

# ESSAYS ON MARKET DISCIPLINE IN EMERGING MARKETS

A Ph.D. Dissertation

by

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December 2007

*To Enis, Yaman and Ceren*

ESSAYS ON MARKET DISCIPLINE IN EMERGING  
MARKETS

The Institute of Economics and Social Sciences  
of  
Bilkent University

by

AYŞE ECE UNGAN

In Partial Fulfillment of the Requirements for the Degree of  
DOCTOR OF PHILOSOPHY

in

THE DEPARTMENT OF MANAGEMENT  
BILKENT UNIVERSITY  
ANKARA

December 2007

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## ABSTRACT

### ESSAYS ON MARKET DISCIPLINE IN EMERGING MARKETS

Ayşe Ece Urgan

A Ph. D. Dissertation

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December 2007

In the aftermath of major crises, most emerging markets improved their banking industries according to Basel-II requirements, which emphasize the role of market discipline, supervision and capital adequacy in controlling risk-taking by banks. After the 1998 crisis in the Russian Federation and the 2001 crisis in Turkey, Central Bank of Russia and Banking Regulation and Supervision Agency of Turkey restructured and consolidated the banking industries in both of the countries. In the restructured banking environment, market discipline could be used as a complementary mechanism for improved supervision of banking systems. First two essays of this thesis elaborate on depositor discipline in the Russian Federation and Turkey. Findings provide evidence that in the Russian Federation, depositors allocate funds in well-capitalized and liquid banks. Similarly after the crisis, depositors in Turkey prefer well-capitalized banks that have favorable asset quality. Although banks in Turkey operate more efficiently, due to excessive guarantees, depositors do not monitor banks' risk taking behavior particularly before restructuring. In the third essay, the role of different types of shareholders in disciplining listed banks in Turkey is studied. While diversified shareholders are interested in profitability, owner-managers are concerned with capital adequacy, liquidity and efficiency of the banks. In addition, owner-managers are found to have some influence on bank management to reduce risk-taking. In particular, small banks take measures to increase the capital ratio while decreasing non-performing loans as a result of an increase in shareholders' asset risk assessments.

Keywords: Banking, market discipline, depositor discipline, equityholder discipline, emerging markets, stock prices, Russian Federation, Turkey.

## ÖZET

### YÜKSELEN PİYASALARDAKİ PAZAR DİSİPLİNİ ÜZERİNE MAKALELER

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Aralık 2007

Ekonomik krizler sonrasında yükselmekte olan piyasaların bankacılık sektörleri, banka risklerinin risk yönetim sistemleri, denetim ve pazar disiplini ile kontrol altına alınmasını öngören Basel-II Uzlaşısı'nın gereklerine göre düzenlenmiştir. Rusya Federasyonu'nda 1998 yılında, Türkiye'de ise 2001 yılında yaşanan krizlerden sonra, Rusya Merkez Bankası ve Bankacılık Düzenleme ve Denetleme Kurumu (BDDK) tarafından Rusya ve Türkiye'deki bankacılık sektörleri sağlam ve güvenilir biçimde çalışmak üzere yeniden yapılandırılmıştır. Bu koşullar altında pazar disiplini her iki ülkede de banka denetiminin tamamlayıcı unsuru olarak kullanılabilir. Bu tezin ilk iki makalesinde, Rusya ve Türkiye'deki mudilerin bankalar üzerindeki disiplini incelenmiştir. Rusya Federasyonu'ndaki mudiler, mevduatlarını sermaye yeterliliği ve likiditesi yüksek olan Rus bankalarına yönlendirmişlerdir. Benzer şekilde Türk mudiler de sermaye yeterliliği yüksek olan bankaları tercih etmişlerdir. Bunun yanı sıra, Türk mudilerinin 2001 krizinden sonra bankaların artan kredi risklerini de dikkate aldığı görülmüştür. Analiz döneminde Türk bankalarının Rus bankalarına göre daha verimli çalıştığı görülmüştür. Ancak tüm mevduatların devlet güvencesi altında olduğu dönemde Türk mudilerin pazar disiplini uygulamadığı tespit edilmiştir. Üçüncü makalede, İstanbul Menkul Kıymetler Borsası'nda işlem gören bankaların hisselerini satın alan farklı yatırım eğilimlerine sahip yatırımcıların bankalar üzerindeki izleme ve etkileme yetileri incelenmiştir. Bulgular, portföy yatırımcılarının karlılık oranı yüksek olan bankaları, tek hisse senedine yatırım yapan yatırımcıların ise sermayesi, likiditesi ve verimliliği yüksek olan bankaları tercih ettiğini göstermektedir. Buna ilave olarak, artan varlık riskinin, banka sahip ve yöneticilerini bilanço risklerini azaltma yönüne sevkettiği görülmüştür. Özellikle küçük banka yöneticilerinin yükselen varlık riskini azaltmak amacıyla sermaye yeterliliği rasyosunu yükseltirken sorunlu kredileri azalttığı tespit edilmiştir.

Anahtar Kelimeler: Bankacılık, pazar disiplini, mevduat sahipleri disiplini, hisse senedi sahipleri disiplini, yükselen piyasalar, hisse fiyatları, Rusya Federasyonu, Türkiye.

## ACKNOWLEDGEMENTS

I would like to thank my supervisors, Assistant Professor Dr. Selçuk Caner and Associate Professor Süheyla Özyıldırım for their continuous support and patience during my doctoral studies.

I would also like to express my deep gratitude to the top management of Alternatifbank A. Ş and all of my colleagues in Ankara Branch.

I am greatly inspired by the clients and bankers that I get to know during my professional banking career. The subject of this thesis would never emerge without them.

I should also thank for the continuous support and motivation provided by my mother and father. I am very thankful to my lovely children, Ceren Naz and Yaman Alp for their love and understanding. My special thanks is to my dear husband, Enis. This degree could never be possible without him. My family was always there for me.

The last but not the least, thanks to all of the valuable teachers who had implicitly or explicitly played role in my education.

# TABLE OF CONTENTS

|  |            |
|--|------------|
| <b>ABSTRACT</b>  | <b>iii</b> |
| <b>ÖZET</b>  | <b>iv</b>  |
| <b>ACKNOWLEDGEMENT</b>   | <b>v</b>   |
| <b>TABLE OF CONTENTS</b>   | <b>vi</b>  |
| <b>CHAPTER 1. INTRODUCTION</b>   | <b>1</b>   |
| 1.1 Market Discipline in Financial Markets . . . . .                                       | 3          |
| 1.1.1 Agents of Market Discipline . . . . .  | 6          |
| 1.1.2 Pre-requisites for Market Discipline . . . . .                                       | 9          |
| 1.2 Market Discipline in Emerging Markets . . . . .  | 10         |
| <b>CHAPTER 2. DEPOSITORS' ASSESSMENT OF BANK RISKI-<br/>NESS IN THE RUSSIAN FEDERATION</b> | <b>18</b>  |



|     |   |    |
|-----|---|----|
| 2.1 | Introduction . . . . .                      | 18 |
| 2.2 | Literature Review . . . . .                 | 21 |
| 2.3 | Banking in the Russian Federation . . . . . | 26 |
| 2.4 | Empirical Model . . . . .                   | 33 |
| 2.5 | Data . . . . .                              | 36 |
| 2.6 | Empirical Results . . . . .                 | 39 |
| 2.7 | Conclusion . . . . .                        | 54 |

**CHAPTER 3. DEPOSITORS’ ASSESSMENT OF BANK RISKI-  
NESS: A COMPARATIVE ANALYSIS** **56**

|     |   |    |
|-----|---|----|
| 3.1 | Introduction . . . . .                                | 56 |
| 3.2 | Literature Review . . . . .                           | 61 |
| 3.3 | Banking in the Russia Federation and Turkey . . . . . | 63 |
| 3.4 | Empirical Model . . . . .                             | 70 |
| 3.5 | Data . . . . .  | 73 |
| 3.6 | Empirical Results . . . . .                           | 76 |
| 3.7 | Conclusion . . . . .                                  | 87 |

**CHAPTER 4. OWNER–MANAGER RESPONSES TO OUTSIDE  
EQUITYHOLDERS’ BANK RISK MONITORING** **91**

|     |                        |    |
|-----|------------------------|----|
| 4.1 | Introduction . . . . . | 91 |
|-----|------------------------|----|

|       |   |            |
|-------|---|------------|
| 4.2   | Literature Review . . . . .             | 94         |
| 4.3   | Banking in Turkey . . . . .             | 98         |
| 4.4   | Methodology and the Data . . . . .      | 102        |
| 4.4.1 | The Empirical Model . . . . .           | 102        |
| 4.4.2 | Data . . . . .                          | 109        |
| 4.5   | Empirical Results . . . . .             | 112        |
| 4.5.1 | Monitoring . . . . .                    | 112        |
| 4.5.2 | Influence . . . . .                     | 117        |
| 4.6   | Conclusion . . . . .                    | 120        |
|       | <b>CHAPTER 5. CONCLUSION</b>            | <b>122</b> |
|       | <b>SELECTED BIBLIOGRAPHY</b>            | <b>127</b> |
|       | <b>APPENDICES</b>                       |            |
|       | A. STOCHASTIC FRONTIERS . . . . .       | 135        |
|       | B. FINANCIAL SYSTEM IN TURKEY . . . . . | 137        |

## LIST OF TABLES

|     |   |    |
|-----|---|----|
| 2.1 | Russian Banking Sector (2000-2005) . . . . .  | 28 |
| 2.2 | The Clustering of Russian Banks (by the end of 2005) . . . . .  | 31 |
| 2.3 | Summary of Banks' Balance Sheet Activities (by the end of March<br>2005) . . . . .                    | 38 |
| 2.4 | Descriptive Statistics for (2000:1-2005:1) . . . . .  | 39 |
| 2.5 | Estimated Coefficients of Deposit Growth Equation . . . . .   | 41 |
| 2.6 | Estimated Coefficients of Interest Rate Equation . . . . .  | 46 |
| 2.7 | Estimated Coefficients of Deposit Growth Equation for Large Banks<br>by Different Groupings . . . . . | 50 |
| 2.8 | Estimated Coefficients of Interest Rate Equation for Large Banks<br>by Different Groupings . . . . .  | 52 |
| 3.1 | Financial System Assets (by the end of 2005) . . . . .  | 64 |
| 3.2 | Ownership Structure of Russian and Turkish Banking Sectors (by<br>the end of 2005) . . . . .          | 66 |

|     |   |     |
|-----|---|-----|
| 3.3 | Russian and Turkish Banking Sectors (2001-2005) . . . . .   | 67  |
| 3.4 | Russian and Turkish Banking Sector Concentration Levels (2002-<br>2005) . . . . .                                     | 69  |
| 3.5 | Mean Operating Efficiencies of Russian and Turkish Banks . . . . .  | 70  |
| 3.6 | Descriptive Statistics (2000:1-2005:1) . . . . .  | 75  |
| 3.7 | Estimated Coefficients of Deposit Growth Equation . . . . .   | 78  |
| 3.8 | Estimated Coefficients of Implicit Interest Rate Equation . . . . .   | 84  |
| 4.1 | Management Response to Risk . . . . .   | 107 |
| 4.2 | Publicly Traded Banks in Turkey (December, 2006) . . . . .  | 110 |
| 4.3 | Descriptive Statistics (1997:4-2006:3) . . . . .  | 111 |
| 4.4 | Estimated Coefficients of the Monitoring Equation . . . . .   | 114 |
| 4.5 | Estimated Coefficients of the Influence Equation . . . . .  | 119 |
| B.1 | Turkish Financial System (by end of 2006) . . . . .   | 138 |
| B.2 | Recent Aggregates of Turkish Banking Industry . . . . .   | 139 |
| B.3 | Financial Information about Turkish Banks According to Function<br>and Ownership Structure (by end of 2006) . . . . . | 140 |
| B.4 | Important Statistics of Selected Capital Markets in Emerging Coun-<br>tries (2005-2006) . . . . .                     | 143 |

## LIST OF FIGURES

|     |   |     |
|-----|---|-----|
| 2-1 | Number of Banks by Ownership and Number of Branches . . . . . | 30  |
| B-1 | ISE Indices (1997:4-2006:3) . . . . .                         | 145 |

# CHAPTER 1

## INTRODUCTION

The firm is a legal fiction that serves as a nexus of contracts between the various stakeholders, as described by Jensen and Meckling (1976). The conflict of interest between the stakeholders of a firm caused by the separation of the ownership and control in corporations with many non-manager equityholders had been argued since Adam Smith (1776). Agency problems arise since perfectly binding contracts among the stockholders and creditors, stockholders and managers and inside and outside equityholders<sup>1</sup> do not exist. The agency theory was formalized by Jensen and Meckling (1976) and applied to modern corporations by Fama (1980) and Fama and Jensen (1983). As these studies unfold, corporations are efficient forms of economic organizations. Additionally, their success all over the world has proven that the benefits of such firms are sufficient to overcome agency costs. Although

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<sup>1</sup>Inside equityholder owns 100 percent of the firm until the sales of the shares of the firm to outside equityholders in order to raise external capital. Outside equityholders provide only equity and inside equityholders provide both capital and management. Therefore in this thesis, inside equityholders, who are the fractional owners managing the firm will be referred as owner-managers.

agency costs are unavoidable, it can be reduced. Direct discipline is considered to be a part of the solutions to costs arising because of the principal agent problem between the managers and providers of capital<sup>2</sup>.

Agency costs caused by the conflict of interest among debtholders and outside equityholders and owner-managers and outside equityholders can also be reduced by the market signals as the increase in debt prices and decrease in stock prices. Moreover, market may restrict the ability of the firm to generate external capital in the form of debt and equity. Consequently, the firm value reduces. In the industries where public has strong interest such as banking, regulating the industry is the first choice of the authorities to restrain the reduction in bank asset value, in order to protect small investors, limit individual and systemic bank failures. So, Regulatory discipline has depressed market discipline in mitigating the agency costs. On the other hand, Demirgüç-Kunt and Detragiache (2002), using 1980–1997 data from 61 countries, present evidence that government regulation and supervision of banks might be inadequate. Their findings reveal that lax supervision accompanied with extensive deposit insurance result in financial system instability and generate substantial loss to the public. Additionally, innovations in products and markets and advances in technology and information processing originate a metamorphosis in banks, which become larger than their traditional counterparts. Banks operate across a broader geographic area, offer extensive range of products and become complex and opaque. More flexibility is

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<sup>2</sup>Various direct discipline mechanisms are delegated monitors, mandatory disclosures of relevant information, managerial compensations that align managers' and equityholders' interests, threat of takeover, threat of being fired and direct intervention by the large outside equityholders.

needed in prudential regulation and supervision of banks as the pace of change increases. During last two decades, supplementing regulation and supervision with market discipline and its potential benefits attracted the academic and regulatory interest. Research has demonstrated that market discipline supports bank supervision. Furthermore, regulatory authorities regard inclusion of market discipline mechanisms in their supervisory process as desirable<sup>3</sup> (See Flannery 1998). However, both researchers and regulators have reached a consensus market discipline is not meant to replace governmental regulation and supervision, rather it is a complementary mechanism and a part of bank regulation and supervision.

## 1.1 Market Discipline in Financial Markets

Berger (1991) states that market discipline in banking refers to a situation in which private sector agents face costs that are positively related to the risks undertaken by banks and react on the basis of these costs. Later, Lane (1993), in his seminal work, defines market discipline in the context of financial markets as “financial markets providing signals that lead borrowers (i.e. banks) to behave in a manner consistent with their solvency”.

According to Bliss and Flannery (2002), market discipline has two components. “Monitoring” refers to market participants’ incentives and ability to understand changes in a firm’s condition and incorporate their opinion into the firm’s stock and debt prices. Bliss (2004) states that, incentives to monitor depend on the

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<sup>3</sup>See Third Pillar of New Basel Capital Accord (Basel II)



costs and benefits of monitoring. Market participants will monitor the banks if benefits of monitoring are more than its costs. Benefits of monitoring are related to the size of the exposure. So, numerous equityholders and debtholders that have small investments are considered to monitor less than the few stakeholders with large investments do. Cost of monitoring is related to accessing information conveniently. Transparency and information disclosure is the main issue because in a transparent banking environment investors are able to collect information about banks' risks and prospects. The ability component refers to the proper interpretation of the market information. When the investors incorporate their assessments in the prices, they decide to buy or sell their investments of the banks. So, market monitoring is reflected in equity prices, yield spreads of the debt instruments, amount of transactions and changes in contract features concerning derivatives.

The second component of market discipline is "Influence" which refers to the process that the changes in market participants' behavior induce the managers to respond to adverse changes in firm condition. Kwast et al. (1999) define two categories for "Influence": "Direct Discipline" and "Indirect Discipline". "Direct Discipline" refers to the situation that bank managers avoid the increase in bank risks when they anticipate higher cost of funding and risk of decrease in the willingness to invest or transact. It is also known to be *ex ante* discipline. "Indirect Discipline" occurs *ex post*, when private parties and government supervisors monitor the market prices of debt instruments in order to determine bank risk taking. Then these parties could increase the cost of funds to banks and limit the sup-

ply of credits. Further they can reduce the bank's ability to engage in derivative contracts.

Power of market discipline derives from the ability of the price system, which is an effective mechanism for conveying aggregate information from diverse sources and transactions about the wealth maximizing motives of economic agents. Thus, market discipline is considered to be forward-looking, flexible and continuous. Berger (1991) identifies a number of benefits for the society that emerges from the enhanced market discipline. First, market discipline may reduce moral hazard problems that extensive government guarantees create for banks. Secondly, along with the enforcement to limit bank risk taking, market discipline puts pressure on banks to increase efficiency. Thirdly, markets react more quickly than the regulators because they are anonymous, less susceptible to political pressure and forbearance and continuously monitor bank risk taking. They are also exempt from the political influence in specific bank closure decisions or actions taken during the systemic problems in banking. Fourthly, Berger (1991) points out that market discipline could reduce the regulatory burden on banks. Finally, by sending market signals to bank managers, market discipline reduces part of the burden on regulators created by the necessity to prove the deterioration in banks financial position.

Despite of its benefits, market discipline has limitations. D'Avolio et al. (2001) discuss that markets are not willing to generate enough information for investors to allocate their funds appropriately and efficiently. Sometimes, even misleading information could be generated. Thus, there are limits to transparency when

markets are left alone. On the other hand, too much disclosure may induce bank runs or systemic crisis because of the coordination failures among many dispersed agents (Rochet and Vives 2002). Therefore, disclosure of accurate, relevant and timely information has to be imposed by the regulators. There is also a conflict in the goals of enhancing market discipline and protecting small and unsophisticated investors. While extensive safety nets create moral hazard problem and increase bank risk taking, increased market discipline may undermine the adequacy of the safety nets and create instable and unsafe environment for unsophisticated depositors. Furthermore, changing the liability structure of the banks, (i.e. mandatory subordinated debt proposals) may be an effective tool to discipline for large banks. Although large banks may access to subordinated debt market with reasonable costs, it is considered to be over-costly to small banks. So, discipline by the uninsured debtholders would not exist. Finally, market participants could rely on each other, stop monitoring and free riding replaces market discipline. Overall, governments need to design right incentives for the market participants to engage in effective market discipline. Market discipline and supervision are complements to each other: they can not work efficiently without the other.

### **1.1.1 Agents of Market Discipline**

Llewellyn and Mayes (2003) define agents of market discipline as stakeholders who have an interest in the risk characteristics, safety and performance of a bank. Major stakeholders of the bank include debtholders (including depositors and bondholders), equityholders, regulators and borrowers. According to Bliss (2004),

debtholders bear the credit risk associated with the risk taking of banks that they lend to. Their return has no upside potential. Until maturity of the debt, pricing remains constant. Incentives to discipline the banks contained in these contracts are known to be heterogeneous. Depending on deposit insurance limits and the maturity of the contracts, lenders impose different levels of discipline. Calomiris and Kahn (1991) are the first to formally define market discipline, as depositors having the incentive to monitor the bank, and prematurely withdraw their demandable deposits. They emphasize that the depositors do not simply price the risk (risk averse) but also act to limit it (risk intolerant). Llewellyn and Mayes (2003) argue that insured depositors have little incentive to monitor because of the explicit and implicit government guarantees. Uninsured depositors, for example holders of Certificate of Deposits (CDs), form a better source of discipline than the insured depositors do. CDs are for fixed terms with a known interest rate either fixed or tied to short-term interest rates. However, most of the CDs are issued with short-term maturity and can be traded in the secondary markets. Thus, bank risk taking may not be priced accurately because short-term investors could easily sell the CDs and exit when they perceive an increase in bank risk taking. Moreover, uninsured debtholders are considered to be the right participant for market discipline purposes. Subordinated debt (SND), which is uninsured because of the contract features, has long term maturity. SND contracts are similar to equity because they are inferior to the other debt instruments and among the first to lose value in the event of failure. Additionally, potential loss in the event of failure is limited for SNDs. On the other hand, SND contracts are similar to other large

debentures. Both types of debt instruments have no upside return potential and they can be traded in the secondary market. Therefore, the incentives of the SND holders are more linked to those of regulators.

Equity prices are considered to provide secondary market information to regulatory authorities. Equityholders have both upside and down side potential for return. In one period analysis in the context of Black and Scholes (1973), equityholders will maximize their wealth by inducing managers to increase risk. Thus by taking risks, the upside potential for returns in bank shares is unlimited. On the other hand, equityholders may lose limited amount of investment in the event of failure. Moreover, in a moral hazard situation, the costs of the excessive risk taking will be borne by the deposit insurance scheme. So, the equityholders have incentives to select risk-taking banks (see Evanoff 1993). On the other hand, equityholders have incentives to monitor bank risk taking behavior if the analysis is extended to multiple periods. Increased risk results in the increased interest expense for the corporation in the second period because debtholders of the firm price risk. Consequently, expected cash flows of firm is reduced. Therefore, equityholders are considered to care for expected future cash flow and risk simultaneously and prefer appropriate risk and return combinations.

Regulators as delegated monitors of the taxpayers are concerned with the excessive risk taking of the banks. Most of their efforts focus on monitoring the safety and soundness of individual banks. However, they have the general aim to ensure the safety and the soundness of the financial system. Although implementation of both functions supports each other, in rare occasions, in order to avoid

conflicts, supervisory forbearance may create implicit safety nets. Therefore, the regulators need to rely on market information in order to improve bank supervision. Finally, borrowers are included in the major stakeholders group because their business may be affected if a bank gets in to difficulty and calls the loans. However the evidence on borrower discipline is rare (see Kim et al. 2005).

### **1.1.2 Pre-requisites for Market Discipline**

In the context of Lane (1993), there are four conditions or pre-requisites to implement market discipline of financial markets. First, capital markets must be working. This condition requires that there exist efficient and unrestricted capital markets in order to provide appropriate signals. Later Llewellyn and Mayes (2003) improve this condition such that the markets should also efficiently incorporate information about the changes in risk into prices. Moreover there should be sufficient number of monitoring stakeholders. Secondly, there must be relevant and accurate public disclosure of bank capital structure and risk exposures. Llewellyn and Mayes (2003) add that the monitoring stakeholders should be able to interpret and rationally adjust their behavior according to the information about the status of the bank that they have an interest. Furthermore, behavioral adjustments by stakeholders should lead to changes in the market quantities and prices. Thirdly, market participants must not believe that the borrower would be bailed out in the case of actual default. This condition is related to the incentives to market participants to monitor the banks. Llewellyn and Mayes (2003) state that the benefits of monitoring should be higher than its costs. Extensive explicit guarantees and

implicit guarantees like bail out and ‘Too-Big-To-Fail’ policies, which increase free riding among the uninsured depositors and undermine market discipline should be avoided. Finally, borrowers should be conscious about the change in market quantities and prices and have the ability to respond to adverse market signals.

Empiric research has shown that pre-requisites for market discipline are evident using developed markets’ data (see Gilbert 1990; Flannery 1998; Flannery and Nikolova 2004 for extensive literature reviews about market discipline in developed markets).

## **1.2 Market Discipline in Emerging Markets**

In most of the emerging markets, not all of the necessary conditions for market discipline are observed. Levy-Yeyati and Martinez-Peria (2004) discuss that market discipline in the context of developed markets may be difficult to observe in the emerging economies. Institutional characteristics of banking and macroeconomic factors in these economies affect market discipline. The capital in flows and outflows in the emerging markets provoke changes in macroeconomic conditions. Because of the superior returns in emerging markets with respect to the developed markets, rapid international capital flows are observed. However, capital flies quickly even due to small changes in developed economies and instability in world politics. Levy-Yeyati and Martinez-Peria (2004) mention that rapid capital inflows and outflows create large shocks in interest rates, exchange rates and output volatility in emerging economies. Banks are subject to large systematic risks

that might threaten the asset value. Moreover, stakeholders of the banks react to the macroeconomic conditions, which are beyond the control of bank managers. In such a circumstance, investors are not interested in individual bank fundamentals no matter how strong they are. Therefore, traditional definition of market discipline tests is not relevant for disclosing the sensitivity of the participants in emerging markets to changes in bank risk taking. Levy-Yeyati and Martinez-Peria (2004) argue that market responds to broader set of risks, which are driven by macroeconomic conditions in the emerging markets. They conclude that, studies of market discipline in the emerging markets need to consider systemic risk along with the bank specific risk factors.

Caprio and Honohan (2003) analyze the various aspects of market discipline in developing countries. They question the belief that market discipline on banks cannot be effective in less developed financial environments. Their study reveals several results about various factors that affect the extent of market discipline in emerging markets. First, government banks and foreign banks own important shares in the banking industries of the developing countries. Foreign owned banks are subject to home country market discipline rather than the host country discipline. Government banks are equipped with the implicit deposit guarantees at least to the extent of the government's credibility. Therefore market discipline by the local investors is not effective on both types of banks. However, in markets where private ownership dominates, market discipline is better than the pre-existing beliefs. Secondly, most of the emerging markets are dominated by the few number of investors with large investments in different industries. Caprio and



Honohan (2003) state that the quality and the relevance of information to a few number of large investors about bank risk taking is higher than the information available to government supervisors in these countries. Thirdly, share of total banking assets of the listed banks in emerging markets varies extensively. They argue that the probability for the existence of market discipline increases with the increase in the share of total banking assets of the listed banks. Finally, rating agencies also have disciplining effect on the emerging market banks. Their results show that in the less developed countries, market discipline works better than the general prejudice. They conclude that success of market discipline will improve if the role of the explicit guarantees is limited, government ownership of banks is reduced and greater disclosure is promoted.

The motivation of this thesis arises because of a couple of observations about the banking industry in the Russian Federation and Turkey. First, professionals of the banking industry in both of the countries observe indications of depositor discipline. By the end of 2005, private banks owned by the local investors and government controlled banks, dominate banking industry in both of the countries. Government and private banks held 91.7 percent and 91.1 percent of the assets of the banking sector in the Russian Federation and Turkey, respectively. Foreign owned banks are very minor in both countries. So, home country discipline imposed on the foreign owned banks, as discussed in Caprio and Honohan (2003), may not spread to the private and government banks. However local market discipline may exist. But, high deposit market share of the government controlled banks, 62 percent and 38.8 percent in the Russian Federation and Turkey by the

end of 2005, respectively, may undermine market discipline because of the implicit guarantees provided by these banks. Overall depositors in both of the countries have some incentives and barriers to discipline bank risk taking. Additionally, both the Russian Federation and Turkey experienced severe crises in the near past. As Levy-Yeyati and Martinez-Peria (2004) argue, depositors in both of the countries may consider macroeconomic factors that are beyond the control of the bank managers and owners more than the bank fundamentals in their investment decisions. The extent of depositor discipline in both countries is interesting, but a demanding issue that institutional and macroeconomic factors form obstacles for the incentives to market participants to monitor and influence risk taking banks.

Secondly, in Turkey, share of the total banking assets of the listed banks<sup>4</sup> is 64.8 percent of the assets of Turkish banking industry. Additionally, total value of share trading of the five listed banks is 27.9 percent of the total value of share trading in Istanbul Stock Exchange (ISE). Both foreign and local outside equity investors are observed to demonstrate a clear preference for bank shares. According to Caprio and Honohan (2003) both of the indicators increase the probability that the outside equity investor monitor and influence the risk taking by banks. On the other hand, in the Russian Federation, only Sberbank is listed. Moreover, trading volume of Sberbank shares is low because a large portion of the shares are held by the Ministry of Finance and the Central Bank of Russia. So, outside equityholder discipline is neither observed nor expected in the Russian Federation.

In the first essay, market discipline of banking industry in the Russian Feder-

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<sup>4</sup>By the end of 2006 there are thirteen listed banks in Turkey.

ation Banking Industry is studied. Russian banking industry has gone significant changes after the crisis in August 1998. Deposits of the banking industry have increased and public confidence in the banking system has been established. Banks in Russian Federation are distributed over a very large geography making it difficult to supervise. In such a banking system, market discipline can be useful in monitoring bank risk taking behavior. Deposits and capital are the main funding source for Russian banks. Debt instruments such as certificates of deposit (CD) or subordinated debt (SND) do not exist. Furthermore, only Sberbank is listed. Therefore, the analysis of market discipline in the Russian Banking Industry is limited to depositor discipline. The reaction of Russian depositors to excessive risk taking by banks during the period 2000:1–2005:1 is studied to test the existence of market discipline. In this essay, other than the bank risk factors obtained from the financial statements of the banks, macroeconomic risk factors and institutional factors such as the ownership structure and the effects of deposit insurance system are considered as independent variables affecting depositors. The results provide evidence on the existence of quantity discipline. Banks significantly increase their deposits during the analysis period in response to increases in capital and liquidity. However Russian depositors have no price discipline on the banks in terms of demanding higher interest rates from risky banks. In a further analysis, we categorize banks according to their level of capitalization and liquidity. We present evidence that market discipline exists for under-capitalized and low-liquidity banks. Depositors do not monitor the risk-taking behavior of the well-capitalized and liquid banks. This may be due to explicit guarantees for state-owned bank and implicit

guarantees for large sound banks. But, even large banks with less capital and liquidity are subject to discipline by depositors.

