Information acquisition by institutional depositors during bank panic

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Abstract

We utilize high-frequency data to study heterogeneity in access to bank-level information by institutional depositors during a bank panic. We examine Russian banking crisis of Summer-2004 triggered by the Central Bank announcement to liquidate banks for suspicious financial operations. We find that private information about bank soundness is available to depositors who have close connection with the bank. Other depositors base their withdrawal decisions on publicly observable bank characteristics, including rumors. Furthermore, we find evidence of information spillovers from "connected" to "non-connected" depositors. These results reveal active information acquisition by depositors and rationality of their behavior during bank panic.

This draft: Sep 5, 2017

JEL codes: G21, G38, H26

Keywords: Bank panic, institutional depositors, bank-firm connections, information spillovers, depositor discipline

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1. Introduction

Bank panics and contagious runs on bank deposits have severe impacts on financial system stability. During the "Great Moderation" of the 1950s-2000s, it was a widely-held belief that bank panics were a thing of the past, at least in developed economies. However, bank runs during the recent Great Recession have demonstrated that all financial systems remain vulnerable to bank panics.[2] Thus, it is critically important to understand the anatomy of bank panics to either prevent or to mitigate their detrimental effects. Yet to this day, there is only limited empirical evidence on the informational determinants of bank panics and bank runs, especially in the context of the whole banking system.

Studying the effects of bank panics empirically is a challenging task. The key challenge is data availability, as it is very difficult to obtain a dataset with high-frequency information about the behavior of individual depositors across different banks. Another limitation is the scantiness of appropriate natural experiment settings suitable for identifying the effect of bank panic, as those are commonly accompanied by other macroeconomic shocks (Kaminsky and Reinhart, 1999) which make it difficult to disentangle the impact of panic *per se* from that of the underlying aggregate shock.

In this study, we use a unique transaction-level dataset that allows us to analyze depositors' responses to different types of bank specific information depending on the depositors' own characteristics and relationship with the bank. As a laboratory for our study we consider the Russian banking panic of summer 2004. This crisis was triggered by the unexpected Central Bank announcement in May 2004 to crack down on money-laundering and offshore operations, followed with a demonstrative closure of one bank heavily involved in such activities. Notably, there were no aggregate macroeconomic shocks to the Russian economy at the time. Thus, this setting provides a rare opportunity to study the depositors' behavior during bank panic without contamination from concurrent macroeconomic shocks.

In our analysis, we focus on institutional depositors (non-financial companies and other banks) whose behavior is rarely analyzed in the existing studies of bank panics, where instead the focus is on behavior of individuals. However, in order to understand the determinants of banking crises, it is essential to explore the behavior of institutional depositors. Such depositors usually

[2] Some authors even view the collapse in the Mortgage Backed Securities' Repo market during the Great Recession as a run on a "shadow banking system" developed around subprime mortgage market in the U.S. (See e.g. Gorton and Metrick, 2012).

control a large share of total deposits (e.g. in our sample, they accounted for around sixty percent of total deposits), so this group of depositors is interesting in its own right. More importantly, as institutional depositors are likely to have the sophistication, incentives, and capacity to acquire and process information about troubled banks during a banking crisis, their withdrawals from a bank might serve as a signal for withdrawals by less sophisticated depositors such as individuals, small business owners, etc[3].

We further focus on private domestic[4] deposit-holding banks headquartered in Moscow. During the period of our analysis, the Moscow banking market represented almost eighty percent (77.8% as of the end of 2003) of total institutional deposits. Such high concentration of institutional depositors' activity in one geographical market allows us to abstract from regional heterogeneity in information acquisition channels, while still covering the overwhelming share of the country's institutional deposits.

Our main results are as follows. First, we find that only depositors with close business ties with their deposit-holding bank respond to private information regarding their bank's closure risk. Given the Central Bank's announced intent to weed out banks involved in questionable offshore activities, we utilize the measure of bank involvement in suspicious offshore operations (developed by Chernykh and Mityakov, 2017) as a proxy for a bank's risk to face disciplinary action by the Central Bank. This measure is calculated from mandatory and confidential bank reports to the Central Bank and is observed by us, the researchers, ex post, but was not publicly available at the time of the banking crisis. Still, we find that such private information seeps through to some groups of depositors, namely those that have a close business connection to their banks.

We furthermore find notable heterogeneity in such "connected" depositors' response during the banking crisis. We find that depositors who are likely themselves to be involved in suspicious operations intensify their contacts with offshore active banks, while more transparent depositors (especially depositor-firms) tend to cut ties with such banks. Such dichotomy in connected depositors' responses is consistent with the finding in Chernykh and Mityakov (2017) that offshore-active banks seem to conduct their operations on behalf of their suspicious clients. We infer that less transparent depositors might intensify their contacts with offshore-active banks

[3] This logic is further supported by our own results, as less informed institutional depositors pay attention to the behavior of more informed ones.

[4] We exclude state-owned banks, as they enjoy implicit government guarantees even in the absence of deposit insurance. Subsidiaries of foreign-owned banks are excluded as they can rely on financial help from a parent bank.

during banking crisis to use their services while the opportunity window for suspicious operations is still open, whereas more transparent depositors might withdraw from offshore-active banks for fear of losing their deposits due to regulatory action by the Central Bank[5]. More generally, this result suggests that in the analysis of bank panic, it is important to take into account not only the characteristics of the bank but also of the depositors, as different depositors might respond differently to the same information depending on their own characteristics.

We also study the behavior of "non-connected" depositors to understand what kind of information they respond to during a bank panic. We find some evidence of "run-to safety" on their part, as they tend to transfer funds into the banks with higher pre-crisis capital adequacy ratios. In contrast, we find that connected depositor-firms tend to provide financial support to the banks with which they have a close business relationship by increasing the transfer of funds into low (pre-crisis) capital banks during the banking crisis.

We further uncover information spillovers from "connected" to "non-connected" depositors and show that depositors without strong a business connection to their bank seem to pay attention to current withdrawals of funds by connected depositors. Moreover, we find that non-connected depositor-banks might have an informational advantage over non-connected depositor-firms in this respect. Our results indicate that non-connected depositor-banks have access to high frequency information about connected depositors' withdrawals. Specifically, we find a significant relation between the transfers of non-connected depositor-banks and total withdrawals performed by connected ones when we explore variation both within and across deposit-holding banks[6]. In contrast, depositor-firms tend to have a rough idea about the quality of their bank, as the negative relationship between their transfers and withdrawals by connected firms is observed when we explore variation only across the deposit-holding banks[7].

Finally, we analyze the role of rumors about bank risk by utilizing the "blacklists" of banks which were floating around the business community at the time of the crisis. We find that such rumors do have an effect, but only on depositor-firms without a strong business connection with

[5] The bank liquidation process may span up to three years in Russia. That means that even if the closed down bank was technically solvent and all uninsured institutional depositors received their money in full eventually, they face a risk of a very prolonged delay in their access to all deposited funds during the generally lengthy liquidation process.
[6] These effects are strongest not for the contemporaneous withdrawals but for two to three week lags, suggesting that there exists some delay in information transmission from connected to non-connected depositor-banks.
[7] From econometric point of view, we observe such relation with and without deposit-holding bank fixed effects for depositor-banks, but only without deposit-holding bank fixed effects for depositor-firms.

their deposit-holding bank. Notably, controlling for bank offshore activity, depositor-firms with a strong business connection to their bank increase the transfers of funds to the banks that are blacklisted. This could indicate that connected depositors being informed about their bank quality decide to help the bank if it accidentally gets on a blacklist to retain the human capital of the bank-customer relationship (e.g. in order to be able to use its services in the future)[8]. Alternatively, a prudent bank that accidentally gets on a blacklist might provide incentives for all depositors to transfer funds into it, but only connected depositors correctly perceiving the quality of the bank take advantage of such incentives.

There are several advantages to use Russia and this particular banking crisis episode as a laboratory for our study. First, as we mentioned above, this bank panic was caused by an unexpected policy announcement by the regulator; as such, it provides a cleaner identification of bank panic effects on depositors' behavior, without contamination from macroeconomic shocks. Another notable feature of this experiment is that all deposits during this episode were completely uninsured. Thus, our results are less likely to be affected by the moral hazard effects associated with the presence of deposit insurance. Last but not least, due to a historical data leak, Russia has several highly-detailed firm and bank level datasets in the public domain that make it possible to analyze individual depositors' and individual banks' behavior at a very high (weekly) frequency.

We use Russia for our studies because the unique data and the policy shock under consideration offers the advantages described above. Yet, we believe the empirical patterns we uncover are of general interest, as they contribute to an understanding of depositor's behavior during banking crisis in general. To the best of our knowledge, this is the first empirical study that analyzes the behavior of and the information spillover effects among different groups of institutional depositors during a banking crisis in the context of the entire banking system and with such high-frequency data.

Our results indicate that information acquisition during an interaction between a bank and an institutional borrower is a two-way street. In an extremely opaque market with high bank compliance risks and low trust in banks, not only banks but also bank customers are constantly engaged in monitoring, evaluation, and information acquisition regarding their banks. This customer monitoring and information revelation through a business relationship with a bank is

[8] Note that (transparent) depositor-firms do still punish their bank for actual rather than rumor-based involvement in suspicious operations (offshore activities) by withdrawing funds from it during the crisis.

further explained by the fact that many institutional (and uninsured) bank customers are not only borrowers but also deposit-fund providers and, thus, have strong incentives to act as active (and informed) monitors of their banks.

Our paper bridges together several strands of literature on the financial fragility of banking institutions. First, it contributes to the banking literature on bank-runs and bank panics. On the one hand, from a system-wide perspective, there is a long-standing theoretical and empirical debate on the origins of bank runs. A seminal paper in this literature by Diamond and Dybvig (1983) emphasizes the irrational component of bank runs. In their setup, individual depositors, as a result of some "sunspot," expect others to withdraw funds from the bank, which causes them to run the bank, too. On the other hand, a more "rational" view – as proposed in Calomiris and Gorton (1991) – explains across-the-board depositors' withdrawals with the existence of the asymmetric information when depositors, upon receiving some negative macroeconomics news, make a decision to withdraw from all banks as they cannot reliably distinguish each bank's failure risk due to information asymmetries.

In terms of the origins of bank panic, our results are not consistent with the random "sunspot"-based withdrawals and are more in line with the asymmetric information view of a bank panic, where depositors cannot access the true but unobservable quality of a bank and withdraw from *all* banks. Complementing that literature, we find that even in an opaque market, institutional depositors have at least some information to assess a likelihood of a bank failure and that deposit withdrawals are largely targeted, i.e. do not occur across all banks without any discrimination. In this regard, our results are more in the spirit of Calomiris and Mason (1997) and Calomiris and Mason (2003), who argue that deposit contraction during the pre-DIS period bank panic episodes in the U.S. were (at least partially) related to bank-level risk fundamentals. Schumacher's (2000) empirical results also support information-based depositors' decisions to withdraw in the setting of an emerging market (Argentinian) bank panic episode.

Second, our paper contributes to the growing literature that utilizes high frequency depositor-level data for the analysis of individual depositors' behavior during bank runs. Due to data availability, this literature mostly explores runs on individual banks on a case-by-case basis and focuses on informational flows between different groups of depositors conditional on a bank-run happening (Iyer, Puri, and Ryan, 2016) or uses experimental data (see Brown, Trautmann and Vlahu, 2016).

Like those papers, our empirical findings also support the role of heterogeneity in depositors' access and response to bank-level information as well as information spillovers between different groups of depositors. Complementing this literature our paper analyzes the depositors' behavior in the context of the whole banking system, which allows us to study the informational prerequisites for the bank to experience a run on its deposits in the first place.[9]

Overall, the results of this study bridge the insights from both (more macro-based) bank panic and (case-studies based) bank-run literatures. We argue that informational asymmetries during bank panics might not be as severe as was originally expected. Publicly unobservable information about a bank's risk to face regulatory enforcement action seems to be known at least by some ("informed") agents and tends to seep through to other ("uninformed") agents who do not have direct access to private information but can observe withdrawal decisions by informed depositors.

Finally, while most empirical studies in banking literature look mostly at the retail depositors' (individuals) withdrawal patterns (e.g. Iyer and Puri, 2012; Davenport and McDill, 2006; Iyer, Puri, and Ryan, 2016; Iyer, Jensen, Johannesen and Sheridan, 2017), our study focuses on institutional depositors whose behavior, as we mentioned above, is crucial for the understanding of bank panic, since their withdrawals might serve as a coordinating signal for other, less sophisticated depositors.

The rest of the paper proceeds as follows: in Section 2, we describe the institutional background behind our study; Section 3 provides a description of the datasets used and measures constructed; Section 4 contains empirical results; and Section 5 contains extensions and robustness checks. Section 6 concludes.

2. Institutional Background

2.1. Confidence crisis in the Russian banking sector in the Summer of 2004.

The focus of our study, a reputation-based bank confidence crisis in Russia, was triggered by a regulatory attempt to clean out the banking system from financial intermediaries involved in

[9] To the best of our knowledge there is only one paper that studies the behavior of individual depositors in the context of the whole banking system: Iyer, Jensen, Johannesen and Sheridan (2017), who analyze the effect of a change in the depositor insurance coverage limit in Denmark and assess the resulting response by the individuals. Unlike that paper, our study focuses on institutional depositors, and we analyze bank-level characteristics with varying degrees of observability and emphasize the heterogeneity in access to bank level information by different groups of depositors.

suspicious, semi-legal or outright illegal operations, mostly in the area of capital flight to offshore jurisdictions and/or money laundering facilitation operations.

The clean-up attempt was closely associated with the initial stages of the *de novo* deposit insurance system (DIS) introduction in Russia. Following the passage of DIS legislation in December 2003, the regulator initiated a number of supervisory measures to enhance prudency and compliance in the banking sector in an attempt to reduce risk exposure of the to be established insurance fund and to screen out banks for mandatory deposit insurance membership.[10] Under the original DIS legislation, banks had to apply for the DIS system acceptance by July 1, 2004 and, following the rigorous on-site examinations, the regulators planned to start issuing deposit insurance acceptance decisions in the early fall of 2004, on a case-by-case basis.

Before the application deadline, Central Bank senior officials made several notable public announcements about their intention for a targeted clean-up in the banking sector. In February 2004, deputy head of Russia's central bank - Andrey Kozlov[11] - made a statement that the regulator foresaw difficult times ahead in dealing with banks involved in money laundering schemes and that one plausible solution would be to ban suspected banks from retail deposit market. Three months later, in May 2004, the Central Bank demonstratively closed a medium-size private domestic bank (Sodbiznesbank) for suspicious money laundering operations. This was the very first incidence in Russia of closing seemingly solvent bank solely due to the violation of the anti-money laundering legislation. Shortly after that, another bank, Credittrustbank, was promptly closed down for similar accusations. Furthermore, a high-ranked government official made a public statement on a regulatory intent to proceed with a policy of closures of about ten more unnamed banks involved in suspicious activities.[12]

[10] For more details of the DIS introduction in Russia, see empirical studies by Chernykh and Cole (2011) and Karas, Pyle and Schoors (2013). Tompson (2004) discusses institutional and legislative details of the process. The 2004 CBR Annual Banking Sector Report included a special Appendix that describes the situation in the Russian banking sector in May – July 2004.

[11] Andrei Kozlov, who had initiated and headed the Central Bank's campaign against fraudulent banks and money laundering and had been directly involved in the license revocation process, was fatally shot by two professional killers in September 2006 in Moscow. Although the case was not completely solved, senior government officials and banking sector experts made a number of statements relating Kozlov's assassination to his professional duties. The convicted organizer of this crime was an executive of a bank that lost its license during the anti-money laundering campaign.

[12] The actual warning was very credible as it came from up high in the government hierarchy: the actual statement of the existence of the black list of ten banks came from deputy Finance minister who was also the head of Federal Monitoring Commission, the main government watchdog for the banking system that tips the Central Bank of possible infractions.

Since no specific list of such banks was announced, the depositors began to guesstimate the probability of their banks' closures and to withdraw funds from banks they deemed as suspicious. The mass media outlets draw additional public attention to these events further triggering the rapidly expanding cascade of bank runs.

Since the DIS was not in effect at that time – all types of depositors, including interbank, corporate and retail fund providers – began panicking and preemptively withdrawing their deposited funds. Available macro-level evidence suggests that interbank market was the first to react: as banks started reevaluating their counterparty risk exposures and the probability of specific banks' closures, the interbank lending rate jumped and the banks' liquidity drained quickly. As early as in May, the turnover on the Russian interbank market dropped by 12.2% and then by another 13.3% in June. Simultaneously, the overnight ruble-denominated interbank lending rate jumped from 2% to 3% APR in the first quarter of 2004 to a volatile 10% to 20% in the second quarter.

In Figure 1, we illustrate the unusual nature of this confidence crisis by highlighting that the turbulence in the interbank lending rates, indicating unfolding liquidity crisis, was spiked amid very stable macro-economic conditions, as illustrated by the perfectly flat pattern for the national currency exchange rate graph – a common indicator of any macro-economic shocks in the Russian financial markets.

[Figure 1]

By June, the confidence-based liquidity crisis in the interbank lending market was accompanied by the confidence-based retail depositors' run from selected Moscow-based banks. Excluding Sberbank and VTB (two major state-controlled banks), the net withdrawals amounted to RUB 5.2 billion in June and RUB 18.1 billion in July. Starting from July, the contagion spread to regional banks. In July, aggregate net withdrawals in regional banks amounted to RUB 6.3 billion. The situation was recognized as dangerous when in early July Guta-bank, a privately-controlled Moscow bank with a large regional branches network, suspended all repayments to retail depositors.

It is worth noting that the traditional macro-level deposit market indicators did not signal any turbulence as the total volume of deposits in the banking system remained relatively stable, suggesting the flight to safety and reallocation flows within this troubled deposit market. Overall,

by various estimates from 20 to 27 banks have failed during this crisis episode due to bank run, regulatory closure and illiquidity issues.

To stabilize the situation and to calm down the panic, liquidity crisis and depositor confidence crisis, by the end of July CBR introduced a number of emergency measures, including drastic reduction of the required reserve ratio from 7% to 3.5% (to improve banks' liquidity position) and assisted in the acquisition of a failing private bank, Guta-bank, by a state-controlled VTB bank, thus sending a signal to the market that the Central Bank is ready to step in for any further required bailouts. Most importantly, the original DIS legislation was promptly changed and the CBR issued temporary insurance guarantees for retail deposits in all active commercial banks during the period of the DIS introduction. The revised DIS law guaranteed deposit coverage for depositors of all banks. Following these nonconventional measures, the bank confidence crisis was essentially resolved and was officially labeled as a "mini-crisis" in the regulatory disclosures. Since August-September 2004, the interbank market and the retail deposit market were back to normal and exhibited growth. In Figure 2, we summarize the timeline for the stages of this 2004 confidence crisis development and resolution by months.

[Figure 2]

2.2. Institutional Depositors in the Russian banking sector

Although regulatory disclosure and mass media during the bank confidence crisis in Russia focused mostly on the interbank and retail depositors' behavior, the crisis setting under consideration represents an interesting laboratory to study the response of institutional depositors (non-financial companies and other banks).

