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**MARKET DISCIPLINE, FINANCIAL
INFORMATION AND DEPOSIT INSURANCE:
THE EVIDENCE FROM RUSSIAN MARKET
FOR PERSONAL DEPOSITS.**

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S 46 Semenova M.: **Market Discipline, Financial Information and Deposit Insurance: the Evidence from Russian Market for Personal Deposits:** Working paper WP10/2008/01. — Moscow: State University — Higher School of Economics, 2008. — 44 p.

In this paper we study market discipline in the Russian market for personal deposits — the market that is traditionally tightly regulated in Russia and most of the measures are related to additional depositor protection and transparency enhancement. The largest Moscow banks' depositor survey (November, 2007) allows us adding new results to those obtained by the authors who used only the regression analysis methodology, as well as examining some characteristics of depositors' investment strategies, which were not articulated in previous papers. Namely we are able to trace the use of financial information, to reveal the degree of confidence added by banks' admittance to the deposit insurance system, to highlight the categories of the depositors who may preserve the incentives for market discipline even after the deposit insurance system introduction. Moreover we show the statistically significant factors influencing the propensity to exert market discipline, either quantity-based one or maturity shifts. However we do not ignore the regression analysis; this kind of empirical study, based on panel data (2:2004 — 4:2007), is also presented in this paper. Comparing regression analysis results with those of the survey we should conclude that regression analysis helps to make the obtained static picture clearer in many aspects.

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Семенова М.В. Рыночная дисциплина, финансовая информация и система страхования вкладов: пример российского рынка банковских вкладов физических лиц: Препринт WP10/2008/01. — М.: ГУ ВШЭ, 2008. — 44 с.

Данная работа посвящена изучению рыночной дисциплины на российском рынке банковских вкладов физических лиц — рынке, который традиционно подвержен жесткому регулированию со стороны государства, и большинство мер направлено на защиту прав вкладчиков и поддержание стабильности системы. Опрос вкладчиков крупнейших московских банков, проведенный в ноябре 2007 г., позволил получить результаты, дополняющие выводы авторов, использовавших в своих исследованиях лишь регрессионный анализ, а также выявить ряд характеристик инвестиционных стратегий вкладчиков, которые в предшествующих работах не упоминались. Были проанализированы способы использования финансовой информации о деятельности банков, определена степень дополнительного доверия к российским банкам, обусловленная их вступлением в систему страхования вкладов (ССВ), выявлены группы вкладчиков, которые и после появления ССВ сохраняют стимулы к использованию механизмов рыночного дисциплинирования. Более того, были обнаружены статистически значимые факторы, влияющие на склонность к рыночной дисциплине (количественному дисциплинированию и структурным сдвигам). В данном исследовании также используется регрессионный анализ (на основе данных за период 2:2004 — 4:2007). Сопоставление полученных результатов позволяет по многим аспектам дополнить полученную статическую картину.

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Introduction

Like any other financial service market, the market for bank deposits is exposed to information asymmetry problems: all deposits are characterized by some probability that the bank will not be able to repay due to default, but the depositors' ability to change characteristics of deposit supply in response to excessive risk-taking by banks is rather questionable, as the information available for them may be not sufficient or difficult to interpret. Regarding personal deposits held not by firms, but by individuals, this problem is of particular urgency and, therefore, of particular significance for many Russian banks. While the share of such deposits in banks' liabilities may amount to 40%, such bank clients may be particularly exposed to bank panics, which are able to plunge the whole banking system into crisis. At the same time the market for personal deposits is traditionally tightly regulated in Russia and most of the measures are related to additional depositor protection. It was on this market where the legislators introduced mandatory deposit insurance system as well as additional requirements to provide financial information availability.

Is financial information crucial in determining the depositors' investment strategies in Russia? Do depositors use this information in their banks' reliability monitoring? Do they exert market discipline The New Basel Capital Accord (Basel II) relies on? How to test for market discipline presence and to measure its intensity if we deal with the market for personal deposits? Is regression analysis the only way to do this? These are the questions our study is aimed to answer or at least to make step or two in getting to the truth.

Under market discipline we understand the set of mechanisms, through which depositors may implicitly control their banks, changing characteristics of deposit supply — changing investment strategies, in other words — in a response to changes in financial indicators of risks undertaken by banks. This phenomenon is usually studied using regression analysis methodology. The result that would suggest the existence of market discipline is the significance of the correlation between deposits or deposit growth (for quantitative mechanism), shares of deposits of various maturity in total deposits (for quantitative mechanism based on maturity structure shifts) or average deposit interest rates (for price mechanism) and a number of financial indicators of bank financial position and performance.

However this approach applied to the data from financial statements of Russian banks provides ambiguous results. Some authors conclude that there is no market discipline — neither quantitative nor price — on Russian market for deposits¹, some, on the contrary, demonstrate the existence of disciplining by quantity and by price, even on the market for personal deposits².

We studied market discipline using a completely different approach, namely, survey methodology with the use of questionnaires addressed directly to depositors. Actually, the idea was to switch from regression analysis based on data provided by banks to the analysis of what real depositors do say, answering the questions about their financial behavior and decision-making processes. This approach seems to provide a good opportunity to improve the understanding of what depositors' investment decisions are based on. However we do not ignore the regression analysis: this kind of empirical study is also presented in this paper so we are able to compare the results obtained within different analysis frameworks.

The important factor that should be particularly emphasized is deposit insurance system. This system may be the source of moral hazard: after DIS introduction even those depositors who have ability — funds, time and expertise — to monitor banks effectively may stop doing so: why to bother if even in case of bank bankruptcy the insurance fund will be the source of deposit repayment anyway (some empirical studies prove this hypothesis³, other, on the contrary, refute⁴). So for Russian market for personal deposits where this institution was introduced quite recently⁵ it seems to be very important to find out whe-

¹ For example, Hosono, Iwaki, Tsuru (2004) (based on 1995-2002 data).

² For example, Karas, Pyle, Schoors (2006) (based on 1999-2002 data), Peresetsky, Karminsky, Golovan (2007) (based on 2002-2004 data), Semenova (2007) (based on 2006-2006 data).

³ For example, Ioannidou, de Dreu, (2006) and Hosono, (2004).

⁴ For example, Davenport, McDill (2006).

⁵ In the very end of 2003 the owners of personal deposits in Russian banks obtained the state guaranty that in case of their bank's bankruptcy they have an opportunity to get the repayment of their funds (but not more than 100,000 rubles). Not earlier than in two weeks after the banks license is cancelled the depositor applying for the reimbursement should send a request to the Deposit Insurance Agency. The amount of his or her deposit (taking "the ceiling" into account) must be repaid in three days. At the same time the Agency takes the depositors place in the line of banks creditors. Both on-call and time personal deposits are insured, but there is no insurance for firm deposits or bank deposits. The participation in the system is obligatory for all banks, which have a license for retail deposits acceptance. Banks are admitted on the base of the financial stability coefficients brought in line with the requirements. Per se the set of coefficients is standard: for capital adequacy, assets quality, management quality, earnings and liquidity, but the requirements are stricter, than those for ordinal check-ups. August 2006 witnessed the raise of maximum amount of compensation up to 190,000 rubles (with a 90% coverage for amounts

ther DIS provided additional confidence to the depositors reducing the incentives to exert market discipline.

To sum up we have the following goals to reach:

1) To determine whether the deposit insurance system introduction influenced depositors' investment strategies. We are interested in finding out a) whether depositors became confident in their banks and whether this fact changed their incentives to monitor financial reliability and, if the depositors did not change their strategies, b) to determine the reasons why the strategies remained unchanged (the information about DIS is not sufficient, the maximum coverage is too low, the trust in any state guaranties is absent).

2) To find out, what the role of information about banks' financial position and performance is in depositor decision-making processes.

3) To investigate whether any mechanism of market discipline exists in Russian market for personal deposits (whether depositors interpret correctly the signals they get from their banks and other sources of information about the level of risks associated with banks, whether they associate the changes of financial indicators with some changes in the level of bank reliability). We analyze the quantitative mechanisms: disciplining by quantity and by maturity shifts. This implies determining a) the changes of financial indicators, which might result into withdrawing funds from the bank by depositors, b) the changes of financial indicators, which might make depositors switch from long-term to short-term or even to on-call deposits.

Our study allows moving closer to answers for the questions, which are very important for subsequent Russian banking sector modernization and, in particular, for reforming of personal deposit market: which disciplinary strategies are used by individual depositors and how do they use the financial information available to them? Is there any need to take some measures aimed to increase the volumes of available financial information or is it more important to improve the forms used to represent it or introduce some initial processing mechanisms, making the data less complicated to interpret? What may the results be if the maximum coverage of the deposit insurance is further increased and will this influence depositors' incentives to monitoring of their banks and market discipline?

This paper is organized as follows. We start by brief literature review to demonstrate the most frequently used ways to measure the market discipline. In the next section we discuss in detail the results of a survey covering individual depositors of Moscow banks. Then we describe the regression analysis based on

more than 100,000 rubles), the next step was the raise of "the ceiling" up to 400,000 rubles and it is expected that the coverage will continue to rise (Semenova, 2007).

the data provided by the Central bank. In final section we compare obtained results and emphasize the most important conclusions.

