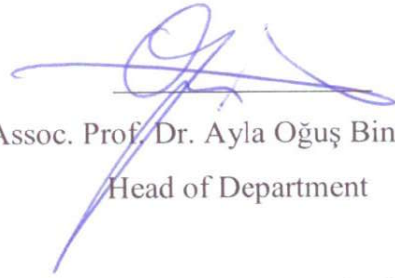THE GRADUATE SCHOOL OF SOCIAL SCIENCES

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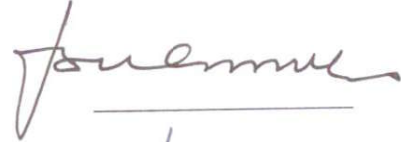Assoc. Prof. Dr. Ayla Oğuş Binatlı

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ABSTRACT


THE IMPACT OF DEPOSIT INSURANCE ON PERFORMANCE OF

TURKISH COMMERCIAL BANKS

Cantekin, Gonca

MA in Financial Economics, Graduate School in Social Sciences


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This thesis analyzes the impact of deposit insurance on net interest margins for Turkish Commercial Banks by dividing the sample period (1998-2009) into two sub-periods: before partial saving deposit insurance period (1998-2003) and after partial saving deposit insurance period (2004-2009). The empirical results from the single step estimation approach using panel data, is based on the dealership model proposed by Ho and Saunders (1981). The results indicate that deposit insurance affects the net interest margins is especially due to the moral hazard problem. In particular, we use the banks' specific characteristics and macroeconomic variables in order to uncover the determinants of banks' net interest margins in accordance with the related literature. The findings show that operating costs, capital adequacy, size, default risk and credit risk are related to banks' interest margins. The results further indicate that macroeconomic variables are statistically significant in the all periods.


 Keywords: net interest margin, deposit insurance, panel data

# ÖZET

## MEVDUAT SİGORTASININ TÜRKİYE'DEKİ TİCARİ BANKALARIN PERFORMANSI ÜZERİNE ETKİSİ

Cantekin, Gonca

Finansal Ekonomi Yüksek Lisans Programı

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Bu çalışma mevduat sigortasının Türkiye'deki ticari bankaların net faiz marjlarına olan etkisini örnek dönemi (1998-2009) iki alt periyot olan kısmi mevduat sigortasından önce (1998-2003) ve kısmi mevduat sigosrtasından sonra (2004-2009) bölerek incelemektedir. Panel data kullanılarak tek adım tahmin yaklaşımından elde edilen ampirik sonuçlar Ho and Saunders (1981) tarafından geliştirilen dealership modeline dayanmaktadır. Sonuçlar mevduat sigortasının öncelikle ahlaki tehdit probleminden dolayı net faiz marjlarını etkilediğini ortaya koymaktadır. Özellikle, bu alanda yapılan önceki çalışmalara uygun olarak bankaların belirli özellikleri ve makroekonomik değişkenler kullanılarak  net faiz marjlarını belirleyen faktörleri de ortaya koymaktadır. Bulgular operasyon maliyetleri, sermaye yeterliliği, hacim, ödemelerde gecikme riski ve kredi riskinin bankaların faiz marjlarıyla ilişkili olduğunu göstermektedir. Ayrıca, sonuçlar makroekonomik değişkenlerin tüm dönemler için istatiksel olarak anlamlı olduğunu da ortaya koymaktadır.


Anahtar Kelimeler: net faiz marjı, mevduat sigortası, panel data

To My Parents

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TABLE OF CONTENTS

CHAPTER

LIST OF FIGURES and TABLES

# Chapter 1

## Introduction

One of the most important roles of financial system in an economy is to promote economic growth through efficient intermediation between lenders and borrowers. Banking systems dominates the financial system in most developing countries. Over the past twenty years, policy makers in these countries, as in the developed countries, have taken significant steps to liberalize their financial markets. The main aim of the liberalization and structural reform process was to create a sound, stable and efficient financial system. Due to the role banking system in the financial system, significant efforts were directed particularly toward deregulating and improving legislation related to the banking system. These changes included privatization of public banks, elimination of restrictions on domestic and foreign entries, and adoption of international standards of effective supervision. Particularly, opening the banking market to the foreign competition has been as an integral part in the creation of a efficient and productive banking sector.

The experience of the financial system in Turkey is not different than those of in other developing countries' financial system. The financial system in Turkey has undergone a liberalization and structural reform process since 1980. The main feature of the liberalization efforts in Turkey was that the financial liberalization program was introduced before the achievement of macroeconomic stability. Particularly, in early 1990s, the public sector borrowing requirements increased significantly, and the

authorities lost control of fiscal deficit finance. The first major financial (or banking) crisis occurred in January 1994. The Turkish Lira was devalued by more than 100% against the US Dollar. Economic growth was negative and about half of the central bank foreign reserves were eroded in managing the crisis. The government took further step to introduce a full saving deposit insurance to prevent bank runs. Instable economic growth, high inflation, high public sector borrowing requirements, and high volatility in exchange rates were the characteristics of 1990s. The Turkish economy faced the second major wave of financial crises in February 2001, starting with the disinflation program of 1999. The crisis began in the financial system and later spread to the real sector, the Turkish Lira was devalued significantly, and the most of the central bank foreign reserves were eroded in managing the crisis, as in the case of 1994 crisis. Also, the Turkish economy shrunk about 10%. Due to the moral hazard problem of the full saving deposits insurance and foreign currency dominated liabilities of commercial banks, banking system was the most affected. In 2001, the commercial banks tried to manage high amounts of cash withdraws in order to decrease the portfolio risk and to pay back short-term foreign debt.[1] As a result, several banks became insolvent and were taken over by the Saving Deposit Insurance Fund due to the crisis.

A new structural reform program that emphasizes the significance of governmental regulation and supervision to improve the stability and soundness of the banking system in Turkey was the important part of the standby agreement with the IMF in 2001. A new banking law was enacted, and the Banking Regulation and Supervision Agency has become effective in regulating and monitoring the sector. The authorities took a further

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[1] See Kasman (2002)

step to abandon full saving deposits insurance in June of 2004. The partial saving deposit insurance, which was TL50000, started to be implemented. Since then, the rules of game have changed in the Turkish banking system, therefore, banks should monitor their relative performance levels in order to survive in a new regulatory and competitive environment.

The main aim of this thesis is to investigate the impact of regulatory changes on the determinants of net interest margin of banks operating in the Turkish banking sector. Due to the new regulatory environment and partial saving deposit insurance the competitive conditions have changed in the Turkish banking sector. The reason for this is believed to be that depositors and banks behavior have changed since the introduction of partial saving deposits insurance. As discussed above, banks play an important role in economic growth through the process of intermediation between lenders and borrowers. Therefore, it is worthwhile to focus on the bank net interest margin since the costs of intermediation affect social welfare.

The net interest margin, defined as the ratio of net interest income to total assets of banks, consists of important information about the efficiency of banking system. It is well known that NIM in developing countries is higher than in developed countries. The main reasons can be lack of competition, high intermediation costs and changing regulations. It is very important to determine the factors that affect NIM in the explanation of the performance of the banks in the financial system. Another possible reason is that high interest margins can be reflection of an inefficient banking sector and

a high degree of information asymmetry.[2] Hence, identifying the determinants of net interest margin before and after the partial saving deposit insurance could help us to understand changing trends in bank efficiency and provide policy recommendations for the banking regulatory body.

Studying the determinants of net interest margin in the context of the developing countries makes a significant contribution to the related literature. Turkey as a developing country provides a fertile laboratory to examine the net interest margin since she is engaged in a process of deregulation, privatization, economic integration and technological change, while the system has witnessed more consolidation in recent years. The other contribution of the thesis is that it examines the impact of partial saving deposits insurance on the determinants of net interest margin by dividing the sample into two sub-periods: Before and after the introduction of partial saving deposits insurance. By dividing the sample, we analyze how the magnitudes of net interest margin determinants have changed between the two sub-periods. To the author's best knowledge, this is the first study that investigates the impact of deposit insurance on the determinants of net interest margin in Turkey. The empirical findings of the thesis will provide information on the impact of the new regulatory environment on the performance and market power of the sector in the very recent past.

The following parts of this thesis as follows. Chapter 2 covers the literature regarding the determinants of bank net interest margins analyses. Theoretical and empirical evidences from cross-country and single-country studies are also presented. Chapter 3

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[2] See Claeys&Vennet (2005) for further information

includes a brief history of the economy and banking system in Turkey from the Ottoman Empire to the present to analyze the reform process structurally.

Chapter 4 introduces the methodology and presents the model used in the thesis. Chapter 5 contains the descriptions of the variables and data used in the analysis and then reports the results suggested by the Hausman test. Finally, the main conclusions of the thesis are summarized in Chapter 6.

# Chapter 2

# Literature Review on Net Interest Margin

## 2.1. Theoretical Studies

Two theoretical approaches have been developed in the analysis of bank net interest margin in the literature. In the Ho and Saunders (1981) dealership model, a bank is assumed to be a risk-averse dealer in the loan and deposit market where the loan requests and deposit supplies arrive non-synchronously. Banks, carrying out the intermediary services of credit demand and supply of deposits to be random, and occur at different times, bear the cost of uncertainty, and expect to maximize the utility of terminal wealth. These researchers, who set up at two-step estimation procedure to test their model[3], analyzed the determinants of bank net interest margins, and conclude that the degree of market competition and the interest rate risk are two basic components of the interest margin.

