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Abstract

We study the impact of global financial sanctions on the Russian banks and economy. Financial sanctions were consecutively imposed between 2014 and 2019, allowing potentially-targeted (but not yet sanctioned) banks to adjust their international and domestic exposures. Compared to similar other banks, targeted banks immediately reduced their foreign assets. Yet, to deal with considerable domestic depositor withdrawals, targeted banks at first actually expanded their foreign liabilities. Once sanctioned, however, banks not only further reduced their foreign assets but also started to decrease their foreign liabilities as well. Despite the introduction of government support the sanctioned banks substantially contracted their lending to the domestic corporate sector resulting in a potential loss in domestic GDP of at least four percent. However, at the same time the sanctioned banks increased household lending by almost the same magnitude, mostly offsetting the loss in GDP. Finally, unique hand-collected board membership and location data coupled with a two-stage difference-in-differences approach that flexibly addresses potential treatment diffusion allows us to show that throughout this period state-controlled banks were not all equally recognized as potential sanction targets.

JEL Classification: E65, F34, G21, G41, H81

Keywords: banks, Financial sanctions, Political influence, International borrowings, Foreign Assets, Informational effects of sanctions, Treatment diffusion

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"Crime and Punishment?" How Russian Banks Anticipated and Dealt with Global Financial Sanctions*

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1 Introduction

Politics affects the banking sector in many ways (e.g., Calomiris and Haber, 2014). For example, governments in many countries direct commercial bank lending to specific sectors and/or stimulate lending to small and medium-sized enterprises (Brown and Dinc, 2005; Kang et al., 2015, among others). And during the recent covid-19 pandemic, many governments created emergency loan guarantee schemes that were covering and spurring their banks' lending. In this paper, we turn to another recent and striking episode of political impact, i.e., the global financial sanctions on Russian banks with close ties to their domestic government that commenced in 2014 and were sequentially imposed on various Russian banks during a five-year period.

Indeed following the annexation of the Crimean peninsula by the Russian Federation in early 2014, many Western countries started to impose sanctions on major banks and non-financial firms linked to the Kremlin in order to curtail their international operations.[1] A very important feature of this internationally coordinated restrictive policy was that the sanctions were not imposed all at once, i.e., on a full list of politically connected entities in Russia, but in contrast was phased-in for at least half a decade from 2014 to 2019, with various types of restrictive measures being *sequentially* imposed on various entities from the list.

This phasing-in of the sanctions constitutes a very interesting and policy relevant laboratory to analyze not only the immediate effects on the already-sanctioned banks but also on those banks that are not yet sanctioned but that seem targeted and may be sanctioned in the near future. The point is that such targeted banks have time to adjust their international operations before the actual sanctions materialize. What makes the story even more interesting is that the domestic creditors of these targeted banks may also anticipate sanctions to be imposed and, having observed the effect of the sanctions on the already sanctioned banks, these creditors may run. The potentially targeted banks thus have to take such a run into account. Henceforth we refer to the immediate effects of sanctions on the sanctioned banks as *direct* effects, and we call the adjustments of the potentially targeted but not yet sanctioned banks to the anticipated sanctions the *informational* effects. In this paper, we thus estimate and compare the direct and informational effects of sanctions against the largest Russian banks with respect to their international and domestic operations.

Beyond the measurement of the impact of the sanctions *per se*, more broadly, our research analyzes how banks adjust their international operations in response to external shocks to their

[1] We are not the first to study the impact of the sanctions. Belin and Hanousek (2020) for example focus on Russian non-financial firms and study the effects of sanctions on their international trade flows *vis-à-vis* their US and EU trade partners. Ahn and Ludema (2020) also study the effects of sanctions against Russian firms, showing that the targeted approach to sanctions, i.e., the so-called *smart* sanctions, was new but efficient since they negatively affected the firms' activities while causing minimal "collateral" damage. Davydov et al. (2021) study how European firms perceive Russia-related sanctions. In contrast to these studies we focus on the impact of the sanctions on the balance sheets of banks and aim to measure the pass-through from the financial sector to the real economy.

assets and liabilities and what repercussions for their domestic operations these shocks could have.

Our main sources of the information on which Russian banks were included in the sanction list, and when sanctions would be effectuated, are: (i) the US Department of the Treasury, with its official press-releases on the reasons and types of sanctions being imposed on particular entities; and (ii) the Risk Advisory (a leading global risk management consultancy) which provides an aggregated list of sanctioned banks, by sanction types (see Section 2.2 for details). From these two sources one can infer that there are two major types of sanctions, i.e., those affecting debt and those restricting assets, with the former representing restrictions mainly on placement of new debt in international markets and the latter imposing restrictions on foreign assets holdings of treated banks. Henceforth, and for the sake of convenience, we label these two types of sanctions as "*debt*" and "*assets*" sanctions, respectively.[2] As of 2019, the debt sanctions were imposed on 20 financial entities which include all state-owned banks (which are historically the largest banks in Russia) and their affiliates; the assets sanctions were introduced against 24 other politically influenced financial corporations (either owned by major oligarchs or operating in the Crimea). In our empirical analysis we distinguish the direct and informational effects of debt and asset sanctions to measure the "price of being" either a state-owned or oligarch-owned financial firm in Russia.

Our empirical design consists of four main steps. In the first step we run the matching estimator of Abadie and Imbens (2011) to find those non-sanctioned banks in Russia which are similar in key balance sheet characteristics to those on the sanction list. The second step involves running difference-in-differences regressions on the matched sample of banks in which we jointly estimate direct and informational effects of sanctions on the key international operations of Russian banks (with foreign assets and liabilities) and a myriad of their domestic operations for either debt or assets sanctions. In a third step we address a concern of *treatment diffusion* that is likely to arise because the Western countries had not recognized roughly 40 banks that are controlled by the Russian government and thus were likely to also adapt their international (and domestic) operations when the first sanctions were announced in March 2014. We suggest a two-stage modification of the difference-in-differences approach. In our proposed approach, the first stage builds a series of discrete choice models describing subjectively perceived probabilities of being sanctioned by all such banks, and the second stage runs the difference-in-differences regressions on extended treatment group of banks covering not only those that had eventually been sanctioned but also those with high predicted probabilities of being sanctioned. Finally, in a fourth step, we estimate the real implications of the aggregated direct and informational effects of sanctions with a structural vector autoregressive (SVAR) model.[3]

[2]According to the US Department of the Treasury, debt sanctions are called "*sectoral*" while assets sanctions are titled "*entity*".

[3]We use the narrative sign restriction approach of Antolin-Diaz and Rubio-Ramirez (2018) and apply the credit supply shock identification scheme of Gambetti and Musso (2017). The idea here is that sanctions could be treated as negative shocks to bank loan supply since banks may face binding borrowing constraints. With the use of SVAR model, we are able to at least capture the overall effect of this decreased loan supply on GDP

We collate bank-level, person-level and macroeconomic data from several sources. Bank-level characteristics are obtained from the Central Bank of Russia's database, which discloses monthly bank balance sheets from January 2004 and quarterly bank profit and loss accounts from 2004 Q1 covering approximately 95% of the banking system total assets. With monthly data, we can track the adjustment of targeted banks in a more detailed manner.[4] Further, we manually collect the data on each and every member of the board of directors for each and every state-controlled bank that had or had not eventually been sanctioned. We extract this information from several sources, starting from the banks' annual financial reports, the persons' CVs, and Google search. Finally, macroeconomic characteristics of the Russian economy are retrieved from: (i) the database of the Federal State Statistic Service (Rosstat)[5], which delivers monthly data on output, as proxied by the index of basic economic activities, and CPI inflation; and (ii) the database of CBR, which also contains the monthly data on risk-free interest rate, composite interest rate on loans to individuals and non-financial firms, and the loans themselves.[6]

Our estimates indicate that within 24 months after the first portion of sanctions were imposed in March 2014 the targeted (but not yet debt-sanctioned) Russian banks increase, not decrease, their international borrowing over their total liabilities by 3.8 percentage points and reduce their international assets over their total assets by 1.1 percentage points, on average. In contrast, during the same period of time the targeted (but not yet asset-sanctioned) Russian banks decrease, as one could expect, their international borrowing by 2.5 percentage points of their total liabilities and reduce their international assets by 1.6 percentage points of their total assets, on average. Importantly, we reveal that the strength of the informational effect critically depends on the geographical location of banks. The closer to Moscow the headquarter of a bank is located, the less potent is the informational effect on *not yet debt*-sanctioned banks but the stronger it is on *not yet asset*-sanctioned banks.[7] This implies that the state-owned or -controlled banks in Moscow could have informational advantages over the banks in more distant cities in Russia. We also show that the maturity of international borrowings matters when we consider the informational effects of sanctions: approximately 2/3 of the estimated effects for both not yet debt- and not yet asset-sanctioned banks are due to long-

in Russia by estimating the elasticity of output with respect to loan volumes *when* negative credit supply shocks are in place. Overall, our difference-in-differences analysis delivers an estimate of credit reduction caused by sanctions and our SVAR-analysis tracks its aggregated effect in terms of the reduction in output.

[4]This information is culled from the so-called Forms 101 and 102, respectively; see https://www.cbr.ru/banking_sector/otchetnost-kreditnykh-organizaciy/. We thus do not rely on international sources of bank-level data, i.e., the former Bureau Van Dijk's Bankscope and current Orbis database because the domestic data we have access to covers almost all banks over the last 15 years and are published in both monthly and quarterly formats. Our paper is not the first one that studies the domestic data on Russian banks. Among others, Karas et al. (2013) and Chernykh and Cole (2011) also analyze these data, in an application to market discipline during the crisis periods of 1998 and 2008, respectively; Juurikkala et al. (2011) employ the domestic data to study the lending channel of monetary policy transmission in Russia.

[5]See https://eng.gks.ru/folder/13913.

[6]See https://www.cbr.ru/eng/banking_sector/statistics/.

[7]In other words, the first type of banks, especially if located in Moscow, can possibly continue to enjoy cheaper funding from abroad until the borrowing constraint is not binding. The second type of banks is more concerned with possible asset freezes by international governments, and the more so if located in Moscow.

term foreign liabilities (i.e., with maturity of 3 years or more). Further, within 24 months after the sanctions are imposed, (already treated) debt-sanctioned banks switch from increasing to reducing their international liabilities and they continue to sell their foreign assets but both effects are close to zero, thus implying that the banks could have fully adapted to the sanctions before. Conversely, (already treated) asset-sanctioned banks experience stronger direct effects of sanctions than the informational effects described above — that is, they further decrease their foreign liabilities by 5.8 percentage points and their foreign assets by 1.6–2.2 percentage points. These are the primary effects of sanctions, i.e., the effects through which sanctions channel into the Russian banking system. We then estimate the secondary effects, i.e., the effects related to banks' adjustments of their domestic liabilities and assets. We show that targeted banks face no withdrawals of retail and corporate depositors in response to the very first sanction announcement in March 2014; however, they face depositors' withdrawals when the sanctions against these banks are imposed. The sanction-based withdrawals amount to –2.2 and –10 percentage points of the debt- and asset-sanctioned banks' total assets. The government then stepped in and supported the banks, thus preventing disorderly failures.

Regarding the treatment diffusion, we find that those banks with government-connected persons in the board of directors were likely to behave very similarly to those banks that were eventually sanctioned. This proves that treatment diffusion exists and matters. Our baseline estimates of the informational effects of the first sanction announcement survives when accounting for the treatment diffusion phenomenon.

In the macro part, we reveal a credit re-shuffling effect of the sanctions: the targeted banks decline corporate credit by an equivalent of 4 percentage points of Russian GDP, possibly anticipating sanctions against Russian firms, and, almost by the same amount, increase credit to households, which are less likely to appear in the sanction list of Western governments. The net effect on the Russian economy is rather small, thus confirming previous findings from macroeconometric research (Dreger et al., 2016; Pestova and Mamonov, 2019; Ahn and Ludema, 2020). However, and differently from the latter studies, we show that the (small) net effect is composed of a rather large negative and a rather large positive effect of sanctions on firm and household credit, respectively, thereby altering the composition of bank lending.

Our research contributes to several strands of the literature. First, we add micro-level evidence on how sanctions affected the banking system in the Russian economy and, through that, we document what effect the sanctions had on output, thus enriching recent macro-level studies (Dreger et al., 2016; Pestova and Mamonov, 2019) and firm-level analysis (Belin and Hanousek, 2020; Ahn and Ludema, 2020). Second, by showing that targeted banks adjusted their operations in advance, i.e., before the sanctions were put in place, we provide empirical evidence of forward-looking behavior of economic agents in anticipation of sanctions. This speaks to the role of information in the economy and how agents, in this case banks and depositors, adapt to news (Beaudry and Portier, 2006; Jaimovich and Rebelo, 2009; Barsky and Sims, 2011; Blanchard et al., 2013; Forni et al., 2017, among others). Third, we add to

the literature on market discipline by providing further evidence on information vs. panic-based deposit withdrawals (Martinez Peria and Schmukler, 2002; Karas et al., 2013; Osili and Paulson, 2014, among others). Fourth, our paper is closely related to research on the role of state-owned banks in the economy (La Porta et al., 2002; Dinc, 2005; Brei and Schclarek, 2013, among others). In addition, we believe our results may have important policy implications for both the Russian government and Western countries. For the former, our estimates imply that, if the imposition of sanctions were not phased-in, the negative effect could have been larger, which is economically inefficient for the country with long lasting recessions. For the latter, our results indicate that, even despite the phasing-in, the sanctions still had a significant effect.

The remainder of this paper is organized as follows. In Section 2, we describe the hypotheses related to informational and direct effects of sanctions and the main steps of our empirical design. Section 3 then introduces the data sources, descriptive analysis and most relevant case-studies on largest Russian banks under sanctions. In Section 4, we present our baseline empirical results on sanctioned vs. non-sanctioned banks matching and difference-in-differences regressions of the sanctions effects on Russian banks. In Section 5 we further address the issue of treatment diffusion. In Section 6 we briefly describe our macroeconomic estimates of the real effects of financial sanctions on the Russian economy. We outline our robustness checks in Section 7. Section 8 concludes.

2 Empirical design and hypotheses

In this section, we describe the construction of sanctioned and matched non-sanctioned banks, which constitute respectively treatment and control groups. We then specify our empirical equations within the difference-in-differences approach and we outline our hypotheses. We finally discuss the SVAR model aimed at estimating the macroeconomic effect of credit decline in the treatment group following the sanction imposition.

2.1 Hypotheses

We develop and test the following five hypotheses in our study.

First, there exist an informational effect when the first banks are hit with sanctions, which pushes not yet treated banks to adjust their international and domestic operations in advance, i.e., before another installment of sanctions arrives. This effect relates to an otherwise standard precautionary motive. We refer to this hypothesis as "*anticipating a punishment*" (H1).

Second, directions of the informational effect differ for foreign assets and foreign liabilities of not yet treated banks. On the one hand, such banks are likely to fear freezes of their foreign

assets which could be undertaken by punishing Western countries, and thus they can sale their (or a part of their) foreign assets right after the first portion of sanctions is imposed. As a referent point, we naturally choose March 20, 2014 when one of potentially treated banks was the first one to face sanctions.[8] On the other hand, the not yet treated banks may still be willing to borrow more from international financial markets until the opportunity window is closed by the sanctions (if borrowing domestically is more expensive). We call this the "*non-monotone informational effects*" hypothesis (H2).[9]

Since in the hypotheses 1 and 2 we are investigating (bank) behavior in response to a threat of sanctions, not to sanctions themselves, we further hypothesize that potentially targeted banks with headquarters located in Moscow could possess more information regarding possible threats of sanctions compared to the banks located in remote regions. 26 out of 44 eventually sanctioned banks are located in Moscow while the rest are dispersed from the annexed Crimea in the very South (approximately 1,200 km from Moscow) to Siberia (2,100 km) and even more remote regions in the East (Yakutia, about 5,000 km from Moscow). We hypothesize that the strength of H1 and H2 is greater for potentially targeted banks in Moscow than for the others. Signals of the threats could be less noisy for banks in Moscow than for the other banks thus giving them an opportunity to properly adjust their international operations.

Third, direct and informational effect of sanctions differ for debt vs. asset-sanctioned banks. This speaks to "*heterogeneous sanctions effects*" (H3).

Fourth, both informational and direct effects are in place, i.e., affect banking foreign and domestic operations. We refer to it as "*double sanctions effect*" (H4). Having observed a sanction against itself, each respective bank continues (or is forced to continue) adjusting its international operations accordingly.

Finally, as a result of the sanctions, loan supply to the economy declines causing negative macroeconomic implications. This is the "*negative macroeconomic effects of sanctions*" hypothesis (H5).

2.2 Identification of sanctioned banks (treatment group)

As we have mentioned in the Introduction, there are two major types of sanctions against Russian financial institutions: debt and assets sanctions, with the former affecting 20 state-owned banks and their affiliates, and the latter impacting another 24 banks owned by individuals closely related to the Kremlin. More formally, the US Office of Foreign Assets Control (OFAC)

[8] It was the "Bank Rossiya" owned by the Kovalchuk family, one of the richest oligarchs in the country; see https://www.treasury.gov/resource-center/sanctions/OFAC-Enforcement/Pages/20140320_33.aspx.

[9] Of course, with the balance sheet information we cannot trace the country-level sources from which either foreign assets or foreign liabilities originate. However, we still should observe an effect on both if sanctions were effective.

administers economic sanctions against Russia and specifies two sanction lists: the Specially Designated Nationals (SDN) List and the debt Sanctions Identifications (SSI) List. SDN implies complete prohibition of economic relationships with certain individuals and their businesses, whereas SSI targets specific activities to be forbidden. In mid-2014, OFAC had issued four directives shaping the SSI prohibited activities. All the details can be found in a special alert by ReedSmith devoted to sanctions.[10] We focus here only on the Directive 1 which targets financial sector and thus is important for our analysis. Specifically, the Directive 1 eliminates any opportunities for "*...engaging in transactions in, providing financing for, or otherwise dealing in new debt with a maturity of longer than 30 days, or equity for persons identified on the SSI List*".

With this information in hand, we are ready to start forming the treatment group for our analysis. To do so, we collect the dates of sanction announcements and all relevant bank-level information from the official OFAC's website. In addition, we cross-check the resultant list of sanctioned banks by other sources: particularly, we retrieve the lists of debt- and asset-sanctioned banks from the website of the international consulting company "Risk Advisory".[11]

The resultant list of debt- and asset-sanctioned banks consists of 44 financial institutions that faced international restrictions imposed between 2014 and 2019 (see Appendix B). Among the 20 banks in the debt sublist we have (i) 4 different state-owned or -controlled commercial banks which constitute the "big-4" of the Russian banking system (i.e., Sberbank, VTB, Gazprombank, and the Russian Agricultural Bank), (ii) 1 state-owned development bank (VEB), and (iii) 15 major subsidiaries of the "big-4" or VEB. Within this sublist, we have to exclude VEB and 3 subsidiaries because they do not disclose their balance sheets through the CBR's database. Further, among the 24 banks in the assets sublist, we have (i) 12 banks operating in the Crimean peninsula. (ii) at least 2 banks controlled by the Rotenberg family, and (iii) 10 banks controlled by either local governments or other state-owned entities. Within these 24 banks we have to exclude 4 banks because for 2 of them the sanctions were eventually repealed, the 3rd one does not disclose its balance sheets, and the 4th one is a duplicate (it already appears in the debt sublist). In total, we thus have 36 financial institutions which constitute the treatment group for our empirical analysis. The balance sheet characteristics of the group, including size and foreign and domestic operations, are presented and discussed in Section 3.1 below.

2.3 Matching: Identification of non-sanctioned banks (control group)

As we have noted in the previous section, certain Russian banks received treatment in the form of either debt or assets sanctions at different points in time between 2014 and 2019 rather than

[10] https://www.reedsmith.com/en/perspectives/2014/10/overview-of-the-us-and-eu-sanctions-on-russia.
[11] https://www.riskadvisory.com/sanctions/russia-sanctions-list/.

all together and at once. There are 36 such banks for which the bank-level data are available for the analysis. These banks are rather heterogeneous in terms of bank size and other bank-specific indicators (details are reported below), and it is therefore unlikely that their average characteristics are representative of the banking system as a whole. We thus have to account for these features properly by constructing a matched sample of non-sanctioned banks, i.e., the control group, relative to which we will be estimating the effects of sanctions.