How to measure market discipline

Most of the early papers that study market discipline mechanisms, concentrate on the experience of the US commercial banks and S&Ls (saving and loans associations⁶) in 1980s-1990s. These studies can be divided into three groups according to the nature of mechanisms examined. The results of the first group studies support the hypothesis that uninsured depositors charge higher interest rates to riskier banks because these interest rates contain risk premia (e.g. Hannan, Hanweck, 1988; Ellis, Flannery, 1992). In a second set of studies (e.g. Jordan, 2000; Goldberg, Hudgins, 1996) the quantity-based approach is used. If bank fundamentals demonstrate greater risks, depositors tend to withdraw their fund from this bank, so it becomes more difficult for the bank to raise additional deposits. Some authors combines both approaches (e.g. Park, 1995; Park, Peristiani, 1998) and demonstrate that riskier banks offer higher deposit interest rates but they are able to accumulate smaller amount of uninsured deposits.

The case studies dedicated to the presence of market discipline in other countries become more and more numerous now. The existence of market discipline was proved for developed countries (e.g. for Switzerland (Birchler, Maechler (2001)) or Japan (Murata, Hori (2006)), as well as for some developing countries: Argentine, Chile, Mexico (Martinez Peria, Schmuckler (1999, 2001)), Bolivia (Ioannidou, de Dreu (2006)), Colombia (Barajas, Steiner (2000)), India (Ghosh, Abhiman), Turkey (Ungan, Caner), Uruguay (Goday, Gruss (2005)). Notably they show that market discipline exists even in the market for small insured deposits. “All-around-the-globe” studies (Demirgüç-Kunt, Huizinga (1999), Hosono, Iwaki, Tsuru (2004)) allow making some cross-country comparison. They prove that quantity-based approach is more appropriate for developing economies, where due to asymmetry of information and lack of transparency of financial markets the interest rates are unlikely to reflect all the information about bank risks, and for developed countries a mix approaches should be used

One more possible disciplinary mechanism may be called “maturity shifts”: depositors may switch from riskier long-term deposits to less risky short-term

⁶ For simplicity hereinafter they are called “banks”, but legally they are not.

or even on-call ones if they face additional risk-taking by bank (Murata, Hori, 2006, Semenova, 2007).

In addition to already mentioned criterion it’s worth distinguishing all the papers according to econometric models estimated. This division is important because it helps to understand why the model presented by this paper was chosen. Before the papers by Martinez Peria, Schmuckler (1999, 2001) were published the authors estimated dependent variables in two steps. The first one is the determination of the probability of bank failure. The second one is constructing the estimate of dependent variables according to this probability and some factors, which are not related to the bank fundamentals. Martinez Peria and Schmuckler reasonably noted that this approach fails to demonstrate explicitly, whether the changes of dependent variables were caused mostly by some particular bank fundamental, so they offered to use a one step model. This approach is used by most of their followers that is why our study contains econometric model, which explicitly demonstrates the relationship between dependent variable and the bank fundamentals as well as macroeconomic characteristics.

Market discipline: ask the depositors

Data characteristics: the survey

This study is based on two types of data: data obtained from a survey and panel data, constructed using bank financial statements, published by The Central Bank. We start from describing the first data set, which were obtained within the framework of research project “Financial competence of retail depositors: the influence of institutional factors on market discipline and depositors investment strategies” of the Laboratory for Institutional Analysis of Economic Reforms⁷ (State University — Higher School of Economics, Moscow).

The empirical stage was performed by the Public Opinion Foundation⁸ in November, 2007. This stage includes the survey, covering depositors⁹ of the largest banks registered¹⁰ in Moscow (Sberbank¹¹ was not included). 580 questionnaires were filled in by individual depositors of eight Moscow banks.

⁷ <http://lia.hse.ru>

⁸ www.fom.ru

⁹ Those who hold pension deposits are not included (as these function as accounts to obtain pension payments, not as deposits).

¹⁰ All these banks are in the list of 30 largest banks.

¹¹ Sberbank is the largest Russian bank, controlled by the state. Sberbank covers 53% of the personal deposit market.

To obtain the sample means we «re-weighted» the results, obtained for each of the banks. The weights are proportioned to the market share of this or that bank¹², taking into account the number of the respondents was not equal for all banks (Table 1).

Table 1. Banks, number of the respondents and weights

	Number of the respondents	Weight according to retail deposit market share	Notes
Alfa-bank	67	0,08363	Private domestic bank
Bank of Moscow	77	0,25069	Bank controlled by local authorities
<i>Bank Societe Generale Vostok</i>	67	0,01970	Owned by Banque Societe Generale (France)
<i>Bank "Vozrozhdenie"</i>	66	0,10569	Private domestic bank
<i>Bank VTB24</i>	89	0,27719	Bank owned by the bank VTB controlled by the state
<i>Investsberbank</i>	81	0,04974	Owned by OTP Group (Hungary)
<i>Rosbank</i>	67	0,14470	Private domestic bank
<i>Uniastrum-bank</i>	66	0,06866	Private domestic bank

There are 54% female and 46% male respondents, 66% of them are with higher education. The highest proportion of the depositors with higher education is among the BSGV clients (82%), the lowest — among Rosbank clients (57%). The latter are characterized by the highest proportion of the depositors with secondary education and incomplete higher education. The average last month income per family member is 10-40 thousand rubles¹³ for more than a half of the respondents (55%). The maximum proportion of the richest depositors — their income per family member exceeds 40 thousand rubles — is among depositors of BSGV (28%). While defining the financial position of their family most of the respondents chose the answer «Financial position is strong enough, but we could not afford a new car or an expensive journey» (54%). Only 17% of the depositors chose the definition «Financial position is strong, we could afford buying a new car or an expensive journey» (the maximum proportion — 43% — is among BSGV clients).

We are interested in analyzing the strategies of clients of different groups of banks, formed according to their ownership structure: we distinguish among

¹² The weights are obtained from the RBC bank rating (the rating based on the bank deposits, October, 1st, 2007).

¹³ 1 Russian ruble ≈ 24-24,5 USD.

“state banks” (banks owned mostly by state or local authorities — we have two state banks in our sample), “foreign banks” (banks owned mostly by foreign financial institutions, these are another two banks in the sample) and “private domestic banks” (all the rest banks).

Deposit diversification

We start by analyzing how the depositors distribute their investments into bank deposits. We consider total amounts of these investments, deposit maturity structure, distribution among different bank products and between different banks.

Considering the total amounts of money invested in different deposits within one bank, the diversification is the following. The overall deposits of 50% of the respondents do not exceed 100 thousand rub. i.e. will be fully compensated by Deposit Insurance Agency in case of bank’s inability to repay the funds. 28% of the depositors hold the deposits, which do not exceed 400 thousand rub. in common. Finally only 6% of bank clients have the deposits exceeding 400 thousand rub. (see Figure 1). This proportion is the highest for BSGV depositors: one out of five clients hold the deposited funds over than 400 thousand rub.

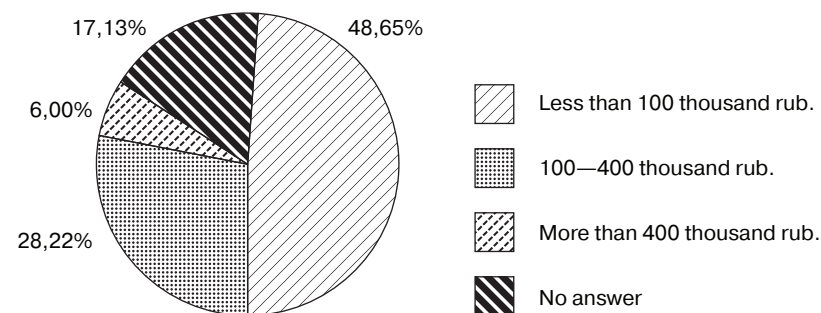


Figure 1. Total deposits in one bank

It is important to stress that there is a positive relationship between bank client’s total deposits and his or her income (Table 2). Among those holding the deposits less than 100 thousand rub., the most frequently mentioned income per family member is 10-40 thousand rub., at the same time among the largest deposit holders this income exceeds 20 thousand rub. (the share of the richest depositors with income exceeding 60 thousand rub. per family member is the highest — 27%).

Table 2. Deposits subject to depositors' income

Depositor's total deposits in this bank	Depositor's income per family member (last month)								Overall
	Less than 7 thousand rub.	7-9,9 thousand rub.	10-14,9 thousand rub.	15-19,9 thousand rub.	20-39,9 thousand rub.	40-60 thousand rub.	More than 60 thousand rub.	No answer	
Less than 100 thousand rub.	7%	7%	17%	32%	18%	3%	4%	13%	100%
100-400 thousand rub.	3%	3%	11%	23%	23%	10%	5%	27%	100%
More than 400 thousand rub.	10%	2%	0%	2%	35%	7%	27%	17%	100%
No answer	5%	1%	6%	8%	15%	7%	1%	56%	100%

There are two main characteristics of the depositors according to their choice of maturity structure of their investments. Firstly, the proportion of on-call investments is high enough: on-call deposits are held by 12% of the respondents, 41% hold wage cards, 22% hold other plastic cards. Secondly, 29% of the depositors hold the deposits with the maturity exceeding 1 year, and the deposits with the maturity from half a year to 1 year are held by 22% of the respondents. Thus there is a significant proportion of the depositors, who explicitly prefer long-term investments, and this is very important finding in the situation when banks become more and more interested in “long money”. Maximum proportion of the long-term deposits with the maturity exceeding 1 year is among clients of state banks (VTB24 clients (45%) and Bank of Moscow depositors (38%)), minimal proportion is among foreign banks' clients (BSGV clients (3%)).