There are two main reasons why behavior of institutional depositors is essential for the understanding the determinants of bank panics during banking crisis. First, such depositors constitute a sizeable fraction of overall deposits. Thus, their behavior is interesting in its own right. As of the end of 2003 (at the beginning of our study period), cumulative, aggregate-level institutional deposits (interbank and corporate) accounted for a sizeable 41.4% of the Russian banks' assets financing (or sixty percent of total deposits). Of these, 69% of total institutional deposits were nonfinancial companies' deposits and the remaining 31% were owned by other banks.[13]

[13] For comparison, household deposits comprised 27.8% of banks' funding and these core deposit funds were heavily dominated by term, non-transaction and interest-bearing household deposits (97% of total).

More importantly, such depositors usually have resources and sophistication for the acquisition and interpretation of financial information. As such their decision to withdraw funds from a particular bank might trigger withdrawals by other (less sophisticated) depositors.[14]

In the case of Russia, there are two additional benefits of looking at institutional depositors. First, at the time of our analysis institutional deposits were (and still are) completely uninsured. Even the proposed deposit insurance system was designed to cover exclusively household deposits. In this regard, institutional depositors likely had no implicit government guarantees of their deposits in private banks. Another notable feature of the institutional deposits in Russia, especially in the case of corporate deposits, is their short-term nature. For example, as of 2003, 71% of nonbank institutional deposits were comprised of transaction (or demand) accounts and only 29% were term deposit contracts.

Thus, given their deposit term structure and uninsured status, institutional depositors are expected to be highly sensitive to bank-level risk and should actively seek to acquire and correctly interpret all available information about their deposit-holding banks.

3. Data description

In this study, we bring together several novel datasets from Russia to analyze the acquisition of bank-level information by different groups of depositors and their (potentially heterogeneous) response to it during the bank panic episode depending on depositor's own characteristics.

3.1. Measuring depositor's transfers.

In this study, we exploit the unique feature of a highly-centralized and strictly standardized interbank payment system in Russia for all ruble-denominated transfer of funds. All commercial Russian banks have to keep a correspondent account with the Central Bank (or its special regional units). According to the CBR payment statistics, 93% of all interbank wire transfer orders in rubles (in terms of the total volume) were performed through banks' accounts with the Central Bank. This transaction level database compiled and maintained by the Central Bank covers essentially the universe of all noncash ruble-denominated deposit flows between banks and their institutional customers in 2004.

[14] We do find some supporting evidence for the latter claim when in the results section we show that even among institutional depositors less informed agents do pay attention to the behavior of more informed ones (See information spillover results in section 4.4).

Due to a historical fluke these data were leaked into the public domain in 2005, and have been since made available online and used for research purposes (See e.g. Braguinsky (2009), Mironov and Zhuravskaya (2016), Chernykh and Mityakov (2017)). The Central Bank while never formally acknowledging the leak was willing to use conclusions from research papers based on those data for policy-making purposes. In fact, senior Central Bank officials even publicly called for providing free access to the leaked data for research and even commercial use.[15] As the things stand now, the Central Bank seems to be aware of the data usage for research and even implicitly encourages it (See Chernykh and Mityakov (2017) for more details).

From this dataset, we construct measures of flow of funds for individual agents to a given bank as the net sum of all wire transfers received by minus all wire transfers sent by a given depositor at a particular bank in any given week. To avoid scale effects, we normalize this measure by total weekly turnover (sum of the funds sent and received) by a given depositor through all banks. Namely, we define (normalized) net transfer of depositor *j* from bank *i* in week *t* as:

$$NetTR_{i,j,t} = \frac{Received_{i,j,t} - Sent_{i,j,t}}{\sum_{i'} Received_{i',j,t} + Sent_{i',j,t}} \quad (1)$$

where $Received_{i,j,t}$ ($Sent_{i,j,t}$) is total amount of money received (sent) by depositor *j* on its accounts in bank *i* in week *t*.

This measure effectively shows how sizeable are transfers into (out of when negative) a given bank by a given depositor compared to total wire transfer activity of this depositor in a given week.[16] Tables 1 and 2 provide summary statistics for this measure for depositor-bank and depositor firms respectively. We find that the average transfer during our sample period is positive both for depositor-banks and negative for depositor-firms but the means, as expected, are much smaller than standard deviation (3.4 percentage point for depositor banks vs -1.1 percentage point for depositor-firms).[17]

Since state-owned banks have an implicit government guarantee and subsidiaries of foreign banks in Russia have access to their main office financial resources, in our study we restrict attention to depositors in private Russian banks only. We further look at Moscow-headquartered

[15] See http://bankir.ru/publikacii/20051118/provodki-cb-rf-vorovat-nelzya-pokypat-1378429/ (in Russian)

[16] In Appendix section A8 we consider an alternative normalization by dividing by average weekly turnover for a given depositor, rather than current week turnover. This allows to abstract from changes in volatility in a given week. The results are the same.

[17] In our data look only at private Moscow-headquartered deposit-holding banks, that's why net transfers do not average out to zero.

bank, which is not very restrictive since at the time of our analysis deposits in those banks constituted around eighty percent of total (institutional) deposits. This allows us to abstract from regional differences in information acquisition process while still accounting for a large portion of total institutional deposits.

3.2. Bank characteristics.

We analyze what types of information depositors observe and take into account in their withdrawals decisions during and after the bank panic. Hence, we consider several bank-level characteristics that might differ in their visibility to different groups of depositors.

First, we consider the measure of bank involvement in suspicious offshore operations developed in Chernykh and Mityakov (2017). This measure is constructed on the basis of monthly bank reports to the Central Bank which contain information about bank's account holdings in all foreign countries over the years 2000-2003. In particular, this measure is defined as the fraction of account holdings in offshore financial centers out of total balances on all foreign accounts for a given bank (See Appendix A1 for more details on calculation of this measure). This measure is unique in that it is observable by us, the researchers, ex post, but it was not public information during the banking crisis in 2004. At the same time, it is a very crucial measure of bank riskiness during this particular bank panic episode given the Central Bank announced intent to crack down on suspicious operations.

There is a considerable variation in this measure with mean offshore fraction being around 13 percentage points and standard deviation around 0.19. Those statistics are effectively weighted by the number of customers a bank has.[18] The unweighted mean offshore fraction is around 0.1 with a standard deviation of 0.2 suggesting that in 2000-2003 (before the Central Bank announcement) a sizeable fraction of total bank transactions with foreign countries (around 10 percent) went through offshore zones. Means calculated in our data (i.e. weighted by the depositor's utilization of a particular bank) are even higher suggesting that the banks that are heavily utilized by the depositors tend to conduct even more offshore operations than the average bank.

In contrast to offshore fraction, bank regulatory capital is more likely to observed by all market participants (at least institutional depositors) and it indicates whether a given bank has sufficient cushion of funds to withstand any potential run on its assets. In our sample mean capital

[18] Number of weekXdepositor observations per bank to be precise.

adequacy ratio is around 26 percent with a standard deviation of 17 percent. This value is rather high by international standards. Partly it is due to higher business risks in Russia, even the minimum required capital in Russia was around 10-11 percent due to higher uncertainty in Russian economy. On the other hand, higher values of regulatory capital might reflect unconventional business model with little exposure to high credit risk operations and high activity in payment-related financial services such as foreign exchange operations, wire transfers, and clients' cash management services.[19]

Focusing on these two measures has an advantage in that it allows us to illustrate the difference in response of individuals depositors to publicly available information about bank quality (capital adequacy ratio) and private information about bank riskiness (offshore fraction).

In our paper, we also study the effect of rumors about bank risk as opposed to factual information. This is motivated by the fact that after the initial announcement and demonstrative closure of one of the banks for suspicious operations government officials also announced that they have a black list of banks that they are going to close in the coming months. During ensuing panic several black lists were circulated and widely discussed in the banking community and institutional depositors representing guesstimates of which banks might be the next targets of Central Bank regulatory action.

We collected information from two largest forums of the banking business community http://bankir.ru and http://archive.mbkcentre.ru/. These forums regularly place among most widely used social media business resources for banking professionals to this day. At the time of our analysis (in 2004) they were the major online resources for banking community to exchange information. Banking professionals utilize those forums for technical assistance, exchange of news, and other bank pertinent information. Naturally those forums served as platforms for the spread of rumors about bank regulatory risk during the bank panic. We consider a union of four proposed black lists that there circulated on those forums at the time. They partially overlap and contain 37 unique banks. In our analysis, we use a dummy variable for whether a bank is included in at least of those lists as a measure of rumors about bank propensity to be closed down by the regulator for suspicious activities.

[19] In this regard, higher values of capital might also signal risk of bank closure by the regulator for questionable activities. To address this in the analysis below we look separately at banks with moderate levels of capital (below 25%) and banks with excessive capital (above 25%).

3.3. Depositor's characteristics

In this paper, we emphasize heterogeneity of institutional depositors' response depending on depositor's own characteristics. In particular, we study whether depositor's access and response to information is different depending on the following factors.

First, we look separately at depositor-firms and depositor-banks, as it could be argued that other banks might have an advantage in their access to and ability to process financial information about their deposit-holding bank. We utilize tax identification numbers contained in the transfers database and match them to bank registration information available at the Central Bank website (www.cbr.ru) to identify depositors that are themselves banks. We further use the first two digits of tax ID's to extract Moscow-based entities.

Second, we divide depositors into those with and without strong business ties to their deposit-holding banks.

For depositor-firms we use information on whether a given company has received business loans from the given bank in the last 2-3 years. This information is also contained in the mandatory monthly bank reports database of Central Bank.[20] From those records, we create a dummy variable, which is equal to unity if a given company had any loans from the bank in 2002 or 2003. During the period of our analysis business loans were extremely rare and were extended only to firms that were insiders to a given bank. Summary statistics in our sample support the first of those claims: less than 1 percent of all depositor-firms had past loan relationship with their deposit-holding bank.[21]

For the depositors that are themselves are banks we use information whether they have a correspondent account with their deposit-holding bank, as creation of such a relationship involves considerable sharing of information between the two banks. Here we again use monthly bank reports to the Central Bank about their account holdings and turnover on all of their correspondent accounts in all banks.[20] The number of bankXbank pairs with correspondent account connection is considerably higher than for the firms, around 35 percent.[21]

Final dimension of depositor's heterogeneity, we explore, is depositor's own involvement in suspicious operations. The idea being that depositors that are likely to benefit from suspicious operations of their banks might respond differently to information about their bank involvement

[20] This is the same database of Central Bank records that was used by Chernykh and Mityakov (2017) in their analysis of offshore banking operations.
[21] These numbers are means from our sample, i.e. effectively weighted by the number of transactions.

in offshore operations. Here we utilize a measure of tax evasion developed by Braguinsky and Mityakov (2015) for all Moscow firms and banks. See Appendix A2 for more details about their measure.

Summary statistics for all the variables used in our analysis are presented in Tables 1 and 2 for depositor-banks and depositor-firms respectively.

4. Results

4.1. Empirical specification and outline of hypotheses.

Our goal is to find out which information about bank risk/quality institutional depositors have access to and respond to with their transfers during the banking panic. We also would like to understand whether different depositors respond differently to the same bank level information depending on their own characteristics. Thus, we emphasize informational heterogeneity both on the deposit-holding bank and depositor sides.

Bank level heterogeneity

In terms of deposit-holding bank characteristics, we classify available measures of bank quality into publicly and privately observed. We utilize in our analysis the following measures of bank risk/quality that might vary in their observability by different groups of depositors.

First, we consider the measure of bank involvement in suspicious offshore operations developed by Chernykh and Mityakov (2017) as the proxy of bank regulatory risk. This measure is particularly important for the bank panic we consider, as the Central Bank announcement explicitly mentioned closures of banks for suspicious offshore operations. Being compiled from confidential bank reports to the Central Bank, this measure is unique in that it is observable by the researchers ex-post but was bank private information at the time of our analysis. We are interested to see to what extent this private bank information is taken into account and by which groups of depositors.

Second, we consider bank capital adequacy ratio measured before the bank panic (at the end of 2003). This measure is publicly observable and signals to the market participants that the bank have sufficient cushion of funds to withstand a run on its assets.

Third, we consider rumors floating around the banking community about potential targets for Central Bank further disciplinary action. As was mentioned in the institutional backgrounds section 2 above, senior government officials announced plans to clean the system off of suspicious banks but stopped short of providing the actual list. During the resulting panic industry

professionals actively discussed and circulated "black" lists that supposedly contained banks that would be closed next. We utilize information from such lists to see whether inclusion of a bank in one of those lists has an effect on its depositors. Like bank capital ratio this measure is likely to be observed by all depositors. But unlike capital ratio, which represents factual information about the bank, this measure does not necessarily reflect quality of the bank as it is based on rumors.

Finally, we also study informational spillovers between different groups of depositors. In this case the measure of bank quality is total withdrawals done by one (likely to be more informed) group of depositors. To assess the strength and timing of the information spillovers we investigate whether there is a contemporaneous or future periods response from the other (likely to be less informed) group of depositors to these withdrawals measure. In terms of observability this measure falls somewhere in between the other bank characteristics and is used to help us illustrate the flows of information between depositors during the bank panic.

Depositor level heterogeneity and outline of hypotheses

In order to understand the mechanics of the bank panic we argue that it is essential to look not only at the characteristics of deposit-holding banks but also at the characteristics of bank's depositors, as different depositors might respond differently to the same information about their bank depending on their own characteristics. We consider the following dimensions of depositor heterogeneity.

First, we divide depositors in depositor-firms and depositor-banks. We conjecture that depositor-banks might have an advantage over non-financial companies in acquisition and processing of information about banks.

Second, we divide depositors according to the strength of their business relationship with their deposit-holding bank. We call those two groups of depositors connected and non-connected, respectively. To divide depositor-firms into connected and non-connected we use an indicator variable whether a given company received loans from the bank in the last 2-3 years. The idea being that business loans were extremely rare in Russia at the time of our analysis and were mostly extended to firms that were somehow related to the bank. For depositors that are themselves banks, we use a dummy for whether these banks have a correspondent account with the given bank; as establishment of a correspondent account relationship involves considerable sharing of information between the two parties involved.

Our conjecture is that connected depositors are more likely to have access to private information about bank risk: such as offshore fraction, while both groups of depositors are likely to observe bank public information, such as bank capital or rumors.

Finally, we study heterogeneity of depositors' responses depending on their own involvement in suspicious operations. Namely, we utilize tax evasion measure developed by Braguinsky and Mityakov (2015) for Moscow firms and banks. This is motivated by the finding in Chernykh and Mityakov (2017) that offshore-active banks tend to perform their operations on behalf of their tax-evading clients. As a result, depositor's tax evasion is likely to measure the depositor's direct benefit from having access to an offshore-active bank.

We hypothesize that after Central Bank announcement depositors who themselves are involved in suspicious operations might increase their interactions with offshore-active banks before opportunity windows for their activity closes due to the Central Bank regulatory action. At the same time, more transparent depositors might transfer funds out of offshore-active bank during bank panic for fear of the bank closure by the regulator.

We summarize our hypothesis about different groups of depositors' response towards different bank characteristics described above in Table 3. In the empirical results section below, we will be filling in tables similar to Table 3 to see whether the results would support our conjectures.

Empirical specification

To analyze the effect of different bank-level characteristics on depositors' behavior during bank panic we correlate weekly net transfer of funds by a given depositor into a given bank with various bank-level risk/quality measures while allowing for the heterogeneity of the response during the following non-overlapping time periods. Namely, we divide the timeframe of our analysis (Jan-Dec2004) into four distinct subperiods: period before the bank panic (weeks before 20), initial (very acute) phase of bank panic (weeks 21-29 in 2004), phase of calming down (weeks 30-41), and after the bank panic period (weeks 42+ in 2004).[22]

In particular, we consider the following empirical specification:

$$NetTR_{i,j,t} = f_t + b_i + \beta_1 RUN_t BC_i + \beta_2 ARUN_t BC_i + \beta_3 ERUN_t BC_i + \gamma X_{i,t} + \epsilon_{i,j,t} \quad (2)$$

[22] In robustness section 4.1 we consider more flexible empirical specification with monthly dummies and find the similar empirical patterns.

Here $NetTR_{i,j,t}$ is the net transfer (sum of all funds received minus funds sent) by depositor j into bank i in week t. To avoid scale effects this variable is normalized by total weekly turnover (total funds sent plus total funds received) of a given depositor.[23] BC_i Is information about bank i quality. RUN_t , $ARUN_t$, and $ERUN_t$ are dummies for the initial period of bank panic (weeks 20-29 in 2004), calming down period (weeks 30-41), and after bank panic period (after week 42) respectively. In our main specification, we also control for (deposit-holding) bank level heterogeneity by including bank fixed effects b_i and include time (week) fixed effects f_t to account for aggregate time shocks.[24]

To study the response of depositors to different measures of bank risk during the bank panic, we estimate regression equation (2) using different bank information measures BC_i described above. To illustrate the heterogeneity in the response of different groups of depositors to the same bank-level characteristic BC_i we examine the estimates of equation (2) for different subsamples of depositorsXbank pairs.

4.2. Bank panic and behavior of depositor-banks.

We start our analysis by looking at depositors that themselves are banks. We first study depositors' response to private information about quality of the bank where they hold deposits in: measure of their deposit-holding bank involvement in offshore operations. As was mentioned above, this measure is of particular importance to depositors given the announced Central Bank intent to crack down on suspicious offshore activities. Tables 4 contains estimation results of equation (2) for different groups of depositor-banks.

In specification 1 we estimate the relation between offshore fraction and net transfer of funds into a given bank for the whole sample of depositor-banks. We find that during and after the bank panic there is little change in bank-depositors' response to offshore activities of their bank. Point estimates are positive and sometimes are statistically significant, but implied effects are small in economic sense.[25] Estimated effects increase by a factor of two-three when we restrict the

[23] As an alternative normalization variable, we considered average weekly turnover for the whole year by a given depositor. The advantage of this latter measure is that if a depositor makes large transfers of funds during the bank panic episode then normalization by contemporaneous weekly turnover might dampen the total effect. The results are similar for this alternative normalization and are presented in Appendix A8.

[24] Bank fixed effects b_i absorb the level of BC_i variable in empirical specification (1). In a robustness section 5.2 we consider a saturated specification with depositorXbank fixed effects. The results are similar.

[25] An increase in offshore fraction by one standard deviation (by 0.2) is associated with an increase in the net transfer by 0.1-0.2 percentage points, which is a small effect given that standard deviation of the net transfer variable is around 0.1 (10 percentage points).

sample to depositor-banks with a strong business connection to their deposit-holding bank in the form of a correspondent account relationship (Specification 3). At the same the effects are essentially zero for the depositors without such close business connection (Specification 2).

These responses for the average depositor, however, mask important heterogeneity depending on depositor's own involvement in suspicious operations, which, as we argued in the hypothesis section above, might proxy for the benefit they receive from dealing with an offshore-active bank. We utilize Braguinsky and Mityakov (2015) tax evasion scores developed for Moscow companies (both banks and non-financial firms) to divide depositor-banks into two groups ("sound" and "suspicious") depending on whether their tax evasion scores are above or below the average value. We again conduct estimation separately for depositors-banks with and without correspondent account in a given bank. Estimation results are presented in specifications 4-7 of Table 4.

We find that it is suspicious depositors with strong business ties to the bank who significantly intensify their transfers into offshore active banks during and after the bank panic (Specification 7). These effects are not only statistically significant but also imply economic effects of considerable magnitudes. For a one standard deviation increase in bank offshore activity (by 0.2) the net transfer of funds increases by around 0.5-0.7 percentage point (0.2*0.34) which is a sizeable effect given that standard deviation of the dependent variable is around 10 percentage points. In contrast, more transparent depositors that do have a correspondent account in an offshore active bank cut their transfers to it during the bank panic (Specification 5), but the effects are somewhat small in size (0.25 pp change in net transfer for a one standard deviation increase in offshore measure). As before the effects for the non-connected depositors are essentially zero (Specifications 4 and 6). Thus, it seems that only connected depositor-banks observe offshore activities of their bank and respond to this information during the bank panic.