There are at least two ways to construct the matched sample of banks in our case: one is based on finding matches on the pre-treatment period around the the very first date when sanctions materialized (March 2014) and the other searches for matches around each individual date of sanctions within 2014–2019. We choose the first one as our baseline approach and leave the second one to be discussed in the robustness section. The reason why we do so is that being owned or controlled by the government is exogenous to the date of sanctions in the sense that, after March 2014, not yet treated banks could start anticipating sanctions against them just because of their ties to the Kremlin, whereas domestic private and foreign-owned banks knew they were likely immune to sanctions. If a bank anticipates sanctions, it adapts in advance and thus matching around the individual date rather than on the pre-March 2014 period is subject to a behavioral bias. We want to compare banks *before* they could have known about the threat of sanctions.

Let us formalize our chosen approach to matching. Suppose that index i reflects a bank from the treatment group with the sanction date t_i, with $i = 1...S$ ($S = 36$) and $t_i \in [2014, 2019]$. Here, t_1 reflects March 2014, when the first bank faced sanctions ("Bank Rossiya"). For each i we need to find n matches among non-sanctioned banks (i.e., the banks that did not face sanctions at all in our sample) at the common pre-treatment period $[t_1 - k, t_1)$, with $n = 1, 2...n^*$ and $k = 1, 2...k^*$. For choosing n^*, we follow the recommendations of Abadie and Imbens (2011) and set $n^* = 4$ in our baseline estimations.[12] In turn, for choosing k^*, we have no specific rule of thumb, except that it cannot be too large if we want to capture causal effects. For the baseline estimates, we set $k^* = 24$ months. We also check more narrow and more wider windows to capture the peak effects and reveal when the effects die out. We index matching banks with $j^{(n)}$, with $j = 1...S \times n^*$.

We apply the bias-adjusted near-neighbor matching estimator of Abadie and Imbens (2011) to find matches to sanctioned banks at the pre-treatment period. Following Gropp et al. (2019), we employ the following bank-specific indicators BSF_{it} in the matching procedure: bank size (as measure by the logarithm of total assets), equity capital, loans granted to the economy, deposits and accounts attracted from the economy, net income, and net interest income (all but size are as % of bank total assets). These measures reflect (i) bank asset structure, (ii) bank liability structure, (iii) size and capitalization, and (iv) profitability from interest-bearing

[12] Four matches were shown to be a good trade-off between preserving enough variance in the sample and decreasing the bias of the final estimates. Gropp et al. (2019) follow the same rule of thumb when constructing a matched sample of banks for their analysis.

and other sources of income. In addition, we include non-performing loans ratio and cash and other reserves holdings (also as % of bank total assets) to control for credit and liquidity risk exposures. We need bias-adjustment because the number of continuous covariates exceeds two. Finally, we control for time (month) fixed effects when running the matching estimator to account for the differences in common shocks exposures between different blocks of banks. By a block we mean a sanctioned bank and its n^* matches. Including time fixed effects is important because we have time-varying periods of treatment imposition (Goodman-Bacon, 2021). The equation then reads as:

$$FY_{it} = \gamma_t + \beta \mathbb{1}_i + \sum_{r=1}^{8} \xi_r BSF_{it}^{(r)} + \varepsilon_{it}, \text{ if } t \in [t_1 - k, t_1) \tag{1}$$

where FY_{it} is either foreign assets or foreign liabilities of bank i in month t (as % of bank total assets), $\mathbb{1}_{it}$ is an indicator of whether a bank i faces sanctions at some date $t_i \in (t_1, t_S]$ (i.e., in the future five years), γ_t is time FE, and the estimation is performed on the pre-treatment part of chosen window, i.e., $[t_1 - k, t_1)$.

Having estimated Equation (1) with specified number of matches (recall, $n^* = 4$ in the baseline case), we identify the matched banks be their registration numbers. We thus construct the matched sample and we apply the Welch test on mean differences between the groups for each covariate on the pre-treatment period. We thus can define the binary indicator reflecting our treatment variable which we will further use in DiD-framework to test the informational effect of sanctions:

$$TREAT_i = \begin{cases} 1 \text{ in } [t_1 - k, t_1 + k] \ , & \text{if bank } i \text{ faces sanctions at } t_i \\ 0 \text{ in } [t_1 - k, t_1 + k] \ , & \text{if bank } i \text{ never faces sanctions and is a match} \\ ., & \text{if bank } i \text{ is not a match or } t \notin [t_1 - k, t_1 + k] \end{cases} \tag{2}$$

where $[t_1 - k, t_1 + k]$ is an estimation window for bank i and all its matches j in DiD regressions (see below).

Of course, if we want further explore direct effects of sanctions then setting 24 and even 36 months is not enough to cover the five-year horizon during which the sanctions were imposed. We thus extend the time span for the same treated and matched non-treated banks by adding all observations inside the $[t_i - k, t_i + k]$ windows for $i = 2...36$. For banks with smaller i's the two resulting window intersects more, for banks with bigger i's less.

As a preliminary step before the DiD analysis, we run the bias-adjusted matching estimator of Abadie and Imbens (2011) to the same Equation (1) but on the full available post-treatment periods $[t_i, T]$, where T is the end of the sample, for both FY_{it} = foreign assets and FY_{it} = foreign liabilities in order to make sure the sanction indeed had an overall (long-run) significant

effect on the Russian banking sector. We estimate β as the average treatment effect on the treated (ATET). In addition, such an analysis allows us to compare these matching estimation results with those that we obtain with our DiD regressions. Since we use DiD for matched sample, our DiD estimates should also reflect ATET and thus be similar to the matching estimates (Athey and Imbens, 2006). Any revealing distinctions between them could be attributed to the differences in time span.

2.4 Difference-in-differences: Microeconomic effects of sanctions

With the constructed matched sample of banks we now proceed to the main part of our empirical analysis, namely, difference-in-differences (DiD) estimates of sanction effects. We perform our estimations in three steps: first we include only individual effects of sanctions, then we add informational component, and finally we distinguish between debt and assets sanctions effects. We run these estimations for two groups of dependent variables — those reflecting foreign operations and then domestic activities. As we have already discussed, the primary effect of sanctions is channeled into the balance sheets of banks through foreign assets and foreign liabilities positions (*group one, primary effect*). The secondary effects appear when the banks that have already faced sanctions, or anticipate them, substitute these two positions with domestic counterparts, including deposits from and loans to households, non-financial firms, and banks. However, and this is what makes the analysis more interesting, households, firms and banks are not blind and may fairly start to panic when bad news on sanctions about another large bank arrives. If this is so, the government has to step in and support the affected banks, thus preventing their disorderly failures, on the one hand, and the banks themselves may attempt to prevent panic withdrawals by increasing attractiveness of their services (e.g., by raising interest rates on deposits), on the other. This is exactly what we find and report below, with some degree of heterogeneity. In other words, we trace the secondary effect of sanctions on various forms of domestic liabilities and assets, dividing them into those related to government and related to other economic agents, and on prices of these liabilities and assets (*group two, secondary effect*).

The rest of this section is devoted to technical details on the estimated equations.

Before specifying our DiD regressions, we need to properly define two indicator variables which reflect post-sanction periods in our sample. Testing of the informational effects of sanctions implies determining a common date at which the first portion of sanctions against Russian banks was introduced. As we discussed above, this is t_1 = March 20, 2014, when the "Bank Rossiya" was punished with the assets-type sanctions. Thus, the indicator variable which we

use to test for the informational effects of sanctions reads as:

$$INFO.FIRST_{it} = \begin{cases} 1, & \text{if bank } i \text{ faces sanctions or is a match and } t \in [t_1, t_1 + k] \\ 0, & \text{if bank } i \text{ faces sanctions or is a match and } t \in [t_1 - k, t_1) \\ ..., & \text{if else} \end{cases} \quad (3)$$

Further, for testing of the direct effects of sanctions, we build an indicator variable which equals 1 for sanctioned banks and their matches after the imposition of sanctions on each bank $i = 2...S$, equals 0 for the same banks at the respective pre-treatment period, and is empty for all other cases (see also Figure A.I in Appendix A for a visualisation):

$$SANCTION_{it} = \begin{cases} 1 \text{ in } [t_i, t_i + k] \ , & \text{if bank } i \text{ faces sanctions at } t_i \text{ or is a match} \\ 0 \text{ in } [t_i - k, t_i) \ , & \text{if the same as above} \\ ..., & \text{if else} \end{cases} \quad (4)$$

For each foreign and domestic dependent variable, we start with testing for the informational effects of sanctions. To do so, we run a DiD regression of the following form:

$$FDY_{it} = \alpha_i + \gamma_t + \beta_1 \Big(TREAT_i \times INFO.FIRST_{it} \Big) + \sum_{r=1}^{8} \xi_r BSF_{it}^{(r)} + \beta_2 INFO.FIRST_{it} + \varepsilon_{it}, \text{ if } t \in [t_1 - k, t_1 + k] \quad (5)$$

where FDY_{it} is either foreign- or domestic-based dependent variable discussed above, α_i is a bank i's FE, γ_t is time FE, and k determines the estimation window (in months). We set $k = 24$ months for our baseline estimations and check shorter and longer horizons ($k \in [1, 24)$ and $k \in (24, 36]$, respectively, for concreteness). $TREAT_i$ is perfectly absorbed by bank FEs, α_i, and is thus dropped from equation.

We run Equation (5), and all following equations, separately for debt-sanctioned banks (with their matches) and for asset-sanctioned banks (with their respective matches).

Using Equation (5) we can formalize the first three of our five hypotheses (see 2.1) as follows:

Hypothesis H1 "*anticipating a punishment*" is supported if β_1 is statistically different from zero, meaning that not yet treated banks could start adjusting their international operations in advance, i.e., prior to facing sanctions.

Hypothesis H2 "*non-monotone informational effects*" is supported if $\beta_1 > 0$ for FDY_{it} = foreign liabilities (borrow more until it is prohibited) and $\beta_1 < 0$ for FDY_{it} = foreign assets (sell it while it is not frozen).

Hypothesis H3 "*heterogeneous sanction effects*" speaks to differences between debt and assets sanctions and materializes if $\beta_1^{debt} \neq \beta_1^{assets}$ in statistical sense. This follows from the differences between the sanction types discussed above.

We then test the strength of both H1 and H2 depending on the geographical distance of the headquarter of each potentially targeted bank and its matches from the center of Moscow. For the latter we use the geo-code of the Kremlin. To get geo-codes of each bank in our sample we need their respective addresses with zip-codes. In this respect we face an obstacle that the Central Bank of Russia discloses names, registration numbers, and addresses of only those banks that are registered within the Russian Federation at current date.[13] We, however, need these addresses back to 2011, i.e., at least $k = 36$ months before the first portion of sanctions was imposed. To overcome this issue we exploited one of Internet archives that allows one to browse a history of any web-site for a given date (in days).[14] With this tool, we gathered the necessary data from snapshots of the CBR's web-site in monthly frequency from 2011 till 2020. With the obtained bank addresses we computed the distance to Moscow measures using one of Geocoder available in web.[15] Eventually, we modify Equation (5) by adding the $DISTANCE_i$ covariate in a triple DiD fashion as follows:

$$\begin{aligned} FDY_{it} = \alpha_i + \gamma_t &+ \beta_1\Big(TREAT_i \times INFO.FIRST_{it}\Big) \\ &+ \beta_2 INFO.FIRST_{it} + \beta_4\Big(INFO.FIRST_{it} \times DISTANCE_i\Big) \\ &+ \beta_5\Big(TREAT_i \times INFO.FIRST_{it} \times DISTANCE_i\Big) \\ &+ \sum_{r=1}^{8} \xi_r BSF_{it}^{(r)} + \varepsilon_{it}, \text{ if } t \in [t_1 - k, t_1 + k] \end{aligned} \tag{6}$$

If banks located in Moscow possessed more information on potential threat of facing sanctions than banks in other cities then, after March 2014, (i) they could start borrowing internationally more compared to non-Moscow banks and (ii) they could be less prone to selling assets internationally compared to the same banks. In terms of Equation (6), these would mean $\beta_5 > 0$ for FDY_{it} = foreign liabilities and $\beta_5 < 0$ for FDY_{it} = foreign assets.

Having explored the potential of the informational effects of sanctions we then turn to

[13] See https://www.cbr.ru/banking_sector/credit/FullCoList/ (In Russian).
[14] See archive.org.
[15] See https://geopy.readthedocs.io/en/stable/.

analyzing the direct effects of those. The DiD regression modifies to:

$$
\begin{aligned}
FDY_{it} = \alpha_i + \gamma_t + \beta_1 \Big(TREAT_i \times INFO.FIRST_{it} \Big) + \sum_{r=1}^{8} \xi_r BSF_{it}^{(r)} \\
+ \delta_1 \Big(TREAT_i \times SANCTION_{it} \Big) \\
+ \beta_2 INFO.FIRST_{it} + \delta_2 SANCTION_{it} + \varepsilon_{it}, \\
\text{if } t \in [t_i - k, t_i + k] \text{ or } t \in [t^* - k, t^* + k]
\end{aligned}
\tag{7}
$$

Using Equation (7) we can express our fourth hypotheses as follows.

Hypothesis H4 "*double sanction effects*" implies both β_1 and δ_1 are jointly different from zero. Sanctions affect a bank i before and starting from they are imposed on it. This concerns both foreign and domestic operations. In addition, we expect different effects on debt vs. asset-sanctioned banks, as in hypothesis H3 above; that is, either $\beta_1^{debt} \neq \beta_1^{assets}$ or $\delta_1^{debt} \neq \delta_1^{assets}$ (or both) in statistical sense.

Having estimated our DiD regressions for both groups of dependent variables — international and domestic — we aggregate the microeconomic estimates of the sanctions' effects to the macroeconomic level by applying a structural vector autoregressive model (SVAR) with 5 endogenous variables, as in Gambetti and Musso (2017), which we estimate using the Antolin-Diaz and Rubio-Ramirez (2018) approach. Specifically, we first obtain an aggregate decline of credit to the real economy caused by sanctions; then we obtain an elasticity of GDP with respect to credit volumes *during* the periods of credit supply shock; and, finally, we multiply the two to come up with the macroeconomic effects of sanctions. Since macroeconometric analysis *per se* is not our primary goal and we use it solely to build a bridge between a micro- and macro-level we put all the necessary details on SVAR-analysis, data, and results in Appendix F. Here we just state that our fifth hypothesis reads as:

Hypothesis H5 "*macroeconomic effects of sanction*" exist and are non-trivial.

Concerning technical issues, it is worth noting that the issue of time-varying treatment appears in several financial- and non-financial studies. For instance, a labor economics application can be found in Autor (2003), and a banking application in Joaquim et al. (2019). Technical details are provided in a recent paper by Goodman-Bacon (2021).

Finally, serial correlation is likely to impact our estimations because the sanctioned banks are not randomly chosen, they are either state-owned or -controlled and thus may share similar trends. This can lead to seriously underestimated standard errors, as is shown by Bertrand et al. (2004). To address this issue, we cluster standard errors at the level of sanctioned banks, thus allowing correlation across these banks. We also experiment with clustering within the two sanction types (debt vs. assets), thus allowing correlation within each of the type.

3 Data

This section describes the data sources for bank-level and macroeconomic analyses in the paper. For the bank-level data, we provide first general descriptive statistics of sanctioned vs. all non-sanctioned banks (i.e., before matching) and then we dive deeper into the selected cases of largest banks under sanctions. For the latter, we analyze the time evolution of foreign assets and liabilities around the imposition of sanctions on the "Bank Rossiya" (March 20, 2014) and around the followed bank-specific dates of sanctions (from April, 2014). This illustrates our "*anticipating a punishment*" and other bank-level hypotheses.

3.1 Bank-level data for matching and difference-in-differences estimates

3.1.1 General descriptive analysis

As we have discussed in the Introduction, we use domestic sources on the bank-level data, namely, the CBR's official database on monthly balance sheets and quarterly profit and loss accounts which are publicly available from 2004.

Table 1 below reports descriptive statistics by sanction type and the domestic / international groups of dependent variables at the bank level. Specifically, by columns we present means, medians, and standard deviations for the 16 debt-sanctioned banks, 20 assets sanctions banks, and all the rest (non-sanction) banks over the period of 2009M1–2019M6. By rows, we have five panels of variables: panel 1 for foreign assets and liabilities; panels 2–4 for domestic liabilities, assets, and their prices, respectively; and panel 5 for bank size, equity capital, and non-performing loans.

[Table 1 about here.]

Analysis of descriptive statistics shows that, on average, debt-sanctioned banks are those most dependent on foreign liabilities and most engaged in foreign assets purchases compared to other types of banks in Russia, i.e., asset-sanctioned banks and non-sanctioned banks. As per cent of total assets, both operations are approximately twice as large as those in the other two groups of banks (see Panel 1). In this respect, the debt sanctions were properly addressed. We also notice that, even for the debt-sanctioned banks, both foreign assets and liabilities are unlikely to be the major positions in their balance sheets covering about 10% of the total whereas private deposits and corporate deposits hold by about 20% of the balance sheets each. At the same time, foreign assets and liabilities of the debt-sanctioned banks are comparable with the role of inter-bank loans and deposits, respectively. Other types of attracted funds,

namely, government deposits and loans from the Central Bank of Russia are minor. More or less similar picture applies to assets and non-sanctioned banks (see Panel 2).

As for the assets, all three groups of banks are rather similar in terms of direction of credit, being much more specialized on corporate lending rather than granting loans to individuals. Loans to non-financial firms account for 30–35% of assets while loans to individuals take about 12 to 16%. For the rest, debt-sanctioned banks lend somewhat more in the inter-bank market and hold much less assets in cash and reserves compared to the assets- and non-sanctioned banks (see Panel 3).

What concerns expenses and returns, debt-sanctioned banks pay much lower wages to its personnel, pay less interest to private depositors but higher interest to corporate depositors, and earn less on lending to households and firms compared to the other banks (see Panel 4). Without going further into the details, these features are historically attributed to state-owned banks in Russia, with their private depositors associating stability of these banks with the overall stability of the government (and thus supplying funds at lower rates) and with their borrowers being either among those of the highest quality in the economy (in case of Sberbank) or among those politically motivated (for the rest), thus demanding loans at lower deposit rates.

Finally, debt-sanctioned banks are the largest banks in the system being as much as two times larger than the asset-sanctioned banks, which, in turn, are 1.7 times larger than the average non-sanctioned banks. Correspondingly, the equity-to-assets ratio reverts, with the debt-sanctioned banks operating historically near the regulatory threshold and the average non-sanctioned bank being at least two times farther from the threshold. As for the non-performing loans (NPL) ratio, we observe another specific feature of the Russian banking system, specifically, that the NPLs of both groups of sanctioned banks are higher, not lower, compared to non-sanctioned banks. Politically motivated loans are eventually less profitable, which speaks to a classical notion of government being less efficient in the economy than other economic agents.

3.1.2 Foreign assets and foreign liabilities of sanctioned vs. non-sanctioned banks: A more detailed view

We now plot the time evolution of foreign assets and liabilities of sanctioned banks. We start with cases-studies on the largest banks among those faced either debt of assets restrictions, and then analyze group-level averages.

Case-studies. We select three largest and/or most interesting cases from each debt- and asset-sanctioned groups and investigate their behavior around the imposition of sanctions on the "Bank Rossiya" and/or around the period they themselves faced sanctions. From the debt list we take top-3 banks in terms of size – Sberbank, VTB, and Gazprombank; from the assets

list – the "Bank Rossiya" itself (owned by largest oligarchs, the Rotenberg family), and two banks operating in the Crimean peninsula. Results are reported in Figure 1 below.

[Figure 1 about here.]

Assets sanctions imposed on the "Bank Rossiya" had an immediate negative effect: the bank dramatically decreased its foreign assets, by 17 percentage points of total assets (from 25 to 8%) within just one month, and foreign liabilities, by about 3 percentage points of total assets (from 5 to 2%).[16] Till the end of the sample period in mid-2019 both positions remained at very low, if not zero, levels. This speaks to long run negative, and efficient, effects from sanctions.[17] As for the two other selected asset-sanctioned banks, RNCB has also decreased its foreign assets dramatically right after the news on the "Bank Rossiya" — by about 15 percentage points of total assets, from 17% to 2% within two months. Sanctions were imposed against it only 20 months after, which is supportive to our "*anticipating a punishment*" hypothesis. The same holds for the bank's foreign liabilities, which had been decreased fairly before the sanctions to the zero levels. In this respect, the sanctions were almost inefficient. The other bank, "Genbank", had also immediately decreased both operations after the news on the "Bank Rossiya", but, differently from the previous two banks, it kept non-zero levels of both until the sanction arrived on December 2015, after which both operations shrunk rather fast to near-zero levels. In this respect, the sanction were efficient.