McShane and Sharpe (1985) apply a differentiated version of the Ho and Saunders (1981) model to Australian commercial banks. Uncertainty is due to credit and deposit interest rates in the Ho and Saunders (1981), whereas in the Mc Shane and Sharpe (1985) it arises from the changes in the short term money market interest rates. The results suggest that market power, degree of absolute risk aversion, interest rate uncertainty and average trading volume of bank are all positively related to the net

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[3] The first step involves the estimation of a 'pure interest spread' by regressing observed margins on a number of bank-specific characteristics. In the second step, the estimated pure spreads are explained by macro economic and market structure variables.

interest margin, which is consistent with the theoretical model developed by Ho and Saunders (1981).

Allen (1988) develops Ho and Saunders' (1981) theoretical model by considering different types of loans. Such diversification benefits emanate from the interdependence of demand across banks services and products (portfolio effect). In the theoretical model of Allen (1988), the determinants of bank net interest margin also include cross demand elasticity in addition to the variables of Ho and Saunders (1981).

Angbazo (1997) analyze that whether default risk and interest rate risk premia are homogenous or not for different active size of banks. Angbazo (1997) indicate that the shallowness of the credit markets could affect bank net interest margin in two ways, if credit risk increased with rising risk premium bank net interest margin can increase, on the other hand if loan interest rates are insensitive to the deposit rates margins can narrow in consequence of credit rationing. Also, due to widespread use of off-balance sheet vehicles, volatility and effect size of these instruments to the margins was included in the analysis.

Wong (1997) indicate that bank net interest margins are positively affected by the market power, operating costs, degree of interest rate risk and degree of credit risk while the bank's capital is negatively related to the spread. Furthermore, the results of the study are supported by Ho and Saunders (1981), McShane and Sharpe (1985), Zarruck (1989) and Angbazo (1997).

## 2.2. Empirical Studies

### 2.2.1. Cross country studies

Demirgüç-Kunt and Huizinga (1999) show that bank characteristics, macroeconomic conditions, explicit and implicit bank taxes, regulation of deposit insurance, general financial structure and the legal and institutional environment significantly affect bank interest margins by using bank-level data for 80 developed and developing countries for the period 1988- 1995. The empirical result of the paper indicates that in developing countries foreign banks have greater margins than domestic banks but in developed countries the opposite is true. Moreover, efficiency in legal system, lack of corruption and existence of explicit deposit insurance coincide with lower interest margins.

Demirgüç-Kunt and Huizinga (2000) investigate the impact of financial development and structure on bank interest margins using bank-level data for a large number of developed and developing countries. They find that as the wealth level of the country increases, financial systems has become more active and competitive but it brings lower profits. In developing countries stock market development increase borrowing capacity, thus, profits and margins of banks arise. However, they find that financial structure does not have a significant effect on bank profits and margins.

Demirgüç-Kunt, Laeven and Levine (2004) examine the influence of bank regulations, market structure and institutional development on bank margins and overhead expenditures across a broad cross-section of countries while controlling for bank-specific factors by using data on cover 1400 banks across 72 countries. The data

investigate that bank regulations, concentration and inflation have positive impacts on bank margins and overhead costs. Furthermore, the effects of bank regulations become insignificant when the indicators of economic freedom or property rights protection are controlled. Thus, it is clear that bank regulations reflect private property and competition in the related countries, and cannot be isolated for bank net interest margins.

In the dealer model developed by Ho and Saunders (1981), they test the determinants of bank net interest margin by using quarterly income and balance sheet data for 53 commercial banks in 1976- 1979 period. Ho and Saunders (1981) purify idiosyncratic factors (required reserves, implicit interest payments, default premiums on loans) that affect the net interest margins of an individual bank, and proceed from pure interest margin, which is assumed to be universal across banks. The model indicates that this pure interest margin depends on the degree of the bank management risk aversion, the market structure, the average size of bank transaction and variance of interest rates.

Saunders and Schumacher (2000) analyze the determinants of bank net interest margins by application of the Ho and Saunders model in seven major countries of OECD during the period 1988-1995 for a sample of 614 banks. The results suggest that interest rate volatility and market structure have significant impacts on bank margins. Interest rate volatility has a positive effect in reducing bank margins. However, the effects of market structure on spreads can change across countries.

Maudos and Guevara (2004) examine the fundamental elements of interest margin for five European countries in the period 1993-2000 using a panel data of 15,888 observations. They included operating cost as an explicit component of net interest

margin. The empirical results show that interest margin depends on the operating cost, the interest rate and credit risk, the risk aversion, opportunity costs, implicit interest payments and quality of management.

Abreu and Mendes (2003) investigate bank interest margins for some European countries by using panel data analysis for the period 1986-1999. They found that loan to asset ratio, operating costs and inflation are positively related with net interest margins. Also, the European Monetary System (EMS) crisis of 1992 has a positive impact on the net interest margins.

Drakos (2003) tests the effect of the transition process, the ownership status and foreign banks entry on bank interest margin by using a panel data of banks of eleven countries for the period 1993 – 1999. The results show that the transition process is partially effective on significantly reduction of margins. The results also show that foreign banks entry should be modified since it reduces margins by enhancing competition.

Valverde and Fernandez (2007) investigate the relationship between bank margins and specialization in seven European countries during 1994-2001 in order to analyze the determinants of bank margins. In their study, they use Lerner index in addition to the other four dependent variables. They find that specialization and bank margins are positively related with each others. The empirical results of the paper show that income and market power of the banks increase by using diversification in outputs.

Brock and Suarez (2000) analyze the reason of excessive net interest margin although financial liberalization process and reducing reserve requirements for seven Latin

American countries (Argentina, Bolivia, Chile, Colombia, Mexico, Peru, and Uruguay) during the mid-1990s. The results of the study suggest that liquidity and capital risk, inflation, interest rate volatility and GDP growth affect bank margins although the size of these effects differs across countries.

Peria and Mody (2004) study the impact of increasing foreign participation and high concentration on Latin American bank margins by using bank specific indicators and macroeconomic variables during the late 1990s. The results suggest that foreign banks work at lower interest spreads relative to domestic banks. On the other hand, foreign banks, which have entry to the system by buying national banks, have higher interest rates than new foreign banks. As a result, foreign bank participation has no impact whereas bank concentration has positive impact on margins.

Doliente (2005) analyzes the net interest margins of four Southeast Asian countries; Indonesia, Malaysia, Philippines and Thailand for the period 1994-2001. The paper explores that the region's margins are explained by bank-specific factors such as operating expenses, capital, loan quality, liquid assets and volatility of interest rates.

Claeys and Vander-Vennet (2008) analyze the factors behind consistently high net interest margins in the Central and Eastern European Countries by controlling for the macroeconomic environment and ownership structure over the years 1994-2001. They attribute to low efficiency or non competitive conditions than find that important policy actions are required for the non- accession countries especially for CEE banks.

Hawtrey and Liang (2008) assess the determinants of bank net interest margins by using panel data for the fourteen banks of OECD countries during the period 1987-2001. The empirical findings are consistent with the theoretical model developed by Ho and Saunders (1981). The results suggest that net margins are affected by market power, operational cost, risk aversion, interest rate volatility, credit risk, volume of loans, implicit interest payments and quality of management.

Kasman et al. (2010) study the effects of financial reforms on the determinants of commercial bank net interest margin in the banking systems of the new EU member countries and candidate countries for the period 1995-2006. The results suggest that size and managerial efficiency are negatively and significantly related to net interest margins.

### 2.2.2. Single country studies

Drakos (2002) examines the determinants of bank net interest margins by controlling for bank specific characteristics and using the dealership model for Greek commercial banks. The findings indicate that default, liquidity risk and interest rate are significant determinants of net interest margins within the period 1992-1999.

Barajas et al. (1999) analyze bank net interest margins of Colombian banking sector by dividing the sample period (1974-1996) into two sub-periods: pre-liberalization (1974-88) and post-liberalization (1991-96). They find that average interest spread does not change for both of the periods, just the weights of determinants change such as operational costs, financial taxation, market power and loan quality.

Brock and Franken (2003) examine the determinants of bank net interest margins by using interest rate spreads from bank income statements and balance sheets for Chile over the period 1994-2001. The results show that the estimated effects of industry concentration, business cycle and monetary policy variables change markedly between interest rate spreads based on balance sheet data and interest rate spreads using disaggregated loan and deposit data.

Afanesieff et al. (2001) analyze whether macro or microeconomic factors have more impact on bank interest margins in Brazil for the period 1997-2000. They find that macroeconomic conditions are the main determinants of bank margins relative to the inflation rate, interest rate volatility and microeconomic factors.

Sensarma and Ghosh (2004) investigate the impact of ownership on banks net interest margins in the Indian banking industry for the 1997-2002 period by using panel data analysis. The findings suggest that ownership has significant effect on margins; especially foreign banks have the highest margins, followed by public and private banks. In addition to this, size of banks and non-interest income are not significantly related with margins.