In the second essay, depositors' assessment of bank riskiness in the Russian Federation and Turkey are evaluated. Turkey makes a better case for comparison with the Russian banking industry because mainly local banks control the banking industries and the share of government banks is declining in both of the countries. Furthermore, since 2000, banking industries in both countries have undergone major restructuring demonstrated by mergers, liquidations and improvements in capital adequacy and management. Comparison of depositor behavior in both countries provides evidence for monitoring. Indeed, Russian depositors reallocate deposits either by holding on them or depositing in the safe state-owned banks once information becomes available about the increased riskiness of a bank. On the other hand, they have no price influence on the banks in terms of demanding higher interest rates for increased risks. Banking industry in Turkey is competitive and more developed than the banking industry in the Russian Federation. However, between 1994–2004, there was extensive deposit insurance practice in Turkey which might have undermined market discipline. Our findings support that during the period of extensive guarantees, depositors' monitoring of banks becomes ineffective. Government reduced the guarantees after 2004 when restructuring of the industry was accomplished. Then, depositors had the incentives to monitor banks. According to the empirical findings, during the post-crisis period, depositors in Turkey are concerned with the capital base and asset quality of banks.

One of the benefits of market discipline is considered to be the increasing effect on the efficiency of banks and the banking system as a whole. In this essay, efficiency in the resource utilization by banks is also measured. After the crises, operations of the banks in both countries improved resulting in more efficient financial intermediation. Furthermore, there is evidence that, depositors in the Russian Federation respond positively to banks with improved efficiency by increasing their funds in these banks.

In the third essay, the market disciplining of banks in terms of the response of the shareholders to risks incurred by the banks and the extent of influence of different types of shareholders on management to limit risk-taking are measured. Monitoring by shareholders would result in changes in the equity prices and required rates of return of banks. Differences exist in the ways portfolio investors and owner-shareholders monitor bank risk taking. In addition, market discipline implies that management observe the change in the market valuation of the bank and respond to market signals by the shareholders by changing the composition of the balance sheet.

Turkish banking industry provides a good test of the extent and the effectiveness of monitoring and influence by shareholders. First, the period considered is marked by high interest rate volatility, high inflation and low liquidity. So, one can observe the reaction of shareholders to risk under extreme economic conditions. Second, the period studied includes episodes of comprehensive guarantees on deposits. Also, the banking industry does not issue any subordinated debentures and notes. So, any evidence of market discipline can be attributed to sharehold-

ers. Third, there is a large volume of bank stocks traded at the Istanbul Stock Exchange (ISE). Bank stocks account for about one-third of the trading volume in ISE. Also, publicly traded banks account for about one-half of the banking industry's assets. Forth, ownership structure is a determining factor in monitoring bank risk-taking behavior.

It is shown in this essay that shareholders are sensitive to different measures of risk and monitor the banks. Shareholders who own bank shares as part of a portfolio are concerned about market risk and would not mind banks taking excessive risk. However, for owner-managers total risk is relevant. Moreover, given the institutional differences of the banks and the Turkish Banking industry, owner-managers are influenced by market risk assessments. They are found to play an important role in limiting risk-taking behavior by banks.

This thesis is organized as follows. In chapter two, first essay on depositors' assessment of bank riskiness in the Russian Federation is presented. Disciplining efforts of the depositors in the Russian Federation are compared to depositor discipline in Turkey in the second essay, given in chapter three. The third essay about owner-manager responses to outside equityholders' monitoring behavior of the public banks in Turkey is presented in chapter four. The thesis is concluded in chapter five.

## **CHAPTER 2**

# **DEPOSITORS' ASSESSMENT OF BANK RISKINESS IN THE RUSSIAN FEDERATION**

### **2.1 Introduction**

The New Basel Accord (2001) introduced guidelines for all major commercial banks to promote safety, competition and a comprehensive approach to assess risk-taking. The Accord framework includes, minimum risk-based capital requirements, an adequate supervisory review and market discipline as the three pillars of a banking system. Moreover, the preconditions for the existence of a sound banking system, as outlined by the Bank for International Settlements (BIS), are sustainable sound macroeconomic policies, a safety net for the public that funds the banking system, and an efficient system of resolution of banks. The need for market discipline of banks by stakeholders is especially important in jurisdictions where it is difficult to impose minimum capital requirements and implement ef-

fective bank supervision. Particularly, depositors' monitoring and disciplining of the banks can restrain disproportionate risk-taking. As depositors monitor bank riskiness, they are expected to reallocate their funds within the banking industry away from riskier banks. Since 1998, the Russian Banking Industry has undergone significant changes both in terms of a reduction in the number of banks as well as in establishing public confidence in the use of the banking system for financial intermediation. Along with growing per capita income, more savings have been channeled to the banking industry since 1999. As of 2005, there are 1,253 banks, down from a high of over 3,300 in 1995, distributed over a very large geography making it difficult to supervise and monitor. In such a banking system with a large number of banks, market discipline imposed by depositors can be useful in regulating bank risk-taking behavior. By providing more accurate, freely available information about the banks' financial status, the banking industry in the Russian Federation would benefit from depositor discipline.

In order to measure the extent of market discipline in the Russian Banking Industry we study the reaction of Russian depositors to excessive risk-taking by banks during the period 2000:1-2005:1. However, Russian banking industry consists of many banks that are not comparable to commercial banks operating in other market economies. Therefore, we included in the sample banks with assets more than \$50 million accounting for 96 percent of all deposits in the industry<sup>1</sup>. In accordance with the literature on market discipline, we test whether depositors withdraw their funds or demand higher interest rates in response to high risk-

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<sup>1</sup>In the empirical analysis, we estimated market discipline including all banks in addition to our sample banks for robustness.



taking by banks. The risk factors are obtained from the financial statements of the banks. In addition, we account for the effects of other factors on deposits such as economic factors as well as the deposit insurance system introduced in 2004<sup>2</sup>.

We find that banks significantly increased their deposits during the analysis period in response to increases in capital and liquidity as expected. These results indicate that market discipline is exercised by changes in deposits while in other countries there is evidence that interest rates also play a disciplining role. To understand the factors that contribute to the difference between the Russian banking industry and banks in other countries, we analyze banks by categorizing according to their level of capitalization and liquidity. We present evidence that market discipline exists for under-capitalized and low-liquidity banks. For well-capitalized and liquid banks, depositors do not see the need to monitor their risk-taking behavior. This may be due to explicit guarantees for state-owned bank and implicit guarantees for large sound banks. But, even large banks with less capital and liquidity are subject to discipline by depositors as demonstrated by the sensitivity of deposits to bank risk factors such as capital and liquidity adequacy and membership in the deposit insurance system.

The essay is organized as follows. In the second section we provide a brief review of market discipline in various forms in developed as well as emerging markets. In section three, a brief review of the Russian banking industry is provided. The model used in estimating the equations of depositor discipline is presented in

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<sup>2</sup>In accordance with deposit insurance law of the Russian Federation, each depositor is guaranteed the full return of his or her deposits in each insured bank up to a maximum of 100,000 Rubles per account, inclusive. That figure corresponds to 1.1 times 2003 per capita Russian GDP.

section four. We describe the data in section five. In section six, we discuss the estimation results. Conclusions are included in section seven.

## 2.2 Literature Review

Asset prices are effective mechanisms for conveying information about the wealth maximizing motives of economic agents. Therefore, market participants can restrict the volume and cost of funding to signal unattractive risk-return trade-offs. Market discipline describes a situation in which private sector agents, such as equity holders and debtholders produce information that helps supervisors in recognizing problem banks and implementing corrective measures. Bliss and Flannery (2002) identify two distinct components of market discipline as “monitoring” and “influencing”. Monitoring occurs when investors incorporate changes in a firm’s risk-taking in stock or bond prices. Influencing refers to the ability of market participants to affect a firm’s financial decisions. Berger (1991) states that bank stakeholders face costs that increase as firms undertake risks and stakeholders take action because of these costs<sup>3</sup>. There are three broad classes of market reactions. First, depositors may require higher interest rates. Second, investors may withdraw uninsured funds from the bank. Finally the bank may be forced to restore its financial condition.

Calomiris and Kahn (1991) are the first to formally define market discipline as depositors having the incentive to monitor the bank and prematurely withdraw

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<sup>3</sup>The stakeholders are depositors, shareholders, and creditors.

their demandable deposits. They emphasize that the depositors do not simply price the risk (risk averse) but also act to limit it (risk intolerant). Flannery (1998) empirically points out that the liability market for the banks are sensitive to the changes in banks' financial conditions and investors identify and act according to the default risk changes. Recent research on cross-country supervisory framework emphasizes the importance and the need for enhanced transparency obtained by the disclosure of relevant information and the reinforcement of market discipline (see Barth et al. 2002; 2003; and 2004). Empirical evidence supports market discipline based on improved financial information disclosures, and enhancing market participants' ability to assess and control banks' risks in the US and Europe (see Gilbert 1990; Flannery 1998; and Flannery 2001). In addition, market discipline can be established using the relationship between risk indicators and subordinated debt yields or large deposit rates. Risk premia on subordinated notes and debentures are correlated with accounting risk measures, asset portfolio composition, credit agency or regulatory ratings, and the probability of failure (see Jagtiani and Lemieux 2001; Morgan and Stiroh 2001; Sironi 2002; Evanoff and Wall 2002; and Jagtiani et al. 2002).

As an alternative to subordinated debt, Hall et al. (2002a) document a positive relation between the yields on certificates of deposits (CD) and financial ratios of the banks that have a satisfactory regulatory rating. However, Jagtiani and Lemieux (2001) find no evidence of market discipline in the uninsured CD market using a sample of bank holding companies with failing subsidiaries. Moreover, Furfine (2001) provides evidence of market discipline in the overnight federal

funds market where creditors require interest rates dependent on the credit risk of the borrowers. Market discipline can also exist in the form of decreases in the availability of uninsured funds because investors withdraw their funds if they believe that the bank is becoming more risky. Furthermore, the higher borrowing costs of the uninsured funds may force the banks to shift to insured funds. Consistent with market discipline, Billet et al. (1998), Jagtiani and Lemieux (2001), and Hall et al. (2002a) show that as the financial condition of the bank worsens their reliance on insured funds increases (see Goldberg and Hudgins 1996; Park and Peristiani 1998; and Goldberg and Hudgins 2000 for similar results on thrifts).

Banks are the dominant financial intermediaries in emerging markets. In addition to the opaqueness of ordinary banking activities, frequent financial crises, state ownership of banks, and inadequate supervision necessitate close monitoring of financial institutions by the market. Market discipline by shareholders, creditors, and depositors can control the risk-taking behavior of banks. While in most developed financial markets, shareholders demonstrate their assessment of a listed bank's risk-taking in the the market value of the bank, market prices have no role or a very limited role in emerging markets. Banks are either privately held or the traded shares are a very small portion of the outstanding bank shares in emerging markets<sup>4</sup>. Furthermore, in developing financial markets, there is very little subordinated debt that is valued in secondary markets reflecting bank riskiness.

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<sup>4</sup>Even if the bank stocks are traded, the number of shares held by outside equityholders is usually very small. For example, the only bank stock traded in the Russian Trading System (RTS) is the state-owned Sberbank. The shares traded are a very small portion of the outstanding shares. A very large majority of shares are held by the Ministry of Finance and the Central Bank of Russia.

Thus, in countries where the availability of instruments for market discipline is limited due to inadequate listed bank equity or subordinated debt, depositors are the primary source for disciplining bank risk-taking behavior. The combination of government regulation and supervision and monitoring by depositors would result in high quality banks that are conducive to financial intermediation without risking depositors funds.

Empirical studies of market discipline for the developing countries focuses on the behavior of depositors. Most of the evidence about the existence and efficacy of market discipline comes from Latin America. Calomiris and Powell (2001) report that in Argentina high asset risk and leverage are associated with greater deposit withdrawals and high asset risk is reflected in higher deposit interest rates. Barajas and Steiner (2000) study market discipline by depositors in Colombia. They show that the depositors prefer banks with strong fundamentals namely, high capitalization, liquidity, low non-performing loans and profitability. Martinez-Peria and Schmukler (2001) test interaction in the 1980s and the 1990s between market discipline and deposit insurance and the impact of banking crises on market discipline in Argentine, Mexico and Chile. Their findings support the view that there is market discipline across all three countries. Depositors reduce the level of their deposits and increase the interest rate demanded from those banks undertaking high risks. Their results also suggest that the deposit insurance in these three countries is not fully credible and both insured and uninsured depositors exercise market discipline. Moreover, according to the evidence provided, market discipline by depositors separately increased in Argentina, Chile and Mexico following

a bank crisis.

In another study on the existence of depositor discipline in India, Ghosh and Das (2003) focus on the Indian Banking Industry during the 1990s after the liberalization of the banking sector. Bank fundamentals are significant in determining the changes in deposits and interest paid. Therefore, the authors argue that depositors in India punish banks for risky behavior during the analysis period. Ungan and Caner (2004) study the existence of market discipline in Turkey. They estimate that there was evidence of market discipline in the Turkish banking industry in the 1988-2003 period. It is observed that uninsured depositors closely monitored the risk indicators obtained from financial data. However, the introduction of full deposit insurance ceased the monitoring motives for both insured and uninsured depositors.

There is a paucity of study that analyzes depositor discipline in the transition economies. Mondschean and Opiela (1999) provide findings regarding market discipline in Poland during 1992-1996. Their results suggest that the depositors demand higher interest rate for the risky banks before the changes in the insurance scheme and that the fully insured banks pay lower interest rates as expected. Moreover, the state-owned banks have both implicit and explicit coverage. They conclude that the full deposit insurance scheme and government ownership of Polish banks reduce the monitoring incentives of the market participants. Recently, Karas et al. (2004) examine market discipline in the Russian deposit market for the period 1997-2002. They provide evidence for market discipline using all operating credit institutions' data. Their data set covers small banks that usually collect

deposits of several depositors, mainly the owners. Furthermore their data set includes the 1998 crisis period when the financial statements of the banks are not transparent. Therefore the significance of their results varies by the sub-periods chosen and types of depositors.

## **2.3 Banking in the Russian Federation**

During the Soviet period when the economy was state-controlled and centrally-planned, the government owned and managed the banking system in the Russian Federation. Gosbank was the central bank and the only commercial bank. Savings were kept in another state-owned bank, Sberbank. There were also two other state banks, Vneshtorgbank that handled foreign trade transactions and Stroybank that provided investment credits for enterprises. Following the economic reforms to establish a market-based system in 1991, the Russian Banking System has evolved into a two-tier system including the central bank and the commercial banks. Until 1995, the regulation of the commercial banks by the Central Bank of the Russian Federation (CBR) was quite lax, which led to the existence of numerous commercial banks of suspectable quality. By the end of 1995, there were over 3,300 banks most of which were small and had little capitalization. A large portion of the banks were financially linked to companies and provided subsidized credits.

The Russian Banking System was shaken by the financial crisis of 1998. Repayments of private and public external debt were temporarily frozen. Devaluation of

the ruble and low levels of liquidity led to the bankruptcy of many banks. However, Russian banks already had serious problems before the 1998 crisis. They had poor capitalization, low liquidity, and high exposure to exchange rate risk. Further, they were reluctant to act as intermediaries between borrowers and savers for several reasons. First, there was a large informational asymmetry between the banks and the customers. Second, the banks were not equipped with the screening and monitoring skills needed to avoid credit risks. They were not able to discriminate credit risks of potential borrowers. Third, the banks could not reclaim their loans due to the weak rule of law and enforcement. Fourth, some of the small banks were purchased by newly established undercapitalized enterprises to be used as their “pocket banks”<sup>5</sup>. Consequently, there did not exist a real banking industry in the earlier years after the break up of the Soviet Union. Few banks were able to operate at the national level. Moreover, many banks do not have branches in the regions of the Russian Federation.

During the 1998 crisis, many banks were either bankrupt or liquidated. Most of the illiquid banks were allowed to operate until March 1999 when the CBR started restructuring the Russian banking system. By the end of the first half of 2005, the Russian economy has experienced seven years of robust economic growth and the Russian Banking industry has also recovered. Since 2002, CBR has strengthened the financial conditions in the banking industry by issuing new prudential regulations. With the introduction of the deposit insurance system in 2004, prudential standards were further strengthened. The introduction of

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<sup>5</sup>These banks facilitate borrowing at favorable terms by owners. In addition, banks can be used in reducing the tax liability of the owners.



Table 2.1: Russian Banking Sector (2000-2005)

|  | 2000    | 2001    | 2002     | 2003     | 2004     | 2005   |
|--|---------|---------|----------|----------|----------|--------|
| Nominal GDP<br>(billion rubles)                    | 7,302.2 | 8,944.0 | 10,818.0 | 13,201.0 | 16,779.0 | 21,617 |
| Total Banking Sector<br>Assets<br>(billion rubles) | 2,260.9 | 3,159.7 | 4,145.3  | 5,600.7  | 7,136.9  | 9,750  |
| <b>Share of GDP (%)</b>                            |         |         |          |          |          |        |
| Total Assets                                       | 30.96   | 35.33   | 38.32    | 42.43    | 42.53    | 45.10  |
| Total Capital                                      |         | 5.07    | 5.37     | 6.17     | 5.64     | 5.70   |
| Total Loans  |         | 13.16   | 14.71    | 17.17    | 18.77    | 19.0   |
| Total Deposits <sup>†</sup>                        | 9.53    | 7.58    | 9.52     | 11.47    | 11.71    | 12.81  |
| Other Bank Funds <sup>‡</sup>                      |         | 10.09   | 10.09    | 10.49    | 11.84    | 13.73  |
| <b>Share of Total Assets (%)</b>                   |         |         |          |          |          |        |
| Total Capital                                      |         | 14.37   | 14.02    | 14.55    | 13.26    | 12.64  |
| Total Loans  |         | 37.24   | 38.39    | 40.48    | 44.14    | 42.20  |
| Total Deposits                                     | 30.78   | 21.45   | 24.84    | 27.04    | 27.52    | 28.31  |
| Other Bank Funds                                   |         | 28.57   | 26.33    | 24.73    | 27.83    | 30.30  |

*Source:* Central Bank of the Russian Federation Banking Supervision Report, 2004. <sup>†</sup>Includes only household deposits. <sup>‡</sup>Other bank funds are mainly funds obtained from other bank and non-bank financial institutions.

the deposit insurance system created an opportunity for the CBR to thoroughly examine all the banks<sup>6</sup>. With the anticipation of a membership in the deposit insurance system, many banks started to improve their balance sheets long before the CBR examinations. Banks that were admitted to the new deposit insurance scheme after being examined by the CBR account for 98 percent of deposits. Nevertheless, key problems remain to be addressed such as strengthening creditor rights and expanding the implementation of International Accounting Standards (IAS).

In Table 2.1, aggregate measures of the Russian banking sector from 2000 to

<sup>6</sup>Deposit insurance, introduced in 2004, has limited power in terms of supervision and regulating banks. These functions exclusively remain at the CBR. So, the newly established deposit insurance agency operates like a cash box. In 2005, the Agency was also given authority to liquidate banks.

2005 are presented. The asset-to-GDP ratio of banks increased from 31.0 percent in 2000 to 45.1 percent in 2005. In the meanwhile, capital ratios remained more or less the same. Banks were able to expand their loan portfolios as demand from the corporate sector and households increased. As of end of 2005 there were 1253 active banks, of which 32 were state banks. The number of foreign banks increased to 51. The number of branches which are very few declined from 3,793 to 3,295 (see Figure 2-1). Most of the decline in the number of branches is due to Sberbank's closing of branches in major urban areas. However, the second largest state bank Vneshtorgbank and foreign banks increased the number of their branches during the same period. Furthermore, foreign banks paid higher interest rates compared to other banks which increased their market share. The industry started facing competition from foreign banks after 2004.

Central Bank of Russian Federation classifies banks according to ownership, type of funding, clientele and risk characteristics. Table 2.2 demonstrates the bank clusters identified by the CBR and their shares of assets and capital. Accordingly, state-owned banks provided 40.7 percent of assets and 33.8 percent of capital in the banking industry. State-owned banks and diversified banks jointly provide about 70 percent of total corporate loans with state-owned banks' share at about 47 percent. These two groups of banks also provided 75 percent of loans to the households. Intra-group banks are defined by the CBR as those banks controlled by one or few related owners. These banks are also characterized by recurring large loans to few borrowers. The largest groups of banks are small and medium-sized banks in the Moscow region. However, their shares of total banking industry

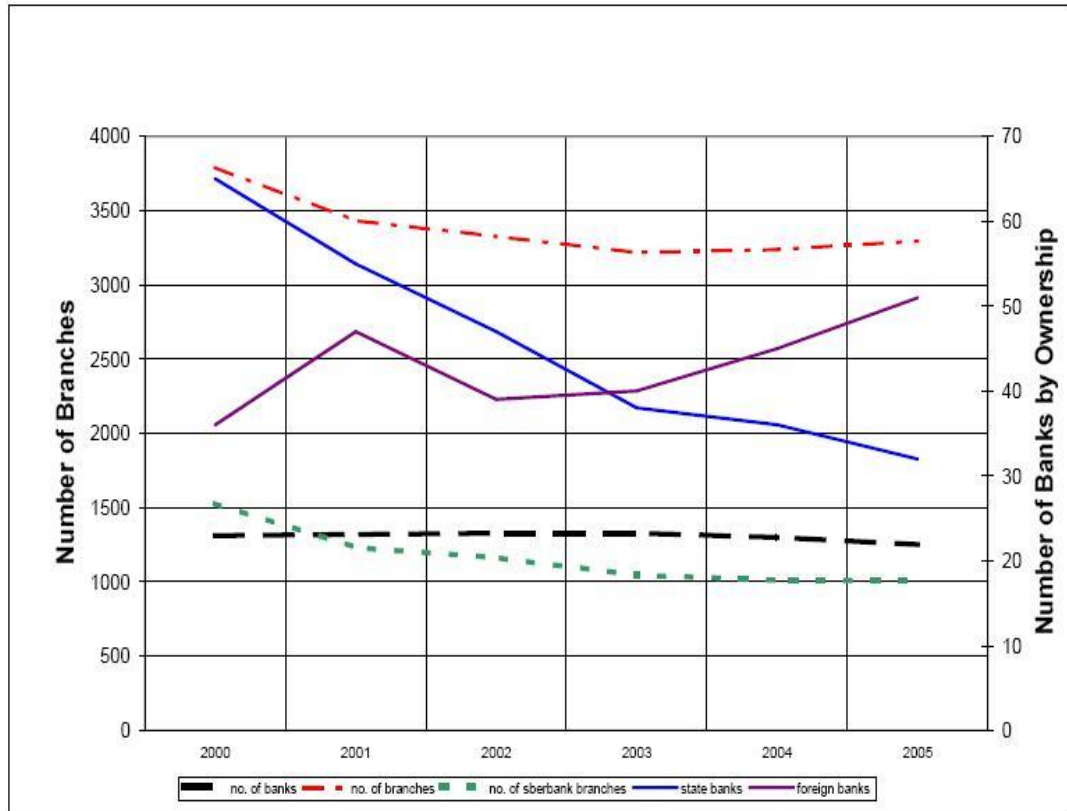


Figure 2-1: Number of Banks by Ownership and Number of Branches

assets and capital remain small.

Since 2004, long-term borrowing and corporate deposits as a source of funding have grown faster than household deposits. Corporate deposit growth was mainly in diversified banks, state-owned banks and the foreign-owned banks. Moreover, due to their good international credit ratings, state-owned and diversified banks were able to raise funds in the international interbank market thus, reducing their reliance on deposits. As a result, the share of Sberbank in household deposits declined from 60 percent to 54 percent. However, half of this decline was captured by another state-owned bank, Vneshtorgbank. Foreign banks also experienced large increases in household deposits. Interestingly enough, small and medium-

Table 2.2: The Clustering of Russian Banks (by the end of 2005)

| Credit Institutions              | Number | Share of Total Assets | Share of Total Capital |
|----------------------------------|--------|-----------------------|------------------------|
| State-controlled Banks           | 32     | 40.7                  | 33.8                   |
| Foreign-controlled Banks         | 51     | 8.3                   | 9.2                    |
| Intra-group Banks <sup>†</sup>   | 109    | 16.2                  | 19.4                   |
| Diversified Banks <sup>††</sup>  | 74     | 25.1                  | 23.4                   |
| Small and Medium Banks in Moscow | 455    | 5.1                   | 8.6                    |
| Regional Small and Medium Banks  | 484    | 4.2                   | 5.4                    |
| Non-bank Credit Institutions     | 48     | 0.5                   | 0.2                    |
| Total                            | 1,253  | 100.0                 | 100.0                  |

*Source:* Central Bank, Bank Supervision Report, 2005. <sup>†</sup>Intra-group banks are those controlled by several related owners. CBR identifies them according to large loans per borrower and preferential lending. <sup>††</sup>Diversified banks are large banks neither controlled by the state nor foreign-owned and do not belong to intra-groups.

sized banks in the Moscow region and other regions that were admitted to the deposit insurance system observed the least growth in their household deposits.

According to CBR (2006), the banking industry is concentrated in the deposit market. The top 200 banks (16 percent of all banks), which the CBR uses as a benchmark, account for 89.6 percent of the total bank assets and 85 percent of the industry's total capital. The biggest bank, Sberbank, accounts for 28.6 percent of all banking industry assets, 54 percent of deposits and 33 percent of total equity in the banking industry.

The top five banks' share in terms of assets in banking industry declined from 45 percent to 43.8 percent in 2005. During the same period the share of top five bank in total banking industry's equity increased from 34 percent to 36 percent. Furthermore, the number of banks with excess capital over the statutory capital amount of 5 million euros increased from 501 to 602. Thus, banks increasingly relied on own funds and corporate deposits to fund asset acquisition since 2004.

The Russian banking industry has low levels of concentration in terms of assets, loans and capital. However, household deposits continue to be concentrated despite a steady decline observed in the last three years. Concentration levels measured by Herfindahl-Hirschman Index (HHI) for assets is about 0.09 and fairly stable (see CBR, 2005). HHI for loans was estimated to be at 0.12 in 2005 up from 0.105 in 2004. The concentration ratio for capital was at 0.05 in 2005. HHI concentration value for household deposits was at 0.3 in 2005 down from 0.4 in 2004<sup>7</sup>. These estimates indicate high concentration in the deposit market. The decline in the concentration of deposits is primarily due to the reduction in the deposits in Sberbank. The government plans to sell the remaining state-owned shares once Sberbank's share of total deposits decline to less than 50 percent possibly, in 2008. So, one can expect further decline in deposit concentration. While it is declining, high concentration ratios for deposits have implications for depositor discipline in banks in the Russian Federation. Households placing their deposits in few large banks demonstrate that it is safer to deposit in few large banks and enjoy guarantees on deposits. Furthermore, despite the growth in the utilization of the banking services, the infancy of the deposit insurance system might have increased the tendency of depositors to put their savings in larger banks and benefit from "Too-Big-To-Fail" protection.

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<sup>7</sup>HH Index is a commonly accepted measure of market concentration. It is calculated by the squaring of the market shares of each bank competing in the market and then summing the resulting numbers. It ranges between zero and one. HHI less than 0.1 is considered low concentration, 0.1 to 0.2 is medium concentration and bigger than 0.2 is considered high concentration.

## 2.4 Empirical Model

We have three questions in this essay. First, did market discipline exist in the Russian Federation; that is, did the preceding bank specific risk factors significantly explain the change in bank deposits and interest rates on deposits? Second, did the market discipline change significantly after the introduction of limited deposit insurance? Third, while controlling for bank risk variables and other factors, did bank ownership structure affect the change in deposits and the interest rates?

According to Calomiris and Kahn (1991), depositors facing increase in bank risk-taking can either demand high interest rates or withdraw funds from the bank. In order to examine depositor behavior, we estimate two models, one for the change in deposits and one for the interest rates. Therefore, we have a vector of variables  $Z_j = [Z_1, Z_2]$ , where  $Z_1$  is the change in deposits and  $Z_2$  is the interest rate. In each model, we test whether bank specific risk factors, macroeconomic factors, bank ownership structure and deposit insurance significantly affect the behavior of depositors. In the tests of the existence of depositor discipline in Russian Federation during the period 2000:1 to 2005:1, we estimate the following

reduced form model using quarterly data:

$$\begin{aligned}
Z_{j,t}^i = & \alpha_j + \sum_{j=1}^2 \beta_j Z_{j,(t-1)}^i + \sum_{k=1}^5 \phi_{j,k} Risk_{k,(t-1)}^i + \sum_{p=1}^2 \gamma_{j,p} Macro_{p,(t-1)} \\
& + \sum_{q=1}^2 \delta_{j,q} Bank_{q,t}^i + \sum_{l=1}^2 \psi_{j,l} Size_{l,(t-1)}^i + \varphi_j DIDummy_t \\
& + \sum_{k=1}^5 \theta_{j,k} Risk_{k,(t-1)}^i \cdot DIDummy_t \\
& + \sum_{l=1}^2 \lambda_{j,l} Size_{l,(t-1)}^i \cdot DIDummy_t + u_{i,t}
\end{aligned} \tag{2.1}$$

such that  $i = 1, \dots, N$ ,  $t = 1, \dots, T$ ,  $j = 1, 2$ .  $N$  is the number of banks in the Russian Federation,  $T$  is the number of observations per bank that varies across institutions due to the unbalanced panel, and  $u_{i,t}$  is the error term.  $Z_{1,t}^i$  is the percentage change in the deposits, and  $Z_{2,t}^i$  is the implicit deposit interest rate. They both measure depositors' assessment of bank riskiness for bank  $i$  at time  $t$ .