All these patterns apply to the three selected debt-sanctioned banks, to some degree. Sberbank was permanently increasing its foreign liabilities before the sanctions on the "Bank Rossiya" arrived and then turned to permanently decreasing them. The peak level exactly corresponds to the March 2014 date — about 7% in terms of total assets. By the end of the sample period, international borrowings of Sberbank is no more than 2.5% of total assets. Since Sberbank is able to borrow not only in Western but from Asian financial markets as well, the time evolution of its foreign operations is much smoother than those of others banks under sanctions. Still, the Sbaerbank evidence is also supportive of our hypotheses. Another important aspect of the sanction story is that, since debt sanctions target liability side of the balance sheet, Sberbank was not decreasing its foreign asset holdings, thus exhibiting no fear of asset freezes, for some reasons, or fully replacing the sources of these assets from Western to Asian jurisdictions (which we cannot distinguish with the balance sheet information, unfortunately).

[16] Of course, we should be clear and normalize assets with total assets and liabilities with total liabilities, but since total assets equal total liabilities we do not distinguish between them here, for convenience reasons.

[17] Before the sanctions, the "Bank Rossiya" had intensive international operations borrowing funds from financial markets and granting loans to foreign banks and foreign non-financial firms. All these became minor after the sanctions in the long run. Another implication of sanctions is that Visa and Mastercard had blocked all operations of the bank's credit cards. The bank had lost its ability to carry out transactions in foreign currency. However, the Russian government had fully, and even over-, compensated these restrictions to the bank by increasing its deposits and by replacing "Alfa-bank" (the largest private bank in Russia, inside top-10 banks in terms of assets, never facing sanctions) with the "Bank Rossiya" as an operator of the wholesale energy-market in the country (with annual turnover equaled about 1.5% of GDP).

Finally, VTB and Gazprombank acted in a very similar vein decreasing its foreign assets and foreign liabilities twice — first, after the news on the "Bank Rossiya" on March 2014, and second, after they themselves faced sanctions on July 2014. Both types of international operations decreased substantially in the long run for these two banks (by a factor of 3). These patterns support our H3 "*double sanction effects*" hypothesis.

Averages across groups. Figure 2 below reflects the time evolution of foreign assets and liabilities of debt- vs. asset-sanctioned banks, computed as across-bank average within a given group for each points in time. What is visible at first sight is that, at the pre-treatment stage, those banks that in afterwards became debt-sanctioned banks had much larger foreign operations compared to those from the assets list (by factors 2 to 3). Qualitatively, the figure largely confirms our case-study examples: (i) on average, not yet sanctioned banks had started to decrease their international operations after the negative news on the "Bank Rossiya" arrived on March 2014 and (ii) sanctions had a substantial negative effect on the foreign operations of the banks from the debt list while their effect on the banks from the assets list was more moderate. While it is not making a sanctioned vs. non-sanctioned banks analysis totally superfluous, the latter notion also shows that a separate analysis of debt and assets banks make good sense.

[Figure 2 about here.]

Finally, Figure 3 below reports the averaged time evolution of foreign assets and liabilities of all sanctioned vs. non-sanctioned banks. What first comes to an eye is that non-sanctioned banks are substantially different from sanctioned banks in terms of international operations. No matter of when the sanctions were introduced, non-sanctioned banks held 4 to 6% of their assets and liabilities in international jurisdictions. Note that this full non-sanctioned group includes from about a thousand (in 2010) to less than four hundreds (in 2019) banks. We thus, for a purely illustrative purpose, shrink this group to only the top-200 banks in terms of assets at each point in time. As can be seen, this results in a much more comparable group. Of course, our subsequent regression analysis is based on matching. But it roughly corresponds to top-200 given that we use 1:4 matching rule as a baseline. What we can see now is that all (i.e., average of debt and assets) sanctions banks decreased their foreign liabilities from 6.5% to 5.2% within two months after the bad news on the "Bank Rossiya" and then to about 2.5% by mid-2019. Of course, it is not a causal effect of the sanctions yet and a pure correlation (recall that the Russian economy entered another recession during the same period); however, the evidence is indicative. Foreign assets were also decreased substantially — from 9% on March 2014 to just 4.5% in mid-2019. Top-200 banks also decreased their international operations within few months after March 2014. However, differently from the sanctioned banks, the long run levels of the operations decreased not that much, if any. We suspect it could be more due to business cycle fluctuations. Some degree of negative spill-over effects from the sanctioned banks can also be the case, but it is outside of the scope of our paper.

[Figure 3 about here.]

4 Results

In this section, we present and discuss our baseline results on the micro- and macroeconomic effects of sanctions. We start with describing the matching and DiD estimation results on foreign assets and liabilities, as the main variables through which the effect of sanction is channeled into the financial system in Russia (primary effects). We then turn to analyzing the effects of sanctions on domestic activities of Russian banks (secondary effects) and how government and other economic agents reacted to sanctions.

4.1 Primary effects of sanctions

In this section, we examine how banks adjusted their foreign assets and liabilities in response to sanctions. We describe the ATET estimates obtained through the DiD regressions, and, by varying time window around the imposition of sanctions from 1 to 36 months, we explore the time evolution of the sanction effects from shorter to longer horizons.

4.1.1 Matching estimation results: not yet sanctioned and never sanctioned banks

We apply the bias-adjusted near-neighbor matching estimator of Abadie and Imbens (2011) and match each bank that was not yet sanctioned as of March 2014 (except for the very first bank faced sanctions at the date, i.e., "Bank Rossiya") with four banks chosen from the list of either foreign- or domestic private-owned banks (i.e., those that had no "crime" and thus no "punishment" anticipated). In other words, we construct a matched sample by running regression (1) on the 24-months pre-treatment period (i.e., March 2012 to February 2014) using $n^* = 4$ matches. We then compare the resultant control group with the group of treated banks by performing the Welch test on mean differences.

The Welch test results appear in Table C.I (see Appendix C) and indicate that, in terms of (i) equity capital to total assets ratio, (ii) attracting deposits from and granting loans to individuals and non-financial firms, (iii) net (interest) income, (iv) cash and reserves, and (v) non-performing loans our control and treatment groups are statistically identical at the pre-treatment period (two years prior to March 2014). However, still some differences remain in terms of the size of total assets when we compare not yet debt-sanctioned banks and their matches. This is because the former include all state-owned banks, of which the first 6 are exactly the first six largest banks in the system. It is therefore not possible to fully match them with non-sanctioned banks in terms of size.

4.1.2 Informational effects of the very first sanction: How large they are and when they reach their peaks?

We now turn to difference-in-differences (DiD) estimates of the sanction effects using the matched sample of sanctioned and non-sanctioned banks. We begin with considering the effects of the very first sanction announcement occurred in March 2014. Specifically, we run a series of the DiD regression (5) by consecutively expanding the window $[-k, k]$ around the March 2014, with $k = 1, 2...36$ months.

The DiD estimation results for selected $k = 12, 24, 36$ months appear in Table 2 below. In columns (1)–(3) we report the results for not yet *debt*-sanctioned banks and in columns (4)–(6) for not yet *asset*-sanctioned banks. In columns (1) and (4) we employ an estimation window which equals ±12 months around March 2014 (roughly, short-term horizon), in columns (2) and (5) we expand the window to ±24 months (mid-term effects), and in columns (3) and (6) we finish with ±36 months (longer-term effects). The table contains two panels of rows: *Panel 1* contains the results for foreign liabilities and *Panel 2* for foreign assets.

[Table 2 about here.]

The estimation results clearly indicate that not yet sanctioned banks turned to adapting their international operations in advance, i.e., having observed the first portion of sanctions in March 2014 and before they were themselves sanctioned later on, as compared to the matched non-sanctioned banks. We also reveal substantial differences between the behavior of not yet debt- and asset-sanctioned banks.

First, not yet *debt*-sanctioned banks raised, not decreased, their international borrowings after March 2014, by 3.8 percentage points of their total assets on average (Panel 1, column (2)). This implies the banks were treating foreign financial markets as an important source of (possibly cheaper than domestic) funds. In general, it is in line with the "borrow-while-permitted" logic. Interestingly, we find no evidence of any precautionary changes in the share of foreign assets of these banks in response to the first sanction announcement (Panel 2, columns (1)–(3)). For some reason, these banks apparently had no fear of asset freezes by foreign governments.

Second, not yet *asset*-sanctioned banks exhibited different reactions. After March 2014, they turned to decreasing both international borrowings, by 2.5 percentage points (Panel 1, column (5)), and international asset holdings, by 1.6 percentage points of their total assets (Panel 2, column (5)). These figures imply the banks decided to avoid gambling for Western funds and switched to domestic funds, from the liability side, and, though somewhat lower, adjusted their international assets.

[Figure 4 about here.]

To avoid any concern that the just described informational effects of sanctions hold only for the selected estimation windows, we depict the DiD estimated effects for each $k = 1, 2...36$ to provide a full picture on the evolution of the informational sanction effects. Figure 4 reports the results for the foreign liabilities of not yet debt-sanctioned banks (a) and not yet asset-sanctioned banks (b) and for the foreign assets of those (c and d). The figure clearly eliminates the concern.

4.1.3 Geographical variation of the informational effects: distance to Moscow

We now ask whether geography matters for explaining the just revealed informational effects of financial sanctions? The estimation results appear in Table 3 below.

[Table 3 about here.]

Four outcomes emerge from the presented estimates. First, not yet debt-sanctioned banks were less likely to expand foreign liabilities if located farther from Moscow. This is indicated by a highly significant negative estimate of the coefficient on the triple interaction of the treatment indicator, the indicator of the first sanction announcement in March 2014, and the continuous variable of the distance to Moscow. Second, accounting for the distance to Moscow allows us to reveal a significant effect of the sanction announcement in March 2014 on the foreign assets of not yet debt-sanctioned banks. Without it, the (average) effect estimated in the previous section was insignificant. Now, we can claim that those not yet debt-sanctioned banks whose head quarters are located farther from Moscow were more likely to reduce their international assets. Therefore, these banks could reveal a fear of asset freezes while being less sure on which of the two types of sanctions will be introduced. Third, regarding not yet asset-sanctioned banks, we also observe that the degree of in-advance adaptation depends on the distance to Moscow. It holds for international liabilities of these banks and not foreign assets. Specifically, not yet asset-sanctioned banks were less likely to reduce their international borrowings in few months after March 2014 if they were located outside Moscow. On contrary, we observe no such dependencies when considering the international assets of these banks.

Overall, these results point to differential exposure of these banks to information on upcoming sanctions, specifically, that the banks located farther from Moscow were less informed on the upcoming sanctions and thus were adapting their international operations less strong compared to those banks located closer to the Kremlin.

4.1.4 Informational vs. individual effects of financial sanctions

We now turn to evaluating the joint performance of the informational and direct effects of sanctions. The estimations results appear in Table 4 below.

[Table 4 about here.]

Strikingly, our estimates suggest that those banks that eventually were debt-sanctioned *fully* adapted their international liabilities in advance. This follows from (i) positive and highly statistically significant coefficient on the interaction of the treatment variable and the indicator of first sanction announcement and (ii) insignificant coefficient on the interaction of the same treatment variable and the indicator of actual sanction introduction. When considering the international assets of debt-sanctioned banks, we conclude that neither the informational nor the direct effects are significant, thus meaning that, *on average* and *apart from distance from Moscow*, these banks were reluctant regarding possible assets freezes by the Western countries.

The estimates on the asset-sanctioned banks are rather different. They suggest these banks, again on average, were more likely to adapt their international operations when the sanctions against them were actually imposed, not in advance. This holds for both foreign liabilities and foreign assets.

Overall, we conclude that the effects of sanctions were very much heterogeneous with respect to (i) the sanction type (debt vs. assets) and (ii) the timing (announcement vs. actual imposition).

4.1.5 Structure of foreign liabilities and its response to sanctions

To conclude the analysis of the primary effects of sanctions, we investigate how the not yet sanctioned banks adjusted the structure of their foreign liabilities as a result of the first sanction announcement in March 2014, and then how and whether they did so when they actually faced sanctions. We consider the following grid in the maturity of international liabilities: those maturing within 1 year, between 1 and 3 years, and beyond 3 years, which thus correspond to short-, mid-, and long-term borrowings. We also force the estimated effects to be dependent on the distance to Moscow to better capture differential exposure of banks towards information on the upcoming sanctions. The estimation results appear in Table 5 below.

[Table 5 about here.]

As can be inferred from the presented estimates, not yet debt-sanctioned banks were raising *long-term* international borrowings in few months after the first sanction announcement in March 2014 — the effect equals 2.5 percentage points of total liabilities for the banks located in Moscow (the maximal effect), while the overall effect estimated in the previous section equaled 4.2 percentage points (see Panel 1 in column (2)). Again, we show that this effect crucially depends on the distance to Moscow, so that the farther from the Kremlin, the lower the effect, thus revealing a differential exposure of banks to the information on upcoming

sanctions depending on geographical characteristics. The mid-term foreign liabilities were less likely to be raised by these banks (see Panel 2 in column (2)).

Regarding the not yet asset-sanctioned banks, the estimates suggest that they were equally decreasing both long- and mid-term foreign liabilities, and that these effects do not depend on the distance to Moscow.

Overall, we again obtain an empirical evidence that the informational effect of the first sanction announcement produced very heterogeneous response of potentially targeted banks. Those anticipated debt sanctions were raising, not reducing, international borrowings — especially long-term borrowings (borrow more and at longer horizons while permitted). The effect declines with the geographical distance from Moscow, thus once again favoring the idea that information on the upcoming sanctions was less precise for the banks with farther locations.

4.1.6 DiD with pre-trends

We perform an exercise in which we artificially move back each individual sanction date by 1, 2, 3, and 4 years before the sanction date took place. To fully mimic the time structure of sanction imposition and account for the informational effect of sanctions, in each of the four cases we also move back the sanction date of the first bank punished by sanctions, i.e., the "Bank Rossiya". In each of the four cases, we run the difference-in-differences regression, as implied by equation (7) but with time indices adjusted according to our current exercise. In addition, we make a symmetric counterfactual exercise by moving the sanction dates forward by the same 1, 2, 3, and 4 years, again accounting for the information effects. Finally, we plot the estimated coefficients on $TREAT_i \times SANCTION_{it}$ in Figure J.II below. The upper panel reports the estimates for the whole sample of sanctions banks, the middle panel does it for debt- and the lower panel for asset-sanctioned banks. We set $k = 12$ in all regressions.

[Figure 5 about here.]

[Figure 6 about here.]

The pre-ternd estimation results on the *informational* effects of sanctions deliver the following results (see Figure 5. First, and strikingly, for not yet debt-sanctioned banks we obtain that these banks could have started to increase their international borrowings one yer prior to the very first sanction announcement in March 2014. Though we cannot test it, we note that a political crisis in Ukraine occurred exactly in late 2013.[18] If major state-owned banks in Russia possessed some information on what will follow in Crimea half a year after (directly

[18]The so-called "euromaidan" crisis. See, e.g., https://www.bbc.com/news/world-europe-30131108.

from the government), they could fairly anticipate financial sanctions from the West and, therefore, could have started to adapt their international operations. For international assets of not yet debt-sanctioned banks and for both international operations of not yet asset-sanctioned banks we reveal no pre-trends and confirm our baseline regression results reported in previous sections.

When we turn to the pre-trend estimation results on the *direct* effects of sanctions we obtain pre-trends in 3 of 4 cases (see Figure 6). However, these pre-trends are just a reflection of the informational effects of sanctions and are fully in line with our respective estimates from previous sections.

4.2 Secondary effects of sanctions

Having established that the sanctions had indeed channeled through foreign assets and foreign liabilities of (not yet) treated banks into the Russian banking system, we now move to discussing the implications of these channels for other key balance sheet positions of the treated banks vis-a-vis matched non-sanctioned banks. Specifically, we ask what had happened with quantities and prices of domestic assets and liabilities of the treated banks?

Below, we present the results in three portions: first, for domestic liabilities, then for assets, and finally for prices (proxied by expenses and returns).

4.2.1 Quantities: Domestic liabilities of (not yet) sanctioned banks

We start with domestic bank liabilities, among which we consider (i) private deposits, corporate deposits, and deposits attracted from the inter-bank market as those originating from *non-government sources* and (ii) government deposits and loans obtained from the Central Bank of Russia (CBR) as those from *government sources*. What in general one may expect to see is that all types of private depositors could exhibit a panic, thus withdrawing their funds from treated banks in response to sanctions, while the government could step in and substitute for these funds to prevent disordered failures.

DiD estimation results. We now run a series of the DiD regressions, as implied by equation (7), by performing estimates on estimation windows $[-k, k]$, in which $k = 1, 2...36$ months after either bank-specific sanction date (direct effects) or the date of sanctions against the "Bank Rossiya" (informational effects). We report the estimated coefficients on $TREAT_i \times SANCTION_{it}$ and $TREAT_i \times INFO.FIRST_t$ graphically. Figure 7 below reports the results for private (upper panel) and corporate (lower panel) deposits. Other liabilities are also discussed but not reported in the main text to preserve space.

[Figure 7 about here.]

The DiD estimation results suggest that, in the case of not yet debt-sanctioned banks, private depositors were not responsive to the informational effects of sanctions, possibly due to a lack of attention and/or expertise, whereas they were so after the sanctions directly punished their banks (see Figure 7.a). Specifically, our estimates indicate that, for any chosen DiD estimation window, the informational effects of sanctions on the attraction of private deposits by not yet debt-sanctioned banks are statistically insignificant. Conversely, the estimates of the direct effects of sanctions are negative and statistically significant (from the 5th to 29th months after the sanctions) peaking at –2.2 percentage points of the group's total assets. In other words, having observed the sanction against their banks, private depositors could have started *panic* withdrawals.

Our DiD results also indicate that, in the case of not yet asset-sanctioned banks, private depositors were also unlikely to launch withdrawals in response to the informational effects of sanctions — moreover, the estimates are positive, not negative, and statistically significant (from the 7th month after the sanctions) peaking at 5 percentage points of the group's total assets (see Figure 7.b). What does it imply? Recall from the previous section that not yet asset-sanctioned banks decreased their foreign liabilities by an average of 3 percentage points within 24 months after March 2014. Taken together, the two pieces of empirical evidence could suggest that the banks were (partially) substituting one source of attracted funds (international) with the other (domestic) by playing with inattention / lacking expertise of private depositors who are unlikely to be able to predict future sanctions and thus, in the moment, were unlikely to withdraw funds. However, the picture changes dramatically when we consider the direct effects of sanctions: as in the case of debt-sanctioned banks, asset-sanctioned banks also experienced a sharp drop in the attraction of private funds after the sanctions were imposed. The estimates imply the banks could have lost up to 10 percent of their total assets within three years after the sanctions.

Further, in terms of corporate deposits, our DiD estimates suggest that the informational effects of sanctions were again insignificant in case of not yet debt-sanctioned banks (see Figure 7.c) but again positive and significant for not yet asset-sanctioned banks (see Figure 7.d). In the latter case, the effect peaked at 2 percentage points of the group's total corporate deposits. This also implies the group was substituting international sources of funds with domestic *in advance*, i.e., before facing the sanctions directly. Finally, the direct effects of sanctions on the already debt- and asset-sanctioned banks were mostly positive, reflecting the substitution of funds again, though insignificant for majority of estimation windows considered. The exceptions are $k = 11$ months for debt-sanctioned banks and $k \geq 33$ months for asset-sanctioned banks, with peaked reactions equal to +2.5 and +3.5 percentage points, respectively.

Regarding other domestic sources of funds, our DiD estimates imply that (not yet) debt-sanctioned banks switched to decreasing their inter-bank borrowings, obtained a government

support in the form of municipal- or federal-state deposits, and were unlikely to change their borrowings from the central bank (see Figure E.I.a,c,e in Appendix E). Rather differently, (not yet) asset-sanctioned banks switched to substantially increasing their inter-bank borrowings — especially after the direct effects of sanctions materialized (recall the dramatic withdrawals of private depositors), obtaining support directly from the government (though not that large compared to inter-bank market), and decreasing their borrowings from the central bank (see Figure E.I.b,d,f). The latter may seem counter-intuitive at first sight; however, it can be explained through a focus of the banks on substituting for decreased funds from the inter-bank market. The inter-bank deposits increased by about 6 percentage points of the group's total assets.

