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Abstract

This study examines how the introduction of deposit insurance affects depositors and banks, using the deposit-insurance scheme introduced into the Russian banking system as a natural experiment. The fundamental research question is whether the introduction of deposit insurance leads to a more effective banking system as evidenced by increased deposit-taking and decreased reliance upon State-owned banks as custodians of retail deposits. We find that banks entering the new deposit-insurance system increase both their level of retail deposits and their ratios of retail deposits to total assets relative to banks that do not enter the new deposit insurance system. These results hold up in a multivariate panel-data analysis that controls for bank- and time- random effects. The longer a bank has been entered into the deposit insurance system, the greater is its level of deposits and its ratio of deposits to assets. Moreover, this effect is stronger for regional banks and for smaller banks. We also find that implementation of the new deposit-insurance system has the effect of "leveling the playing field" between State-owned banks and privately owned banks. Finally, we find strong evidence of moral hazard following implementation of deposit insurance in the form of increased bank risk-taking. Financial risk and, to a lesser degree, operating risk increase following implementation.

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1. Introduction

Academics, policymakers and others have debated the costs and benefits of explicit deposit insurance for almost two centuries, going back to the early 1800s when several states in the U.S. adopted various deposit insurance schemes to protect their state banking systems (Calomiris, 1994) and continuing through 1933, when the U.S. became the first country to provide such insurance on a national basis, until today. On the one hand, explicit deposit insurance reduces the likelihood and severity of bank runs during a financial crisis; on the other hand, explicit deposit insurance may increase the likelihood of financial crisis.

Indeed, Demirguc-Kunt and Detragiache (2002) provide evidence that explicit deposit insurance increases the likelihood of banking crises, especially when institutions are weak and interest rates are deregulated. However, they do not address potentially *positive* effects of deposit insurance; they conclude that an interesting question for future research is "whether there are reasons to adopt explicit deposit insurance despite its negative impact on systemic stability," such as "that it may create a basis for a more developed banking system that performs more financial intermediation."

In this study, we provide new evidence that, at least in part, provides an answer to this question. More specifically, we examine how bankers and depositors responded to the introduction of explicit deposit insurance, using the deposit-insurance scheme introduced into the Russian banking system in 2004 as a natural experiment. The fundamental research question we address is whether or not deposit insurance leads to a more effective banking system as evidenced by increased deposit-taking and decreased reliance upon state-owned banks as custodians of retail deposits.

We also test for potential negative effects of deposit insurance in the form of increased risk-taking. We examine changes in financial risk, as measured by the ratio of bank capital to assets, and changes in operating risk, as measured by the ratio of bank loans to assets.

The Russian experiment is an ideal laboratory for this research. Prior to 2004, there was no system of deposit insurance in Russia, and there were three banking crises during the previous 16 years—in 1992, 1995, and 1998—when retail depositors suffered substantial losses. This led retail depositors to either rely upon State-owned banks that were explicitly protected by the government guarantees or to keep their savings "under their mattresses." In addition, there are more than 1,000 banks in Russia, and these banks entered into the new deposit insurance system one-by-one at different points in time rather than all at once.

In order to conduct this experiment, we assemble a unique new dataset on the Russian banking industry from a variety of publicly available Russian-language sources. Using these data, we contribute to the literature on deposit insurance in at least two key areas.

First, we provide new evidence on the issue of whether or not a system of explicit deposit insurance leads to increased financial intermediation in the form of higher levels of deposits. Our results provide strong evidence that financial intermediation as measured by the level of deposits does increase following implementation of a deposit insurance system.

Second, we provide new evidence on the issue of whether or not deposit insurance leads to reduced reliance upon State-owned banks. This second issue is at least as important as the first, as La Porta *et al*. (2002) demonstrate: government ownership of banks around the world is pervasive and has negative consequences for financial development and economic growth. King and Levine (1993) and numerous others have demonstrated the importance of financial development for economic growth. (See Levine (2004) for a recent survey.) We find that reliance

upon State-owned banks as a repository for deposits does decrease following implementation of an explicit deposit-insurance system, but that this result is driven by the one dominant State-owned bank, Sberbank, which may have reduced its reliance upon retail deposits in response to the cost of the new deposit insurance premiums. Even so, this result suggests that implementation of the new deposit-insurance system had the effect of "leveling the playing field" between State-owned and privately owned banks.

The remainder of the paper is organized as follows. In section 2, we provide a very brief review of the literature on deposit insurance, highlighting papers that are most relevant to the research questions we address. In section 3, we provide background information on the implementation of deposit insurance in Russia. In section 4, we describe our unique dataset on Russian banks. In section 5, we present our methodology for testing our hypotheses regarding the effects of deposit insurance implementation on the Russian banking system. Our results appear in section 6, and we close with a summary and conclusions in section 7.

2. Literature on the costs and benefits of deposit insurance

There are a number of theoretical papers that explore the cost and benefits of a deposit insurance system; these are summarized by Kane (1995, 2000).[1] In a seminal article by Diamond and Dybvig (1983), a system of deposit insurance ensures bank stability threatened by depositor runs. However, researchers universally accept that deposit insurance creates moral hazard, as banks can fund high-risk assets that are not reflected in their liability costs (deposit rates). The U.S. S&L and commercial banking crises during the 1980s and 1990s well demonstrated the

[1] See, for example, Diamond and Dybvig (1983), Chari and Jagannathan (1988), Kane (1995), Calomiris (1996), Bhattacharya et al. (1998), and Allen and Gale (1998).

costs of such moral hazard, as regulators spent hundreds of billions in dollars to sell or liquidate insolvent financial institutions.

An even wider literature empirically analyzes the costs of deposit insurance. Most of these studies analyze data at the country-level rather than at the bank level. In general, these studies find that moral hazard is a greater problem in countries with explicit deposit insurance, leading to a greater likelihood of banking crises.[2]

There are only two previous studies of which we are aware that analyze the potentially *beneficial* effects of deposit insurance. Cull, Senbet and Sorge (2005) examine cross-country data over the 1990-99 period for evidence on whether or not deposit insurance contributes to the development and stability of a country's financial system. Their results suggest that deposit insurance has a negative impact on financial development and growth in the long run, except in countries with strong legal and regulatory institutions. Angkinand (2009) examines whether deposit insurance (and other banking regulations) can reduce the output costs of banking crises. Using data from 47 crises in 35 countries during 1970 – 2003, she finds that the output cost is lower for countries with high deposit insurance coverage.

While there have been a number of recent articles that look at banking in transition economies,[3] there are very few studies during the past two decades that examine bank-level data for evidence on the impact of deposit insurance. Duan, Moreau, and Sealey (1992) test whether banks shift risk to the deposit insurer. Using a sample of 30 large publicly traded U.S. banks,

[2] See, for example, Honohan and Klingebiel (2003); Kane and Klingebiel (2004); Demirgüç-Kunt and Huizinga (2004); Laeven (2004); and Demirgüç-Kunt, Kane, and Laeven (2006).

[3] See, for example, Berkman, Cole and Fu (2009), Brown et al. (2009); Cole, Moshirian and Wu (2008); Fu and Heffernan (2009); Koutsomanoli-Filippaki, Margaritis and Staikouras (2009); and Männasoo and Mayes (2009).

they find that banks are largely unsuccessful in increasing their actuarial liabilities to the deposit insurer.

Mondschean and Opiela (1999) examine the impact of changes in deposit insurance on the market for bank time deposits in Poland. They find that, after a new law increased deposit-insurance coverage, bank-specific variables became less important in explaining differences in deposit interest rates. They interpret this as evidence of decreased market discipline following the increase in deposit-insurance coverage.

Laeven (2002) examines bank-level data from Bankscope and Datastream for 144 banks in seven emerging-market countries and seven developed countries over the period 1991-98, and uses the cost of deposit insurance to examine the relation between governance structures and bank risk-taking. He finds that the costs are highest for banks with concentrated private ownership and lowest for banks with dispersed ownership, indicating that risk-taking is highest for the former and lowest for the latter group of banks.

Hovakimian, Kane and Laeven (2003) analyze bank-level data from Bankscope and Datastream for 390 banks in 56 countries over the period 1991-99 to examine how deposit insurance influences risk-shifting by banks—whereby banks shift risks onto the deposit insurer without paying adequate compensation. They find that explicit deposit insurance exacerbates risk-shifting, especially in countries with weak institutions. They also find that this effect is mitigated by loss-control features such as risk-based premiums and co-insurance.

Gueyie, Jean-Pierre and Van Son Lai (2003) examine the impact of implementation of fixed-rate deposit insurance in Canada. Using data from 1959 – 1982 on five publicly traded banks, they find that various market-based measures of risk-taking increased, while capital ratios decreased, following implementation in 1967.

Gonzales (2005) examines how regulatory restrictions affect bank charter value and bank risk-taking. Using a sample of 251 banks in 36 countries, he finds that deposit insurance encourages banks to engage in risk-shifting, and that better country-level governance reduces the incentives for such risk-shifting. He also shows that deposit insurance increases bank charter value.

3. Background on the Russian experiment in deposit insurance

In 1934, the U.S. became the first country to implement a system of deposit insurance, responding to banking runs following the stock market crash of 1929. During the past 75 years, most developed, and many developing, countries have followed suit. In 1998, the IMF recommended limited forms of deposit insurance as "best-international practice." By the time of the Demirguc-Kunt and Detragiache (2002) study, 61 countries had adopted some form of deposit insurance, and, as of October 2008, there were 101 countries with deposit-insurance systems in operation, with another 18 countries planning for such systems.[4]

During autumn of 2003, the Russian Federal Assembly passed a series of six bills that formed the basis of a system of explicit deposit insurance for the Russian banking system. In December of 2003, these bills were signed into law, culminating more than a decade of efforts. (See Tompson (2004) for details of the six bills.) The Assembly intended for coverage to be quite modest, covering only physical persons to a maximum of RUB100,000 or about USD3,500. However, regulators expected this level of insurance to cover about 85% of all retail deposits in the country. As Demirguc-Kunt and Detragiache (2002) point out, limited coverage is

[4] Source: International Association of Deposit Insurers: http://www.iadi.org

one important way to mitigate the moral hazard associated with deposit insurance, covering only those least likely to monitor bank risk-taking.