To contrast depositors' responses to privately available information we next turn to bank information that is likely to be observed by all market participants: pre-crisis capital adequacy ratios. In Table 5 we present estimates of equation (2) for capital adequacy ratios measured at the end of 2003 as a determinant of depositors' behavior during the bank panic.

When we look at the whole sample of banks (Panel A of Table 5) we find, if anything, that there is a negative relationship between initial bank capital ratio and depositors' transfers into the bank during and after the bank panic. Even though estimated coefficients are (sometimes)

statistically significant the implied effects are rather small: 0.2-0.3 percentage points change in the net transfer for a one standard deviation change in capital ratio (by 0.17).

We conjecture that this might be due to an inherent non-linearity of the capital ratio as a measure of bank quality. Higher capital adequacy at moderate levels of capital ratio might serve as a positive signal of bank quality since it implies that the bank has a higher cushion of funds to withstand potential adverse shocks. However, excessively high capital might signal a problematic business model based on cash transactions and inadequate financial intermediation that might entail a higher probability of regulatory action given the Central Bank policy announcement.

To probe this conjecture, we re-estimate regression equation (2) for the subsample of (depositor-holding) banks that have capital adequacy ratios below 25 percent.[26] In this subsample we do find that higher initial capital adequacy ratio implies an increase in the transfer of funds by depositors during and after the bank panic. The effects are in general larger for depositors without a strong business connection to their banks (Specifications 2, 4, 6 vs 3, 5, and 7). We also find no heterogeneity in unconnected depositors response to capital ratio depending on their own involvement in suspicious operations.[27]

Estimated coefficients are statistically significant and the implied effects are considerable in economic sense. For a one standard deviation in capital adequacy ratio (by 0.17) the net transfer by non-connected depositors increases by 0.7-1.5pp. Thus, it seems that for moderate capital adequacy ratios depositors see higher bank capital as a positive signal of bank quality and intensify their transfers to such banks during and after the bank panic. Notably, the effects are stronger for depositors without strong business connection to their banks.

Thus, we observe a notable dichotomy in depositors' responses to public and private information depending on depositor's connection to the bank. Connected depositors change their behavior during the bank panic on the basis of privately available information about their bank quality (offshore fraction) while non-connected depositors seem to base their withdrawal decisions on the basis of publicly available information: initial bank capital adequacy ratio (provided its level is not excessively high).

[26] At the time of our analysis Central Bank regulatory cutoff was 10-11 percent depending on bank size, so capital adequacy ratios above 25 percent clearly signal that the bank might be overcapitalized.

[27] In the Appendix A5 we perform estimation on the sample of banks with capital ratio above 25% and indeed confirm that higher levels at the upper tail of capital ratio distribution are viewed negatively by the depositors.

Taken together our results shed light on the mechanics of financial flows during the bank panic. They indicate that depositor-banks rationally respond to available information about their deposit-holding bank risk. We find that depositors with close business ties to their banks have an informational advantage over depositors without such ties, as they respond to a very specific and relevant measure of their bank risk, their deposit-holding bank involvement in suspicious offshore operations. Moreover, this response is heterogeneous depending on depositor's own involvement in suspicious activities.

More generally our results emphasize differences in access to bank information and heterogeneity in the response (conditionally on having such access) to such information by different groups of depositors.

4.3. Bank panic and behavior of non-financial companies.

Above we studied the response of depositor-banks to private and public information about their deposit-holding bank quality. We found that depositor-banks with strong business connection to their bank tend to respond to private information about their deposit-holding bank quality (offshore fraction), while non-connected depositors (especially transparent ones) respond to publicly available information (pre-crisis capital). However, depositors that are themselves banks might have informational advantage and expertise at processing financial information about other banks. As a result, their response might be not representative of the response of other, less sophisticated depositors. In this regard, it is essential to analyze the behavior of depositors that are non-financial companies who at the time of our analysis constituted the major group of depositors.[28]

In Table 6 we explore the relation between bank offshore operations and net transfer of funds by depositor-firms by estimating regression equation (2) for the case when depositors are non-financial companies.

As before, we find very little connection between offshore operations of a given bank and depositor-firms in the full sample of company-bank observations (specification 1). Even when we constrain our sample to company-bank observations with strong business connection[29] (specification 3) and estimated coefficients increase by an order of magnitude, the implied effects

[28] As was mentioned in the institutional background section above non-financial companies accounted for 69 percent of total deposits held by institutional depositors, which amounts to around 40 percent of total deposits.

[29] In this case we proxy such connection by whether non-financial company took any loan from a given bank in 2002-2003.

are still somewhat small in economic sense and not statistically significant. In this case, an increase in offshore activity of deposit-holding banks by one standard deviation (by 0.2) is associated with an increase in the net transfer of connected depositor-companies after the bank panic by around 0.5-0.6 (=0.03*0.2) percentage points, which is a modest effect given that standard deviation of net transfer variable for depositor-firms is around 30 percentage points.

However, these estimates mask heterogeneity in response depending on depositor's own involvement in suspicious operations. In specifications 4-7 we reestimate regression equation (2) for depositor-firms depending on their tax evasion scores developed in Braguinsky and Mityakov (2015). As before, we divide all depositor-firms into two groups: "transparent" and "suspicious" depending on whether their tax evasion score is above or below the mean value.

We find that suspicious connected firms tend to intensify their contacts with offshore active banks during and after the bank panic, while more transparent connected firms decrease their transfers to such banks at the same time. Estimated coefficients are not only statistically significant but also imply effects of considerable magnitudes. A one standard deviation increase in bank's offshore activity of (by 0.2) is associated with a decrease in the net transfer by transparent depositor-firms by 0.8-1 percentage points (=0.51*0.2) and an increase in the net transfer by suspicious depositors by around 1-1.2 percentage points. Notably, these effects are completely absent for non-connected depositor-firms.

Thus, it seems that in the case of non-financial companies only those with strong business relationship with a bank tend to change their transfer decisions on the basis of their bank involvement in offshore operations, with more transparent depositors cutting down ties to the offshore active banks and less transparent ones intensifying their contacts with such banks during the bank panic. We conjecture that those patterns can be explained by the fact that suspicious depositor-firms might be direct beneficiaries of offshore operations conducted by the banks.[30] Hence, after the Central Bank announcement to restrict offshore operations, they intensify their transfers into their respective offshore-active banks while the opportunity window for such

[30] This is consistent with the finding in Chernykh and Mityakov (2017) that banks seem to conduct offshore operations to facilitate tax evasion of their clients.

operations is open. At the same time, more transparent (but connected) depositors decide to cut down ties with offshore-active banks for fear of regulatory action.[31]

We also look at the depositor-firms' response to publicly available information: pre-crisis bank capital. Estimation results are presented in Table 7. Given the non-linearities in capital as a signal of bank quality presented in the previous section for depositor-banks we conduct estimation on the subsample of banks with capital adequacy ratios below 25 percent (Panel B).[32] We find that capital adequacy ratio might be perceived as a positive signal by the depositors without connection to a given bank, but the effects are small in economic sense and not statistically significant (Specifications 2). Only for the sample of suspicious depositors without strong business connection to the bank do we find some evidence of positive relation between bank capital and the transfer of funds during the bank panic (Specification 6): the implied effects are around one percentage point (=0.05*0.18) increase in net transfer for a one standard deviation increase in bank capital adequacy ratio (by 0.18).

At the same time, we find very strong (in economic sense) negative relationship between bank capital and the net transfer of connected depositor-firms (Specification 3). These effects are observed regardless the transparency status of the depositor (Specifications 5 and 7). Estimated coefficients imply that for a one standard deviation lower bank capital adequacy ratio (by 0.18) net transfer of connected to this bank increase by around 3-4 percentage points. Thus, it seems that connected depositors bring their funds to their low-capital bank's during the crisis.

There are two potential explanations of why this happens. On the one hand, during the time of our analysis only firms related in some way to the bank (e.g. through common ownership) were able to receive loans from it. Hence, the negative effects we find for connected depositor-firms might indicate the inflow of capital to troubled banks during the bank panic from common (company and bank) owners. On the other hand, it could be that during the bank panic low-capital banks start offering incentives to all depositors to keep their funds, but only connected depositor-firms correctly perceiving quality of their bank respond to them.

[31] As was mentioned in the introduction, during the liquidation process all bank assets are frozen. So, even if the bank has enough assets to cover its liabilities there could be a significant delay before depositors would get their money back.

[32] For completeness (in Appendix Table A5.2), we perform the analysis for the subsample of deposit-holding banks with capital adequacy ratio above 25 percent and do not find any significant result.

Overall, our results indicate that private information about bank quality such as offshore fraction seems to affect withdrawal decisions only of depositor-firms with close business connection to their banks. Moreover, we find that there is an important heterogeneity in such depositors' response depending on their own characteristics: transparent depositors are likely to reduce their interactions with offshore-active banks while suspicious depositors intensify their operations with such banks. We do find some evidence of flight to safety on the basis of past capital ratio, but the effect is somewhat more muted than in the case of depositor-banks. Finally, we find some evidence that depositor-companies connected to lower capital banks tend to help those banks during the banking crisis by intensifying the transfer of funds into such banks.

4.4. Information spillovers: uninformed agents' response to past withdrawals of informed agents.

Above we found that depositors that have close business ties to a given bank (either through a correspondent account relationship or through past loans relationship) tend to observe private information about their bank risk (degree of involvement in offshore operations) and act on this information during the bank panic. In this section, we would like to investigate whether market participants without strong business connection with their deposit-holding banks observe and respond to withdrawal decisions of the connected to their bank depositors, who might be more informed about their bank quality. To probe this conjecture, we consider the following empirical specification:

$$NetTR_{i,j,t} = f_t + (b_i) + \beta_1 RUN_t Flows_{i,t} + \beta_2 ARUN_t Flows_{i,t} + \beta_3 ERUN_t Flows_{i,t} + \alpha Flows_{i,t} + \gamma X_{i,t} + \epsilon_{i,j,t} \quad (3)$$

Here $NetTR_{i,j,t}$ is the net transfer by (less informed) depositor j into bank i in week t normalized either by total weekly turnover of this company j . $Flows_{i,t}$ are total (normalized) withdrawals of funds by informed depositors from bank i in the current week t.[33] To avoid scale effects, we calculate "*Flows*" variable as total withdrawal done in week t normalized by deposit-holding bank assets.

Coefficients $\beta_k,\ k = 1,2,3$ measure the change in uninformed depositors' responses to withdrawals done by informed depositors during and after the bank panic, while $\alpha + \beta_k$ indicate the total impact of $Flows$ variable in each respective time period (during and after the bank panic).

[33] As a robustness check to avoid potential contemporaneous correlations of transfers of depositors with and without business connection to the bank we also consider flows variable lagged by one week and further explore alternative lag structures in *Flows* variable in robustness section 5.2. and find similar results.

We consider specifications with and without deposit-holding bank fixed effect b_i. Specification with such fixed effects use variation in the outflows by more informed depositors within a given bank to identify the response of less informed depositors, while specification without such fixed effects uses combined within and between variation in such outflows.

We start by looking at depositor-firms without strong business connection to their bank and analyze whether their net transfer is related to total withdrawals of depositor-firms that do have a close business relation with the bank in the form of past loans given.

We first estimate specification (3) without deposit-holding bank fixed effects. Estimation results are presented in specifications 1-3 of Table 8. We find that even before the bank panic there is a negative relation between the transfer of funds by non-connected depositor-firms and withdrawals by connected depositor-firms: for a one standard deviation increase in the outflows by connected depositor-firms (by 0.1) non-connected depositor-firms decrease their net transfers by around 0.4-0.5 of a percentage point, which is a modest effect given that standard deviation of the dependent variable is around 25 percentage points. However, these effects are considerably intensified (doubled or even tripled) during the bank panic: for a one standard deviation increase in the outflows by connected firms the net transfer of non-connected depositor-firms decreases by more than 1-1.5 (0.1*(-0.44-0.11)) percentage points during the bank panic (specification 1), the effect being even larger for tax-evading depositor-firms (specification 3).

But these patterns virtually evaporate once we include deposit-holding bank fixed effects (specifications 4-6 of Table 8), estimated coefficients become small and not statistically significant. Thus, the result in specifications 1-3 is likely to be driven by variation in outflows of connected depositor-firms across banks and not by variation in outflows at a given bank level.

Taken together these patterns suggests that non-connected depositor-firms might have some perception about their bank quality. Hence, there is a correlation between the withdrawals of informed depositors and less informed ones. During the bank panic the effect of this information is intensified as the overall risk of bank closures is increased. However, non-connected depositor-firms do not seem to have access to real-time information about withdrawals of more informed agents as there is virtually no-connection between withdrawals of connected and non-connected depositor-firms once bank level heterogeneity is accounted for by the bank fixed effect.

In contrast, we uncover different patterns for the depositors that are themselves are banks. In this case, we divide depositors into informed and less informed depending on whether there is

a correspondent account relation established between the depositor-bank and deposit-holding bank. We, as before, calculate *Flows* variable as the total withdrawal of funds by connected depositor-banks normalized by deposit-holding bank (pre-crisis) assets. Estimation results are presented in Table 9.

In the first three columns of Table 9 we present estimation results without the deposit-holding bank fixed effects. As for the depositor-firms, we find that there is a negative relationship between withdrawals done by connected depositor-banks and net transfer of non-connected depositor-banks before the bank panic. Those effects become somewhat smaller during the bank panic, but the implied overall effect during the bank panic is still negative (Specifications 1-3).

However, when we control for deposit-holding bank heterogeneity using fixed effects we do find negative coefficients on the interactions of total outflows of connected depositor-banks with bank-panic and after-bank-panic periods dummies (Specifications 4-6). Since those estimates use within (deposit-holding) bank changes in total outflows by connected depositor-banks as identifying variation, estimated coefficients show the impact of an increase in total outflows of funds from a given bank by connected depositor-banks on the net transfer done by non-connected depositor-banks.

We find that before the bank panic an increase in outflows by connected depositor-banks has little effect on the net transfer of non-connected depositors (estimated α's are small and even positive). However, bank panic completely changes those patters. During and after the bank panic the net transfer by non-connected depositor-banks is likely to decrease when connected depositor-banks intensify their withdrawals from a given bank (estimated β_k's are negative) and combined effects ($\alpha + \beta_k$) become negative as well.

This suggests that, unlike non-connected depositor-firms, (non-connected) depositor-banks do (negatively) respond to the increases in the weekly outflows of funds performed by connected depositor-banks. Notably, this response is only observed during and after the period of bank panic.

Estimated coefficients are not only statistically significant but also imply effects of considerable magnitudes. For a one standard deviation increase in connected depositor-banks (by 0.26) net transfers of non-connected depositors during bank panic drop by around 0.5

(=0.27*(0.01-0.025)) percentage points,[34] which is a considerable effect given that standard deviation of the net transfer for depositor-banks is around 11 percentage points.

Overall, we document a notable connection between outflows of funds performed by depositors with strong business connection to their bank and the net transfer by depositors without strong business ties to the bank. When we explore variation across banks we find that both depositor-banks and depositor-firms view withdrawals of funds by connected depositors as adverse information about the bank. Thus, both groups of depositors seem to possess some information about their bank quality and take it into account in the transfer decisions.

However, there is a striking difference between non-connected depositor-firms' and depositor-banks' response once we control for deposit-holding bank fixed effect, i.e. when identification comes from the changes in outflows of funds by connected depositors at the individual deposit-holding bank level. In this case, we find that increases in outflows by connected depositors do have a negative effect on transfers by non-connected depositor-banks (during and after the bank panic) but not the depositor-firms.

These results imply that non-connected depositor-banks might have informational advantage over depositor-firms, as they seem to observe high frequency (weekly) information about their bank prospects (embedded in connected depositors' outflows) and act on this information during the bank panic. In contrast, non-connected depositor-firms might have a rough idea about their bank quality, and they do act on this information during the bank panic; estimated combined effects $\alpha + \beta_k$ in specifications 1-3 in Table 8 (i.e. without deposit-holding bank FE) are negative and are larger in magnitudes during and after the bank panic. However, non-connected depositor-firms seem not to observe real-time variation in informed depositors' behavior and as a result might not respond to concurrent information shocks about their bank prospects.

4.5. Role of rumors during banking crisis.

Above we have considered the impact of factually correct information about banks, being it privately (offshore fraction) or publicly available (capital adequacy ratio) bank level information. At the same time during banking crisis and ensuing panics there could be information flows, some of which are simply hearsay and rumor-based and, as such, do not necessarily reflect actual bank

[34] This is a combined effect $\alpha + \beta_k$. The change in the impact of outflows before and after the bank panic implied by β_k is even larger: – 0.7pp for a one standard deviation increase in outflows.

conditions. In this regard in order to analyze the determinants of bank panics it is instructive to see whether rumors about bank risk has any effect on depositors and, if yes, on which ones.

In practice, it could be difficult to disentangle rumors from actual bank-level risk as it is both difficult to observe rumors that float around during a turbulent periods of banking panics and contrast them with actual information about bank propensity to fail.

However, in our set up we can measure both phenomena. On the one hand, given the Central Bank intent to close banks for suspicious offshore operations and money laundering we, as before, can use offshore fraction as the indicator of actual risk of bank closure. On the other hand, from historical records we obtained several blacklists of banks that were circulating in the field during the banking panic in Summer 2004.[35] Those lists were motivated by regulator's announcement that after the initial closure of one of the banks they have plans to close ten more banks.

These lists represent educated guesses of business analysist and leakages from insiders, but they also might be contaminated by fake alerts spread by unscrupulous competitors. In the end, we take those lists for what they are: rumors and hearsay circulated in the business community about bank closure risks at the time of our analysis. Even if those lists were completely fake, they are still useful as, being observed by all market participants, they might serve as coordination mechanisms to start (self-fulfilling) bank-runs.

First, we contrast these black lists to actual data by relating the probability of a bank to be included in one or more of the black lists with offshore fraction and other bank level controls. In particular, we estimate the following regression equation by probit:

$$BL_i = \alpha + \beta OF_i + \gamma X_i + \epsilon_i \qquad (4)$$

Here BL_i is a dummy indicating whether bank i is included in one or more of the black lists circulated during the bank panic. OF_i is the measure of offshore activities of bank i. We also include other controls X_i such as (pre-crisis) bank capital ratio, bank size, etc. Table 10 contains estimation results by probit (specifications 1-3) and linear probability model (specifications 4-6).

We do find a positive connection between bank's involvement in offshore operations (measured before the crisis) and its propensity to be included in one of the black lists. Economic

[35] As was mentioned in the data description section above those lists are derived from several forums for bank analysts where such lists were actively posted and discussed at the time of banking crisis in Summer 2004: http://bankir.ru and http://archive.mbkcentre.ru/ .

significance of the implied relation is sizeable. For a one standard deviation increase in offshore measure (by 0.2) estimated propensity to be included in one of the lists goes up by 1.2 percentage point in the probit specification (=0.2*0.6), which is a moderate effect given that standard deviation of "blacklist" dummy is around 18 percent. Estimated coefficients in the probit specification are cut by a factor of 2-3 when we include a dummy for whether a bank is headquartered in Moscow,[36] but they increase back to original values when we conduct estimation for subsample of Moscow-only banks. Linear probability model (presented in specification 4-6) suggests somewhat higher but still modest effects across all specifications. There seems to be no connection between blacklist dummy and other bank-level controls: such as (pre-crisis) bank size or capital ratio. Overall, we conclude that rumors tend to be related to the bank involvement in suspicious offshore operations but there is a lot of noise in that signal as well.