Overall, we find that neither private nor corporate depositors organized withdrawals on not yet sanctioned banks and the not yet asset-sanctioned banks were exploiting this situation to partially substitute for declining foreign liabilities. When the sanctions arrived and private depositors observed them, they started withdrawals from both debt- and asset-sanctioned banks, despite knowing that the banks are either state-owned or -controlled and despite the deposits insurance system was working well (there were no cases of a failure to turn back private deposits after bank failures in the past). However, the government stepped in and — either directly or indirectly (through inter-bank market) — supported the banks, thus preventing their disorderly failures.

4.2.2 Quantities: Domestic assets of (not yet) sanctioned banks

We further analyze how (not yet) sanctioned banks adjusted their key domestic assets in response to the changes in their liabilities. Among the assets we consider loans to individuals, loans to non-financial firms, loans to other banks through inter-bank market, and cash and reserves.

DiD estimation results for domestic loans to the real economy appear in Figure 8 below. Several outcomes emerge.

[Figure 8 about here.]

The most striking result is that both (not yet) debt- and asset-sanctioned banks turned to reshuffling the structure of their loan portfolios by decreasing the volume of credit granted to non-financial firms and increasing the volume of credit allocated to households in response to either informational or direct effects of sanctions (or both). We interpret this result as the banks' forward-looking willingness to insure the profitability of their loan portfolios from a rising risk of sanctions against Russian firms *per se* (that may fairly appear in the US sanction list themselves). Firms themselves could face sanctions and stop repaying their debts while

individuals (at least, those not in the SDN list) were free of such "sudden" constraints. As a results, the sanctioned banks became more specialized in retail lending than before. Our conclusion on reductions of loans to firms is consistent with the findings in Ahn and Ludema (2020) who revealed the sanction indeed had a negative effect on Russian firms.

Specifically, the estimates suggest that (not yet) debt-sanctioned banks could have decreased their loans to non-financial firms by 2 percentage points of their total assets in response to the informational effects of sanctions and by another 3.2 percentage points as a result of direct effects of sanctions (Figure 8.c). On the contrary, the same banks increased loans to individuals by up to 3 percentage points of their total assets in response to the informational and by another 2.3 percentage points in response to the direct effects of sanctions (Figure 8.a). As one can infer, the loan portfolio was effectively re-balanced, not squeezed.

For the (not yet) asset-sanctioned banks the estimates imply a reduction of corporate loans by 7 percentage points in response to the informational effects though a partial recovering, by 4 percentage points, as a result of the direct effects of sanctions (Figure 8.d). Loans to individuals remained the same after the informational effects but increased substantially, by 4 percentage points of total assets, as a result of the direct effects of sanctions (Figure 8.b).

Regarding other domestic assets, the DiD results indicate that (not yet) debt-sanctioned banks reduced their inter-bank exposures in response to both informational and direct effects of sanctions (Figure E.II.a) while (not yet) asset-sanctioned banks effectively increased such exposures — by about 8 percentage points of their total assets in response to the informational effects of sanctions (direct effects are estimated as insignificant, see Figure E.II.b). Finally, both groups of banks expanded their cash and reserves holding in response to the informational effects of sanctions, possibly anticipating depositors' panic runs. Recall that such runs had not occurred in that situation. However, deposit withdrawals occurred in response to the direct effects of sanctions (see above) — these are mirrored in the reduction of cash and reserves by 2 percentage points of the debt-sanctioned banks' total assets (Figure E.II.c) and by 7 percentage points of the asset-sanctioned banks' total assets (Figure E.II.d), respectively.

Overall, the DiD estimates show that both debt- and asset-sanctioned banks increased, rather than decreased, their loans to individuals in the long run and reduced their loans to non-financial firms, thus effectively becoming more specialized in retail lending. This revealed re-balancing effect is new in the literature.

4.2.3 (Effective) interest rates of (not yet) sanctioned banks

We finally consider changes in the prices of bank assets and liabilities, as measured by effective interest rates, after the banks faced the informational and then direct effects of sanctions.

DiD estimation results appear in Figure 9 below.

[Figure 9 about here.]

First, the results imply that the informational effects of sanctions were unlikely to change the price the (not yet) debt- and asset-sanctioned banks pay on their funds. In case of (not yet) debt-sanctioned banks the informational effects were also insignificant in terms of the average return rate on their assets. However, the effects were significantly negative in terms of the average return rate for the (not yet) asset-sanctioned banks.

Second, the results also indicate that the direct effects of sanctions were much more substantive for both groups of banks and their effective interest rates. Specifically, debt-sanctioned banks were significantly raising their interest rates on borrowed funds, possibly to increase the price attractiveness of their deposits after observing deposit withdrawals. On contrary, asset-sanctioned banks were significantly decreasing the prices they pay on borrowed funds, possibly due to being unable to recover their private deposits after private depositors withdrew their funds. Finally, both groups of banks were seemingly forced to increase the price of their loans (recall that we revealed the reshuffling of loan portfolios from corporate to retail credit, and that retail credit is typically more expensive in Russia than the corporate credit).

4.3 A summary of the DiD estimation results

We now summarize the empirical findings we obtain for the informational and individual effects of sanctions on both international operations (*direct effects*) and domestic operations (*secondary effects*) of sanctioned banks. We provide two layers of comparisons: the short-term effects of sanctions vs. longer-term effects. The first are those estimated in a DiD window equal to ± 12 months around the date of sanctions, and the second equal to ± 36 months. This division shows whether the effects are rising or declining as time passes. The summary appears in Table 6 below.

[Table 6 about here.]

The table illustrates the main findings we obtained so far, namely, that the informational effects of sanctions matter for both foreign and domestic operations, and that location of the treated banks also plays a role in this context. The table also shows that some effects are persistent while the others attenuate as time passes. For instance, the informational effect of sanctions on the foreign liabilities of (not yet) debt-sanctioned banks preserve even in three years after March 2014, whereas the same effect on (not yet) asset-sanctioned banks is peaking at shorter horizons and dies out at longer horizons.[19] Another example is that

[19]Though indirectly, this may imply that not yet debt-sanctioned banks could intentionally issue new debt of *longer* maturities in Western financial markets within the period from March 2014 until they faced their individual sanctions.

(already) debt-sanctioned banks experienced private depositors' withdrawals only at shorter horizons, whereas (already) asset-sanctioned banks faced more prolonged withdrawals. Finally, the largest negative effects of the sanctions are those related to (i) in-advance adjustment of foreign assets by not yet debt-sanctioned banks (especially located farther from Moscow, –10 percentage points of total assets), (ii) foreign liabilities decreases by and private depositors' withdrawals from (already) asset-sanctioned banks (–6 and up –10 percentage points of total assets, respectively), and(iii) corporate credit reductions by not yet asset-sanctioned banks (up to –7 percentage points of total assets).

5 Treatment diffusion

We have established so far that those banks that were sanctioned during 2014–2019 adapted a great body of their international and domestic operations *in advance*, i.e., after the first sanction announcement were *actually* treated. This clearly indicates that being a state-owned or -controlled bank was forcing the bank's managers to react properly on the negative news, namely, that the Western countries had sanctioned a similar bank. We have implicitly assumed till the moment that the sanction coverage of Russian banks was complete, i.e., that those 44 banks that actually faced the sanctions over the six year period represent the full sample of targeted financial institutions. However, one may have a concern that since the actual owner(s) can be hidden through several intermediate entities,[20] the Western countries did not recognize all the banks that are indirectly controlled by the Russian government and should thus have been targeted as well.[21] If so, then our baseline estimates of the informational effects of sanctions are biased due to omitted *treatment diffusion*, i.e., due to possible adaptation of international operations that the unrecognized banks could have undertaken in advance.[22]

To address this concern, we appeal to Karas and Vernikov (2019) who provide a comprehensive hand-collected database on the ownership structure and license revocation of all 3,176 banks that are or were operating in the Russian banking system over the last three decades. Indeed, when we focus on the period 2014–2020 we find from the database that the total number of state-owned and -controlled banks in Russia equals 55, and that, among these, only 17 were actually (debt) sanctioned. The other 38 banks are left uncovered, and thus are able to continue their international operations, if any, without restrictions.

What is the profile of these 38 uncovered banks and how do they compare to the actually treated 44 banks? Recall that, due to data limitations, we have bank-level data on 33 out of the

[20]Recall that among the 20 debt-sanctioned banks 15 rather small (in terms of total assets) were sanctioned because they are subsidiaries of either the "*Big-4*" state-owned banks or the development bank VEB.

[21]It is likely that identifying all such banks is costly for the Western countries. However, it is also clear that, if necessary, the already sanctioned banks may transfer a part of their prohibited international operations to their unsanctioned subsidiaries, thus dampening the overall effects of sanctions.

[22]In addition, a related concern could be that the unrecognized banks could appear in the control group of matched banks when we performed our difference-in-differences analysis.

44 sanctioned banks. The 17 banks that are the intersection of the 33 actually treated and the 55 state-controlled banks from Karas and Vernikov (2019) are primarily the debt-sanctioned banks. The $33-17=16$ banks that are actually treated but are *not* in the Karas and Vernikov (2019) list are predominantly the asset-sanctioned banks. We thus have three subgroups of banks: (i) 16 asset-, (ii) 17 debt-sanctioned banks, and (iii) 38 uncovered banks to which we refer as *diffused* banks. We report comparative summary statistics on the mean size of total assets and relative size of international operations as before-and-after $t^* = \textit{March 2014}$ in Table 7 below.

[Table 7 about here.]

The descriptive data presented in Table 7 clearly shows why it is important to account for treatment diffusion. First, we observe that the defined 38 diffused banks (columns (7)–(9)) are *larger* in terms of total assets than the 16 asset-sanctioned banks (columns (1)–(3)). This eliminates a concern that these banks are too small to pay attention. Of course, they are much smaller than the 17 debt-sanctioned banks (columns (4)–(6)).[23] Second, the 38 diffused banks have non-trivial portions of international operations on their balance sheets, which are comparable to those of the asset-sanctioned banks. This in turn eliminates a concern that these banks could have not been targeted because they had nearly zero international operations. Of course, again the ratios of their foreign assets and liabilities in total assets are well below those observed in the debt-sanctioned banks.[24] Finally, we also observe that these diffused banks *decreased* their international operations after March 2014, as the other two subgroups of banks. Of course, these reductions cannot be fully attributed to the in-advance adaptation in the anticipation of upcoming sanctions,[25] but we argue the evidence favors this view. At least, we can say that these banks were unlikely, *on average*, to expand the international operations of their hidden owners who actually faced sanctions.

Having established that the 38 diffused banks were in between the asset and debt-sanctioned banks in terms of size and had similar structure of their international operations, we are now going to explore how the treatment diffusion affects our baseline results.

Let us now describe the idea of how we propose to capturing the treatment diffusion. Suppose that a bank is in the Karas and Vernikov (2019) list of state-controlled banks and is not one of the "Big-4" who would obviously be recognized by the Western countries due to size and legal status. Suppose then that at $t^* = \textit{March 2014}$ the bank obtains the news that the first portion of sanctions affected similar bank (in terms of relations with the Russian government). The bank is thus likely to treat this news as a (noisy) signal of upcoming sanctions against

[23] Recall that these 17 banks are the largest players in the banking system, since they contain the "Big-4" (see Section 3).

[24] But this is likely to be again a reflection of their lower size compared to the "Big-4" (i.e., lower size — less diversified activities).

[25] Recall the Russian economy entered a recession driven by the negative oil price shock at the same time.

itself in the near future. We argue that the subjectively perceived probability of being sanctioned in the future crucially depends on the share of *government-connected persons*[26] in the board of directors of the bank: the greater is the share, the higher is the subjective probability. This is likely because a greater share of government-connected persons makes it easier for the Western countries to recognize the bank as state-controlled. If so, then the banks with greater portions of government-connected persons should start adapting their international operations after t^* more aggressively compared to those banks with lower such portions, thus adding to the informational effects of sanctions.

Our idea is thus to create a variable that equals the share of government-connected persons in the board of directors of each and every bank from either the list of unrecognized state-controlled banks or already sanctioned banks. With this variable at hand, we could run a series of cross-sectional logit regressions at each date $t \geq t^*$ describing how the government presence in a bank affects its subjectively perceived probability of being sanctioned, all else being equal. For each such date, after estimating the logit regression, we can predict the probability of being sanctioned for each bank in the sample. We further can extend the treatment group of banks by those financial institutions for which the predicted probabilities of being sanctioned exceed the median value at each respective date and re-run our difference-in-differences regressions. Effectively, we thus propose a *two-stage approach* to account for the treatment diffusion, in which the first stage identifies those banks that are likely to adapt their international operations because they realize the risk of sanctions due to government-related persons in its board of directors, and the second stage estimates the diffused average treatment effect on the treated (ATET) conditional on the predicted probabilities from the first stage.

Construction of the government share variable. For each bank i from the subgroup of the 33 already sanctioned banks or the subgroup of the 38 unrecognized state-controlled banks we do the following. First, we access the bank's i official web-site and download annual reports for each year $t \geq t^* = 2014$, where possible, up to 2019. Second, from the annual reports we extract the information on the composition of the board of directors in respective year. That is, we gather name, surname, date of birth, and the information on career path, where possible, for each person p entering the board of directors of the bank i at year t. Of course, we face large variation in the degree of such data disclosure, ranging from no disclosure at all (11 banks out of the 38 unrecognized banks) to at least names and surnames being disclosed (all actually sanctioned banks and $38 - 11 = 27$ unrecognized banks) or even full CVs attached to the reports. If the annual reports contain all the necessary information on each person p, we stop searching; if not, we take the names, surnames and dates of birth and appeal to publicly available sources: the Google search, search through either the nation-wide database on Russian

[26]For instance, federal or municipal ministers; senators, city mayors, or regional governors from the ruling political party "Edinaya Rossiya" (literally, "United Russia"); oligarch families with close ties to the Kremlin; governors of other recognized state-controlled entities, and so on.

banks[27] or the database on managers employed in Russian companies, more broadly.[28] Third, with this rich information aggregated from various sources, we proceed to constructing the government share variable, $GovShare_{it}$. For this purpose, we suggest the following criterion: we attribute a person p from the bank's i board of directors to those who had relations with the Russian government in period t (or before) if the person p:

1. enters at t, or entered before t, the board of directors of at least one other state-owned or -controlled financial (e.g., the "Big-4" and VEB) or non-financial (e.g., Rosneft[29]) entity;
2. is at t, or was before t, either a local or federal minister or deputy / senator from the ruling party ("Edinaya Rossiya");

Below in Table 8 we report a description of the constructed $GovShare_{it}$ variable. We were successful to gather the necessary data on government-connected persons in a half of the 16 asset-sanctioned banks; 16 of the 17 debt-sanctioned banks, and 27 of the 38 unrecognized, or diffused, banks. We observe that, *on average*, the diffused banks are in between the asset and debt-sanctioned banks in terms of the share of government-connected persons in the board of directors. The mean value of the $GovShare_{it}$ variable equals roughly 54%, which is by 26 percentage points larger than in the asset-sanctioned banks and by 30 percentage points lower than in the debt-sanctioned banks. We also find substantial variation across the three subgroups, ranging from 8 to 100%, which is important for the upcoming logit regression analysis.

[Table 8 about here.]

Treatment diffusion: A two-stage approach. Having constructed a meaningful $GovShare_{it}$ variable, we are now ready to formally introduce our estimation approach aimed at capturing treatment diffusion. At the first stage we predict a subjectively perceived probability of being sanctioned based on the variation in the $GovShare_{it}$ variable using a logit regression framework. Since we are working with subjective perceptions of sanctions, we further hypothesize that such the perceptions depend crucially on the distance to Moscow, a variable that proved its relevance in determining the heterogeneity of the informational effect of sanctions above. The resulting

[27] https://www.banki.ru/.
[28] https://www.e-disclosure.ru/poisk-po-kompaniyam.
[29] The major oil extracting and exporting company in Russia

logit specification reads as:

$$\begin{aligned} Pr\{Sanctioned_{it} = 1 \mid X_{it}\} \\ = \Lambda\Bigg(\beta_1 GovShare_{it} + \beta_2\Big(GovShare_{it} \times DistToMoscow_i\Big) \\ + \beta_3 DistToMoscow_i + BankControls_{it}\Bigg) \end{aligned} \tag{8}$$

where $Sanctioned_{it}$ is an indicator variable that equals 1 if a bank i was sanctioned at t or before, and 0 if not. X_{it} are observables that encompass the government share in the board of directors of the bank i, its distance to Moscow, and other controls, $BankControls_{it}$. Among the latter we consider (i) a structure of international operations, as proxied with the difference between foreign assets and foreign liabilities, relative to the bank's i total assets (TA); (ii) a structure of domestic operations, as measured by the difference between individuals' deposits and individuals' loans, % of TA; (iii) annual growth of the bank's i TA; (iv) the quality of the bank's i loan portfolio, as measured by NPLs ratio to TA; (v) the role payed by the bank's i in domestic inter-bank market, as measured by the difference between loans issued and deposits attracted there, % of TA; and (vi) profitability of the bank's i TA, as measure by monthly ROA indicator. Finally, $\Lambda(\cdot)$ is the logistic distribution.

Recall that we estimate a *series* of cross-sectional, not panel, logit regressions for each month $t \geq t^*$. This implies a time variation in the estimated coefficients in Equation (8), which in turn allows us to flexibly account for a changing nature of bank adaptation to negative news on upcoming sanctions. Importantly, we consider two versions of the $Sanctioned_{it}$ variable: one for *debt* and the other for *asset* sanctioned banks; that is, we run two parallel loops of cross-sectional logit regressions. This will be crucial at the second stage because we will face a necessity to assume which of the two type of sanctions a not yet treated bank can encounter (see below).

Below in Table 9 we report a part of the estimation results that pertains to the peaks of sanction imposition during the so-called first wave of sanctions (2014, Panel 1), when the "Big-4" banks were sanctioned, and the second wave (2017, Panel 2), when the U.S. government imposed sanctions on 38 individuals and entities in Russia due to cyber-attacks during presidential elections in U.S. in 2016 and the Russian military campaign in Syria.[30] In columns (1)–(3) we report the results for the full subsample composed of debt- and asset-sanctioned banks, purely for comparative reasons and not for further use, while columns (4)–(6) disclose the results for the debt-sanctioned banks vis-a-vis never sanctioned banks and columns (7)–(9) for the asset-sanctioned banks vis-a-vis never sanctioned banks.

[Table 9 about here.]

[30]The full estimation results are not reported to preserve space and are available upon request.

Several outcomes emerge from the estimation results of the first stage. First, and most important, our constructed $GovShare_{it}$ variable works and exhibits differential impact on debt- and asset-sanctioned banks. Specifically, the estimated coefficients on the $GovShare_{it}$ variable are always highly statistically significant for the debt-sanctioned banks and never — for the asset-sanctioned banks.[31] This implies that the presence of government-connected persons in a bank's board of directors raises the subjectively perceived probability of being *debt* sanctioned, i.e., restricted only on the side of new debt placement in international financial markets, not asset freezes by the Western governments. Second, mixing the two types of sanctions (in columns (1)–(3)) deteriorates the precision of estimates for the first wave of sanctions while being unable to do so for the second wave. Third, we find that the distance to Moscow played a role during the first wave of sanctions and, within that, for the debt-sanctioned banks only, namely, we observe that the greater the distance to Moscow, the larger is the effect of $GovShare_{it}$ on the subjectively perceived probability of being debt-sanctioned. This may speak to an informational asymmetry: those banks located farther from Moscow could assign a larger weight on the presence of government-connected persons in their board of directors when assessing the likelihood of sanctions as compared to the banks located near the Kremlin. During the second wave of sanctions this heterogeneous effect disappears, thus possibly indicating that the informational asymmetry regarding the upcoming sanctions had vanished, and banks, no matter where they were located, started to equally treat the signals of sanctions when negative news occurred.[32]

To understand the economic significance of possessing government-connected persons in the board of directors, we compute the product of the marginal effect of the $GovShare_{it}$ on $Pr\{Sanctioned_{it} = 1 \mid X_{it}\}$ and a one standard deviation of the $GovShare_{it}$ variable. We do this computation for each month t after we estimate respective logit model in the loop. Since in the list of regressors we also have the interaction of $GovShare_{it}$ and the distance to Moscow, we set the $DistToMoscow_i$ variable at its sample mean for concreteness.[33] Thus obtained economic effects of $GovShare_{it}$ are plotted in Figure 10.(a) for debt sanctions and Figure 10.(b) for asset sanctions. Our results suggest that an increase in the share of government-connected persons in the board of directors by a one standard deviation raises the probability of being debt-sanctioned by 1 to 4 percentage points,[34] depending on the month, whereas the effects are

[31] We also note that the pseudo-R^2 in the models for debt-sanctioned banks is greater by factors 2 to 3 than those in the models for asset-sanctioned banks.