In August 2006, the Assembly increased the coverage limit to RUB190,000, which equals approximately 130 percent of 2006 per capita GDP. This newly adopted amendment also introduced co-insurance, as the amounts above RUB100,000 are reimbursed at only a 90 percent rate. The Assembly introduced the coinsurance mechanism to provide incentives for large depositors to monitor their banks. In subsequent years, the Assembly has gradually increased the coverage limit further—to RUB400,000 in March 2007 and to RUB700,000 in October 2008. The October 2008 law amendments have also abolished the coinsurance for the amounts in excess of RUB100,000 and established full coverage up to RUB700,000. [5]

One of the primary goals of deposit-insurance implementation was to draw out the estimated USD40 billion in cash savings held by Russian citizens "under their mattresses" and outside of the banking system, which then could be used by banks as the basis for new loans. Specifically, the Law on Deposit Insurance defined three closely related goals: (i) the protection of depositors' funds, (ii) the increase in the depositors' confidence in the Russian banking system and (iii) the attraction of household savings in the Russian banking system. These goals arose out of historical experience of Russian depositors, who had been victimized by the losses suffered during the banking crises of 1992, 1995, and 1998, which collectively led to a loss of confidence in privately owned banks.

There is also another institutional characteristic of the Russian deposit market that increases the banking system's vulnerability and the importance of the deposit insurance system in preventing bank runs. By law, all retail deposits in Russia, including term deposits, are

[5] See amendments to the Federal Law "On Insurance of Household Deposits in Banks of the Russian Federation," which took effect On October 14, 2008. The new parameters of the deposit insurance system are applicable to banks that failed after October 1, 2008.

revocable. Any deposit can be withdrawn by its owner at any time (Civil Code Article 837). Thus, all deposits in Russia are essentially demand deposits.

Prior to the new legislation, the Russian government had explicitly stated that it would cover depositor losses only at State-controlled banks[6], the largest of which was Sberbank. Largely due to its explicit coverage, Sberbank came to dominate the retail deposit market with a market share of 62.8% as of the end of 2003, prior to the deposit insurance system implementation. Sberbank represents a special case of the State-controlled banks as the Central Bank of Russia ("CBR") directly participates in its capital with a 67% share. As of 2008, it was the largest bank in the Central and Eastern Europe. Hence, a supplementary goal of the deposit-insurance implementation was to introduce a fair competition among all banks in the system and to reduce the reliance of retail depositors on Sberbank (and other State-controlled banks).

The process for banks' entry into the deposit-insurance system involved several stages and included rigorous on-site examinations. Each bank had to apply for deposit-insurance coverage and then was subject to a special examination before coverage would be granted. The law set the deadline for the banks' applications as the end of June 2004. Regulators approved applications of the first group of 26 banks in September 2004 and issued the last approvals in September 2005. All procedures, including appeals, were finalized by the end of 2005. As a result of adverse findings during the special on-site bank examinations, regulators rejected the applications of 191 banks, and revoked the licenses of another 24 banks. Appendix 1 summarizes stages of deposit insurance introduction in Russia.

[6] Before the introduction of the deposit-insurance system, the State-controlled banks with more than 50% of state ownership enjoyed full implicit insurance guaranteed by the Russian government. This insurance did not have any coverage limits—all household deposits in these banks were fully covered.

Federal law 177-FZ "On the Insurance of Household Deposits in Banks of the Russian Federation" established the Deposit Insurance Agency ("DIA") in January 2004. The DIA manages the deposit insurance fund, monitors banks' insurance premiums and organizes compensation payouts. All insured banks have to pay insurance premiums on a quarterly basis, which the DIA initially set at a flat 0.15% rate on their average daily balances of household deposits during the accounting quarter. In July 2007, the DIA reduced the insurance premium to 0.13%. As of the 4th quarter of 2008, The DIA reduced the premium to only 0.10%.

By the end of the Deposit-Insurance-System (DIS) introduction in December 2006, the DIA register included 924 insured banks or about 80% of Russian banks. The banks that failed to enter the DIS lost the right to attract new deposits. However, they retained the right to serve the existing deposits [7] and to apply for a new license for retail deposits' operations and DIS acceptance in two years after the initial rejection.

4. Data

We use bank-level balance-sheet data to provide new evidence regarding how bankers and depositors respond to the introduction of deposit insurance. As shown in Table 1, the Russian banking industry is growing quite fast in terms of assets but remains relatively small as a percentage of GDP. In 2007, the RUB20,241 billion in total assets accounted for 61.4% of GDP.

For comparison, Barth, Caprio, and Nolle (2004) survey cross-country banking sector characteristics and report that the banking-system assets in countries comparable to Russia's level of economic development are, on average, 91.3% of GDP. The ratio of deposits to assets is also relatively low in Russia, but has grown from about 18.7% in 1999 to 25.4% in 2007. The

[7] By deposit-insurance law amendments, the remaining deposits of non-member banks are insured by the Central Bank of Russia instead of the Deposit Insurance Agency.

ratio of loans to assets is more typical of developed banking systems, ranging from a low of 31.9% in 1999 to a high of 60.7% in 2007.

The Russian banking system has been (and continues to be) dominated by Sberbank—the State-owned bank enjoying an explicit State guarantee of deposit insurance. However, its dominance of the retail deposits market has weakened during recent years, as Sberbank's share of deposits has fallen from 63.0 percent at the end of 2003 to 54.4 percent at the end of 2007 (Figure 1).

There is no comprehensive and publicly available source of data on the financial statements of Russian banks. However, we are able to construct a unique and representative dataset of Russian banks by combining information from three reliable local sources, none of which are available in English.

The first of these sources is a set of financial reports published online by the CBR itself. [8] A majority of Russian banks grant the CBR permission to disclose their detailed balance sheets and income statements on the monthly basis through the CBR website. For example, in February 2004 (the first month for which this information is available), about 52% of all Russian banks disclosed their financial statements. By the end of 2006, this number had gradually risen to almost 70%. We decode the detailed entries of reported financial statements by relying on the Russian Accounting Standards for banks and the CBR official methodologies for the aggregation of accounts.

We obtain *monthly* data on deposits, loans, assets, and liabilities of approximately 800 Russian banks from the records of the CBR for the period Feb. 1, 2004 through Dec. 1, 2006. Hence, the sample period consist of 35 months and covers pre- and post-DIS introduction. The

[8] See http://www.cbr.ru/credit/transparent.asp.

panel is unbalanced and consists of 26,076 bank-month observations. The number of unique banks with financial data from the CBR in at least one month is 851; 743 banks have data for at least 20 months and 615 banks have data for all 35 months. The number of banks that disclose their financial statements through the CBR website gradually increases over time: from 663 at the beginning of 2004 to 793 at the end of 2006. Some banks may have statements for non-continuous months; therefore, the number of unique banks, 851, is larger.

To distinguish among State-controlled, foreign-controlled, and privately-controlled domestic banks, we use information on each bank's equity accounts. By the Russian Accounting Standards for banks, all equity shares must be reported by the type of owner. We define *State-controlled* bank as a bank in which any combination of State entities, including various government authorities or government-owned companies, hold a majority ownership stake. We define a *foreign-controlled* bank as a bank in which foreign investors collectively own a majority stake. In the case of Russia, a typical foreign-controlled bank is a subsidiary company of a foreign bank, as the Russian banking law does not allow foreign branches.

Our second source is a weekly periodic publication of the CBR known as the *Bulletins of the Central Bank of Russia.* This publication contains non-financial characteristics of all banks licensed by the CBR. From this source we obtain information on bank legal form (open joint-stock, closed joint-stock, or private bank), location (Moscow or regional bank), and license type (general license or license with restrictions). We hand-collect this information from the bulletin as of year-end 2005. [9]

[9] See *Вестник Банка России*, Issue 2 (872), January 19, 2006.

Our third source is a publicly available registry of all insured banks maintained by the DIA.[10] From this source, we obtain information on the date of each banks' entry into the deposit-insurance system.

We are able to accurately match-merge information from these three data sources by using a unique license registration number assigned to each bank by the CBR. Each of the three data sources uses this registration number as a means of identifying individual banks. We provide a description of each variable and data source in Appendix 2.

Our sample is broadly representative of the Russian banking system, encompassing approximately 60 percent of the industry by number of banks and about 96 percent of the industry by household deposits. (It should be noted that Sberbank, by itself, accounts for 60% of the industry's household deposits and about 30% of the industry's assets.) Our sample is even more representative for the banks that operate on the household-deposits market. For example, as of the end of 2005, only 1,045 out of 1,205 Russian banks had a license for attracting household deposits. By the end of 2006, the number of banks with a household-deposit license declined to only 924, as the banks that did not enter the deposit insurance system lost their privilege to attract new deposits.

Table 2 reports descriptive statistics for our financial and non-financial variables. In Panel A of Table 2 are descriptive statistics on financial characteristics of our sample banks. Average assets rise from RUB11.156 billion in February 2004 to RUB22.643 billion in December 2006, but these values are highly skewed by Sberbank; median assets rise from RUB774 million in February 2004 to RUB1.378 billion in December 2006. Similar changes are seen in retail deposits: the average rose from RUB2.182 billion to RUB3.739 billion while the

[10] See http://www.asv.org.ru/guide/bank/.

median rose from RUB109 million to RUB219 million. Consequently, the average and median ratios of retail deposits to assets remained relatively constant at 21 - 22 percent and 18 - 19 percent, respectively. The median ratio of equity to assets dropped from 18 percent to 14 percent, primarily because of the increase in assets rather than a decline in equity. The mean (median) ratio of loans to assets increases from 41 (42) percent to 47 (49) percent during the sample period, with a relatively stable standard deviation of about 18 percent.

In Panel B of Table 2 are descriptive statistics for non-financial characteristics of our sample banks. About 30 percent of our banks have a general license while the remaining 70 percent hold restricted licenses. About 45 percent are organized as open-stock companies and 55 percent as closed-stock companies. Around 39 percent are Moscow-area banks with the remainder classified as regional banks. By ownership, 93 percent are domestic private, 3 percent are State-controlled and 4 percent are foreign-controlled. In general, the study sample is representative for the structure of the Russian banking system.

Panel B of Table 2 also reports the distribution of sample banks by the stages of DIS acceptance. About 75 percent of sample banks were accepted in the first stage, 10 percent were accepted in the second or third stages (after the initial rejection in the first stage), and the remaining 15 percent had not been accepted into the DIS by the end of its introduction.

5. Methodology

According to Allen and Santomero (1997), financial intermediation occurs when institutions take deposits and channel funds to firms, in other words, when they issue deposits and use these funds to make loans. Consequently, we focus on measures of deposit-taking and loan-issuance. We track the deposits of privately held and State-owned Russian banks during the

period before and after passage and implementation of deposit insurance in order to test the following three hypotheses:

H1: The level of deposits and ratio of deposits to assets will increase with the number of days that a bank has been entered into the DIS, which differs for each bank.