Bennaceur and Goaied (2003) study the influence of financial structure, macroeconomic indicators and banks' characteristics on net interest margins for the Tunisian banking industry during 1980-2000. High amount of capital and with large overheads have positive impact on net interest margins although size has a negative effect. On the other hand, the paper investigates that macroeconomic indicators and interest rate liberalization have no effect on bank margins.

Beck and Hesse (2009) analyze to what extent the relatively high interest margins on the Ugandan banking sector over the period 1999-2005. Using cross-country comparison they focus on four hypotheses to explain the high margins such as risk based view, the small financial system view, the market structure view and the macroeconomic view. The findings show that bank privatization process, foreign bank entry and banking market structure has no economically significant effect on interest margins despite foreign banks work with a lower interest margin in Uganda. Similarly, macroeconomic variables as well do not explain changes in margins over time, on the other hand bank specific variables such as bank size, operational costs, loan portfolio composition largely explain changes in margins. However, fixed effects, which are not based on observations and time, changes explain mostly the differences between bank net interest margins.

Ben-Khedhiri et al. (2005) analyze net margins of deposit banks by using panel data for Tunisia's financial system after financial liberalization between 1996-2003 periods. The results show that net interest margin is significantly affected by the bank specific variables and regulatory variables whereas macroeconomic variables do not influence the bank margins in Tunisian banking sector. They analyze. The results also show that banks, which work with lower operational costs and also greater scale and leverage ratios, have more profits.

Williams (2007) show that market power, operating cost, implicit interest payment, management quality and credit risk  significantly affect the bank net interest margins for Australia banking sector for the years 1989-2001. The results suggest that bank net interest margins reduced over the study period particularly because of the credit risk that had a negative relationship between NIM.

# Chapter 3

## History of Turkish Banking System

The Turkish banking system emerged in the last period of Ottoman Empire, with the establishment of Ottoman Bank in 1856. The main activities of Ottoman Bank and other foreign-owned banks were internal and external debt payments for Ottoman Treasury. Although the new 21 banks were financed by government, they were unable to continue their banking operations because of the foreign banks dominance between 1911 and 1923. The War of Independence was the end of this period. There were 13 private and 22 public banks in the beginning of Republic Period, most of which served on the local platform with only one branch. Türkiye İş Bankası and Türkiye Sanayi and Maadin Bankası were also encouraged by the government in the beginning of the Republic Period.

The World Economic Depression in 1929 and 1930 was a global crisis and each country was affected differently. As a result of the negative effects of the Great Depression, the number of the banks in the industry decreased from 60 in 1932 to 40 in 1945. After the crisis, the government adopted a new strategy and took banks under state control. However, the most important events of this period were the foundation of the Central Bank in 1930 and large state banks such as Sumer Bank, EtiBank and T.Halk Bankası. The basic reason of foundation of the Central Bank was to improve the economy after 1929 crisis.

In the following years of World War II the role of the state reduced in the economy but investments continued to be controlled by the state and resources of Central Bank. The Governments supported the private sector and it accelerated economic growth between 1945 and 1959. In this period, interest rates and commission rates were determined by the Central Bank, increasing competition in branch banking and deposit collection increased. As a result of the expansion of the private sector, 27 private banks and 3 public banks were established, and the diversity of credit institutions and branch banking increased.

Economic fundamentals got worse rapidly at the end of the 1950 because of the rising inflation, trade deficits and external debt. Although the Government took loans from European countries, public expenditures did not reduce. Thus, the Turkish lira was devalued from 2.8 to 9 lira per US dollar in 1958. The Banks Association of Turkey was founded in 1958 in order to develop the banking sector and prevent unfair competition.

In the late 1950s, despite the 1958 stabilization program, economic sanctions did not work and the economy slid into a recession. Therefore, the Government started to apply planned economy with more intervention, instead of liberal economy policy. The early 1960s was an important period for banking sector. 15 banks failed between 1960 and 1964, therefore, in 1960 Liquidation Fund was established to pay off the deposits holders of these banks. In 1983, this fund was transferred to the Saving Deposit Insurance Fund.

The aim of the industrialization policy implemented between 1960 and 1980 was to produce industrial goods in the domestic market and make investments in support of

public and private sector. During this period, new foreign banks and commercial banks, except in some special cases, were not allowed to be established and hence the banking sector remained under state control and influence. The deposit and loan interest rates, bank commission rates and credit limits were determined by the import substitution policies. There were no interest and exchange rate risks and also no product and price competition in the market. At this time, the only way to attract more deposits was to increase the number of branches. This was encouraged and small banks were merged to reduce average fixed costs.

This period saw the establishment of five development banks, which are TC.Turizm Bankası (1962), Sınai Yatırım ve Kalkınma Bankası (1963), Devlet Yatırım Bankası (1964), Türkiye Maden Bankası (1968) and Devlet Sanayi ve İşçi Yatırım Bankası (1976), and two commercial banks, which are Amerikan-Türk Dış Ticaret Bankası and Türk- Arap Bankası (1977).

One of the most important features of the banking sector in this period was that large private commercial banks became bank holding companies[4], meaning that any industrial or commercial company could control the important part of bank's capital. This was encouraged by the Government with the aim of increasing the private sector investments. In addition, the Government tried to increase the level of medium term credits with the complex incentive systems. The banks had to include in their credits at least 10% of medium term loans and interest rates of these were higher than the other credits. Hence, banks applied this easily and this regulation was profitable.

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[4] The Banks Association of Turkey and Banking System '1958-2007' (2009)

Although the planned period was a fast development process, using methods leading to inflation, producing only for domestic consumption and inability to export, caused foreign exchange bottle-neck in 1970s. As a result of using convertible deposits and similar measures in order to overcome this bottle-neck, external debt increased significantly.

Since establishment of Republic 1923 until 1980 period, excluding 1929 World Economic Crisis, the main characteristic of economic policies implemented in Turkey was a planned economy based on import substitution. Government showed great effort to change the terms of structure and made several attempts to develop national banking. Basic function of banks was defined as the provision of financing investments in the development plan area.

The Turkish financial and banking system experienced significant changes since financial liberalization program in January 1980. The Turkish banking system was a closed system and heavily regulated in terms of market entry.[5] In addition, real interest rates were negative because of high inflation, and there were interest rate ceilings on deposits. In order to encourage foreign and national banks to enter the market, most of the restrictions on market entry were eliminated. Moreover, funds, which are provided by abroad, became one of the most important source in the financial system. The main goal of financial liberalization program was to increase efficiency and competitiveness in the banking sector.

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[5] See Kasman (2002)

Opening the banking system to the foreign banks, in the number of commercial banks increased from 43 in 1980 to79 in 2000. As a result of increasing number of banks and competition in the sector, concentration ratio decreased significantly.  Flexible exchange rate and positive real interest rate policy began to be implemented in order to support the new strategy, restructure the economy in accordance with the rules of free market economy, and raise the level of savings for stable growth. In addition to this, institutions and regulations for the financial market liberalization started to be formed.

Starting in 1984, foreign exchange deposit accounts became free for residents and non residents. The Capital Markets Law, which was enacted in 1982, created the necessary legal and institutional structures for capital market instruments. The Istanbul Stock Exchange and Interbank Money Market were established in 1986 in order to provide liquidity in the financial system. Since the new banking law enacted in 1985, different changes continued in the Turkish financial system, and had a significant impact on the banking sector. Open market operations, standard reporting system in banks and unified accounting system were adopted in 1987. When foreign exchange regime changed in 1990, Turkish lira was declared a convertible currency. In 1992, electronic funds transfer system started to be used.

These changes in economic policy caused instability and macroeconomic problems such as high current account deficits and public deficits in 1990s. Furthermore, inflation level increased dramatically. The main reason of this continuous high inflation was the substitution of the foreign currency to domestic currency. The banks and financial institutions borrowed from international markets with lower interest rates instead of

domestic market. It had a positive impact on growth, whereas this increased the risks. As a result of the continuously growing macroeconomic problems, Turkey experienced a serious economic crisis in 1994. Domestic and foreign investors pulled out of the market and this caused a record level increase in interest rates. Therefore, the Turkish lira depreciated by almost 70 percent against the US dollar.

The 1994 currency crisis in Turkey, the banking system collapsed rapidly and lost a significant part of own sources. In addition, the impact of crisis on the productivity, technology and efficiency was dramatic. Although the negative effects of economic constriction, public demand did not reduce. In order to ensure confidence in the banking and financial sector, and prevent the growth of the crisis, deposits are fully guaranteed by the government. Thus, the banks hit high risk limits with bad management. Moreover, after 1994, foreign banks began to use more deposit funds that increased from 26% to 53%, and less purchased funds decreased from 47% to 17%.

After 1995, the government and banks' own efforts helped banking sector, and all sectors of the economy immediately recovered. Financial instruments became more attractive with high interest rates, and investors focus on short term tools. Although borrowing from abroad had high costs and tax, closed foreign exchange positions reopened.