[32] We have also considered a binary version of the $GovShare_{it}$ variable: 1 if the share of government-connected persons in the bank's i board of directors is strictly greater than zero at time t, and 0 if else. The logit estimations produce qualitatively the same results (available upon request).

[33] We demean our variables before running regressions by subtracting respective unconditional means from each variable to address multicollinearity concerns arising in the models with cross-products of explanatory variables. Thus, the mean of the demeaned distance variable varies from some 5 to 35 km depending on the month, and the min of the demeaned distance equals roughly –180 km and stands for the banks located in Moscow. We therefore can interpret our results as those relevant for the banks located *outside* the city of Moscow in the Western part of Russia.

[34] Interestingly, we observe an increasing trend in the estimated economic effects from the beginning of the first wave of sanctions in March 2014 up to the beginning of the second wave of sanctions in mid-2017. The effects then turn to declining, thus indirectly indicating that potentially targeted banks could have accumulated

always zeros for asset sanctions.

[Figure 10 about here.]

To complete the first stage of our treatment diffusion approach, we report the time evolution of the predicted probabilities of being sanctioned for each month and bank, i.e., $\widehat{Pr}\{Sanctioned_{it} = 1 \mid X_{it}\}$ for debt- and asset-sanctioned banks, see Figure 10.(c)–(d). In case of debt sanctions, we obtain that the median predicted probability centers around 20% and that the variation is rather large, from nearly 0% to 100%. For the asset-sanctioned banks, the median estimated probability is lower by about 10 percentage points and the variation is more narrow across the months. With the predicted probabilities of being sanctioned, we are now ready to describe the second stage of our approach.

At the second stage, we then run almost the same difference-in-differences regressions as before, except now we *extend* the treatment group and *shorten* the range of non-state-connected banks to be matched and selected into the control group. Specifically, we include a bank i in the extended treatment group if the bank i ever faces sanctions within the sample period *or* $\widehat{Pr}\{Sanctioned_{it} = 1 \mid X_{it}\} \geq \overline{Pr}$, where we set $\overline{Pr} = 0.02$ to be equal the unconditional probability of being sanctioned in the sample. Respectively, if the bank i enters the extended treatment group, we never select it into the control group. For convenience, we refer to bank i as either actually sanctioned (S), diffused (D) or never sanctioned matched (NSM) bank. The underlying indicator variable $TREAT.DIFFUSION_{it} = 1$ if $i \in S$ or $i \in D$, and 0 if $i \in NSM$. In what follows, we turn from the indicator variable to a *treatment intensity* variable.[35] That is, we re-define the treatment variable as $TREAT.DIFFUSION_{it} = \widehat{Pr}\{Sanctioned_{it} = 1 \mid X_{it}\}$ if $i \in S$ or $i \in D$, and 0 if $i \in NSM$ The second-stage regression then reads as:

$$\begin{aligned} FDY_{it} = \alpha_i + \gamma_t + \beta_1 \Big(& TREAT.DIFFUSION_{it} \times INFO.FIRST_t \Big) \\ & + \beta_2 \Big(TREAT.DIFFUSION_{it} \times INFO.FIRST_t \times DISTANCE_i \Big) \\ & + \beta_3 INFO.FIRST_{it} + \sum_{r=1}^{R} \xi_r BSF_{it}^{(r)} + \varepsilon_{it}, \text{ if } t \in [t_1 - k, t_1 + k] \end{aligned} \tag{9}$$

where t_1 is March 2014, which marks the first sanction announcement, and the rest of the variables are as defined above. We put the diffusion effect to be dependent on the distance to Moscow since our results above clearly indicate that a spread of the information on upcoming sanctions was heterogeneous, which we could capture through geographical differences in the location of banks' headquarters.

The estimation results from the second stage appear in Table 10 below. Due to space

enough experience in interpreting the signals of upcoming sanctions.

[35] We do so to preserve space. The full estimation results are available from the authors upon request.

limitations, we report here only the results related to the international operations of not yet treated banks.[36] To decompose the informational effects of sanctions, we first run regression (9) under an assumption that the treatment group is composed of only *diffused* banks (D), see columns (1) for debt and (2) for asset sanctions. We then focus on not yet debt-sanctioned banks as a treatment group: we report the baseline estimates from above in column (3) (i.e., without diffused banks) and we report the new results obtained for extended treatment group in column (4) (i.e., with the diffused banks). We finally do the same for not yet sanctioned banks in columns (5) and (6). The table contains two panels, as before: Panel 1 reflects the results with foreign liabilities as a dependent variable and Panel 2 switches to foreign assets.

[Table 10 about here.]

Hand collecting the individuals' data on government connections was time consuming but the estimation results seem worth the effort. Indeed, there are several important outcomes from our treatment diffusion analysis. First, we find that those banks that were anticipating *asset* sanctions after March 2014 (but eventually were never sanctioned) turned to decreasing their international borrowings in advance, and the more so when located farther from Moscow, thus clearly reflecting the existence of an informational asymmetry across such banks (the effect is significant at 10%; see column (2), Panel 1). Interestingly, our results further suggest that these banks also turned to selling international assets after the first sanction announcement in March 2014 (see column (2), Panel 2). Again, the effect is largest for the banks located in Moscow, exhibiting a tendency to decline with the distance from Moscow (the effects are significant at 5%). Therefore, the behavior of the diffused banks anticipated asset sanctions is very much similar to those banks that eventually faced asset sanctions: the closer a bank is to Moscow (i) the lesser intensity of reducing the international borrowings, and (ii) the greater intensity of selling international assets in advance. These two outcomes are in line with "borrow while possible" and "sell while not frozen", respectively.

Second, what concerns the behavior of those diffused banks that could anticipate *debt* sanctions, we find they were also likely to raise international borrowings on average, with the effect being less strong when located farther from Moscow, but respective two coefficients are estimated less precisely than for the actually treated banks (compare columns (1) and (3), Panel 1). However, we find that the diffused banks were decreasing their foreign assets when located outside Moscow, in advance (see column (1), Panel 2). This is again similar to the behavior of actually treated banks (see column (3), Panel 2).

Third, when consider the *extended* treatment group composed of the banks that were likely to anticipate *debt* sanctions, we find that the results qualitatively are the same as in the baseline version before: (i) the banks were raising international borrowings after the first sanction

[36] The results on the domestic operations, i.e., those considered in previous sections (loans to households and corporates, deposits of households and corporates, and others), are available upon request.

announcement in March 2014, and less so when located outside Moscow (compare columns (3) and (4), Panel 1); and (ii) the banks were decreasing their international assets in response to the same event, especially if located farther from Moscow (compare columns (3) and (4), Panel 2).

Fourth, for the *extended* treatment group with the banks likely anticipated *asset* sanctions, we also find similar results to the baseline case, though some differences are also there. As in the baseline estimates (column (5)), we find the banks were decreasing both foreign liabilities (Panel 1) and foreign assets (Panel 2). However, the distance from Moscow exhibits no influence on the informational effects of the sanction announcement on neither foreign liabilities nor foreign assets of the banks.

Overall, we find that those banks with government-connected persons in the board of directors were likely to behave very similarly to those banks that were eventually sanctioned. This proves that treatment diffusion exists and matters. Our baseline estimates of the informational effects of the first sanction announcement survives when accounting for the treatment diffusion phenomenon.

6 Macroeconomic implications of the microeconomic effects of financial sanctions

We now present the final exercise of our paper, namely, we analyze the macroeconomic implications of the just discussed microeconomic estimates of the sanctions effect on largest Russian banks. Ideally, to run this exercise we need a matched bank-borrower sample to trace how the effects of sanction on banks channeled to the banks' borrowers, as is done, though for different purposes, in, e.g., Chodorow-Reich (2014), Amiti and Weinstein (2018), and Gropp et al. (2019). However, as we discussed in Introduction, these data are publicly unavailable. We thus appeal to alternative methodologies, among which we choose structural vector autoregressive models (SVAR) with sign restrictions which allow us to identify credit supply shocks and its effects on the real economy, at the aggregated level. We follow Gambetti and Musso (2017) in identification of credit supply shocks (SR) and add the narrative component (NSR) to the analysis, as suggested by Antolin-Diaz and Rubio-Ramirez (2018).

Estimation results of the SVAR-model appear in Appendix F. Given the estimated impulse response functions from our SVAR-model, we are able to describe how we use them jointly with our microeconomic estimates of sanctions to evaluate the real effects on the economy.

Recall now the microeconomic estimates of the informational and direct effects of sanctions on loans. Let us start with loans to non-financial firms. As we reported in Section 4.2.2, the informational effects of sanctions on (not yet) debt- and asset-sanctioned banks peaked at

–2 and –7 percentage points, respectively. The average distance, at which the informational effects are in work, equals 21 months, i.e., this is the actual distance between March 2014 (the first portion of sanctions) and the average date at which another portions of sanctions were introduced. During this 21 months the average volume of the debt-sanctioned banks' total assets equals 2,604 billion of rubles and that of the asset-sanctioned banks' assets equals 85 billion of rubles.[37] Recall that we have 16 banks in the debt- and (effectively) 17 banks in the assets sanctions list. Therefore, we can estimate the aggregate decline of loans to non-financial firms caused by the informational effect of sanctions as –833 and –101 billions of rubles, respectively for the debt- and asset-sanctioned banks.[38] Now, apply the estimated elasticity of output (GDP) with respect to loan volumes estimated from our SVAR-analysis (1.52) and obtain that the informational effect of sanctions could have caused a decline of the Russian economy's GDP (i) by –1.5 percentage points because of credit reductions by (not yet) debt-sanctioned banks and (ii) –0.2 percentage points because of loan reductions by (not yet) asset-sanctioned banks (averages for 2014–2015), amounting to –1.7 percentage points in total. This result implies the the very first announcement of sanctions in March 2014 had a rather moderate though noticeable negative effect on the Russian GDP through reductions of loan to non-financial firms. Strikingly, this result is very similar to the purely macroeconomic estimate of the sanctions effect on Russian GDP obtained by Pestova and Mamonov (2019). By applying the Bayesian methods to estimate VARs, the authors conclude that during the same 2014–2015 Russian GDP could have fallen by –1.2 percentage points because of sanctions.[39]

However, and differently from the existing macroeconometric research, we can disaggregate the effects of sanctions on those channeling through firms vs. those through households. And the informational effect through households was positive, not negative. Computed in a similar fashion, we obtain that Russian GDP in 2014–2015 could have been increased by 2.3 percentage points as a result of credit re-shuffling — that is, through rising lending to households initiated by (not yet) debt-sanctioned banks. This positive effects overweighs the negative one thus, by 0.5 percentage points in terms of GDP after the informational effects of sanctions.

It is not the end of the story though. The direct effects of sanctions appear to be much larger compared to the just described informational one. Average volumes of assets during respective periods had increased to 3,137 and 160 billions of rubles for debt- and asset-sanctioned banks, respectively. Applying the same logic as above, we can estimate that debt-sanctioned could had decreased corporate loans by 1,606 billion of rubles whereas the asset-sanctioned banks could had compensated this decline by only 109 billion of rubles. Through the estimated elasticity of GDP to loan volumes during the periods of credit supply shock, these figures imply the Russian GDP could had fallen by 2.5 percentage points over 2015–2017 as the result of corporate credit

[37] For comparative reasons, if we take the 2014-2015 average ruble to US dollar exchange rate (49.69 rubles per 1 dollar), these are equivalent to 52.4 and 1.7 billion of US dollars, respectively.

[38] These are computed as $-0.020 \times 16 \times 2,604$ and $-0.07 \times 17 \times 85$.

[39] Though the authors address a different channel — through "sudden stops" of the opportunities to place new external debt by Russian entities.

reduction by the debt-sanctioned banks and recovered by only 0.2 percentage points due to expanded corporate credit by asset-sanctioned banks. Again, it is still not the end of the story. Russian GDP could had increased over the same period by 1.8 and 0.2 percentage points due to rising credit to households initiated by debt- and asset-sanctioned banks in response to the direct effects of sanctions. On net, the credit re-shuffling could lead to a rather moderate decline of GDP — by only 0.4 percentage points after the direct effects of sanctions took hold.

Overall, this macroeconomic exercise indicates that the sanctions against largest Russian banks could had very much negative (informational and direct) effects on the Russian economy through declined bank lending to non-financial firms (–4 percentage points of GDP) but, at the same time, almost equally positive (informational and direct) effects through expanded lending to households (–4 percentage points of GDP). These numbers are able to explain why previous macroeconometric research reveals an absence of disruptive effects of the Western sanctions against the Russian economy (Dreger et al., 2016; Ahn and Ludema, 2020). That the macroeconomic effects are significant allows us to conclude our H5 "*macroeconomic effects of sanctions*" hypothesis is also supported by the data.

7 Robustness checks

We run a myriad of robustness checks aimed at proving validity of our baseline results on each of the five tested hypotheses.

First, since we matched banks before the DiD analysis, one could claim that including bank-specific control variables into the DiD regressions is redundant. We thus dropped them and re-run each and every regression. Results survived.

Second, one could claim matching on the pre-treatment horizon which includes only 24 months is ad-hoc. We thus repeated the matching exercise with 12 and 36 months as pre-treatment periods prior to March 2014. Then we again re-run each and every regression from the text and again obtained that the baseline results remain qualitatively, and even quantitatively, very similar.

Third, some objections may touch including Sberbank into the sample of treated banks because the bank is disproportionately large, holding one third of the banking system's assets. It is impossible to find a good match thus. We therefore exclude this bank from our analysis and again repeated each and every regression. All but macroeconomic effects survive. Specifically, macro effects decreased but still remain significant. In addition, we then exclude the second (VTB), third (Gazprombank), and fourth (Russian Agricultural Bank) largest banks from the analysis. Even in this case the results remain valid.

Fourth, we note that the placebo results from the main text also survive a battery of

robustness checks, including variation in the number of control bank-specific variables and the number of matches at the matching procedure, including / excluding largest and smallest banks within the debt-sanctioned group.

Fifth, we varied the DiD estimation window: we consider the whole period from two years prior to March 2014 till the end of the sample period in the mid-2019. These regressions imply the same results (see Appendix G).

Sixth, we show that pooling debt- and asset-sanctioned banks mixes / confounds the effects. Specifically, it blurs the informational effects and lowers the direct effects of sanctions (see Appendix H).

Seventh, we vary the sign restriction schemes in our SVAR-analysis — restricting only volumes of loans and lending rate. The macroeconomic estimates of the sanction effects are preserved.

Finally, one could argue we should have focused on matching banks prior to each and every date of sanction imposition rather than a unified date of March 2014. We perform the Abadie and Imbens (2011) 1:4 matching of banks based on the scheme depicted in Appendix A. We then again repeat all the regressions. See Appendix I for the implied informational and direct effects of sanctions and see Appendix J for corresponding placebo exercise. Baseline results are still there without any qualitative changes.

8 Conclusion

Financial sanctions against the largest Russian banks were imposed at different points in time between 2014 and 2019, thus leaving room for not yet sanctioned banks to *anticipate punishment*. Our estimates indicate that indeed such an informational effect of sanctions existed and pushed banks to adjust their foreign and domestic assets and liabilities in advance, i.e., before the sanctions hit. On average, such not yet sanctioned banks were lucky to continue international borrowings *after* the first portion of sanctions appeared in March 2014 but *before* they faced sanctions themselves. At the same time, during this anticipation period the not yet sanctioned banks were also successful in offloading parts of their foreign assets, thus exhibiting a fear of asset freezes by foreign governments. Nonetheless, after the sanctions had been imposed on these banks, the effect was negative, i.e., the banks had to further decrease their foreign assets and liabilities. We then show how these primary effects of sanctions, i.e., the effects on international operations, lead to secondary effects, i.e., the effects on domestic assets and liabilities. From the liabilities side, the sanctions caused a series of hefty withdrawals by private and corporate depositors, but the negative effects were eliminated by the Russian government that stepped in and directly or indirectly funneled additional funds into the sanc-

tioned banks, thus preventing any disorderly bank failures. From the assets side, we show that sanctioned banks reduced loans to non-financial firms (possibly because the firms could have faced sanctions themselves and exhibited problems with repaying debts) and expanded loans to individuals. Macroeconomic implications of these changes to loan portfolios of sanctioned banks were rather modest.

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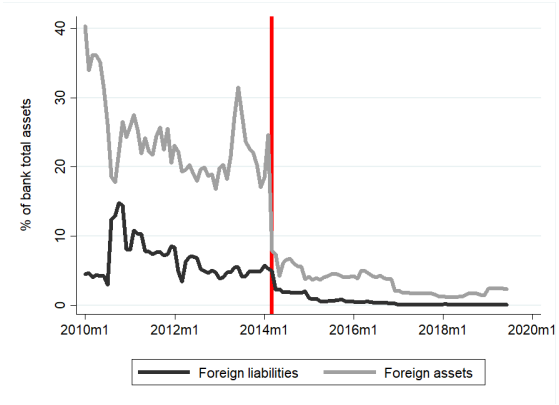
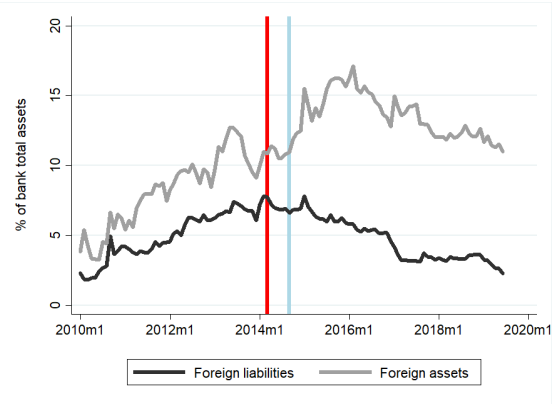
Figures

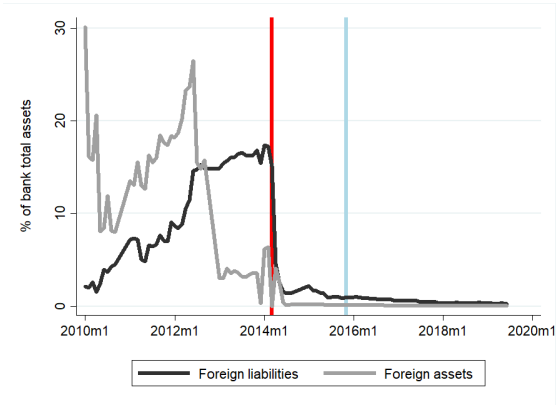
assets sanctions	debt sanctions



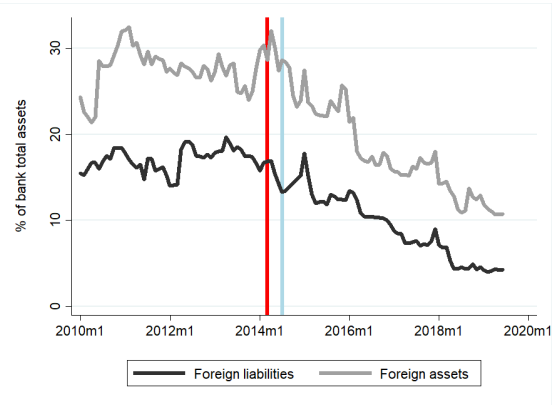
(a) "Bank Rossiya" (*the first bank under sanctions*)



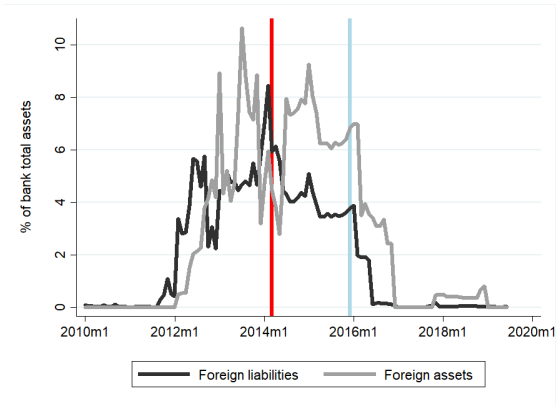
(b) "Sberbank" (top-1, state-owned)



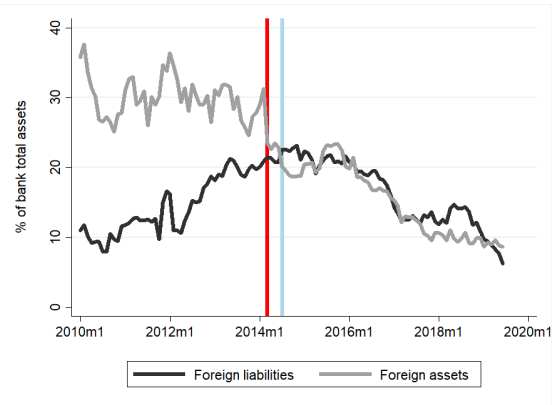
(c) "Russian National Commercial Bank" (RNCB, operates in Crimea)



(d) "VTB" (top-2, state-owned)



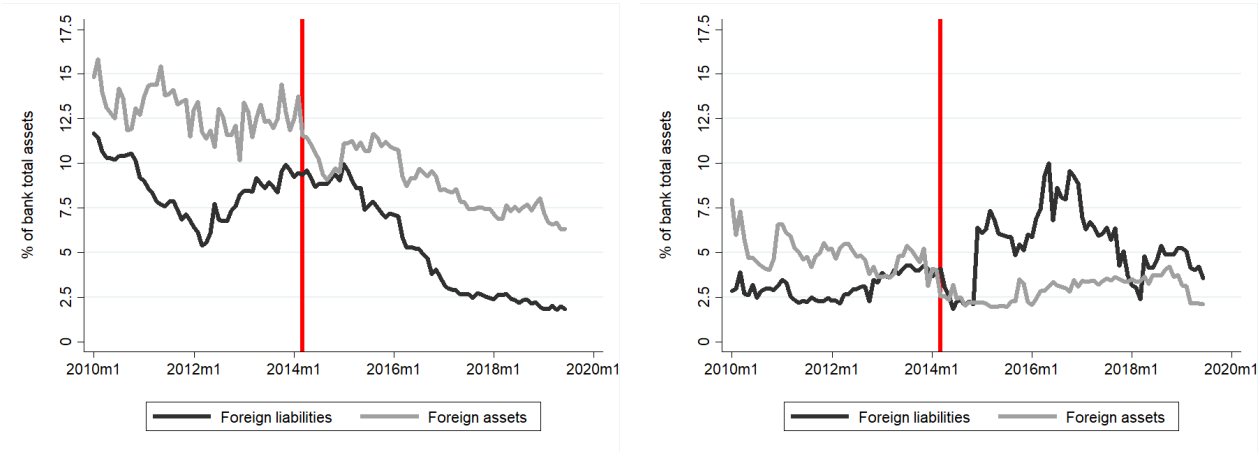
(e) "Genbank" (operates in Crimea)



(f) "Gazprombank" (top-3, state-controlled)

Note: The figures report foreign liabilities (black line) and foreign assets (grey line), as % of respective total assets, of selected banks that faced sanctions. Red vertical red line marks March 2014 — the month in which financial sanctions against Russian banks were imposed for the first time (the "Bank Rossiya"). Blue vertical line represents the period when individual sanctions were then introduced.