$Z_{2,t}^i$  is calculated as the ratio of interest expense to total deposits in the previous period, similar to previous studies in the market discipline literature (for example, Martinez-Peria and Schmukler 2001 for Argentina, Chile and Mexico; and Mondschean and Opiela 1999 for Poland). Although theoretically marginal rates indicate the sensitivity of interest rates on deposits to change in bank riskiness, as the marginal interest rates are not available, implicit interest rates are used in this essay. However, as the majority of deposits are short-term in the Russian Federation, it can be argued that the difference would not be significant enough to alter results. Nevertheless, Peresetsky et al. (2006) use marginal interest rates for selected banks (26 banks were contacted to obtain interest rates

on deposits of various size and maturity) to understand how interest rates are determined in the Russian Federation and find results similar to our study where implicit interest rates on deposits are used.

$(Risk_{k,t}^i)$  denotes the five factors are included in the estimations as the sources of risk after controlling for other factors such as macroeconomic fluctuations that affect bank balance sheets. The proxies for bank riskiness are the following financial ratios: non-performing loans-to-assets, loans-to-assets, capital-to-assets, net profit after tax-to-assets and liquid assets-to-assets. Macroeconomic impacts  $(Macro_{p,t})$ , are controlled by changes in the consumer price index (CPI) and the dollar-ruble exchange rate. Bank ownership status  $(Bank_{q,t}^i)$ , is described by two dummy variables that account for the state and foreign ownership. These variables are incorporated to the model for the sake of controlling institutional strategies of banks on deposit growth and interest rates.  $(Size_{l,t}^i)$ , size of the bank is characterized by two variables: natural logarithm of asset size of a bank and the relative size of the bank's total deposits in its total funding base. The bank's total funding base includes deposits, interbank loans and long-term debt.  $DI Dummy_t$  is a time dummy that identifies periods of deposit insurance after its introduction in the second half of 2004.

In accordance with the literature on market discipline, it is expected that an increase in both non-performing loans-to-assets, loans-to-assets will negatively affect deposit growth. On the other hand, increasing riskiness, due to high non-performing loans and indebtedness, positively affects the interest paid on deposits. Increases in capital-to-asset, net after-tax profit-to-assets, and liquid assets-to-



assets ratios indicate a reduction in the riskiness of banks.

In addition to the relation between bank riskiness and depositors' reaction to risk, we control for economic and banking sector factors that might affect growth in deposits and the deposit interest rates. First, two major price variables: percentage change in CPI and fluctuations in the ruble-dollar parity, are included in equation 2.1 to account for the impact of macroeconomic fluctuations on depositors' behavior. Second, the ownership status of Russian banks state, private or foreign, are included in order to control the institutional strategies of different banks on interest rates and source of funds. We also use two different size measures; assets of a bank and the relative size of a bank's total deposits in its total funding base. Finally, the dummy variable  $DIDummy_t$  interacts with risk factors and the size variables after the introduction of the deposit insurance system.

The model described in 2.1 is a reduced form specification of deposit demand and supply relationship. We include the lagged dependent variables in each equation to account for the dynamics of the dependent variables. In a similar model studied by Martinez-Peria and Schmukler (2001), the simultaneity of the two dependent variables is ignored and their results are biased (e.g., see Gouriéroux and Monfort (1995), pp. 297-322).

## 2.5 Data

Quarterly bank-level data is obtained from data services provider Mobile Information Services and covers the period from 2000:1 to 2005:1. Considering major

macroeconomic fluctuations and reporting quality, we use the data after 1999 excluding the crisis year of 1998 and its aftermath. The 2000-2005 period is a financially stable period for the Russian financial markets and the quality of the financial statements are substantially better compared to prior years<sup>8</sup>. The data set included 1,461 commercial banks operating in the Russian Federation during the 2000-2005 period. Asset size of banks varies from \$2 billion for the largest bank to less than \$10,000. We exclude small banks and estimate market discipline by depositors using two separate groups of banks. Small banks are excluded because 96 percent of deposits are placed in large banks. In most cases, small banks have few depositors. Often, the few depositors a small bank has are either the owners, a large firm or local administrations. So, the possibility that external depositors may have any influence on bank risk-taking by small banks is very unlikely. The first data set includes only the biggest 50 banks in the Russia Federation according to asset size in 2005. The second data set includes 377 banks with assets more than \$50 million in 2005. Eight of the banks are excluded from the data set because of insufficient number of consecutive financial information during the analysis period. Therefore, only 369 banks are included for estimation purposes in the data set.

In Table 2.3, we report the nominal amount and industry shares of total assets, total loans, total deposits and total capital. Banks with assets greater than \$50 million are named as “Big Banks” and account for about 95 percent of the total

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<sup>8</sup>Starting 2002, CBR introduced new regulations to improve reporting by banks. Since 2004, CBR requires the new methodology to be used in the calculation of capital and liquidity adequacy ratios.

Table 2.3: Summary of Banks' Balance Sheet Activities (by the end of March 2005)

| Banks                     | Total Assets |                | Total Loans |     | Total Deposits |     | Total Capital |     |
|---------------------------|--------------|----------------|-------------|-----|----------------|-----|---------------|-----|
|                           | Rubles       | % <sup>§</sup> | Rubles      | %   | Rubles         | %   | Rubles        | %   |
| All                       | 7089         | 100            | 3635        | 100 | 2439           | 100 | 939           | 100 |
| Top 50 Banks <sup>†</sup> | 5226         | 74             | 2778        | 76  | 1993           | 82  | 578           | 62  |
| Big Banks <sup>‡</sup>    | 6706         | 95             | 3464        | 95  | 2353           | 96  | 842           | 90  |

<sup>§</sup>Share in the Russian Banking industry. <sup>†</sup>“Top 50 Banks” by asset size. <sup>‡</sup>Assets above \$50 million.

assets and loans. “Big Banks” account for 96 percent of total deposits and 90 percent of the total capital in the Russian banking industry. Depositor discipline of the “Top 50 Banks” are also analyzed separately as they are the money-center banks that dominate the Russian economy. “Top 50 Banks” represent 74 percent of the assets and 76 percent of total loans given by the banking industry. They also account for 82 percent of the deposits and 62 percent of the capital of the banking industry.

Table 2.4 shows the descriptive statistics for both the “Big Banks” and the “Top 50 Banks”. On average, the “Top 50 Banks” pay lower implicit interest rates on deposits compared to banks with assets worth \$50 million or more. Consequently, these banks are relatively less successful in attracting new deposits. Average growth rate in deposits is 16.65 percent for the “Big Banks” while it is only 14.92 percent for the “Top 50 Banks”. Net non-performing loans, as a share of assets, are marginally lower for the “Top 50 Banks”. Moreover, the “Top 50 Banks” operate with lower capitalization and liquidity and, they are more profitable than the banks with assets \$50 million or more.

Table 2.4: Descriptive Statistics for (2000:1-2005:1)

|                                       | Banks with<br>Assets > \$50 million<br>(N=369) |         | Top 50<br>Banks<br>(N=50) |         |
|---------------------------------------|--|---------|---------------------------|---------|
|                                       | Mean   | Std Dev | Mean                      | Std Dev |
| <b>Dependent Variables (%)</b>        |  |         |                           |         |
| Growth in Deposits                    | 16.65  | 65.58   | 14.92                     | 52.29   |
| Implicit Interest Rate                | 13.00  | 113.66  | 9.3                       | 30.78   |
| <b>Bank Risk Variables (%)</b>        |  |         |                           |         |
| Non-Performing Loans/Assets           | 0.13   | 0.52    | 0.12                      | 0.37    |
| Total Loans/Assets                    | 37.24  | 18.35   | 39.32                     | 17.36   |
| Total Capital/Assets                  | 21.36  | 14.26   | 16.71                     | 10.15   |
| Net Profit After Tax/Assets           | 2.14   | 2.77    | 2.53                      | 2.76    |
| Liquid Assets/Assets                  | 44.06  | 26.91   | 43.54                     | 60.02   |
| <b>Size Variables</b>                 |  |         |                           |         |
| Assets (in natural logarithm)         | 21.46  | 1.5     | 23.72                     | 1.41    |
| Total Deposits/Total Funding Base (%) | 92.52  | 18.87   | 85.50                     | 23.98   |

*Source:* Mobile Information Services.

## 2.6 Empirical Results

The empirical model described in equation 2.1 is estimated using pooled cross-sectional time series data for the period 2000:1 to 2005:1. First, we estimated the model using ordinary least squares (OLS) regressions for the “Big Banks” and the “Top 50 Banks” as well as for all banks. Then, in order to account for the differences across individual banks, the fixed-effect model which captures the differences by the constant terms for each member of the panel data is estimated<sup>9</sup>.

The coefficient estimates, both with OLS and the fixed-effect model for the deposit growth equation, are presented in Table 2.5. The first column of the Table 2.5 are for all banks, while columns 2 and 3 include estimates for “Big

<sup>9</sup>Due to the existence of large number of banks in the Russian Federation, we could not estimate the fixed-effect model for all banks.

Banks.” Columns 4 and 5 include the estimates of “Top 50 Banks.” The difference in estimated coefficients between all banks and the large banks can be attributed to the small banks. It can be observed that the effect of small banks on estimated coefficients for lagged deposit growth rates and interest rates are not different from those of the large banks, both in terms of sign and size. If the deposit accumulation rate is high in the previous period, then there is a significant slowdown in the deposit growth of both small and large banks. Moreover, if banks offer higher interest rates in the previous period, then the funds deposited in these banks increase significantly, with an increasing pace as the banks grow in assets.

For all three data set including all banks, banks with assets more than \$50 million and “Top 50 Banks”, two risk factors have significant effect on the deposit growth during the sample period. As expected, higher capital-to-asset ratio and higher liquid assets-to-asset ratio increase growth in deposits implying depositors’ preference for well-capitalized and liquid banks. Only, OLS estimation of capital-to-asset ratio is not significant for the “Top 50 Banks” group. These findings also suggest that the ability to access their funds anytime appears to be significantly important for the depositors in the Russian Federation.

Higher loans-to-asset ratio for large banks and especially for the “Top 50 Banks” has a positive effect on deposit growth. Total loans are only significant in the OLS estimates of large banks at 10 percent level with the wrong sign. For the “Top 50 Banks”, loans are significant at 5 percent but with the wrong sign again. Since loans-to-asset ratio is used as proxy for credit risk, this result is not consistent with the expectations. The positive sign of loan-to-asset ratio im-

Table 2.5: Estimated Coefficients of Deposit Growth Equation

| Dependent Variable: Growth in Deposits at time $t$          | Banks with Asset Size     |                                    |                              |
|---|---------------------------|------------------------------------|------------------------------|
|   | All Banks<br>(OLS)<br>(1) | Above \$50 million<br>(OLS)<br>(2) | Top 50 Banks<br>(OLS)<br>(4) |
| Constant  | 0.0757<br>(1.179)         | 0.6342<br>(4.365)***               | 0.7749<br>(2.168)**          |
| Growth in Deposits ( $t-1$ )                                | -0.1535<br>(-23.708)***   | -0.2052<br>(-17.801)***            | -0.1610<br>(-5.176)***       |
| Implicit Interest Rate ( $t-1$ )                            | 0.0005<br>(4.179)***      | 0.0171<br>(2.644)***               | 0.4010<br>(6.719)***         |
| <b>Bank Riskiness (<math>Risk_{(t-1)}</math>)</b>           |                           |                                    |                              |
| Non-Performing Loans / Assets                               | -0.6986<br>(-1.211)       | -0.9041<br>(-0.590)                | -0.0021<br>(-0.001)          |
| Total Loans / Assets  | -0.0263<br>(-0.878)       | 0.0834<br>(1.660) *                | 0.2399<br>(2.011)**          |
| Total Capital / Assets                                      | 0.0734<br>(3.185)***      | 0.1956<br>(3.320)***               | 0.0865<br>(0.459)            |
| Net Profit After Tax / Assets                               | 0.1073<br>(0.723)         | -0.5862<br>(-1.922) *              | -0.9092<br>(-1.204)          |
| Liquid Assets / Assets                                      | 0.0322<br>(1.964)**       | 0.1438<br>(4.896)***               | 0.0738<br>(2.538)**          |
| <b>Macroeconomic Variables (<math>Macro_{(t-1)}</math>)</b> |                           |                                    |                              |
| Change in Consumer Price Index                              | 0.1284<br>(0.393)         | 0.8668<br>(1.777) *                | 1.5752<br>(2.997)***         |
| Change in FX Rate   | 0.4051<br>(1.549)         | 0.2867<br>(0.744)                  | -0.4041<br>(-0.485)          |
| <b>Ownership Dummies (<math>Bank_{(t-1)}</math>)</b>        |                           |                                    |                              |
| State Banks Dummy   | 0.0149<br>(0.504)         | 0.0563<br>(1.569)                  | 0.1099<br>(2.076)**          |
| Foreign Bank Dummy  | -0.0228<br>(-0.697)       | -0.097<br>(-2.863)***              | -0.0352<br>(-0.660)          |
|   |                           |                                    | 1.2354<br>(1.083)            |
|   |                           |                                    | -0.4422<br>(-0.521)          |
|   |                           |                                    | 0.0909<br>(0.480)            |
|   |                           |                                    | -0.205<br>(-1.354)           |

t-statistics are in parentheses.

\*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table 2.5: Estimated Coefficients of Deposit Growth Equation (Cont'd)

| Dependent Variable: Growth in Deposits at time $t$        | Banks with Asset Size     |                                    |                        |                              |                       |
|---|---------------------------|------------------------------------|------------------------|------------------------------|-----------------------|
|   | All Banks<br>(OLS)<br>(1) | Above \$50 million<br>(OLS)<br>(2) | (Fixed-Effect)<br>(3)  | Top 50 Banks<br>(OLS)<br>(4) | (Fixed-Effect)<br>(5) |
| <b>Deposit Insurance Dummy</b><br><i>DIDummy</i>          | 0.0061<br>(0.241)         | -0.0223<br>(-0.590)                | -0.0531<br>(-1.366)    | 0.0861<br>(1.057)            | 0.0378<br>(0.4417)    |
| <b>Size Variables (<math>Size_{t-1}</math>)</b><br>Assets | 0.0031<br>(1.016)         | -0.0205<br>(-3.493)**              | 0.0322<br>(2.109)**    | -0.0327<br>(-2.294)**        | 0.0440<br>(1.1893)    |
| Total Deposit/Total Funding Base                          | -0.0003<br>(-11.120)***   | -0.1573<br>(-3.607)***             | -0.2425<br>(-4.095)*** | -0.0335<br>(-0.430)          | -0.1835<br>(-1.539)   |
| <b>Interaction Dummies</b><br>(NNPL/TA)· <i>DIDummy</i>   | -2.6502<br>(-1.213)       | 5.7838<br>(1.132)                  | 0.6202<br>(0.116)      | 1.1450<br>(0.114)            | -4.5930<br>(-0.423)   |
| (TL/TA)· <i>DIDummy</i>                                   | 0.0747<br>(0.176)         | -0.1436<br>(-1.260)                | -0.1428<br>(-1.201)    | -0.3421<br>(-1.311)          | -0.3239<br>(-1.168)   |
| (CA/TA)· <i>DIDummy</i>                                   | -0.0036<br>(-0.055)       | 0.3462<br>(2.370)**                | 0.5581<br>(3.656)***   | 0.9857<br>(1.620)            | 1.5453<br>(2.293)**   |
| (TP/TA)· <i>DIDummy</i>                                   | 0.1581<br>(0.360)         | 1.0559<br>(1.495)                  | 0.9544<br>(1.286)      | 2.4654<br>(1.819)*           | 2.6134<br>(1.790)*    |
| (LA/TA)· <i>DIDummy</i>                                   | -0.0049<br>(-0.271)       | 0.0991<br>(0.744)                  | 0.1331<br>(0.939)      | -0.1514<br>(-0.502)          | -0.1038<br>(-0.315)   |
| Assets · <i>DIDummy</i>                                   | -0.0087<br>(-2.278)**     | -0.0034<br>(-0.762)                | -0.0062<br>(-1.353)    | -0.0025<br>(-0.299)          | -0.0069<br>(-0.760)   |
| <b>Regression Statistics</b>                              |                           |                                    |                        |                              |                       |
| R-squared   | 0.0351                    | 0.0622                             | 0.1184                 | 0.1377                       | 0.1628                |
| Adjusted R-squared  | 0.0342                    | 0.0594                             | 0.0650                 | 0.1190                       | 0.0965                |
| F-statistics  | 39.8887***                | 22.2646***                         | 44.8387***             | 7.3459***                    | 8.9151***             |
| F-statistics for fixed effects                            | -                         | 1.1457***                          | 1.1457***              | 0.5386                       | 0.5386                |
| N   | 1459                      | 377                                | 377                    | 50                           | 50                    |

t-statistics are in parentheses.

\*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

plies that loan expansion is not perceived as a risk factor by depositors. It can be argued that depositors view the financing of profitable loans by non-deposit sources as a benefit in terms of higher interest earnings. Consequently, depositors do not consider, growth in loans financed by different sources, as a risk to their savings. In particular, the significant positive relationship between deposit growth and higher loans-to-asset ratio for the “Top 50 Banks” indicates their ability to find international funding cheaper than domestic deposits. Most of the “Top 50 Banks” have good credit rating and have no difficulty in obtaining funds from corporations and international banks.

The estimated coefficients of interaction dummies with deposit insurance shows that the introduction of deposit insurance alters the behavior of depositors of small banks. Since the interaction dummies of all banks turns to be insignificant for all risk factors, it can be argued that deposit insurance impaired the disciplinary efforts of the depositors against small banks. Nevertheless, depositors of large banks continue to seek banks with high capital-to-assets ratios. Furthermore, depositors of the “Top 50 Banks” prefer profitable banks after the introduction of deposit insurance. The general public has not been aware of the full benefits of the insurance and also, banks have not been aggressive enough to sell the benefits of being a member bank in the insurance system. It can be argued that sufficient time has not lapsed for the depositors to diversify their deposits based on the assessment of banks after the introduction of the deposit insurance system. In addition, CBR in admitting the qualifying banks to the insurance system may have biased in favor of well-capitalized banks.



State ownership was not a major factor in determining deposit growth. However, among the “Top 50 Banks”, depositors prefer state banks even though this result is only supported in the OLS estimation. In addition, size was only significant and with the correct sign for banks with assets more than \$50 million. Since they are all “Big Banks”, this variable is not significant for the “Top 50 Banks”.

Estimated coefficients of risk factors affecting interest rates on deposits are presented in Table 2.6. When banks observe increases in deposits in the previous period, they reduce current interest payments on deposits. However, the magnitude of the response of small banks is much bigger compared to large banks. Small banks are compelled to reduce deposits due to limited ability to allocate excess funds.

Further, banks follow the trend in interest rate on deposits paying higher interest rates if interest rates are on the rise in the previous period. They continue to offer same interest rates on deposits, however at a decreasing rate. We do not observe differences in the response of small and large banks.

For the “Top 50 Banks”, capital-to-asset ratio, liquidity ratio and profitability are found to be significantly affecting the interest rates paid on deposits. However, the signs indicate that less risky banks, namely those that can increase their capitalization, liquidity and profitability, paid higher interest rates during the analysis period. These findings imply that to a large extent interest rates are determined by large banks that do not want to lose market share on deposits to growing mid-sized and foreign banks. In particular, since capital-to-asset ratio of the large banks are already relatively low (see Table 2.4), they use deposits more

as a major source of funding. We also observed that foreign banks in the “Top 50 Banks” group paid significantly higher interest rates on deposits to increase market share in the domestic deposit market.

As seen in Table 2.6, size plays a significant role in the determination of the interest rates on deposits. More precisely, as the asset size increases, large banks pay lower interest rates, in contrast, small banks pay higher rates. This conflicting pricing by banks of different sizes indicates the effort of small banks to attract more deposits for improving their inadequate source of external funds from depositors. Especially, due to the fact that there has been a decrease in the accumulation of deposits in the large banks since 2001 (mainly the decline of Sberbank’s share), small banks had to pay a price to obtain more deposits.

The introduction of deposit insurance provided an opportunity for banks to improve their financial balances. As it can be seen from the coefficients of the interaction dummies, large banks with adequate capitalization were able to reduce interest expenses once they were admitted to the deposit insurance system. Small banks, once admitted to the deposit insurance system tried to attract deposits by offering higher interest rates. Membership in the deposit insurance system also requires increases in the capital for many small banks. Until 2005, more than half of the banks had equity less than 5 million Euros, the statutory threshold. By 2008, all member banks in the deposit insurance system have to have minimum capital more than the statutory threshold. So, most of the increases in capital-to-asset ratios since 2003 can be attributed to small banks trying not to lose their licenses to collect deposits. This can be confirmed with the large significant

Table 2.6: Estimated Coefficients of Interest Rate Equation

| Dependent Variable: Implicit Interest Rates on Deposits at time $t$ | Banks with Asset Size     |   |                              | Top 50 Banks<br>(Fixed-Effect)<br>(5) |
|---|---------------------------|---|------------------------------|---------------------------------------|
|   | All Banks<br>(OLS)<br>(1) | Above \$50 million<br>(Fixed-Effect)<br>(2) | Top 50 Banks<br>(OLS)<br>(4) |                                       |
| Constant  | -6.6686<br>(-1.833) *     | 0.4824<br>(2.103)**                         | 0.3297<br>(2.296)**          | -                                     |
| Growth in Deposits ( $t-1$ )  | -3.4441<br>(-9.528)***    | -0.1569<br>(-8.753)***                      | -0.1709<br>(-9.185)***       | -0.0776<br>(-6.235)***                |
| Implicit Interest Rate ( $t-1$ )                                    | 0.5179<br>(76.945)***     | 0.5087<br>(49.610)***                       | 0.4165<br>(37.141)***        | 0.1302<br>(5.178)***                  |
| <b>Bank Riskiness (<math>Risk_{t-1}</math>)</b>                     |                           |   |                              |                                       |
| Non-Performing Loans / Assets                                       | -5.4562<br>(-0.166)       | -0.9230<br>(-0.381)                         | -3.2362<br>(-1.187)          | 2.1559<br>(0.788)                     |
| Total Loans / Assets  | -2.8148<br>(-1.658) *     | -0.0457<br>(-0.575)                         | -0.1751<br>(-1.420)          | -0.0546<br>(-0.731)                   |
| Total Capital / Assets  | 2.1299<br>(1.628)         | 0.1960<br>(2.107)**                         | -0.1012<br>(-0.702)          | 0.3827<br>(3.277)***                  |
| Net Profit After Tax / Assets                                       | -5.2848<br>(-0.627)       | -0.8291<br>(-1.719) *                       | -0.8016<br>(-1.272)          | 1.1805<br>(3.211)***                  |
| Liquid Assets / Assets  | 1.6890<br>(1.816) *       | 0.0603<br>(1.297)                           | 0.0576<br>(1.092)            | 0.1734<br>(14.261)***                 |
| <b>Macroeconomic Variables (<math>Macro_{t-1}</math>)</b>           |                           |   |                              |                                       |
| Change in Consumer Price Index                                      | 48.8464<br>(2.633)***     | 2.5208<br>(3.266)***                        | 2.4623<br>(2.964)***         | 1.8473<br>(4.274)***                  |
| Change in FX Rate   | 18.2044<br>(1.225)        | 0.0827<br>(0.136)                           | 0.0666<br>(0.109)            | -0.2515<br>(-0.783)                   |
| <b>Ownership Dummies (<math>Bank_{t-1}</math>)</b>                  |                           |   |                              |                                       |
| State Banks Dummy   | -0.9446<br>(-0.509)       | 0.0140<br>(0.246)                           | -0.0225<br>(-0.179)          | -0.0359<br>(-0.499)                   |
| Foreign Bank Dummy  | -0.7742<br>(-0.538)       | -0.0266<br>(-0.497)                         | 0.0801<br>(0.413)            | 0.2097<br>(1.851) *                   |

t-statistics are in parentheses.

\*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table 2.6: Estimated Coefficients of Interest Rate Equation (Cont'd)

|   | Banks with Asset Size     |                                    |                       | Top 50 Banks<br>(Fixed-Effect)<br>(5) |
|---|---------------------------|------------------------------------|-----------------------|---------------------------------------|
|   | All Banks<br>(OLS)<br>(1) | Above \$50 million<br>(OLS)<br>(2) | (Fixed-Effect)<br>(3) |                                       |
| Dependent Variable: Implicit Interest Rates on Deposits at time $t$ |                           |                                    |                       |                                       |
| <b>Deposit Insurance Dummy</b><br>$DIDummy$                         | -0.7742<br>(-0.538)       | 0.0321<br>(0.539)                  | 0.0514<br>(0.838)     | 0.0669<br>(2.044)**                   |
| <b>Size Variables</b> ( $Size_{(t-1)}$ )<br>Assets                  | 0.2931<br>(1.704)*        | -0.0204<br>(-2.195)**              | -0.0552<br>(-2.291)** | -0.0149<br>(-2.609)**                 |
| Total Deposit/Total Funding Base                                    | 0.0009<br>(0.581)         | -0.1051<br>(-1.526)                | -0.0737<br>(-0.788)   | -0.1238<br>(-3.954)**                 |
| <b>Interaction Dummies</b><br>( $NNPL/TA$ )· $DIDummy$              | -57.1544<br>(-0.460)      | 0.6438<br>(0.080)                  | -7.3330<br>(-0.865)   | -0.1711<br>(-0.442)                   |
| ( $TL/TA$ )· $DIDummy$  | -6.0069<br>(-1.667)*      | 0.0314<br>(0.174)                  | -0.0473<br>(-0.252)   | 0.0612<br>(0.584)                     |
| ( $CA/TA$ )· $DIDummy$  | 12.2938<br>(3.347)**      | -0.2908<br>(-1.264)                | -0.4507<br>(-1.868)*  | -0.4197<br>(-1.717)*                  |
| ( $TP/TA$ )· $DIDummy$  | -31.1258<br>(-1.248)      | 0.7764<br>(0.695)                  | 1.0207<br>(0.870)     | -0.5427<br>(-0.997)                   |
| ( $LA/TA$ )· $DIDummy$  | 0.6128<br>(0.335)         | -0.1221<br>(-0.579)                | -0.2145<br>(-0.958)   | -0.2023<br>(-1.672)*                  |
| Assets · $DIDummy$  | 0.0609<br>(0.500)         | 0.0023<br>(0.334)                  | 0.0072<br>(0.988)     | 0.0037<br>(1.080)                     |
| <b>Regression Statistics</b>  |                           |                                    |                       |                                       |
| R-squared   | 0.2180                    | 0.2868                             | 0.3308                | 0.4383                                |
| Adjusted R-squared  | 0.2173                    | 0.2847                             | 0.2901                | 0.4765                                |
| F-statistics  | 306.9498***               | 135.0760***                        | 165.2352***           | 35.8920***                            |
| F-statistics for fixed effects                                      | -                         | 1.1822***                          | 1.1822***             | 2.8369***                             |
| N   | 1459                      | 377                                | 377                   | 50                                    |

t-statistics are in parentheses.

\*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

coefficient of interaction dummy for the capital-to-asset ratios of small banks.

One variable which had no effect on disciplining banks by depositors is the non-performing loans-to-asset ratio. While it is considered an important variable in identifying banks' riskiness in the developed markets, it has no significant impact on the deposits and/or interest rates paid by banks in the Russian Federation. It appears that it is hard to identify the impact of a change in the bad loans on deposits or interest rates using quarterly data due to the treatment of non-performing loans by the CBR. There is strict write-off regulation which has been in effect since 2002 that does not allow banks to carry non-performing assets longer than 90 days on their balance sheets. Since banks comply with this requirement (or roll them over into new loans), non-performing loans-to-asset ratios of banks are insignificant in the estimated depositor discipline equations.

While we use relatively large banks to demonstrate the existence of depositors' reaction for excessive risk-taking, it is possible that deposit growth is influenced by other factors. For example, there might be strong depositor confidence in the large banks because of the possible existence of implicit guarantees such as "Too-Big-To-Fail" (TBTF) protection. In addition, there might be aggressive marketing strategies pursued by less risky, well capitalized and liquid banks to improve their market shares. Or, it can be argued that by investing in new branches, personnel, and by advertising, etc. large banks may achieve higher deposit growth without offering higher interest rates and these findings might be interpreted as market

discipline<sup>10</sup>. To identify the factors that contribute to depositors' reaction to bank riskiness, we re-classify the banks in our sample according to their capitalization and liquidity. We separate banks with asset more than \$50 million (377 banks) into two groups according to their capital and liquidity ratios. Banks with liquidity and capital-to-asset ratios above the median are grouped as "Liquid and Well-Capitalized Banks" and the other banks are called "Remaining Banks".