In the second half of 1998, Turkey signed an IMF agreement in order to solve macroeconomic problems and improve the financial sector. However, it would not be enough to encourage the financial system. The size of open positions and forward exchanges were limited. The capital income tax and stoppage tax for interbank

transactions created a serious shock in the markets. Moreover, early general elections, 1998 Russian Crisis, Adapazarı and Duzce earthquakes caused capital outflow and high risk environment in the financial markets after a short time. Thus, Turkey began an extensive disinflation program in December 1999. The main goal of this program was to increase supervision, and monitoring in the banking sector, and create a more competitive structure in the system.

Since the disinflation program began, inflation and interest rates decreased, capital inflows increased, and domestic demand started to expand. In addition, current account deficit and foreign trade deficit increased. In the second half of the year, economy conditions started to deteriorate because of the insufficient structural arrangements, unexpected inflation rate, and lack of domestic demand control. As a result of this process, the banking sector had a serious economic crisis in November 2000. The sharp effect in the market calmed down after a new intent letter was sent to IMF. However, at the end of December, the level of average interest rates, overnight rate and secondary market bond rate were four times higher than levels in November. Government continued to take the necessary measures to strengthen the banking system. In order to increase efficiency in banks supervisions and audit results, opening new branches were limited. Competition regulations, which break the tie between privately-owned and public-owned banks in the Banks Act, had been abolished.

In February 2001, when the prime minister declared there was an intensive political crisis in Turkey that caused a very deep crisis in highly sensitive markets.[6] The

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[6] See Özatay and Sak (2002)

overnight rates jumped to unpredictable levels of 6200 percent in uncompounded terms on that da, and there was a huge drop in foreign exchange reserves of the Central Bank. As a result, just three days later, the exchange rate system collapsed and the central bank announced that a floating exchange rate system started to be implemented in Turkey. By this announcement, the dollar rate jumped from a level of 685 thousand liras to 958 thousand liras in a day. [7]

In this period, 23 banks went bankrupt and the audit of them was taken under control of Savings Deposit Insurance Fund. The main reasons of these bankrupts were imprudent management, extremely high interest rate and exchange rate speculation. The state authorities expressed that banking crisis in 2001 cost $60 billion excluding public banks. SDIF received just $18.5 billion of it. As a result, very important changes and various measures initiated in order to strengthen the Turkish banking sector. The independent audit and an omnibus law completed to facilitate the restructuring of the state banks. The World Bank, the Treasury and other government authorities formulated new plans to deal with a potential non performing loan problem in the banking sector. In addition, the necessary regulations were issued by the Capital Markets Board of Turkey to have a derivatives market, and provide the banking system with a variety of tools to hedge against risks. Foreign participation was expected to increase over the medium term.[8]

Transition to the strong economy program, which was started to implement in April 2001, was overhauled for the 2002 – 2004 period. The main goals of this program were to decrease inflation and public debts, provide fiscal discipline, apply structural reform

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[7] See Feridun (2004)
[8] Banking Sector Reform: Progress Report (August,2001)

and enforce banking system. Moreover, "Law on Restructuring of the Debts to the Financial Sector and Amendments to Some Laws No.4743" established in January 31,2002, and Banking Regulation and Supervision Agency became active in order to restructure the debt of companies and strength the private banks' capital.

In the banking sector, the decreasing trend, which started in 2000 in the number of banks and employees, continued also in 2002, the number of banks decreased from 61 to 54. However, the share of the largest five and ten banks increased significantly. The share of the largest five in total assets increased from 44 percent to 58 percent, and the share of the largest ten increased from 68 percent to 81 percent in the period 1998 and 2002.

**Figure 1**
**Number of Banks**



| Year | Number of Banks |
|------|-----------------|
| 2009 | 49 |
| 2008 | 45 |
| 2007 | 46 |
| 2006 | 46 |
| 2005 | 47 |
| 2004 | 48 |
| 2003 | 50 |
| 2002 | 54 |
| 2001 | 61 |
| 2000 | 79 |
| 1999 | 81 |
| 1995 | 68 |
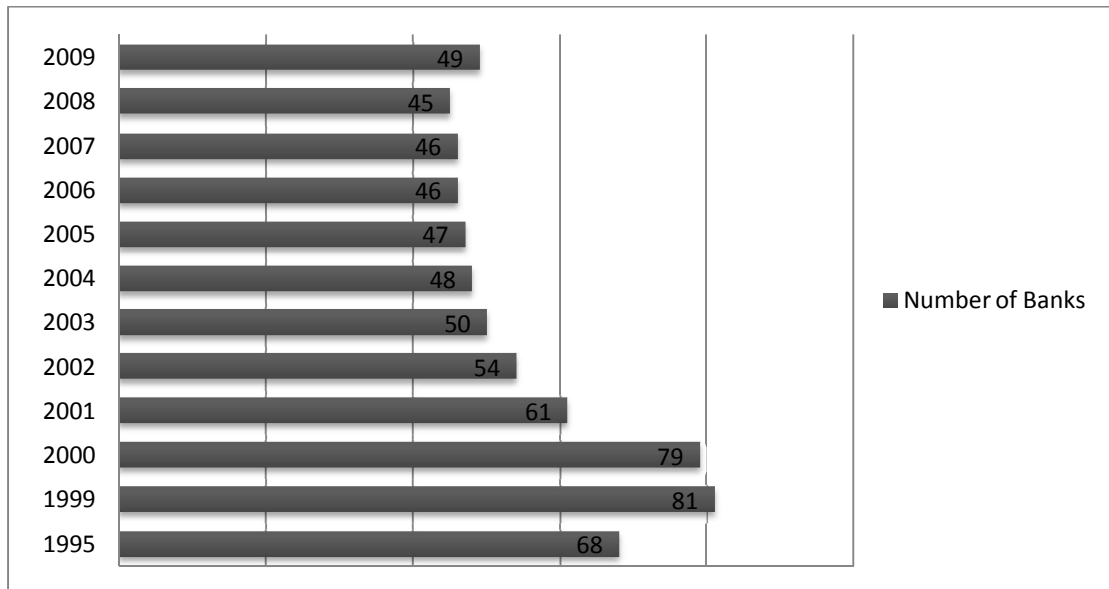
**Source: The Banks Association of Turkey**

In 2002, the most important developments in the banking sector were financial and operational restructure of the banks, and ensuring capital support to the private banks. During 2002 and 2007 period, well defined targets, disciplined applications of them, political stability and favorable conditions in the world economy allow this period to study as 'restructure period' for both economy and banking sector. [9]

According to the literature in general, as the number of banks increase in the sector, the concentration decreases and the competition rises. It is consistent only if the new bank in the sector is strong enough. Therefore, the increase in the number of banks causes decrease in the concentration between 1980-2000 years. On the other hand, it was reversed after 2001, the decrease in the number of banks caused rise in the concentration.

**Figure 2**
**Concentration in the Banking Sector * (percentage)**

| YEARS | 1980 | 1990 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Top 5 Banks** | | | | | | | | | | | | |
| *Assets* | *63* | *54* | *44* | *46* | *48* | *56* | *58* | *60* | *60* | *62* | *62* | *63* |
| *Deposits* | 69 | 59 | 49 | 50 | 51 | 55 | 61 | 62 | 64 | 64 | 65 | 66 |
| *Loans* | 71 | 57 | 40 | 42 | 42 | 49 | 55 | 54 | 48 | 57 | 58 | 55 |
| **Top 10 Banks** | | | | | | | | | | | | |
| *Assets* | *82* | *75* | *68* | *68* | *69* | *80* | *81* | *82* | *84* | *85* | *86* | *87* |
| *Deposits* | *88* | *85* | *73* | *69* | *72* | *81* | *86* | *86* | *88* | *89* | *90* | *91* |
| *Loans* | *90* | *78* | *73* | *73* | *71* | *80* | *74* | *75* | *77* | *83* | *84* | *85* |

**\*As of total assets**

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[9] Sübidey Togan, Turkey Country Report (2010)

Economic performance improved in the consideration of fundamental macro indicators. A stable and high growth rate was gained and inflation rate decreased. A primary surplus was achieved at a rate of 5 percent of GNP during the period. Furthermore, interest rate for public borrowing dropped, and its maturity got longer due to the increase in foreign resources and decrease in risk premiums.

An important restructuring process begun for the banking sector. The private banks strengthen their capital which they lost because of 2001 crisis. The other banks merged with them or transferred to SDIF. The commercial banks were restructured and taken under a common control. A more autonomous structure was formed for public supervision and audit function. In addition, Laws and regulations regarding banks' activities were renovated in 2005, and converged to the internationally-recognized principles and applications significantly.

Following the stable and high growth performance since 2002, Turkey experienced a rapid deceleration in 2008. The main factor, which affected the economic performance in 2008, was instability in the money and capital markets of the developed and developing countries. As a result of this, there were fluctuations in inflation and interest rates. Since then, there had been decrease in net capital flows, expansion in budget deficit, rising in unemployment rate and a quick decline in foreign exchange deposits. Hence, TL depreciated against major currencies in the last quarter. Additionally, the full deposit insurance was implemented in many countries except Turkey. Savings Deposit Insurance Fund's own resources were not sufficient to increase the deposit insurance coverage, which was TL50000, and to cover unlimited deposit insurance.