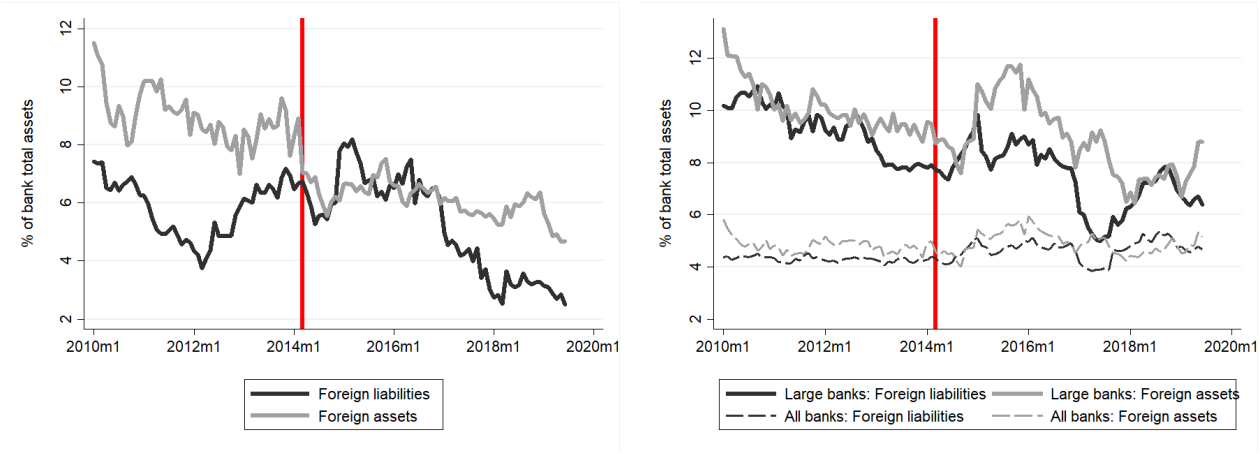
Figure 1: Selected largest Russian banks: Time evolution of foreign assets and liabilities before and after sanctions



(a) debt-sanctioned banks (b) asset-sanctioned banks

Note: The figures report foreign liabilities (black line) and foreign assets (grey line), as % of respective total assets of those banks that eventually faced debt sanctions vs. those faced assets sanctions. Red vertical red line marks March 2014 — the month in which financial sanctions against Russian banks were imposed for the first time (the "Bank Rossiya").

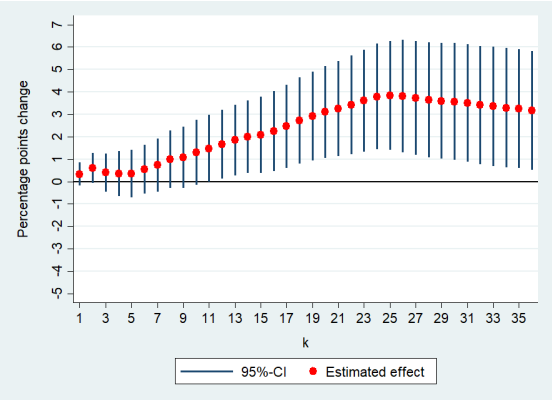
Figure 2: Differences between debt- and asset-sanctioned banks in terms of foreign assets and liabilities



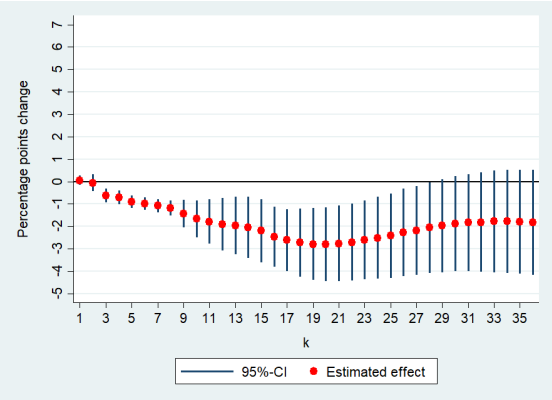
(a) All sanctioned banks (b) All non-sanctioned banks

Note: The figures report foreign liabilities (black line) and foreign assets (grey line), as % of respective total assets of those banks that eventually faced sanctions vs. those faced no sanctions. Within the latter, the figure also shows the top-200 banks in terms of assets to make the group more comparable with the sanctioned group composed of largest banks. Red vertical red line marks March 2014 — the month in which financial sanctions against Russian banks were imposed for the first time (the "Bank Rossiya").

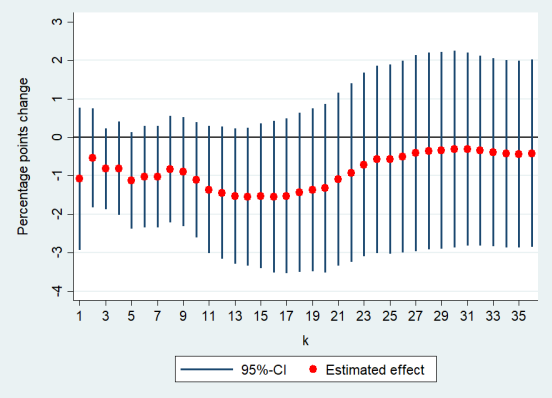
Figure 3: All sanctioned vs. all non-sanctioned banks: time evolution of foreign assets and liabilities before and after sanctions



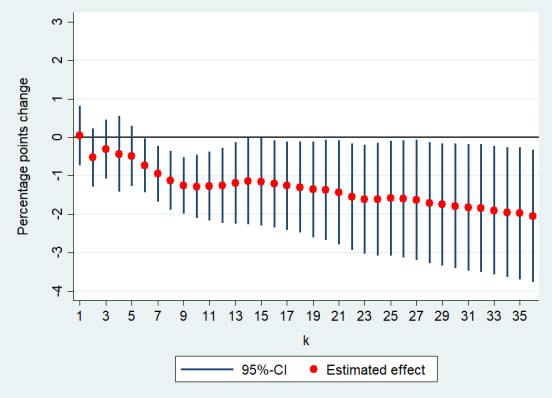
(a) (Not yet) debt-sanctioned bank:
Foreign liabilities, % of bank total assets



(b) (Not yet) asset-sanctioned bank:
Foreign liabilities, % of bank total assets



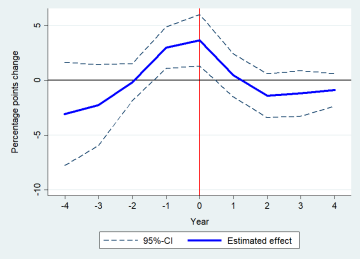
(c) (Not yet) debt-sanctioned bank:
Foreign assets, % of bank total assets



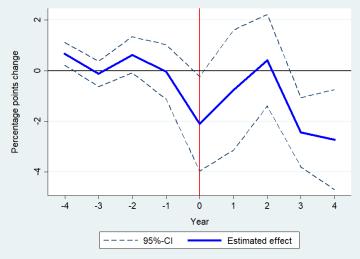
(d) (Not yet) asset-sanctioned bank:
Foreign assets, % of bank total assets

Note: The figures report the difference-in-differences estimates on expanding windows $[-k, k]$ with $k = 1, 2...36$ months after the sanction imposition on the bank "Rossiya" (March 2014). Sanctioned and non-sanctioned bank groups are matched within 1 year prior to March 2014.

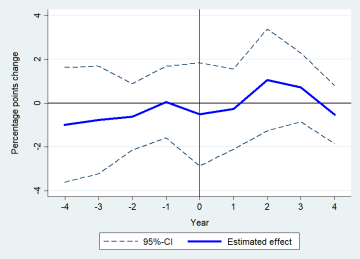
Figure 4: Time evolution of the informational effects of financial sanctions on foreign assets and liabilities



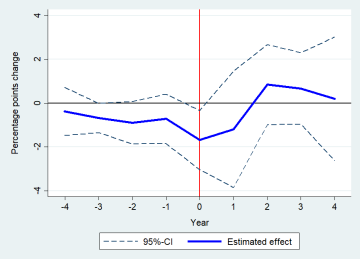
(a) Foreign liabilities, *type = debt*



(b) Foreign liabilities, *type = assets*



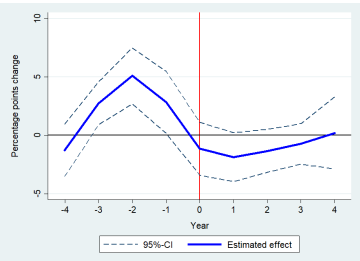
(c) Foreign assets, *type = debt*



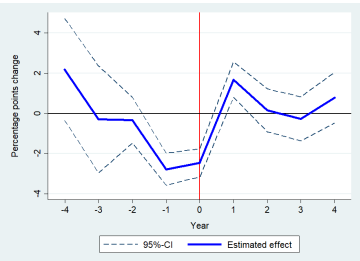
(d) Foreign assets, *type = assets*

Note: The figures report the difference-in-differences estimates of the coefficient on $TREAT_i \times INFO.FIRST_{it}$, as implied by equation (5) but with properly adjusted time indices.

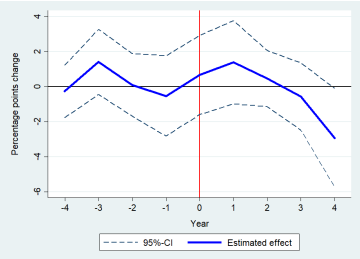
Figure 5: The pre-trend estimates of the informational effects of sanctions on foreign assets and liabilities, *by sanction type*



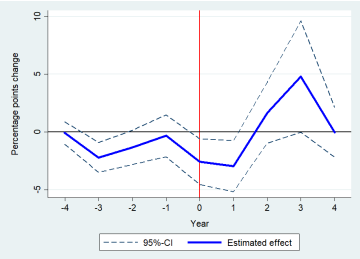
(a) Foreign liabilities, *type = debt*



(b) Foreign liabilities, *type = assets*



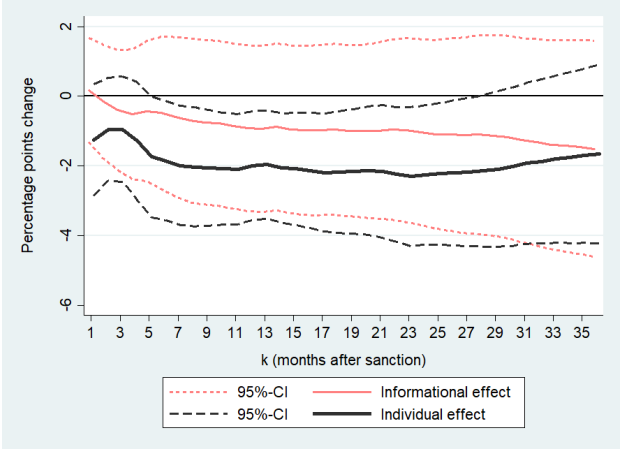
(c) Foreign assets, *type = debt*



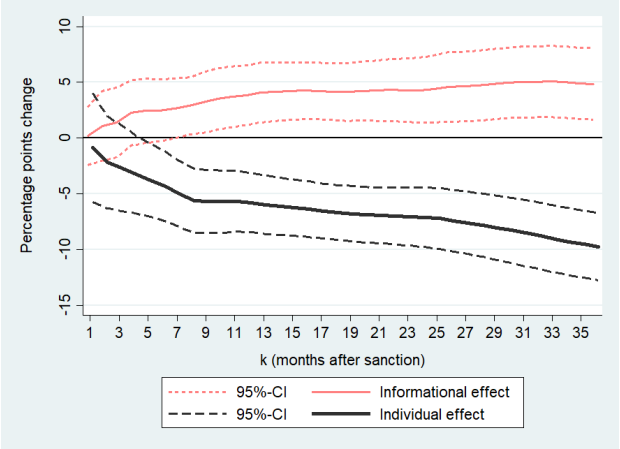
(d) Foreign assets, *type = assets*

Note: The figures report the difference-in-differences estimates of the coefficient on $TREAT_i \times SANCTION_{it}$, as implied by equation (7) but with properly adjusted time indices.

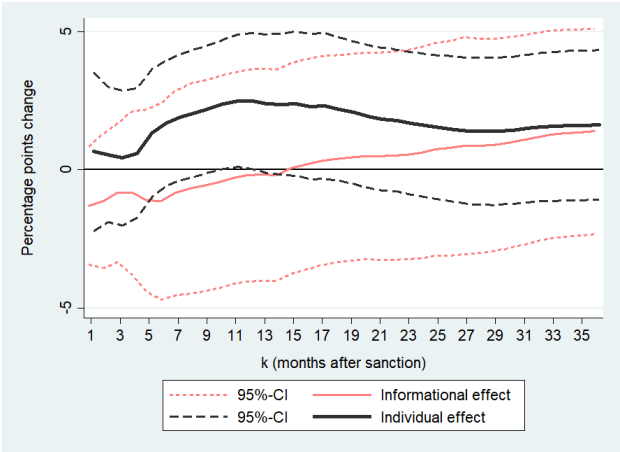
Figure 6: The pre-trend estimates of the direct effects of sanctions on foreign assets and liabilities, *by sanction type*



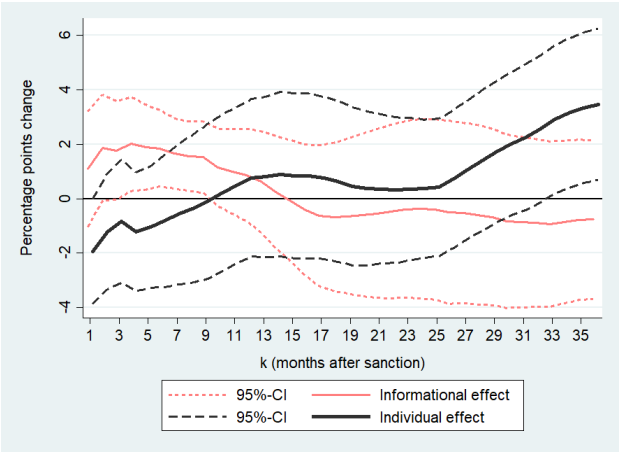
(a) Private deposits, *type = debt*



(b) Private deposits, *type = assets*



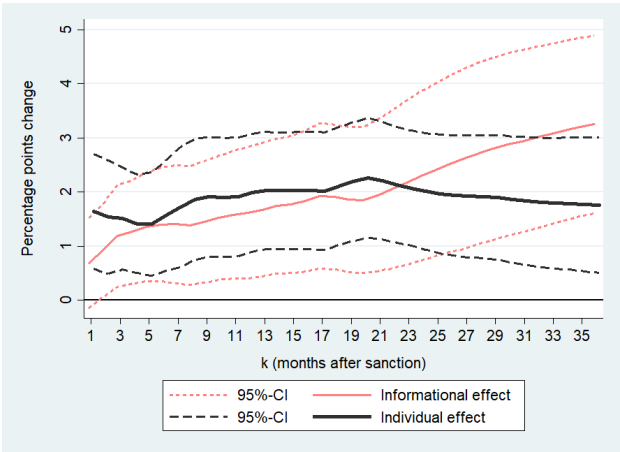
(c) Corporate deposits, *type = debt*



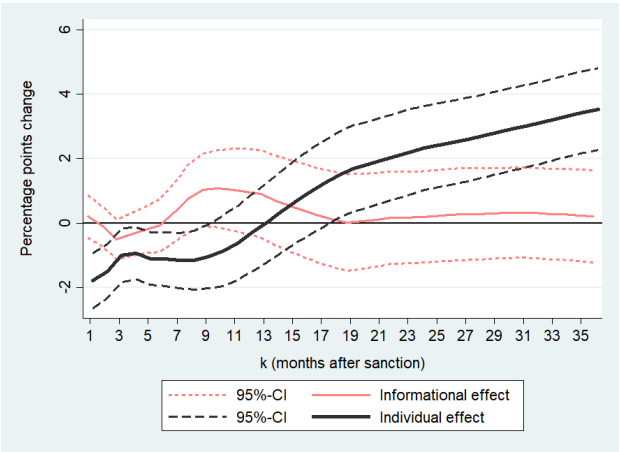
(d) Corporate deposits, *type = assets*

Note: The figures report the difference-in-differences estimates of the coefficients on $TREAT_i \times SANCTION_{it}$ and $TREAT_i \times INFO.FIRST_t$ in equation (7), with dependent variable FDY_{it} reflecting either private or corporate deposits (as % of bank total assets). The estimates are obtained by running DiD on expanding window $[-k, k]$, where $k = 1, 2...36$ months after either bank-specific sanction date (individual effects, black lines) or the date of sanctions against the "Bank Rossiya" (informational effects, pale red lines).