To contrast depositors' response to factual information and rumors about bank propensity we consider the following empirical specification:

$$NetTR_{i,j,t} = f_t + b_i + \beta_1 RUN_t OF_i + \beta_2 ARUN_t OF_i + \beta_3 ERUN_t OF_i +$$
$$+\beta_1 RUN_t BL_i + \beta_2 ARUN_t BL_i + \beta_3 ERUN_t BL_i + \gamma X_{i,t} + \epsilon_{i,j,t} \quad (5)$$

We correlate the net transfer $NetTR_{i,j,t}$ of depositor j into bank i in week t with deposit-holding bank measure of offshore activities OF_i and dummy for being on one of more of the blacklists BL_i. As before, we allow for the effect of these two bank characteristics to vary depending on the stage of the crisis (initial stage, aftershock, after the banking crisis period). Estimation results for depositor-banks and depositor-firms are presented in Tables 11 and 12, respectively.

Results for depositor-firms suggest that only (transparent) depositor-firms without strong business relation to the bank base their withdrawal decisions on blacklist dummy. Keeping other things equal (particularly controlling for offshore fraction) such depositors decrease their net transfer in the bank by 0.5 percentage points if the bank is included in one of more blacklists. Notably, these depositors do not respond to factual information about bank regulatory risk embedded in offshore fraction. This finding suggest that it is this groups of depositors that might be particularly susceptible to rumors about their deposit-holding bank quality.[37]

[36] Moscow dummy itself is highly statistically and economically significant. This is not surprising as most of offshore active banks were located in Moscow utilizing its financial infrastructure to conduct business abroad, and most of the lists recognizing that contained predominantly Moscow banks as well.

[37] Estimation results for blacklist dummy are similar if we omit offshore fraction altogether.

At the same time, depositor-firms with a strong business connection to their bank considerably intensify transfers into the bank if it is included in the blacklist; the results are particularly strong for transparent depositors as estimated coefficients imply an increase in the net transfer by up to 5 percentage points if the bank is blacklisted. The response to offshore fraction of connected depositor-firms is the same as before: with transparent depositors' cutting ties to offshore-active banks and less transparent depositor intensifying contacts with such banks.

Taken together these results suggest that non-connected (transparent) depositors tend to respond to rumors about their deposit-holding bank risk, while connected depositors seem to base their withdrawal decisions on factual information. Moreover, controlling for offshore activity of the bank, depositors that are connected to it are likely to help this bank if it happens to be included in the black list. It is worth noting that this finding parallels the result in Section 4.2 above when connected depositor-firms seem to intensify transfers into low-capital banks during the banking crisis. We conjecture that explanation might be the same: either depositor-firms help the banks they have close business relation with because of ownership ties, or deposit-holding banks provide incentives for all depositors, but only connected ones respond to those correctly perceiving their bank quality.

When we look at depositor-banks we find no clear pattern in the relation between blacklist dummy and the net transfer. For non-connected depositor-banks we find virtually no relationship: estimated coefficients are not statistically significant and small in magnitudes. For connected depositor-banks estimated coefficients are sometimes sizeable in economic sense (e.g. for connected depositor banks in the second wave of bank panic) but overall are very imprecisely estimated and flip signs over time. Estimates for offshore fraction are similar to the ones in the main text (See Table 4). Thus, there may be some rumor based impact on the behavior of depositor-banks but it is less clear-cut than for the depositor-firms.

Overall, we conclude that rumors play a role in the behavior of non-connected depositor-firms. As those companies are unlikely to have access to bank inside operations (such as offshore activity) they have to use all information at their disposal, even if such information is a noisy signal of bank actual probability of closure by the regulator. Connected depositors (both banks and firms) having access to factual information about bank regulatory compliance risk base their decision on offshore fraction. In addition, connected depositor-firms tend to help their banks that happen to get on the blacklist by intensifying the transfer of funds into the during the banking crisis. At the

same time, transparent (and connected) depositor-firms do still punish banks for actual involvement in offshore operations.

5. Extensions and robustness checks

5.1. Flexible time-horizon specification

In the main text above we studied the impact of the banking crisis by interacting dummies for pre-defined time periods with various bank level characteristics (see equation (2)). The dummies in question were defined on the basis of key events (Central Bank announcements) in Russia at the time. In this section, we use alternative more flexible specification where we interact various bank level characteristics with a full set of monthly dummies to see what time patterns would emerge and whether those would coincide with the time periods that we identified in the main text. Namely, we consider the following regression equation:

$$NetTR_{i,j,t} = f_t + b_i + \sum_{m=2}^{12} \beta_m D_m(t) BC_i + \gamma X_{i,t} + \epsilon_{i,j,t} \qquad (6)$$

Here, as before, $NetTR_{i,j,t}$ is the net transfer by depositor i in bank j in week t. BC_i Is bank i level characteristic under consideration. β_m, m=2,…,12 are coefficients on eleven (Feb to Dec) monthly time dummies $D_m(t)$. We drop interaction with the first (Jan) dummy since the full set of month dummies interacted with bank characteristic BC_i is absorbed by deposit-holding bank fixed effect b_i. Estimated coefficients show the differential effect of bank level characteristic BC_i on the depositor net transfer in various months relative to the baseline effect in January.

As in the main text we estimate (6) separately for various groups depositor-bank and depositor-firms depending on depositor's connection to the bank and own involvement in suspicious operations. We relegate tables with the estimated coefficients to Appendix section A3 and instead focus on plots of interactions with monthly dummies β_m for various groups of depositors.

Figures 3-6 plot time-varying effects of offshore fraction and initial bank capital ratio on the transfers of various groups of depositor-banks and depositor-firms. We clearly see the impact of Central Bank announcement in depositor-banks' and depositor-firms' responses over time, that support the definitions of dummies for banking crisis we used in the main text: connected suspicious depositor-firms and banks intensify their contacts with offshore active banks in Jun-Aug timeframe, while transparent depositor-firms tend to cut ties with such banks at the same time (see Figures 3 and 5). As before we do not find significant relationship between offshore fraction for non-connected depositors. At the same time, we do see some evidence of non-connected

depositor-banks intensifying their transfers into banks with higher pre-crisis capital ratio after Jun 2004 timeframe (Figure 4), while the effect is more muted for depositor-firms.

Overall, we argue that more flexible monthly-dummies specification (6) portrays roughly the same picture as our more parsimonious specification (2) in the main text.

5.2 Lag structure in the effect of connected depositors' (out)flows.

In the main text above we established a connection between withdrawals of depositors with strong business connection in a given week and contemporaneous withdrawals of depositors without such connection to their deposit holding bank. In this section, we explore robustness of this finding to alternative lags specification.

First, we estimate specification similar to the one used in the main text but with previous week withdrawals by connected depositors:

$$NetTR_{i,j,t} = f_t + (b_i) + \beta_1 RUN_t Flows_{i,t-1} + \beta_2 ARUN_t Flows_{i,t-1} + \beta_3 ERUN_t Flows_{i,t-1} + \alpha Flows_{i,t-1} + \gamma X_{i,t} + \epsilon_{i,j,t} \quad (7)$$

Here $Flows_{i,t-1}$ are total withdrawals by connected depositors in the past week normalized by total assets of deposit-holding bank. Estimation results for depositor-firms and depositor-banks are presented in Appendix A9, Table A9.1 and A9.2, respectively.

Just as in the main text above, we find that without deposit holding bank fixed effects there is a negative relation between the withdrawals of connected depositors and (subsequent) transfers of non-connected depositors. However, this relation evaporates for (non-connected) depositor-firms once deposit-holding bank fixed effects are included (i.e. when we explore variation in connected depositor-flows over time at the level of a given deposit holding bank), but it is still present for non-connected depositor-banks.

We further explore the lag structure of this effect for depositor-banks by including higher order lags of connected depositor-banks withdrawals, up to four weeks. Estimation results are presented in Table A9.3 of Appendix A9. We find that the effect of past withdrawals is mostly pronounced for two-weeks and three-week lags, while it is much smaller for contemporaneous or past week withdrawals as well as the four-week lag. These patterns indicate that while depositor-banks seem to have an informational advantage over depositor-firms, as they respond to past withdrawals by connected depositors, this advantage is somewhat limited, as they respond to such withdrawals only with a 2-3 weeks lag.

5.3. More flexible fixed effects specification and additional robustness checks

In the main text, we correlated net transfer of funds by a given depositor into a given bank controlling for deposit-holding bank heterogeneity with bank fixed effects. It could be argued that our baseline results could still be affected by omitted variable bias from heterogeneity on the depositorXdeposit-holding bank level. One notable variable of this kind is initial account balance of a given depositor in a given bank. To address this, we consider a specification with depositor X deposit-holding bank fixed effects. Estimation results presented in Appendix section A4. We find that even this saturated specification shows the similar patterns as our baseline.

We further performed a battery of additional robustness checks. We looked at different subsamples of our data to make sure that our results are not driven by a small but influential group of outliers. We dropped depositors with extremely large (positive or negative) transfers, depositors dealing with too many banks (more than ten) out of concerns that such depositors might be not representative of the whole sample. We considered depositors that regularly interact with their deposit-holding banks (at least once per month). In all cases we got the same results as in our baseline specification. All those robustness checks are relegated to the Appendix A8.

6. Conclusion

In this paper, we study the information acquisition process by and information spillovers between different groups of institutional depositors. We exploit a unique regulatory shock: pure information-induced bank panic triggered by an unexpected Central Bank announcement about cleaning the system of banks engaged in suspicious operations supported by disciplinary action against one bank involved in such operations.

Using unique administrative data, we are able to provide a very detailed view of the ensuing bank panic. We find that bank private information about bank risk tend to be observed by some depositors - in particular, those with close business ties to a given bank. Furthermore, this information tends to spill over to other market participants who observe and respond to (albeit with a lag) withdrawal decisions of the more informed depositors. These latter effects are notably stronger for depositor-banks than depositor-firms, suggesting that absent a connection to their deposit-holding bank, depositor-banks still enjoy informational advantage over depositor-firms.

We also examine the role of rumors during bank panic and find that only depositor-firms without close connection to their bank tend to be susceptible to them. Depositor-banks (even those without strong business ties to a given bank), as well as connected depositor-firms, ignore

unfounded rumors about their bank quality. Moreover, depositor-firms tend to provide financial support to banks they have a strong connection with if those banks are rumored (unjustifiably) to be the next enforcement target of the Central Bank's regulatory action. Notably, they do punish their banks for actual involvement in suspicious operations.

Overall, our paper provides a rare glimpse into the anatomy of information flows and heterogeneous depositors' response during a confidence-based banking crisis episode uncontaminated by macroeconomic shocks. Our results emphasize the rational side of depositors' response during banking panic. We show that very confidential but crucial information about bank risk is revealed to some market participants and then spills over to a wider market. Whether such information spillovers are strong enough to rid the system of irrational bank-runs remains a topic of future research.

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Tables and Figures

Table 1: Summary statistics for the sample of depositor-banks

Variable	Obs	Mean	Std. Dev.	Min	Max
Depositor-bank characteristics					
Net transfer	260,968	0.030	0.087	-1.000	1.000
Total withdrawal by connected banks/bank net assets	240,509	-0.083	0.273	-31.295	24.659
Depositor tax evasion	261,528	18.608	1.532	14.953	25.626
Depositor offshore	244,701	0.128	0.198	0.000	1.000
Correspondent account dummy	261,528	0.353	0.478	0.000	1.000
Deposit-holding bank characteristics					
Deposit-holding bank offshore fraction	242,980	0.138	0.196	0.000	1.000
Deposit-holding bank capital	261,527	0.264	0.171	0.000	1.000
Deposit-holding bank net assets (Millions Rub)	261,528	13600	30100	1.11	178000

Notes: Sample includes all depositor-bank X deposit-holding bank observations. Net transfer is defined as the sum of funds transferred into minus funds sent by a given depositor of a given bank normalized by total weekly turnover (funds sent+received) of this depositor. Depositor tax evasion is Braguinsky and Mityakov (2015) tax evasion score. Depositor offshore and deposit-holding bank is offshore fraction of Chernykh and Mityakov (2017) for depositor-bank and deposit-holding bank respectively. Bank capital ratio is calculated as the ratio of regulatory bank capital to total net assets.

Table 2: Summary statistics for the sample of depositor-firms

Variable	Obs	Mean	Std. Dev.	Min	Max
Depositor-firm characteristics					
Net transfer	12,689,335	-0.011	0.250	-1.000	1.000
Total withdrawal by connected depositor-firms/bank net assets	12,007,778	-0.018	0.103	-18.540	3.836
Depositor tax evasion	12,689,335	18.565	1.833	12.278	31.634
Loan relationship dummy	12,689,335	0.006	0.078	0.000	1.000
Deposit-holding bank characteristics					
Deposit-holding bank offshore fraction	11,965,128	0.135	0.187	0.000	1.000
Deposit-holding bank capital	12,689,326	0.268	0.184	0.000	1.000
Deposit-holding bank net assets (Millions Rub)	12,689,335	15700	33200	1.11	178000

Notes: Sample includes all depositor-firm X deposit-holding bank observations. Net transfer is defined as the sum of funds transferred into minus funds sent by a given depositor of a given bank normalized by total weekly turnover (funds sent+received) of this depositor. Depositor tax evasion is Braguinsky and Mityakov (2015) tax evasion score. Bank capital ratio is calculated as the ratio of regulatory bank capital to total net assets.

Table 3. Hypotheses about depositors' behavior during bank panic.

Depositor	Connected		Non-connected	
	Sound	Suspicious	Sound	Suspicious
Publicly observable bank risk	No effect, negative	No effect, positive	Negative	Negative
Privately observable bank risk	Negative	Positive	No effect	No effect

Table 4: Bank offshore operations and transfers by depositor-banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	*Dependent variable: Normalized net transfer into a given bank*						
Offshore activity X	0.005	-0.003	0.014	0.007	-0.013	-0.007	0.023**
1(After Run)	(0.005)	(0.005)	(0.010)	(0.009)	(0.019)	(0.006)	(0.011)
Offshore activity X	0.011*	0.001	0.024**	0.009	-0.012	-0.002	0.034**
1(Aftershock)	(0.006)	(0.005)	(0.011)	(0.008)	(0.016)	(0.006)	(0.015)
Offshore activity X	0.002	-0.005	0.012*	-0.002	-0.004	-0.005	0.017**
1(Run)	(0.003)	(0.003)	(0.007)	(0.005)	(0.013)	(0.004)	(0.008)
Observations	238,230	152,456	85,774	55,076	33,423	97,380	52,351
R-squared	0.075	0.083	0.123	0.103	0.143	0.113	0.156
Correspondent relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-bank to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Correspondent relation is equal to "Yes" if banks have correspondent accounts in each other. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table 5: Initial bank capital and transfers of depositor-banks.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
	Panel A: All banks						
Capital 2003 X	-0.012**	-0.017**	0.000	0.005	0.018*	-0.027***	-0.014
1(After Run)	(0.006)	(0.007)	(0.008)	(0.009)	(0.011)	(0.009)	(0.011)
Capital 2003 X	-0.010	-0.013**	0.005	-0.006	0.007	-0.014*	-0.001
1(Aftershock)	(0.006)	(0.006)	(0.011)	(0.009)	(0.013)	(0.008)	(0.014)
Capital 2003 X	-0.005	-0.007	0.004	-0.001	0.003	-0.008	0.002
1(Run)	(0.004)	(0.005)	(0.007)	(0.006)	(0.010)	(0.006)	(0.008)
Observations	260,967	168,805	92,162	61,227	35,485	107,578	56,677
R-squared	0.080	0.090	0.133	0.112	0.154	0.122	0.174
	Panel B: Sample of banks with initial capital adequacy ratio <25%						
Capital 2003 X	0.028	0.051*	-0.028	0.105*	-0.037	0.026	-0.056
1(After Run)	(0.035)	(0.029)	(0.074)	(0.061)	(0.086)	(0.034)	(0.098)
Capital 2003 X	0.097**	0.076**	0.104	0.068	0.063	0.095**	0.105
1(Aftershock)	(0.041)	(0.032)	(0.076)	(0.057)	(0.079)	(0.041)	(0.092)
Capital 2003 X	0.037	0.039*	0.024	0.045	0.019	0.041	0.018
1(Run)	(0.024)	(0.020)	(0.046)	(0.028)	(0.046)	(0.028)	(0.053)
Observations	157,100	99,726	57,374	37,357	22,851	62,369	34,523
R-squared	0.069	0.078	0.089	0.073	0.116	0.107	0.113
Close business relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given deposit owning bank to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Capital 2003 is deposit-holding bank regulatory capital to total assets ration measured at the end of 2003. Panel B restrict observations to those where deposit-holding bank capital is less than 25 percent. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Correspondent relation is equal to "Yes" if banks have correspondent accounts in each other. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table 6: Bank offshore operations and transfers of depositor-firms.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
Offshore X	-0.004	-0.004	0.024	-0.006	-0.044	-0.003	0.053
1(After Run)	(0.007)	(0.007)	(0.027)	(0.007)	(0.039)	(0.008)	(0.033)
Offshore X	0.001	0.000	0.030	-0.002	-0.043	0.002	0.061**
1(Aftershock)	(0.006)	(0.006)	(0.024)	(0.006)	(0.032)	(0.007)	(0.028)
Offshore X	0.000	0.000	0.011	-0.002	-0.051**	0.002	0.039*
1(Run)	(0.002)	(0.002)	(0.019)	(0.003)	(0.025)	(0.003)	(0.022)
Observations	11,843,042	11,778,578	64,464	4,918,313	27,525	6,860,265	36,939
R-squared	0.049	0.049	0.208	0.041	0.303	0.059	0.272
Loan relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Loan relation is equal to "Yes" if a company borrowed funds from the deposit holding bank in 2002-2003. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level, are reported in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table 7: Initial bank capital and transfers of depositor-firms.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
	Sample of banks with initial capital adequacy ratio <25%						
Capital 2003 X	0.026	0.023	-0.288*	-0.025	-0.286	0.058	-0.193
1(After Run)	(0.073)	(0.073)	(0.162)	(0.064)	(0.228)	(0.081)	(0.199)
Capital 2003 X	0.035	0.032	-0.167	-0.018	-0.182	0.070	-0.102
1(Aftershock)	(0.069)	(0.069)	(0.140)	(0.053)	(0.200)	(0.081)	(0.157)
Capital 2003 X	0.011	0.010	-0.039	-0.019	-0.067	0.030*	0.002
1(Run)	(0.018)	(0.018)	(0.110)	(0.021)	(0.138)	(0.018)	(0.149)
Observations	7,219,603	7,183,401	36,202	2,998,444	16,102	4,184,957	20,100
R-squared	0.041	0.041	0.174	0.034	0.269	0.050	0.219
Close business relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Capital 2003 is deposit holding bank regulatory capital to total assets ration measured at the end of 2003. Sample is restricted to observations with deposit-holding bank capital below 25 percent. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Loan relation is equal to "Yes" if a company borrowed funds from the deposit holding bank in 2002-2003. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level, are reported in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table 8: Withdrawals by connected depositor-firms and transfers by non-connected depositor-firms.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Dependent variable: Net transfer into a given bank*					
Withdrawal by connected depositor-firms/bank assets X	-0.035	-0.023	-0.045	0.013	0.014*	0.011
1(After run)	(0.028)	(0.023)	(0.032)	(0.010)	(0.007)	(0.011)
Withdrawal by connected depositor-firms/bank assets X	-0.085**	-0.057*	-0.105**	0.009	0.011	0.007
1(Aftershock)	(0.040)	(0.031)	(0.047)	(0.009)	(0.008)	(0.009)
Withdrawal by connected depositor-firms/bank assets X	-0.110*	-0.073	-0.135*	0.010	0.012	0.008
1(Run)	(0.062)	(0.048)	(0.071)	(0.008)	(0.008)	(0.008)
Withdrawal by connected depositor-firms/bank assets X	-0.044*	-0.035*	-0.049*	0.002	0.001	0.002
	(0.023)	(0.019)	(0.026)	(0.002)	(0.002)	(0.002)
Observations	11,271,131	4,703,754	6,567,377	11,271,131	4,703,754	6,567,377
R-squared	0.005	0.005	0.006	0.046	0.038	0.056
Bank FE	No	No	No	Yes	Yes	Yes
Depositor type	Any	Transparent	Suspicious	Any	Transparent	Suspicious
Offshore and capital controls	Yes	Yes	Yes	Yes	Yes	Yes
Loan relation	No	No	No	No	No	No
Week FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor-firm. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank panic) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Bank panic) is a dummy for weeks 41+. Withdrawal by connected depositor-firms is total withdrawal by depositor-firms with past loan relationship with the bank in the current week. This variable is further normalized by deposit-holding bank assets at the end of 2003. Tax evasion of the deposit is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (2) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (3) and (6)). Sample is restricted to observations on depositor-firms with no prior (2000-2003) loan relation with deposit-holding banks. All specifications are estimated by OLS with robust standard errors, clustered at the depositor level. In addition, specifications 4-6 include deposit-holding bank fixed effects. ***, **, And * indicate statistical significant at 1%, 5%, and 10% respectively. Offshore banking, foreign transactions (log), capital in 2003 levels and interactions with time dummies are included but not reported.