H2: The market share of deposits at State-owned banks will decrease in response to the new explicit deposit-insurance coverage at privately-owned banks.

H3: Operating risk (as measured by the ratio of loans to assets) and financial risk (as measured by the ratio of equity to assets) will increase in response to implementation of the DIS as a result of moral hazard.[11]

To test these hypotheses, we employ information on total deposits and total assets, along with information on ownership sufficient to categorize privately held and State-controlled banks. We perform univariate tests to determine whether total deposits have increased and whether the market share of State-owned banks has decreased. We also perform these tests in a multivariate framework using the following form:

$$Y_{i,t} = \beta_0 + \beta_1 \times State\text{-}Controlled_{i,t} + \beta_2 \times Days\ in\ DIS_{i,t} +$$

$$+ \beta_3 \times (State\text{-}Controlled_{i,t} \times Days\ in\ DIS_{i,t}) + \beta_j \times Control_{i,t} + \varepsilon_{i,t}$$

[11] The literature on financial institutions is replete with a wide variety of measures of bank risk, including the variability of stock returns, the levels of nonperforming loans, and the z-score, which is a measure of insolvency risk defined as the difference in the capital-to-asset ratio and return on assets divided by the standard deviation of return on assets. We choose to use the loan-to-asset ratio as our measure of operating risk because it has been widely used by regulators around the world, and because we face serious obstacles to using these alternative measures. Most Russian banks are not publicly traded, precluding the use of market measures of risk such as the volatility of stock returns. The z-score requires a long time-series of data for calculating the standard deviation of returns, which is not available for our sample of Russian banks. Finally, information on nonperforming loans for Russian banks is available but has been criticized because these data refer to the value of the delinquent payment rather than to the value of the underlying delinquent loans. Moreover, "evergreening" of nonperforming loans, where nonperforming loans are re-issued as performing loans, is alleged to be a widespread practice at Russian banks.

where:

$Y_{i,t}$ is the natural logarithm of retail deposits at bank *i*, the ratio of retail deposits to total assets at bank *i*, the ratio of equity to assets at bank *i*, or the ratio of loans to assets at bank *i*;

State-Controlled $_{i,t}$ is a zero-one indicator variable for bank *i* during period *t* that is equal to one for State-controlled banks;

Days in DIS $_{i,t}$ is the natural logarithm of the number of days that bank *i* has been accepted into the deposit insurance system as of period *t*, measured as ln (Days in DIS + 1);

Control $_{i,t}$ = a vector of *j* control variables for bank *i*, including dummy variables indicating *Foreign-Controlled Banks*, *Regional Banks*, *General-License Banks*, *Open-Joint-Stock Banks*, as well as *Bank Size* (as measured by the natural logarithm of total assets) and *Leverage* (as measured by the ratio of total equity to total assets); and a series of 34 time fixed-effects dummies for each month in our sample; and

$\varepsilon_{i,t}$ is a random-effects error term for bank *i* in period *t*.

We also interact some of the control variables with our deposit-insurance variable.

Our panel dataset enables us to account for the multiple stages of the DI implementation in Russia and for the fact that the change in the deposit-insurance regime occurred at a different time for each bank. The beta coefficients indicate the percentage changes in deposits for a one unit change in the explanatory variables. According to our hypotheses, we expect ($\beta_2 > 0$) and ($\beta_3 < 0$) for both dependent variables.

A broad set of financial and non-financial control variables allow us to identify which banks in the heterogeneous Russian banking industry benefit most from the introduction of the

deposit-insurance system. The bank-level variables include size, capital ratio, location, legal form, and license type. To distinguish between domestic and foreign-controlled daughter banks, we introduce an additional dummy variable that identifies foreign-controlled banks.

Finally, to control for expected changes in deposits unassociated with deposit-insurance implementation, we also add a set of 34 monthly dummies—one for each month in our sample period. These dummy variables allow us to account not only for the changes in the macroeconomic environment, such as increases in the household income, economy growth, and inflation, but also for the seasonality of deposits.

To test the moral hazard hypothesis (H3), we run two separate sets of regressions using the bank-equity ratio and the bank-loan ratio as dependent variables that proxy for bank financial risk and bank operating risk-taking.

We investigate how the introduction of the DIS affects banks' deposit-taking by employing random-effects estimation. The random-effects model allows us to estimate the effects of time-invariant bank characteristics—such as ownership type, license type, legal form, and location. As described in the data section, our panel is unbalanced and consists of 26,076 bank-month observations. For in-depth analysis, we also split the study sample by four DIS-introduction sub-periods defined in Appendix 1, and run separate regressions.

6. Results

6.1. Univariate comparisons

In Table 3, we document the differences in deposit levels between insured and non-insured banks across four periods of deposit-insurance introduction, which are described in Appendix 1. Within each period, we average across bank-month observations. In the pre-DIS implementation period, all banks are non-insured.

During the first stage of DIS implementation, the banks gradually enter the DI system—some banks enter the system later than others because of the time-consuming CBR examination procedures. During this period, membership is a positive signal while non-membership is not a negative signal yet.

In the following period, (stages 2 and 3 by the DI law), a bank that was initially rejected has a right to appeal and can be accepted if it addressed the CBR criticism that caused rejection in the Stage 1. At this stage, the non-membership is a negative signal, as the bank was initially rejected by the CBR. By the end of DIS introduction, each bank's quality has been completely revealed to the public by its ultimate acceptance or rejection by the CBR.

In Panel A of Table 3, we look at the level of deposits in millions of rubles. We focus our discussion on the medians rather than the means because of the disproportionate impact of Sberbank. In the pre-DIS implementation period, the median level of deposits is 120, and rises to 135 in the first stage, 161 in the second and third stages, and peaks at 204 in the post-implementation period. During the first stage of DIS implementation, we see the difference between insured and uninsured banks emerge, with the median of the former at 241 and the median of the latter at 91. In the second and third stages of DIS implementation, the median of insured banks is 212 while the median for uninsured banks is 37. Finally, after DIS implementation, the median for insured banks peaks at 267, while the median for uninsured banks falls to 4, indicating a near total withdrawal from the market for retail deposits. At each stage, the difference in medians is statistically significant at better than the 0.01 level. In general, the numbers reveal that, in each subsequent stage of the DIS implementation, the overall growth of deposit in Russia is accompanied with the gradual redistribution of retail deposits within the banking system from non-insured to insured banks.

In Panel B of Table 3, we look at the ratio of retail deposits to total assets. In the pre-DIS implementation period, the median ratio of retail deposits to total assets is 0.18. This ratio rises to 0.182 in the first period, to 0.189 in the second and third periods, and peaks at 0.191 in the post-implementation period. During the first stage of DIS implementation, we again see the difference between insured and uninsured banks emerge, with the median of the former at 0.28 and the median at the latter at only 0.14. In the second and third stages of DIS implementation, the median of insured banks is 0.23 while the median for uninsured bank falls to only 0.06. Finally, after DIS implementation, the median for insured banks is 0.22, while the median for uninsured banks falls even farther to 0.01, again indicating a near total withdrawal from the market for retail deposits. [12] At each stage, the difference in medians again is statistically significant at better than the 0.01 level.

In general, the results in Panel B of Table 3 for both the level of retail deposits and the ratio of retail deposits to total assets are broadly supportive of our hypothesis that the level of deposits and ratio of deposits to assets will increase at banks accepted into the DIS but will fall at banks rejected from the DIS.

Table 4 reports descriptive statistics for the evolution of the level of retail deposits and the ratio of retail deposits to assets in the subsample of the State-controlled banks. As described earlier (Panel B Table 2), there are 24 unique State-controlled banks in our sample. These are the banks that are majority-owned by any combination of federal or local governments. As of the end of 2005, the size of State-controlled banks in our sample ranges from RUB223 million of assets (regional bank Elita) to RUB5,316,694 (Sberbank). The median size of these banks is

[12] In 2006 and 2007, *CBR Banking System Development Reports* explain the decrease of retail deposits share in bank liabilities by the gradual development of alternative investment opportunities for the individuals, including mutual funds and "blue chip" stocks. Other potential explanations: (1) assets grew faster than retail deposits (see Table 1) and banks have to rely on other sources of financing; and (2) consumption boom in Russia.

RUB1,136 million, which is comparable to the median size of private banks' assets for the same period.

In the pre-DIS regime, the State-controlled banks enjoyed full government guarantees on their household deposits. The exclusive deposit insurance for this group of banks was granted by the provisions of the old Civil Code (article 840). During the DIS introduction, these guarantees were revoked, as the State-controlled banks had to enter the system on the common rules. Sberbank, as a special case, retained the full government deposit guarantee until the end of 2006, but only for those deposits that were opened before the DIS introduction. Sberbank entered the DIS in January 2005. Overall, 22 out of 24 State-controlled banks in our sample entered the DIS in the 1st stage, one entered the system in the 2nd stage, and one entered the system in 2008.

The descriptive statistics in Table 4 provides mixed results. On the one hand, there is no evidence of the consistent decline in the household deposits for the State-controlled banks, as measured by either the levels of deposits or the ratio of deposits to assets. On the other hand, there is a distinct downward trend in Sberbank's ratio of deposits to assets. Because this bank accounts for a very large share of the country's household deposits, the decline in Sberbank's deposit-to-asset ratio results in a gradual decline in the overall market share of state-controlled banks. This declining trend in Sberbank market share also is evident in Figure 1.

One possible explanation for the observed gradual decline of Sberbank's deposit-to-asset ratio during the sample period is changes in this bank's deposit policy in response to the DIS introduction. As described in the background section, the DIS insurance premium is flat and mandatory in Russia. Therefore, the DIS imposed new costs for a State-controlled bank, especially for a bank with a very high deposit-to-assets ratio (in the case of Sberbank, above 95th percentile) and a huge deposit portfolio. In 2005, Sberbank paid RUB7.7 billion, or 3.2% of its

total expenses, as insurance premiums. Our argument in favor of Sberbank's choice to reduce its retail deposit portfolio due to its increased costs is further supported by the fact that, during the sample period of 35 months, Sberbank increased its deposit interest rate to compete with private banks only once. This happened in February 2006 and it was the first increase since August 2003. Therefore, the reduction in Sberbank's deposit ratio following the DIS introduction may be driven not only by the changes in the depositors' reliance on the State banks, but also (and, perhaps, primarily) by the fact that the DIS eliminated an unfair competitive advantage of State banks in the retail deposit market and increased their costs of funding.