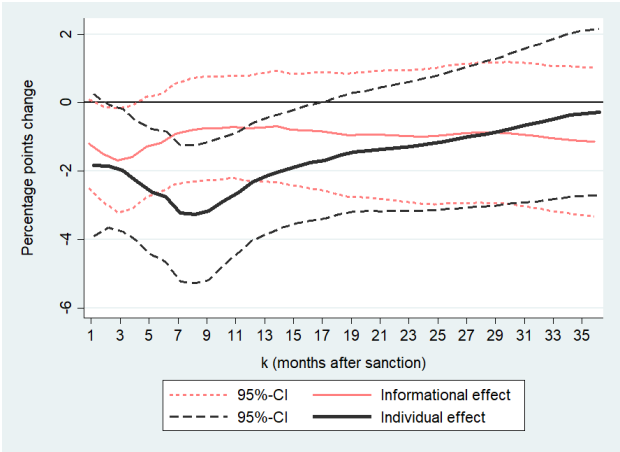
Figure 7: What happened with key domestic bank liabilities after sanctions? (*by sanction type*)



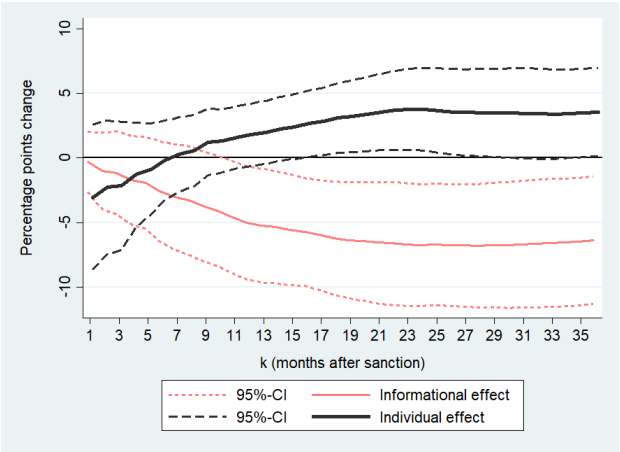
(a) Loans to individuals, *type = debt*



(b) Loans to individuals, *type = assets*



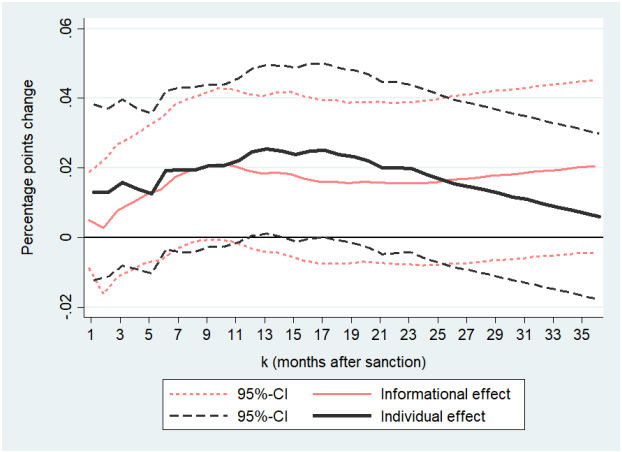
(c) Loans to firms, *type = debt*



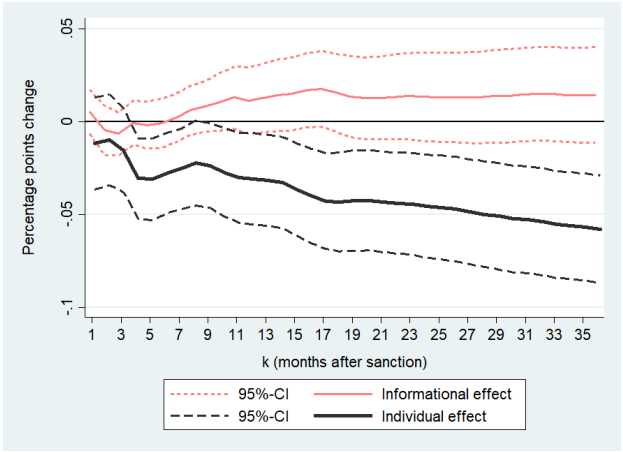
(d) Loans to firms, *type = assets*

Note: The figures report the difference-in-differences estimates of the coefficients on $TREAT_i \times SANCTION_{it}$ and $TREAT_i \times INFO.FIRST_t$ in equation (7), with dependent variable FDY_{it} reflecting either loans to individuals or loans to non-financial firms (as % of bank total assets). The estimates are obtained by running DiD on expanding window $[-k, k]$, where $k = 1, 2...36$ months after either bank-specific sanction date (individual effects, black lines) or the date of sanctions against the "Bank Rossiya" (informational effects, pale red lines).

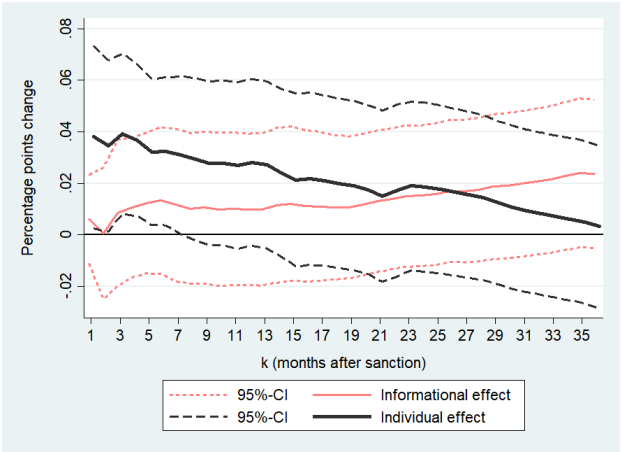
Figure 8: How banks adjusted their assets after sanctions?
by sanction type



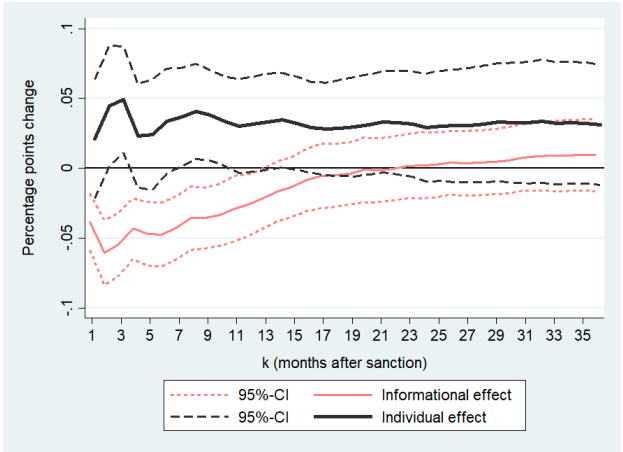
(a) Average funding rate, *type = debt*



(b) Average funding rate, *type = assets*



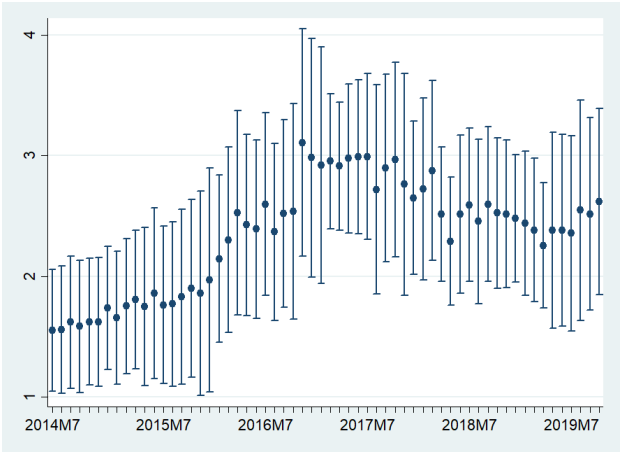
(c) Average return rate, *type = debt*



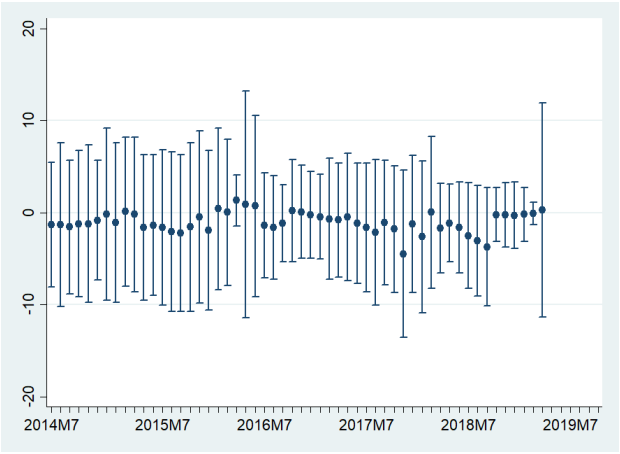
(d) Average return rate, *type = assets*

Note: The figures report the difference-in-differences estimates of the coefficients on $TREAT_i \times SANCTION_{it}$ and $TREAT_i \times INFO.FIRST_t$ in equation (7), with dependent variable FDY_{it} reflecting either average funding rate or average return rate, as measured by the ratio of monthly interest expenses or monthly interest income to total assets, respectively. The estimates are obtained by running DiD on expanding window $[-k, k]$, where $k = 1, 2...36$ months after either bank-specific sanction date (individual effects, black lines) or the date of sanctions against the "Bank Rossiya" (informational effects, pale red lines).

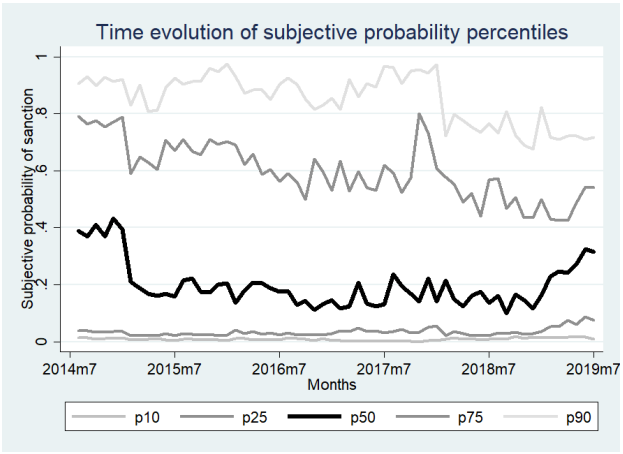
Figure 9: What happened with effective interest rates after sanctions?
by sanction type



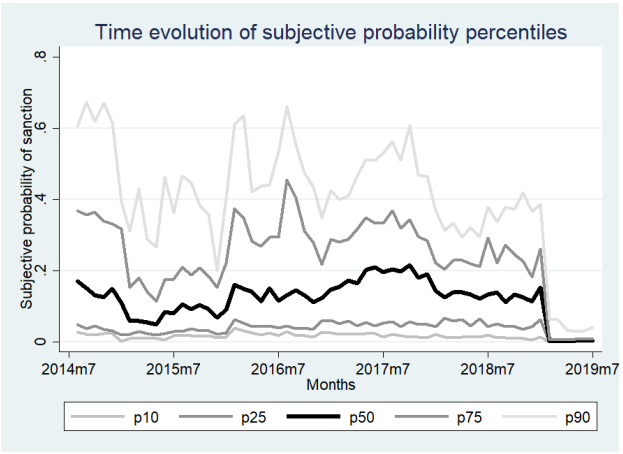
(a) Debt sanctions: Economic effects of $GovShare_{it}$ on $Pr\{Sanctioned_{it} = 1 \mid X_{it}\}$



(b) Asset sanctions: Economic effects of $GovShare_{it}$ on $Pr\{Sanctioned_{it} = 1 \mid X_{it}\}$



(c) Debt sanctions: predicted $Pr\{Sanctioned_{it} = 1 \mid X_{it}\}$



(d) Asset sanctions: predicted $Pr\{Sanctioned_{it} = 1 \mid X_{it}\}$

Note: The figures report the estimated economic effects of the government-connected members in banks' board of directors on the probability of being debt (a) or asset (b) sanctioned, and the predicted probabilities of being debt (c) or asset (d) sanctioned. Economic effect is computed as the product of the marginal effect of the $GovShare_{it}$ on $Pr\{Sanctioned_{it} = 1 \mid X_{it}\}$ and a one standard deviation of the $GovShare_{it}$ variable. "p10" to "p90" are respectively 10 to 90%-tiles.

Figure 10: Post-estimation after the logit models of the probability of being sanctioned: economic effects and predictions

Tables

Table 1: Descriptive statistics
(*at the bank-month level, from 2009M1 to 2019M6*)

Sanction type	Debt			Assets			Non sanction		
	Mean	p50	SD	Mean	p50	SD	Mean	p50	SD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel 1: Transmission variables = Foreign liabilities and assets, as % of bank total assets									
Foreign liabilities	7.39	2.36	10.71	4.09	0.67	10.25	4.48	0.02	11.17
Foreign assets	11.51	9.04	9.64	4.18	1.47	6.69	4.92	0.48	9.47
Panel 2: Domestic variables = Main liabilities, as % of bank total assets									
Private deposits	19.06	12.36	19.49	32.23	33.96	22.65	29.68	29.38	21.41
Corporate deposits	21.50	18.93	16.78	22.58	19.48	16.69	23.57	20.52	17.64
Inter-bank deposits	11.56	3.69	18.58	5.87	1.40	11.43	3.36	0.00	8.39
Government deposits	2.20	0.01	3.57	0.19	0.00	0.68	0.14	0.00	1.49
Central Bank deposits	3.42	0.34	5.59	1.42	0.00	3.83	1.22	0.00	4.47
Panel 3: Domestic variables = Main assets, as % of bank total assets									
Loans to individuals	13.45	6.57	19.27	11.89	8.13	13.21	15.69	10.88	16.00
Loans to firms	33.35	35.20	19.60	29.14	30.27	15.26	32.91	32.19	19.90
Inter-bank loans	11.41	4.94	14.81	8.80	5.51	10.80	8.79	4.23	12.19
Cash & reserves	5.63	3.86	7.03	13.85	7.55	15.94	14.74	9.21	15.22
Panel 4: Domestic variables = Monthly expenses & returns, as % of bank total assets (*) or respective asset (**)									
Personnel expenses (*)	0.13	0.11	0.09	0.30	0.25	0.22	0.32	0.28	0.20
Average funding rate (*)	0.34	0.34	0.15	0.34	0.37	0.21	0.30	0.30	0.19
Expenses on private deposits (**)	0.38	0.43	0.21	0.54	0.59	0.30	0.52	0.57	0.29
Expenses on corporate deposits (**)	0.23	0.20	0.21	0.19	0.14	0.19	0.18	0.11	0.20
Average return rate (*)	0.65	0.64	0.19	0.65	0.66	0.26	0.75	0.75	0.27
Returns on loans to individuals	1.11	1.10	0.21	1.39	1.32	0.44	1.33	1.25	0.50
Returns on loans to firms	0.80	0.82	0.30	1.06	1.10	0.45	1.18	1.17	0.41
Panel 5: Domestic variables = Size, equity capital and quality of assets, as % of bank total assets									
Log of total assets	5.63	5.44	2.28	2.56	2.48	2.04	1.46	1.23	1.80
Equity capital	12.95	11.15	6.94	14.20	11.20	15.32	21.62	16.28	16.11
Non-performing loans	8.75	5.17	12.78	10.78	3.35	19.34	5.97	2.98	10.57

Table 2: Informational effects of sanctions on foreign assets and liabilities: Difference-in-differences estimates on matched samples

Sanction type:	Debt sanctions			Assets sanctions		
Estimation Window $[-k, k]$:	$k = 12$	$k = 24$	$k = 36$	$k = 12$	$k = 24$	$k = 36$
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities, as % of bank total assets						
TREAT×INFO.FIRST	1.662**	3.794***	3.175**	–1.905***	–2.512***	–1.840
	(0.788)	(1.199)	(1.350)	(0.599)	(0.930)	(1.196)
INFO.FIRST	–0.550	–2.919	–7.685**	–1.565**	–1.120	–5.270***
	(1.108)	(2.004)	(2.979)	(0.683)	(1.013)	(1.019)
Constant	59.100***	66.867***	49.080***	8.879	9.480***	11.517***
	(13.293)	(11.198)	(9.972)	(8.077)	(3.355)	(3.242)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank control variables	Yes	Yes	Yes	Yes	Yes	Yes
N obs	1,364	2,657	3,895	1,831	3,511	5,086
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.331	0.315	0.313	0.321	0.287	0.309
Panel 2: Dependent variable = Foreign assets, as % of bank total assets						
TREAT×INFO.FIRST	–1.441	–0.574	–0.422	–1.256**	–1.609**	–2.050**
	(0.876)	(1.240)	(1.241)	(0.498)	(0.749)	(0.875)
INFO.FIRST	–1.898	–4.060**	–4.041***	–0.867	1.221	1.664
	(1.738)	(1.804)	(1.473)	(0.827)	(1.439)	(2.138)
Constant	–22.131	8.592	18.207**	10.759**	11.022***	11.717***
	(13.658)	(8.506)	(8.104)	(5.217)	(2.844)	(3.566)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank control variables	Yes	Yes	Yes	Yes	Yes	Yes
N obs	1,364	2,657	3,895	1,831	3,511	5,086
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.305	0.154	0.149	0.155	0.104	0.103

Note: The table reports the DiD estimates of the sanctions effects on foreign assets and liabilities of Russian banks, based on equation (5). Estimation Window is $[-k, k]$ month around the imposition of sanction on the bank "Rossiya" (March 2014). Sanctioned and non-sanctioned bank groups are matched within 1 year prior to March 2014.

***, **, * indicate that a coefficient is significant at the 1%, 5%, 10% level, respectively. Standard errors are clustered at the sanctioned group level and at the level of each non-sanctioned bank and appear in the brackets under the estimated coefficients.

Table 3: Informational effects of sanctions and distance to Moscow: Difference-in-differences estimates on matched samples

Sanction type:	Debt sanctions			Assets sanctions		
Estimation Window $[-k, k]$	$k = 12$	$k = 24$	$k = 36$	$k = 12$	$k = 24$	$k = 36$
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities, as % of bank total assets						
TREAT×INFO.FIRST	1.669*	4.298***	3.752**	–2.337***	–3.047**	–2.218
	(0.896)	(1.330)	(1.502)	(0.759)	(1.192)	(1.567)
TREAT×INFO.FIRST×DISTANCE	0.128	–1.128***	–0.964*	0.410**	0.505*	0.357
	(0.298)	(0.393)	(0.493)	(0.180)	(0.279)	(0.383)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank control variables	Yes	Yes	Yes	Yes	Yes	Yes
N obs	1,364	2,657	3,895	1,831	3,511	5,086
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.332	0.318	0.317	0.322	0.288	0.309
Average distance (km): treated / control	284	/	904	929	/	1,183
Panel 2: Dependent variable = Foreign assets, as % of bank total assets						
TREAT×INFO.FIRST	–0.393	0.749	1.321	–1.295**	–1.372	–1.832*
	(1.020)	(1.348)	(1.405)	(0.636)	(0.970)	(1.103)
TREAT×INFO.FIRST×DISTANCE	–2.336***	–3.770***	–5.224***	0.077	–0.184	–0.164
	(0.353)	(0.378)	(0.434)	(0.182)	(0.396)	(0.512)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank control variables	Yes	Yes	Yes	Yes	Yes	Yes
N obs	1,364	2,657	3,895	1,831	3,511	5,086
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.320	0.171	0.176	0.159	0.111	0.110
Average distance (km): treated / control	284	/	904	929	/	1,183

Note: The table reports the DiD estimates of the sanctions effects on foreign assets and liabilities of Russian banks, based on equation (5). Estimation Window is $[-k, k]$ month around the imposition of sanction on the bank "Rossiya" (March 2014). Sanctioned and non-sanctioned bank groups are matched within 1 year prior to March 2014. All necessary cross-products of the TREAT, INFO.FIRST and DISTANCE variables are included.

***, **, * indicate that a coefficient is significant at the 1%, 5%, 10% level, respectively. Standard errors are clustered at the sanctioned group level and at the level of each non-sanctioned bank and appear in the brackets under the estimated coefficients.

Table 4: Informational vs. individual effects of sanctions:
Difference-in-differences estimates on matched samples

Sanction type:	Debt sanctions			Assets sanctions		
Estimation Window $[-k, k]$	$k = 12$	$k = 24$	$k = 36$	$k = 12$	$k = 24$	$k = 36$
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities, as % of bank total assets						
TREAT×INFO.FIRST	1.739*	3.775***	3.777***	1.167	1.816	2.757**
	(1.023)	(1.302)	(1.276)	(0.895)	(1.215)	(1.270)
TREAT×SANCTION	–0.595	–0.368	–0.374	–5.973***	–5.831***	–6.337***
	(0.997)	(1.203)	(1.214)	(1.273)	(1.527)	(1.863)
N obs	2,172	3,489	4,646	2,821	4,614	5,899
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.223	0.235	0.234	0.244	0.260	0.219
Panel 2: Dependent variable = Foreign assets, as % of bank total assets						
TREAT×INFO.FIRST	–0.721	–0.400	–0.877	–0.406	–0.814	–0.949
	(1.059)	(1.108)	(1.080)	(0.932)	(0.763)	(0.781)
TREAT×SANCTION	–0.101	0.836	0.937	–1.955**	–1.578*	–2.260**
	(0.800)	(1.152)	(1.227)	(0.969)	(0.822)	(0.879)
N obs	2,172	3,489	4,646	2,821	4,614	5,899
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.178	0.184	0.199	0.137	0.124	0.141

Note: The table reports the DiD estimates of the sanctions effects on foreign assets and liabilities of Russian banks, based on equation (5). Estimation Window is $[-k, k]$ month around the imposition of sanction on the bank "Rossiya" (March 2014) joined with $[-k, k]$ month around the imposition of sanction on a bank j ($j \neq$ bank "Rossiya") from either the debt sanction list or assets sanction list. Sanctioned and non-sanctioned bank groups are matched within 1 year prior to March 2014. Bank FEs, month FEs, and the full set of bank-specific controls are included but not reported.