Table 3. Bank products chosen by depositors of different banks

	State banks	Foreign banks	Private domestic banks
On-call deposit	14,75%	16,16%	7,23%
Other plastic card	19,33%	17,40%	25,52%
Wage debit card	28,09%	48,47%	58,33%
Deposit with maturity less than half a year	1,20%	6,32%	3,52%
Deposit with maturity from half a year to 1 year	23,59%	12,83%	20,27%
Deposit with maturity over than 1 year	41,75%	9,11%	15,84%

Noteworthy the wage card holders open time deposits (16,6% wage card holders have the deposits with the maturity from half a year to 1 year, and 23,3% — with the maturity over than 1 year), as well as on-call deposits and other plastic cards, which are not wage ones (11% and 6% wage card holders respectively) in their bank. This tendency is especially explicit for state bank clients and much less pronounced for depositors of foreign banks (see Table 4).

Table 4. Investment structure of wage cards holders

Deposit type	Share of wage cards holders holding other bank products			
	All banks	State banks	Foreign banks	Private domestic banks
On-call deposit	11,16%	17,15%	8,36%	1,91%
Other plastic card	5,86%	5,44%	0,59%	7,61%
Deposit with maturity less than half a year	0,35%	0,00%	0,00%	0,98%
Deposit with maturity from half a year to 1 year	16,62%	17,15%	8,95%	17,29%
Deposit with maturity over than 1 year	23,34%	34,80%	0,00%	9,19%

The existence of such a tendency — opening more than one deposit in one bank — is confirmed by the data presented in Table 4a: one out of three holders of long-term deposit has a wage card opened in the same bank.

The employer seems to be an implicit supplier of the depositors for the bank and this is especially true for employers who chose wage projects of private domestic banks: a half of the long-term deposit holders hold wage cards of the same bank.

So the depositors tend to diversify their deposits choosing products with different maturities (and different interest rate) within one bank.

Considering cross-bank diversification 50% of the respondents have no deposits in other banks. 64% of the depositors who hold the deposits in other banks — in other words, 32% of the respondents — are the clients of Sberbank, 19% — 9,5% correspondingly — have deposits in other private domestic banks. Therefore, investing money into deposits of some other bank the depositors explicitly prefer Sberbank to diversify their deposits.

Table 4a. Investment structure of the depositors holding deposits with over than half a year maturity

Deposit type	All banks		State banks		Foreign banks		Private domestic banks	
	Share of the depositors holding deposit with maturity from half a year to 1 year	Share of the depositors holding deposit with maturity over than 1 year	Share of the depositors holding deposit with maturity from half a year to 1 year	Share of the depositors holding deposit with maturity over than 1 year	Share of the depositors holding deposit with maturity from half a year to 1 year	Share of the depositors holding deposit with maturity over than 1 year	Share of the depositors holding deposit with maturity from half a year to 1 year	Share of the depositors holding deposit with maturity over than 1 year
On-call deposit	6,88%	7,46%	7,33%	11,37%	8,37%	0,00%	5,86%	2,54%
Other plastic card	12,09%	13,71%	7,33%	12,57%	12,34%	12,34%	19,85%	15,84%
Wage debit card	30,47%	30,61%	25,47%	19,40%	0,00%	12,34%	44,75%	52,64%
Deposit with maturity less than half a year	0,59%	0,00%	0,00%	0,00%	8,37%	0,00%	0,00%	0,00%

Deposit insurance system: the depositors' point of view

Before we move directly to the role of financial information in monitoring activities we should emphasize the role of deposit insurance system in forming and supporting the depositors' confidence in banking system and, consequently, reducing the incentives to exert monitoring and market discipline.

The appearance of deposit insurance system added confidence in safety of the deposits for most of bank clients; this is the opinion of 59% of the depositors (45% of the depositors believe that they obtained a 100%-guaranty that all their fund will be repaid, 13,6% — confirm that their total deposits exceed the maximum coverage but the substantial proportion of the deposits will be repaid anyway).

Noteworthy the share of the depositors who do not believe in the guaranties provided by the deposit insurance system is quite high: 24% of the respondents associate themselves with this group. This share increases as the total amount of deposits in this bank grow and is maximum for those depositors who could not say what amount of money exactly is invested into the deposits of this bank (that is not so obvious, however, for depositors of foreign and private domestic banks) (Table 5).

Table 5. Depositors' attitude to DIS subject to the amount of deposits in this bank

Q: "Did DIS introduction provide any additional confidence in reliability of your investments?" / Depositor's total deposits in this bank	"Maximum insurance coverage exceeds the amount of my deposits so I am fully insured"		"Maximum insurance coverage is lower than the amount of my deposits, but the fact that I am partly insured adds some confidence"		"Compared to the amount of my deposits maximum insurance coverage is too low to create any confidence"		"I do not believe in such state guaranties"	
	All banks	State banks	Foreign banks	Private domestic banks	All banks	State banks	Foreign banks	Private domestic banks
Less than 100 thousand rub.	63,59%	76,98%	47,45%	44,85%	6,45%	4,23%	1,36%	22,40%
100-400 thousand rub.	45,62%	48,12%	34,21%	43,79%	5,10%	2,19%	0,00%	25,13%
More than 400 thousand rub.	5,30%	0,00%	2,05%	10,82%	20,28%	5,61%	45,88%	31,38%
Less than 100 thousand rub.	2,76%	76,98%	47,45%	44,85%	4,23%	4,23%	1,36%	16,76%
100-400 thousand rub.	23,19%	48,12%	34,21%	43,79%	2,19%	2,19%	0,00%	32,24%
More than 400 thousand rub.	42,67%	0,00%	2,05%	10,82%	20,28%	5,61%	45,88%	33,66%
Less than 100 thousand rub.	7,30%	76,98%	47,45%	44,85%	11,12%	4,23%	1,36%	16,76%
100-400 thousand rub.	32,33%	48,12%	34,21%	43,79%	10,89%	2,19%	0,00%	32,24%
More than 400 thousand rub.	54,10%	0,00%	2,05%	10,82%	24,62%	5,61%	45,88%	33,66%

However, according to obtained answers some depositors are not quite well aware of details of deposit insurance compensation mechanisms (Table 5). Actually 6,5% of the depositors holding the deposits, which do not exceed 100 thousand rub., are sure that the compensation is not enough for them, another 3% think that they will be provided only by some part of these 100 thousand rub. (in reality these deposits will be fully compensated in case of bank's inability to repay the deposits). These proportions are the highest for clients of private domestic banks. 45,6% of the holders of the deposits from 100 to 400 thousand rub. and 5% of the largest deposit holders, on the contrary, declare that their funds will be fully compensated by the Deposit Insurance Agency (however only 90% the funds exceeding 100 thousand rub. will be repaid, but not more than 400 thousand rub.). Taken together these "mistaken" depositors are the least numerous among the clients of the foreign banks. That may be not surprising if we take into account that they have the largest deposits in their banks and are the most "highly-educated" — they have enough incentives to study carefully the terms of deposit insurance and/or enough education to understand all the details.

The last — but not the least — finding that should be highlighted here is the fact that for 6,5% of holders of the deposits from 100 to 400 thousand rub., as well as for 20% of the largest deposit holders, "the ceiling" of the compensation is too low to generate additional confidence in bank deposits. This group of the depositors accompanied by those who do not believe in DIS guaranties are those agents who may be reasonably expected to keep the incentives to use market discipline mechanisms. Notably this proportion is the highest among those who keep their money in foreign banks (46% of them claim the compensation is not enough), for state bank depositors it is the lowest.

Bank reliability monitoring

38% of the depositors claim they monitor the information that may indicate the reliability of the bank and do so on the regular basis. This propensity to monitor increases as the total amount of depositor's invested funds rise: among those who hold the deposits less than 100 thousand rub. the proportion of the depositors regularly monitoring their banks is 29%, for the holders of deposits from 100 to 400 thousand rub. this proportion is 44%, and 73% of the largest deposit holders regularly monitor their banks (Table 6). This is the most explicit for foreign bank depositor: more than 90% of large depositors regularly monitor the reliability of their banks. On the contrary the subjects of bank monitoring among large depositors of the state banks are two times less frequent.

Table 6. Bank reliability monitoring subject the amount of deposits in this bank

Q: "Do you regularly monitor any information that could prove the reliability of your bank?" / Depositor's total deposits in this bank	All banks		State banks		Foreign banks		Private banks	
	Yes	No	Yes	No	Yes	No	Yes	No
Less than 100 thousand rub.	28,74%	67,94%	26,45%	70,35%	21,67%	76,21%	33,92%	62,34%
100—400 thousand rub.	44,33%	47,22%	45,93%	41,42%	43,41%	56,59%	41,91%	54,85%
More than 400 thousand rub.	73,41%	22,25%	44,88%	5,61%	91,78%	8,22%	63,68%	36,32%

Lack of confidence in state-provided guaranties as well as low level of maximum coverage may be the reasons for monitoring incentives appearance. The share of the depositors looking at the information about their bank grows as the proportion of fully covered deposits decreases (Table 7). Noteworthy the depositors for whom the compensation is not enough to add some confidence in their bank's reliability, use the information that may contain the indicators of the changes in their bank's reliability more frequently than those who do not believe in the DIS guaranties at all — that is true for foreign and private domestic banks.