Table 9: Withdrawals by connected depositor-banks and transfers by non-connected depositor-banks.

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable: Net transfer into a given bank					
Withdrawals by connected banks/bank assets X	0.006	0.016	0.002	-0.023***	-0.022**	-0.023*
1(After run)	(0.012)	(0.015)	(0.014)	(0.008)	(0.011)	(0.012)
Withdrawals by connected banks/bank assets X	-0.001	0.012	-0.006	-0.024*	-0.026**	-0.024
1(Aftershock)	(0.016)	(0.016)	(0.020)	(0.012)	(0.011)	(0.018)
Withdrawals by connected banks/bank assets X	0.013	0.039***	-0.002	-0.023***	-0.016**	-0.028**
1(Run)	(0.012)	(0.015)	(0.013)	(0.008)	(0.008)	(0.011)
Withdrawals by connected banks/bank assets	-0.042***	-0.050***	-0.039***	0.013*	0.012	0.013
	(0.014)	(0.015)	(0.014)	(0.007)	(0.008)	(0.010)
Observations	138,773	50,311	88,462	138,773	50,311	88,462
R-squared	0.008	0.007	0.011	0.067	0.093	0.085
Deposit-holding Bank FE	No	No	No	Yes	Yes	Yes
Depositor tax evasion	Any	Transparent	Suspicious	Any	Transparent	Suspicious
Week FE	Yes	Yes	Yes	Yes	Yes	Yes
Correspondent account	No	No	No	No	No	No

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-bank to a particular deposit holding bank divided by total weekly turnover of the depositor-bank. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank panic) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Bank panic) is a dummy for weeks 41+. Withdrawals by connected banks are total current week withdrawals by depositor-banks that have a correspondent account relation with their deposit-holding bank. This variable is further normalized by deposit-holding bank assets at the end of 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (2) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (3) and (6)). Sample is restricted to observations on depositors with no correspondent account relation with the deposit-holding banks. "Withdrawals by connected banks" are total withdrawals in a given week from a given bank by depositor-banks with correspondent account relation with the bank divided by the deposit-holding bank total assets. All specifications are estimated by OLS with robust standard errors, clustered at the depositor level. In addition, specifications 4-6 include deposit-holding bank fixed effects. ***, **, And * indicate statistical significant at 1%, 5%, and 10% respectively. Offshore banking, foreign transactions (log), capital in 2003 levels and interactions with time dummies are included but not reported.

Table 10: Blacklist probability and bank characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable: Dummy for bank being in one of the four black lists							
Offshore fraction	0.062***	0.063**	0.028	0.076*	0.115***	0.119***	0.092**	0.099*
	(0.024)	(0.025)	(0.019)	(0.044)	(0.036)	(0.039)	(0.040)	(0.054)
Log total foreign transactions	0.005**	0.006**	0.004**	0.008**	0.005**	0.006**	0.005**	0.009**
	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)	(0.004)
Log net assets	0.005	0.004	0.001	0.005	0.008	0.008	0.005	0.007
	(0.005)	(0.005)	(0.004)	(0.010)	(0.006)	(0.007)	(0.007)	(0.011)
Regulatory capital		0.125	0.037	0.062		0.102	0.042	-0.013
		(0.109)	(0.078)	(0.199)		(0.132)	(0.133)	(0.209)
Regulatory capital -squared		-0.130	-0.058	-0.107		-0.100	-0.074	-0.019
		(0.112)	(0.079)	(0.196)		(0.126)	(0.127)	(0.192)
Moscow dummy			0.045***				0.049***	
			(0.012)				(0.016)	
Observations	845	797	796	478	845	797	796	478
Estimation	Probit	Probit	Probit	Probit	OLS	OLS	OLS	OLS
Sample	All	All	All	Moscow	All	All	All	Moscow

Notes: Sample includes all deposit-holding banks with positive foreign transaction flows. In addition, specifications (3) and (6) restrict the sample to Moscow-headquartered banks only. Dependent variable is a dummy variable that a given depositor bank is contained in one of four lists of suspicious banks circulated at the time of the panic among market participants. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Regulatory capital is calculated at the end of 2003. Specifications (1)-(3) are estimated by probit with marginal effects reported, specifications (4)-(6) are estimated by OLS. Robust standard errors in parenthesis. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table 11: Rumors during banking crisis and transfers of depositor-banks.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: net transfer into a given bank normalized by total depositor's weekly turnover						
Blacklist X	0.000	-0.002	0.002	-0.000	0.005	-0.003	-0.002
1(After run)	(0.004)	(0.005)	(0.007)	(0.005)	(0.009)	(0.005)	(0.009)
Blacklist X	0.000	0.002	-0.000	0.003	-0.009	-0.000	0.003
1(Aftershock)	(0.005)	(0.004)	(0.007)	(0.005)	(0.009)	(0.006)	(0.009)
Blacklist X	-0.000	0.001	-0.001	0.001	0.001	-0.001	-0.004
1(Run)	(0.003)	(0.003)	(0.005)	(0.003)	(0.010)	(0.003)	(0.005)
Offshore fraction X	0.005	-0.002	0.013	0.007	-0.014	-0.007	0.023**
1(After run)	(0.005)	(0.005)	(0.010)	(0.008)	(0.019)	(0.006)	(0.011)
Offshore fraction X	0.011*	0.000	0.024**	0.008	-0.010	-0.002	0.034**
1(Aftershock)	(0.006)	(0.005)	(0.011)	(0.008)	(0.016)	(0.006)	(0.014)
Offshore fraction X	0.002	-0.005	0.012*	-0.002	-0.004	-0.005	0.017**
1(Run)	(0.003)	(0.003)	(0.007)	(0.005)	(0.012)	(0.004)	(0.008)
Observations	238,230	152,456	85,774	55,076	33,423	97,380	52,351
R-squared	0.075	0.083	0.123	0.103	0.143	0.113	0.156
Correspondent relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Deposit-holding bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-bank to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Blacklist is a dummy variable that a given depositor bank is contained in one of four lists of suspicious banks circulated at the time of the panic among market participants. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Correspondent relation is equal to "Yes" if banks have correspondent accounts in each other. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table 12: Rumors during banking crisis and transfers of depositor-firms.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: net transfer into a given bank normalized by total depositor's weekly turnover						
Blacklist X	-0.003	-0.003	0.021	-0.004	0.030	-0.003	0.004
1(After run)	(0.003)	(0.003)	(0.018)	(0.003)	(0.024)	(0.003)	(0.019)
Blacklist X	-0.002	-0.002	0.040**	-0.005**	0.052***	-0.001	0.025
1(Aftershock)	(0.002)	(0.002)	(0.016)	(0.002)	(0.014)	(0.002)	(0.022)
Blacklist X	-0.001	-0.001	-0.003	-0.002**	0.002	-0.000	-0.009
1(Run)	(0.001)	(0.001)	(0.011)	(0.001)	(0.016)	(0.001)	(0.016)
Offshore fraction X	-0.003	-0.003	0.021	-0.004	-0.048	-0.002	0.053
1(After run)	(0.007)	(0.007)	(0.028)	(0.006)	(0.039)	(0.007)	(0.033)
Offshore fraction X	0.001	0.001	0.024	-0.000	-0.050	0.002	0.057**
1(Aftershock)	(0.006)	(0.006)	(0.024)	(0.005)	(0.031)	(0.006)	(0.029)
Offshore fraction X	0.001	0.001	0.012	-0.001	-0.051**	0.002	0.041*
1(Run)	(0.002)	(0.002)	(0.019)	(0.003)	(0.025)	(0.002)	(0.022)
Observations	11,843,042	11,778,578	64,464	4,918,313	27,525	6,860,265	36,939
R-squared	0.049	0.049	0.208	0.041	0.304	0.059	0.272
Loan relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Deposit-holding bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Blacklist is a dummy variable that a given depositor bank is contained in one of four lists of suspicious banks circulated at the time of the panic among market participants. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Loan relation is equal to "Yes" if a company borrowed funds from the deposit holding bank in 2002-2003. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level, are reported in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively

Figures

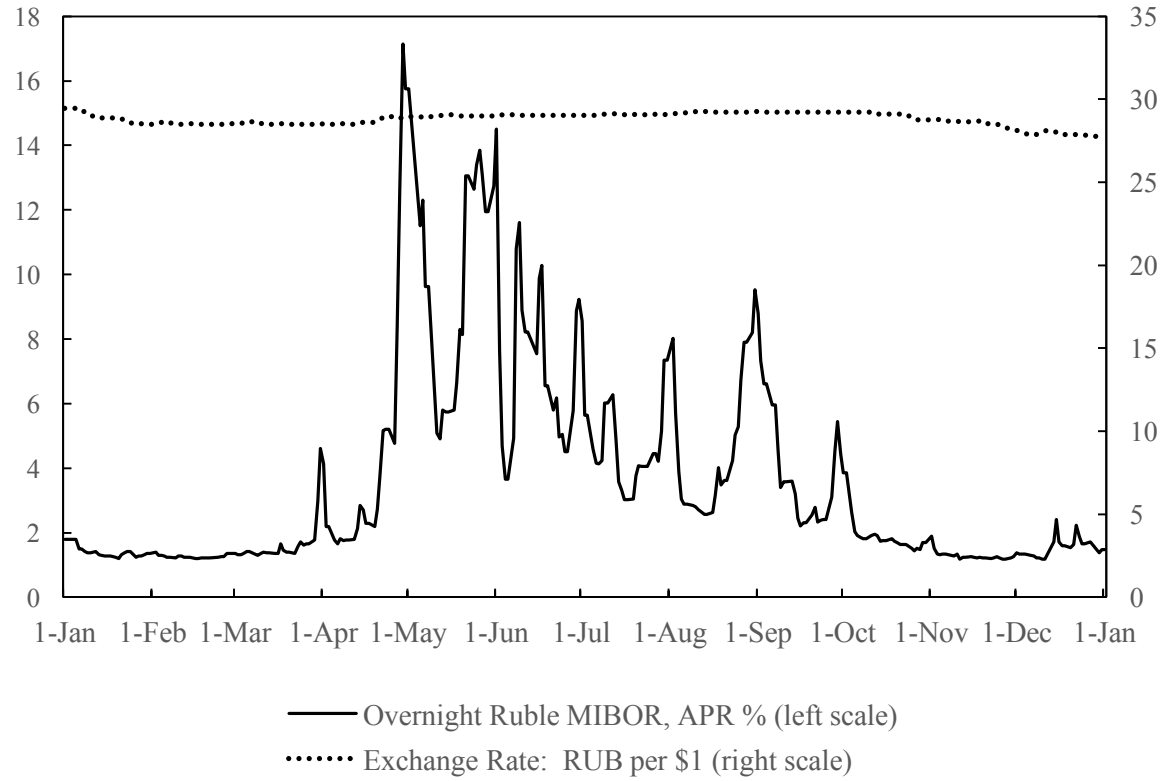


Figure 1. Reputation-based liquidity crisis amid macro-economic stability (2004).
This graph shows Moscow Interbank Offered Rate (MIBOR) on ruble overnight interbank loans interest rates in 2004. End-of-the day exchange rates are quoted as Rubles per 1 USD. The raw, daily frequency data for this graph are obtained from the Central Bank of Russia official statistics and cover all trading days in 2004.

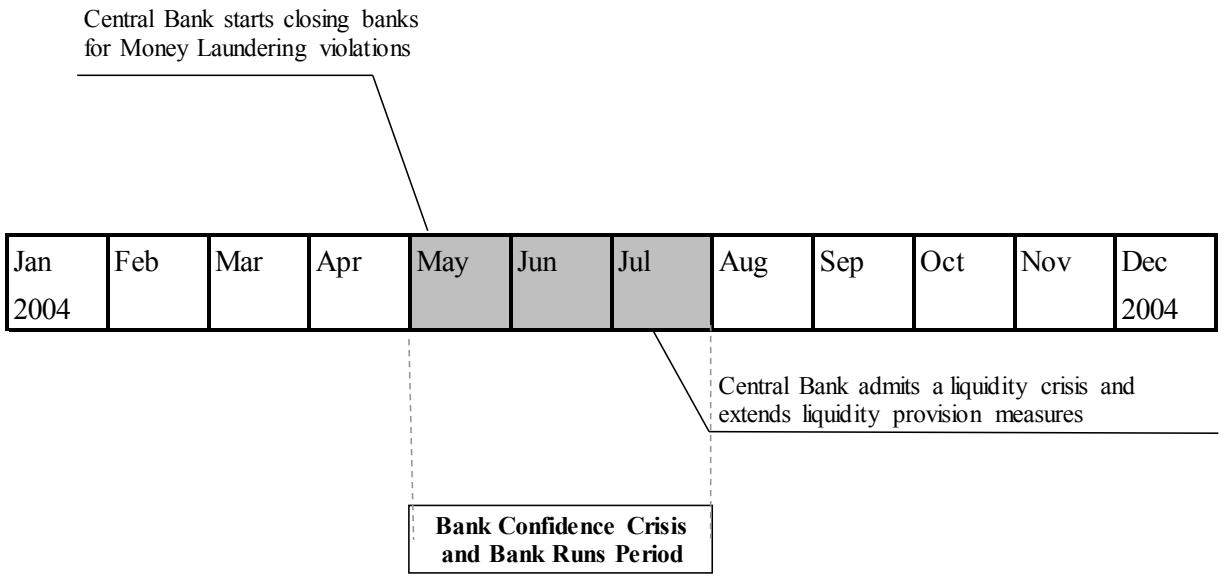


Figure 2. Timeline for the 2004 Bank Confidence Crisis Development in Russia

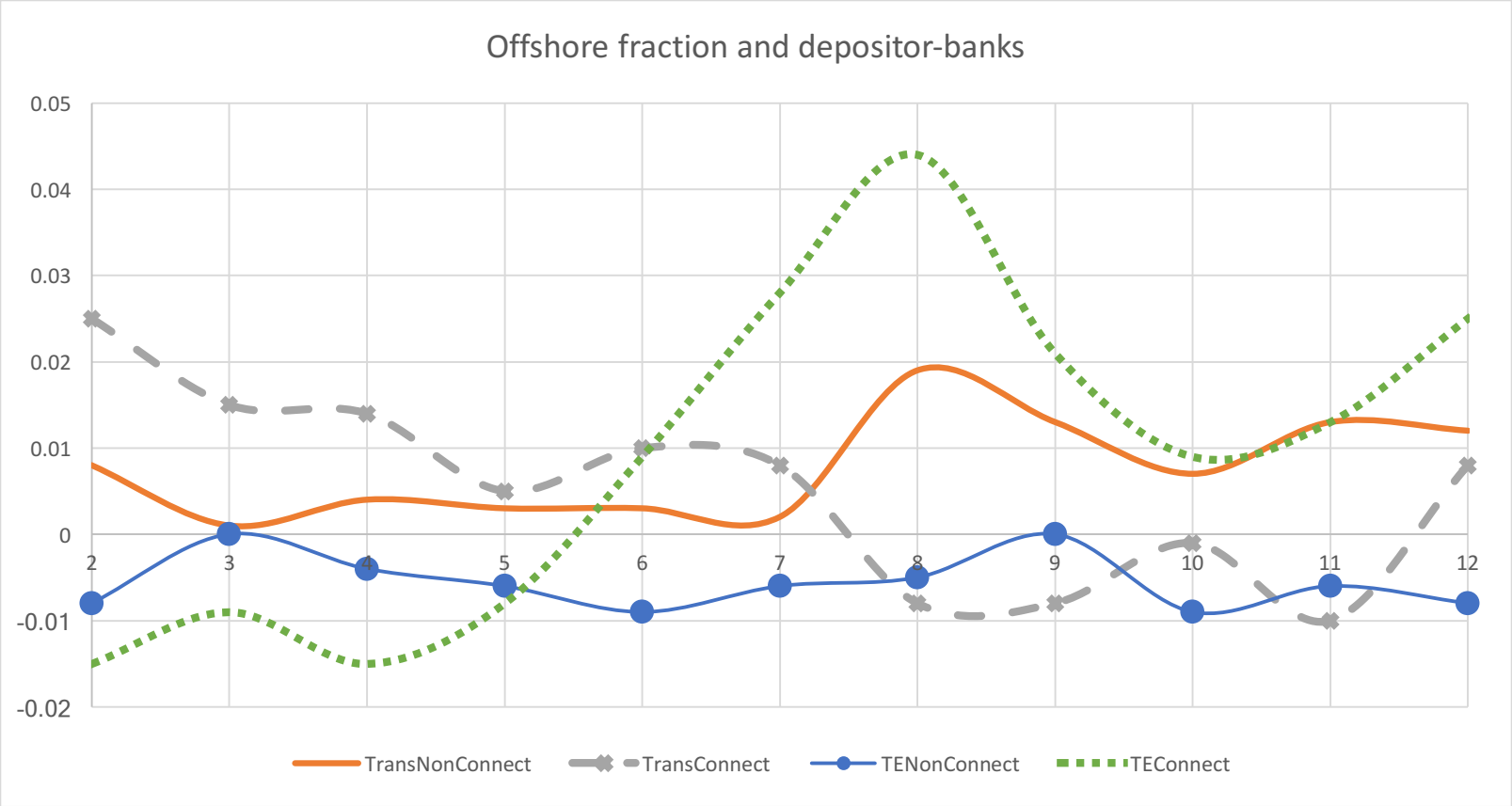


Figure 3: Month by month response to offshore fraction by depositor-banks.