6.2. Random-effects regression analysis

In Tables 5 through 8, we present the results from our random-effects regressions analyzing the level of deposits and the ratio of retail deposits to total assets, respectively. We present the results of five regressions for each dependent variable: results for the full period, for the pre-DIS period, for the first stage of the DIS period, for the second and third stages of the DIS period and for the post-DIS period. In each regression, we measure each bank's deposit-insurance status by the (natural logarithm of) the number of days that the bank has been in the deposit-insurance system, for which we expect a positive and significant coefficient.

We include a series of control variables. We include firm size as measured by the natural logarithm of total assets. We include dummies for a regional bank (as opposed to a Moscow bank), for a general banking license (as opposed to a restricted banking license) and for an open joint-stock company (as opposed to closed joint-stock or private company). We include month dummies to control for macro-economic and seasonality effects.

We also include two interaction terms, interacting the number of days that the bank has been in the deposit insurance system with bank size and with the dummy indicating regional

banks. We expect that smaller banks and regional banks disproportionately benefited from implementation of the DIS so that the coefficient on the first interaction term should be negative and on the second term should be positive.

Finally, in Tables 7 and 8, we control for bank risk-taking behavior by including two additional explanatory variables: financing risk (measured by the ratio of total equity to total assets) and operating risk (measured by the ratio of total loans to assets).

In Table 5 are our results for the natural logarithm of retail deposits. Our primary variables of interest are the length of deposit insurance coverage and the two interactions of that variable with firm size and with the dummy for regional banks. We find that the length of deposit-insurance coverage is positive and statistically significant, strongly supportive of our primary hypothesis. The interaction with regional banks also is positive and statistically significant, indicating that this effect is more important for regional banks than for Moscow banks and for small banks (as revealed by the coefficients on the two interaction terms).

In Table 6 are our results for the ratio of retail deposits to total assets. Again, our primary variables of interest are the length of deposit-insurance coverage and the two interactions of that variable with firm size and with the dummy for regional banks. We find that the length of deposit-insurance coverage is positive and statistically significant, strongly supportive of our primary hypothesis. The interaction with regional banks also is positive and statistically significant, indicating that this effect is more important for regional banks than for Moscow banks and for small banks (as revealed by the coefficients on the two interaction terms).

To address our hypothesis on the decrease of deposits in State-controlled banks in response to the DIS introduction, we include interaction of State-controlled bank indicator variable with the logarithm of days in DIS in all multivariate tests. Overall, the results in Tables

5 and 6 provide weak support for our expectation that the DIS implementation in private banks leads to the reduction of deposits in State-controlled banks. Although the estimated coefficient is negative at some stages of DIS introduction, it is insignificant. One possible explanation for this result is that the adjustment of the State-controlled banks to a new deposit market regime in which State banks have to pay insurance premiums and to compete with private banks is a slow process. As of the end of 2006, the overall consistent decline in the share of State-controlled banks in the Russian deposit market was driven by the declines at Sberbank.

Finally, we control for bank risk-taking behavior. These results are reported in Tables 7 and 8, and are consistent with our main results in Tables 5 and 6.

6.3. Does deposit insurance create incentives for greater risk-taking?

Thus far, we have examined the "bright side" of deposit insurance; we now turn to the "dark side" of deposit insurance: moral hazard induced by incentives for greater bank risk-taking. We examine two alternative paths by which banks could increase risk—financial risk as measured by the ratio of bank equity to assets and operating risk as measured by the ratio of bank loans to assets. We examine the dark side both graphically in Figure 2 and statistically in Tables 9 and 10.

First, we graph the ratio of bank equity to assets—our inverse measure of financial risk—and the ratio of bank loans to assets—our measure of operating risk, in Panels B and C, respectively of Figure 2. We plot the median ratios for all banks and separately for banks accepted in Stage 1 of the DIS and for banks accepted in Stages 2 or 3 of the DIS.

In Panel B of Figure 2, we see that banks accepted in Stage 1 had lower-than-average capital ratios, whereas banks accepted in Stages 2 or 3 had higher-than-average capital ratios. More interesting is the time-series behavior of the Stage 2/3 banks' capital ratio, which rises, but

then falls, by the end of the period, to almost the same level as that of Stage 1 banks. This suggests that these banks boosted their capital ratios in order to improve their chances of Stage 2/3 acceptance, but then increased their financial risk after acceptance—consistent with the moral-hazard hypothesis. Stage 1 banks also increased their financial risk after acceptance, as evidenced by the decline in their ratio of equity to asset—also consistent with the moral-hazard hypothesis.

In Panel C of Figure 2, we see that banks accepted in Stage 1 had higher-than-median operating risk as measured by the loan-to-asset ratio, whereas banks accepted in Stage 2/3 had lower-than-median operating risk. Stage 2/3 banks rapidly increased their operating risk during the Stage 1 period prior to their acceptance into the DIS, which is inconsistent with the moral hazard hypothesis. After a slight increase at the beginning of the Stage 1 period, the loan-to-asset ratio of Stage 1 banks is relatively stable—also inconsistent with the moral-hazard hypothesis.

Together, Panels B and C of Figure 2 provide at least some evidence in favor of the moral-hazard hypothesis in the form of increased financial risk as evidenced by declining capital ratios, but not in the form of increased operating risk as measured by the loan-to-asset ratio. Next, we look at more rigorous econometric evidence on the moral-hazard issue.

In Table 9, we analyze the ratio of bank equity to assets using the same set of explanatory variables used to examine the deposit-to-asset ratio. Our primary variable of interest is the log of days in the DIS. If banks increased their financial risk, then we would expect a negative and significant coefficient on this explanatory variable. Moreover, we would expect that the coefficient on this variable would decrease (increase in magnitude) as we move through the stages of implementation. As shown in the first row of Table 9, this is exactly what we find. All coefficients are negative and statistically significant at better than the 0.01 level. For the full

sample, the coefficient is -0.026. When we examine the coefficients by stage of implementation, we see that the coefficients are -0.018 for Stage 1, -0.049 for Stages 2 and 3, and -0.108 for the period after implementation. In general, these results provide econometric support in favor of the moral-hazard hypothesis that banks increased their financial risk following acceptance into the DIS, consistent with the graphical evidence in Panel B of Figure 2.

In Table 10, we analyze the ratio of bank loans to assets using the same set of explanatory variables used to examine the equity-to-asset ratio and the deposit-to-asset ratio. Again, our primary variable of interest is the log of days in the DIS. If banks increased their operating risk, then we would expect a positive and significant coefficient on this explanatory variable. Moreover, we would expect that the coefficient on this variable would increase as we move through the stages of implementation. As shown in the first row of Table 10, we find limited evidence consistent with these expectations. Most of the coefficients are positive, but only one of four (that for the full sample) is statistically significant at better than the 0.05 level. For the full sample, the coefficient is 0.007. When we examine the coefficients by stage of implementation, we see that the coefficients are 0.013 for Stage 1, -0.010 for Stages 2 and 3, and 0.025 for the period after implementation. In general, these results provide only limited econometric support in favor of the moral-hazard hypothesis that banks increased their operating risk following acceptance into the DIS, consistent with the graphical evidence in Panel C of Figure 2.

6.4 Evaluation of the "costs" and "benefits" of deposit insurance

One way to evaluate the relative "costs" and "benefits" from implementation of deposit insurance is to evaluate the standardized marginal effects of our DIS variable. This essentially involves comparisons of standardized regression coefficients. To facilitate the robust comparison

of the relative impact of the DIS introduction on banks' deposit-taking versus risk-taking incentives, we transform our main dependent variables (deposit ratio to capture benefits; equity ratio and loan ratio to capture risk-taking) and the set of the explanatory variables so that each standardized variable has a mean of 0 and a standard deviation of 1; we then rerun the panel regressions. The obtained standardized coefficient estimates for the basic model specification reveal the following effects.

For the whole sample period, if we increase an average bank's length of membership in the DIS, measured as Ln (Days in DIS +1), by one standard deviation, then the loans to asset ratio will result in only 0.10 standard deviation increase, the predicted equity ratio will decrease by 0.49 standard deviations, while the deposit ratio will increase by 0.37 standard deviations. Thus, in terms of standard units, the length of the DIS membership has the strongest relative effect on the decrease of the capital ratio and somewhat weaker, but pronounced positive, effect on the deposit ratio. The effect on the loan ratio is relatively small. Overall, it appears that the magnitudes of the Ln (Days in DIS + 1) coefficients in the model specifications with standardized equity and deposit ratios as dependent variables are not very different. It suggests comparable economic importance of positive and negative effects of DIS.

Clearly, a reasonable limitation applies. What is "stronger" – a 0.49 decrease in the equity to assets ratio or a 0.37 increase in the deposit to assets ratio if we think of it in real (practical) terms? Should 0.10 standard deviation increase in the loan-to-asset ratio add to the "negativity" of DIS intro? In addition, there can be a number of other positive and negative influences on the balance of costs and benefits that we do not address in the study and, thus, do not even attempt to measure.

6.5. Robustness checks

For the robustness check, we perform the following empirical tests. First, we use an alternative measure for the DIS acceptance. We replace the log of the number of days in DIS by a zero-one indicator variable that is equal to zero for observations occurring before a bank acceptance into deposit insurance and to one for observations occurring after the acceptance. The results remain unchanged. Second, we exclude Sberbank from the analyses. This also does not affect our results. Third, we exclude banks that were liquidated during the sample period. All results are qualitatively similar to the main results in Tables 5 and 6. Finally, we account for the fact that, in the last period, after the DIS implementation, the non-insured banks lost the privilege to attract new deposits. To answer the question if there is any value of getting deposit insurance early, we run additional regression for the last sub-period for a subsample of insured banks only. The results are very similar to estimation results for Model 5 in Tables 5 and 6.

7. Conclusions

In this study, we use a natural experiment to provide new evidence on the benefits to depositors and banks from implementation of a system for insuring deposits. In 2004, Russia implemented a new system for insuring the funds of depositors. We test whether implementation of this system benefited depositors and banks in the form of increased deposit-taking and reduced reliance upon State-owned banks. We also test whether implementation of this system resulted in moral hazard in the form of increased risk-taking.

We find that banks entering the new deposit-insurance system increased both their level of retail deposits and their ratios of retail deposits to total assets relative to banks that did not enter the new deposit-insurance system. We find that these results hold up in a multivariate

panel-data analysis that controls for bank and time random effects in addition to a number of control variables. We also find that the longer a bank was entered into the deposit-insurance system, the greater was both its level of retail deposits and its ratio of retail deposits to assets. Moreover, this effect was stronger for regional banks and for smaller banks, which we expect to disproportionately benefit from the implementation of deposit insurance at the expense of their Moscow-based and larger rivals.