Table 7. Propensity to monitor subject to the degree of confidence added by DIS

		Q: "Did DIS introduction provide any additional confidence in reliability of your investments?"			
Q: "Do you regularly monitor any information that could prove the reliability of your bank?"		"Maximum insurance coverage exceeds the amount of my deposits so I am fully insured"	"Maximum insurance coverage is lower than the amount of my deposits, but the fact that I am partly insured adds some confidence"	"Compared to the amount of my deposits maximum insurance coverage is too low to create any confidence"	"I do not believe in such state guaranties"
All banks	Yes	34,08%	46,64%	59,71%	43,09%
	No	60,87%	34,43%	40,29%	53,00%
State banks	Yes	32,50%	39,18%	50,00%	54,34%
	No	61,88%	28,05%	50%	38,71%
Foreign banks	Yes	22,58%	81,17%	62,55%	23,77%
	No	77,42%	18,83%	37,45%	75,11%
Private domestic banks	Yes	38,97%	52,00%	72,82%	36,14%
	No	55,91%	48,00%	27,18%	61,73%

That is important to emphasize, which information sources are used by those, who monitor the reliability of the banks. At least once in six months the depositors look through bank ratings (17,5%) and other analytics (8%), presented in different mass media; they also ask their relatives and friends, who they think are competent in this issue, for advice (11%). Noteworthy financial information is examined regularly by 13,5% of the depositors (11% use the Central Bank web-site for this). Maximum proportion of these depositors is among Alfa-bank and VTB24 clients, minimal — among Bank of Moscow depositors.

Noteworthy, 30% of the depositors have never tried to get the financial statements of their bank, another 23% know this information is available but they do not need it.

On the other hand 18% of bank clients are aware that financial statements are available and use them while monitoring their bank's reliability (15% of the respondents have done this several times, 3% — use it on a regular basis). However 21% are sure that this information is closed for them and they are not authorized to have a look at a balance sheet or a profit-and-loss account (this is not true according to Russian banking legislation). Maximum share of these depositors is among Bank of Moscow clients that may explain the lowest proportion of those who regularly look through financial statements of the bank.

Thus the information contained in banks' financial statements may at least potentially interest 39% of the depositors but more than a half of them are sure they do not have the right to use it.

Noteworthy the share of the depositors, who are sure that bank's financial statements are unavailable, decreases as the proportion of fully insured deposits in total deposits and total amount of deposits fall (that is obvious for state bank clients and, less articulated, for private domestic banks), at the same time the share of those, who used this information a couple of times goes up dramatically (Table 8). It seems to be quite probable that those who declare they do not have the right to look through the financial statements simply have not tried to get them.

At last the important finding is that the share of those, who regularly use the financial statements are among those who do not believe in guaranties provided by deposit insurance system (9,2%).

Table 8. The use of financial statements subject to the degree of confidence added by DIS

		Q: "Did DIS introduction provide any additional confidence in reliability of your investments?"			
Q: "Are your bank's financial statements available for you? If yes, how often do you look at data presented there?"		"Maximum insurance coverage exceeds the amount of my deposits so I am fully insured"	"Maximum insurance coverage is lower than the amount of my deposits, but the fact that I am partly insured adds some confidence"	"Compared to the amount of my deposits maximum insurance coverage is too low to create any confidence"	"I do not believe in such state guaranties"
All banks	No, this information is not public	23,35%	17,00%	7,78%	19,89%
	Available, but I am not interested in this information	25,57%	29,91%	27,64%	17,43%
	Available and I used this information a couple of times	10,80%	19,61%	45,16%	15,23%
	Available and I use this information on a regular basis	2,96%	3,64%	0,00%	9,17%
	I have never tried to get this information so I do not know	28,54%	9,25%	14,49%	30,15%
State banks	No, this information is closed	26,52%	14,03%	0,00%	16,13%
	Available, but I am not interested in this information	26,37%	25,15%	25,00%	12,90%
	Available and I used this information a couple of times	8,44%	25,15%	50,00%	22,58%
	Available and I use this information on a regular basis	0,00%	0,00%	0,00%	9,68%
	I have never tried to get this information so I do not know	31,29%	7,01%	25,00%	25,81%

Table 8

		Q: "Did DIS introduction provide any additional confidence in reliability of your investments?"			
Q: "Are your bank's financial statements available for you? If yes, how often do you look at data presented there?"		"Maximum insurance coverage exceeds the amount of my deposits so I am fully insured"	"Maximum insurance coverage is lower than the amount of my deposits, but the fact that I am partly insured adds some confidence"	"Compared to the amount of my deposits maximum insurance coverage is too low to create any confidence"	"I do not believe in such state guaranties"
Foreign banks	No, this information is closed	2,15%	12,94%	25,11%	4,26%
	Available, but I am not interested in this information	33,35%	31,77%	0,00%	27,35%
	Available and I used this information a couple of times	19,36%	25,88%	62,55%	15,25%
	Available and I use this information on a regular basis	2,15%	9,42%	0,00%	1,12%
	I have never tried to get this information so I do not know	40,84%	19,99%	12,34%	48,88%
Private domestic banks	No, this information is closed	22,39%	22,70%	13,59%	26,48%
	Available, but I am not interested in this information	22,69%	37,34%	40,07%	19,61%
	Available and I used this information a couple of times	12,95%	9,26%	32,75%	8,46%
	Available and I use this information on a regular basis	7,98%	8,47%	0,00%	10,31%
	I have never tried to get this information so I do not know	21,57%	10,79%	0,00%	30,41%

Financial competence and market discipline

Now we turn to the analysis of "potential market discipline". This term we use for emphasizing that the survey does not allow revealing depositors' real actions, we may just find out what are their intentions, how would they react to these or those information signals. To be closer to the CAME(L)¹⁴ rating model we chose for each "letter" one or two of the simplest (as we deal with the most unsophisticated category of depositors) bank fundamental to ask the respondents about: bank capital for capital adequacy (C), consumer loans and risky assets for asset quality (A), labor costs for management quality (M) and profits for earnings (E). We included both variants of changes in bank fundamentals (positive and negative) to give the depositor the opportunity to demonstrate financial competence. We analyze only quantity-based mechanism of market discipline and the maturity shifts. So the respondents were offered to answer the following questions (the set of answers is the same for both of them):

Q: "What information could make you withdraw you money from this bank?"

Q: "What information could make you switch from long-term to short-term or even on-call deposits in this bank?"

- 1 bank assets decreased
- 2 bank assets increased
- 3 bank capital decreased
- 4 bank capital increased
- 5 bank decided to grant less consumer loans
- 6 bank decided to grant more consumer loans
- 7 overdue loans of bank clients decreased
- 8 overdue loans of bank clients increased
- 9 bank profit decreased
- 10 bank profit increased
- 11 bank decided to spend less on employees
- 12 bank decided to spend more on employees
- 13 bank decided to invest into less risky projects
- 14 bank decided to invest into riskier projects
- 15 nothing from mentioned above

¹⁴ Liquidity was excluded as a difficult notion for an average individual depositor.

The depositors demonstrate strong sensitivity to changes of some indicators of financial position and performance of their bank, independently of the source this information about these changes was obtained from. The quantity-based disciplinary mechanism (the prospective of withdrawing funds) is characterized by the following:

If the assets of the bank decrease, 34,5% of the depositors will prefer to withdraw their funds

32% of bank clients will close the deposits, if they become aware of bank profits decrease.

- If bank invests in riskier projects, 30% will withdraw their funds,
- If bank equity is reduced, 29% of the respondents are ready to withdraw their money,
- The growth of written-off loans will result in withdrawal of 15,5% depositors' funds,
- Expansion or contraction of the activities on the consumer loans market is not estimated by depositors unambiguously (4,3% of them will close their deposits in the former case, 6% — in the latter one).
- The changes in overheads also generate an ambiguous signal (8% of the depositors will withdraw their money in both cases.
- Only 14,5% of the respondents will not withdraw their funds in response to change of financial indicators.

The intensity of market discipline differs among depositors of different banks (Table 9). The effects mentioned above, are the largest for state and private domestic banks. Noteworthy the depositors of the latter demonstrate articulated reaction to the scope of consumer lending: 9% of the depositors will withdraw their money if their bank grants less consumer loans. At the same time the share of those who would not withdraw their funds in the offered situations is the highest for clients of foreign banks.

Table 9. Potential market discipline (quantity)

Q: "What information could make you withdraw you money from this bank?"	State banks	Foreign banks	Private domestic banks
bank assets decreased	38,77%	18,35%	29,71%
bank assets increased	0,57%	1,30%	0,57%
bank capital decreased	30,67%	16,10%	27,84%
bank capital increased	0,00%	0,93%	0,57%
bank grants less consumer loans	4,86%	4,82%	8,85%
bank grants more consumer loans	5,61%	4,26%	2,95%
overdue loans of bank clients decreased	1,77%	0,00%	1,81%

Table 9

Q: "What information could make you withdraw you money from this bank?"	State banks	Foreign banks	Private domestic banks
overdue loans of bank clients increased	19,36%	14,82%	9,48%
bank profit decreased	41,47%	11,33%	21,64%
bank profit increased	1,83%	0,00%	0,51%
bank spends less on employees	6,81%	5,00%	9,66%
bank spends more on employees	9,48%	1,30%	6,51%
bank invests into less risky projects	2,40%	2,79%	1,41%
bank invests into riskier projects	28,87%	28,35%	31,57%
nothing from mentioned above	10,48%	22,86%	19,01%

Among other reasons which may explain the withdrawal of funds depositors mentioned the most frequently:

- A drop in deposit interest rate (16%).
- The information about any financial problems of the bank and a decrease in its reliability: about bank bankruptcy and license cancellation (11,5%), lower rating of the bank, aggravating of its financial position (8,5%).
- Doubts in bank reliability (10%).

Only for 3,5% of the depositors there are no reasons, which could cause the withdrawal of the funds earlier that the deposits mature.