This figure plots estimated coefficients on monthly dummies interaction with offshore fraction for depositor-bank. See in specification (3) the main text. Depositors are divided into four groups depending on their Braguinsky-Mityakov (2015) tax evasion scores and depending on having strong business relation with their deposit-holding bank. "Transparent" ("Suspicious") depositors are designated on the basis of whether their score is above(below) mean tax evasion score for the sample. Strong business ties are proxied by the presence of correspondent account relation between depositor-bank and deposit-holding bank. "TransConnect" ("TransNonConnect") represent the sample of transparent depositors with (without) strong business ties with their deposit-holding bank. "TEConnect" ("TENonConnect") represent the sample of suspicious depositors with (without) strong business ties with their deposit-holding bank.

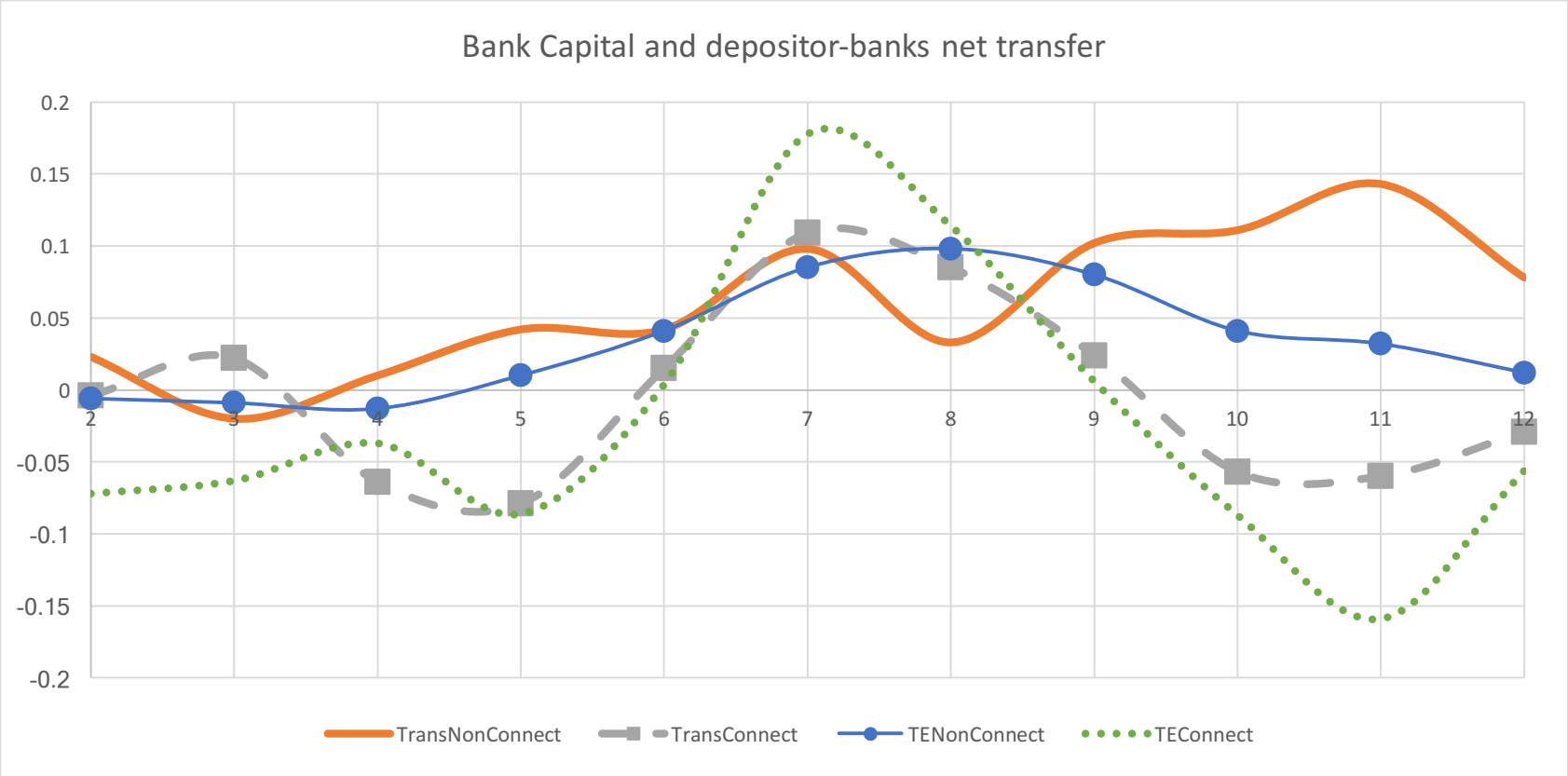


Figure 4: Month by month response to deposit-holding-bank capital ratio by depositor-banks.

This figure plots estimated coefficients on monthly dummies interaction with pre-crisis deposit-holding bank capital ratio for depositor-bank sample. See specification (3) in the main text. Depositors are divided into four groups depending on their Braguinsky-Mityakov (2015) tax evasion scores and depending on having strong business relation with their deposit-holding bank. "Transparent" ("Suspicious") depositors are designated on the basis of whether their score is above(below) mean tax evasion score for the sample. Strong business ties are proxied by the presence of correspondent account relation between depositor-bank and deposit-holding bank. "TransConnect" ("TransNonConnect") represent the sample of transparent depositors with (without) strong business ties with their deposit-holding bank. "TEConnect" ("TENonConnect") represent the sample of suspicious depositors with (without) strong business ties with their deposit-holding bank.

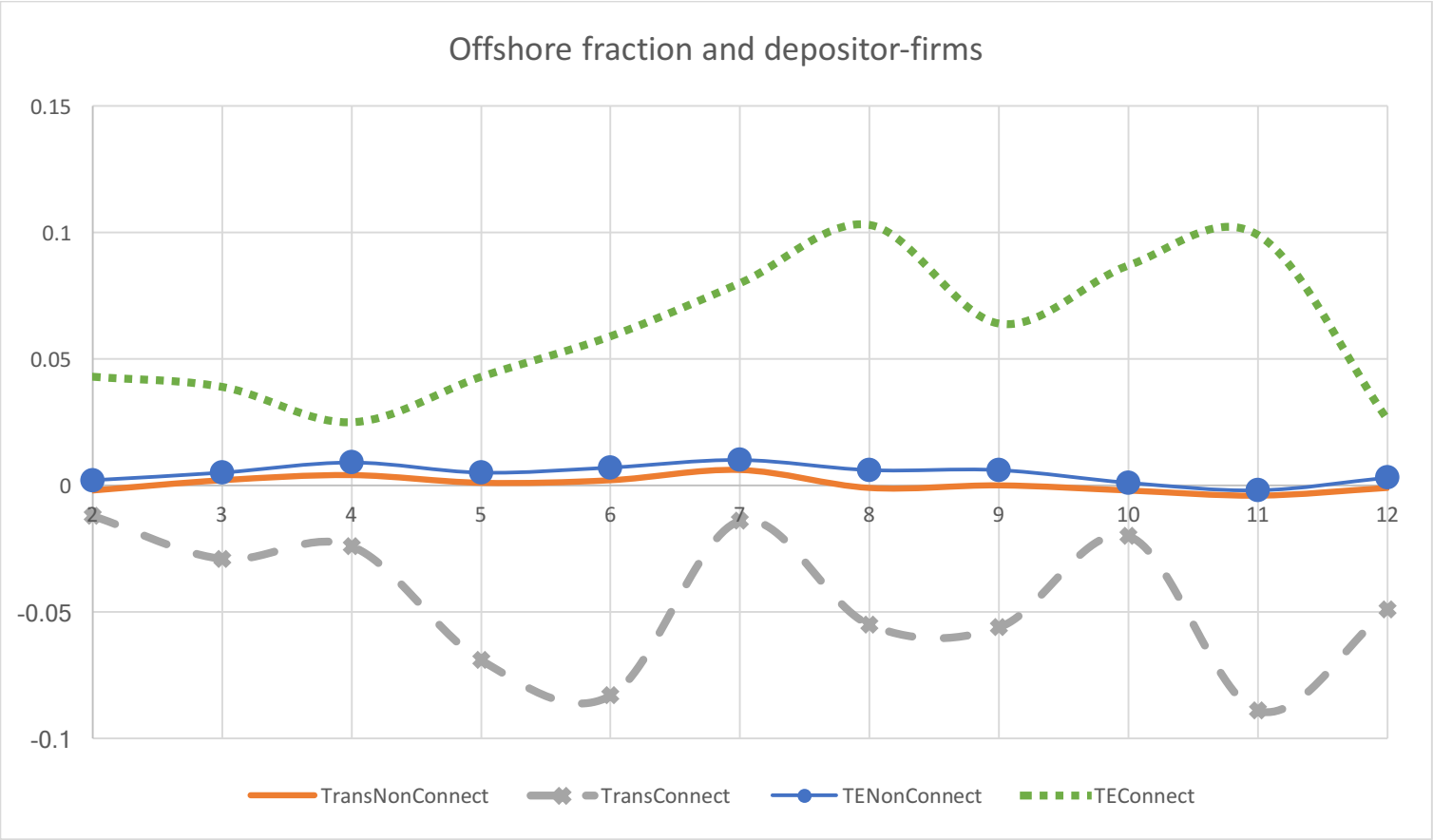


Figure 5: Month-by-month response to offshore fraction by depositor-firms.

This figure plots estimated coefficients on monthly dummies interaction with offshore fraction for depositor-firms. See in specification (3) the main text. Depositors are divided into four groups depending on their Braguinsky-Mityakov (2015) tax evasion scores and depending on having strong business relation with their deposit-holding bank. "Transparent" ("Suspicious") depositors are designated on the basis of whether their score is above(below) mean tax evasion score for the sample. Strong business ties are proxied by the presence of loan relation between depositor-firm and deposit-holding bank. "TransConnect" ("TransNonConnect") represent the sample of transparent depositors with (without) strong business ties with their deposit-holding bank. "TEConnect" ("TENonConnect") represent the sample of suspicious depositors with (without) strong business ties with their deposit-holding bank.

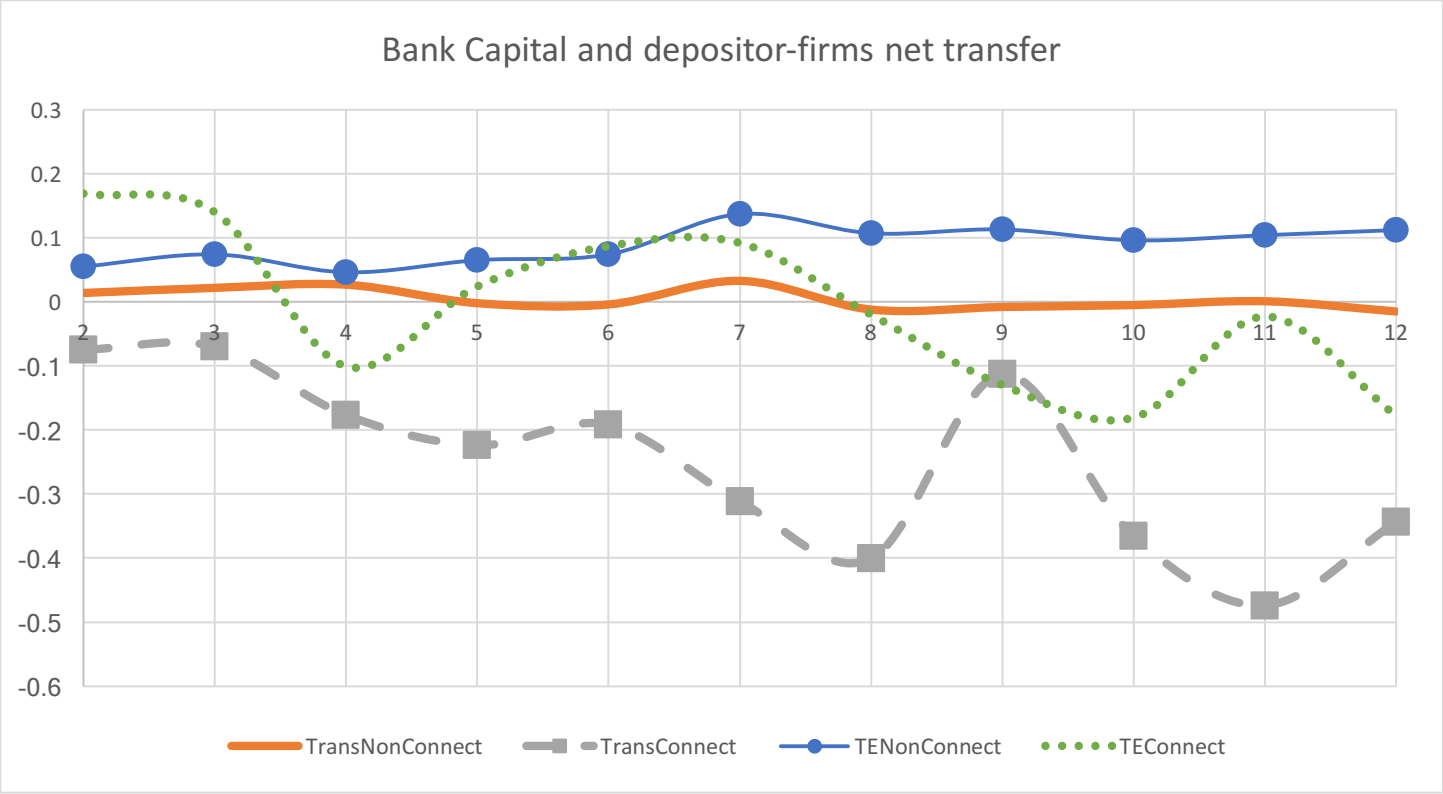


Figure 6: Month-by-month response to deposit-holding bank capital ratio by depositor-firms.

This figure plots estimated coefficients on monthly dummies interaction with deposit-holding bank pre-crisis capital ratio for depositor-firms sample. See in specification (3) the main text. Depositors are divided into four groups depending on their Braguinsky-Mityakov (2015) tax evasion scores and depending on having strong business relation with their deposit-holding bank. "Transparent" ("Suspicious") depositors are designated on the basis of whether their score is above(below) mean tax evasion score for the sample. Strong business ties are proxied by the presence of loan relation between depositor-firm and deposit-holding bank. "TransConnect" ("TransNonConnect") represent the sample of transparent depositors with (without) strong business ties with their deposit-holding bank. "TEConnect" ("TENonConnect") represent the sample of suspicious depositors with (without) strong business ties with their deposit-holding bank.

Online Appendix

Appendix A1. Offshore fraction calculation (from Chernykh and Mityakov (2017))

Our measure of bank exposure to offshore operations is based on an intensity of a given bank interaction with less transparent offshore financial centers. To identify less transparent offshore localities, we utilize the official directory of offshore jurisdictions issued by the Central Bank of Russia in 2003. The regulator further subdivided this list into three groups/tiers of countries in the order of less financial disclosure and, therefore, higher loss reserve requirements for banking operations. (see below) Group 1 represents offshores viewed as generally compliant with international monitoring efforts. So, we focus on Group 2 and 3 countries, which represent semi- or outright non-compliant offshore financial centers. Russian Central Bank recognized this heterogeneity by requiring no loss reserves for banking operations in offshore financial centers from Group 1% and 50% and 100% loss reserves for banking operations in offshores from Group 2 and 3 respectively. To measure the amount of interaction between a given bank and offshore jurisdictions we use information from mandatory bank reports to the Central Bank of Russia over the years 2000-2003. Those reports require each bank to provide information about all of its accounts in other banks, including banks in foreign countries. The Central Bank collects detailed information in those reports, including end of the month balances and monthly volume of transactions in each correspondent account.

We construct a measure of offshore activities of a given Russian bank (in a given year) with offshore financial centers from a particular group/tier by taking the annual volume of transactions of this bank through the countries in this offshores group, normalized by the total annual volume of transactions through all foreign countries done by this bank in a given year. Namely, denote $OFV_{i,j,t}$ annual amount of transactions of a Russian bank i through its correspondent accounts in (foreign) bank j in year t. Then we define year t intensity of bank i offshore activity with offshores in group k as:

$$OF_{i,t}^{(k)} = \sum_{\substack{j \text{ is located in} \\ \text{group } k \text{ offshore}}} OFV_{i,j,t} \Big/ \sum_{\substack{j \text{ is located in} \\ \text{anycountry}}} OFV_{i,j,t} \qquad \text{(A1.1)}$$

For a given Russian bank, this measure indicates what fraction of total annual flows through foreign countries occurs via offshore financial centers from a particular group k. As our main measure of offshore activities of a given Russian bank we use combined offshore fraction for offshore localities in groups 2 and 3.

$$OF_{i,t} = OF_{i,t}^{(2)} + OF_{i,t}^{(3)} \qquad \text{(A1.2)}$$

List of offshore jurisdictions classification issued by the Central Bank of Russia on August 7, 2003.

Tier 1: "Civilized" offshores (no additional loss reserve requirement)

1.1. Some areas of UK
- Guernsey, Jersey, Sark
- Isle of Man

1.2. Ireland (Dublin, Shannon)

1.3. Cyprus

1.4. Malta
1.5. China (Hong Kong)
1.6. Luxembourg
1.7. Switzerland
1.8. Singapore

Tier 2: "Grey" offshores (50% loss reserve requirement on all transactions)
2.1. Antigua and Barbuda
2.2. Bahamas
2.3. Barbados
2.4. Bahrain
2.5. Belize
2.6. Brunei-Darussalam
2.7. Dependent territories of UK
- -Anguilla
- - Bermudas
- -British Virgin Islands
- -Montserrat
- - Gibraltar
- -Turks and Caicos islands
- - Cayman islands

2.8. Grenada
2.9. Djibouti
2.10. Dominica
2.11. China (Macao)
2.12. Costa-Rica
2.13. Lebanon
2.14 Mauritius
2.15. Malaysia (island Labuan)
2.16. Maldives
2.17. Netherlands Antilles
2.18 Monaco
2.19. New Zealand
- - Cook islands
- - Niue

2.20. UAE (Dubai)
2.21. Panama
2.22. Portugal (Madeira island)
2.23. Western Samoa
2.24. Seychelles
2.25. St Kitts and Nevis
2.26. St Lucia
2.27. St Vincent and the Grenadines
2.28. USA
- - US virgin islands
- - Puerto Rico

- state of Wyoming
- state of Delaware

2.29. Tonga
2.30. Sri Lanka
2.31. Palau

Tier 3: "Black" offshores (100% loss reserve requirement on all transactions)

3.1. Andorra
3.2. Comoros
- Anjouan island

3.3. Aruba
3.4 Vanuatu
3.5. Liberia
3.6. Liechtenstein
3.7. Marshall islands
3.8. Nauru
3.9. Serbia and Montenegro

Appendix A2. Measuring Tax Fraud from individual car values and reported incomes (based on Braguinsky, Mityakov, and Liscovich (2014) and Braguinsky and Mityakov (2015)).