Our results regarding State-owned banks are less straightforward. We find that deposits and the ratio of deposits to assets declined at State-owned banks following introduction of deposit insurance. However, this result was driven entirely by declines at Sberbank, which dominates the market, and there are competitive reasons why Sberbank may have voluntarily chosen to reduce its retail deposits in response to the new deposit insurance premiums. Even so, this result suggests that implementation of the new deposit-insurance system had the effect of "leveling the playing field" between State-owned banks and privately owned banks.

Finally, we find strong evidence that implementation of deposit insurance increased moral hazard in the form of increased risk-taking. We find that financial risk, as measured by the ratio of bank equity to assets, increased significantly, i.e., the ratio equity to assets declined, following implementation. We also find limited evidence that operating risk, as measured by the ratio of bank loans to assets, increased, i.e., the ratio of loans to assets increased, following implementation. Together with our results regarding retail deposits, these results are supportive of both a dark side and a bright side of deposit insurance.

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Appendix 1

Timeline for the Introduction of a Deposit Insurance System in Russia.

	Period	Overview	Sample months
1	Pre-DI	Dec 2003: Adoption of the Russian Deposit Insurance law Jan 2004: Creation of the Russian Deposit Insurance Agency Jun 2004: The deadline for banks' applications for the DIS acceptance. *The number of applied banks is 1140.* The Central Bank of Russia starts on-site banks' examinations.	02/01/04 – 09/01/04
2	1st stage	Sep 2004: The CBR starts issuing acceptance decisions. Mar 2005: The end of the 1st stage of DIS acceptance—all applied banks receive acceptance or rejection decision. *The number of accepted banks is 824.*	10/01/04 – 03/01/05
3	2nd and 3rd stages	Apr – Sep 2005 (Stage 2): Some rejected banks exercise their right to address the CBR criticism and to file the second application for the DIS acceptance. *The number of banks which filed the second application is 265.* *The number of banks accepted in DIS in Stage 2 is 92.* Oct – Dec 2005 (Stage 3): Banks, rejected in Stage 2 can file two appeals. *The number of banks which filed appeals is 142.* *The number of banks accepted in DIS in Stage 3 is 5.*	04/01/05 – 12/01/05
4	After DI	By the end of 2005, CBR finalizes all DIS acceptance procedures in accordance with the Russian DIS Law. The DIS introduction in Russia is completed. *The total number of accepted banks is 924 or about 80% of all Russian banks.*	01/01/06 – 12/01/06

Appendix 2

Variable Definitions and Sources.

Variables	Definition	Source
1. Financial		Russian banks' monthly balance sheet data reported to CBR (Form 101)
Households' deposits	Demand deposits, term deposits, and payment cards accounts held by resident and nonresident individuals in rubles and foreign currency	Deposits are aggregated from the following bank accounts by the Russian Bank Accounting Standards: (42301; 42302; 42303; 42304; 42305; 42306; 42307; 42309; 42310; 42311; 42312; 42313; 42314; 42315; 42601; 42602; 42603; 42604; 42605; 42606; 42607; 42609; 42610; 42611; 42612; 42613; 42614; 42615)
Bank size	Natural logarithm of bank assets	Bank assets are calculated based on the CBR methodology "101-I" by subtracting from the gross book assets the balances on the following accounts: (105**, 20319, 20320, 30208, 30302, 30304, 30306, 325**, 40111, 40311, 459**, 50112, 50610, 50905, 61406, 61408, 702**, 704**, 705**)
Deposit ratio	Ratio of household deposits to bank assets	See above definitions for deposits and assets
Equity ratio	Ratio of book equity to bank assets	Book equity is calculated through the aggregation of the following accounts by the Russian Bank Accounting Standards: 102(01-06); 103(01-06); 104(01-06); -105(01,02); 106(01-04); 107(01-04); 701(01-07); -702(01-09); 703(01,02); -704(01,02); -705(01,02)
Loan ratio	Ratio of bank loans to businesses, households, and government entities to bank assets	Bank loans are calculated through the aggregation of the following Asset side accounts by the Russian Bank Accounting Standards: 441** to 458**; 460** to 473**

Appendix 2 (cont.)
Variable Definitions and Sources.

Variables	Definition	Source
2. Non-Financial		
DIS member	Dummy variable equal to one if a bank is a DIS member in a given month and equal to zero otherwise	Deposit Insurance Agency register
Days in DIS	Natural logarithm of one plus the number of days a bank is insured	Deposit Insurance Agency register
General license bank	Dummy variable equal to one if a banks holds a general license (a license without any restrictions on the legitimate banking operations) and equal to zero otherwise (a restricted license, such as operations in rubles only)	CBR Bulletin of Banking Statistics
Open joint-stock bank	Dummy variable equal to one if a banks is in legal for of the open joint-stock company (*OAO*) and equal to zero otherwise (private bank: *ZAO* or *OOO* legal form)	CBR Bulletin of Banking Statistics
Regional bank	Dummy variable equal to one if a bank is headquartered outside Moscow or Moscow region and equal to zero otherwise	CBR Bulletin of Banking Statistics
State-controlled bank	Dummy variable equal to one if government entities own more than 50% of bank voting equity and equal to zero otherwise	Equity accounts by the Russian Accounting Standards: (10201 + 10202 + 10203) for joint stock banks or (10401 + 10402 +10403) for private banks
Foreign-controlled bank	Dummy variable equal to one if foreign investors own more than 50 % of bank equity and equal to zero otherwise	Equity accounts by the Russian Accounting Standards: 10206 for joint stock banks or 10406 for private banks

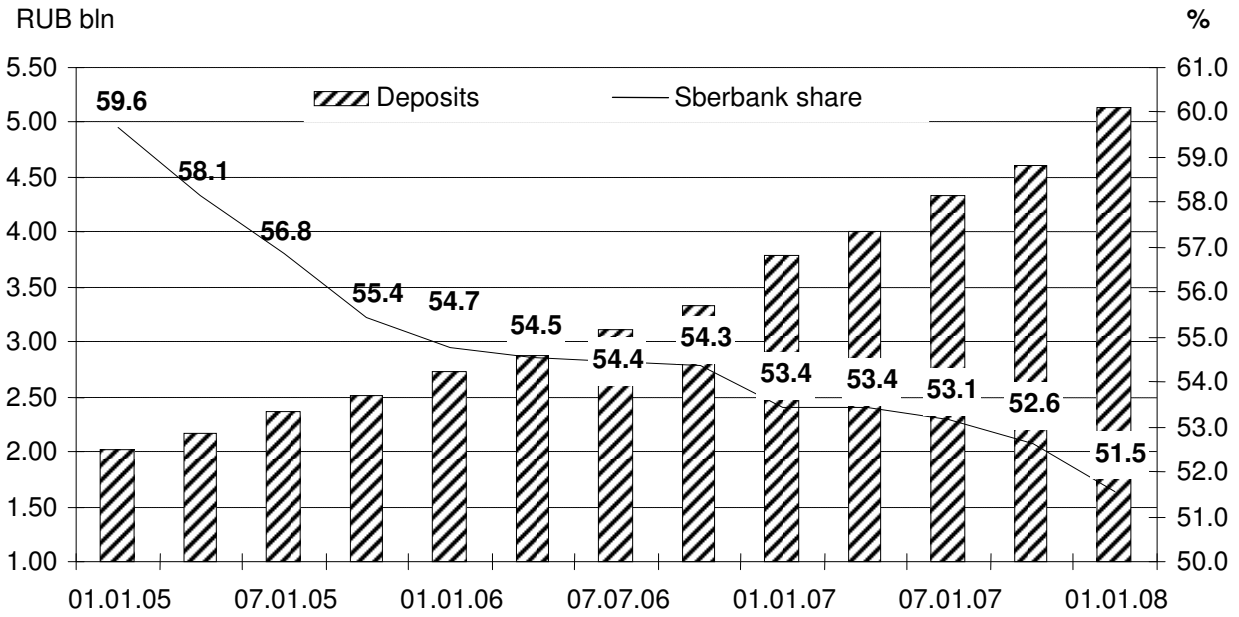

Fig.1. Deposit market growth (billion of RUB) and Sberbank deposit market share (%): 2004 – 2007.
Source: Russian Deposit Insurance Agency, 2007 annual report.

A. Deposit-to-Asset Ratios (Medians)

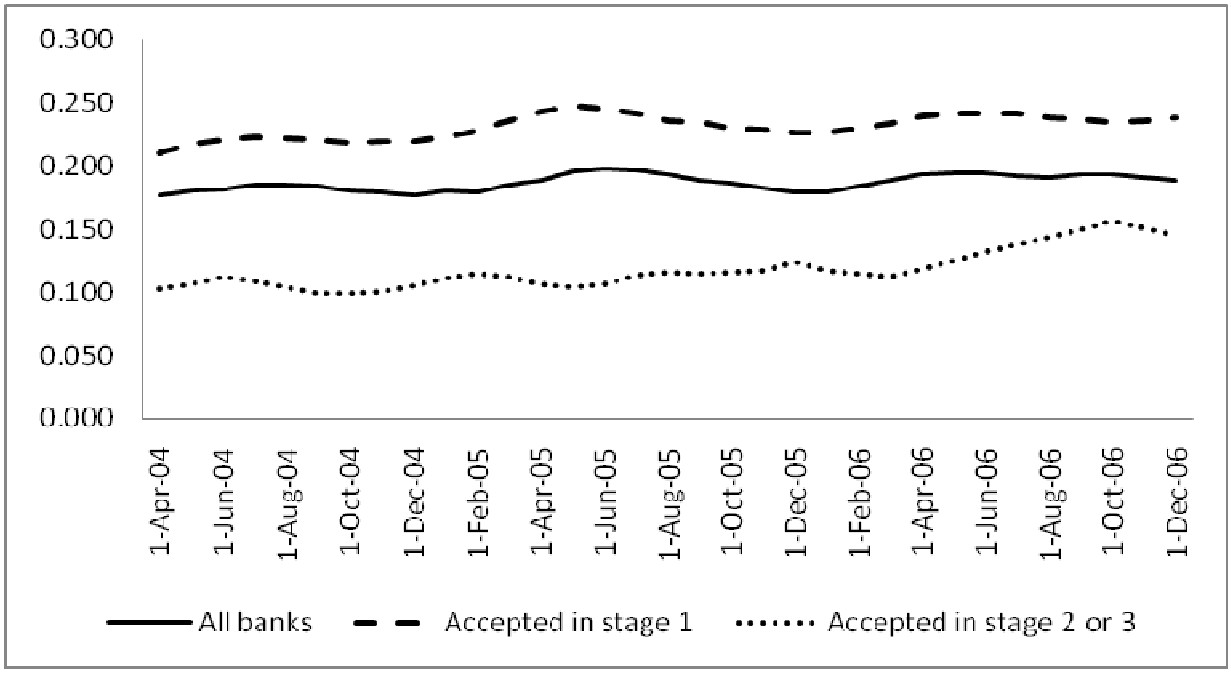

Fig. 2. Evolution of the deposit, loan, and capital ratios around the DIS introduction in Russia: 2004-2007.
The graphs show three-month moving averages for deposit to assets, equity to assets, and loans to assets median ratios for all sample banks and for two subsamples of accepted banks: banks accepted in the 1st stage (from September 2004 to March 2005) and banks accepted in later, 2nd or 3rd stages (from March to December 2005).