Tables 2.7 and 2.8 present the estimated coefficients of deposit growth and interest rate equations for liquid and well-capitalized banks and, the remaining banks. According to the OLS and fixed-effect estimates, none of the risk factors has a significant impact on the deposit growth as well as interest paid on deposits in the sub-sample of liquid and well-capitalized banks. These banks are perceived as unlikely to fail by the depositors. As it can be seen in Tables 2.7 and 2.8, when the assets of the liquid and well-capitalized banks increase, growth rate of deposits increases even though interest rates paid on deposits by these banks decline.

However, among the remaining banks, there is no indication of safety by the depositors. In the sub-sample of less-capitalized and less-liquid banks, depositors exercise discipline based on capitalization and liquidity. When placing funds in less-capitalized and less-liquid banks, depositors seek banks with better capitalized banks. In addition, liquid banks are preferred by depositors. We observe that interaction dummies with deposit insurance, excluding non-performing and the total loans, are all significant. Even though size interaction dummy has the

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<sup>10</sup>However, as mentioned before there is no significant change in building network of branches in the Russian Federation during the analysis period (see Figure 2-1).

Table 2.7: Estimated Coefficients of Deposit Growth Equation for Large Banks by Different Groupings

| Dependent Variable: Growth in Deposits at time $t$        | Banks with Asset Size Above \$50 million          |                         |                                 |                         |
|---|---|-------------------------|---------------------------------|-------------------------|
|   | Liquid and Well-Capitalized Banks<br>(OLS)<br>(1) | (Fixed-Effect)<br>(2)   | Remaining Banks<br>(OLS)<br>(3) | (Fixed-Effect)<br>(4)   |
| Constant  | 0.4315<br>(0.923)                                 | -                       | 0.6791<br>(4.799)***            | -                       |
| Growth in Deposits ( $t-1$ )                              | -0.2950<br>(-12.526)***                           | -0.3307<br>(-13.704)*** | -0.1444<br>(-10.975)***         | -0.1783<br>(-13.261)*** |
| Implicit Interest Rate ( $t-1$ )                          | 0.0125<br>(1.264)                                 | 0.0114<br>(1.075)       | 0.0371<br>(3.240)***            | 0.0515<br>(3.900)***    |
| <b>Bank Riskiness (<math>Risk_{t-1}</math>)</b>           |   |                         |                                 |                         |
| Non-Performing Loans / Assets                             | -1.3593<br>(-0.421)                               | 0.5059<br>(0.137)       | -0.3424<br>(-0.197)             | -0.9575<br>(-0.493)     |
| Total Loans / Assets                                      | -0.0915<br>(-0.700)                               | -0.1164<br>(-0.569)     | 0.1286<br>(2.430)**             | 0.1035<br>(1.273)       |
| Total Capital / Assets                                    | 0.2512<br>(1.637)                                 | 0.1385<br>(0.613)       | 0.1978<br>(3.149)***            | 0.3679<br>(3.786)***    |
| Net Profit After Tax / Assets                             | -0.2587<br>(-0.422)                               | 0.2165<br>(0.249)       | -0.6911<br>(-1.924)*            | -0.4990<br>(-1.119)     |
| Liquid Assets / Assets                                    | 0.0675<br>(0.422)                                 | -0.1156<br>(-0.555)     | 0.1510<br>(5.688)***            | 0.1462<br>(4.887)***    |
| <b>Macroeconomic Variables (<math>Macro_{t-1}</math>)</b> |   |                         |                                 |                         |
| Change in Consumer Price Index                            | 0.7563<br>(0.573)                                 | 2.2355<br>(1.615)       | 0.9181<br>(1.877)*              | 1.2217<br>(2.297)**     |
| Change in FX Rate   | -1.2950<br>(-1.254)                               | -2.0166<br>(-1.948)*    | 0.7826<br>(2.024)**             | 0.7490<br>(1.929)*      |
| <b>Ownership Dummies (<math>Bank_{t-1}</math>)</b>        |   |                         |                                 |                         |
| State Banks Dummy   | -0.1817<br>(-1.291)                               | 0.0563<br>(0.243)       | 0.0818<br>(2.432)**             | 0.1412<br>(1.805)*      |
| Foreign Bank Dummy  | -0.1130<br>(-1.342)                               | 0.1347<br>(0.501)       | -0.0896<br>(-2.524)**           | -0.3619<br>(-2.694)***  |

t-statistics are in parentheses.

\*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table 2.7: Estimated Coefficients of Deposit Growth Equation for Large Banks by Different Groupings (Cont'd)

|   | Banks with Asset Size Above \$50 million          |                       |                                 |                        |
|---|---|-----------------------|---------------------------------|------------------------|
|   | Liquid and Well-Capitalized Banks<br>(OLS)<br>(1) | (Fixed-Effect)<br>(2) | Remaining Banks<br>(OLS)<br>(3) | (Fixed-Effect)<br>(4)  |
| Dependent Variable: Growth in Deposits at time $t$          |   |                       |                                 |                        |
| <b>Deposit Insurance Dummy</b><br>$DIDummy$                 | -0.0029<br>(-0.028)                               | -0.0713<br>(-0.688)   | -0.0252<br>(-0.668)             | -0.0376<br>(-0.962)    |
| <b>Size Variables (<math>Size_{(t-1)}</math>)</b><br>Assets | -0.0098<br>(-0.510)                               | 0.1110<br>(3.187)***  | -0.0231<br>(-4.077)***          | -0.0022<br>(-0.135)    |
| Total Deposit/Total Funding Base                            | -0.1212<br>(-1.208)                               | -0.0886<br>(-0.705)   | -0.1741<br>(-3.680)***          | -0.3273<br>(-4.927)*** |
| <b>Interaction Dummies</b><br>(NINPL/TA)· $DIDummy$         | -3.8364<br>(-0.226)                               | -5.9139<br>(-0.338)   | 6.2764<br>(1.266)               | 3.2933<br>(0.630)      |
| (TL/TA)· $DIDummy$  | -0.1150<br>(-0.427)                               | -0.0758<br>(-0.271)   | -0.1541<br>(-1.266)             | -0.1650<br>(-1.297)    |
| (CA/TA)· $DIDummy$  | 0.1304<br>(0.361)                                 | 0.3882<br>(1.028)     | 0.6088<br>(3.567)***            | 0.8460<br>(4.723)***   |
| (TP/TA)· $DIDummy$  | -0.4164<br>(-0.295)                               | 0.5193<br>(0.351)     | 1.9699<br>(2.361)**             | 1.8111<br>(2.054)**    |
| (LA/TA)· $DIDummy$  | -0.2497<br>(-0.656)                               | -0.2339<br>(-0.587)   | 0.3181<br>(2.295)**             | 0.4018<br>(2.729)***   |
| Assets· $DIDummy$   | 0.0072<br>(0.557)                                 | -0.0018<br>(-0.135)   | -0.0093<br>(-2.025)**           | -0.0119<br>(-2.477)**  |
| <b>Regression Statistics</b>                                |   |                       |                                 |                        |
| R-squared   | 0.0960  | 0.1564                | 0.0556                          | 0.1111                 |
| Adjusted R-squared  | 0.0847  | 0.0956                | 0.0519                          | 0.0568                 |
| F-statistics  | 8,5039***   | 14,7611***            | 14,9768***                      | 31,6499***             |
| N   | 91  | 91                    | 287                             | 287                    |

t-statistics are in parentheses.

\*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.



Table 2.8: Estimated Coefficients of Interest Rate Equation for Large Banks by Different Groupings

| Dependent Variable: Implicit Interest Rates on Deposits at time $t$ | Banks with Asset Size Above \$50 million          |  |                                 |  |
|---|---|--|---------------------------------|--|
|   | Liquid and Well-Capitalized Banks<br>(OLS)<br>(1) | Remaining Banks<br>(Fixed-Effect)<br>(2) | Remaining Banks<br>(OLS)<br>(3) | Remaining Banks<br>(Fixed-Effect)<br>(4) |
| Constant  | 3.7961<br>(3.672)***                              | -  | -0.1421<br>(-1.162)             | -  |
| Growth in Deposits ( $t-1$ )  | -0.3210<br>(-6.158)***                            | -0.3393<br>(-6.364)***                   | -0.0429<br>(-3.866)***          | -0.0471<br>(-4.042)***                   |
| Implicit Interest Rate ( $t-1$ )                                    | 0.4647<br>(21.269)***                             | 0.3806<br>(16.217)***                    | 0.6212<br>(62.568)***           | 0.5300<br>(46.367)***                    |
| <b>Bank Riskiness (<math>Risk_{(t-1)}</math>)</b>                   |   |  |                                 |  |
| Non-Performing Loans / Assets                                       | -5.2419<br>(-0.733)                               | -11.4801<br>(-1.394)                     | -0.3607<br>(-0.240)             | -0.4137<br>(-0.246)                      |
| Total Loans / Assets  | -0.0311<br>(-0.107)                               | -0.4515<br>(-0.994)                      | -0.0353<br>(-0.772)             | -0.1239<br>(-1.768) *                    |
| Total Capital / Assets  | -0.4230<br>(-1.245) **                            | -0.9998<br>(-1.996) **                   | 0.2499<br>(4.613)***            | 0.2709<br>(3.233)***                     |
| Net Profit After Tax / Assets                                       | -1.2328<br>(-0.907)                               | -1.4864<br>(-0.769)                      | -0.3776<br>(-1.215)             | -0.2565<br>(-0.664)                      |
| Liquid Assets / Assets  | 0.0131<br>(0.037)                                 | -0.2924<br>(-0.631)                      | 0.0513<br>(2.231)**             | 0.0708<br>(3.077)***                     |
| <b>Macroeconomic Variables (<math>Macro_{(t-1)}</math>)</b>         |   |  |                                 |  |
| Change in Consumer Price Index                                      | 1.5827<br>(0.542)                                 | 1.6845<br>(0.548)                        | 2.2904<br>(5.407)***            | 2.8526<br>(6.187)***                     |
| Change in FX Rate   | 1.0860<br>(0.475)                                 | 0.7674<br>(0.334)                        | -0.2045<br>(-0.611)             | -0.2891<br>(-0.859)                      |
| <b>Ownership Dummies (<math>Bank_{(t-1)}</math>)</b>                |   |  |                                 |  |
| State Banks Dummy   | -0.1567<br>(-0.502)                               | -0.1890<br>(-0.367)                      | -0.0013<br>(-0.044)             | -0.0034<br>(-0.050)                      |
| Foreign Bank Dummy  | 0.1026<br>(0.553)                                 | 0.1282<br>(0.215)                        | -0.0407<br>(-1.326)             | -0.0208<br>(-0.179)                      |

t-statistics are in parentheses.

\*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table 2.8: Estimated Coefficients of Interest Rate Equation for Large Banks by Different Groupings (Cont'd)

|   | Banks with Asset Size Above \$50 million          |                        |                        |  |
|---|---|------------------------|------------------------|--|
|   | Liquid and Well-Capitalized Banks<br>(OLS)<br>(1) | (Fixed-Effect)<br>(2)  | (OLS)<br>(3)           | Remaining Banks<br>(Fixed-Effect)<br>(4) |
| Dependent Variable: Implicit Interest Rates on Deposits at time $t$ |   |                        |                        |  |
| <b>Deposit Insurance Dummy</b><br><i>DIDummy</i>                    | 0.0570<br>(0.254)                                 | 0.1193<br>(0.520)      | 0.0581<br>(1.777) *    | 0.0377<br>(1.112)                        |
| <b>Size Variables (<i>Size</i> (<math>t-1</math>))</b><br>Assets    | -0.1656<br>(-3.890)***                            | -0.2085<br>(-2.690)*** | 0.0066<br>(1.352)      | 0.0310<br>(2.167)**                      |
| Total Deposit/Total Funding Base                                    | -0.0752<br>(-0.339)                               | 0.0245<br>(0.088)      | -0.1084<br>(-2.648)*** | -0.1037<br>(-1.803)*                     |
| <b>Interaction Dummies</b><br>(NNPL/TA)· <i>DIDummy</i>             | 1.6735<br>(0.044)                                 | -59.1554<br>(-1.520)   | 1.0884<br>(0.253)      | 0.3627<br>(0.080)                        |
| (TL/TA)· <i>DIDummy</i>   | -0.1505<br>(-0.252)                               | -0.0054<br>(-0.009)    | 0.0723<br>(0.687)      | -0.0010<br>(-0.009)                      |
| (CA/TA)· <i>DIDummy</i>   | -0.0402<br>(-0.050)                               | -0.1452<br>(-0.173)    | -0.2387<br>(-1.631)    | -0.2972<br>(-1.913)*                     |
| (TP/TA)· <i>DIDummy</i>   | 0.7961<br>(0.254)                                 | 0.9275<br>(0.282)      | 0.3537<br>(0.490)      | 0.1695<br>(0.222)                        |
| (LA/TA)· <i>DIDummy</i>   | -0.3083<br>(-0.365)                               | -0.1975<br>(-0.223)    | -0.0399<br>(-0.332)    | -0.1384<br>(-1.084)                      |
| Assets· <i>DIDummy</i>  | 0.0084<br>(0.295)                                 | 0.0056<br>(0.188)      | -0.0011<br>(-0.287)    | 0.0029<br>(0.701)                        |
| <b>Regression Statistics</b>  |   |                        |                        |  |
| R-squared   | 0.2518  | 0.2980                 | 0.4683                 | 0.4987                                   |
| Adjusted R-squared  | 0.2425  | 0.2475                 | 0.4662                 | 0.4679                                   |
| F-statistics  | 26.9922***  | 33.8480***             | 224.2519***            | 252.1700***                              |
| N   | 91  | 91                     | 287                    | 287                                      |

t-statistics are in parentheses.

\*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

unexpected sign, this is mostly due to large banks' loss of market share.

Both capital and liquidity ratios are significant with positive coefficients in the interest rate equations for under-capitalized and/or illiquid banks. Higher interest rates paid by these banks even though they increase their capitalization and liquidity can be explained by their efforts to improve their market share and to qualify for joining the deposit insurance system starting 2004:<sup>11</sup> Furthermore, CBR introduced new requirements for capital and liquidity adequacy for commercial banks since 2003. Banks in general anticipated that they have to improve their balance sheets before they can join the deposit insurance system. Hence, we do not observe any depositor discipline after the introduction of deposit insurance.

## 2.7 Conclusion

In this essay, we measured the extent of market discipline imposed by depositors on the banks in the Russian Federation. Banking in the Russian Federation has developed rapidly since the financial crisis in 1998. Since the crisis, banking industry has consolidated and improved its role in financial intermediation. A new banking law was introduced with the intent of improving the prudential requirements for banks in line with Basel principles. In the meanwhile, depositors became aware of banks' risk-taking behavior.

In particular, we find that depositors imposed limited market discipline on

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<sup>11</sup>We estimate our empirical model by dividing data before and after the introduction of the deposit insurance system and observe that significantly higher pricing policy of the under-capitalized and/or less-liquid banks did not continue after the insurance system started.

bank risk-taking. Depositors change their funds in the banks based on the banks' liquidity and capital adequacy. This result on depositor discipline is consistent with the results from other emerging markets. Similar behavior of depositors in emerging markets suggests that the depositors are not completely informed about the risk-taking behavior of banks but prefer highly capitalized banks.

In addition to highly capitalized banks, depositors also prefer liquid banks for placing their funds. Moreover, depositors find safety in larger banks that are more liquid and well-capitalized as compared to other large banks.

Risk factors are not significant in demanding higher interest rates on deposits. Estimations on less-capitalized and/or less-liquid large banks indicate that these banks pursue aggressively high pricing strategies to increase their external funds. Thus, they would be qualified to join the deposit insurance system and also satisfy the minimum requirements of the CBR. However, it is observed that the establishment of the deposit insurance system has not yet been effective in determining depositor behavior.

## CHAPTER 3

# DEPOSITORS' ASSESSMENT OF BANK RISKINESS: A COMPARATIVE ANALYSIS

### 3.1 Introduction

Depositors' reaction by changing the flow and price of loanable funds is expected to restrict banks' excessive risk-taking. This disciplining behavior by depositors contributes to bank supervisors' efforts in maintaining a well-functioning banking system. By increasing the awareness of all stakeholders of banks and requiring more timely and comprehensive disclosure by banks, supervisors can reduce the potential risks of the banking industry. Major stakeholders of banks are the shareholders, the borrowers, and the depositors. The role of these stakeholders to discipline banks vary according to their ability to access information that proxy risk-taking behavior of banks. For example, market prices of debt and equity contracts issued by banks in the developed markets contain significant information

on risk-taking behavior of banks.<sup>1</sup>

In most of the emerging economies, banks are either privately held or floated shares are a very small portion of the outstanding bank shares.<sup>2</sup> Moreover, various financial contracts such as subordinated debentures simply do not exist. So, the effectiveness of the market discipline is limited to depositors in most of the emerging markets.

In this essay, we compare the effectiveness of depositors' discipline on banks in the Russian Federation to bank discipline in Turkey. In addition, we underline the effects of different institutional factors and structural differences on depositor reaction in both countries. Depositors would adjust their funds held by the banks or banks may be compelled to increase the price of deposits when financial ratios as indicators of risk deteriorate. The risk factors considered in the study are standard CAMEL ratios. The estimations are controlled for institutional and economic factors. While depositors respond in a similar manner to bank riskiness in both countries, the measures taken by bank supervisors influence the behavior of the depositors. For example, in Turkey we observe the disappearance of depositor discipline after the introduction of unlimited government guarantees on all bank deposits and liabilities. Turkish authorities chose a costly bailout of banks after the financial crisis in 2001. The non-performing loans of the banks were replaced by Treasury bonds. The result of this operation was to almost double the public

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<sup>1</sup>See for example Flannery (1998) for a comprehensive survey on the relationship between equity and bond prices and, bank riskiness.

<sup>2</sup>Even if the bank stocks are traded, the number of shares held by outside shareholders is usually very small. For example, the only bank stock traded in the Russian Trading System (RTS) is the state-owned Sberbank. The shares traded form a very small portion of the outstanding shares. Central Bank of Russia is the majority shareholder of Sberbank.

debt-to-GDP ratio. So, the cost of the bank bailout was borne by the general public.

On the other hand, in the Russian Federation, bank losses after the crisis in 1998 were to a large extent paid by the depositors. The losses incurred in the early 1990s due to high inflation and the experience of the 1998 crisis made the Russian general public aware of the risks involved in depositing funds in the banking system. Depositors response in withdrawing funds from Sodbizbank in 2004 was swift. Even rumors about an imminent collapse of Alfabank, the largest private bank at the time, resulted in long lines at the bank's branches resulting with a liquidity shortage. The bank weathered the short-lived run by obtaining credit in international credit markets. Costly experiences both in the Russian Federation and Turkey should have compelled banks to improve their operations and risk-taking in order to attract deposits.

Both countries experienced severe banking crises followed by major restructuring and recovery of the banking industry.<sup>3</sup> Comparison of market discipline in both countries provides evidence for the development of measures to improve control of risk taking behavior by banks.

Turkish banking industry makes a better case for comparison with the Russian banking industry. Both countries are characterized by declining share of state-owned banks and increasing share of private banking. Given the consolidation activities, banking in the Russian Federation can be considered as converging to the Turkish banking industry. However, one may want a comparison of the Russian

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<sup>3</sup>Russian crisis in August 1998 and Turkish crises in November 2000 and February 2001.

Federation with Central and Eastern European (CEE) countries but, banking industry development has taken a completely different course in these countries. In CEE countries, the banking industry is dominated by foreign banks. In contrast, both Turkish and Russian banking industries are still dominated by domestic bankers. Moreover, banking industries in both countries have undergone major restructuring demonstrated by mergers, liquidations and improvements in capital adequacy and management since 2000.

After the financial crisis in 1998, the Russian banking industry has undergone significant changes both in terms of a reduction in the number of banks as well as in establishing public confidence in the use of the banking system for financial intermediation. Along with growing income, more savings have been channeled to the banking industry since 1999. As of 2005, there were 1,253 banks, down from a high of over 3,300 in 1995, distributed over a very large geography making it difficult to supervise and monitor. In such a banking system with a large number of banks, market discipline imposed by depositors can be useful in regulating bank risk taking behavior. In addition, market discipline can increase competitiveness in the banking industry as depositors reallocate funds away from risky banks. Indeed, Russian depositors reallocate deposits either by withdrawing funds from the banking system or depositing in the safe state-owned banks once information becomes available about the increased riskiness of a bank. However, they have no price influence on the banks in terms of demanding higher interest rates for increased risks. This implies a perfectly elastic demand for funds. Banks are able to substitute deposits with other funds.



Similar to the Russian banking industry, Turkish banks experienced significant consolidation after the crisis in 2001. The number of commercial banks has dropped dramatically from 80 in 1999 to 47 in 2005. Turkey has a competitive banking industry, offering many financial products to depositors as well as utilizing high technology in obtaining deposits with relative ease. However, banking industry was most adversely affected by the crisis in 2001. As a result, state guarantees were increased to cover all bank liabilities to avoid bank runs and bankruptcies. In the meanwhile, introduction of this policy marked a change in the behavior of depositors where monitoring of banks became ineffective. After sufficient confidence building measures have been established in the banking industry, guarantees were finally reduced after 2004. During the post-crisis period when partial deposit insurance became in effect, improvement in the capitalization and asset quality of banks increased the depositors' and investors' confidence in the Turkish banking industry. With reduced state guarantees, depositors chose well capitalized banks for their funds.

In addition to the improvements in the financial structure of banks, we measure the performance of management to assess resource utilization by banks. To do this, we calculate an efficiency score for each banks for each period. After the crises, banks in both countries, improved their operations resulting in more efficient financial intermediation. We find evidence that efficient banks were able to increase deposits.

The essay is organized as follows. In section two, we provide a brief review of market discipline literature in emerging markets. Banking industries in the

Russian Federation and Turkey after 2000 are discussed in section three. The model used in estimating depositor discipline is presented in section four. In section five, we described the data. We discuss the estimation results and compare depositor discipline in the Russian Federation and Turkey in section six, and we conclude the essay in section seven.

## **3.2 Literature Review**

Banks are the dominant financial intermediaries in emerging markets. In addition to the opaqueness of ordinary banking activities, frequent financial crises, state ownership of banks, and inadequate supervision necessitate close monitoring of these institutions. Market discipline of banks refers to private stakeholders producing information that helps supervisors in recognizing problem banks and implementing corrective measures. Major stakeholder of banks are their shareholders, borrowers, and depositors. The role of these stakeholders to discipline banks vary substantially according to their ability to access information that proxy risk-taking behavior of banks. For example, market prices of debt and equity contracts issued by the banks in the developed markets contain significant information on risk-taking behavior of banks (see Flannery 1998). However, in most of the emerging economies, banks are either privately held or the traded shares are a small portion of the outstanding bank shares. Caprio and Honohan (2004) provide evidence that the ratio of listed banks' assets to banking assets in emerging markets increase as per capita GDP increases. They argue that equity market discipline can exist if

the market share of the listed banks is large<sup>4</sup>. Moreover, various financial contracts such as subordinated debentures simply do not exist. Hence, the exercise of the market discipline is limited to certain stakeholders namely, depositors in most of the emerging markets using limited information from the financial statements of the banks.

Calomiris and Kahn (1991) argued that because depositors are both risk averse and risk intolerant, they monitor their bank and take actions in order to price and limit their risks. In particular, they showed that market discipline by depositors is observed from the increase in the deposit rates and/or premature withdrawal of the demandable deposits. Using mainly balance sheet data, it is hypothesized that there is a significant relationship between deposit rates, deposit growth and the bank riskiness.

Previous empirical studies in the emerging economies are concentrated on Latin American economies (see Calomiris and Powell 2001 for Argentina; Barajas and Steiner 2000 for Columbia; and Martinez-Peria and Schmukler 2001 for Argentine, Mexico and Chile). Later, there are also evidence for Poland by Mondschean and Opiela (1999), for India by Ghosh and Das (2003), for Turkey by Ungan and Caner (2004) and Onder and Ozyildirim (2003) and for Russian Federation by Karas et al. (2006) and Ungan et al. (2006).

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<sup>4</sup>The only bank stock traded in the Russian Trading System (RTS) is the state-owned Sberbank. Moreover The Ministry of Finance and the Central Bank of Russia hold the majority of shares.

### 3.3 Banking in the Russia Federation and Turkey

We compare banking industry in the Russian Federation with Turkish banking industry in terms of relative importance of banks in the economy, aggregate financial ratios, concentration and efficiency in the management of the banks. According to the existing financial institutions and markets in the Russian Federation and Turkey, it is apparent that in both countries, the banking sector dominates the financial system. As shown in Table 3.1, the size of the transactions in the banking sector in both countries are significantly higher than the other financial institutions. As of 2005, more than 85 percent of the financial assets in both countries were owned by the banking industry.

In both countries, state banks' involvement in financial intermediation is significantly high. In Turkey, even though the share of the state banks has declined over the years, the existing three state banks have 31.4 percent of the overall banking assets as of 2005 (Table 3.2). Moreover, state banks account for 24.7 percent of the capital and 38.8 percent of the deposits of the banking industry while they provide only 21.0 percent of the loans. In the Russian Federation, 32 state banks own 40.7 percent of the banking industry assets, a significantly higher proportion than in Turkey. State banks account for 33.8 percent of the capital and 62 percent of the deposits while providing about 46.7 percent of corporate loans. So, Russian state-owned banks have a much bigger share of the banking industry than state banks in Turkey. However, the trends indicate that the states's share in banking has been converging to its share in Turkey.

Table 3.1: Financial System Assets (by the end of 2005)

|                       | Russian Federation               |                                  |               |                 | Turkey                           |                                  |               |                 |
|-----------------------|----------------------------------|----------------------------------|---------------|-----------------|----------------------------------|----------------------------------|---------------|-----------------|
|                       | Number of Financial Institutions | Assets <sup>†</sup> (\$ billion) | Assets to GDP | Share in Assets | Number of Financial Institutions | Assets <sup>†</sup> (\$ billion) | Assets to GDP | Share in Assets |
| Banking Sector        | 1253                             | 344.8                            | 45.1          | 89.3            | 47                               | 294.2                            | 81.6          | 85.0            |
| Insurance Companies   | 1075                             | 20.7                             | 2.7           | 5.4             | 35                               | 6.4                              | 1.8           | 1.9             |
| Private Pension Funds | 261                              | 12.2                             | 1.6           | 3.2             | 11                               | 4.2                              | 1.2           | 1.2             |
| Investment Funds      | 360                              | 8.1                              | 1.1           | 2.1             | 36                               | 23.8                             | 6.6           | 6.9             |
| Other <sup>‡</sup>    | -                                | -                                | -             | -               | 184                              | 17.6                             | 4.9           | 5.1             |
| Total                 | 2949                             | 385.8                            | 50.5          | 100.0           | 313                              | 346.3                            | 96.1          | 100.0           |

*Source:* Central Bank of Russia and Banking Regulation and Supervision Agency of Turkey. <sup>†</sup>: \$1.0 = 28,28 Ruble and \$1.0 = 1,3495 Turkish Liras by the end of 2005. <sup>‡</sup>: Participation Banks, Leasing and Factoring Companies, Securities Intermediary Institutions and Consumer Finance Companies are included.

Both in Russian Federation and in Turkey, foreign banks' share in terms of assets remains below 10 percent which is far from the average in any CEE banking industry. Overall, banking industry in both countries is characterized by declining share of the state-owned banks and increasing share of private and foreign banks<sup>5</sup>.

Central Bank of Russia (CBR) classifies domestic private banks as large diversified banks, intra-group banks, that is, banks owned by large corporations, medium and small size Moscow region banks and medium and small regional banks<sup>6</sup>. Diversified banks own about one-fourth of the banking industry assets and capital. They are the second largest after the state-owned banks in terms of assets and capital.

Banking industry in Russian Federation has experienced continuous growth since 2000. Ratio of bank assets to GDP in the Russian Federation rose from 35.3 percent in 2001 to 45.1 percent in 2005 (see Table 3.3). Despite severe banking crisis in 2001<sup>7</sup>, the asset size of the Turkish banking industry was 81.6 percent of GDP in 2005, up from 77 percent in 2002. Asset to GDP ratio in Turkey is almost twice as much as in the Russian Federation. However, this is due to longer asset accumulation process in Turkey relative to the Russian banking industry.

There are several structural similarities of the banking industries in the Russian Federation and Turkey. First, the capital base of the banking industries in both of the countries adapted international capital standards. Because of the timing of the

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<sup>5</sup>In some CEE countries, foreign-owned banks constitute the whole banking industry.

<sup>6</sup>As of 2005, there are 74 diversified banks; 109 inter-group banks; 455 medium and small size Moscow region banks; and 484 medium and small regional banks.

<sup>7</sup>The increase in 2001 can be explained by the decrease in real GDP of Turkish economy due to 2001 financial crisis.

Table 3.2: Ownership Structure of Russian and Turkish Banking Sectors (by the end of 2005)

|                          | Russia Banking Sector |        |         |                             | Turkish Banking Sector |        |         |                |
|--------------------------|-----------------------|--------|---------|-----------------------------|------------------------|--------|---------|----------------|
|                          | No. of Banks          | Assets | Capital | Share of Loans <sup>†</sup> | No. of Banks           | Assets | Capital | Share of Loans |
| State Controlled Banks   | 32                    | 40.7   | 33.8    | 46.7                        | 3                      | 31.4   | 24.7    | 21.0           |
| Private Banks            | 1170                  | 51.0   | 57.0    | 45.9                        | 16                     | 59.7   | 55.7    | 65.2           |
| Foreign Banks            | 51                    | 8.3    | 9.2     | 7.4                         | 14                     | 5.2    | 6.1     | 9.9            |
| Other Banks <sup>‡</sup> | -                     | -      | -       | -                           | 14                     | 3.7    | 13.5    | 3.9            |
| Total                    | 1253                  | 100.0  | 100.0   | 100.0                       | 47                     | 100.0  | 100.0   | 100.0          |

*Source:* Central Bank of Russia, Banking Regulation and Supervision Agency of Turkey and The Banks Association of Turkey.