This approach to measuring income tax fraud at the level of individual bank starts from the observation that it is relatively easy to misreport earnings, but it is costly to drive an unregistered vehicle.[38] This difference is the key to the following identification strategy, which employs administrative data on wages and car values to measure hidden earnings. Specifically, Braguinsky et al. consider the following relation between reported and actual earnings:

$$\ln E^R_{i,t} = \ln E^*_{i,t} - T_{j(i,t),t} + \mathbf{g'_1 X}^{(1)}_{i,t} + \phi_1(t) + u^{(1)}_{i,t}, \qquad \text{(A2.1)}$$

Here $E^R_{i,t}$ and $E^*_{i,t}$ are reported earnings of individual i in year t respectively. Reported earnings of individual i working in year t for a firm $j(i,t)$ differ from actual earnings depending on individual level controls (such as age, gender, position in the firm's hierarchy $\mathbf{X}^{(1)}_{i,t}$) as well as firm-level (time-varying) propensity to underreport incomes by a certain percentage ($T_{j,t}$) common for all employees of a given company in a given year. Firm-level tax evasion scores $T_{j,t}$ is the main variable of interest. Obviously one cannot use regression (A1) to estimate these scores, since actual earnings E^* are not observed. To measure tax evasion at the firm level Braguinsky et al. bring additional information in the form of car values of employees. Namely, they consider the following log-linear relation between car values C and actual incomes E^*:

$$\ln C_{i,t} = \lambda \ln E^*_{i,t} + \mathbf{g}'_2 \mathbf{X}^{(2)}_{i,t} + \phi_2(t) + u^{(2)}_{i,t}. \qquad \text{(A2.2)}$$

To calculate $T_{j,t}$, Braguinsky et al. combine equations (A2.1) and (A2.2) to get:

$$\ln E^R_{i,t} - \frac{1}{\lambda} \ln C_{i,t} = -T_{j(i,t),t} + \mathbf{g'X}_{i,t} + \phi(t) + u_{i,t}. \qquad \text{(A2.3)}$$

In calculation of tax evasion scores $T_{j,t}$ they employ the value of λ=0.35 which itself is estimated from subsample of employees of foreign multinationals from Western countries assuming that in those cases earnings are unlikely to be falsified and, thus, λ can be estimated on this subsample using specification given in equation (A2.2).

[38] Moscow police routinely conduct traffic stops to check the paperwork. Unregistered vehicles are impounded and can be recovered only after paying a fine and producing the registration document.

Appendix A3. Flexible specification for the effect of bank characteristics on depositor transfers.

Table A3.1: Deposit-holding bank offshore fraction and net transfer of depositor-banks.

	(1)	(2)	(3)	(4)
	Dependent variable: net transfer into a given bank			
Feb 2004 x	0.008	0.025**	-0.008	-0.015
Offshore fraction	(0.005)	(0.012)	(0.005)	(0.011)
March 2004 X	0.001	0.015	-0.000	-0.009
Offshore fraction	(0.005)	(0.011)	(0.005)	(0.011)
April 2004 x	0.004	0.014	-0.004	-0.015
Offshore fraction	(0.006)	(0.013)	(0.006)	(0.015)
May 2004 X	0.003	0.005	-0.006	-0.008
Offshore fraction	(0.006)	(0.014)	(0.007)	(0.013)
June 2004 X	0.003	0.010	-0.009	0.009
Offshore fraction	(0.008)	(0.020)	(0.006)	(0.014)
July 2004 X	0.002	0.008	-0.006	0.028
Offshore fraction	(0.010)	(0.022)	(0.009)	(0.018)
August 2004 x	0.019*	-0.008	-0.005	0.044**
Offshore fraction	(0.011)	(0.016)	(0.009)	(0.020)
September 2004 x	0.013	-0.008	-0.000	0.021
Offshore fraction	(0.010)	(0.024)	(0.010)	(0.019)
October 2004 x	0.007	-0.001	-0.009	0.009
Offshore fraction	(0.009)	(0.025)	(0.007)	(0.018)
November 2004 x	0.013	-0.010	-0.006	0.013
Offshore fraction	(0.012)	(0.024)	(0.008)	(0.017)
December 2004 x	0.012	0.008	-0.008	0.025*
Offshore fraction	(0.010)	(0.019)	(0.008)	(0.014)
Observations	55,076	33,423	97,380	52,351
R-squared	0.103	0.143	0.113	0.156
Correspondent relation	No	Yes	No	Yes
Depositor type	Transparent	Transparent	Suspicious	Suspicious

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-bank to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. Feb 2004-December2004 are month dummies. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (1) and (2)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (3) and (4)). Correspondent relation is equal to "Yes" if the depositor-bank has correspondent account relation with the deposit-holding bank. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table A3.2: Deposit holding bank 2003 capital adequacy and net transfer of depositor-banks.

	(1)	(2)	(3)	(4)
	Dependent variable: net transfer into a given bank			
Feb 2004 x	0.023	-0.004	-0.006	-0.072
Capitalization 2003	(0.035)	(0.062)	(0.026)	(0.062)
March 2004 X	-0.020	0.022	-0.009	-0.063
Capitalization 2003	(0.029)	(0.056)	(0.028)	(0.073)
April 2004 x	0.010	-0.064	-0.013	-0.037
Capitalization 2003	(0.033)	(0.069)	(0.038)	(0.079)
May 2004 X	0.042	-0.079	0.010	-0.086
Capitalization 2003	(0.035)	(0.074)	(0.041)	(0.077)
June 2004 X	0.042	0.015	0.041	0.004
Capitalization 2003	(0.043)	(0.081)	(0.045)	(0.095)
July 2004 X	0.098	0.109	0.085	0.178
Capitalization 2003	(0.072)	(0.107)	(0.060)	(0.119)
August 2004 x	0.033	0.085	0.098	0.114
Capitalization 2003	(0.069)	(0.101)	(0.067)	(0.116)
September 2004 x	0.102	0.024	0.080	0.006
Capitalization 2003	(0.068)	(0.101)	(0.051)	(0.109)
October 2004 x	0.111	-0.057	0.041	-0.087
Capitalization 2003	(0.067)	(0.112)	(0.049)	(0.128)
November 2004 x	0.143	-0.060	0.032	-0.159
Capitalization 2003	(0.089)	(0.121)	(0.051)	(0.125)
December 2004 x	0.078	-0.029	0.012	-0.056
Capitalization 2003	(0.067)	(0.100)	(0.047)	(0.121)
Observations	37,357	22,851	62,369	34,523
R-squared	0.073	0.117	0.107	0.113
Loan relation	No	Yes	No	Yes
Depositor type	Transparent	Transparent	Suspicious	Suspicious

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-bank to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. Feb 2004-December2004 are month dummies. Capitalization 2003 is deposit-holding bank capital adequacy ratio defined at the ratio of regulatory capital to bank total assets in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (1) and (2)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (3) and (4)). Correspondent relation is equal to "Yes" if the depositor-bank has correspondent account relation with the deposit-holding bank. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table A3.3: Deposit-holding bank offshore fraction and net transfer of depositor-firms.

	(1)	(2)	(3)	(4)
	Dependent variable: net transfer into a given bank			
Feb 2004 x	-0.002	-0.012	0.002	0.043**
Offshore fraction	(0.004)	(0.035)	(0.006)	(0.021)
March 2004 X	0.002	-0.029	0.005	0.039
Offshore fraction	(0.005)	(0.029)	(0.006)	(0.033)
April 2004 x	0.004	-0.024	0.009*	0.025
Offshore fraction	(0.005)	(0.043)	(0.005)	(0.023)
May 2004 X	0.001	-0.069*	0.005	0.043
Offshore fraction	(0.005)	(0.041)	(0.005)	(0.034)
June 2004 X	0.002	-0.083**	0.007	0.059
Offshore fraction	(0.006)	(0.040)	(0.007)	(0.038)
July 2004 X	0.006	-0.014	0.010	0.080**
Offshore fraction	(0.006)	(0.042)	(0.008)	(0.036)
August 2004 x	-0.001	-0.055	0.006	0.103**
Offshore fraction	(0.008)	(0.047)	(0.009)	(0.045)
September 2004 x	0.000	-0.056	0.006	0.064
Offshore fraction	(0.009)	(0.039)	(0.011)	(0.039)
October 2004 x	-0.002	-0.020	0.001	0.087*
Offshore fraction	(0.009)	(0.044)	(0.010)	(0.045)
November 2004 x	-0.004	-0.089*	-0.002	0.099**
Offshore fraction	(0.009)	(0.052)	(0.010)	(0.047)
December 2004 x	-0.001	-0.049	0.003	0.026
Offshore fraction	(0.010)	(0.045)	(0.011)	(0.044)
Observations	4,918,313	27,525	6,860,265	36,939
R-squared	0.041	0.303	0.059	0.272
Loan relation	No	Yes	No	Yes
Depositor type	Transparent	Transparent	Suspicious	Suspicious

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. Feb 2004-December2004 are month dummies. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (1) and (2)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (3) and (4)). Loan relation is equal to "Yes" if the depositor-firm received loans from deposit-holding bank in 2002-2003. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table A3.4: Deposit holding bank 2003 capital adequacy and net transfer of depositor-firms.

	(1)	(2)	(3)	(4)
	Dependent variable: net transfer into a given bank			
Feb 2004 x	0.014	-0.075	0.055	0.169
Capitalization 2003	(0.043)	(0.191)	(0.054)	(0.157)
March 2004 X	0.022	-0.070	0.074	0.140
Capitalization 2003	(0.047)	(0.181)	(0.058)	(0.180)
April 2004 x	0.027	-0.177	0.046	-0.101
Capitalization 2003	(0.037)	(0.210)	(0.040)	(0.173)
May 2004 X	-0.002	-0.224	0.065	0.024
Capitalization 2003	(0.040)	(0.227)	(0.046)	(0.227)
June 2004 X	-0.004	-0.192	0.074	0.087
Capitalization 2003	(0.049)	(0.213)	(0.054)	(0.222)
July 2004 X	0.033	-0.312	0.137*	0.092
Capitalization 2003	(0.050)	(0.277)	(0.071)	(0.237)
August 2004 x	-0.012	-0.401	0.107	-0.020
Capitalization 2003	(0.069)	(0.246)	(0.091)	(0.276)
September 2004 x	-0.008	-0.113	0.113	-0.130
Capitalization 2003	(0.086)	(0.249)	(0.108)	(0.232)
October 2004 x	-0.005	-0.366	0.096	-0.181
Capitalization 2003	(0.086)	(0.278)	(0.103)	(0.223)
November 2004 x	0.001	-0.474*	0.104	-0.023
Capitalization 2003	(0.087)	(0.278)	(0.102)	(0.274)
December 2004 x	-0.015	-0.344	0.112	-0.178
Capitalization 2003	(0.091)	(0.292)	(0.106)	(0.263)
Observations	2,998,444	16,102	4,184,957	20,100
R-squared	0.034	0.269	0.050	0.219
Loan relation	No	Yes	No	Yes
Depositor type	Transparent	Transparent	Suspicious	Suspicious

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. Feb 2004-December2004 are month dummies. Capitalization 2003 is deposit-holding bank capital adequacy ratio defined at the ratio of regulatory capital to bank total assets in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (1) and (2)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (3) and (4)). Loan relation is equal to "Yes" if the depositor-firm received loans from deposit-holding bank in 2002-2003. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Appendix A4: Different Fixed effects specifications.

Table A4.1: Offshore operations and transfers by depositor-banks. DepositorXbank fixed effects specification.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	*Dependent variable: Normalized net transfer into a given bank*						
Offshore activity X	0.004	-0.002	0.015	0.004	0.008	-0.006	0.016
1(After Run)	(0.005)	(0.005)	(0.011)	(0.008)	(0.023)	(0.006)	(0.012)
Offshore activity X	0.010**	0.002	0.022**	0.010	0.015	-0.004	0.024*
1(Aftershock)	(0.005)	(0.004)	(0.010)	(0.008)	(0.019)	(0.005)	(0.012)
Offshore activity X	0.003	-0.001	0.011*	0.003	0.016	-0.003	0.006
1(Run)	(0.003)	(0.002)	(0.006)	(0.004)	(0.013)	(0.003)	(0.007)
Observations	238,230	152,456	85,774	55,076	33,423	97,380	52,351
R-squared	0.625	0.705	0.562	0.639	0.513	0.734	0.579
Correspondent relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Depositor X Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-bank to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Correspondent relation is equal to "Yes" if banks have correspondent accounts in each other. All specifications are estimated by FE-OLS with depositor-bankXdeposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table A4.2: Initial bank capital and transfers of depositor-banks. Depositor-bankXdeposit-holding bank fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
	Sample of deposit-holding banks with initial capital adequacy ratio <25%						
Capital 2003 X	0.045	0.082**	-0.006	0.141**	-0.043	0.037	-0.013
1(After Run)	(0.031)	(0.035)	(0.055)	(0.070)	(0.080)	(0.030)	(0.073)
Capital 2003 X	0.083***	0.066**	0.106**	0.100*	0.053	0.037	0.110
1(Aftershock)	(0.029)	(0.032)	(0.051)	(0.056)	(0.065)	(0.035)	(0.070)
Capital 2003 X	0.046***	0.043***	0.049	0.066***	0.022	0.026	0.050
1(Run)	(0.016)	(0.015)	(0.031)	(0.023)	(0.036)	(0.020)	(0.042)
Observations	157,100	99,726	57,374	37,357	22,851	62,369	34,523
R-squared	0.628	0.713	0.558	0.625	0.533	0.748	0.566
Close business relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Depositor X Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given deposit owning bank to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Capital 2003 is deposit-holding bank regulatory capital to total assets ration measured at the end of 2003. Panel B restrict observations to those where deposit-holding bank capital is less than 25 percent. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Correspondent relation is equal to "Yes" if banks have correspondent accounts in each other. All specifications are estimated by FE-OLS with depositor-bankXdeposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table A4.3: Bank offshore operations and transfers by depositor-firms. Depositor-bankXdeposit-holding bank fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
Offshore X	0.001	0.001	-0.005	0.000	-0.058	0.002	0.026
1(After Run)	(0.001)	(0.001)	(0.026)	(0.001)	(0.039)	(0.002)	(0.033)
Offshore X	0.001	0.001	0.005	0.001	-0.038	0.001	0.029
1(Aftershock)	(0.001)	(0.001)	(0.020)	(0.001)	(0.031)	(0.001)	(0.025)
Offshore X	0.000	0.000	-0.002	-0.001	-0.040*	0.001	0.016
1(Run)	(0.001)	(0.001)	(0.014)	(0.001)	(0.022)	(0.001)	(0.018)
Observations	11,843,042	11,778,578	64,464	4,918,313	27,525	6,860,265	36,939
R-squared	0.837	0.838	0.640	0.823	0.649	0.844	0.628
Loan relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Depositor X Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Loan relation is equal to "Yes" if a company borrowed funds from the deposit holding bank in 2002-2003. All specifications are estimated by FE-OLS with depositor-bankXdeposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level, are reported in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table A4.4: Initial bank capital and transfers of depositor-firms. Depositor-bankXdeposit-holding bank fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
	Sample of banks with initial capital adequacy ratio <25%						
Capital 2003 X	0.003	0.003	-0.231	-0.011	-0.175	0.013	-0.256
1(After Run)	(0.006)	(0.006)	(0.142)	(0.009)	(0.209)	(0.009)	(0.195)
Capital 2003 X	0.004	0.003	-0.095	-0.008	-0.042	0.012	-0.121
1(Aftershock)	(0.006)	(0.006)	(0.122)	(0.008)	(0.184)	(0.008)	(0.166)
Capital 2003 X	-0.005	-0.006	-0.023	-0.014**	0.054	0.000	-0.087
1(Run)	(0.004)	(0.004)	(0.096)	(0.006)	(0.134)	(0.006)	(0.133)
Observations	7,219,603	7,183,401	36,202	2,998,444	16,102	4,184,957	20,100
R-squared	0.827	0.828	0.641	0.813	0.649	0.835	0.626
Close business relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Depositor X Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Capital 2003 is deposit holding bank regulatory capital to total assets ration measured at the end of 2003. Sample is restricted to observations with deposit-holding bank capital below 25 percent. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Loan relation is equal to "Yes" if a company borrowed funds from the deposit holding bank in 2002-2003. All specifications are estimated by FE-OLS with depositor-bankXdeposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level, are reported in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Appendix A5: Results for high capital deposit-holding banks

Table A5.1: Higher capital ratio and transfers of depositor-banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
	Sample of banks with capital adequacy ratio >25%						
Capital 2003 X	-0.019**	-0.018*	-0.015	0.001	0.008	-0.028**	-0.029*
1(After Run)	(0.008)	(0.009)	(0.012)	(0.012)	(0.016)	(0.012)	(0.017)
Capital 2003 X	-0.018*	-0.012	-0.013	-0.008	-0.006	-0.014	-0.023
1(Aftershock)	(0.010)	(0.010)	(0.015)	(0.012)	(0.022)	(0.013)	(0.019)
Capital 2003 X	-0.010	-0.009	0.001	-0.006	-0.013	-0.011	0.000
1(Run)	(0.007)	(0.008)	(0.011)	(0.008)	(0.021)	(0.010)	(0.012)
Observations	103,760	69,040	34,720	23,839	12,611	45,201	22,109
R-squared	0.096	0.105	0.198	0.157	0.231	0.143	0.254
Close business relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given deposit owning bank to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Capital 2003 is deposit-holding bank regulatory capital to total assets ration measured at the end of 2003. Sample is restricted to observations to those where deposit-holding bank capital is more than 25 percent. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Correspondent relation is equal to "Yes" if banks have correspondent accounts in each other. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table A5.2: Initial bank capital and transfers of depositor-firms.