B. Equity-to-Assets Ratios (Medians)

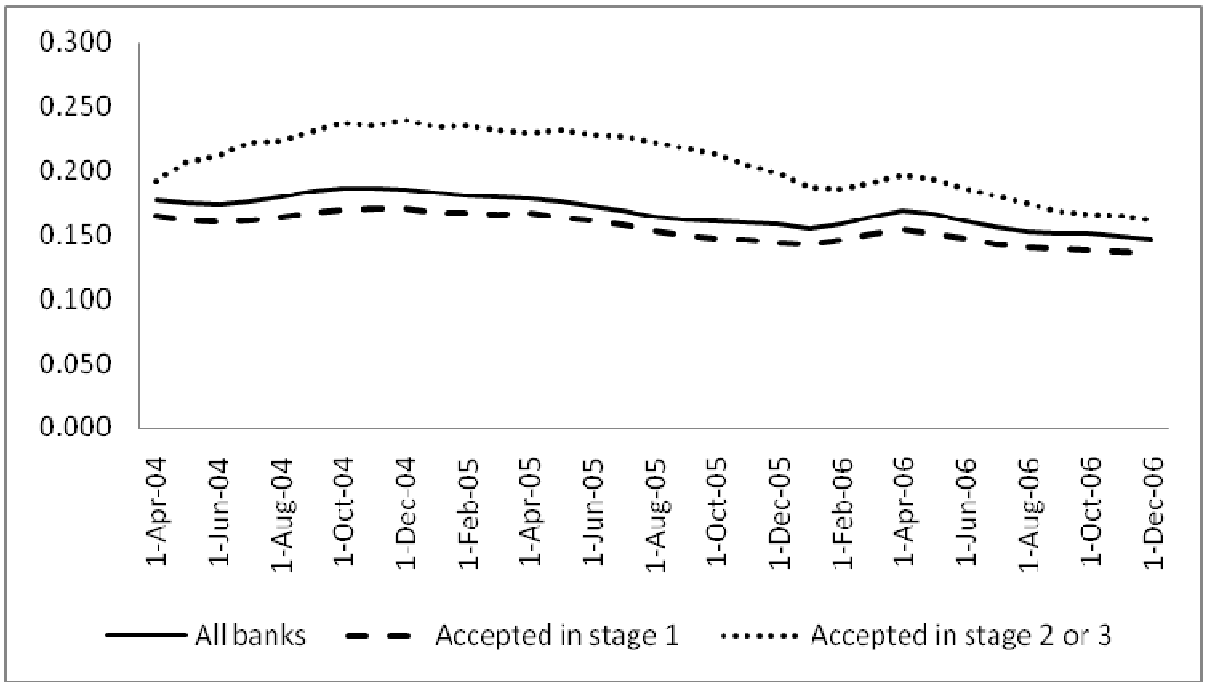

Fig. 2 (cont.) Evolution of the deposit, loan, and capital ratios around the DIS introduction in Russia: 2004-2007.
The graphs show three-month moving averages for deposit to assets, equity to assets, and loans to assets median ratios for all sample banks and for two subsamples of accepted banks: banks accepted in the 1st stage (from September 2004 to March 2005) and banks accepted in later, 2nd or 3rd stages (from March to December 2005).

C. Loan-to-Asset Ratios (Medians)

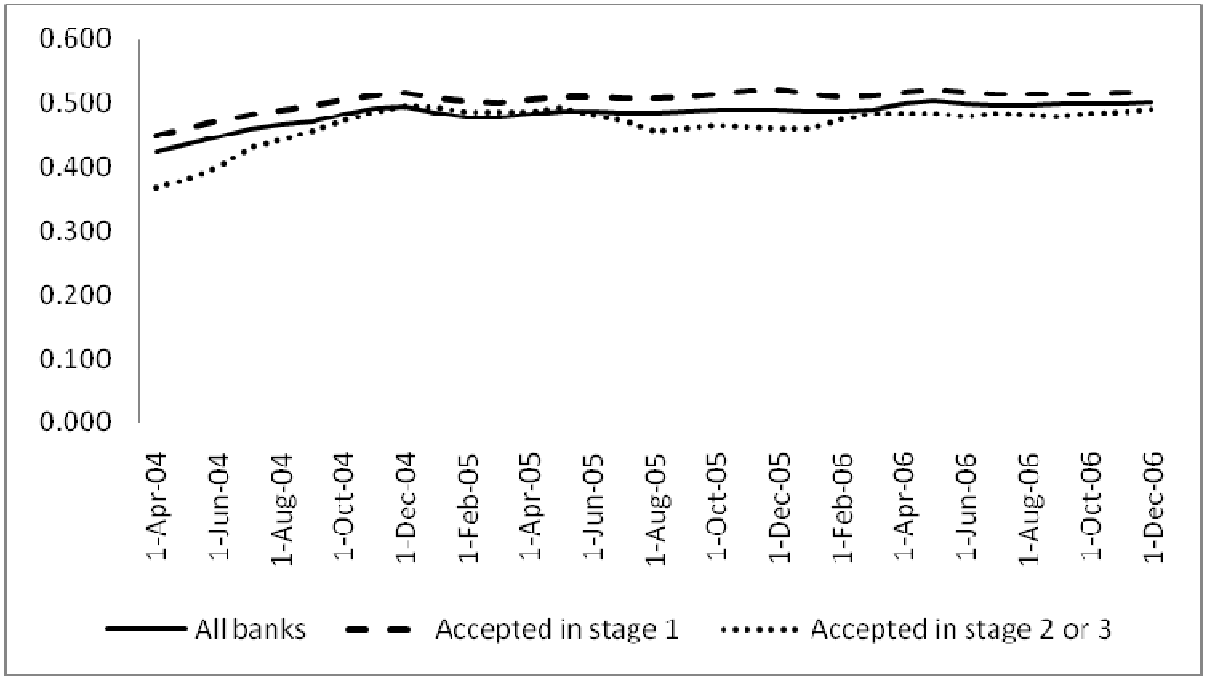

Fig. 2 (cont.) Evolution of the deposit, loan, and capital ratios around the DIS introduction in Russia: 2004-2007.
The graphs show three-month moving averages for deposit to assets, equity to assets, and loans to assets median ratios for all sample banks and for two subsamples of accepted banks: banks accepted in the 1st stage (from September 2004 to March 2005) and banks accepted in later, 2nd or 3rd stages (from March to December 2005).

Table 1
Evolution of the Russian banking system: Macro indicators, 1999 – 2007.

	1999	2000	2001	2002	2003	2004	2005	2006	2007
No. of banks	1,349	1,311	1,319	1,328	1,278	1,249	1,205	1,143	1,092
Assets	1,586	2,363	3,160	4,145	5,601	7,137	9,750	14,046	20,241
% of GDP	32.9	32.3	35.3	38.3	42.3	42.1	45.1	52.4	61.4
Capital	168	286	454	581	815	947	1,242	1,693	2,672
% of GDP	3.5	3.9	5.1	5.4	6.2	5.6	5.7	6.3	8.1
% to Assets	10.6	12.1	14.4	14.0	14.6	13.3	12.7	12.1	13.2
Loans to firms	507	847	1,324	1,796	2,685	3,888	5,454	8,031	12,288
% of GDP	10.5	11.6	14.8	16.6	20.3	22.9	25.3	29.9	37.3
% to Assets	31.9	35.9	41.9	43.3	47.9	54.5	55.9	57.2	60.7
Household deposits	297	446	678	1,030	1,518	1,977	2,755	3,794	5,137
% of GDP	6.2	6.1	7.6	9.5	11.5	11.7	12.8	14.3	15.6
% to Assets	18.7	18.9	21.5	24.8	27.1	27.7	28.3	27.0	25.4

(Amounts in Billions of Russian Rubles)
Source: "Bulletin of Banking Statistics," Central Bank of Russia, selected issues (2002 – 2008)

Table 2
Descriptive statistics on sample banks' characteristics.

Panel A. Continuous bank characteristics (January 2004 – November 2006, four periods)

	02.01.2004	01.01.2005	01.01.2006	12.01.2006
Number of sample banks	663	735	769	793
Days in DIS				
Mean	0	21	303	594
Median	0	0	346	680
Std. Dev.	0	31	144	238
Assets (RUB million)				
Mean	11,156	12,641	16,881	22,643
Median	774	852	1,125	1,378
Std. Dev.	139,057	155,986	197,984	251,843
Retail deposits (RUB million)				
Mean	2,182	2,527	3,080	3,739
Median	109	138	189	219
Std. Dev.	38,118	43,787	50,728	62,900
Retail deposit to assets ratio				
Mean	0.21	0.22	0.22	0.22
Median	0.18	0.18	0.18	0.19
Std. Dev.	0.16	0.17	0.18	0.18
Loans to assets ratio				
Mean	0.41	0.46	0.47	0.47
Median	0.42	0.48	0.48	0.49
Std. Dev.	0.18	0.19	0.19	0.18
Book equity to assets ratio				
Mean	0.22	0.22	0.20	0.19
Median	0.18	0.18	0.15	0.14
Std. Dev.	0.15	0.16	0.15	0.14

Panel B. Discrete bank characteristics

	No. of banks	% of sample banks
DIS acceptance		
Banks accepted in the 1st stage	638	75.0
Banks accepted in the 2nd or 3rd stages	85	10.0
Not accepted by the end of DIS introduction	128	15.0
License type		
General license	243	28.6
License with restrictions	608	71.4
Legal form		
Open joint stock banks	376	55.8
Closed joint stock and private banks	475	44.2
Location		
Regional banks	523	61.5
Moscow banks	328	38.5
Ownership type		
Privately-controlled banks	792	93.1
State-controlled banks	24	2.8
Foreign-controlled banks	35	4.1
Total unique sample banks	851	100.0

Table 3
Non-parametric comparison of insured and uninsured banks.