<sup>†</sup>: Only corporate loans for Russian Federation. <sup>‡</sup>: Other banks in Turkey include the bank controlled by State Deposit Insurance Fund and the investment and development banks.

Table 3.3: Russian and Turkish Banking Sectors (2001-2005)

|                            | Russia Banking Industry |       |       |       |       | Turkish Banking Industry |       |       |       |       |
|----------------------------|-------------------------|-------|-------|-------|-------|--------------------------|-------|-------|-------|-------|
|                            | 2001                    | 2002  | 2003  | 2004  | 2005  | 2001                     | 2002  | 2003  | 2004  | 2005  |
| GDP (\$ billion)           | 306.6                   | 345.5 | 431.7 | 588.9 | 763.7 | 122.6                    | 167.4 | 254.3 | 318.0 | 360.4 |
| Total Assets (\$ billion)  | 108.3                   | 132.2 | 182.6 | 247.7 | 344.8 | 117.5                    | 129.5 | 178.0 | 227.2 | 294.2 |
| <b>Share of GDP (%)</b>    |                         |       |       |       |       |                          |       |       |       |       |
| Assets                     | 35.3                    | 38.3  | 42.3  | 42.1  | 45.1  | 95.9                     | 77.3  | 70.0  | 71.4  | 81.6  |
| Capital                    | 5.1                     | 5.4   | 6.2   | 5.6   | 5.7   | 8.6                      | 9.3   | 10.0  | 10.7  | 11.0  |
| Loans                      | 14.8                    | 16.6  | 20.3  | 22.9  | 25.3  | 21.0                     | 17.8  | 18.6  | 23.2  | 30.8  |
| Deposits                   | 7.6                     | 9.5   | 11.5  | 11.7  | 12.8  | 66.1                     | 50.2  | 43.5  | 44.6  | 50.0  |
| <b>Share of Assets (%)</b> |                         |       |       |       |       |                          |       |       |       |       |
| Capital                    | 14.4                    | 14.0  | 14.6  | 13.3  | 12.7  | 9.0                      | 12.1  | 14.2  | 15.0  | 13.5  |
| Loans                      | 41.9                    | 43.3  | 47.9  | 54.5  | 55.9  | 21.9                     | 23.0  | 26.5  | 32.4  | 37.8  |
| Deposits                   | 21.5                    | 24.8  | 27.1  | 27.7  | 28.3  | 68.9                     | 64.9  | 62.2  | 62.4  | 61.2  |

Source: The ratios for the Russian Federation are obtained from the Banking Supervision Report, Central Bank of Russia (2006).



crises in both of the countries, banks in the Russian Federation had strengthened their capital base three years before the banks in Turkey did. Secondly, in both of the countries, number of banks with good credit ratings has increased. As a result, these banks can easily raise funds from the international interbank market. Finally, in both of the countries, consumer credits are the fastest growing credit category due to the demand from the consumers, although the demand for commercial credits is strong in both of the countries.

On the other hand, there is a couple of differences in the deposit and loan structures of the Russian Federation and Turkey. The volume of deposits in Turkey is more than the volume of credits. By the end of 2005, only 62 percent of the deposits is channeled as credits. In contrast, the volume of credits in the Russian Federation is the twice of the volume of deposits. Secondly, share of deposits in the liabilities of Russian banks is far less than the share of deposits in the liabilities of Turkish banks. However, share of deposits in the Russian Federation is increasing while it has reached a saturation in Turkey.

According to CBR (2006), the banking industry in the Russian Federation is highly concentrated. Sberbank accounts for 28.6 percent of all banking industry assets and 33 percent of total equity in the banking industry. In 2005, the top ten banks' share in terms of assets in banking industry is 53.5 percent (see Table 3.4). These banks account for 69 percent of the deposits and provide 57.7 percent of the loans of the Russian banking industry.

The biggest bank in Turkey is a privately owned bank, Is Bank. State owns the second biggest bank in Turkey. These two banks accounts for 29.4 percent of

Table 3.4: Russian and Turkish Banking Sector Concentration Levels (2002-2005)

|                     | Russian Banking Sector |      |      |      | Turkish Banking Sector |      |      |      |
|---------------------|------------------------|------|------|------|------------------------|------|------|------|
|                     | 2002                   | 2003 | 2004 | 2005 | 2002                   | 2003 | 2004 | 2005 |
| <b>Assets (%)</b>   |                        |      |      |      |                        |      |      |      |
| Top 5 Banks         | 44.7                   | 43.7 | 45.2 | 45.4 | 58.4                   | 60.3 | 59.5 | 63.0 |
| Top 10 Banks        | 54.6                   | 53.2 | 53.5 | 53.5 | 80.8                   | 82.3 | 84.0 | 85.0 |
| <b>Loans (%)</b>    |                        |      |      |      |                        |      |      |      |
| Top 5 Banks         | 48.8                   | 46.5 | 49.2 | 50.2 | 56.3                   | 54.7 | 54.1 | 56.3 |
| Top 10 Banks        | 58.0                   | 54.5 | 57.1 | 57.7 | 77.0                   | 76.8 | 79.0 | 81.0 |
| <b>Deposits (%)</b> |                        |      |      |      |                        |      |      |      |
| Top 5 Banks         | 64.4                   | 62.4 | 63.6 | 59.8 | 62.2                   | 63.0 | 64.9 | 66.1 |
| Top 10 Banks        | 73.1                   | 70.5 | 70.0 | 69.0 | 86.5                   | 86.6 | 89.6 | 89.8 |

*Source:* Central Bank of Russia and The Bank Association of Turkey.

the assets of the industry. The top 10 banks control 84.1 percent of the assets and they provide 80.9 percent of the loans. Moreover 89.1 percent of the deposits are placed in the top 10 banks<sup>8</sup>.

Banking industry in both countries experienced improved management after restructuring and consolidation following the crises. Estimated efficiency scores in both countries demonstrate the effects of better use of bank resources. In Table 3.5, bank efficiencies according to size and ownership in the Russian Federation and in Turkey are presented. The efficiency scores are calculated using the stochastic frontier approach. Calculation of efficiency scores are explained in the Appendix A (for further analysis of bank efficiency, see Caner and Konorovich 2004). The operating efficiencies show some similarities between the two

<sup>8</sup>According to Table 3.4, concentration levels in Turkey seem to be higher as compared to the levels in the Russian Federation. However, it should be noticed that top 10 banks in Turkey account for 21 percent of all banks whereas in the Russian Federation, top 10 banks account for 0.8 percent of all banks.

Table 3.5: Mean Operating Efficiencies of Russian and Turkish Banks

|      | Russian Federation |                        |         |         |             | Turkey    |         |         |             |
|------|--------------------|------------------------|---------|---------|-------------|-----------|---------|---------|-------------|
|      | All Banks          | Big Banks <sup>†</sup> | Foreign | Private | State-Owned | All Banks | Foreign | Private | State-Owned |
| 2000 | 0.459              | 0.518                  | 0.503   | 0.498   | 0.455       | 0.379     | 0.369   | 0.429   | 0.258       |
| 2001 | 0.414              | 0.490                  | 0.445   | 0.424   | 0.411       | 0.409     | 0.489   | 0.358   | 0.471       |
| 2002 | 0.428              | 0.508                  | 0.439   | 0.385   | 0.430       | 0.479     | 0.544   | 0.490   | 0.324       |
| 2003 | 0.459              | 0.478                  | 0.432   | 0.365   | 0.464       | 0.623     | 0.753   | 0.641   | 0.437       |
| 2004 | 0.444              | 0.523                  | 0.445   | 0.388   | 0.446       | 0.517     | 0.536   | 0.581   | 0.380       |
| 2005 | 0.463              | 0.524                  | 0.432   | 0.397   | 0.466       | 0.525     | 0.450   | 0.597   | 0.353       |

<sup>†</sup> Banks with asset size above \$50 million.

countries. The efficiency scores are significantly higher for Turkey than in the Russian Federation since it has a more competitive banking industry. However, especially in 2004 and 2005 efficiency scores of large banks in the Russian Federation are very similar to the aggregate Turkish banking industry. We observe an overall improvement in the bank efficiency in both countries during the period under consideration. However, there are still notable differences in terms of operating efficiency levels if banks are categorized according to their ownership status. The most efficient cluster in the Russian Federation is state-owned banks while privately-owned Turkish banks are the most efficient group in Turkey. Efficiency loss in Turkey in 2004 is due to investments in employees and other resources by banks in order to increase their retail business.

### 3.4 Empirical Model

We have several questions in this essay. First, did market discipline exist in the Russian Federation and Turkey; that is, did the preceding bank specific risk factors significantly explain the change in bank deposits and interest rates on deposits?

Secondly, what were the bank specific risk factors that cause the difference of the extent of market discipline in the Russian Federation and Turkey? Thirdly, what were the effects of the full deposit insurance in Turkey? Fourthly, did the market discipline change significantly after the introduction of limited deposit insurance in the Russian Federation? Finally, while controlling for bank risk variables and other factors, did bank ownership structure, and operational efficiency of banks affect the change in deposits and the interest rates?

In order to examine depositor behavior, we estimate two sets of model, one for the change in deposits and one for the interest rates for each country. Therefore, we have a vector of variables such that  $Z_j = [Z_1, Z_2]$ , where  $Z_1$  is the change in deposits and  $Z_2$  is the interest rate. In each model for each country, we test whether bank specific risk factors, macroeconomic factors, bank ownership structure and deposit insurance significantly affect the behavior of depositors. In the tests of the existence of depositor discipline in Russian Federation during the period 2000:1 to 2005:1, and in Turkey during 1997:4 to 2006:3, we estimate the following reduced form model using quarterly data:

$$\begin{aligned}
Z_{j,t}^i = & \alpha_j + \sum_{j=1}^2 \beta_j Z_{j,(t-1)}^i + \sum_{k=1}^5 \phi_{j,k} Risk_{k,(t-1)}^i + \sum_{p=1}^2 \gamma_{j,p} Macro_{p,(t-1)} \\
& + \sum_{q=1}^3 \delta_{j,q} Bank_{q,t}^i + \sum_{l=1}^2 \psi_{j,l} Size_{l,(t-1)}^i + u_{i,t}
\end{aligned} \tag{3.1}$$

such that  $i = 1, \dots, N$ ,  $t = 1, \dots, T$ ,  $j = 1, 2$ .  $N$  is the number of banks in each country,  $T$  is the number of observations per bank that varies across institutions and countries due to the unbalanced panel and  $u_{i,t}$  is the error term.  $Z_{1,t}^i$  is the

percentage change in the deposits, and  $Z_{2,t}^i$  is the implicit deposit interest rate. They both measure depositors' assessment of bank riskiness for bank  $i$  at time  $t$ .

$Z_{2,t}^i$  is calculated as the ratio of interest expense to total deposits in the previous period. Theoretically, marginal rates indicate the sensitivity of interest rates on deposits to change in bank riskiness. However, as the marginal interest rates are not available for both of the countries, we use the average interest rates on deposits in this essay, similar to other studies on market discipline in emerging markets (see Martinez-Peria and Schmukler 2001; and Mondschean and Opiela 1999). The lagged values of the dependent variables are added to the right hand side in order to account for the simultaneity of the growth in deposits and the implicit interest rates.

$(Risk_{k,t}^i)$  represents the five factors are included in the estimations as the sources of risk after controlling for other factors such as macroeconomic fluctuations that affect bank balance sheets. The proxies for bank riskiness are the following financial ratios: non-performing loans-to-assets, loans-to-assets, capital-to-assets, net profit after tax-to-assets and liquid assets-to-assets. Macroeconomic impacts  $(Macro_{p,t})$ , are controlled by changes in the consumer price index (CPI) and the dollar-ruble exchange rate for the Russian Federation. We only control changes in the wholesale price index (WPI) for Turkey. Other than bank risk indicators, we control various bank characteristics that might affect the growth in deposits and implicit interest rates.  $(Bank_{q,t}^i)$ , is described by three variables: two dummy variables that account for the state and foreign ownership and a variable to control operational efficiency of the banks. These variables are incorporated to

the model for the sake of controlling institutional strategies of banks on deposit growth and interest rates. ( $Size_{l,t}^i$ ), size of the bank is characterized by two variables: natural logarithm of asset size of a bank and the relative size of the bank's total deposits in its total funding base. The bank's total funding base includes deposits, interbank loans and long-term debt. Finally, two different time dummy variables,  $DI Dummy_t$  and  $Crisis_t$ , are introduced into the empirical model for Turkey in order to control the impact of full insurance periods and crisis periods on deposit market. During 1997:4-2004:2, all of the household deposits are fully covered by the government sponsored insurance system in Turkey. Hence, dummy variable for partial insurance period (2004:3-2006:3) equals to one otherwise it is zero. Another time dummy is used for controlling the effect of recent financial crisis in Turkey during the period 2000:4-2001:2. It is hypothesized that financial market investors including the depositors in Turkey might have acted different than they did during the normal periods of the economy.

### 3.5 Data

For the Russian Federation, quarterly bank-level data is obtained from data services provider Mobile Information Services and covers the period from the first quarter of 2000 to the first quarter of 2005. The data for Turkish banking industry is provided by Banking Association of Turkey and covers the period from 1997:4 to 2006:3<sup>9</sup>.

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<sup>9</sup>In Turkey, periods covered for the analysis depend on the electronic availability of the data set.

To test the depositors' assessment in the Russian Federation against risk-taking behavior by banks, we use the data after 1999 excluding the crisis year of 1998 and its aftermath. The 2000-2005 period is a financially stable period for the Russian financial markets and the quality of the financial statements are substantially better compared to prior years. The size of the assets of the banks in the Russian Federation varies from \$2 billion for the largest bank to less than \$10,000. Often, depositors of the small banks are either the owners, a large firm or local administrations. Hence, the possibility that external depositors may have any influence on bank risk-taking by small banks is very unlikely. Therefore, we consider only banks with assets greater than \$50 million. During the period 2000-2005, there are 377 banks in the Russian Federation with asset size greater than \$50 million. These banks account for about 95 percent of the total assets and loans, 96 percent of total deposits and 90 percent of the total capital of the banking industry (CBR, 2006). Eleven of the 377 banks are excluded from the data set because of insufficient number of consecutive financial information during the analysis period.

For the sample of Turkish banks 41 out of the 47 are used to test the depositors' reaction to bank risk-taking. Six banks were excluded due to insufficient data. Nevertheless, banks included account for more than 96 percent of the total assets and loans, 99.99 percent of total deposits and 87 percent of total capital.

In Table 3.6, summary statistics for the dependent and independent variables used in the empirical model are presented. In order to simplify the comparison among Russian Federation and Turkey, the mean and standard deviation of each variable are calculated over the period between 2000-2005. In the Russian Feder-

Table 3.6: Descriptive Statistics (2000:1-2005:1)

|                                   | Russian Banking Industry <sup>†</sup> |         | Turkish Banking Industry |         |
|-----------------------------------|---------------------------------------|---------|--------------------------|---------|
|                                   | Mean                                  | Std Dev | Mean                     | Std Dev |
| <b>Dependent Variables</b>        |                                       |         |                          |         |
| Growth in Deposits                | 0.1665                                | 0.6584  | 0.0385                   | 0.5893  |
| Implicit Interest Rate            | 0.1347                                | 1.1563  | 0.3294                   | 0.5910  |
| <b>Independent Variables</b>      |                                       |         |                          |         |
| Non-Performing Loans/Assets       | 0.0014                                | 0.0072  | 0.0095                   | 0.0210  |
| Total Loans/Assets                | 0.3580                                | 0.1908  | 0.2713                   | 0.2531  |
| Total Capital/Assets              | 0.2218                                | 0.1598  | 0.1534                   | 0.1633  |
| Net Profit After Tax/Assets       | 0.0222                                | 0.0325  | 0.0047                   | 0.1291  |
| Liquid Assets/Assets              | 0.4423                                | 0.2691  | 0.2747                   | 0.1884  |
| <b>Size Variables</b>             |                                       |         |                          |         |
| Assets (in natural logarithm)     | 21.3515                               | 1.5612  | 20.4512                  | 2.0314  |
| Total Deposits/Total Funding Base | 0.9154                                | 0.2106  | 0.6983                   | 0.2578  |
| Operating Efficiency              | 0.5042                                | 0.1812  | 0.4500                   | 0.2848  |
| <b>Macroeconomic Variables</b>    |                                       |         |                          |         |
| Change in Price Index (Quarterly) | 0.0361                                | 0.0160  | 0.0720                   | 0.0593  |
| Change in FX                      | -0.0014                               | 0.0252  |                          |         |

<sup>†</sup>Includes banks with asset size above \$50 million.

ation, deposit market is rather small considering the size of the Russian economy. Hence, the growth in the deposits market is significantly higher in the Russian Federation than in Turkey. More precisely, the growth rate of deposits in the Russian Federation is almost four times more than the rate in Turkey during 2000-2005. Note also that during the sample period, interest rates on deposits in Turkey are twice as high as the interest rates in the Russian Federation, i.e., on average, 13.47 percent in the Russian Federation and 32.94 percent in Turkey. One can observe that there are several similarities in the summary statistics of the two countries.



On average, banks are highly capitalized, liquid and utilizes deposits as a major source of funds<sup>10</sup>. Moreover, standard deviations of the bank related variables including bank risk measures are very high in both economies suggesting significant differences among banks. Furthermore, operating efficiencies of the banks in the Russian Federation and Turkey are, on average, similar in the sense that there need to be further improvements for both countries.

### 3.6 Empirical Results

We estimate fixed-effects regressions using cross-sectional time series data to measure the extent of the reaction of depositors to bank risk-taking by the Russian and the Turkish banks. Estimated coefficients of the deposit growth equation and the interest rate equation are included in Tables 3.7 and 3.8 respectively. Columns 1-3 have the estimated coefficients for the Russian Federation while coefficients for Turkish banks are included in columns 4-6. The models given in columns 2 and 6, are slightly different because there are few efficient foreign-owned banks in the Russian Federation, few foreign-owned banks in Turkey during 1997:4-2002:1, and few state-owned banks in Turkey during 1997:4-2006:3, we excluded some of the ownership dummies in the fixed-effects regressions, when necessary. Estimated coefficients using the full sample of banks in both countries are shown in columns 1 and 4 in Tables 3.7 and 3.8. Sub-sample estimates are provided to test

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<sup>10</sup>CBR introduced new regulations to improve reporting by banks. Since 2004, CBR requires the new methodology to be used in the calculation of capital and liquidity adequacy ratios. Hence, there are slight differences between the calculation of capitalization and liquidity ratios in both countries.

the robustness of the model as well as providing clearer understanding of effects of depositor response to different types of banks. In particular, banks in the Russian Federation have been split according to operating efficiencies in the loan market. Furthermore, depositors' behavior in Turkey is analyzed over two subperiods to differentiate disciplining behavior before and after the crisis. Thus, for the Russian Federation in columns 2-3, we report the estimated coefficients for the banks above and below 75 percentile in terms of operating efficiency respectively. 75 percentile in efficiency of Russian banks corresponds to the average efficiency of the Turkish banks. In columns 5-6, we present the empirical results using Turkish banking data for equal subperiods: 1997:4-2002:1 and 2002:2-2006:3.

Considering all banks in the Russian Federation and in Turkey (columns 1 and 4), we observe that there is a significant slowdown in the deposit growth of banks if the deposit accumulation rate was high in the previous period. More precisely, if banks' deposits grew by 10 percent in the previous quarter, the current deposits would decline by 2.36 percent in the Russian Federation and 2.78 percent in Turkey. Moreover, if banks operating in the Russian Federation offered higher interest rates in the previous period then, funds deposited in these banks increase significantly, suggesting that depositors respond positively to higher interest rates offered by these banks. In particular, efficient banks in the Russian Federation (column 2 of Table 3.7) achieved highest growth by increasing previous period interest rate on deposit. The similar behavior of depositors in Turkey is observed only in the second subperiod. Since implicit interest rates on deposits during the first subperiod are extremely high (mean interest rate is 30.5 percent with

Table 3.7: Estimated Coefficients of Deposit Growth Equation

| Dependent Variable:                                       | Growth in Deposits: Russian Federation |                               |                               | Growth in Deposits: Turkey   |                         |                         |
|---|--|-------------------------------|-------------------------------|------------------------------|-------------------------|-------------------------|
|   | All Banks<br>(1)                       | Operating Efficiency          |                               | Full Sample<br>Period<br>(4) | Subperiods              |                         |
|   |  | Above 75<br>Percentile<br>(2) | Below 75<br>Percentile<br>(3) |                              | (1997:4-2002:1)<br>(5)  | (2002:2-2006:3)<br>(6)  |
| Growth in Deposits at time $t$                            |  |                               |                               |                              |                         |                         |
| Growth in Deposits ( $t-1$ )                              | -0.2363<br>(-20.0226)***               | -0.2020<br>(-8.1693)***       | -0.2461<br>(-18.3346)***      | -0.2778<br>(-10.2153)***     | -0.2251<br>(-5.5960)*** | -0.2169<br>(-5.3768)*** |
| Implicit Interest Rate ( $t-1$ )                          | 0.0167<br>(2.3766)**                   | 0.6673<br>(6.2074)***         | 0.0145<br>(2.0211)**          | -0.0307<br>(-0.8415)         | -0.0445<br>(-0.9338)    | 0.1362<br>(1.6792)*     |
| <b>Bank Riskiness (<math>Risk_{t-1}</math>)</b>           |  |                               |                               |                              |                         |                         |
| Non-Performing Loans/Assets                               | 0.2535<br>(0.1553)                     | -1.5805<br>(-0.3964)          | 0.3397<br>(0.1870)            | -0.3801<br>(-0.3552)         | -1.0501<br>(-0.6082)    | 0.2719<br>(0.1489)      |
| Total Loans/Assets  | -0.1312<br>(-1.7570)*                  | 0.0819<br>(0.5744)            | -0.1130<br>(-1.3175)          | 0.0414<br>(0.5026)           | 0.0187<br>(0.1516)      | -0.5934<br>(-2.1834)**  |
| Total Capital/Assets                                      | 0.4594<br>(5.0359)***                  | 0.4986<br>(2.5421)**          | 0.4114<br>(4.0135)***         | 0.1257<br>(0.8094)           | 0.5746<br>(1.7696)*     | 0.6092<br>(1.7657)*     |
| Net Profit After Tax / Assets                             | 0.0519<br>(0.1361)                     | -0.5726<br>(-0.6880)          | -0.2540<br>(-0.6042)          | -0.1171<br>(-0.5886)         | -0.2877<br>(-0.8792)    | -0.2516<br>(-0.6629)    |
| Liquid Assets/Assets                                      | 0.1517<br>(4.6237)***                  | 0.0939<br>(0.6146)            | 0.1506<br>(4.4169)***         | -0.2011<br>(-2.1019)***      | -0.2275<br>(-1.2573)    | -0.1447<br>(-0.7870)    |
| <b>Macroeconomic Variables (<math>Macro_{t-1}</math>)</b> |  |                               |                               |                              |                         |                         |
| Change in Price Index <sup>†</sup>                        | 1.2238<br>(2.3467)**                   | 0.5595<br>(0.5415)            | 1.5921<br>(2.6302)***         | 0.0907<br>(0.2536)           | 0.7168<br>(1.1858)      | -0.0951<br>(-0.1420)    |
| Change in FX Rate   | -0.0837<br>(-0.2391)                   | 0.1153<br>(0.1648)            | -0.3906<br>(-0.9619)          |                              |                         |                         |

<sup>†</sup>We used the consumer price index in the Russian Federation and the wholesale price index in Turkey. t-statistics are in parentheses. \*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table 3.7: Estimated Coefficients of Deposit Growth Equation (Cont'd)

| Dependent Variable:<br>Growth in Deposits at time $t$      | Growth in Deposits: Russian Federation |                               |                               | Growth in Deposits: Turkey   |                          |                          |
|--|--|-------------------------------|-------------------------------|------------------------------|--------------------------|--------------------------|
|  | Operating Efficiency                   |                               |                               | Subperiods                   |                          |                          |
|  | All Banks<br>(1)                       | Above 75<br>Percentile<br>(2) | Below 75<br>Percentile<br>(3) | Full Sample<br>Period<br>(4) | (1997:4-2002:1)<br>(5)   | (2002:2-2006:3)<br>(6)   |
| <b>Institutional Characteristics (<math>Bank_t</math>)</b> |  |                               |                               |                              |                          |                          |
| Foreign Banks  | -0.2088<br>(-1.7203) *                 |                               | -0.2040<br>(-1.6537) *        | 0.1622<br>(0.9860)           |                          | -0.1069<br>(-0.4579)     |
| State Banks  | 0.1368<br>(1.7320) *                   | 0.4597<br>(2.8643) ***        | 0.0361<br>(0.3926)            |                              |                          |                          |
| Operational Efficiency                                     | 0.1828<br>(2.9086) ***                 |                               |                               | 0.0628<br>(0.8195)           | 0.1198<br>(0.8744)       | -0.0057<br>(-0.0574)     |
| <b>Size Variables (<math>Size_{(t-1)}</math>)</b>          |  |                               |                               |                              |                          |                          |
| Assets   | 0.0125<br>(0.9196)                     | 0.0485<br>(1.7613) *          | 0.0095<br>(0.6031)            | -0.1356<br>(-3.8655) ***     | -0.2827<br>(-3.8247) *** | 0.0387<br>(0.4551)       |
| Total Deposit/Total Funding Base                           | -0.2478<br>(-4.1891) ***               | -0.4370<br>(-3.0300) ***      | -0.1822<br>(-2.7893) ***      | -0.7323<br>(-7.6091) ***     | -1.2873<br>(-7.1866) *** | -0.9373<br>(-5.7370) *** |
| <b>Time Dummies</b>  |  |                               |                               |                              |                          |                          |
| Deposit Insurance  |  |                               |                               | 0.1172<br>(2.3069) ***       |                          | 0.1023<br>(1.6563) *     |
| Crisis   |  |                               |                               | -0.1047<br>(-1.8676) *       | -0.0445<br>(-0.6353)     |                          |
| <b>Regression Statistics</b>                               |  |                               |                               |                              |                          |                          |
| R-squared  | 0.1117                                 | 0.1055                        | 0.1258                        | 0.2056                       | 0.2670                   | 0.2548                   |
| Adjusted R-squared   | 0.0589                                 | 0.0477                        | 0.0733                        | 0.1689                       | 0.2000                   | 0.1809                   |
| F-statistics   | 61.2357 ***                            | 16.7536 ***                   | 57.3104 ***                   | 23.2781                      | 18.4784                  | 14.9328                  |
| Number of Banks  | 366                                    | 91                            | 275                           | 41                           | 41                       | 41                       |

†We used the consumer price index in the Russian Federation and the wholesale price index in Turkey. t-statistics are in parentheses. \*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

standard deviation of 63.9 percent) in Turkey, deposit growth is found to be less responsive to an increase in interest rates.

As it can be observed in column 1 of Table 3.7, Russian depositors prefer more liquid and more capitalized banks suggesting that there is significant market reaction to discipline banks. Moreover, even though it is weakly significant, the decline in the deposit growth of banks is 1.31 percent at the current period if banks have already increased their loans-to-asset ratio by 10 percent. This result suggests that increasing loan portfolios increases the credit risk of a bank, hence depositors in the Russian Federation withdraw their funds from these banks. However, increasing non-performing loans and profitability of banks have no significant impact on the growth of deposits. Deposit growth in most efficient banks (above 75 percentile) depends significantly on higher capital-to-asset ratio while deposit growth rate of less efficient banks (below 75 percentile) depends on both higher capital-to-asset and higher liquid assets-to-asset ratios. This evidence is consistent with the view that liquidity is an important factor enabling banks to buffer their lending activity against adverse shocks.

Columns 4-6 in Table 3.7, include coefficients of the deposit growth equation estimated for Turkey. First, there is no apparent reaction of the Turkish depositors to risk factors of the banks for the full sample period between 1997:3 and 2006:3 (fourth column in Table 3.7). The only significant risk variable, liquid assets-to-assets ratio has a negative sign related to deposit growth contrary to what is expected. However, in the case of Turkey, a negative value for this coefficient may imply depositor discipline. Because, Turkish banks have long kept liquid

assets in the form of government securities. But, given the persistent high interest rates on deposits until 2004, banks financed high-yield government securities with borrowed funds from abroad. This meant high exchange rate risk for the banks. So, contrary to the sign of the coefficient of liquid assets in the Russian Federation equation, an increase in liquid assets may reduce the deposits held at banks in Turkey.

In columns 5-6 of Table 3.7, Turkish data is split into subperiods. We observe that during the two subperiods, banks with higher capital-to-asset ratios are able to increase growth in deposits. Moreover, in the second subperiod in which banking system have been restructured after financial crisis in 2001, depositors' significant reaction against risk-taking is more apparent. In particular, we find that deposit growth significantly declines for banks with too much loans as a share of assets. Since loans-to-asset ratio is used as proxy for exposure to credit risk, similar to the depositors in the Russian Federation, increasing loan portfolio of Turkish banks is perceived as high risk for those banks.