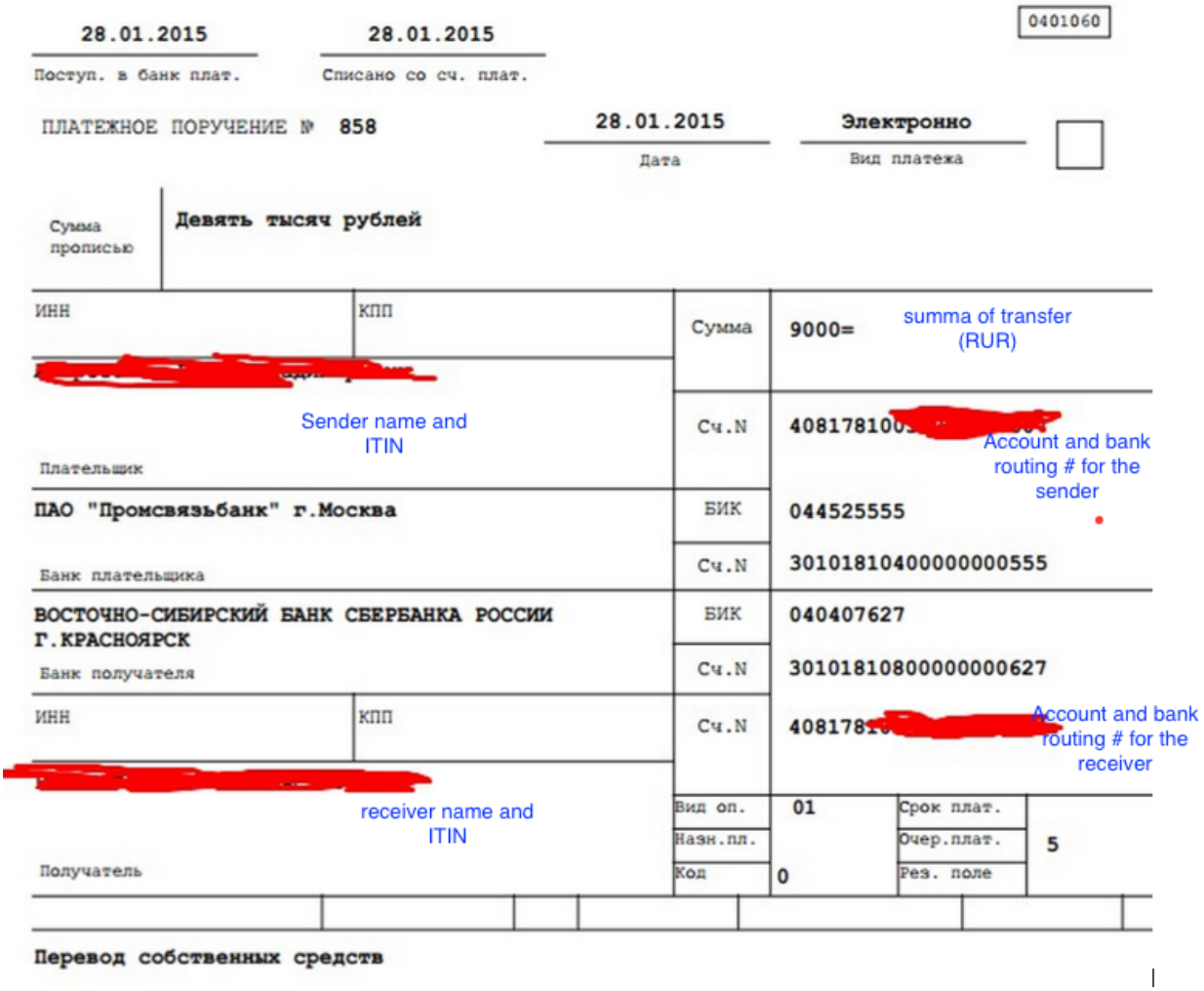
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
	Sample of banks with initial capital adequacy ratio >25%						
Capital 2003 X	-0.001	-0.002	-0.006	-0.003	0.010	-0.001	0.004
1(After Run)	(0.006)	(0.006)	(0.037)	(0.005)	(0.044)	(0.007)	(0.046)
Capital 2003 X	0.003	0.003	-0.021	0.003	-0.000	0.002	-0.014
1(Aftershock)	(0.006)	(0.006)	(0.029)	(0.006)	(0.041)	(0.007)	(0.036)
Capital 2003 X	0.004	0.004	-0.013	0.004	-0.040	0.003	0.014
1(Run)	(0.005)	(0.005)	(0.023)	(0.005)	(0.038)	(0.006)	(0.026)
Observations	5,463,779	5,422,937	40,842	2,262,709	15,537	3,160,228	25,305
R-squared	0.062	0.062	0.249	0.051	0.345	0.075	0.326
Close business relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Capital 2003 is deposit holding bank regulatory capital to total assets ration measured at the end of 2003. Sample is restricted to observations with deposit-holding bank capital above 25 percent. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Loan relation is equal to "Yes" if a company borrowed funds from the deposit holding bank in 2002-2003. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level, are reported in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Appendix A6. Explanation of the raw data structure: Electronic wire transfer orders database

Our data come from the universe of domestic wire transfers that happened in Russia in 2004. This appendix illustrates the detailed structure of our raw data that allows us to perform customer-bank matches and to tract the exact direction of deposit inflows and outflows flows during the sample period. The set of unique identifiers of each money transfer order within the Russian banking system that we use in this study includes: (1) date; (2) sum of a wire transfer; (3) national ID of an institutional account deposit holder; (4) unique bank ID for a sending bank; (5) unique bank ID for a beneficiary bank; (6) national ID for a beneficiary company.

Figure A6.1. Example of filled in form (all confidential firm-specific data are crossed-out)



Appendix A8: Net transfer normalized by weekly turnover averaged over the year for a given depositor.

Table A8.1: Offshore operations and transfers by depositor-banks. Alternative net transfer normalization.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	*Dependent variable: Normalized net transfer into a given bank*						
Offshore activity X	0.009	0.000	0.022*	0.003	-0.012	-0.000	0.039**
1(After Run)	(0.006)	(0.006)	(0.012)	(0.007)	(0.020)	(0.008)	(0.015)
Offshore activity X	0.009	-0.002	0.026*	-0.001	-0.011	-0.001	0.046**
1(Aftershock)	(0.007)	(0.005)	(0.015)	(0.006)	(0.021)	(0.007)	(0.021)
Offshore activity X	-0.000	-0.005	0.008	-0.004	-0.016	-0.004	0.019**
1(Run)	(0.004)	(0.004)	(0.008)	(0.005)	(0.014)	(0.006)	(0.010)
Observations	238,749	152,804	85,945	55,193	33,480	97,611	52,465
R-squared	0.036	0.038	0.065	0.066	0.061	0.046	0.097
Correspondent relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-bank to a particular deposit holding bank divided by averaged over the year total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Correspondent relation is equal to "Yes" if banks have correspondent accounts in each other. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table A8.2: Initial bank capital and transfers of depositor-banks.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
Capital 2003 X	-0.006	0.016	-0.064	0.023	-0.072	0.022	-0.076
1(After Run)	(0.034)	(0.028)	(0.081)	(0.039)	(0.119)	(0.045)	(0.100)
Capital 2003 X	0.018	0.009	0.007	-0.018	0.032	0.036	0.001
1(Aftershock)	(0.034)	(0.027)	(0.073)	(0.032)	(0.122)	(0.041)	(0.082)
Capital 2003 X	-0.014	-0.018	-0.015	-0.023	-0.024	-0.007	-0.015
1(Run)	(0.030)	(0.033)	(0.060)	(0.027)	(0.094)	(0.049)	(0.059)
Observations	157,469	99,987	57,482	37,437	22,903	62,550	34,579
R-squared	0.026	0.029	0.045	0.048	0.045	0.038	0.077
Close business relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given deposit owning bank to a particular deposit holding bank divided by averaged over the year total weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Capital 2003 is deposit-holding bank regulatory capital to total assets ration measured at the end of 2003. Panel B restrict observations to those where deposit-holding bank capital is less than 25 percent. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Correspondent relation is equal to "Yes" if banks have correspondent accounts in each other. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level are included in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table A8.3: Bank offshore operations and transfers of depositor-firms.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
Offshore X	0.012	0.012	-0.007	0.009	-0.058	0.014	0.020
1(After Run)	(0.007)	(0.007)	(0.048)	(0.006)	(0.073)	(0.009)	(0.062)
Offshore X	0.006	0.005	0.045	0.000	-0.002	0.009	0.065
1(Aftershock)	(0.006)	(0.006)	(0.048)	(0.005)	(0.075)	(0.007)	(0.065)
Offshore X	0.004	0.004	-0.005	0.001	-0.092	0.006	0.031
1(Run)	(0.004)	(0.003)	(0.033)	(0.003)	(0.058)	(0.004)	(0.040)
Observations	11,843,042	11,778,578	64,464	4,918,313	27,525	6,860,265	36,939
R-squared	0.018	0.019	0.042	0.015	0.071	0.022	0.052
Loan relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total averaged over the year weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Loan relation is equal to "Yes" if a company borrowed funds from the deposit holding bank in 2002-2003. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level, are reported in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table A8.4: Initial bank capital adequacy and transfers of depositor-firms.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
	Sample of banks with initial capital adequacy ratio <25%						
Capital 2003 X	0.068	0.069	-0.798***	0.025	-0.616*	0.101	-0.812*
1(After Run)	(0.054)	(0.054)	(0.299)	(0.040)	(0.359)	(0.066)	(0.429)
Capital 2003 X	0.046	0.045	-0.262	0.012	-0.028	0.070	-0.381
1(Aftershock)	(0.059)	(0.059)	(0.256)	(0.042)	(0.336)	(0.073)	(0.378)
Capital 2003 X	0.007	0.007	-0.231	-0.012	0.235	0.022	-0.549
1(Run)	(0.019)	(0.019)	(0.265)	(0.019)	(0.347)	(0.024)	(0.336)
Observations	7,219,603	7,183,401	36,202	2,998,444	16,102	4,184,957	20,100
R-squared	0.014	0.015	0.040	0.012	0.066	0.017	0.067
Close business relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total averaged over the year weekly turnover of the depositor. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Capital 2003 is deposit holding bank regulatory capital to total assets ration measured at the end of 2003. Sample is restricted to observations with deposit-holding bank capital below 25 percent. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Loan relation is equal to "Yes" if a company borrowed funds from the deposit holding bank in 2002-2003. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level, are reported in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Appendix A7: Robustness to outliers

Table A7.1: Bank offshore operations and transfers of depositor-firms: companies dealing with more than 10 different banks are dropped.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
Offshore X	-0.004	-0.004	0.031	-0.006	-0.043	-0.003	0.058*
1(After Run)	(0.007)	(0.007)	(0.029)	(0.007)	(0.048)	(0.008)	(0.032)
Offshore X	0.001	0.000	0.037	-0.002	-0.032	0.002	0.062**
1(Aftershock)	(0.006)	(0.006)	(0.025)	(0.006)	(0.040)	(0.007)	(0.029)
Offshore X	0.001	0.000	0.017	-0.002	-0.039	0.002	0.040*
1(Run)	(0.003)	(0.003)	(0.019)	(0.003)	(0.027)	(0.003)	(0.023)
Observations	11,521,763	11,462,922	58,841	4,711,710	23,431	6,751,212	35,410
R-squared	0.050	0.050	0.212	0.042	0.319	0.060	0.273
Loan relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample excludes companies dealing with more than 10 different banks. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Loan relation is equal to "Yes" if a company borrowed funds from the deposit holding bank in 2002-2003. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level, are reported in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Table A7.2: Bank offshore operations and transfers of depositor-firms: Sample of companies dealing with their bank at least once per month.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Net transfer into a given bank						
Offshore X	0.011**	0.011*	0.005	0.008	-0.065	0.012**	0.037
1(After Run)	(0.005)	(0.005)	(0.028)	(0.006)	(0.041)	(0.006)	(0.032)
Offshore X	0.012***	0.012***	0.008	0.007	-0.064**	0.015***	0.039
1(Aftershock)	(0.004)	(0.004)	(0.023)	(0.005)	(0.031)	(0.005)	(0.026)
Offshore X	0.006*	0.005*	0.007	0.001	-0.054**	0.008***	0.035
1(Run)	(0.003)	(0.003)	(0.020)	(0.004)	(0.025)	(0.003)	(0.025)
Observations	5,361,775	5,304,453	57,322	2,162,589	24,335	3,141,864	32,987
R-squared	0.112	0.113	0.227	0.092	0.335	0.134	0.288
Loan relation	Any	No	Yes	No	Yes	No	Yes
Depositor type	Any	Any	Any	Transparent	Transparent	Suspicious	Suspicious
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor. Sample includes companies dealing with their bank at least once per month. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank Run) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Run) is a dummy for weeks 41+. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (4) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (6) and (7)). Loan relation is equal to "Yes" if a company borrowed funds from the deposit holding bank in 2002-2003. All specifications are estimated by FE-OLS with deposit-holding bank fixed effects and time (week) fixed effects. Robust standard errors, clustered at the deposit-holding bank level, are reported in parentheses. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.

Appendix A9 Lagged flows

Table A9.1: Connected depositor-firms past withdrawals and withdrawals of non-connected depositor-firms.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Dependent variable: Net transfer into a given bank*					
Withdrawal by connected companies/bank assets(-1) X	0.003	0.010	-0.002	0.019	0.019	0.018
1(After run)	(0.047)	(0.035)	(0.056)	(0.020)	(0.016)	(0.024)
Withdrawal by connected companies/bank assets(-1) X	-0.077	-0.049	-0.097	0.016	0.019	0.012
1(Aftershock)	(0.056)	(0.045)	(0.066)	(0.024)	(0.019)	(0.028)
Withdrawal by connected companies/bank assets(-1) X	-0.070	-0.036	-0.091	0.015	0.022	0.009
1(Run)	(0.077)	(0.066)	(0.084)	(0.017)	(0.016)	(0.017)
Withdrawal by connected companies/bank assets(-1)	-0.069***	-0.063***	-0.072***	0.000	0.000	0.000
	(0.025)	(0.024)	(0.026)	(0.004)	(0.004)	(0.005)
Observations	4,453,067	1,814,468	2,638,599	4,453,067	1,814,468	2,638,599
R-squared	0.007	0.008	0.007	0.071	0.065	0.082
Deposit-holding bank FE	No	No	No	Yes	Yes	Yes
Depositor type	Any	Transparent	Suspicious	Any	Transparent	Suspicious
Offshore and capital controls	Yes	Yes	Yes	Yes	Yes	Yes
Loan relation	No	No	No	No	No	No
Week FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-firm to a particular deposit holding bank divided by total weekly turnover of the depositor-firm. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank panic) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Bank panic) is a dummy for weeks 41+. Withdrawal by connected companies (-1) is total withdrawal by depositor-firms with past loan relationship with the bank in the previous week. Tax evasion of the deposit is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (2) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (3) and (6)). Sample is restricted to observations on depositor-firms with no prior (2000-2003) loan relation with deposit-holding banks. "Withdrawals by connected companies" are total withdrawals in a given week from a given bank by depositor-firms with past loan relations with the bank divided by the bank total assets. All specifications are estimated by OLS with robust standard errors, clustered at the depositor level. In addition, specifications 4-6 include deposit-holding bank fixed effects. ***, **, And * indicate statistical significant at 1%, 5%, and 10% respectively. Offshore banking, foreign transactions (log), capital in 2003 levels and interactions with time dummies are included but not reported.

Table A9.2: Connected depositor-banks past withdrawals and withdrawals of non-connected depositor-banks.

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable: Net transfer into a given bank					
Withdrawals by connected banks/bank assets (-1) X	0.017	0.042*	0.006	-0.023**	-0.010	-0.034*
1(After run)	(0.018)	(0.022)	(0.021)	(0.011)	(0.018)	(0.018)
Withdrawals by connected banks/bank assets (-1) X	-0.001	0.021	-0.009	-0.041***	-0.029	-0.045*
1(Aftershock)	(0.022)	(0.026)	(0.027)	(0.014)	(0.020)	(0.023)
Withdrawals by connected banks/bank assets (-1) X	0.013	0.042*	0.001	-0.041***	-0.025*	-0.048**
1(Run)	(0.016)	(0.022)	(0.019)	(0.013)	(0.013)	(0.020)
Withdrawals by connected banks/bank assets (-1)	-0.056***	-0.070***	-0.051**	0.020*	0.008	0.031
	(0.020)	(0.021)	(0.022)	(0.011)	(0.013)	(0.019)
Observations	73,742	26,837	46,905	73,742	26,837	46,905
R-squared	0.012	0.010	0.017	0.102	0.129	0.140
Deposit-holding Bank FE	No	No	No	Yes	Yes	Yes
Depositor tax evasion	Any	Transparent	Suspicious	Any	Transparent	Suspicious
Week FE	Yes	Yes	Yes	Yes	Yes	Yes
Correspondent account	No	No	No	No	No	No

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-bank to a particular deposit holding bank divided by total weekly turnover of the depositor-bank. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank panic) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Bank panic) is a dummy for weeks 41+. Withdrawal by connected banks (-1) is total withdrawal by depositor-banks with correspondent account relationship with the bank in the previous week. Tax evasion of the depositor is tax evasion measure of Moscow based entities developed by Braguinsky and Mityakov (2015). Low tax evasion indicates sample of depositors below the median tax evasion score (specifications (2) and (5)), high tax evasion indicates a sample of depositors above the median tax evasion scores (specifications (3) and (6)). Sample is restricted to observations on depositors with no correspondent account relation with the deposit-holding banks. "Withdrawals by connected banks" are total withdrawals in a given week from a given bank by depositor-banks with correspondent account relation with the bank divided by the deposit-holding bank total assets. All specifications are estimated by OLS with robust standard errors, clustered at the depositor level. In addition, specifications 4-6 include deposit-holding bank fixed effects. ***, **, And * indicate statistical significant at 1%, 5%, and 10% respectively. Offshore banking, foreign transactions (log), capital in 2003 levels and interactions with time dummies are included but not reported.

Table A9.3: Lags of withdrawals of connected depositor-banks and contemporaneous withdrawals of non-connected depositor-banks.

	Dependent variable: Net transfer of non-connected depositor-banks				
Lag of total withdrawals	Current	one week	two week	three week	four week
Total withdrawals of connected depositor-banks/bank assets X	-0.017	-0.019	0.005	-0.026**	-0.005
1(After Run)	(0.020)	(0.013)	(0.013)	(0.012)	(0.020)
Total withdrawals of connected depositor-banks/bank assets X	-0.012	-0.016	-0.045*	-0.024*	0.007
1(Aftershock)	(0.021)	(0.017)	(0.023)	(0.014)	(0.014)
Total withdrawals of connected depositor-banks/bank assets X	-0.012	-0.007	-0.023	-0.046**	0.004
1(Run)	(0.019)	(0.017)	(0.015)	(0.019)	(0.018)
Total withdrawals of connected depositor-banks/bank assets	0.009	0.016	0.006	0.025**	0.002
	(0.016)	(0.013)	(0.012)	(0.012)	(0.013)
Observations	26,177	Bank FE	Yes	Week FE	Yes

Notes: Dependent variable is ratio of weekly net transfer by a given depositor-bank to a particular deposit holding bank divided by total weekly turnover of the depositor-bank. Sample covers weeks of Jan 2004-Dec 2004. 1(Bank panic) is a dummy variable for (weeks 20-29), 1(aftershock) is a dummy for weeks (30-41), and 1(After Bank panic) is a dummy for weeks 41+. Withdrawal by connected banks is total withdrawal by depositor-banks with correspondent account relationship with the bank, column titles indicate length of the lag in weeks. All lags coefficients are from single regression. Sample is restricted to observations on depositors with no correspondent account relation with the deposit-holding banks. "Withdrawals by connected banks" are total withdrawals in a given week from a given bank by depositor-banks with correspondent account relation with the bank divided by the deposit-holding bank total assets. Specifications is estimated by FE-OLS with deposit-holding bank fixed effects and week fixed effects. Deposit-holding bank fixed effects and week fixed effects are included by not reported. Offshore banking, foreign transactions (log), capital in 2003 levels and interactions with time period dummies are included but not reported. Robust standard errors, clustered at the depositor level, are reported in parenthesis. ***, **, And * indicate statistical significant at 1%, 5%, and 10% respectively.

Appendix A10. Blacklist dummy for Moscow headquartered banks only.

Table A10.1: Blacklist probability and bank characteristics. Moscow-headquartered banks only

	(1)	(2)	(4)	(5)
	Dependent variable: Dummy for bank being in one of the four black lists			
Offshore fraction	0.079*	0.076*	0.101*	0.099*
	(0.045)	(0.044)	(0.054)	(0.054)
Log total foreign transactions	0.008**	0.008**	0.008**	0.009**
	(0.004)	(0.004)	(0.004)	(0.004)
Log net assets	0.008	0.005	0.009	0.007
	(0.009)	(0.010)	(0.010)	(0.011)
Regulatory capital		0.062		-0.013
		(0.199)		(0.209)
Regulatory capital -squared		-0.107		-0.019
		(0.196)		(0.192)
Observations	479	478	479	478
Estimation	Probit	Probit	OLS	OLS
Sample	All	All	All	All

Notes: Sample includes Moscow-headquartered deposit-holding banks with positive foreign transaction flows. Dependent variable is a dummy variable that a given depositor bank is contained in one of four lists of suspicious banks circulated at the time of the panic among market participants. Offshore is a fraction of foreign operations undertaken by a given deposit holding bank that goes through non-transparent offshore zones. Non-transparent offshore zones are defined by Russian Central Bank list of offshore localities in 2003. Regulatory capital is calculated at the end of 2003. Specifications (1), (2) are estimated by probit with marginal effects reported, specifications (3),(4) are estimated by OLS. Robust standard errors in parenthesis. ***, **, And * indicate statistical significant at 1%, 5%, and 10%, respectively.