Central Bank took serious precautions aim at easing negative effects of the global crisis on Turkey. For this purpose, Central Bank increased the exports rediscount credit limit, and resumed its activities as an intermediary in the foreign exchange deposit market. The Banking Regulation and Supervision Agency allowed banks to restructure loans, which had no problems, in order to protect the financial strength of banks. Banking sector focused on protecting the loan quality and increasing its foreign exchange liquidity assets. In 2008, balance sheet size of the deposit banks reported an average growth of 25.9 percent. Although this stable growth and increase in loan supply during 2002 and 2008, the banking system in Turkey was still relatively small compared to EU member states.

The crisis had deep impacts on the financial sector, and almost all sectors affected negatively. The main indicators of this global crisis were decline in the world output and trade volume at the highest level for last 40 years, rising of budget deficit and public debt, increasing unemployment and loss of confidence to the markets. The national authorities, international institutions and central banks aimed at providing liquidity support to financial markets by decreasing interest rates. As a result, the financial markets of developed and emerging markets recovered more rapidly.

The global crisis and international developments also affected financial sector in Turkey. Gross National Income and foreign trade volume diminished, budget deficit and unemployment rate increased, and also capital inflow decreased in parallel to the world economy. In the banking sector, balance sheet risks and liquidity needs increased rapidly in the first quarter of 2009. However, Turkey stayed in safe due to the effective measures taken by the authorities and successful risk management by banks. This efficient approach of Turkish banking sector was mentioned as 'the best story of Turkey' in 2009[10].

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[10] The Banks Association of Turkey (2010)

# Chapter 4

## Methodology

The starting point in the literature for analyzing the determinants of the net interest margin is the dealership model proposed by Ho and Saunders (1981), and developed by Allen (1988), Angbazo (1997) and Wong (1997).[11] In the dealership model, banks are viewed as risk-averse dealers between demanders and suppliers of funds in the credit market. The net interest margin is expressed as the ratio of net interest income (banks interest income - banks interest expense) to total assets.[12] There are two methods to study the determinants of bank net interest margins. The first method is the two-step procedure, which is a measure and estimation of the 'pure' margin. The main advantage of this model is that it allows 'pure' margin to be estimated.[13] The other method is the single-step estimation, which explains the determinants of net interest margins by different potential determinants.

Following Angbazo (1997), Demirguc-Kunt and Huizinga (1999), Drakos (2003), Maudos de Guevara (2004) and Kasman et al. (2010), the single-step estimation approach is used to analyze the determinants of net interest margin in the Turkish banking system for the period 1998-2009.

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[11] According to the dealership approach, banks are risk-averse dealers trying to balance loan and deposit markets, where loan requests and deposit flows are not necessarily synchronized. In this set up, bank spreads are interpreted as fees charged by banks for the provision of liquidity under transactions uncertainty. The firm theoretical model of banks assumes these operate in a static framework where the demand and supply for loans and deposits clears both markets. (Peria and Mody 2004)

[12] This definition was used widely in the literature: Angbazo (1997), Saunders and Schumacher (2000), Drakos (2003)

[13] See Kasman et al (2010)

The net interest margins are generally expressed as a function of bank-specific explanatory variables. Following the approach commonly used in the literature, we specify net interest margins as a function of bank specific variables such as operating cost (OC), capital adequacy (CAR), implicit interest payments (IIP), size (logarithm of total loans, LTL), managerial efficiency (EFF), deposit ratio (DEPLIA), default risk (DR), credit risk (CRISK), liquidity ratio (LIQRISK) and herfindahl index (HHTL), and macroeconomic variables such as GDP growth rate (GDPG) and the capitalization of stock market (CAP).

The panel data models are used to analyze the impact of deposits insurance on the determinants of commercial bank net interest margins in the Turkish banking industry. The panel data models (fixed and random effects) have several advantages. First, including banking firm effects, unobserved heterogeneity can be controlled. This is important because OLS regression is biased if a variable is omitted that is related the dependent variable. All bank-specific, non time-varying determinants of net interest margins not explicitly addressed in the regression specification are captured by model. Second, panel estimation allows us to obtain more reliable estimates by observing the behavior of banks over time and testing for changes in the coefficients.

The empirical model is specified as follows:

*afad*

$$NIM_{it} = \beta_1 + \beta_2 OC_{it} + \beta_3 CAR_{it} + \beta_4 IIP_{it} + \beta_5 LTL_{it} + \beta_6 EFF_{it} + \beta_7 DEPLIA_{it}$$
$$+ \beta_8 DR_{it} + \beta_9 CRISK_{it} + \beta_{10} LIQRISK_{it} + \beta_{11} HHTL_{it} + \beta_{12} FDUM \qquad (1)$$
$$+ \beta_{13} DEPDUM + \beta_{14} GDPG_{it} + \beta_{15} CAP_{it} + \varepsilon_{it}$$

where NIM, FDUM and DEPDUM denote the net interest rate margin of bank *i* at time *t*, dummy variable to control for foreign ownerships and dummy variable to control for deposit insurance, respectively.

# Chapter 5

# Data and Empirical Results

## 5.1. Data

The bank level data used in this thesis are obtained from the Banks Association of Turkey and only commercial banks are considered. The macroeconomic indicators data such as GDP growth and market capitalization are derived from World Tables of World Bank. The data are examined from missing values and extreme values. The annual data set based on dollar covers all commercial banks in Turkey over the sample period 1998-2009. The final sample included balance sheets and income statements of 75 commercial banks. All the ratios are calculated in accordance with studies in the related literature. Table 1 summarizes the definitions and expected signs of all the variables used for the empirical model.

**Table 1**
**Description of the variables**

|  | *Description of the variables* | *Expected Sign* |
|---|---|---|
| ***Dependent Variable***<br>**Net Interest Margin (NIM)** | Difference between interest income and interest expense divided by total assets. |  |
| ***Explanatory Variables***<br>**Operating Costs (OC)** | The ratio of operating costs to total assets:<br>The banks with higher operating costs need to work with higher margins in order to cover their costs. | + |

| | | |
|---|---|---|
| **Capital adequacy (CAR)** | The ratio of capital to total assets: If the banks have higher level leverage (especially well capitalized banks), they force lower cost of external funding and larger net interest margins. | + |
| **Implicit Interest Payments (IIP)** | The difference between noninterest expense and non interest income divided by total assets: It indicates the extra payments to depositors though service charge remission or other types of transfers. An increase in IIP means a rise in net spreads. | + |
| **Size (LTL)** | Volume of loans granted in logarithms. | +/- |
| **Managerial Efficiency (EFF)** | The ratio of operating costs to gross income. | +/- |
| **Deposit Ratio (DEPLIA)** | The ratio of deposits to total liabilities. | - |
| **Default Risk (DR)** | The ratio of nonperforming loans to total loans. | + |
| **Credit Risk (CRISK)** | The ratio of nonperforming loans to total assets. | + |
| **Liquidity Ratio (LIQRISK)** | The ratio of liquid assets to total assets: It indicates the differences in bank assets and banks' ability to repay short term credits. If deposit market is competitive, there will be no enough cash to meet deposits or new loan demand. Therefore, greater liquidity | - |

| | | | |
|---|---|---|---|
| | will be negatively associated with interest margins. | | |
| **Herfindahl Index (HHTL)** | Herfindahl index as a proxy of market concentration in terms of total loans. | + | |

## 5.2. Descriptive Statistics

To examine the impact of deposit insurance on the net interest margins, the data sample is divided into two sub-periods. The first sub-period covers the pre-partial insurance period 1998-2003. The second sub-period covers the post-partial insurance period 2004-2009. Table 2 reports the summary statistics of the variables for whole sample. Hence, Table 3 and Table 4 present the summary statistics of the variables for both sub-periods.

**Table 2**
**Summary Statistics (1998 – 2009 periods)**

| *Variables* | *Mean* | *Standard Deviation* | *CV* |
|---|---|---|---|
| **NIM** | 0.074 | 0.115 | 1.552 |
| **OC** | 0.068 | 0.072 | 1.065 |
| **CAR** | 0.102 | 0.200 | 1.951 |
| **IIP** | 0.046 | 0.497 | 10.823 |
| **LTL** | 2.446 | 1.146 | 0.468 |
| **EFF** | 2.248 | 28.275 | 12.575 |
| **DEPLIA** | 0.574 | 0.280 | 0.488 |
| **DR** | 0.441 | 3.690 | 8.363 |
| **CRISK** | 0.038 | 0.088 | 2.303 |
| **LIQRISK** | 0.370 | 0.237 | 0.640 |
| **GDPG** | 3.049 | 4.870 | 1.597 |
| **CAP** | 27.411 | 10.741 | 0.391 |

**Table 3**
**Summary Statistics (1998-2003 periods)**

| Variables | Mean | Standard Deviation | CV |
|---|---|---|---|
| NIM | 0.092 | 0.142 | 1.547 |
| OC | 0.083 | 0.088 | 1.049 |
| CAR | 0.072 | 0.241 | 3.346 |
| IIP | 0.062 | 0.636 | 10.121 |
| LTL | 2.117 | 1.058 | 0.499 |
| EFF | 3.312 | 24.981 | 7.541 |
| DEPLIA | 0.586 | 0.317 | 0.541 |
| DR | 0.677 | 4.709 | 6.947 |
| CRISK | 0.050 | 0.111 | 2.222 |
| LIQRISK | 0.416 | 0.229 | 0.551 |
| GDPG | 1.800 | 4.751 | 2.636 |
| CAP | 25.04 | 11.326 | 0.452 |

When we analyze the differences between two sub periods, it is clear that bank net interest margins decrease significantly in the second sub-period (2004-2009). Although the number of commercial bank have decreased in the sector, the competition seems to be increased. Moreover, net interest margins are more volatile in the post-partial insurance period. Default risk, credit risk and liquidity risk have decreased in the post-partial insurance period. The main reason of decrease in default risk is that the non-performing loans decreased in the second period. In the post-partial insurance period, operations of banks in the sector have been more cautious in producing loans. This banks' behavior cause decrease in the size of problem loans in the total loan portfolio.