Overall, there is significant negative reaction by depositors in response to bank risk-taking suggesting disciplinary efforts of the market in both countries. However, when we consider effects of various other bank characteristics on deposit growth, there are notable differences in each market. First, efficient banks in the Russian Federation have been able to increase their deposits significantly. However loan efficiency has no effect on the deposit growth rate in Turkey. As mentioned before, deposits are still growing in the Russian Federation whereas slightly declining in Turkey (see Table 3.3). Hence, increasing operating efficiency in the

loans market results in depositors to recognize the success of the bank management and invest in those efficient banks. Moreover, banks in the top 25 percentile in terms of efficiency (column 2 of Table 3.7) with higher assets also experience higher deposits controlling for bank risk measures and macroeconomic conditions.

In the Russian Federation, state-owned banks especially the more efficient ones achieved higher growth in deposits during the analysis period. This result suggests that since depositors' risk is already covered by the government, they achieved significant and positive growth during the analysis period. On the other hand, foreign-owned banks are still having trouble in attracting depositors' savings.

In the banking literature, the possibility of bailing-out of banks by regulatory agencies is referred to as a "Too-Big-To-Fail" (TBTF) policy. In general, a bank tends to become larger and riskier if its uninsured creditors believe that they will benefit from TBTF coverage. In the Russian Federation, significant growth in deposits of most efficient banks as their assets increase suggests depositors' preference for larger and efficient banks (e.g., state-owned banks) due to the possible protection by TBTF policy. Contrary to the evidence in the Russian Federation, banks' increasing asset size in Turkey resulted in declining deposits. This relation is found to be more strong during the first subperiod: 1997:4-2002:1 in which all deposits in Turkey are fully insured. Comprehensive insurance on deposits in Turkey during 1997:4-2004:2 provided coverage for all bank deposits and debts. Thus, depositors in Turkey perceived that full insurance by the government was a stronger coverage than the implicit guarantee offered by a TBTF policy. Turkish depositors shift to TBTF policy when partial insurance became effective in

2004. This behavior demonstrates the positive relationship between assets and deposit growth during the 2002:2-2006:3 period. There is one similarity in the deposit markets where banks in the Russian Federation and Turkey prefer to limit deposits as a funding source if the share of deposits in total funding base has increased in the previous period.

Table 3.8 includes the estimation results of price discipline equations where the dependent variable is implicit interest rate on deposits. The estimated coefficients of risk factors measure the ability of the depositors to demand higher interest rates when a bank's riskiness increases. We observe that implicit interest rates predictably decline in both Russian Federation and Turkey when deposit growth accelerates. Interest rates increased on deposits are followed by higher interest rate in the next period.

The only significant bank discipline variable both in Russian Federation and Turkey is the ratio of loans to assets. However, in the Russian Federation, estimation presented in column 1 the ratio does not have the expected sign. Russian depositors are not able to demand higher interest rates on deposits when their banks increase the size of their loan portfolio relative to total assets. This may be attributable to the small size of deposits available to the banks in the Russian Federation. Thus, banks are able to keep their interest costs low (see also Ungan, et al. 2007). However, in Turkey the opposite is true. As it is shown in column 6 in Table 3.8, in the post-crisis period, depositors demand higher interest rates when the loans of the banks increase faster than total assets. So, depositors start to impose discipline when the deposit insurance is limited. In the



Table 3.8: Estimated Coefficients of Implicit Interest Rate Equation

| Dependent Variable:   | Implicit Interest Rate: Russian Federation |                               |                               |                              | Implicit Interest Rate: Turkey |                        |  |
|---|--|-------------------------------|-------------------------------|------------------------------|--------------------------------|------------------------|--|
|   | All Banks<br>(1)                           | Operating Efficiency          |                               | Full Sample<br>Period<br>(4) | Subperiods                     |                        |  |
|   |  | Above 75<br>Percentile<br>(2) | Below 75<br>Percentile<br>(3) |                              | (1997:4-2002:1)<br>(5)         | (2002:2-2006:3)<br>(6) |  |
| Implicit Interest Rates on Deposits at time $t$             | -0.1744<br>(-9.2987)***                    | -0.0209<br>(-3.9809)***       | -0.2131<br>(-8.8454)***       | -0.0297<br>(-1.6003)         | -0.0426<br>(-1.3380)           | -0.0384<br>(-1.8593)*  |  |
| Growth in Deposits ( $t-1$ )                                | 0.4162<br>(37.1419)***                     | 0.2363<br>(10.3332)***        | 0.4175<br>(32.3600)***        | 0.4922<br>(19.7794)***       | 0.4464<br>(11.8776)***         | 0.3078<br>(7.4651)***  |  |
| Implicit Interest Rate ( $t-1$ )                            |  |                               |                               |                              |                                |                        |  |
| <b>Bank Riskiness (<math>Risk_{(t-1)}</math>)</b>           |  |                               |                               |                              |                                |                        |  |
| Non-Performing Loans/Assets                                 | -3.8077<br>(-1.4633)                       | -0.5865<br>(-0.6915)          | -4.3793<br>(-1.3387)          | 0.4311<br>(0.5961)           | 1.0443<br>(0.8127)             | 0.3149<br>(0.3400)     |  |
| Total Loans/Assets  | -0.2650<br>(-2.1658)**                     | -0.0138<br>(-0.4577)          | -0.2474<br>(-1.6066)          | 0.0116<br>(0.2054)           | 0.0194<br>(0.1987)             | 0.5272<br>(3.7755)***  |  |
| Total Capital/Assets  | -0.0574<br>(-0.3965)                       | -0.0386<br>(-0.9273)          | -0.1664<br>(-0.9054)          | 0.0201<br>(0.1989)           | -0.0711<br>(-0.2869)           | -0.1742<br>(-1.0373)   |  |
| Net Profit After Tax /Assets                                | -0.6491<br>(-1.0692)                       | -0.0119<br>(-0.0672)          | -0.7430<br>(-0.9821)          | 0.1439<br>(1.1847)           | 0.3342<br>(1.4396)             | 0.0331<br>(0.1703)     |  |
| Liquid Assets/Assets  | 0.0605<br>(1.1631)                         | 0.0104<br>(0.3209)            | 0.0509<br>(0.8298)            | -0.0482<br>(-0.7384)         | -0.0707<br>(-0.4931)           | 0.0743<br>(0.7853)     |  |
| <b>Macroeconomic Variables (<math>Macro_{(t-1)}</math>)</b> |  |                               |                               |                              |                                |                        |  |
| Change in Price Index <sup>†</sup>                          | 2.1595<br>(2.5905)***                      | 2.1352<br>(9.7128)***         | 2.7245<br>(2.5008)**          | 0.2131<br>(0.8737)           | 0.6742<br>(1.4082)             | -0.4482<br>(-1.3056)   |  |
| Change in FX Rate   | 0.4131<br>(0.7447)                         | 0.0607<br>(0.4093)            | 0.2996<br>(0.4101)            |                              |                                |                        |  |

<sup>†</sup>We used the consumer price index in the Russian Federation and the wholesale price index in Turkey. t-statistics are in parentheses.

\*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Table 3.8: Estimated Coefficients of Implicit Interest Rate Equation (Cont'd)

| Dependent Variable:<br>Implicit Interest Rates on Deposits at time $t$ | Implicit Interest Rate: Russian Federation |                               |                               | Implicit Interest Rate: Turkey |                         |                        |
|--|--|-------------------------------|-------------------------------|--------------------------------|-------------------------|------------------------|
|  | All Banks<br>(1)                           | Operating Efficiency          |                               | Full Sample<br>Period<br>(4)   | Subperiods              |                        |
|  |  | Above 75<br>Percentile<br>(2) | Below 75<br>Percentile<br>(3) |                                | (1997:4-2002:1)<br>(5)  | (2002:2-2006:3)<br>(6) |
| <b>Institutional Characteristics (<math>Bank_t</math>)</b>             |  |                               |                               |                                |                         |                        |
| Foreign Bank   | 0.0883<br>(0.4564)                         | 0.0836<br>(0.3765)            | 0.0231<br>(-0.2054)           | 0.0142<br>(0.1174)             |                         |                        |
| State Bank   | -0.0215<br>(-0.1705)                       | -0.0492<br>(-0.2971)          |                               |                                |                         |                        |
| Operational Efficiency   | 0.3331<br>(3.3044)***                      |                               | 0.0079<br>(0.1505)            | -0.0709<br>(-0.6544)           | 0.0165<br>(0.3244)      |                        |
| <b>Size Variables (<math>Size_{t-1}</math>)</b>                        |  |                               |                               |                                |                         |                        |
| Asset Size   | -0.0466<br>(-2.1160)**                     | 0.0001<br>(0.0190)            | 0.0570<br>(2.4030)**          | 0.1535<br>(2.6543)***          | -0.0968<br>(-2.2714)**  |                        |
| Total Deposit/Total Funding Base                                       | -0.0455<br>(-0.4826)                       | -0.0853<br>(-2.7881)***       | 0.0063<br>(0.0951)            | 0.2310<br>(1.6283)             | -0.1906<br>(-2.2840)**  |                        |
| <b>Time Dummies</b>  |  |                               |                               |                                |                         |                        |
| Deposit Insurance  |  |                               | -0.0721<br>(-2.0824)**        |                                | -0.0871<br>(-2.7831)*** |                        |
| Crisis   |  |                               | 0.2010<br>(5.2276)***         | 0.2009<br>(3.6184)***          |                         |                        |
| <b>Regression Statistics</b>   |  |                               |                               |                                |                         |                        |
| R-squared  | 0.3315                                     | 0.3756                        | 0.4858                        | 0.5183                         | 0.4611                  |                        |
| Adjusted R-squared   | 0.2916                                     | 0.3349                        | 0.4621                        | 0.4745                         | 0.4080                  |                        |
| F-statistics   | 241.6838***                                | 85.5824***                    | 85.3147                       | 54.7861                        | 37.6489                 |                        |
| Number of Banks  | 366  | 91                            | 41                            | 41                             | 41                      |                        |

†We used the consumer price index in the Russian Federation and the wholesale price index in Turkey. t-statistics are in parentheses.

\*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

first sub-period, when the depositors enjoyed excessive insurance on deposits the increasing loans is not considered as a risk factor. One can conclude that there is no depositor discipline in the Russian Federation by means of demanding higher interest rates for increased risk while in Turkey limited price discipline exists when deposit insurance is limited.

According to estimation results in Table 3.8, other bank characteristics also influence interest paid on deposits. Banks in the Russian Federation and in the second subperiod all banks in Turkey, decrease interest rate on deposits as the assets of a bank increase. That is, depositors lose the leverage to demand higher compensation for deposits as size of banks increases. Less efficient Russian banks benefit from TBTF policies. They reduce interest paid on deposits as they grow in size (see third column of Table 3.8). This is also true for Turkish banks in the second subperiod. Since household depositors are fully insured in the first subperiod, even large banks pay higher interest rate to compete with other banks. However, in the second subperiod, large banks pay less interest rate on deposits suggesting TBTF policy in Turkey (see sixth column of Table 3.8).

Efficient banks, in the Russian Federation and all banks in Turkey after 2002, paid less interest on deposits, while increasing share of funding by deposits. For example, in the Russian Federation mean implicit interest paid by banks above 75 percentile is 7.77% as compared to 14.77% paid by less efficient banks.

One year after the crisis, interest rates started to decline in Turkey. Introduction of limited deposit insurance corresponds with the decline in interest rates. Therefore, the negative sign of the limited deposit insurance coefficient indicates

a time effect rather than the effect of a reduction in deposit insurance.

Bank ownership has no effect on implicit interest paid on deposits both in the Russian Federation and Turkey. Neither foreign banks nor state banks have competitive advantage over other banks in both countries. This may indicate increased competition in the banking industry. Depositors do not differentiate banks in terms of interest rates based on ownership.

### **3.7 Conclusion**

Depositor discipline of banks serves as an important tool for limiting risk-taking by banks thus avoiding large bank losses as experienced in the Russian Federation in 1998 and Turkey in 2001. We test for the existence of depositor discipline and its implementation in the Russian Federation and Turkey. Russian banking industry and households have been experiencing major changes in financial intermediation as the economy transforms into a more market-based economy. In the Russian Federation depositors suffered large losses after the crisis in 1998 while in Turkey depositors as well as other creditors were fully protected from incurring in during the banking crisis in 2001. So, do we observe difference in the behavior of depositors after such experience?

Depositors can do one or a combination of two things when faced with excessive risk-taking by banks. They can withdraw their funds placed in the banks or demand higher interest rates when the banks' risk factor increase. We do see evidence of depositors discipline both in the Russian Federation and in Turkey. But

the discipline imposed by depositors is mostly by means of adjusting the quantity of funds kept in banks as deposits. The significant factors that determine the change in the flow of deposits is the capital adequacy of banks both in the Russian Federation and Turkey. Liquidity is also important in determining the deposits held in banks. But, here the depositors demonstrate different behavior in Russian Federation and Turkey. While depositors increase funds in liquid banks in the Russian Federation, liquidity is not perceived as low risk in Turkey because banks may be funding liquid assets with international funds which includes exchange rate risk. Depositors are also averse to increased lending by banks. They respond by reducing deposits held at banks when there is an increase in lending suggesting increasing perceived credit risk.

However, there is no evidence of price discipline by depositors on banks in the Russian Federation. This may be attributable to the overall small size of deposits available to banks. Also, Russian banking industry includes a significant share of intra-group banks related to major corporations where the parent company and affiliates are the major depositors. In Turkey, limited price discipline is observed on banks that increase the share of loans portfolio in assets.

Separating the banks based on efficiency scores in the Russian Federation reveals that depositors are able to differentiate between good banks and poor banks. Depositors are willing to accept lower interest income by placing in more efficient banks. Less efficient banks try to take advantage of size. By growing they are able to pay lower interest rates.

Depositor discipline both in the Russian Federation and in Turkey is influenced

by non-risk factors. Market development, supervisory agencies, types of banks and types of depositors all affect depositors' influence on banks. For example, in the Russian Federation, depositors still remember the effects of loss of wealth in the early 1990s and the 1998 crisis. They are cautious in placing savings in the banking system. In Turkey banks operate in a more level field but the guarantees provided by the bank supervisors reduce the role of market forces in limiting bank risk-taking behavior. In the Russian Federation, the dominance of state-owned banks provides an implicit protection. So, deposits tend to concentrate in state-owned banks.

The existence of depositor discipline in the Russian Federation is encouraging in terms of controlling risk-taking behavior of banks. However, one should not ignore the role of CBR in improving the fundamentals in the banking industry. CBR has introduced stringent regulations in terms of accounting standards, and new norms on capital adequacy, liquidity and foreign exchange risks as well as limits on related party lending since 2001. Similar changes occurred in Turkey. The Bank Regulatory and Supervisory Agency was first established in 2000. The weak supervision exercised initially was replaced by improved supervision supported by a new banking law. Strict reporting requirements and frequent bank examinations by the Agency as well as independent examiners improved the fundamental of the banks and limited excessive risk-taking.

However, there is still much to be learned about the changes in the Russian and Turkish banking industry. For example, further research on depositor discipline in the Russian Federation is needed on the different banking groups such as

the regional banks, intra-group banks etc. Additionally, diversified banks deserve special attention since they may be instrumental in improving financial intermediation in the Russian Federation. Finally, both the Russian Federation and Turkey are experiencing increased share of foreign banks. The effects of foreign bank participation on depositors would be a further area of research for both countries.

# CHAPTER 4

## OWNER-MANAGER RESPONSES TO OUTSIDE SHAREHOLDERS' BANK RISK MONITORING

### 4.1 Introduction

Soundness of the banks is considered to be a necessary condition for the stability of the economic system. Moreover, safety of the individual banks and the banking system as a whole is crucial for the continuity of the credit markets. However, banks are exposed to external economic shocks more than the other industries. The extent of bank risk is further complicated because of agency problems among the shareholders, depositors and managers. So, it is in the best interest of both the regulators and the other participants in the economy to limit the excessive risk taking behavior of bank management.



In addition to the regulatory discipline, it is commonly accepted that risk taking by banks can be significantly limited if they issue sufficient amounts of publicly-tradable securities. Investors can assess the extent of riskiness by valuing the marketable securities issued by the banks. Subordinated debt issued by the banks is one of the well-known instruments of the publicly-tradable securities that the market valuation of bank riskiness is made possible. Flannery and Sorescu (1996) show that removal of government guarantees improves risk assessment by the holders of subordinated bank debt.

However, issuance of additional debt increases the default probability of the banks. Further, the relation between yield on subordinated debt and bank risk is not constant. A study by the Federal Reserve (1999) found that subordinated debt can explain risk only in times when the banking industry is in distress. In addition to the above-mentioned limitations, it should be emphasized that subordinated debt issuance is not for all banking industries. It depends on the availability of investors, the economic conditions of the country such as inflation or the overall riskiness of the economy manifested in high real interest rates. It may not have a market or it may be too costly for the bank. In the absence of subordinated debt, share prices of publicly-traded banks can be used by investors to impose market discipline on banks. Stock price data often is more easily available than bond prices in many cases. According to Flannery et. al. (2004), stock prices of publicly-traded banks are efficient indicators of bank riskiness.

In this essay, we measure the market disciplining of banks in terms of the response of the shareholders to risks incurred by the banks and the extent of

influence of different types of shareholders on management to limit risk-taking. In particular, we examine the risk monitoring by different types of shareholders. Differences exist in the ways portfolio investors and owner-managers monitor bank risk taking. We find that while owner-managers respond to total equity risks and individual risks, diversified shareholders consider portfolio risks. In addition, we measure the effectiveness of the shareholders' risk measures in influencing the management to reduce the riskiness of the bank's balance sheet.

Measuring shareholder market discipline on the Turkish banking industry provides a good test of the extent and the effectiveness of monitoring and influence by shareholders. First, the period considered is marked by high interest rate volatility, high inflation and low liquidity. So, one can observe the reaction of shareholders to risk under extreme economic conditions. Second, the period studied includes episodes of comprehensive guarantees on deposits. Also, the banking industry does not issue any subordinated debentures and notes. So, any evidence of market discipline can be attributed to shareholders. Third, there is a large volume of bank stocks traded at the Istanbul Stock Exchange (ISE). Bank stocks account for about one-third of the trading volume in ISE. Also, publicly traded banks account for about one-half of the banking industry's assets. Forth, ownership structure is a determining factor in monitoring bank risk-taking behavior. Shareholders are sensitive to different measures of risk. Shareholders who own bank shares as part of a portfolio are concerned about market risk and would not mind banks taking excessive risk. However, for owner-managers total equity risk is relevant. In this regard Turkish banking industry provides an interesting case. Because,

some of the majority owners of banks are not necessarily motivated by returns. For example, a political party is a large shareholder in one of the largest private banks. In another publicly traded bank, government is the largest shareholder. Employees' pension funds also own significant portion of bank shares. Given such institutional differences, we find that owner-managers play an important role in limiting risk-taking behavior by banks.

Section two provides a brief summary of the related literature on market discipline. In section three we describe the characteristics and the developments in the Turkish banking industry. Section four discusses the model and the data used in estimating monitoring and influencing of banks by shareholders. We explain and interpret the estimation results in section five. The essay concludes with section six.

## **4.2 Literature Review**

Lane (1993), in his seminal work defines market discipline in the context of financial markets as “financial markets providing signals that lead borrowers (i.e. banks) to behave in a manner consistent with their solvency”. This definition leads to the two components of market discipline defined by Bliss and Flannery (2002): “Monitoring” and “Influence”. Shareholders are one of the key monitors in addition to regulators, depositors and creditors. So, shareholders would use all the available financial information about a bank to assess its risk taking behavior. Monitoring by shareholders would result in changes in the equity prices

and required rates of return of banks. In addition, market discipline implies that management observe the change in the market valuation of the bank and respond to market signals by the shareholders. Influencing by shareholders would result in alterations in the composition of the balance sheet.

Extensive evidence supports the hypothesis that markets can effectively monitor a firm's true financial condition. Early research that stock prices provide informative signals about bank risk taking concentrates on the idea of contemporaneous relationship between stock prices and the financial statements of the banks (Gilbert, 1990; Flannery, 1998; Bliss and Flannery, 2002). However, an increase in stock prices does not always indicate an increase in the safety of a bank. It may be a result of an increase in the portfolio risk, which corresponds to an increase in the failure probability. Therefore, in later studies, equity market indicators other than price and return were considered in the analysis of market discipline. For example, using total risk, portfolio beta and idiosyncratic risk assessments for Bank Holding Companies (BHC), Hall et al. (2002b), show that shareholders value credit risk about the same as the regulators. However, they respond less elastically to liquidity, interest rate, and leverage risk. Recently, Krainer and Lopez (2004) and Nikolova (2003) and Gropp et al. (2006) combine equity and debt market indicators by constructing implied asset volatility estimates of banks. They show that combined indicators outperform the models using either set of indicators in explaining bank risks.

Market based risk assessment of banks are also affected by the factors other than risk measures based on financial statements. For example Konishi and Ya-

suda (2004) examine empirically the determinants of risk taking at commercial banks in Japan. Their findings support that increase in equity and bank franchise value reduces market based indicators. Moreover they show that ownership of banks by stable shareholders who do not engage in short term stock trading is negatively associated to market based risk assessments. Sullivan and Spong (2007) show that banks, where the shareholders and managers have a substantial portion of their wealth at risk are the most likely to be operated in a safe and sound manner. In the European banking context Baele et al. (2007) calculate market based risk measures such as bank franchise value, systematic and idiosyncratic components of risk. They show that bank franchise value increases with the increase in the diversity of returns and equity. Similarly diversification of revenue streams has a positive effect on the systematic risk while its effect on the idiosyncratic component of risk is negative. They conclude that investors that are able to diversify consider the systematic risk and they have the classic risk and return trade-off problem while shareholders, borrowers and regulators which are interested in idiosyncratic risk benefit from the reduced bank-specific risk due to diversification.

Whereas market participants' ability to monitor bank risks has been studied vastly, research on the ability to influence is rare. Bliss and Flannery (2002) study bondholder and stockholder influence on managerial actions. Although they identify patterns consistent with beneficial market influences, they have no strong evidence for managerial influence. Nier and Baumann (2006) show that market discipline is influential on for banks to limit their risk of default by holding capital

buffers. Capital buffers of banks are positively associated with the increase in uninsured deposits and total equity risk expressed in weekly standard deviation of the stock prices.

The evidence on the shareholder discipline in emerging markets is restricted to monitoring. Caprio and Honohan (2004) state that share of total banking assets of the listed banks in emerging markets varies extensively. They provide evidence that the probability for the existence of stock market discipline increases with the increase in the share of total banking assets of the listed banks. However they do not present evidence for the influencing ability of market participants. Bongini et al. (2002) explore the performance of stock market prices, accounting data and credit ratings in forecasting bank fragility for East Asian countries. They find out that information content of stock prices and rating agencies is not superior to the backward looking accounting information. They conclude that in less developed financial markets it is important for the supervisors to rely on different assessments of financial fragility of the banks. Richards and Deddouche (1999) examine emerging markets bank stock returns around the announcements of rating changes by rating agencies. They use data from the Emerging Market DataBase of the International Finance Corporation. They find out that supervisors should be cautious in using the information embedded in bank stock prices to monitor the safety and soundness of the banking industry in emerging markets.

### 4.3 Banking in Turkey

Turkish banking system consists of large state-owned commercial banks and private banks. Since 1980, the share of state-owned banks declined in terms of the assets while the private banks increased their share in total banking assets. One main objective of the structural adjustment program that was initiated in 1980 was the liberalization and integration of the financial system with the rest of the world. Until 1980, the financial system was characterized by controls on capital flows, a fixed exchange rate regime and restrictions on interest rates. The liberalization program resulted in major changes in the balance sheets of banks until 1993. The two big changes were the increases in the non-deposit sources of funding and the share of foreign denominated assets and liabilities. The change in the composition of assets and liabilities resulted in increased vulnerability to external shocks. Furthermore, short-term deficit-financing policy of the government coupled with high interest rate and low depreciation of the exchange rate policy encouraged banks to change from lending to private businesses to purchasing government securities. Most of the funding for purchases of government securities came from short term loans obtained from foreign banks. The short positions of the banks continued to increase while profits increased. By the end of 1993, the return on equity of the banking industry was as high as 43%. However, the government reversed its policy and adopted a low interest rate and low depreciation policy on the exchange rate. This reversal of policy led to the financial crisis in 1994 that resulted in the devaluation of the Turkish Lira (TL). As banks struggled to close their foreign currency open positions, they suffered large losses. Consequently, three banks

were liquidated and state-owned banks assets shrank substantially.

The recovery of the banking industry after the crisis in 1994 was short-lived. After some remedial measures and the establishment of full deposit insurance for deposits, government returned to the high interest low depreciation of the exchange rate policy. A regulatory agency , Bank Regulation and Supervision Agency (BRSA) was established in 2000. State banks continued extending loans to the agricultural sector and the small and medium-sized enterprises (SME) as a result of continued political patronage. The losses of the state banks originating from loans at below market rates and political favoritism were not completely compensated by the Treasury. Attracted by high margins between the yield on government securities and cost of borrowing abroad, private banks increased their holdings of government securities, defying market risk and exchange rate risk.

Another problem with the private banks was the extent of related party lending. Most of the banks belonged to holding companies with businesses in diversified industries as a result of rapid growth of some business groups. Although limits existed on related party lending, banks often avoided restrictions by adopting a reciprocity strategy. That was lending to related businesses of fellow bank owners. The bank owners would return the favor by lending to the businesses of the other bank owner. Owner-managers did not demonstrate prudence in evaluating and monitoring the projects and credit risks of the group companies. During the 1990s, related party lending was a major problem of the industry. According to BRSA, about 20% of total loans were made to related-businesses that would not have otherwise qualified as a loan. Imprudent lending resulted in the group banks



which ultimately resulted in their liquidation.

The period between the financial crisis in 1994 and the double dip financial crisis of late 2000 and early 2001 was characterized by increased riskiness of the banking industry. During this period state-owned banks were exposed to interest rate risk while private banks were subject to credit and foreign exchange risk. The banking system during the period was heavily influenced by the increasing borrowing requirements of the government financed by domestic debt, policy reversals by the central banks and the inability of the BRSA to resolve problem banks.

Prior to the crisis in 2001, banks operated in a high inflation environment thus limiting their ability to borrow long-term domestically. Financing of asset acquisition with increasingly shorter term liabilities became a structural characteristic of the Turkish banking industry. State owned banks were accumulating large non-performing loans while private banks were increasing their short-term foreign exchange liabilities to finance purchase of high yielding government securities.<sup>1</sup> Slow depreciation of the TL encouraged the banks to expand the practice of increasing foreign currency liabilities.

In addition to short term financing of purchases of government securities through overnight borrowing and repos, banks increasingly started using structured loan agreements where government securities were used as collateral for borrowing abroad. Particularly, one mid-sized bank, Demirbank was holding large amounts of government securities. Increasing interest rates in November 2000 triggered

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<sup>1</sup>During the period, Treasury was financing budget deficits with loans from state banks and at the same time as the supervisor of banks allowing them to treat non-performing loans as performing loans.

large sell offs of government securities and Demirbank lost its ability to borrow short term and subsequently taken over by the State Deposit Insurance Fund (SDIF). This event marked the beginning of the financial crisis.

The number of banks in Turkey was 50 by the end of 2006, down from 81 in 2000. Banking industry consists of fourteen private banks, fifteen foreign banks, thirteen investment and development banks, four participation banks, three state banks and the SDIF bank. After 2003, the banks restructured their branches and personnel in order to increase their market share especially in consumer loans and loans to SMEs.

Weak institutional environment in the form of poor supervision first by the Treasury then, by the BRSA the vulnerability of state banks to interest rate increases, the vulnerability of private banks to exchange risks and the financing of government debt by short term securities were all significant factors in the development of poor banking practices in Turkey.

Due to the significant influence of the fiscal policy pursued by a succession of governments in the 1990s banking industry operated in a financial environment that was marked by dependence on high real returns on government securities and risky lending. High public sector borrowing obscured monitoring efforts by the shareholders. Further, extensive related party lending rendered any effective monitoring by shareholders. Consequently, ownership structure of the banks limited market discipline. Owner-managers determined the extent of risk taking by banks. Holding companies that owned banks benefitted from reduced borrowing costs and increased lines of credits provided by their own banks. In addition,

Turkish banking industry has some unique peculiarities. For example, majority of the shares of the largest private bank, IsBank, is owned by a political party. The objectives of the party may very well be different than that of a profit seeking investor. Pension funds of employees also own a large portion of the shares of IsBank. Ownership of shares by the employees' pension fund is common practice in Turkey.

## **4.4 Methodology and the Data**

### **4.4.1 The Empirical Model**

We estimate the responsiveness of shareholders to risk measures of banks and their ability to influence management decisions on the risk variables of the bank. Once shareholders observe increasing risks originating from the balance sheet of the banks, they influence the management to reduce risks that may result in a loss of wealth. This interaction between the shareholders and the bank management is defined by Bliss and Flannery (2002) as market discipline demonstrating the investors' ability to evaluate the banks' financial condition and the responsiveness of the bank's management to the investors' risk assessment.

First, we expect that outside shareholders assess the riskiness of the publicly traded banks based on the financial reports of the banks. Thus, shareholders' bank risk monitoring behavior exists if there is a significant relation between equity market-based risk indicators and risk measures obtained from the balance sheet.

Second, we expect that shareholders' assessment of risk is observed in the volatility of rates of return to equity of banks. This volatility influences the risk-taking behavior of the management. However, the influence of shareholders on managerial actions is not obvious. To estimate the extent of influence of shareholders on bank management, we regress return volatility of bank stocks on the direction of the change in risk parameters from the balance sheet.