Panel A. Distribution of observations by sample periods.

DI stage	Bank-month observations					
	Banks not in DIS		Banks in DIS		All banks	
	No.	%	No.	%	No.	%
Pre-DI	5,538	100.0	0	0.0	5,538	100.0
1st stage	2,829	64.2	1,579	35.8	4,408	100.0
2-3rd stages	1,277	18.7	5,570	81.3	6,847	100.0
After DI	1,116	12.0	8,167	88.0	9,283	100.0
Total sample	10,760	41.3	15,316	58.7	26,076	100.0

Panel B. Comparison of retail deposits levels in insured and uninsured banks.

DI stage	Levels of Deposits (RUB millions)									Difference between banks not in DIS and banks in DIS, *p*-values (Medians)
	All banks			Banks not in DIS			Banks in DIS			
	Median	Mean	SE	Median	Mean	SE	Median	Mean	SE	
Pre-DI	120	2,299	539	120	2,299	539	-	-		-
1st stage	135	2,463	649	91	2,297	812	241	2,761	1,079	0.00
2-3rd stages	161	2,802	570	37	147	8	212	3,411	700	0.00
After DI	204	3,395	587	4	84	9	267	3,847	667	0.00
Total sample	160	2,849	302	80	1,813	350	245	3,576	451	0.00

Panel C. Comparison of retail deposits to assets ratio in insured and uninsured banks.

DI stage	Ratio of Retail Deposit to Assets									Difference between banks not in DIS and banks in DIS, *p*-values (Medians)
	All banks			Banks not in DIS			Banks in DIS			
	Median	Mean	SE	Median	Mean	SE	Median	Mean	SE	
Pre-DI	0.181	0.213	0.002	0.181	0.213	0.002	-	-	-	-
1st stage	0.182	0.220	0.003	0.142	0.184	0.003	0.277	0.286	0.004	0.00
2-3rd stages	0.189	0.229	0.002	0.061	0.103	0.004	0.228	0.258	0.002	0.00
After DI	0.191	0.226	0.002	0.010	0.044	0.002	0.224	0.251	0.002	0.00
Total sample	0.187	0.223	0.001	0.134	0.175	0.002	0.230	0.257	0.001	0.00

Table 4
Descriptive statistics for deposit-taking by State-controlled banks.

DI stage	All State-controlled banks (N = 24 unique banks)						Sberbank	
	Deposits (RUB millions)			Deposit to Assets Ratio			Deposits (RUB millions)	Deposit to Assets Ratio
	Median	Mean	SE	Median	Mean	SE		
Pre-DI	108	51,311	16,458	0.146	0.201	0.011	1,052,658	0.612
1st stage	137	58,995	21,637	0.161	0.207	0.013	1,165,168	0.589
2-3rd stages	201	68,462	20,292	0.194	0.227	0.012	1,296,199	0.559
After DI	253	87,242	23,296	0.216	0.230	0.011	1,563,774	0.517

Table 5

Effects of the introduction of deposit insurance on the levels of deposits in Russian banks.

	Full sample	Pre-DI	1st stage	2nd and 3rd stages	After DI
	(1)	(2)	(3)	(4)	(5)
Log (Days in DIS)	0.29***		0.08*	0.40***	0.77***
	(0.02)		(0.04)	(0.07)	(0.11)
State-controlled bank	0.09	0.07	0.16	-0.01	1.27
	(0.13)	(0.21)	(0.23)	(0.42)	(0.86)
State-contr. x Log (Days in DIS)	0.01		-0.02	0.02	-0.20
	(0.01)		(0.02)	(0.06)	(0.13)
Foreign-controlled bank	-0.13	-0.35	-0.41	-0.90***	-0.37**
	(0.08)	(0.23)	(0.25)	(0.19)	(0.12)
Regional bank	1.69***	1.11***	1.15***	0.61***	-1.33***
	(0.14)	(0.17)	(0.16)	(0.16)	(0.25)
Regional x Log (Days in DIS)	-0.01**		(0.00)	0.13***	0.22***
	(0.00)		(0.01	(0.02)	(0.04)
General license bank	0.71***	1.25***	1.27***	0.98***	0.35*
	(0.15)	(0.18)	(0.17)	(0.16)	(0.16)
Open joint stock bank	0.45***	0.68***	0.58***	0.42**	0.57***
	(0.13)	(0.16)	(0.15)	(0.14)	(0.14)
Bank size	1.13***	0.77***	0.77***	0.94***	0.53***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.05)
Bank size x Log (Days in DIS)	-0.01***		-0.00*	-0.02***	0.02**
	(0.00)		(0.00)	(0.00)	(0.01)
Intercept	-5.87***	-0.73	-0.53	-3.27***	-1.50*
	(0.23)	(0.45)	(0.44)	(0.48)	(0.64)
Time dummies (months)	Yes	Yes	Yes	Yes	Yes
Number of observations	26,076	5,538	4,408	6,847	9,283
Number of banks	851	719	756	785	827
Adjusted R-square	0.60	0.56	0.57	0.61	0.56
p-value, chi-sq test	0.00	0.00	0.00	0.00	0.00

This table presents the results from a series of random-effects regressions on an unbalanced panel of Russian banks. The dependent variable is the logarithm of deposits (in thousands of Russian rubles) and the explanatory variables are defined in Appendix 2. The sample consists of 26,076 monthly observations of Russian banks over the period 02/01/2004 – 12/1/2006. In column (2) are the results for the full sample, while, in columns (3) through (6), are results for sub-samples by deposit-insurance introduction periods (defined in Appendix 1). All regressions include a set of month dummies (max 34 for full sample). Standard errors appear in parentheses below coefficients. *, **, and *** indicate statistical significance at the 0.05, 0.01 and 0.001 levels, respectively.

Table 6

Effects of the introduction of deposit insurance on the deposit ratio of Russian banks.

	Full sample	Pre-DI	1st stage	2nd and 3rd stages	After DI
	(1)	(2)	(3)	(4)	(5)
Log (Days in DIS)	0.023***		0.006*	0.040***	0.032***
	(0.001)		(0.003)	(0.006)	(0.008)
State-controlled bank	0.009	0.001	0.006	-0.071*	-0.032
	(0.010)	(0.015)	(0.019)	(0.034)	(0.062)
State-contr. x Log (Days in DIS)	0.004***		0.000	0.013*	0.005
	(0.001)		(0.002)	(0.005)	(0.010)
Foreign-controlled bank	-0.035***	-0.012	-0.007	-0.065***	-0.011
	(0.006)	(0.016)	(0.020)	(0.015)	(0.008)
Regional bank	0.159***	0.133***	0.140***	0.142***	0.025
	(0.010)	(0.012)	(0.012)	(0.013)	(0.018)
Regional x Log (Days in DIS)	0.002***		0.004***	0.002	0.017***
	(0.000)		(0.001)	(0.001)	(0.003)
General license bank	0.004	0.062***	0.059***	0.046***	0.039**
	(0.011)	(0.013)	(0.013)	(0.013)	(0.012)
Open joint stock bank	0.017	0.041***	0.035**	0.030**	0.036***
	(0.010)	(0.011)	(0.011)	(0.011)	(0.010)
Bank size	0.013***	-0.015***	-0.013***	-0.001	-0.018***
	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)
Bank size x Log (Days in DIS)	-0.001***		-0.003***	-0.001	0.000
	(0.000)		(0.000)	(0.000)	(0.001)
Intercept	-0.093***	0.287***	0.264***	0.109**	0.256***
	(0.018)	(0.033)	(0.035)	(0.039)	(0.047)
Time dummies (months)	Yes	Yes	Yes	Yes	Yes
Number of observations	26,076	5,538	4,408	6,847	9,283
Number of banks	851	719	756	785	827
Adjusted R-square	0.28	0.15	0.18	0.23	0.27
p-value, chi-sq test	0.00	0.00	0.00	0.00	0.00

This table presents the results from a series of random-effects regressions on an unbalanced panel of Russian banks. The dependent variable is the ratio of deposits to assets and the explanatory variables are defined in Appendix 2. The sample consists of 26,076 monthly observations of Russian banks over the period 02/01/2004 – 12/1/2006. In column (2) are the results for the full sample, while, in columns (3) through (6), are results for sub-samples by deposit-insurance introduction periods (defined in Appendix 1). All regressions include a set of month dummies (max 34 for full sample). Standard errors appear in parentheses below coefficients. *, **, and *** indicate statistical significance at the 0.05, 0.01 and 0.001 levels, respectively.

Table 7

Effects of the introduction of deposit insurance on the levels of deposits in Russian banks: Controlling for risk factors.