Market discipline by maturity shifts — the change of deposit maturity structure — is less articulated but still exists on the market of individual deposits:

- 23% of the respondents will shift from long-term to short-term deposits if their bank invests in riskier projects.
- If there is a drop in bank assets, 22% of the depositors will prefer short-term investments.
- 18% of the depositors will switch to short-term deposits if there is a decrease in bank profits.
- If bank equity becomes lower, 15,6% of the respondents will change the maturity structure of their deposits.
- Finally 21% of the depositors will not switch to short-term maturity structure in any case.

Again the depositors of foreign banks are the least sensitive to the information about the changes of bank fundamental (Table 10). The depositors of state banks demonstrate high sensitivity to the changes in overdue loans of bank clients: 16% of them will exert a maturity shift, if this bank fundamental increase.

Table 10. Potential market discipline (maturity shifts)

Q: "What information could make you switch from long-term to short-term or even on-call deposits in this bank?"	State banks	Foreign banks	Private domestic banks
bank assets decreased	29,44%	8,72%	13,85%
bank assets increased	2,40%	0,93%	0,65%
bank capital decreased	21,61%	6,68%	9,22%
bank capital increased	0,00%	0,93%	1,99%
bank grants less consumer loans	2,34%	3,16%	9,19%
bank grants more consumer loans	2,46%	0,37%	2,42%
overdue loans of bank clients decreased	1,26%	0,00%	0,00%
overdue loans of bank clients increased	16,26%	2,96%	3,52%
bank profit decreased	23,89%	4,09%	13,36%
bank profit increased	0,63%	0,00%	0,54%
bank spends less on employees	0,00%	2,79%	7,30%
bank spends more on employees	5,43%	0,00%	3,97%
bank invests into less risky projects	1,83%	0,93%	0,79%
bank invests into riskier projects	28,81%	15,00%	16,94%
nothing from mentioned above	7,83%	32,86%	36,25%

Potential market discipline: regression analysis

What are the determinants of the potential market discipline? What determines whether the depositor will use this or that mechanism in response to information signals obtained from any source? To answer these questions we estimate Probit regressions, characterized by following:

Dependant Variables	Notes
reduction of assets	1 – if the depositor marked this information signal, 0 – otherwise
reduction of profit	1 – if the depositor marked this information signal, 0 – otherwise
riskier investments	1 – if the depositor marked this information signal, 0 – otherwise
reduction of capital	1 – if the depositor marked this information signal, 0 – otherwise
increase in overdue loans	1 – if the depositor marked this information signal, 0 – otherwise (was not estimated for maturity shifts)
no withdrawals	1 – if the depositor marked this information signal, 0 – otherwise

Independent Variables	Notes
sex	1 – if the depositor is male, 0 – otherwise
age	1- depositor is 18-24 years old 2- depositor is 25-34 years old 3- depositor is 35-44 years old 4- depositor is 45-59 years old 5- depositor is older than 60
education	1- elementary 2- secondary 3- specialized secondary 4- uncompleted higher 5- higher
income	Depositor's income per family member (last month): 1- less than 1 thousand rub. 2- 1-1,9 thousand rub. 3- 2-2,9 thousand rub. 4- 3-3,9 thousand rub. 5- 4-4,9 thousand rub. 6- 5-6,9 thousand rub. 7- 7-9,9 thousand rub. 8- 10-14,9 thousand rub. 9- 15-19,9 thousand rub. 10- 20-39,9 thousand rub. 11- 40-60 thousand rub. 12- more than 60 thousand rub.
total deposits	Total deposits of the depositor in this bank 1- less than 100 thousand rub. 2- 100-400 thousand rub. 3- more than 400 thousand rub.
on-call deposit	1 – if the depositor holds this type of deposits, 0 – otherwise
other plastic card	1 – if the depositor holds this type of deposits, 0 – otherwise
wage debit card	1 – if the depositor holds this type of deposits, 0 – otherwise
deposit with maturity less than half a year	1 – if the depositor holds this type of deposits, 0 – otherwise
deposit with maturity from half a year to 1 year	1 – if the depositor holds this type of deposits, 0 – otherwise
deposit with maturity over than 1 year	1 – if the depositor holds this type of deposits, 0 – otherwise
state bank	1 – if the bank is a state one, 0 – otherwise
foreign bank	1 – if the bank is a foreign one, 0 – otherwise
no deposit diversification	1 – if the depositor does not have deposits in other banks, 0 – otherwise
deposit insurance	The degree of the confidence added by deposit insurance system 1- fully insured 2- partly insured, but that is enough to increase the confidence 3- no additional confidence
absence of confidence	1 – if the depositor does not believe in state guaranties, 0 – otherwise
use of financial information	Frequency of the use of financial information to monitor the bank reliability 1- does not use 2- used a couple of times 3- use on the regular basis

We estimated the regressions separately for quantity-based mechanism of market discipline and for maturity shifts. Tables 11-12 demonstrate the obtained results.

Table 11. Market discipline subject to depositor, deposit and bank characteristics (marginal effects, 278¹⁵ obs.)

Variable	Reduction of assets	Reduction of profit	Riskier investments	Reduction of capital	Increase in overdue loans	No withdrawals
sex	0,1059***	0,1188***		0,1401**		0,0250
age	0,0152	0,0283		0,0246		0,0139
education	0,0990*	-0,0245		-0,0193		-0,0184
income	0,0371***	0,0123		0,0527**		-0,0256**
total deposits	0,0045	-0,1622*		-0,0696		-0,0011
on-call deposit	-0,1670***	-0,2243*		-0,0214		0,0962
other plastic card	-0,0748	-0,0491		0,0479		0,0209
wage debit card	-0,1403***	-0,2254*		0,0503		0,1722*
deposit with maturity less than half a year	-0,1406	-0,0727		0,1153		0,4756**
deposit with maturity from half a year to 1 year	0,0892	-0,0607943		0,2186**		0,1314***
deposit with maturity over than 1 year	0,1022	-0,0104		0,2020**		0,0531
state bank	0,0421	0,2318*		-0,0028		-0,0071
foreign bank	-0,0919	-0,1653**		-0,0121		0,0339
no deposit diversification	-0,0090	-0,1267**		-0,0209		0,0239
deposit insurance	-0,1205	-0,0074		-0,1448***		0,0225
absence of confidence	0,2305	-0,0095		0,3532**		-0,0486
use of financial information	-0,0222	0,0520		0,0142		-0,0341
Pseudo R ²	0.1067	0.1675	0.0359	0.0792	0.0896	0.1216
Joint significance (p-value)	0.0015*	0.0000*	0.7328	0.0417**	0.1429	0.0654***

*, **, *** — Significant at 1%, 5%, 10% confidence level respectively

¹⁵ Only observation without missing data are included into the regression.

The depositor who will react on reduction of bank assets is more probable a male, have higher level of education or earns higher income. Holding an on-call deposit or a wage card reduces this probability. With the exception of education and income the same is true for reduction of profits. Moreover the higher the total deposits in the bank the lower the probability the funds will be withdrawn. Men and people with higher income are more sensitive to information about bank capital reduction. So are the holders of long-term deposits (with the maturity exceeding half a year), those who do not believe in the guaranties provided by the deposit insurance system and those, for whom the compensation covers lower share of deposits. Finally those who hold wage debit card and/or deposits with the maturity less than 1 year are less probable to react to any information on changes of bank fundamentals.

Table 12. Market discipline (maturity shifts) subject to depositor, deposit and bank characteristics (marginal effects, 278 obs.)

Variable	Riskier investments	Reduction of assets	Reduction of profit	Reduction of capital	No withdrawals
sex		0,0033		0,0312	-0,0100
age		-0,0327		0,0111	0,0102
education		0,0222		-0,0039	0,0124
income		-0,0196		0,0080	-0,0178
total deposits		0,0242		0,0084	-0,0937***
on-call deposit		-0,0461		0,0330	0,0930
other plastic card		0,0292		0,1440**	-0,0375
wage debit card		-0,1630*		0,0109	0,1675**
deposit with maturity less than half a year		-0,0298		0,0772	0,3482***
deposit with maturity from half a year to 1 year		0,1182		0,2011**	0,1255
deposit with maturity over than 1 year		0,1311		0,2322*	-0,0150
state bank		0,0849		0,0856	-0,2528*
foreign bank		-0,0374		-0,0318	-0,0355
no deposit diversification		0,0470		0,0035	0,0357
deposit insurance		-0,0148		-0,0938	0,0818
absence of confidence		0,1286		0,2834	-0,0914
use of financial information		-0,0479		-0,0336	0,0097
Pseudo R ²	0.0644	0.1191		0.1346	0.1513
Joint significance (p-value)	0.2501	0.0055*		0.0074*	0.0000*

*, **, *** — Significant at 1%, 5%, 10% confidence level respectively

Depositors holding wage debit cards are less probable to switch from long-term to short-term or on-call deposits in response to information about bank asset reduction. The holders of plastic cards, which are not wage ones, as well as long-term deposits are sensitive to the signal of bank capital reduction. The large deposit holders as well as the depositors of state banks are less probable to be among those who do not change the deposit maturity structure in response to any information about changes of bank fundamentals. On the contrary, those who hold wage cards or short-term deposits will not react with higher probability.

Noteworthy we found no significant dependency for information on riskier investments neither for quantity-based mechanism nor for maturity shifts. Another important fact is that the cross-bank deposit diversification, as well as the use of financial information, does not affect the probability that the depositor will potentially use this or that mechanism of market discipline. Bank ownership and confidence provided by deposit insurance are also rarely significant.