Three equity market-based risk indicators are used to estimate the extent of shareholders' monitoring of bank risks and influencing management action on risk. The three risk indicators are (i) bank's sensitivity to market returns (market beta),<sup>2</sup> (ii) standard deviation of the bank stock returns (total risk),<sup>3</sup> and (iii) bank's sensitivity to unanticipated returns calculated as the standard deviation of the error terms (idiosyncratic risk). Market beta is an indicator for systematic risk and measures the risk of portfolio investors. Idiosyncratic risk is the risk of unanticipated returns of the bank. Total risk is the weighted sum of systematic and idiosyncratic risks.

Following Flannery and James (1984) and Kane and Unal (1988), we study two-index model below to decompose the total risk of bank  $i$ 's returns:

$$r_{in} = \alpha_i + \beta_m r_{mn} + \beta_b r_{bn} + e_{in} \quad (4.1)$$

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<sup>2</sup>According to CAPM,  $\beta_m = \sigma_{im}/\sigma_m^2$  where  $\sigma_{im}$  is the covariance between the return of asset  $i$  and the return of the market portfolio.  $\sigma_m^2$  is the variance of the return of the market portfolio.

<sup>3</sup> $\sigma(r_{in})$  is calculated using the daily price series in the related quarter adjusted for rights' offerings, stock splits and dividend payments as follows:  $\sigma(r_{in}) = \{\sum_{n=1}^N (r_{in} - \hat{r}_i)^2 / (N - 1)\}^{0.5}$  where  $\hat{r}_i$  is the average daily return for bank  $i$  and  $N$  is the number of trading days.

where  $n = 1, \dots, N$  and  $N$  is the number of trading days in each quarter. The logarithmic return on equity for bank  $i$  is  $r_{in}$  and the logarithmic return on the market index on day  $n$  is  $r_{mn}$ . The composite price index of the top 100 firms by asset size traded in the Istanbul Stock Exchange, ISE 100 Index is used as the market index. To represent the return on a debt instrument index,  $r_b$ , we use daily overnight lending rate. In the above specification for the return on equity,  $\alpha_i$  is the bank-specific intercept,  $\beta_m$  is the bank return's sensitivity to market,  $\beta_b$  is the bank return sensitivity to overnight lending rate and  $e_i$  is the error term for bank  $i$ .<sup>4</sup>

### ***Model I: Shareholders' Bank Risk Monitoring Behavior***

In the first model, we estimate the ability of the shareholders to monitor the risks of the banks. Market-based risk indicators represent outside shareholders' assessment of bank's risk taking behavior. The changes in market prices allow shareholders to observe the market's valuation of the bank. Shareholders' monitoring behavior can be established if there is a significant relation between equity market-based risk indicators and the bank specific risk factors. The risk factors are ratios obtained from the financial statements of the bank. This hypothesis is analyzed using the following model:

$$Y_{it} = \alpha_i + \phi Y_{it-1} + \sum_{j=1}^5 \gamma_j \text{Bank Risk}_{ijt} + \sum_{k=1}^4 \theta_k X_{ikt} + \psi Z_t + e_{it} \quad (4.2)$$

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<sup>4</sup>We separately estimated a single index model where  $r_{in} = \alpha_i + \beta_m r_{mn} + e_{in}$ . The estimated  $\beta_m$  was slightly lower. However, since interest rate is a significant factor in determining bank risk, as argued by many authors we included in the decomposition of return risk.

where  $e_{it}$  is the error term.  $Y_{it}$  represents each one of the three market-based risk indicators: market beta, total and idiosyncratic risks for bank  $i$  at  $t$ . The variable *Bank Risk* represents the CAMEL ratios obtained from the financial statements of the banks: capitalization (capital-to-assets), asset quality (non-performing loans-to-assets), managerial performance (operational efficiency),<sup>5</sup> earnings, (Net profit after tax-to-assets (Return on assets)) and liquidity (liquid assets-to-assets). All of the bank specific risk factors are introduced without a lag in order to account for the contemporaneous relationship between the market-based indicators and the bank risk variables (Flannery, 1998; Gilbert, 1990; Berger, 1991; Bliss and Flannery, 2002).

Bank capitalization, liquidity and operational efficiency are expected to have a negative relation with the equity market-based indicators implying declining risk. An increase in the non-performing loans-to-asset ratio indicates high risk for a bank. Since risk is positively related to return, the profitability of the bank would be positively related to equity market-based risk indicators.

In equation 4.2, we have two sets of control variables.  $X_{ik}$  denotes control variables that are related to other bank characteristics that might affect the volatility of bank stocks. These are bank size (Assets (in logs)), the leverage ratio (Total deposits-to-assets), franchise value (Market-to-book value) and the trading volume of the banking firm in the capital market (Total trading volume (in logs)).

As the increase in bank size and deposits-to-assets ratio increase asset risk, we

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<sup>5</sup>Operational efficiency scores are calculated using a Cobb-Douglass frontier (Batesse and Coelli, 1995). The value of scores range from 0 to one. The estimated scores show the efficiency in providing loans for given deposits and labor force.

expect that both variables have a positive effect on the market beta. Increases in the bank franchise value results in a decline in the risk indicators. The effect of an increase in trading volume in the stock market would be to increase market-based risks. Increases in bank size and the relative size of insured deposits shift part of the bank risk to the deposit insurance agency. Consequently, we expect that other two market-based risk indicators, total risk and idiosyncratic risk to have a negative relation with bank size and the leverage ratio.

Changes in the macroeconomic conditions ( $Z$ ) that might affect the capital market are incorporated as quarterly changes in the current gross domestic product (GDP Growth). It is hypothesized that increase in gross domestic product lowers the volatility of the returns of the banking firms.

### ***Model II: Shareholders' Influence on Management***

Shareholders expect management action to correct disproportionate risk taking. Shareholders' influence on bank management exists if rational managers become aware of changes in the risk indicators and take action to decrease bank risk. Therefore, in the second model, one would expect the bank risk to decrease in the periods following an increase in risk measured by one of the three risk indicator.

Table 4.1 demonstrates the expected response of the bank management to risk indicators. Management reaction to increases in risk indicators can be observed in terms of increases in the capital asset and liquidity ratios and a decrease

Table 4.1: Management Response to Risk

|  | $\Delta(K/A) > 0$ | $\Delta(LA/A) > 0$ | $\Delta(NPL/A) < 0$ |
|--|-------------------|--------------------|---------------------|
| Market Beta ( $\beta$ )                  | +                 | +                  | -                   |
| Total Risk ( $\sigma$ )                  | +                 | +                  | -                   |
| Idiosyncratic Risk ( $\sigma_\epsilon$ ) | +                 | +                  | -                   |

$\Delta$  denotes change over time.  $K/A$  is capital-to-asset ratio,  $LA/A$  is liquid asset-to-asset ratio and  $NPL/A$  is non-performing loans-to-asset ratio.

in non-performing loans ratio as shown in Table 4.1. However, there would be a difference in the magnitude of response of by different types of management. For example, owner-managers would react to changes in total risk more than to changes in the market risk,  $\beta_m$ . Managements response to idiosyncratic risk would also be stronger than to market risk. Market risk would be a limited risk indicator particularly if the bank has to operate in a high risk financial environment.

Berger (1991) argues that since managers' absence of risky actions cannot be observed, it is not easy to measure influence using capital market information. However, Bliss and Flannery (2002) find limited evidence of market influence where return volatility prompts managerial action to increase market value of the bank. To estimate the influence of the shareholders on management, we model the average effect of the market based risk indicators on the the change in bank risk factors. The following logit model is used to estimate the extent of the influence of shareholders' risk indicators on decisions about the composition of balance sheet.

$$Influence_{it} = \alpha_i + \phi Y_{i,t-1} + \sum_{j=1}^2 \theta_j X_{ijt} + \psi Z_t + e_{it} \quad (4.3)$$

where  $e_{it}$  is the error term.  $Influence_{it}$  is a binary variable that equals one



if bank  $i$  decreased its risk (i.e., reduces non-performing loans-to-assets ratio, or increases capital-to-assets and liquid assets-to-assets ratios); and zero if bank  $i$  increased its risk (i.e., increases non-performing loans-to-asset ratio, or decreases the capital ratio and the liquidity ratio).  $Influence_{it}$  measures whether a proper management action is taken or not.

$Y_{it}$  denotes the market-based risk indicators: market beta, total risk and idiosyncratic risk.  $Y_{it}$  is included in the equation with a one quarter lag to account for the time needed for the managerial response. We hypothesize that increases in the market-based risk indicators increase the probability of managers' response so that management decisions result in decreases in the bank specific risks or moral hazard.

In equation 4.3, control variables ( $X_{ij}$ ) are bank size (Assets (in logs)) and franchise value of the bank (Market-to-book value). Although we have no a priori expectation about the relation between the variable  $Influence_{it}$  and the size of the bank, increases in bank franchise value is expected to reduce moral hazard. ( $Z$ ) is a dummy variable for the time period when the newly established banking regulatory agency, the Bank Regulation and Supervision Agency (BRSA) is operational. The dummy variable *BRSA Dummy* is zero from the beginning of the estimation period until the fourth quarter of 2000. It takes a value of one starting in fourth quarter of 2000 until the third quarter of 2006. The incorporation of the *BRSA Dummy* is to control the changes in the bank management after the introduction of the BRSA.

## 4.4.2 Data

We use quarterly data over the period 1997 and 2006. Bank financial statements for each bank are obtained from the Turkish Bankers' Association. Number of sample banks vary. Initially, there were 12 publicly-traded deposit banks in the data set. During the sample period five new bank shares have started to be traded in ISE. Also, during the sample period considered, four banks were closed by the deposit insurance agency. Therefore, the data set is an unbalanced panel of 10 to 16 banks.<sup>6</sup> All bank data from financial statements are transformed into dollars because of the high depreciation in the value of TL until 2005.

Macroeconomic data are obtained from the Central Bank of Turkey. Daily bank equity prices and the ISE 100 Index are obtained from DataStream. All price data are adjusted for rights' offerings, stock splits and dividend payments.

In Table 4.2, we report the percent of traded shares of sample banks, their share in the ISE trading volume, initial public offering dates, type of management and the date of change in management. Until 2005, owner-managers were dominant in the management of publicly-traded banks. As foreign ownership in banks increased, professionals managing the banks also increased. By the end of 2006, 7 of the publicly traded banks out of 16 managed by professional management teams.

Table 4.3 presents the quarterly summary statistics of the variables for the period 1997:4 to 2006:3. The sample period includes the high volatility period 1997

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<sup>6</sup>There are 33 deposit banks in Turkey as of December 2006.

Table 4.2: Publicly Traded Banks in Turkey (December, 2006)

| Banks           | Percent of Stocks Traded in Custody | Share in Total Trading of ISE | Initial Public Offering Date | Majority Ownership | Management            | Date of Change in Management                                   |
|-----------------|-------------------------------------|-------------------------------|------------------------------|--------------------|-----------------------|--|
| Akbank*         | 36                                  | 5.3                           | July 26, 1990                | Sabancı Holding    | Owner Manager         |  |
| Alternatifbank  | 5                                   | 0.3                           | July 03, 1995                | Anadolu Holding    | Owner Manager         |  |
| Demirbank       | -                                   | -                             | July 11, 1990                | Cingilli Holding   | Owner Manager         | December 2000 (taken over by SDIF <sup>‡</sup> )               |
| Denizbank       | 0                                   | 0.6                           | Oct 10, 2004                 | Zorlu Holding      | Owner Manager         |  |
| Esbank          | -                                   | -                             | Mar 06, 1991                 | Zeytinoglu Holding | Owner Manager         | December 2000 (taken over by SDIF)                             |
| Finansbank      | 9                                   | 1.1                           | Feb 02, 1990                 | FIBA Holding       | Owner Manager         |  |
| Dışbank         | 6                                   | 0.3                           | Sept 13, 1990                | Dogan Holding      | Owner Manager         | April 2005 (acquired by Fortisbank NV/SA)                      |
| Garanti Bankası | 52                                  | 7.0                           | June 06, 1990                | Dogus Holding      | Owner Manager         | January 2006 ( General Electric large shareholder)             |
| İş Bankası(C)   | 33                                  | 6.6                           | Nov 16, 1987                 | -                  | Professional Managers |  |
| Şekerbank*      | 98                                  | 0.7                           | Apr 10, 1997                 | -                  | Professional Managers |  |
| TEB             | 20                                  | 0.2                           | Feb 28, 2000                 | Colakoglu Group    | Owner Manager         | February 2005 (BNP Paribas large shareholder)                  |
| Tekstilbank     | 46                                  | 0.6                           | May 23, 1990                 | -                  | Owner Manager         |  |
| Toprakbank      | -                                   | -                             | June 25, 1998                | Toprak Holding     | Owner Manager         | November 2001 (taken over by SDIF)                             |
| Vakıfbank       | 25                                  | 3.3                           | Nov 18, 2005                 | -                  | Civil Servants        |  |
| Yaşarbank       | -                                   | -                             | May 09, 1990                 | Yaşar Holding      | Owner Manager         | December 1999 (taken over by SDIF)                             |
| Yapı Kredi Bank | 26                                  | 5.7                           | May 28, 1987                 | Cukurova Holding   | Owner Manager         | September 2005 (acquired jointly by Koçbank and UniCredit SpA) |

\*: Foreign private equity ownership. ‡: SDIF: Savings Deposit Insurance Fund. Banks taken over by SDIF are not allowed to continue their regular banking operations.

Table 4.3: Descriptive Statistics (1997:4-2006:3)

|   | Mean    | Standard<br>Deviation | Min     | Max     |
|---|---------|-----------------------|---------|---------|
| <b>Market Based Risk Indicators</b>         |         |                       |         |         |
| Market Risk ( $\beta$ )                     | 0.9609  | 0.3634                | -0.2647 | 1.9005  |
| Total Risk ( $\sigma$ )                     | 0.4131  | 0.1510                | 0.1215  | 1.0859  |
| Idiosyncratic Risk ( $\sigma_\varepsilon$ ) | 0.2979  | 0.1351                | 0.0904  | 1.0883  |
| <b>Bank Risk Variables</b>                  |         |                       |         |         |
| Non-performing Loans/Assets                 | 0.0088  | 0.0209                | -0.1717 | 0.1541  |
| Capital/Assets                              | 0.0757  | 0.2679                | -3.2041 | 0.3716  |
| Operational Efficiency                      | 0.5452  | 0.2572                | 0.0006  | 0.9998  |
| Return on Assets                            | -0.0014 | 0.1762                | -1.7574 | 0.2670  |
| Liquid Assets/Assets                        | 0.2442  | 0.1647                | 0.0000  | 0.7973  |
| <b>Control Variables</b>                    |         |                       |         |         |
| Assets (in logs)                            | 21.8725 | 1.2217                | 18.4405 | 24.6087 |
| Market-to-Book Value                        | 1.8692  | 1.8128                | 0.2400  | 21.0100 |
| Total Deposits/Assets                       | 0.6613  | 0.2597                | 0.2991  | 3.5901  |
| Total Trading Volume (in logs)              | 11.9076 | 1.9675                | 5.6426  | 16.0815 |
| GDP Growth                                  | 0.0402  | 0.0620                | -0.1030 | 0.1440  |

to 2001 and the post crisis after 2001 characterized as a period of continued growth and consolidation in banking. State Deposit Insurance Fund (SDIF) took over the management of 4 banks out of a total of 16 publicly-traded banks (Table 4.2).

The average value of market beta for banks is 0.96 implying that banks have a return risk close to the market average. The closeness of the banks' beta to one is due to the dominance of bank share in the ISE. Trading in bank shares constitute about 32% of the trading volume in ISE.

The average return on assets is a small negative. This is due to the large losses incurred by the banking industry during the crisis at the end of 2000 which lasted until February 2001. Banks' average score for operational efficiency is low compared to U.S. and the European banks. However, efficiency score improved over time. While the average levels of all the variables are reasonable, variation

among banks remains high.

## 4.5 Empirical Results

### 4.5.1 Monitoring

Table 4.4 presents fixed effects estimation of the monitoring model (Model I) described in equation 4.2 using market beta (systematic risk), total risk and idiosyncratic risk as dependent variables. Each one of the risk indicators is regressed on bank risk variables obtained using balance sheet information, bank specific control variables and the indicator of general economic conditions. The first two columns contain market beta results, columns 3-4 presents the results for total risk. Columns 5-6 represent the estimated parameters of the model using the idiosyncratic risk. Examining the estimated coefficients across the columns, one observes that the results for systematic risk are different than the results for the other two market-based risk indicators. This implies robust identification of different perception of risk by different shareholders of banks.

Similar to other industries, monitoring of the financial conditions of the banks is costly. Hence, the most extensive monitoring is likely to be done by those who benefit the most from the bank's good performance, i.e., stockholders with significant ownership positions. The CAPM predicts that investors in high market beta shares seek compensation for risk by a high rate of return. However, for managers or inside shareholders, it is the total risk that matters since they are

committed and unable to offset it by diversification (Davis and Pointon, 1984). Recently, Baele, De Jonghe and Vennet (2007) provide evidence that diversified investors such as investment or pension funds are primarily interested in systematic risk exposures but not the non-systematic risk. Saunders, Strock and Travlos (1990) and Sullivan and Spong (2007) emphasized that interest in monitoring management and the bank's operations are influenced according to the proportions of their wealth concentrated in the bank's equity.

We evaluate monitoring behavior by shareholders according to the evidence of significant relation between financial conditions of a bank and non-systematic risks (idiosyncratic and total risks) of the bank. First, we find that there is a significant and positive relation between non-performing loans and the market beta implying risk taking incentives of the diversified shareholders (columns 1-2). Banks with higher non-performing loans are perceived more risky by outside shareholders but not by inside shareholders. Anecdotal evidence suggests that particularly international institutional investors monitoring of the non-performing loans.<sup>7</sup> A positive coefficient for return on assets (ROA) also indicates that diversified investors assessment of risk is consistent with higher returns. A positive relation between the market beta and the ROA implies an increase in systematic risk as profitability increases. A diversified investor would consider this as a signal for further diversification while owner-managers would not consider it as an important factor of risk. The increase in risk may be due to an increase in the general riskiness of the market. Owner-managers would not consider it as significant because they may

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<sup>7</sup>We would like to thank Hasan Ersel for pointing out this fact.

Table 4.4: Estimated Coefficients of the Monitoring Equation

Fixed effect estimates of the monitoring model based on sample of listed banks in Turkey during the period 1997:4 and 2006:3 are presented in the table.

$$Y_{it} = \alpha_i + \phi Y_{it-1} + \sum_{j=1}^5 \gamma_j \text{Bank Risk}_{ijt} + \sum_{k=1}^4 \theta_k X_{ikt} + \psi Z_t + e_{it}$$

|  | Market Based Risk ( $Y_t$ ) |                        |                         |                         |                         |                         |
|--|-----------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|  | Market Beta                 | Total Risk             |                         | Idiosyncratic Risk      |                         |                         |
|  | (1)                         | (2)                    | (3)                     | (4)                     | (5)                     | (6)                     |
| <b>Market Based Risk (<math>Y_{it-1}</math>)</b>         |                             |                        |                         |                         |                         |                         |
| Market Beta  | 0.1644 ***<br>(3.0321)      | 0.1643 ***<br>(3.0268) |                         |                         |                         |                         |
| Total Risk   |                             |                        | 0.2325 ***<br>(4.3092)  | 0.2368 ***<br>(4.1477)  |                         |                         |
| Idiosyncratic Risk                                       |                             |                        |                         |                         | 0.1359 **<br>(2.5785)   | 0.1372 **<br>(2.5922)   |
| <b>Bank Risk Variables (<math>Bank Risk_{it}</math>)</b> |                             |                        |                         |                         |                         |                         |
| Non-performing Loans/Assets                              | 1.6825 *<br>(1.8410)        | 1.6805 *<br>(1.8353)   | -0.2181<br>(-0.5344)    | -0.2161<br>(-0.5288)    | 0.1189<br>(0.3814)      | 0.1216<br>(0.3894)      |
| Capital/Asset  | -0.0275<br>(-0.0473)        | -0.0235<br>(-0.0402)   | -0.6807 **<br>(-2.5671) | -0.6821 **<br>(-2.5681) | -0.4561 **<br>(-2.2467) | -0.4604 **<br>(-2.2600) |
| Return on Assets   | 1.4143 ***<br>(2.8525)      | 1.4215 ***<br>(2.8242) | 0.3036<br>(1.3637)      | 0.2938<br>(1.2942)      | 0.0045<br>(0.0264)      | -0.0052<br>(-0.0301)    |
| Operational Efficiency                                   | -0.0586<br>(-0.8974)        | -0.0578<br>(-0.8739)   | -0.0517 *<br>(-1.7627)  | -0.0526 *<br>(-1.7754)  | -0.0239<br>(-1.0673)    | -0.0249<br>(-1.1017)    |
| Liquid Assets/Assets                                     | -0.0961<br>(-0.6988)        | -0.0940<br>(-0.6712)   | -0.1075 *<br>(-1.7397)  | -0.1100 *<br>(-1.7517)  | -0.0505<br>(-1.0685)    | -0.0532<br>(-1.1070)    |

Table 4.4: Estimated Coefficients of the Monitoring Equation (Cont'd)

|  | Market Based Risk ( $Y_t$ ) |                        |                          |                          | Idiosyncratic Risk       |                          |     |
|--|-----------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----|
|  | (1)                         | (2)                    | (3)                      |                          | (4)                      | (5)                      | (6) |
| <b>Control Variables (<math>X_{it}</math>)</b> |                             |                        |                          |                          |                          |                          |     |
| Assets (in logs)                               | 0.0901 **<br>(2.2860)       | 0.0910 **<br>(2.2395)  | -0.0909 ***<br>(-4.6327) | -0.0913 ***<br>(-4.6230) | -0.0863 ***<br>(-5.9797) | -0.0873 ***<br>(-5.9202) |     |
| Total Deposits/Assets                          | 0.4722 **<br>(2.1300)       | 0.4724 **<br>(2.1275)  | -0.2516 **<br>(-2.5281)  | -0.2513 **<br>(-2.5208)  | -0.3189 ***<br>(-4.1369) | -0.3188 ***<br>(-4.1299) |     |
| Total Trading Volume (in logs)                 | 0.0609 ***<br>(4.2402)      | 0.0609 ***<br>(4.2347) | 0.0102<br>(1.6277)       | 0.0101<br>(1.6166)       | 0.0020<br>(0.4193)       | 0.0020<br>(0.4144)       |     |
| Market-to-Book Value                           | -0.0123<br>(-1.0244)        | -0.0124<br>(-1.0258)   | -0.0103 *<br>(-1.9090)   | -0.0102 *<br>(-1.8858)   | 0.0020<br>(0.4845)       | 0.0021<br>(0.5001)       |     |
| <b>Control Variable (<math>Z_t</math>)</b>     |                             |                        |                          |                          |                          |                          |     |
| GDP Growth                                     |                             | -0.0227<br>(-0.0872)   |                          | 0.0287<br>(0.2324)       |                          | 0.0293<br>(0.3265)       |     |
| <b>Regression Statistics</b>                   |                             |                        |                          |                          |                          |                          |     |
| R-squared                                      | 0.3623                      | 0.3623                 | 0.4529                   | 0.4529                   | 0.5722                   | 0.5724                   |     |
| F statistics                                   | 20.6453                     | 18.5252                | 30.0720                  | 26.9919                  | 48.6049                  | 43.6355                  |     |
| Prob > F                                       | 0.0000                      | 0.0000                 | 0.0000                   | 0.0000                   | 0.0000                   | 0.0000                   |     |
| Number of Observations                         | 349                         | 349                    | 349                      | 349                      | 349                      | 349                      |     |

Notes: t-statistics are in parentheses. \*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.



hedge any increased risk-taking which may be unknown to outsiders.

Owner-managers or large shareholders monitor the fundamental ratios of the bank. In particular, increases in capital-asset ratio, liquidity ratio, and operational efficiency significantly lower the total risk. Thus, reductions in default and liquidity risk reduces the risk perception of the owner-managers and large shareholders. In addition, improved efficiency is an indication of lower risk for them because they anticipate better earnings in the future (columns 3-4).

In columns 5 and 6, increasing capital ratio significantly reduces the idiosyncratic risk of a bank. No other bank risk variable is significant. Higher capitalization provides a cushion for unexpected changes so, as expected, idiosyncratic risks declines significantly with higher capital ratio.

The estimated coefficients of control variables and the three risk indicators provide evidence of different behavior of different types of shareholders. Coefficients of control variables used in the market beta equations are different than the ones for total and idiosyncratic risk. First, increasing bank size and leverage (higher deposits-to-assets ratio) is significantly and positively related to market beta but negatively related to total and idiosyncratic risks. This is expected since large banks are able to diversify their asset risks better than the small banks. Moreover, investors believe that implicit failure guarantees are positively related to bank size. The negative relationship between size and the bank specific risk (column 5-6) is consistent with the findings of Demsetz and Strahan (1997), Penas and Unal (2004), Stiroh, (2006) and Baele et al. (2007). The idiosyncratic risk of banks is perceived to be insignificant when the bank is considered to be

“too-big-to-fail”.

Franchise value disciplines the risk taking associated with moral hazard by increasing the costs of financial distress. We find total risk is negatively related to franchise value of the bank as expected. Since well-diversified investors have limited commitment to the bank, increasing franchise value has no significant effect on the market beta. For wealth maximizing owner-managers market-to-book value is significant. Any improvements in the management of the company increases the market value of the bank which reduces the total risk of the owners.

We find that stocks of banks with higher trading volume have significantly higher volatility. However, this is only significant for the beta coefficient. Since most of the trading activity is done by outside shareholders, periods of high trading results in bigger fluctuations in stock prices. Finally, economic growth has no effect on the market beta, total and idiosyncratic risk.

#### **4.5.2 Influence**

As emphasized by Bliss and Flannery (2002) shareholders must be able to influence the risk-taking behavior by banks in order to exercise market discipline. Further the shareholders would have to use market information in order to influence the bank management. Hence, we estimate the market influence model (Model II) in equation 4.3 using a logistic regression. Any influence on the management should come primarily from the owner-managers and the large shareholders. The influence would manifest itself in the changes in some major financial ratios. We

estimate three equations where the dependent variables are the probability of a change in capital ratio, liquidity ratio and the non-performing loans-to-assets ratio. These are the three key ratios that the management would try to improve based on increased market risk after controlling for other factors.

In Table 4.5, we present the regression results. In all three dependent variables, we find that total risk and idiosyncratic risk have the right sign. As expected, we find that periods of increased total return risk and idiosyncratic risk are followed by increased probability of improvements in the capital and liquidity ratios as well as reduction in the non-performing loans-to-assets ratio by owner-managers. These effects are significantly observed in non-performing loans to assets and capital to assets estimations. Risk measures have no impact on the liquidity ratio. Although one would expect the bank management to increase liquidity when faced with increased risk, all coefficients in the liquidity equations are insignificant. This is due to the costs associated in increasing liquidity which means accepting steep discounts on changing the asset composition from illiquid assets to liquid assets. Managers are not willing to accept losses in order to increase liquidity.

These findings suggest that an increase in the probability of improvement in the financial structure of the bank due to increased volatility is an indication of the disciplinary role of shareholders and imply the existence of influence on the management by owner-managers and large shareholders. Beta has the right sign for the capital ratio and the non-performing loans-to-asset ratio but it is not significant. So, it can be argued that portfolio investors do not exercise any significant control over management.