The macroeconomic indicators GDP growth rate and the ratio capitalization to GDP (CAP) have increased significantly in the post-insurance period. GDP growth rate increased from 1.8 % in the first sub-period to 4.4 % in the second sub-period. As for the

CAP, it raised from 25% to 31%. The main reason of this development is the political stability in Turkey since 2002.

**Table 4**
**Summary Statistics (2004-2009 periods)**

| Variables | Mean | Standard Deviation | CV |
|---|---|---|---|
| NIM | 0.046 | 0.034 | 0.744 |
| OC | 0.109 | 0.041 | 0.373 |
| CAR | 0.150 | 0.090 | 0.598 |
| IIP | 0.019 | 0.019 | 1.009 |
| LTL | 2.971 | 1.085 | 0.365 |
| EFF | 0.696 | 32.839 | 47.132 |
| DEPLIA | 0.557 | 0.207 | 0.372 |
| DR | 0.070 | 0.164 | 2.344 |
| CRISK | 0.020 | 0.018 | 0.894 |
| LIQRISK | 0.299 | 0.232 | 0.774 |
| GDPG | 4.394 | 4.867 | 1.107 |
| CAP | 31.001 | 8.703 | 0.280 |

## 5.3. Empirical Results

Following the recent empirical literature on the determinants of bank NIMs, the econometric model specified in Eq. (1) is estimated using panel data model to control for unobserved heterogeneity. The choice of the fixed effects or random effects is based on the results of the Hausman test. We run three regressions to estimate the model specified in Eq. (1): The first one is for the whole period (1998-2009) and the other two are for sub-periods (1998-2003 and 2004-2009). Table 5 reports the regression results for the period 1998-2009. However, Table 6 and Table 7 report the regression results of two sub-periods. The explanatory variables of the model generally represent the expected signs and have significant effects on net interest margin.

**Table 5**
**Regression Results (Random Effect): 1998-2009**

| Variables | Coefficient | t-statistic |
|---|---|---|
| OC | 0.377* | 5.567 |
| CAR | 0.263* | 7.737 |
| IIP | 0.011*** | 1.662 |
| LTL | 0.013*** | 1.720 |
| EFF | -6.60 | -0.528 |
| DEPLIA | -0.121* | -4.824 |
| DR | 0.003* | -3.418 |
| CRISK | 0.159* | 2.474 |
| LIQRISK | 0.040 | 1.547 |
| HHTL | -0.892** | -2.091 |
| FDUM | -0.005 | -0.344 |
| DEPDUM | 0.027** | 2.451 |
| GDPG | -0.004* | -6.232 |
| CAP | -0.000* | -2.682 |
| *Weighted Statistics* | | |
| Adjusted R2 | 0.408 | |
| F statistics | 24.084 | |
| Prob (F statistic) | 0.000 | |
| Housman | 15.96 (df:14) | |
| Prob (Hausman) | 0.315 | |

Note: *, ** and *** denote significance levels at 1%, 5% and 10%, respectively

The impact of the operating cost (OC) on the NIMs is positive and statistically significant at the conventional levels in all periods, suggesting that banks with higher operating cost require for higher interest rates on loans but lower interest rates on deposits. As the free bank services such as phone banking, internet banking, ATMs and EFTPO increase because of the competition in the banking sector, banks operating costs rise dramatically. In addition, the effect of the operating cost on NIMs is particularly

higher in the second sub-period (2004-2009). Therefore, the banks, that bear higher operating costs, need to cover them with higher margins as previously found by Wong (1997), Barajas et al.(1999), Abreu and Mendes (2003), Maudos de Guevara (2004), Doliente (2005), Williams (2007) and Hawtrey and Liang (2008).

**Table 6**
**Regression Results (Random Effects): Before partial insurance 1998 – 2003**

| Variables | Coefficient | t-statistic |
|---|---|---|
| OC | 0.434* | 5.419 |
| CAR | 0.282* | 6.210 |
| IIP | 0.009 | 1.196 |
| LTL | 0.030* | 2.778 |
| EFF | 0 | 0.725 |
| DEPLIA | -0.183* | -4.952 |
| DR | -0.002** | -2.116 |
| CRISK | 0.259* | 3.311 |
| LIQRISK | 0.083** | 2.386 |
| HHTL | -0.561 | -1.080 |
| FDUM | 0.016 | 0.627 |
| GDPG | -0.009* | -7.278 |
| CAP | -0.002* | -3.916 |
| *Weighted Statistics* | | |
| Adjusted R2 | 0.486 | |
| F statistics | 21.772 | |
| Prob (F statistic) | 0.000 | |
| Housman | 17.791(df:13) | |
| Prob (Hausman) | 122 | |

Note: *, ** and *** denote significance levels at 1%, 5% and 10%, respectively

One of the most significant determinants of the net interest margin is the capital adequacy (CAR) which is measured by the ratio of bank capital to total assets. If banks have higher level of capital, they force lower cost of external funding, and thus, larger net interest margins. Moreover, if the banks have more free capital, the risky assets level in their portfolio and margins will increase. The positive and significant coefficient of the capital adequacy on net interest margin for the whole period and pre partial insurance period is consistent with Ho and Saunders (1981) dealership model, and findings of Wong (1997), Saunders and Schumacher (2000), Brock and Saurez (2000), Bennacuer and Goaied (2003), Doliente (2005) and Kasman *et al.* (2010). Post partial insurance period, the effect of the capital adequacy on NIMs is negative whereas statistically insignificant.

The level of the implicit interest payments (IIP), measured by the difference between noninterest expense and noninterest income divided by total assets, indicates that the extra expenses made up by banks to depositors through extending interest margins. It has a positive and significant impact on net interest margins for the whole period. This result suggests that banks offer free banking services instead of remunerating deposits explicitly by paying an interest rate, leading higher interest margins. This result is consistent with the findings of Maudos de Guevara (2004), Ben-Khedhiri et al. (2005), Willaims (2007), Hawtrey and Liang (2008) and Kasman et al. (2010). In contrast, the impact of the IIPs on the NIMs becomes insignificant in two sub-periods.

The log of volume of loans (LTL), as a proxy of the size of the operations, has a positive and statistically significant coefficient in the whole period and pre-partial insurance

period. These results suggest that an increase in operation size causes a rising in margins. This is consistent with the findings of Maudos de Guevara (2004) and Ben-Khedhiri et al. (2005). On the contrary, the size has a significant and negative effect in post-partial insurance period, suggesting that increased volume of loans may result in a reduction of unit, which achieves scale efficiencies. Thus, larger size operations will result in smaller operating costs and narrower margins. This result is consistent with the findings of Beck and Hesse (2007), Williams (2007) and Hawtrey and Liang (2008).

**Table 7**
**Regression Results (Fixed Effects): After partial insurance 2004 - 2009**

| Variables | Coefficient | t-statistic |
|---|---|---|
| OC | 0.592** | 2.544 |
| CAR | -0.055 | -0.589 |
| IIP | -0.4114 | -1.653 |
| LTL | -0.010* | -1.073 |
| EFF | 8.92E-05* | 2.945 |
| DEPLIA | 0.061* | 2.769 |
| DR | -0.021 | -1.048 |
| CRISK | -0.128 | -0.889 |
| LIQRISK | -0.077* | -3.381 |
| HHTL | -1.189* | -3.893 |
| FDUM | 0 | 0.146 |
| GDPG | -0.002* | -4.371 |
| CAP | -3.73E-05 | -0.422 |
| *Weighted Statistics* | | |
| Adjusted R2 | 0.640 | |
| F statistics | 8.380 | |
| Prob (F statistic) | 0.000 | |
| Housman | 46.743 | |
| Prob (Hausman) | 0.000 | |

**Note: *, ** and *** denote significance levels at 1%, 5% and 10%, respectively**

The managerial efficiency (EFF), measured by the ratio of non interest expense to gross income, has a negative and statistically insignificant impact on the NIMs in the whole period. However, it has a positive impact in two sub-periods whereas significant only in post-partial insurance period. This result implies that higher managerial efficiency stimulates banks to offer higher loan rates. This result is in contrast with the findings of line with the findings of Angbazo (1997), Maudos de Guevara (2004), Hawtrey and Liang (2008) and Kasman *et al* (2010).