Market discipline: back to basics

Data characteristics: the panel

The panel of bank information used in the study is based on the data reported by the Central bank of Russian Federation. The website www.cbr.ru contains Russian banks financial statement data sets (balance sheets and profit and loss accounts¹⁶). The information of the balance sheets is reported on a monthly basis, the data of the profit and loss account — on a quarterly basis. We use the data covering the period from 1st of April 2004, to 1st of January 2008. The majority of financial statements contain all the information necessary to model variables calculation (the variables will be described later).

To construct a balanced panel we have to include into the sample only banks, which functioned during the whole studied period, but this is not the only factor that limits the number of banks in the panel. First of all, although reporting the information of the financial statements (and lots of other reports and — as it is called in Russian — “forms”) to the Central bank is obligatory, public reporting on the site is voluntary, though recommended by the Central bank.

¹⁶ The so-called form 101 and form 102.

Secondly, some of the banks publish only the balance sheets (nearly 6,3% of banks) and some of them publish only profit and loss accounts (less than 1%), so we have no access to the full data, necessary for variable construction. Thus we have 327 banks in our panel.

Although the financial statements are published by the Central bank, of course, one might reasonably doubt whether the information is trustworthy. The case is that the quality of data is a matter of the accountant and his or her incentives and abilities for window-dressing as well. However the data cannot be checked by any additional means, because more precise information is available only for the bank managers, not for outside users and sometimes not even for the Central bank. So it is assumed that the data is reliable. Moreover this is what the depositor may obtain, and it is one more important reason to admit this data. Most of the ratings and rankings published by mass media or rating agencies are based on this particular data. So a depositor makes the decision taking this information — not the internal one — into account.

Econometric model

$$Dep_{i,t} = \alpha_{D,i} + \mu'_D BF_{i,t-1} + \theta'_D Dummy_DIS * BF_{i,t-1} + \theta'_D Dummy_Quarter_t + \varepsilon_{D,i,t}$$

We follow the existing studies in choosing an econometric model and we estimate the following reduced-form equation to analyze quantity-based market discipline:

$Dep_{i,t}$ stands for personal deposits in the bank i at time t . $BF_{i,t-1}$ stands for a vector of bank fundamentals of the bank i , which characterize its risks. The information reaches the depositors later than the reporting date, so this vector is included into regression with a lag (this lag is approximately two months that is why regressing on the previous period variables seems to be quite reasonable). To control for the factors, which are not bank fundamentals, but do influence the depositor decision-making process we introduce Dummy-variables for each of 15 quarters in the panel.

To test for market discipline existence before and after introduction of the deposit insurance system it is needed to differentiate between these two periods. However considering these periods to be the same for all banks and estimating separate regressions for both periods does not seem to be an appropriate way. The case is that the process of banks admittance to the system de jure began in the very beginning of 2004 but de facto lasted until the end of 2005.

Thus in any period with the exception of the first and two last quarters there were the banks, which were already in the list if Deposit Insurance Agency and which were not (see Figure 2).

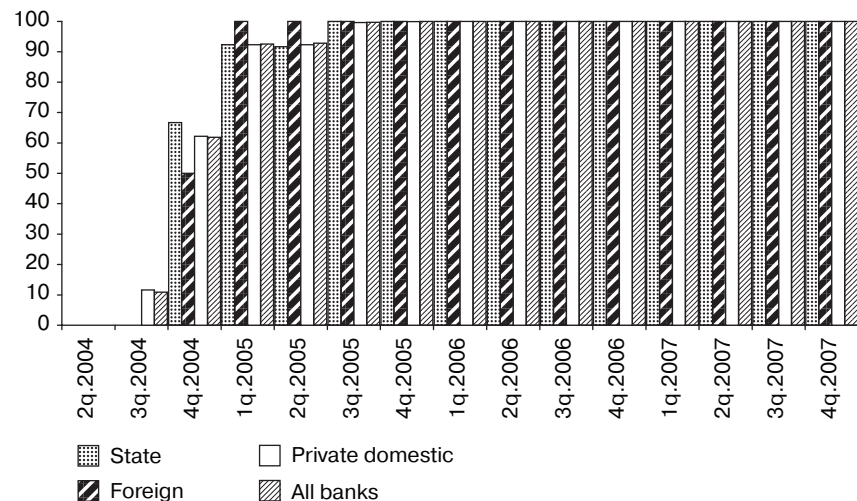


Figure 2. Share of banks in DIS, %

The information from this list related to the dates of admittance allows us to construct a Dummy-variable, which equals to 1 for the quarters the bank operating under a mark “The deposits are insured” and is equal to 0 for all the rest quarters.

We construct and estimate separate regressions for state banks (to obtain the effect of state property), for foreign banks (to obtain the effect of foreign property) and for all the rest banks, which we call private domestic ones.

The group of state banks includes the banks with the share of state ownership¹⁷ exceeding 50%. After the exclusion of state banks from the sample, market discipline mechanisms are expected to become more articulated, at least before deposit insurance system introduction. State banks were considered to be the most reliable ones without any explicit guaranties; they are likely to continue exploiting such an image after admittance to the system.

¹⁷ The ownership of local authorities is also considered to be the “state” one.

Using the notion «foreign bank» we consider the banks with more than 50% of foreign ownership¹⁸. Foreign banks proved to be reliable after the crisis of 1998. Although foreign banks are permitted to operate in Russia only by establishing subsidiaries — and de jure the parent bank is not responsible for the subsidiary’s obligations in case of default — there may exist some mechanisms of implicit insurance: the depositors seem to believe that a parent bank will not let the subsidiary to sink (this may be explained by the fact that they may be not aware of the absence of this responsibility). So the expected market discipline and its changes over time are less explicit for this group of banks.

Excluding them from the sample allows concentrating on the group of private domestic banks. Before their admittance to the system there was neither explicit guaranty of deposit repayment, nor state or foreign support in banking activities. Hence after the admittance depositors’ sensitivity to bank risks — if any existed — is likely to decrease due to appearance of the guaranty of the certain amount repayment. Separate regressions will allow testing all above-mentioned hypotheses and bring to light the deposits dependence on the bank’s ownership structure.

To test the hypothesis of maturity shifts the system of following equations is estimated:

$$\frac{Dep_{i,t}^M}{Dep_{i,t}} = \alpha_{D,i} + \mu'_D BF_{i,t-1} + \theta'_D Dummy_DIS * BF_{i,t-1} + \vartheta'_D Dummy_Quarter_t + \varepsilon_{D,i,t}$$

M — maturity of deposits (to be consistent of survey analysis we consider time deposits with the maturity less than half a year as being short-term, and those with the maturity exceeding half a year as being long-term).

If the depositor discipline does not exist the coefficients of bank fundamentals will be found insignificant. If the mechanism is at work riskier banks will witness an increase in shares of on-call and short-term deposits and a decrease of shares of long-term deposits.

Finally let us emphasize the list of bank fundamentals used in the analysis. We tried to be as close as possible to those indicators, which were mentioned in the survey. The level of bank risk is characterized by the variables chosen using the principles of CAMEL rating system. It is also necessary to include the measure for bank size into regression.

¹⁸ Most of them are subsidiaries of foreign financial institution or banks bought by foreign financial institution, so the foreign ownership accounts for 100%.

Variable	Notes
ln(assets)	Natural logarithm of bank's assets
dis*ln(assets)	Previous variable is multiplied by Dummy_DIS
capital adequacy	Capital to assets ratio
dis*capital adequacy	Previous variable is multiplied by Dummy_DIS
share of consumer loans	Consumer loans to assets ratio
dis*share of consumer loans	Previous variable is multiplied by Dummy_DIS
share of overdue loans	Overdue loans to total assets ratio
dis*share of overdue loans	Previous variable is multiplied by Dummy_DIS
return on assets	Profits to assets ratio
dis*return on assets	Previous variable is multiplied by Dummy_DIS
wage	Costs of labor to assets ratio
dis*wage	Previous variable is multiplied by Dummy_DIS
share of working assets	Working assets to assets ratio
dis*share of working assets	Previous variable is multiplied by Dummy_DIS
d32004 — d42007	Dummy_Quarter

Estimation results: quantity-based market discipline

Table 13 demonstrates the results of quantity-based market discipline analysis considering the whole period of time we are interested in.

Here we can see that for state banks the only significant factors are capital adequacy, working assets and the share of consumer loans. The depositors tend to withdraw their money in response to lower capital adequacy ratio, higher proportion of risky working assets and larger scope of operation on the consumer deposit market. Notably the deposit insurance system introduction did not influence these relationships.

For depositors of foreign banks capital adequacy was also significant but after the banks were admitted to DIS the effect of this ratio changes dropped dramatically. What did not change is the reaction to the activities on consumer loan market, but here the depositors withdraw if observe the contraction of

them. A new significant factor introduced here is bank profitability: higher return on assets is, however, interpreted as a negative factor by depositors.

Depositors of private domestic banks use market discipline mechanism quite actively. They react to bank size changes, even to higher degree after the banks entered DIS. They are sensitive to capital adequacy but this sensitivity was reduced by DIS. Another two significant factors — the share of consumer loans (positive relationship) and costs of labor (positive relationship) — lost much in importance after the state added guaranties and introduced DIS.

Estimation results: maturity shifts

Table 14 demonstrates the maturity shifts in action. It should be stressed that we are interested in the significance of the bank fundamental for at least two of the three presented categories of deposits. Only in this case we deal with a maturity shift, namely a reduction of the share of one category of deposits and a simultaneous increase of another one.

For depositors of state banks two factors proved to be significant. As bank assets rise depositors tend to switch from short-term to long-term deposits. In the same time an increase in the share of overdue loans results into a shift from long-term to short-term and on-call deposits. Both the relationships were sufficiently aggravated, when banks were admitted to DIS, but still exist.