Table 4.5: Estimated Coefficients of the Influence Equation

Logit model estimates of the relation between the direction of risk change (moral hazard) and market-based risk indicators is modeled. The regression coefficients are estimated using fixed effects based on sample of publicly traded banks in Turkey during the period 1997:4 and 2006:3.

$$Influence_{it} = \alpha_i + \phi Y_{i,t-1} + \sum_{j=1}^2 \theta_j X_{ijt} + \psi Z_t + e_{it}.$$

|                              | (1)                  | (2)   | (3)   | (4)  | (5)   | (6)   | (7)   | (8)   | (9)   |
|------------------------------|----------------------|---|---|--|---|---|---|---|---|
|                              |                      | <b>Increasing<br/>Capital/Assets<br/>(Influence<sub>it</sub> = 1)</b> | <b>Increasing<br/>Liquid Assets/Assets<br/>(Influence<sub>it</sub> = 1)</b> | <b>Increasing<br/>Assets/Assets<br/>(Influence<sub>it</sub> = 1)</b> | <b>Increasing<br/>Loans/Assets<br/>(Influence<sub>it</sub> = 1)</b> | <b>Increasing<br/>Loans/Assets<br/>(Influence<sub>it</sub> = 1)</b> | <b>Increasing<br/>Loans/Assets<br/>(Influence<sub>it</sub> = 1)</b> | <b>Decreasing<br/>Loans/Assets<br/>(Influence<sub>it</sub> = 1)</b> | <b>Decreasing<br/>Loans/Assets<br/>(Influence<sub>it</sub> = 1)</b> |
| <b>Market Based Risk</b>     |                      |   |   |  |   |   |   |   |   |
| ( $Y_{i,t-1}$ )              |                      |   |   |  |   |   |   |   |   |
| Market Beta                  | 0.0744<br>(0.2251)   |   |   | -0.1309<br>(-0.4201)   |   |   | -0.0807<br>(-0.2351)  |   |   |
| Total Risk                   |                      | 1.2152*<br>(1.6846)   |   |  | 0.6773<br>(0.9900)  |   |   | -2.3807***<br>(-3.2492)   |   |
| Idiosyncratic Risk           |                      |   | 1.0391<br>(1.2539)  |  |   | 1.0260<br>(1.2822)  |   |   | -1.7833**<br>(-2.1283)  |
| <b>Control Variables</b>     |                      |   |   |  |   |   |   |   |   |
| Assets (in logs)             | -0.0239<br>(-1.3844) | -0.0509**<br>(-2.3658)  | -0.0418**<br>(-2.0368)  | 0.0265*<br>(1.7033)  | 0.0057<br>(0.2874)  | 0.0019<br>(0.0977)  | 0.0423**<br>(2.4830)  | 0.0985***<br>(4.4248)   | 0.0757***<br>(3.5810)   |
| Market-to-Book Value         | 0.0630<br>(0.8271)   | 0.0899<br>(1.1592)  | 0.0930<br>(1.1715)  | -0.0850<br>(-1.1350)   | -0.0758<br>(-1.0048)  | -0.0613<br>(-0.7954)  | 0.0676<br>(0.7696)  | 0.0098<br>(0.1128)  | 0.0115<br>(0.1305)  |
| BRSA Dummy                   | 0.4720*<br>(1.9105)  | 0.6532**<br>(2.4934)  | 0.6370**<br>(2.3574)  | -0.4222*<br>(-1.7834)  | -0.3676<br>(-1.5204)  | -0.3132<br>(-1.2494)  | -0.1285<br>(-0.4929)  | -0.4394<br>(-1.6423)  | -0.3931<br>(-1.4268)  |
| <b>Regression Statistics</b> |                      |   |   |  |   |   |   |   |   |
| Log likelihood               | -253.64              | -252.23   | -252.88   | -267.28  | -266.87   | -266.53   | -234.22   | -228.88   | -231.99   |
| Obs with Dep=0               | 186                  | 186   | 186   | 191  | 191   | 191   | 114   | 114   | 114   |
| Obs with Dep=1               | 183                  | 183   | 183   | 198  | 198   | 198   | 275   | 275   | 275   |

Notes: z-values are in parentheses. \*\*\*, \*\* and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

We find that large banks significantly lower capital-to-assets ratio. However, non-performing loans-to-asset ratio increases with asset size. Franchise value measured as the ratio of market to book value is not a significant factor in influencing bank management decisions. Further, the establishment of BRSA increases capital-to-asset ratio due to the additional capital requirements set by the newly established regulatory authority.

## 4.6 Conclusion

We tested for existence of market discipline of banks by different types of shareholders. Shareholder discipline manifests itself in the form of monitoring the riskiness of banks as well as influencing the management actions of the banks to limit risk-taking.

Shareholders monitor banks' risk-taking behavior by observing key financial ratios. We do see a difference in the way shareholders perceive the sources of risk for banks. Diversified shareholders who own shares of banks a part of a large portfolio are primarily interested on high profits. However, for owner-managers capital ratio liquidity and efficiency are important factors determining the level of risk of the banks. While market value over the book value is important for owner-managers, diversified shareholders are primarily interested in return. So, owner-managers demonstrate closer monitoring of banks.

Similarly, owner-managers have some influence on the management to take action in order to reduce risks. The probability of improving key financial ratios,

taken as sign of management response, increases as the total risk increases. Total risk is the most important risk indicator that triggers a management action. However, the influence of owner-managers is observed in small banks. Management of small banks takes measures to increase capital ratio while reducing the share of non-performing loans in assets as a result of increased risk assessment of shareholders.

## CHAPTER 5

### CONCLUSION

After the crisis in the Russian Federation in 1998 and the crisis in Turkey in 2001, Central Bank of Russia and Banking Regulation and Supervision Agency of Turkey restructured the banking industries in both of the countries according to the requirements of Basel II. Market discipline, the third pillar of Basel II, could be used as a complementary mechanism in supervising banks in both countries. In this thesis, the extent of market discipline in the Russian Federation and in Turkey is studied.

In the first essay, depositors' monitoring of bank risk taking in the Russian Federation is measured. After the banking crisis, Central Bank of Russia has consolidated and improved the role of banks in financial intermediation. A new banking law was introduced with the intent of improving the prudential requirements for banks in line with Basel II principles. In the meanwhile, depositors became aware of banks' risk taking behavior. Findings support that depositors

shift their funds in the banks based on the banks' liquidity and capital adequacy. On the other hand, risk factors are not significant in demanding higher interest rates on deposits. It is also observed that the establishment of the deposit insurance system has not yet been effective in determining depositor behavior.

In the second essay, depositor discipline of banks in the Russian Federation and in Turkey is compared. In the Russian Federation depositors suffered because of the large losses after the crisis in 1998 while in Turkey depositors as well as other creditors were fully protected from incurring in during the banking crisis in 2001. Altering institutional and macroeconomic factors affect the extent of depositor discipline in two countries. Evidence in quantity discipline by the depositors is presented both in the Russian Federation and in Turkey. The significant factors that determine the change in the flow of deposits are the capital adequacy, liquidity and asset quality of banks. However, in their assessment of liquidity, depositors demonstrate different behavior in Russian Federation and Turkey. While depositors increase funds in liquid banks in the Russian Federation, liquidity is not perceived as low risk in Turkey because banks may be funding liquid assets with international funds which includes exchange rate risk. On the other hand, there is no evidence of price discipline by depositors on banks in the Russian Federation. In Turkey, limited price discipline is observed on banks that increase the share of loans portfolio in assets. Furthermore, the relation between bank efficiency and market discipline is evident only in the Russian Federation. Depositors are willing to accept lower interest income by placing in more efficient banks. Less efficient banks try to pay lower interest rates by taking the advantage of growth.



In the third essay, existence of market discipline of Turkish banks by different types of shareholders is studied. Shareholders monitor banks' risk-taking behavior by observing key financial ratios. A difference is observed in the way shareholders perceive the sources of risk for banks. Diversified shareholders who own shares of banks a part of a large portfolio are primarily interested on high profits. However, for owner-managers capital ratio liquidity and efficiency are important factors determining the level of risk of the banks. While market value over the book value is important for owner-managers, diversified shareholders are primarily interested in return. So, owner-managers demonstrate closer monitoring of banks.

Similarly, owner-managers have some influence on the management to take action in order to reduce risks. The probability of improving key financial ratios, taken as sign of management response, increases as the total risk increases. Total risk is the most important risk indicator that triggers a management action. However, the influence of owner-managers is observed in small banks. Management of small banks takes measures to increase capital ratio while reducing the share of nonperforming loans in assets as a result of increased risk assessment of shareholders.

Overall, findings support that market discipline exists in the Russian Federation and Turkey. Altering institutional characteristics of banking, macroeconomic factors, features of market participants and the instruments affect the extent of market discipline in two countries. Because of the limited number of debt instruments in the Russian Federation, only depositor discipline is studied. During the analysis period Russian depositors impose quantity discipline. Moreover, because

of the short time elapsed, only partial the effects of the deposit insurance are observed. Financial system and banking industry in Turkey is more developed than its counterparts in the Russian Federation. Therefore, both depositor discipline and outside equityholder discipline could be studied. In Turkey, depositors impose both quantity and price discipline only after the full deposit insurance in the post-crisis period. Before that, Turkish depositors are not interested in monitoring bank risks. There is also evidence in favor of owner-managers' monitoring of bank risks and the ability to influence management in Turkey.

In contrast to the opinions about the ineffectiveness of market discipline in emerging economies, our findings support Levy-Yeyati and Martinez Peria (2004) and Caprio and Honohan (2004). Controlling macroeconomic characteristics and institutional features, we find out that there are evidence in favor of depositor and equityholder discipline in the Russian Federation and Turkey.

Monitoring and influencing ability of the stakeholders in the Russian Federation and in Turkey can be studied further. For example, analysis is needed on regional banks in the Russian Federation as well as the competition between intra-group banks and diversified independent banks. Moreover, for both countries, deposit data used in this thesis is not categorized according to the size of deposits. More detailed data would provide results depending on the size of the investments and the effect of deposit insurance on each category. Furthermore, both of the countries are experiencing increase in share of foreign banks. Foreign bank participation and its reflection on market discipline would be another area of research. Finally, more sophisticated models could develop the analysis on outside

equityholders' monitoring behavior.

The findings of this thesis on the extent of market discipline in the Russian Federation and Turkey has several implications for the regulatory and supervisory authorities of both of the countries. First, both of the countries are in the process of adopting Basel II into their own regulation and supervision procedures. Although the will to increase market discipline appears in the mission statements, most of the effort is spent on risk management procedures. Using market discipline as a supplement to regulatory supervision should be included in the agenda of the authorities. Secondly, the regulatory and supervisory authorities of both of the countries mention about enhanced transparency. However market discipline is more than information disclosure which is only one of the pre-requisites of market discipline among the others. Effort should increase in improving the efficiency of the markets. Additionally, the uninformed stakeholders should be supported to acquire the necessary skills to interpret the information emitted to the markets. Thirdly, the number of stakeholders to monitor the banks in both of the countries should be increased. In the Russian Federation, IPOs for the banks should be encouraged. Furthermore, in both of the countries, uninsured large debtholders should be given incentives to monitor the banks, closely. CD and SND markets should be developed. Finally, although both of the countries have reasonable deposit insurance schemes, other implicit guarantees such as the state ownership of banks should be abandoned.

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## APPENDIX A

### STOCHASTIC FRONTIERS

We use the stochastic frontier production function proposed in Battese and Coelli (1992) where firm effects are assumed to be distributed truncated normal random variables, which are also permitted to vary systematically with time. The output is defined as the volume of loans and the inputs are capital, labor and deposits at banks.

The model is estimated by maximizing a likelihood function. The model may be expressed as:

$$Y_{it} = x_{it}\beta + (V_{it} - U_{it}), \quad i = 1, \dots, N, \quad t = 1, \dots, T$$

where  $Y_{it}$  is (the logarithm of) the production of the  $i$ -th firm in the  $t$ -th time period;  $x_{it}$  is a vector of (transformations of the) input quantities of the  $i$ -th firm in the  $t$ -th time period;  $\beta$  is regression coefficient;  $V_{it}$  are random variables which are assumed to be identically independently distributed (*iid*)  $N(0, \sigma_V^2)$ , and

independent of the

$$U_{it} = U_i \exp(-\eta(t - T)),$$

where  $U_i$  are non-negative random variables which are assumed to account for technical inefficiency in production and are assumed to be *iid* as truncations at zero of the  $N(\mu, \sigma_U^2)$  distribution;  $\eta$  is a coefficient to be estimated; and the panel of data need not be complete (i.e. unbalanced panel data).

## APPENDIX B

### FINANCIAL SYSTEM IN TURKEY

In Table B.1, we present the size and composition of the financial system in Turkey by the end of 2006. There were 50 banks, which dominate the financial system in Turkey: fourteen private banks, fifteen foreign banks, thirteen investment and development banks, four participation banks, and three state banks. The remaining bank belonged to the State Deposit Insurance Fund (SDIF). Number of banks dropped from 80 to 50 during 1999-2006. After 2003, the banks invested in new branches and personnel in order to increase their market share especially in consumers loans and loans to small and medium (SME) size firms. Banking assets accounted for 86.7 percent of GDP. Low level of banking assets to GDP ratio was perceived as a signal for the growth potential of the industry. The second largest financial intermediary was Istanbul Stock Exchange (ISE). Market capitalization was around \$162.4 billion and the ratio of market capitalization to GDP was calculated to be 40.1 percent. Assets of the other institutions in the financial system formed only 11.1 percent of GDP and play a minor role.

Table B.1: Turkish Financial System (by end of 2006)

Turkish financial system size and composition is presented. The number of financial institutions resides in the first column. Assets of the financial institutions are found in the second column. Percentage distribution of assets of the financial system is provided in the third and the fourth columns where Istanbul Stock Exchange (ISE) market capitalization is included in the former column, and excluded in the other. The last column is for the asset to GDP ratio of the financial institutions.

|                             | No of<br>Institutions | Assets<br>(billion \$) | % Distribution<br>ISE |         | Assets/<br>GDP<br>(%) |
|-----------------------------|-----------------------|------------------------|-----------------------|---------|-----------------------|
|                             |                       |                        | (Inc.)                | (Excl.) |                       |
| GDP                         |                       | 407.5                  |                       |         |                       |
| Banks                       | 50                    | 353.8                  | 62.9                  | 88.5    | 86.7                  |
| ISE Market Capitalization   | -                     | 162.4                  | 29.0                  | -       | 40.1                  |
| Central Bank (CBRT)         | -                     | 73.9                   | -                     | -       | 18.1                  |
| Securities Investment Funds | 285                   | 15.6                   | 2.7                   | 3.9     | 3.8                   |
| Insurance Companies         | 35                    | 7.3                    | 1.3                   | 1.8     | 1.7                   |
| Financial Leasing Companies | 81                    | 7.1                    | 1.3                   | 1.8     | 1.7                   |
| Pension Companies           | 11                    | 5.0                    | 0.9                   | 1.3     | 1.2                   |
| Factoring Companies         | 86                    | 4.5                    | 0.8                   | 1.1     | 1.1                   |
| Others                      | 156                   | 6.6                    | 1.1                   | 1.6     | 1.6                   |
| Total                       | 704                   | 636.2                  | 100                   | 100     | 156                   |

*Source:* Banking Regulation and Supervision Agency (BRSA), Istanbul Stock Exchange (ISE), Central Bank of the Republic of Turkey (CBRT), The Association of Capital Market Intermediary Institutions of Turkey.

In Table B.2, we present the aggregate measures of Turkish banking industry for 2005 and 2006. Since 2001 the composition of assets of banks changed. While banks in Turkey increased loans, the share of marketable government securities decreased. Banks started to increase intermediation activity after 2001 crisis. Although banks lent to both companies and individuals, according to BRSA, the consumer loans were growing faster than any other loan category. So, the banks invested in consumer banking by opening new branches, increasing the number of employees and expanding the volume of consumer credits such as credit cards, mortgage and car loans. Deposits, which were about 61 percent of the bank liabilities during 2005-2006, continued to be the main funding source of the loans. However, especially after 2005, banks were interested in alternative funding sources

Table B.2: Recent Aggregates of Turkish Banking Industry

The aggregate measures for Turkish banking industry in 2005 and 2006 are presented. Volume of the important accounts of the aggregate balance sheet and their share in total assets are provided for each year. Deposits to loans ratio is also given.

|                                    | 2005    |                   | 2006    |                   |
|------------------------------------|---------|-------------------|---------|-------------------|
|                                    | Volume* | % Share in Assets | Volume* | % Share in Assets |
| <b>Assets</b>                      |         |                   |         |                   |
| Cash and Money Market Transactions | 46.8    | 11.8              | 62.9    | 12.6              |
| Marketable Securities              | 142.9   | 36                | 158.9   | 31.8              |
| Loans                              | 149.9   | 37.8              | 219     | 43.8              |
| Other                              | 57.4    | 14.4              | 58.9    | 11.8              |
| <b>Liabilities</b>                 |         |                   |         |                   |
| Deposits                           | 243.1   | 61.2              | 307.6   | 61.6              |
| Other Debts                        | 100.2   | 25.2              | 132.6   | 26.5              |
| Capital                            | 53.7    | 13.6              | 59.5    | 11.9              |
| Total                              | 397     | 100               | 499.7   | 100               |
| Deposits/Loans                     | -       | 162.2             | -       | 140.5             |

Source: BRSA Monthly Bulletin. \*: Billion TL

and the ratio of deposits to loans decrease. This can be attributed to a several of reasons. First, both Turkish economy and the banking industry recovered. Imports and exports expanded. Consequently, banks were able to increase trade credits. Secondly, increase in consumer loans facilitated securitizations. Thirdly, risk management requirements of BRSA accelerated the pace of the investment activities of Turkish banks in risk management techniques. Banks were encouraged to disclose information about their financial statements. So, 36 out of 50 banks got rating from international rating agencies. By December 2006, the assets of the rated banks in Turkey accounted for 97.5 percent of the assets of banking industry. So, Turkish banks were able to borrow funds from international banks easily.

Market shares of the banks in Turkey according to function and ownership structure are given in Panel A and Panel B of Table B.3, respectively. In Turkey, deposit banks are permitted to collect deposits and borrow external funds in order



Table B.3: Financial Information about Turkish Banks According to Function and Ownership Structure (by end of 2006)

Banks are grouped in panel A and panel B. In panel A, banks are further divided into subgroups according to functionalities of deposit, investment, development and participation. In panel B, banks are divided into subgroups according to ownership structures of domestic private, state and foreign. Financial information and market share distributions are provided for all groups.

|                                     | Financial Information* |       |          |         |            |          | % Distribution |        |       |          |         |            |          |
|-------------------------------------|------------------------|-------|----------|---------|------------|----------|----------------|--------|-------|----------|---------|------------|----------|
|                                     | Assets                 | Loans | Deposits | Capital | Net Profit | FX Funds | Capital Adeq   | Assets | Loans | Deposits | Capital | Net Profit | FX Funds |
| Turkish Banking Industry            | 499.7                  | 215   | 307.6    | 59.5    | 11.4       | 22.9     | 22.2           | -      | -     | -        | -       | -          | -        |
| <b>Panel A: Function</b>            |                        |       |          |         |            |          |                |        |       |          |         |            |          |
| Deposit Banks                       | 470.7                  | 202.5 | 296.5    | 50.4    | 10.3       | 22.3     | 19.9           | 94.2   | 92.5  | 96.4     | 84.7    | 90.4       | 97.4     |
| Investment and Development Banks    | 15.3                   | 7.2   | -        | 7.6     | 0.7        | 0.6      | 142.77         | 3.7    | 3.3   | -        | 12.8    | 6.1        | 2.6      |
| Participation Banks                 | 13.7                   | 9.3   | 11.1     | 1.5     | 0.4        | -        | 16.5           | 2.1    | 4.2   | 3.6      | 2.5     | 3.5        | -        |
| <b>Panel B: Ownership Structure</b> |                        |       |          |         |            |          |                |        |       |          |         |            |          |
| Domestic Private Banks              | 278.6                  | 131.4 | 163.5    | 29.4    | 5.1        | na       | 17.8           | 55.8   | 60    | 53.2     | 49.4    | 44.7       | na       |
| State Banks                         | 155.5                  | 51    | 109      | 22.2    | 4.7        | na       | 41.2           | 31.1   | 23.3  | 35.4     | 37.3    | 41.3       | na       |
| Foreign Banks                       | 65.6                   | 36.6  | 35.1     | 7.9     | 1.6        | na       | 16.6           | 13.1   | 16.7  | 11.4     | 13.3    | 14         | na       |

Source: Monthly Bulletin produced by BRSA, February 2007. \*: Financial information except FX Funds and Capital Adequacy is provided in billion TL. Information related to FX Funds is given in billion \$ and Capital Adequacy is given in percentage.

to provide loans. However, investment and development banks can only borrow external funds or use their own capital to give credits. Moreover, participation banks make transactions according to different regulations. Therefore, we differentiate banks according to their functions. As presented in Panel A, the subgroup of deposit banks had the largest market share in Turkish banking industry, by the end of 2006. Their assets formed 94.2 percent of the industry and they provided 92.5 percent of the loans while collecting 96.4 percent of the deposits. These banks were able to borrow funds amounting to \$22.3 billion from foreign financial institutions. Amongst the three functional subgroups participation banks had the lowest capital adequacy ratio. Consequently, they could not borrow international funds.

In Panel B, we analyze banks according to their ownership structure. Domestic private banks dominate the banking industry in Turkey, by the end of 2006. They provided 60 percent of the loans and collected 53.2 percent of the deposits. Private and foreign banks were not permitted to collect funds of the state enterprises. Therefore, deposits market shares of private and foreign banks were slightly lower than their shares in the loan market. Consequently, deposit market share of state banks was relatively higher than their loan market share. After the crisis in 2001, the capital structures of state banks were strengthened. Turkish government injected funds to compensate for the non-performing loan and miscellaneous losses. So, in Panel B, we observe that state banks had the highest capital adequacy ratio.

Assets of the foreign banks formed 13.1 percent of the assets of banking industry. In addition to these assets, foreign investors had minority shares in listed

private and state banks. According to capital markets regulations; investors having minority shares have to be kept ISE Settlement and Custody Bank and registered to Central Registry Agency. In total, BRSA disclosed foreign ownership of Turkish banks to be 35.9 percent, by the end of 2006.

Istanbul Stock Exchange (ISE) was one of the attractive emerging capital markets during last few years. In Table B.4, we present important statistics of ISE and some other emerging capital markets. In 2005, the return on ISE 100 Index was the second highest among the selected capital market indices. However, in 2006, ISE 100 Index was the second worst index after Thailand Stock Exchange Index. Volatility in almost all of the emerging markets increased in May and June 2006 because of the global fear that FED would increase the interest rates further to stop the increase in US inflation. ISE was one of the most affected exchanges in emerging economies because timing of the global volatility coincided with the terrorist attack to the Council of State had ended with the death of one of the judges. Consequently, sales in ISE lowered the returns in 2006.

Stock market capitalization to GNP ratio is regarded as the merit that shows the importance of the capital markets in the economy. Both in 2005 and 2006 capital markets in South Africa and Malaysia had the first and second highest stock market capitalization to GNP ratio implying the development of the capital markets. On the other hand, stock market capitalization to GNP ratio for ISE in 2006, decreased to 41 percent which was relatively low among the selected capital markets in Table B.4. There may be several reasons for the low stock market capitalization to GNP. First, there are very little incentives for the companies to

Table B.4: Important Statistics of Selected Capital Markets in Emerging Countries (2005–2006)

The stock market returns of the broad indices in local currencies are presented in the first column. Turnover Velocity in column five is the ratio of the value of domestic share trading in column four to stock market capitalization in column three. The ratio shows both the liquidity of the capital market and the investment horizon of the investors.

|                                 | Stock Market Return (%) |      | Stock Market Capitalization to GDP (%) |       | Stock Market Capitalization (billion \$) |       | Total Value of Share Trading (billion \$) |        | Turnover Velocity of Domestic Shares (%) |       |
|---------------------------------|-------------------------|------|--|-------|--|-------|---|--------|--|-------|
|                                 | 2005                    | 2006 | 2005                                   | 2006  | 2005                                     | 2006  | 2005                                      | 2006   | 2005                                     | 2006  |
| Argentina                       | 21.5                    | 49.9 | 26.9                                   | 24.1  | 47.6                                     | 51.2  | 5.3                                       | 6.9    | 11.2                                     | 7.2   |
| Brazil                          | 27.7                    | 32.9 | 57.3                                   | 66.5  | 474.6                                    | 710.2 | 165.3                                     | 276.1  | 42.8                                     | 45.5  |
| Mexico                          | 37.8                    | 48.6 | 30.8                                   | 41.5  | 239.1                                    | 348.3 | 56.7                                      | 96.4   | 27.2                                     | 29.6  |
| Malaysia                        | -0.8                    | 21.8 | 137.8                                  | 155   | 180.5                                    | 235.6 | 51.6                                      | 75.2   | 28.3                                     | 36.2  |
| South Korea                     | 54                      | 4    | 90                                     | 95    | 718                                      | 834.4 | 1210.7                                    | 1342.1 | 206.9                                    | 171.4 |
| Thailand                        | 6.8                     | -4.7 | 71.6                                   | 68    | 123.9                                    | 140.2 | 95.6                                      | 100.9  | 80.7                                     | 72.7  |
| Poland                          | 33.7                    | 41.6 | 31.2                                   | 43.9  | 93.6                                     | 148.8 | 30.4                                      | 55.7   | 38.7                                     | 45.4  |
| South Africa                    | 43                      | 37.7 | 228.1                                  | 278.7 | 549.3                                    | 711.2 | 201.8                                     | 311    | 44.6                                     | 48.9  |
| Turkey                          | 59.3                    | -1.7 | 44.6                                   | 41    | 161.6                                    | 162.4 | 199.2                                     | 222.7  | 141.3                                    | 168.5 |
| Russian Federation <sup>†</sup> | 85.3                    | 61.3 | 7.8                                    | 16.9  | 60.0                                     | 165.3 | 7.2                                       | 13.8   | 12.0                                     | 8.3   |

*Source:* Statistics from World Federation of Exchanges.

<sup>†</sup> Stock market index, stock market capitalization and total value of share trading for the Russian Federation are obtained from the Russian Trade System (RTS) Stock Exchange, GDP is obtained from [www.imf.org](http://www.imf.org) World Outlook Database. Stock market return, stock market capitalization to GDP and turnover velocity of domestic shares for the Russian Federation are calculated by the author.

\*: Return calculations are in local currency.

go to public. Companies either borrow from banks or sell shares to private equity funds rather than IPOs. So, number of new entries to ISE is very low (ie. It is 9 and 15 in 2005 and 2006 respectively.). Secondly, stock market capitalization in 2006 slightly rose to \$162.4 billion from \$161.6 billion in 2005 because of the negative return of ISE. Thirdly, although ISE had lost value, the economy continued to grow in 2006. So stock market capitalization to GNP ratio declined. Authorities and private sector initiative are seeking means to improve the incentives for IPOs in order to increase the importance of ISE in Turkish economy. In the last two columns of Table B.4, we present the total value of share trading and turnover velocity of the domestic shares. These merits indicate the depth and the liquidity of the capital markets. Total value of share trading was relatively high for ISE. Also, Turkey ranked second in 2005 and 2006 according to turnover velocity of the domestic shares implying that ISE is one of the most liquid emerging markets.

Performance of ISE is traced by several indices. ISE-All Shares Index includes all of the listed banks. According to total value of share trading and market capitalization ISE-100, ISE-50 and ISE-30 indices that include the largest 100, 50 and 30 listed companies, are generated for professional investment purposes. There are also sectoral indices in ISE-All Shares Index. These are financial, industrial, service and technology indices.

In Figure B-1, we present the level of ISE-100 Index and National Financial Institutions' Index during 2002-2006. In 2006, thirteen out of the fifteen banks traded were included in ISE-100, which was 10,370 in 2002. It had risen up to 39,117 in 2006 implying 277.2 percent increase in five years. National Financial

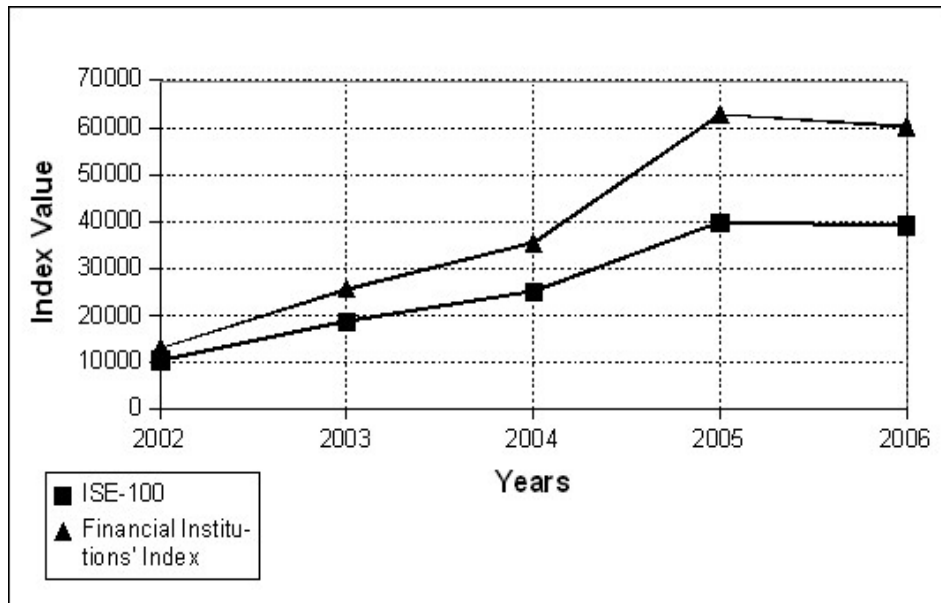


Figure B-1: ISE Indices (1997:4-2006:3)

Institutions' Index is the most important sectoral index in ISE and its weight ISE-All Shares Index is 54.38 percent. It was 12,902 in 2002 and grew up to 60,168 in 2006. During 2002-2006, its return is 366.3 percent and it was superior to the return on ISE-100. National Financial Institutions' Index is composed of companies operating in the finance industry. By the end of 2006, banks and holding companies formed 71.25 percent and 21.45 percent of the index, respectively. Insurance, leasing, factoring companies and real estate investment trusts accounted for the remaining 7.3 percent. In 2006, the ratio of financial institutions' stock market capitalization to total market capitalization was 52.5 percent. Shares of financial institutions were also the most traded shares in ISE. The ratio of total value of share trading of financial institutions to total value of share trading in ISE is 56.1 percent.

Banking is the most important sub-sector in financial institutions sector. It constituted 36.2 percent of stock market capitalization and 33.7 percent (around

\$75 billion) of total value of share trading in ISE, by the end of 2006. There were fifteen listed banks. Two of them were investment and development banks and twelve of them were deposit banks. The remaining bank was a participation bank. Eight out of fifteen banks traded in ISE were amongst the first 25 companies with highest market capitalization and seven of them were also classified amongst the top 25 companies that have the highest total value of share trading.

Foreign investors were attracted to the financial sector. Share trade of financial sector formed 70.8 percent of the value of the transactions by foreign investors. In particular foreign investors were interested in the purchase and sales of the bank shares. Accordingly, value of the bank shares trading reached to 52.1 percent of the foreign investors' trade in 2006.