The deposit ratio (DEPLIA), which is the ratio of deposits to total liabilities, may be either negative or positive. It has a significant negative coefficient in pre-partial insurance period. This result shows that deposits are not loss leader products while deposits are full guaranteed by the government. In contrast, the deposit ratio has a positive and significant impact on net interest margins both in the whole period and post-partial insurance period. This positive relationship between deposits and bank margins indicates that deposits are loss leader products which permits operating with larger interest margins.[14] The main reason of this result is that some of the deposit money banks benefit from long-standing relationships with customers.

Banks' interest margins are expected to be positively related to the default risk, which suggest that banks with higher non performing loans will require higher net interest margin in order to compensate for a greater degree of default risk. The result for the whole period is in accordance with the findings of Angbazo (1997), and Kasman *et al*. (2010) On the other hand, in contrast with the finding of Brock and Saurez (2000).

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[14] See Valverde and Fernandez (2005)

However, there are unexpected sings for both of the sub-periods. There is a negative significant relationship between default risk and bank margins in the first sub period. This result is opposite to the expected sing for this variable. If non performing loans are mispriced, net interest margin does not fully compensate for them, and this creates in negative relationship between them. Furthermore, there is no significant effect of default risk in the post-partial insurance period.

Credit risk (CR), which is measured by the ratio of nonperforming loans to total asset, shows the risk of non repayment on credit. It is expected to be positively related to CR. The results in Table 9 and Table 10 indicate that the credit risk has a positive and statistically significant coefficient both in the whole period and pre-partial insurance period, suggesting that increased credit risk may cause an increase banks' interest rate margin.  In the pre-partial insurance period, the banks give high level of credits under the full saving deposit insurance with unqualified information. The result is consistent with the findings of Wong (1997), Maudos de Guevara (2004), Hawtrey and Liang (2008) and Williams (2007). However, the effect of credit risk on the bank margins becomes insignificant in the post-partial insurance period.

The liquidity (LIQRISK) is measured as the ratio of cash to total assets. Liquid assets indicate cash and other balances in banks assets. As a result of regulations such as reserve or liquidity requirements and mismatching of asset and liability maturity, there will be an extra cost on banks. The margins will increase while the banks transfer this cost to borrowers. The liquidity has a positive and statistically significant coefficient only in the pre-partial insurance period, suggesting that as the liquidity increases, the

bank's appetite for deposits decreases, and hence the bank pays less on deposits thereby increasing the net interest margin. However, the liquidity has a negative and statistically significant coefficient in the post-partial insurance period. The banks can reduce liquidity risk by holding their assets in highly liquid form. It would be expected that as liquid assets increase, the liquidity risk premium in bank interest margins will decrease. This result is in line with the findings of Angbazo (1997), Brock and Saurez (2000), Drakos (2002), Doliente (2005) and Ben-Khedhiri et al. (2005).

As regards to competition between banks in the market, the degree of market concentration is measured by the Herfindahl index[15]. An increase in concentration indicates that more efficient banks are taking over less efficient ones and the level of bank assets in total banking assets increase. The results show that Herfindahl index has negative and significant effect on interest margin in post- partial insurance period, suggesting that banks with monopoly power can charge lower loan rates and higher deposit rates. A possible explanation of this result is that increases in the degree of concentration in the post-partial insurance period influenced by the process of mergers and acquisitions caused an upward pressure on the competition while narrowing the interest margins.

The results also show that the macroeconomic variables such as GDP growth and capitalization are related to net interest margin in the two sub-periods. GDP growth has negative relationship with interest margins for the first sub period as previously found by Brock and Saurez (2000), Demirguc-Kunt and Huizinga (1999) and Kasman *et al.*

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[15] Herfindahl Index defines as the sum of squared loan market shares

(2010). This result may reflect the fact that the fluctuations in economic growth of Turkey for the before partial insurance period raise the risk of banks, and reduce the margins. Although GDP growth becomes stable for the second sub period, the negative relationship remains at nearly the same level. It can be explained by the higher level of the default risk in banks. The capitalization is the ratio of stock market capitalization to GDP is used as a proxy of stock market development. The results indicate that capitalization has a negative significant impact on net interest margins, suggesting that as stock markets develop, this increases competition to the banking products, and decrease net interest margin.

The foreign dummy variable reveals interesting results. This dummy variable has no significant impact on net interest margin for both of the periods. This result suggests that the increased foreign participation in the market does not affect the margins.

Deposit insurance is a guarantee that full or partial amount of the principal will be paid by the government if the bank fails. There are three main objectives of deposit insurance. The first one is to protect the small depositor who does not have enough information about the risk assessment. The second one is to support the confidence in deposit taking institutions, and reduce the probability of deposit runs in the market. The last one is to maintain the stability of the financial system during a crisis. However, the full saving deposit insurance is used as a license for excessive risk taking and increase moral hazard. Thus, the authorities in Turkey started to implement partial saving deposit insurance in June of 2004. It is expected that competitive conditions and banks' interest margins have changed.

The aim of this thesis is to identify the determinants of net interest margin before and after the partial saving deposits insurance. The deposit insurance variable is a dummy variable that takes on a value of one if full deposit insurance is applied, and a value of zero otherwise (partial deposit insurance). As seen in Table 9, deposit insurance dummy variable has a positive and statistically significant coefficient, suggesting that during the post-partial insurance period banks charge lower deposits rates. In this period, deposits are concentrated in few banks in the industry (public and big private banks), since depositors have become more cautious in selecting banks to deposit their money. Hence, deposit concentration in the banking industry has increased. These big public and private banks are also the price setter in the sector. They started to offer lower interest rates on deposits since in most of this period they did not have problem in collecting the deposits. This is the one of the main reasons that the impact of deposit insurance dummy variable on the net interest margin is positive in post-partial insurance period.

# Chapter 6

## Conclusion

The Turkish banking system has undergone important structural changes due to the liberalization process since 1980. The main objective of this process was to create an efficient, stable and sound banking system. However, this process has caused macroeconomic problems, and policy makers have lost control in fiscal deficits. As a result, the 1994 currency crisis occurred in Turkey. Therefore, the government announced full savings deposit insurance to prevent banking failures (and/or bank run) and ensure stability in the banking sector. Although the Turkish Lira was devalued by more than 100% against the US dollar and foreign reserves of central bank were reduced dramatically, the banking sector was able to recover immediately.

Due to the disinflation program of 1999 and insufficient structural arrangements, the second major crisis began in 2001. Particularly, the commercial banks were the most affected because of the moral hazard problem of the full saving deposit insurance. However, The Banking Regulation and Supervision Agency has become effective and the most of the banks were taken under Savings Deposit Insurance Fund control. The partial saving deposit insurance, which was TL50000, was first implemented in 2004. Thus, the degree of market concentration and competition between banks increased in the banking sector. It is believed that depositors and bank performance were influenced by the partial saving deposit insurance.

Hence, the objective of this thesis was to investigate the impact of partial saving deposits insurance on the performance of banks operating in the Turkish banking industry for the period 1998-2009. Following the dealership model in single country studies, the determinants of net interest margin are expressed as a function of operating cost, capital adequacy, implicit interest payments, size, management efficiency, deposit ratio, default risk, credit risk, liquidity ratio and Herfindahl index; and macroeconomic variables such as economic growth and the ratio of capitalization to GDP. To study the impact of deposit insurance on the net interest margin, we divided the sample into two sub periods: Pre-partial insurance period and post-partial insurance period. We also estimate the model for the whole period using a dummy variable to control for the impact of partial insurance policy on the net interest margin.

All the explanatory variables except management efficiency, liquidity risk and Herfindahl index present the expected signs with significant coefficients. The management efficiency (EFF) has statistically insignificant impact on the net interest margin in the whole period. However, it has a positive and significant impact only in the post-partial insurance period, in contrast with the unexpected sign. The result suggests that banks with higher managerial efficiency offer higher interest rates on loans, leading to higher interest margins.

Herfindahl index (HHTL) as a proxy of the degree of market concentration has a negative and statistically significant effect on NIMs in opposition to expected sign as in the case of the management efficiency. Particularly, the high degree of market

concentration after partial saving deposit insurance guarantee in Turkey causes a high level of competition and narrower margins.

Liquidity risk (LIQRISK) has different results in two sub-periods. It has a positive and significant coefficient in the pre-partial insurance period, suggesting that as the liquidity increases, interest rates on deposits reduce, and hence net interest margin increases. However, the negative and significant coefficient of liquidity risk on net interest margin in the post-partial insurance period is consistent with the literature. The deposit market has lost competitiveness in the post partial insurance period, thus, the banks have sufficient cash to meet deposits or new loan demand. This result supports the view that increases in liquid assets promote reduction in liquidity risk premiums in bank interest margins

This study has also found that operating cost, capital adequacy, implicit interest payments, default risk and credit risk are all positively related to banks' interest margins. Operating costs (OC) has a positive and statistically significant effect on NIMs in all periods. This result suggests that competition between banks in Turkey causes an upward pressure on the operating costs, extending the net interest margins, especially for the post-partial insurance period.