	Full sample	Pre-DI	1st stage	2nd and 3rd stages	After DI
	(1)	(2)	(3)	(4)	(5)
Log (Days in DIS)	0.23***		0.06	0.37***	0.64***
	(0.02)		(0.04)	(0.07)	(0.11)
State-controlled bank	0.11	0.07	0.16	0.12	1.50
	(0.13)	(0.21)	(0.23)	(0.41)	(0.85)
State-control x Log (Days in DIS)	0.01		-0.01	0.01	-0.22
	(0.01)		(0.02)	(0.06)	(0.13)
Foreign-controlled bank	0.05	-0.29	-0.44	-0.65***	-0.32**
	(0.08)	(0.22)	(0.25)	(0.18)	(0.12)
Regional bank	1.21***	0.72***	1.07***	0.39*	-1.30***
	(0.13)	(0.16)	(0.15)	(0.16)	(0.25)
Regional x Log (Days in DIS)	0.00		0.00	0.12***	0.20***
	(0.00)		(0.01)	(0.02)	(0.04)
General license bank	1.05***	1.48***	1.13***	1.03***	0.39*
	(0.14)	(0.18)	(0.17)	(0.15)	(0.16)
Open joint stock bank	0.62***	0.80***	0.54***	0.47***	0.60***
	(0.13)	(0.15)	(0.14)	(0.13)	(0.14)
Bank size	0.87***	0.57***	0.81***	0.86***	0.46***
	(0.02)	(0.04)	(0.04)	(0.04)	(0.05)
Bank size x Log (Days in DIS)	-0.01***		0.00	-0.02***	0.03***
	(0.00)		(0.00)	(0.00)	(0.01)
Equity to assets ratio	-2.06***	-1.85***	-0.49**	-1.30***	-0.89***
	(0.08)	(0.16)	(0.15)	(0.14)	(0.12)
Loans to assets ratio	1.23***	0.89***	1.07***	1.44***	0.95***
	(0.05)	(0.09)	(0.09)	(0.10)	(0.08)
Intercept	-2.32***	2.14***	-1.47**	-2.40***	-0.98
	(0.28)	(0.56)	(0.54)	(0.55)	(0.71)
Time dummies (months)	Yes	Yes	Yes	Yes	Yes
Number of observations	26,076	5,538	4,408	6,847	9,283
Number of banks	851	719	756	785	827
Adjusted R-square	0.62	0.58	0.60	0.64	0.58
p-value, chi-sq test	0.00	0.00	0.00	0.00	0.00

This table presents the results from a series of random-effects regressions on an unbalanced panel of Russian banks. The dependent variable is the logarithm of deposits (in thousands of Russian rubles) and the explanatory variables are defined in Appendix 2. The sample consists of 26,076 monthly observations of Russian banks over the period 02/01/2004 – 12/1/2006. In column (2) are the results for the full sample, while, in columns (3) through (6), are results for sub-samples by deposit-insurance introduction periods (defined in Appendix 1). All regressions include a set of month dummies (max 34 for full sample). Standard errors appear in parentheses below coefficients. *, **, and *** indicate statistical significance at the 0.05, 0.01 and 0.001 levels, respectively.

Table 8

Effects of the introduction of deposit insurance on the deposit ratio of Russian banks: Controlling for risk factors.

	Full sample	Pre-DI	1st stage	2nd and 3rd stages	After DI
	(1)	(2)	(3)	(4)	(5)
Log (Days in DIS)	0.018***		0.004	0.035***	0.011
	(0.001)		(0.003)	(0.006)	(0.007)
State-controlled bank	0.012	-0.002	0.005	-0.056	-0.002
	(0.010)	(0.015)	(0.018)	(0.032)	(0.060)
State-control. x Log (Days in DIS)	0.004***		0.000	0.011*	0.002
	(0.001)		(0.002)	(0.005)	(0.009)
Foreign-controlled bank	-0.017**	-0.005	-0.008	-0.034*	-0.003
	(0.006)	(0.016)	(0.020)	(0.015)	(0.008)
Regional bank	0.120***	0.111***	0.131***	0.115***	0.013
	(0.009)	(0.012)	(0.012)	(0.012)	(0.017)
Regional x Log (Days in DIS)	0.003***		0.004***	0.002	0.016***
	(0.000)		(0.001)	(0.001)	(0.003)
General license bank	0.026**	0.070***	0.049***	0.052***	0.048***
	(0.010)	(0.013)	(0.013)	(0.012)	(0.011)
Open joint stock bank	0.029**	0.046***	0.032**	0.036***	0.043***
	(0.009)	(0.011)	(0.011)	(0.010)	(0.010)
Bank size	-0.004**	-0.024***	-0.010***	-0.011***	-0.034***
	(0.001)	(0.003)	(0.003)	(0.003)	(0.004)
Bank size x Log (Days in DIS)	-0.001***		-0.002***	0.001	0.030***
	(0.000)		(0.000)	(0.000)	(0.001)
Equity to assets ratio	-0.150***	-0.101***	-0.051***	-0.156***	-0.145***
	(0.006)	(0.012)	(0.012)	(0.011)	(0.008)
Loans to assets ratio	0.146***	0.082***	0.095***	0.159***	0.105***
	(0.004)	(0.007)	(0.008)	(0.008)	(0.006)
Intercept	0.132***	0.398***	0.208***	0.225***	0.479***
	(0.021)	(0.040)	(0.042)	(0.043)	(0.050)
Time dummies (months)	Yes	Yes	Yes	Yes	Yes
Number of observations	26,076	5,538	4,408	6,847	9,283
Number of banks	851	719	756	785	827
Adjusted R-square	0.36	0.19	0.25	0.32	0.34
p-value, chi-sq test	0.00	0.00	0.00	0.00	0.00

This table presents the results from a series of random-effects regressions on an unbalanced panel of Russian banks. The dependent variable is the ratio of deposits to assets and the explanatory variables are defined in Appendix 2. The sample consists of 26,076 monthly observations of Russian banks over the period 02/01/2004 – 12/1/2006. In column (2) are the results for the full sample, while, in columns (3) through (6), are results for sub-samples by deposit-insurance introduction periods (defined in Appendix 1). All regressions include a set of month dummies (max 34 for full sample). Standard errors appear in parentheses below coefficients. *, **, and *** indicate statistical significance at the 0.05, 0.01 and 0.001 levels, respectively.

Table 9

Effects of the introduction of deposit insurance on the capital ratio of Russian banks.

	Full sample	Pre-DI	1st stage	2nd and 3rd stages	After DI
	(1)	(2)	(3)	(4)	(5)
Log (Days in DIS)	-0.026***		-0.018***	-0.049***	-0.108***
	(0.001)		(0.004)	(0.006)	(0.009)
State-controlled bank	-0.009	0.027	0.044*	0.075*	0.148*
	(0.010)	(0.017)	(0.022)	(0.033)	(0.070)
State-control x Log (Days in DIS)	0.001		-0.001	-0.006	-0.014
	(0.001)		(0.002)	(0.005)	(0.011)
Foreign-controlled bank	0.054***	0.009	0.021	0.073***	0.054***
	(0.006)	(0.019)	(0.024)	(0.015)	(0.010)
Regional bank	-0.183***	-0.185***	-0.170***	-0.153***	-0.143***
	(0.008)	(0.012)	(0.012)	(0.012)	(0.019)
Regional x Log (Days in DIS)	0.006***		0.003*	0.006***	0.001
	(0.000)		(0.001)	(0.001)	(0.003)
General license bank	0.178***	0.173***	0.143***	0.113***	0.140***
	(0.009)	(0.013)	(0.013)	(0.011)	(0.011)
Open joint stock bank	0.079***	0.077***	0.067***	0.054***	0.069***
	(0.008)	(0.011)	(0.011)	(0.009	(0.009)
Bank size	-0.129***	-0.128***	-0.115***	-0.109***	-0.150***
	(0.001)	(0.003)	(0.003)	(0.003)	(0.004)
Bank size x Log (Days in DIS)	0.002***		0.001***	0.003***	0.008***
	(0.000)		(0.000)	(0.000)	(0.001)
Intercept	1.987***	1.986***	1.833***	1.755***	2.307***
	(0.017)	(0.035)	(0.039)	(0.038)	(0.053)
Time dummies (months)	Yes	Yes	Yes	Yes	Yes
Number of observations	26,076	5,538	4,408	6,847	9,283
Number of banks	851	719	756	785	827
Adjusted R-square	0.27	0.29	0.27	0.29	0.28
p-value, chi-sq test	0.00	0.00	0.00	0.00	0.00

This table presents the results from a series of random-effects regressions on an unbalanced panel of Russian banks. The dependent variable is the ratio of bank capital to assets and the explanatory variables are defined in Appendix 2. The sample consists of 26,076 monthly observations of Russian banks over the period 02/01/2004 – 12/1/2006. In column (2) are the results for the full sample, while, in columns (3) through (6), are results for sub-samples by deposit-insurance introduction periods (defined in Appendix 1). All regressions include a set of month dummies (max 34 for full sample). Standard errors appear in parentheses below coefficients. *, **, and *** indicate statistical significance at the 0.05, 0.01 and 0.001 levels, respectively.

Table 10

Effects of the introduction of deposit insurance on the loan-to-asset ratio of Russian banks.

	Full sample	Pre-DI	1st stage	2nd and 3rd stages	After DI
	(1)	(2)	(3)	(4)	(5)
Log (Days in DIS)	0.007**		0.013*	-0.010	0.025
	(0.002)		(0.006)	(0.009)	(0.013)
State-controlled bank	-0.036*	0.028	0.018	-0.023	-0.124
	(0.015)	(0.026)	(0.031)	(0.049)	(0.103)
State-control x Log (Days in DIS)	0.001		-0.003	0.003	0.019
	(0.001)		(0.003)	(0.008)	(0.016)
Foreign-controlled bank	-0.063***	-0.073*	-0.015	-0.108***	-0.012
	(0.010)	(0.029)	(0.033)	(0.022)	(0.015)
Regional bank	0.078***	0.076***	0.063***	0.023	-0.076**
	(0.011)	(0.014)	(0.015)	(0.017)	(0.027)
Regional x Log (Days in DIS)	0.001		0.001	0.009***	0.014**
	(0.001)		(0.002)	(0.002)	(0.004)
General license bank	0.028*	0.048**	0.072***	0.048**	0.086***
	(0.012)	(0.016)	(0.016)	(0.015)	(0.015)
Open joint stock bank	0.000	0.003	0.021	0.005	0.030*
	(0.011)	(0.013)	(0.014)	(0.013)	(0.013)
Bank size	-0.010***	-0.020***	-0.031***	-0.029***	-0.056***
	(0.002)	(0.004)	(0.004)	(0.004)	(0.006)
Bank size x Log (Days in DIS)	0.000		-0.001*	0.001	0.000
	(0.000)		(0.000)	(0.001)	(0.001)
Intercept	0.499***	0.621***	0.805***	0.793***	1.083***
	(0.025)	(0.048)	(0.052)	(0.055)	(0.078)
Time dummies (months)	Yes	Yes	Yes	Yes	Yes
Number of observations	26,076	5,538	4,408	6,847	9,283
Number of banks	851	719	756	785	827
Adjusted R-square	0.06	0.04	0.01	0.04	0.02
p-value, chi-sq test	0.00	0.00	0.00	0.00	0.00

This table presents the results from a series of random-effects regressions on an unbalanced panel of Russian banks. The dependent variable is the ratio of bank loans to assets and the explanatory variables are defined in Appendix 2. The sample consists of 26,076 monthly observations of Russian banks over the period 02/01/2004 – 12/1/2006. In column (2) are the results for the full sample, while, in columns (3) through (6), are results for sub-samples by deposit-insurance introduction periods (defined in Appendix 1). All regressions include a set of month dummies (max 34 for full sample). Standard errors appear in parentheses below coefficients. *, **, and *** indicate statistical significance at the 0.05, 0.01 and 0.001 levels, respectively.