Foreign bank clients are sensitive to bank asset changes and this was not affected by the deposit insurance. Consumer loans are also significant and we can see now that as the scope of bank operations on this market increases the depositors invest more but into on-call deposits rather than to time deposits. The share of overdue loans is important for time deposits: the higher the share the more is withdrawn from long-term deposits to invest into short-term ones. The DIS introduction, however, reduced this effect dramatically. In the same time after DIS introduction return on assets became significant at least for time deposits.

Finally depositors of private domestic banks are sensitive to bank size (an increase results into switch from short-term to long-term deposits) and the share of overdue loans (an increase results into shift from long-term to short-term and on-call deposits) before as well as after the banks were admitted to DIS. After DIS introduction consumer loans became significant and we can observe the same tendency as in the foreign banks.

Table 13. Market discipline for deposits, the influence of DIS

Variable Model	All banks		State banks	
	Random effects		Fixed effects	
	coefficient	z	coefficient	t-statistics
ln(assets)	6292212	4.06*	-2.74e+07	-0.45
dis*ln(assets)	612351.7	2.94*	2738313	0.50
capital adequacy	4.23e+07	4.71*	1.11e+09	3.50*
dis*capital adequacy	-9595594	-1.11	-1.08e+08	-0.37
share of consumer loans	1.60e+07	1.16	-1.92e+09	-1.86**
dis*share of consumer loans	-4803294	-0.42	9.51e+08	0.98
share of overdue loans	6653212	0.12	-6.06e+08	-0.24
dis*share of overdue loans	-1.25e+07	-0.22	-8.52e+08	-0.33
return on assets	4010576	0.06	5.06e+09	1.00
dis*return on assets	-3.21e+07	-0.53	-1.13e+09	-0.23
wage	7.39e+07	1.02	-1.46e+09	-0.58
dis*wage	-1.02e+08	-1.52	-1.06e+09	-0.47
share of working assets	-1.03e+07	-0.52	-3.93e+09	-2.19**
dis*share of working assets	-9393796	-0.45	6.65e+08	0.42
d32004	-248385	-0.07	-3.98e+08	-3.26*
d42004	-516087	-0.16	-3.24e+08	-2.85*
d12005	-1741140	-0.66	-3.12e+08	-3.33*
d22005	-2877515	-1.07	-3.51e+08	-3.62*
d32005	-2713180	-1.09	-2.86e+08	-3.41*
d42005	-2880767	-1.25	-2.69e+08	-3.59*
d12006	-2846607	-1.29	-2.71e+08	-3.76*
d22006	-3791218	-1.60	-3.08e+08	-3.99*
d32006	-3356755	-1.53	-2.54e+08	-3.73*
d42006	-2720997	-1.31	-1.87e+08	-3.11*
d12007	-2470693	-1.21	-1.43e+08	-2.52**
d22007	-1845045	-0.84	-1.24e+08	-1.98***
d32007	-365330.3	-0.18	-3.97e+07	-0.70
_cons	-9.71e+07	-3.95*	8.62e+08	0.83
R ² (pooled)/R ² -within (fixed effects)/Wald chi ² (random effects)				
F-test for joint significance (p-value)				
F-test for fixed effects (p-value)				
Breusch and Pagan Lagrangian multiplier test for random effects (p-value)				
Hausman specification test (p-value)				
Number of observations	4456		154	

*, **, *** — Significant at 1%, 5%, 10% confidence level respectively.

Foreign banks		Private domestic banks	
Fixed effects		Random effects	
coefficient	t-statistics	coefficient	z
1130279	1.57	2755860	18.19*
97156.83	0.89	213634.8	7.51*
1.24e+07	2.72*	9703036	8.23*
-9030469	-1.89***	-3859499	-3.35*
2.06e+07	2.77*	1.55e+07	8.50*
-9303144	-1.54	-5309781	-3.41*
-4.42e+07	-0.61	1.38e+07	1.83***
9.62e+07	1.32	-1.03e+07	-1.31
-3.14e+07	-2.28**	1.39e+07	1.36
1.00e+07	0.96	-1.27e+07	-1.27
4.92e+07	1.06	3.30e+07	3.44*
-4.61e+07	-1.02	-2.73e+07	-3.02*
1.98e+07	0.79	621443.4	0.24
-1.39e+07	-0.62	-3611417	-1.33
-1525922	-1.07	891178.4	2.00**
-1693808	-1.32	532607.3	1.29
-1744089	-1.81***	9614.727	0.03
-1009200	-1.20	13543.33	0.04
-958497.5	-1.27	-71878.1	-0.23
-1357455	-2.02**	-222966.4	-0.75
-1855129	-3.03*	-505525.5	-1.75***
-1781076	-2.86*	-569415.8	-1.83***
-1785924	-3.23*	-618645.2	-2.14**
-1624262	-3.18*	-592877.9	-2.15**
-1324009	-2.77*	-652959.4	-2.39**
-929852.4	-1.85***	-317835.8	-1.09
-668401.8	-1.51	-59127.6	-0.22
-1.60e+07	-1.20	-4.32e+07	-18.24*
0.7533		952.30	
0.0000*		0.0000*	
0.0000*		0.0000*	
0.0000*		0.0000*	
---		0.1141	
157		4145	

Table 14. Maturity shifts for deposit shares, the influence of DIS

Variable	All banks			
	on-call deposits		short-term deposits	
	coefficient	z	coefficient	t-statistics
ln(assets)	.0087799	6.02*	-.0208106	-9.53*
dis*ln(assets)	-.0027033	-2.95*	.001584	1.15
capital adequacy	.0639931	1.92***	-.1221355	-2.45**
dis*capital adequacy	.0977135	2.56**	-.0291904	-0.51
share of consumer loans	.1622264	3.47*	-.0410287	-0.59
dis*share of consumer loans	-.2024203	-4.06*	-.040768	-0.55
share of overdue loans	3.967133	17.67*	-1.03492	-3.08*
dis*share of overdue loans	-.0426305	-0.17	.3233025	0.88
return on assets	1.283726	5.17*	.6903689	1.86***
dis*return on assets	-.8604365	-3.24*	1.0084	2.53*
wage	-1.160035	-4.25*	.6934527	1.70***
dis*wage	.6692103	2.24**	-1.301254	-2.91*
share of working assets	-.2102152	-2.72*	-.1684779	-1.46
dis*share of working assets	-.0255793	-0.28	.1698571	1.25
d32004	(dropped)		.5650683	16.36*
d42004	-.0002761	-0.03	.5460986	15.83*
d12005	.0212725	1.92***	.5225429	15.73*
d22005	.0201192	1.58	.49533	15.93*
d32005	.0239713	1.90***	.4953395	15.58*
d42005	.0224989	1.73***	.4931057	15.24*
d12006	.023116	1.76***	.4823036	14.60*
d22006	.0119183	0.90	.4554781	14.62*
d32006	.0119511	0.91	.4584707	14.36*
d42006	.0122742	0.93	.4577965	14.00*
d12007	.0133245	1.01	.4563233	13.69*
d22007	.0114696	0.86	.4293569	13.78*
d32007	.0215516	1.62	.4278812	13.57*
d42007	.0233609	1.75***	.4354608	13.44*
_cons	-.0905975	-3.93*	(dropped)	(dropped)
R²	0.3428		0.0984	
F-test for joint significance (p-value)	0.0000*		0.0000*	
Number of observations	4436			

All banks				State banks				
long-term deposits		on-call deposits		short-term deposits		long-term deposits		
coefficient	t-statistics	coefficient	z	coefficient	t-statistics	coefficient	t-statistics	
.0120307	4.91*	.0039122	1.28	-.0247692	-4.88*	.020857	3.44*	
.0011193	0.73	.0043252	1.85**	.0117186	3.03*	-.0160439	-3.48*	
.0581423	1.04	-.035589	-0.31	.7610567	3.97*	-.7254678	-3.16*	
-.0685231	-1.07	.1028181	0.80	-.6796396	-3.21*	.5768218	2.28**	
-.1211977	-1.55	-.4588849	-1.18	-.9671069	-1.51	1.425992	1.86***	
.2431883	2.90*	-.2898808	-0.73	1.020948	1.56	-.7310676	-0.93	
-2.932213	-7.78*	5.197346	5.06*	2.932109	1.72***	-8.129456	-4.00*	
-.2806719	-0.68	-3.824129	-3.36*	-4.345729	-2.31*	8.169858	3.63*	
-1.974095	-4.74*	-1.747246	-0.92	-.3520576	-0.11	2.099306	0.56	
-.1479639	-0.33	2.396043	1.16	1.187956	0.35	-3.584003	-0.88	
.4665822	1.02	1.366854	1.51	-.6930062	-0.46	-.6738464	-0.38	
.6320438	1.26	-1.606658	-1.66***	-.7909706	-0.49	2.397627	1.25	
.3786931	2.92*	-.7964457	-1.23	.5224332	0.49	.2740111	0.21	
-.1442779	-0.95	.0839568	0.12	.313508	0.28	-.3974632	-0.30	
.5255292	13.57*	(dropped)		(dropped)		.5192995	4.91*	
.544775	14.08*	-.0155367	-0.66	-.0088521	-0.23	.5436884	5.25*	
.5467821	14.68*	-.0282421	-0.86	-.0553204	-1.01	.6028621	6.41*	
.5751483	16.50*	-.0374357	-1.06	-.1280553	-2.18**	.6847905	7.56*	
.5712868	16.03*	-.0234332	-0.66	-.1314908	-2.25**	.6742236	7.30*	
.5749929	15.84*	-.0365337	-1.00	-.150441	-2.50	.7062743	7.62*	
.5851779	15.80*	-.0282269	-0.78	-.136106	-2.26**	.6836324	7.45*	
.6232011	17.83*	-.0252681	-0.68	-.1590768	-2.59**	.7036444	8.03*	
.6201757	17.33*	-.0009797	-0.03	-.1573176	-2.54**	.6775968	7.36*	
.6205267	16.92*	.0216726	0.58	-.1611062	-2.59**	.6587332	6.89*	
.6209497	16.61*	.0264467	0.70	-.155174	-2.48**	.6480268	6.62*	
.649771	18.60*	.0329419	0.85	-.181733	-2.84*	.6680907	7.24*	
.6411647	18.13*	.0507998	1.28	-.1839799	-2.79*	.6524796	6.80*	
.6317759	17.38*	.0649221	1.62	-.1853492	-2.80*	.6397266	6.39*	
(dropped)	(dropped)	.0118793	0.22	.4688211	5.29*	(dropped)		
	0.1775	0.6744		0.5142		0.4784		
	0.0000*	0.0000*		0.0000*		0.0000*		
	4436				154			

*, **, *** — Significant at 1%, 5%, 10% confidence level respectively.