The positive and significant coefficient of capital adequacy (CAR) on interest margins in whole period and pre-partial insurance period shows that banks with higher capital require for lower cost of funding and higher net interest margins. There is an interesting result for the post partial insurance period. Although the banks in Turkey have higher capital ratios in the second sub-period, the capital adequacy has a statistically

insignificant impact on NIMs. Furthermore, the implicit interest payments (IIP) imply the extra expenses paid by banks have also a positive and significant impact on NIMs, and also increase the interest margins.

The results of the default risk (DR) and credit risk (CR) are consistent with the expected signs for the whole period, suggesting that higher nonperforming loans increase the degree of risk premiums, and hence banks need to cover them with higher interest margins. In contrast, default risk has a negative significant impact on NIMs in the pre-partial insurance period, which shows that mispricing for risk of banks reduces the margins due to the full deposit insurance guarantee.

The size (LTL) is to found to have a positive and significant effect on the net interest margins both in the whole period and in pre-partial insurance period. In contrast, there is a negative relationship between the volume of loans and interest margins as a result of scale efficiencies in the post-partial insurance period. The higher size causes lower operating costs and hence narrower margins. This result is one of the main reasons explaining the decline in the net interest margins in the post-partial insurance period.

The deposit ratio (DEPLIA) has a negative significant coefficient in the pre-partial insurance period. In this period, banks give higher deposit interest rates for collecting more funds under the full saving deposit insurance guarantee. Thus, banks interest expenses and net interest margins increase. In contrast, it has a positive impact on margins in post-partial insurance period. After partial saving deposit insurance guarantee, depositors started to choose mostly the public banks, and hence deposits have been a loss leader product, which cause larger interest margins.

Macroeconomic variables are statistically significant in the whole period. GDP growth rate (GDPG) has a negative and significant impact on net interest margins in all periods. Particularly, the main reason for this result is the macroeconomic problems such as current deficit, high inflation and volatility in exchange rates in Turkey. These problems give rise to the risk of banks and reduce the margins. In spite of well defined targets and political stability in the post-partial insurance period, the negative impact on net interest margins remains the same due to the high level of loans given by banks. There is also a negative significant relationship between the capitalization ratio and net interest margins.

The deposit insurance has statistically positive effect on net interest margins. In pre-partial insurance period, full deposit insurance provides banks with an incentive to implement strategies involving greater risk in order to attract more depositors. Also, the banks lend money more cheaply if they have insufficient information. This moral hazard problem leads banks to increase interest rate margins. Therefore, this caused a serious crisis in the banking sector in November 2000. This result may reflect the fact that the existence of the full deposit insurance is positively related with the probability of banking crisis.

In the post-partial insurance period, depositors generally started to prefer public banks and some large private banks. These banks have become the dominant power in the sector. They reduced the interest rates on deposits. Thus, lower interest expenses cause narrower margins . Overall, it can be said that deposit insurance is one of the major financial regulations affecting the net interest margins of commercial banks in Turkey.

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**APPENDIX A:**

**Table 8: Correlation Coefficients of Explanatory Variables (1998 – 2009 periods)**

|         | NIM    | OC     | CAR    | IIP    | LTL    | EFF    | DEPLIA | DR     | CRISK  | LIQRISK | HHTL   | GDPG   | CAP |
|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|-----|
| NIM     | 1      |        |        |        |        |        |        |        |        |         |        |        |     |
| OC      | 0.080  | 1      |        |        |        |        |        |        |        |         |        |        |     |
| CAR     | 0.461  | -0.286 | 1      |        |        |        |        |        |        |         |        |        |     |
| IIP     | 0.150  | -0.075 | 0.192  | 1      |        |        |        |        |        |         |        |        |     |
| LTL     | -0.222 | -0.338 | -0.147 | -0.032 | 1      |        |        |        |        |         |        |        |     |
| EFF     | 0.046  | 0.063  | 0.029  | 0.028  | 0.040  | 1      |        |        |        |         |        |        |     |
| DEPLIA  | -0.463 | 0.168  | -0.656 | -0.116 | 0.387  | -0.024 | 1      |        |        |         |        |        |     |
| DR      | -0.247 | 0.147  | -0.263 | 0.009  | -0.132 | -0.008 | 0.215  | 1      |        |         |        |        |     |
| CRISK   | -0.265 | 0.417  | -0.629 | -0.195 | -0.025 | -0.014 | 0.491  | 0.300  | 1      |         |        |        |     |
| LIQRISK | 0.130  | 0.071  | 0.022  | -0.033 | -0.631 | -0.090 | -0.227 | 0.070  | -0.112 | 1       |        |        |     |
| HHTL    | -0.057 | -0.149 | 0.300  | -0.047 | 0.195  | -0.077 | -0.069 | -0.067 | -0.109 | -0.330  | 1      |        |     |
| GDPG    | -0.187 | -0.009 | 0.085  | 0.011  | 0.032  | 0.001  | -0.059 | 0.027  | -0.048 | -0.128  | 0.077  | 1      |     |
| CAP     | -0.127 | -0.044 | -0.114 | -0.103 | 0.090  | -0.007 | 0.026  | 0.004  | 0.005  | 0.060   | 0.033  | -0.273 | 1   |

## APPENDIX B:

**Table 9: Correlation Coefficients of Explanatory Variables (1998 – 2003 period)**

|        | NIM    | OC     | CAR    | IIP    | LTL    | EFF    | DEPLIA | DR     | CRISK  | LIQRISK | HHTL   | GDPG   | CAP |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|-----|
| NIM    | 1      |        |        |        |        |        |        |        |        |         |        |        |     |
| OC     | 0.03   | 1      |        |        |        |        |        |        |        |         |        |        |     |
| CAR    | 0.559  | -0.281 | 1      |        |        |        |        |        |        |         |        |        |     |
| IIP    | 0.148  | -0.095 | 0.211  | 1      |        |        |        |        |        |         |        |        |     |
| LTL    | -0.240 | -0.312 | -0.205 | -0.016 | 1      |        |        |        |        |         |        |        |     |
| EFF    | 0.045  | 0.063  | 0.055  | 0.036  | -0.009 | 1      |        |        |        |         |        |        |     |
| DEPLIA | -0.570 | 0.187  | -0.703 | -0.133 | 0.388  | 0.009  | 1      |        |        |         |        |        |     |
| DR     | -0.274 | 0.132  | -0.267 | 0.005  | -0.136 | -0.018 | 0.244  | 1      |        |         |        |        |     |
| CRISK  | -0.324 | 0.397  | -0.658 | -0.207 | 0.042  | -0.042 | 0.563  | 0.292  | 1      |         |        |        |     |
| LIQRISK| 0.155  | -0.007 | 0.023  | -0.061 | -0.492 | -0.015 | -0.203 | 0.064  | -0.180 | 1       |        |        |     |
| HHTL   | 0.062  | 0.007  | 0.252  | -0.028 | -0.035 | -0.083 | -0.060 | -0.028 | -0.025 | -0.324  | 1      |        |     |
| GDPG   | -0.176 | 0.044  | 0.084  | 0.025  | 0.040  | 0.074  | -0.047 | 0.059  | 0.004  | -0.149  | 0.025  | 1      |     |
| CAP    | -0.092 | 0.038  | -0.218 | -0.111 | -0.034 | 0.020  | 0.058  | 0.031  | 0.056  | 0.205   | -0.171 | -0.513 | 1   |

**APPENDIX C:**

**Table 10: Correlation Coefficients of Explanatory Variables (2004 – 2009 period)**

|  | NIM | OC | CAR | IIP | LTL | EFF | DEPLIA | DR | CRISK | LIQRISK | HHTL | GDPG | CAP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NIM | 1 | | | | | | | | | | | | |
| OC | 0.015 | 1 | | | | | | | | | | | |
| CAR | -0.167 | 0.301 | 1 | | | | | | | | | | |
| IIP | -0.059 | 0.831 | 0.206 | 1 | | | | | | | | | |
| LTL | 0.126 | -0.259 | -0.461 | -0.339 | 1 | | | | | | | | |
| EFF | 0.054 | 0.066 | 0.012 | 0.045 | 0.146 | 1 | | | | | | | |
| DEPLIA | 0.139 | -0.022 | -0.473 | -0.018 | 0.578 | -0.096 | 1 | | | | | | |
| DR | 0.165 | 0.155 | 0.301 | 0.095 | -0.322 | 0.021 | -0.332 | 1 | | | | | |
| CRISK | 0.378 | 0.239 | 0.231 | 0.055 | 0.039 | 0.075 | -0.065 | 0.647 | 1 | | | | |
| LIQRISK | -0.253 | 0.103 | 0.302 | 0.190 | -0.766 | -0.212 | -0.369 | 0.153 | -0.239 | 1 | | | |
| HHTL | -0.009 | -0.223 | -0.001 | -0.224 | 0.186 | -0.033 | 0.051 | -0.069 | 0.020 | 0.039 | 1 | | |
| GDPG | -0.144 | 0.172 | -0.098 | 0.150 | -0.191 | -0.058 | -0.056 | 0.058 | -0.194 | 0.028 | -0.629 | 1 | |
| CAP | -0.037 | -0.031 | 0.022 | -0.012 | 0.053 | -0.017 | -0.011 | 0.001 | 0.036 | -0.009 | 0.034 | -0.052 | 1 |