Table 14. Maturity shifts for deposit shares, the influence of DIS (continued)

Variable	Foreign banks					
	on–call deposits		short–term deposits		long–term deposits	
	coefficient	z	coefficient	t–statistics	coefficient	t–statistics
ln(assets)	-.0470056	-3.77*	-.0059317	-0.44	.0529373	3.27*
dis*ln(assets)	.0159357	1.83***	-.0185614	-1.98**	.0026257	0.23
capital adequacy	.9683643	2.51*	.3319227	0.80	-1.300287	-2.59**
dis*capital adequacy	-.2746436	-0.69	-.6416463	-1.49	.9162899	1.77***
share of consumer loans	1.279918	3.91*	-1.586791	-4.50*	.3068733	0.72
dis*share of consumer loans	-.4984347	-1.45	.6540669	1.77***	-.1556323	-0.35
share of overdue loans	-.0980811	-0.03	15.63623	4.64*	-15.53815	-3.83*
dis*share of overdue loans	3.129948	1.00	-16.51709	-4.89*	13.38714	3.28*
return on assets	1.700215	2.13**	-.2135924	-0.25	-1.486623	-1.43
dis*return on assets	-.257718	-0.30	8.406989	8.95*	-8.14927	-7.20*
wage	-4.081058	-1.20	6.549926	1.79***	-2.468867	-0.56
dis*wage	.8453346	0.24	-2.326347	-0.62	1.481011	0.33
share of working assets	4.954809	2.97*	4.562457	2.54**	-9.517265	-4.40*
dis*share of working assets	-5.033078	-2.96*	-5.550098	-3.03*	10.58318	4.80*
d32004	(dropped)		.025212	0.12	.4294825	1.72***
d42004	-.0424408	-0.70	-.0165887	-0.08	.513724	2.07**
d12005	-.0361647	-0.46	.2383758	1.26	.2524834	1.11
d22005	-.1391345	-1.35	.4815295	2.66*	.1122994	0.52
d32005	-.1084156	-1.05	.4801812	2.62*	.0829289	0.37
d42005	-.080879	-0.78	.4914939	2.62*	.0440796	0.19
d12006	-.0749765	-0.73	.4690324	2.44**	.0606386	0.26
d22006	-.1414976	-1.38	.5132105	2.80*	.0829816	0.38
d32006	-.1244852	-1.22	.5054661	2.71*	.0737137	0.33
d42006	-.1164113	-1.14	.4737594	2.50**	.0973464	0.43
d12007	-.1095709	-1.08	.418665	2.17**	.1456003	0.63
d22007	-.1409423	-1.39	.4840137	2.70*	.111623	0.52
d32007	-.0825076	-0.81	.4508444	2.53**	.0863577	0.40
d42007	-.0433836	-0.43	.4687557	2.57**	.0293224	0.13
_cons	.5453055	2.84*	(dropped)		(dropped)	
R²	0.8543		0.8140		0.8195	
F-test for joint significance (p-value)	0.0000*		0.0000*		0.0000*	
Number of observations	157					

*, **, *** — Significant at 1%, 5%, 10% confidence level respectively.

Private domestic banks					
on–call deposits		short–term deposits		long–term deposits	
coefficient	z	coefficient	t–statistics	coefficient	t–statistics
.008588	5.48*	-.0221235	-9.42*	.0135355	5.14*
-.0039212	-4.10*	.0017868	1.25	.0021344	1.33
.0589663	1.74***	-.1342688	-2.64*	.0753024	1.32
.0969792	2.49**	.012597	0.22	-.1095762	-1.6***7
.0786793	1.61	.0318941	0.44	-.1105734	-1.35
-.1510546	-2.91*	-.0669969	-0.86	.2180515	2.50**
3.851944	16.94*	-1.147153	-3.37*	-2.704791	-7.09*
-.2147264	-0.84	.7017361	1.83***	-.4870096	-1.14
.3715697	1.16	.6173272	1.29	-.9888969	-1.84***
-.0411221	-0.12	.483321	0.96	-.442199	-0.78
-1.322619	-4.74*	.6755547	1.62	.6470641	1.38
.8002956	2.63*	-1.319006	-2.89*	.5187098	1.01
-.1733111	-2.24**	-.1964158	-1.69***	.3697269	2.85*
-.0693497	-0.76	.1660987	1.22	-.096749	-0.63
-.0675288	-2.74*	(dropped)		.4847609	11.70*
-.063356	-2.56**	-.0179108	-1.25	.4984989	12.01*
-.0396067	-1.65***	-.0431117	-2.53**	.4999504	12.41*
-.0425332	-1.90***	-.0732429	-3.77*	.5330082	14.16*
-.037289	-1.62	-.0742289	-3.85*	.5287499	13.72*
-.037459	-1.60	-.0776681	-3.90*	.5323591	13.56*
-.0361532	-1.51	-.087171	-4.33*	.5405563	13.48*
-.0482618	-2.14**	-.1147344	-5.66*	.5802282	15.34*
-.0474899	-2.06**	-.1133153	-5.64*	.5780372	14.92*
-.0461346	-1.95***	-.1137147	-5.65*	.5770814	14.53*
-.0451724	-1.87***	-.1128426	-5.57*	.575247	14.21*
-.0485419	-2.15**	-.1399371	-6.85*	.6057109	15.99*
-.0387409	-1.69***	-.1412884	-6.94*	.5972613	15.55*
-.0361404	-1.54	-.1348788	-6.60*	.5882512	14.91*
(dropped)		.582768	15.76*	(dropped)	
	0.2683		0.0866		0.1468
	0.0000*		0.0000*		0.0000*
	4125				

Conclusion

The largest Moscow banks' depositor survey allows us adding some new results to those obtained by the authors who used only the regression analysis methodology, as well as examining some characteristics of depositors' investment strategies, which were not articulated in previous papers. Namely we are able to trace the use of financial information, to reveal the degree of confidence added by banks' admittance to the deposit insurance system, to highlight the categories of the depositors who may preserve the incentives for market discipline even after the deposit insurance system introduction (those for whom the state guaranties are not enough, and those who do not believe in them). Moreover we show the statistically significant factors influencing the propensity to market disciplining, either quantity-based one or maturity shifts.

Comparing the results of regression analysis with those of the survey we should conclude that regression analysis helps to make the obtained static picture clearer in many aspects. Actually the quantity-based market discipline is the most pronounced for state bank depositors — that is not surprising as the admittance to the deposit insurance — as the regression analysis show — did not affect much the incentives to discipline. Maturity shifts are less obvious because after banks were admitted to DIS the depositors became less sensitive to changes in bank fundamentals in forming the maturity structure of their deposits. The same is true for foreign banks: survey show these depositors are the least sensitive to changes in bank fundamentals in exerting quantity-based market discipline and, as regression analysis confirms, the DIS introduction was one of the reasons for this. Finally the same factor — bank admittance to the deposit insurance system — may have caused the fact that the depositors of private domestic banks do not discipline their banks as intensive as those of state banks.

However regression analysis tends to reveal less significant factors compared to the results of the survey. We emphasize two possible reasons for this. One explanation is related to econometric model construction as well as panel data we use: we analyzed depositor behavior over 3,5 years and include 327 banks to the sample, basing our data set on the information actually provided by the banks. These aggregations may cause significant divergence of the results, proving that a survey allows moving closer to revealing individual depositors' decisions. Another possible explanation lies in difference between market discipline and “potential market discipline”. Actually not all the intentions may be realized in practice. This means that the questionnaires should take into account not only the intentions but also real actions of the respondents.

Nevertheless the use of a survey instruments allows estimating the depositors' real decision-making process. This is obviously valuable in optimizing the bank policy of attracting additional funds from this category of clients and in forming the forecasts of the changes in deposit structure resulted from informational signals related to changes in indicators of financial position and results. The obtained results may become of interest of regulatory authorities. In particular they seem to be important being related to the deposit insurance system design. Although from the effectiveness of market discipline the current DIS design is quite successful, we should emphasize the significant proportion of depositors who do not believe in the guaranties provided by the system as well as of those who have incorrect notion of DIS compensation mechanisms. The former keeps market discipline functioning although on a smaller scale. The latter may cause serious problems in resolving bank bankruptcies ex post and creating and supporting the system of confidence ex ante.

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