***, **, * indicate that a coefficient is significant at the 1%, 5%, 10% level, respectively. Standard errors are clustered at the sanctioned group level and at the level of each non-sanctioned bank and appear in the brackets under the estimated coefficients.

Table 5: Informational vs. individual effects of sanctions:
Different maturity of foreign liabilities and the distance to Moscow

Sanction type:	Debt sanctions			Assets sanctions		
	INFO	INFO + DISTANCE	INFO + SANCTION	INFO	INFO + DISTANCE	INFO + SANCTION
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities with maturity ≥ 3 years, as % of bank total assets						
TREAT×INFO.FIRST	2.063**	2.586**	1.547*	–1.255**	–1.268**	–0.575
	(0.930)	(1.071)	(0.865)	(0.593)	(0.611)	(0.387)
TREAT×INFO.FIRST×DISTANCE		–1.069***			0.026	
		(0.280)			(0.065)	
TREAT×SANCTION			0.631			–1.092
			(1.085)			(0.949)
N obs	2,657	2,657	3,489	3,498	3,498	4,626
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.069	0.079	0.116	0.250	0.251	0.249
Panel 2: Dependent variable = Foreign liabilities with maturity $\in [1, 3)$ years, as % of bank total assets						
TREAT×INFO.FIRST	1.749	2.070	2.069*	–1.283**	–1.489**	–0.516
	(1.224)	(1.399)	(1.039)	(0.582)	(0.616)	(0.434)
TREAT×INFO.FIRST×DISTANCE		–0.661			0.189	
		(0.408)			(0.123)	
TREAT×SANCTION			–1.124			–0.374
			(1.328)			(1.008)
N obs	2,657	2,657	3,489	3,498	3,498	4,626
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.161	0.163	0.141	0.225	0.226	0.211

Note: The table reports the DiD estimates of the sanctions effects on foreign assets and liabilities of Russian banks, based on equation (5). Estimation Window is $[-24, 24]$ month around the imposition of sanction on the bank "Rossiya" (March 2014) in columns (1)–(2) and (4)–(5) while in columns (3) and (6) the window is extended by adding $[-24, 24]$ month around the imposition of sanction on a bank j ($j \neq$ bank "Rossiya") from either the debt sanction list or assets sanction list.

***, **, * indicate that a coefficient is significant at the 1%, 5%, 10% level, respectively. Standard errors are clustered at the sanctioned group level and at the level of non-sanctioned banks and appear in the brackets under the estimated coefficients.

Table 6: Summary on the microeconomic effects of the financial sanctions

Sanctions:	Informational effects				Individual effects			
	Debt sanctions		Asset sanctions		Debt sanctions		Asset sanctions	
Time horizon	≤ 1	≥ 3	SR	LR	SR	LR	SR	LR
Panel 1: Foreign operations, as % of bank total assets								
Foreign liabilities	1.6**	3.2**	–1.9***	–1.8	–0.6	–0.4	–6.0***	–6.4***
if located in Moscow	1.7*	3.8**	–2.4***	–2.2				
if located in 2,000 km from Moscow	1.4*	1.6**	–1.6**	–1.5				
Foreign assets	–1.4	–0.4	–1.2**	–2.0**	–0.1	0.9	–2.0**	–2.3**
if located in Moscow	–0.4	1.3	–1.3**	–1.8*				
if located in 2,000 km from Moscow	–4.7***	–10.5***	–1.1	–1.5				
Panel 2: Domestic operations, as % of bank total assets								
Private deposits	–0.7	–1.8	4.0**	4.7**	–2.0**	–1.9	–6.0***	–10.0***
Corporate deposits	–0.1	1.5	0.8	–0.8	2.5*	2.0	0.0	3.5**
Loans to individuals	1.6**	3.2***	1.0	0.1	2.0***	1.8**	–0.3	3.5***
Loans to non–financial firms	–2.0**	–1.3	–5.0**	–7.0**	–3.5**	–0.2	2.0	4.0
Panel 3: Domestic interest rates								
Average funding rate	0.02	0.02	0.01	0.01	0.025**	0.02	–0.03**	–0.06***
Average return rate	0.01	0.02	–0.02**	0.01	0.04**	0.0	0.05**	0.03

Note: *SR* and *LR* stand for short- and longer-term effects of sanctions, as captured by the DiD estimates on ±12 and ±36 months around the date of respective sanctions.
***, **, * indicate that a coefficient is significant at the 1%, 5%, 10% level, respectively.

Table 7: Summary on treated and diffused banks

	Treated & Not state (N=16)			Treated & State (N=17)			Not treated & State (N=38)		
	$t \leq t^*$	$t > t^*$	Diff	$t \leq t^*$	$t > t^*$	Diff	$t \leq t^*$	$t > t^*$	Diff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total assets (TA)	36	154	118	1313	2924	1611	77	256	179
Foreign liabilities, % TA	2.6	2.7	0.1	9.6	7.2	–2.4	4	3.5	–0.5
Foreign assets, % TA	6.5	3.5	–3	12.5	8.1	–4.4	5	4.2	–0.8

Note: t^* = *March 2014*, the date of the first sanction announcement. TA is measured in billion of Rubles. "Treated" stands for actually sanctioned banks. "Not treated" denotes diffused banks. "State" implies a bank is in the Karas and Vernikov (2019) list of state-controlled banks.

Table 8: Summary statistics on the $GovShare_{it}$ variable across the subgroups of treated and diffused banks

	Obs*	Mean	SD	Min	Max
	(1)	(2)	(3)	(4)	(5)
Treated & Not state	8 / 16	26.4	9.7	17	50
Treated & State	16 / 17	83.5	15.4	25	100
Not treated & State	27 / 38	53.9	25.7	8	100

Note: "Treated" stands for actually sanctioned banks. "Not treated" denotes diffused banks. "State" implies a bank is in the Karas and Vernikov (2019) list of state-controlled banks.
* In the "Obs" column we report for how many banks from a given subgroup we were successful in constructing the $GovShare_{it}$ variable.

Table 9: Treatment diffusion: a fragment of the estimation results from the first stage

Sanction type:	Debt + Asset			Debt			Asset		
	t^*-1	t^*	t^*+1	t^*-1	t^*	t^*+1	t^*-1	t^*	t^*+1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel 1: First wave of sanctions, t^* = September 2014									
Government share (GS)	0.183*	0.140	0.156	0.089***	0.092***	0.089***	–0.048	–0.062	–0.048
	(0.107)	(0.116)	(0.103)	(0.014)	(0.012)	(0.011)	(0.175)	(0.153)	(0.168)
Distance to Moscow (DM) / 1,000	–1.320	–1.612	–1.347	–2.481*	–2.410*	–2.445*	–4.420**	–4.528**	–4.266**
	(1.242)	(1.156)	(1.097)	(1.515)	(1.517)	(1.382)	(1.933)	(1.910)	(1.816)
GS × DM / 1,000	0.779	0.492	0.571	0.048**	0.046**	0.049***	–0.510	–0.584	–0.501
	(0.594)	(0.545)	(0.564)	(0.020)	(0.020)	(0.019)	(0.993)	(0.863)	(0.953)
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	813	805	791	796	789	775	798	790	776
Pseudo-R^2	0.373	0.394	0.408	0.641	0.650	0.653	0.276	0.286	0.303
Panel 2: Second wave of sanctions, t^* = June 2017									
Government share (GS)	0.072***	0.064***	0.061***	0.117***	0.121***	0.126***	–0.071	–0.085	–0.046
	(0.012)	(0.009)	(0.008)	(0.028)	(0.031)	(0.034)	(0.159)	(0.162)	(0.153)
Distance to Moscow (DM) / 1,000	–5.010*	–4.097***	–4.267***	–2.438	–3.809	–3.943	–6.881	–6.304*	–6.613*
	(2.948)	(1.521)	(1.494)	(1.980)	(3.156)	(3.610)	(4.339)	(3.385)	(3.945)
GS × DM / 1,000	0.056	0.043**	0.045**	0.014	0.026	0.024	–0.621	–0.705	–0.489
	(0.038)	(0.021)	(0.021)	(0.025)	(0.039)	(0.044)	(0.862)	(0.879)	(0.829)
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	543	541	534	527	525	518	528	526	519
Pseudo-R^2	0.424	0.400	0.320	0.705	0.713	0.712	0.201	0.212	0.194

Note: ***, **, * indicate that a coefficient is significant at the 1%, 5%, 10% level, respectively. Standard errors are clustered at the bank level and appear in the brackets under the estimated coefficients.

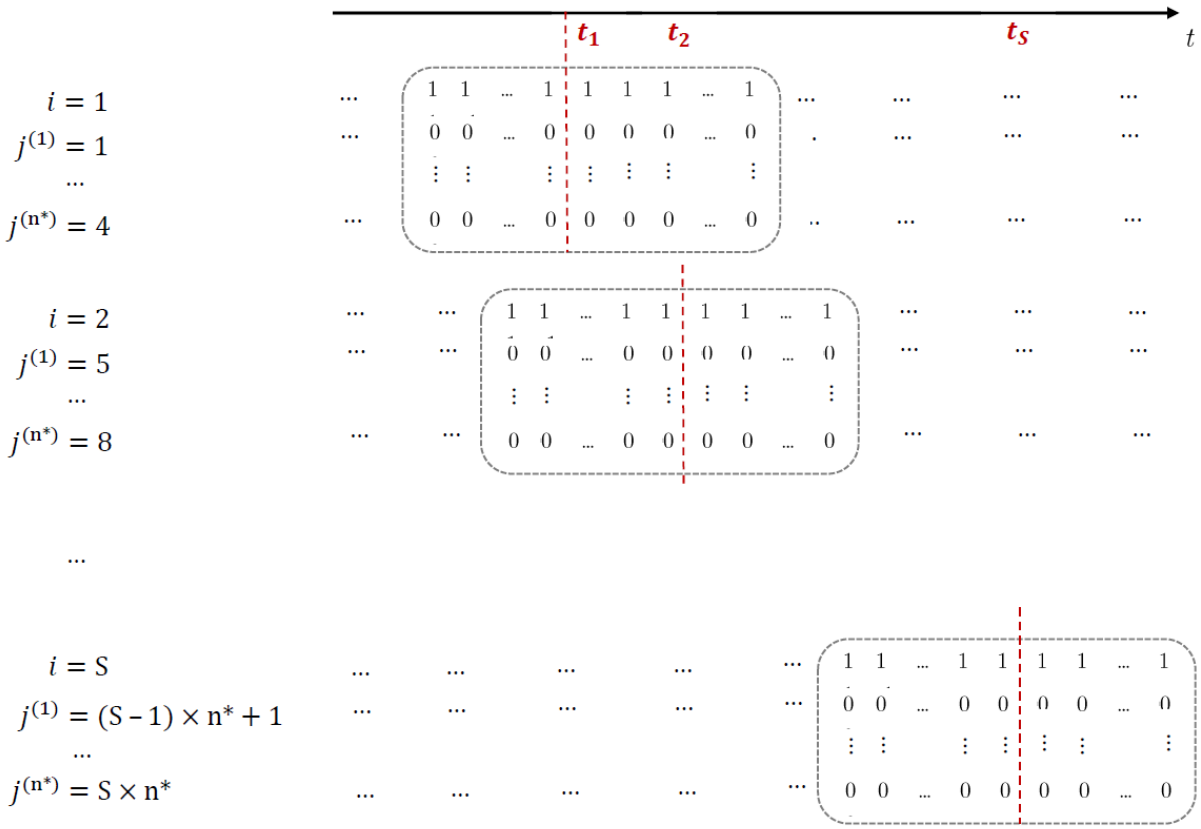
Table 10: Treatment diffusion in international operations:
the estimation results from the second stage

Sanction type:	Diffused		Debt sanctions		Assets sanctions	
Treatment:	Debt	Asset	Actual (*baseline*)	Actual + Diffused	Actual (*baseline*)	Actual + Diffused
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities, as % of bank total assets						
TREAT.DIFFUS×INFO.FIRST	0.636	0.489	4.298***	3.026***	–3.047**	–1.394*
	(0.984)	(0.423)	(1.502)	(0.890)	(1.192)	(0.869)
TREAT.DIFFUS×INFO.FIRST×DIST	–0.160	–0.334*	–1.128***	–0.773***	0.505*	0.055
	(0.333)	(0.202)	(0.493)	(0.294)	(0.279)	(0.194)
Bank FE, Month FE, Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
N obs	3,232	2,791	2,657	5,406	3,511	5,603
N treated / control banks	14 / 54	14 / 45	16 / 39	30 / 114	17 / 59	30 / 119
R^2_{within}	0.229	0.413	0.318	0.236	0.288	0.295
Panel 2: Dependent variable = Foreign assets, as % of bank total assets						
TREAT.DIFFUS×INFO.FIRST	0.933	–1.197**	1.321	–0.340	–1.372	–2.121***
	(0.746)	(0.595)	(1.405)	(0.712)	(0.970)	(0.729)
TREAT.DIFFUS×INFO.FIRST×DIST	–0.712**	0.380**	–3.770***	–1.146***	–0.184***	0.084
	(0.303)	(0.161)	(1.434)	(0.246)	(0.396)	(0.267)
Bank FE, Month FE, Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
N obs	3,232	2,791	2,657	5,406	3,511	5,603
N treated / control banks	16 / 54	14 / 45	16 / 39	30 / 114	17 / 59	30 / 119
R^2_{within}	0.088	0.146	0.171	0.099	0.111	0.097

Note: Estimation window $k = 24$ months.

***, **, * indicate that a coefficient is significant at the 1%, 5%, 10% level, respectively. Standard errors are clustered at the sanction group level and at the level of non-sanction banks and appear in the brackets under the estimated coefficients.

Appendix A Alternative matching procedure



Note: Treated banks are indexed with i, matched banks with j. 1 means treated, 0 non-treated, dashed boxes encompass estimation window $[t_i - k, t_i + k]$ for chosen k, and ... means no estimations are done outside the window.

Figure A.I: Alternative construction of matched sample under time-varying treatment

Suppose that index i reflects a bank from the treatment group with the sanction date t, with $i = 1...S$ ($S = 36$) and t is a corresponding date in 2014–2019. For each i we need to find n matches among non-sanctioned banks (i.e., the banks that have never faced sanctions in our sample) at respective pre-treatment period $t - k$, with $n = 1, 2...n^*$ and $k = 1, 2...k^*$. The binary indicator reflecting alternative definition of the treatment variable:

$$TREAT_i = \begin{cases} 1 \text{ in } [t_i - k, t_i + k] \ , & \text{if bank } i \text{ faces sanctions at } t_i \\ 0 \text{ in } [t_i - k, t_i + k] \ , & \text{if bank } i \text{ never faces sanctions and is a match} \\ ..., & \text{if bank } i \text{ is not a match or } t \notin [t_i - k, t_i + k] \end{cases} \tag{10}$$

where $[t_i - k, t_i + k]$ is an estimation window for bank i and all its matches j.

The scheme depicted in Figure A.I illustrates the alternative matching procedure.

Appendix B The list of debt- and asset-sanctioned banks

#	REGN	Name	Sanctions Type	Sanction Date	Comments	Sanctions Remain
1	2748	Bank of Moscow (OAO)	Sectoral	29Jul2014	The fifth largest bank in Russia. Controlled by VTB (see below)	1
2	1623	Bank VTB 24 (PAO)	Sectoral	22Dec2015	A subsidiary of VTB	1
3	2584	Credit Ural Bank (AO)	Sectoral	1Sep2016	A subsidiary of Gazprombank	1
4	0	Cryogenmash PAO	Sectoral		A subsidiary of Gazprombank	0
5	354	Gazprombank (OAO)	Sectoral	16Jul2014	Russia's third largest bank. Partially owned by the state	1
6	1942	Globexbank (AO)	Sectoral	30Jul2015	A subsidiary of VEB	1
7	1470	Sviaz-Bank	Sectoral	30Jul2015	A subsidiary of VEB	1
8	2546	Novikombank	Sectoral	22Dec2015	A subsidiary of Rostec state corporation	1
9	2433	Prominvestbank	Sectoral	30Jul2015	A subsidiary of VEB	1
10	2790	Roseximbank (ZAO)	Sectoral	30Jul2015	A subsidiary of VEB	1
11	3349	Russian Agricultural Bank (OAO)	Sectoral	29Jul2014	State-owned Russian bank	1
12	3340	SME Bank	Sectoral	30Jul2015	A subsidiary of VEB	1
13	3287	Russian Regional Development Bank (OAO)	Sectoral	30Jul2015	A subsidiary of Rosneft	1
14	1481	Sberbank	Sectoral	12Sep2014	Russia's largest bank. State-controlled.	1
15	2168	Setelem Bank (OOO)	Sectoral	22Dec2015	A subsidiary of Sberbank	1
16	0	Sovremennye Technologii (OOO)	Sectoral		A subsidiary of Sberbank	0
17	588	Surgutneftegazbank (AO)	Sectoral	26Jan2018	A subsidiary of Surgutneftegaz, another sanctioned entity	1
18	0	Vnesheconombank (VEB)	Sectoral		Russian state-owned development bank	0
19	1000	VTB Bank (OAO)	Sectoral	29Jul2014	The second largest Russian bank. State-controlled.	1
20	0	VTB Insurance (OOO)	Sectoral		A subsidiary of VTB Bank	0
21	328	Bank Rossiya	Entity	20Mar2014	Bank owned by several individuals from the sanctions list	1
22	3527	Black Sea Bank of Development and Reconstruction (AO)	Entity	20Jun2017	Russian commercial bank with activities in Crimea	1
23	2398	Commercial Bank North Credit (AO)	Entity	20Jun2017	Russian commercial bank with activities in Crimea	1
24	3098	Commercial Bank Rublev (AO)	Entity	20Jun2017	Russian commercial bank with activities in Crimea	1
25	2402	Evrofinance Mosnarbank (AO AKB)	Entity	11Mar2019	A Russian bank involved in transactions with Venezuela	1
26	2998	ExpoBank	Entity		Russia's 102nd largest bank	0
27	2490	Genbank (AO)	Entity	22Dec2015	A Russain bank, which operates in Crimea	1
28	2571	Inresbank (OOO)	Entity	22Dec2015	The bank is being merged into Mosoblbank	1
29	2377	Investcapitalbank (OAO)	Entity	28Apr2014	Bank controlled by the Rotenberg brothers	1
30	3175	IS Bank (AO)	Entity	20Jun2017	Russian commercial bank with activities in Crimea	1
31	3360	Krayinvestbank (OAO)	Entity	22Dec2015	A Russian bank, which operates in Crimea	1
32	1751	Mosoblbank PAO	Entity	22Dec2015	Russia's 22d largest bank	1
33	0	Mostotrest (PAO)	Entity		A major Russian construction company engaged in the development of the Kerch Bridg	0
34	2546	Novikombank	Entity	22Dec2015	A subsidiary of Rostec	0
35	1354	RNKB (OAO)	Entity	3Nov2015	Russian National Commercial Bank, operates in Crimea and allegedly controlled by th	1
36	2211	RosEnergoBank	Entity		Russia's 130th largest bank	0
37	3099	Russian Financial Corporation Bank (RFC Bank)	Entity	18Apr2018	Bank owned by Rosoboroneksport, another sanctioned entity	1
38	3368	SMP Bank (OAO)	Entity	28Apr2014	Bank controlled by the Rotenberg brothers	1
39	1317	Sobinbank (OAO)	Entity	28Apr2014	Russian bank wholly owned by Bank Rossiya	1
40	1249	TAATTA Bank (AO)	Entity	20Jun2017	Russian commercial bank with activities in Crimea	1
41	3531	TsMRBank (OOO)	Entity	20Jun2017	Russian commercial bank with activities in Crimea	1
42	1084	Verkhnevolzhsky (PAO)	Entity	22Dec2015	A Russian commercial bank, which operates in Crimea	1
43	3528	Sevastopolsky Morskoy Bank (OAO)	Entity	22Dec2015	Not listed in riskadvisory.com but appeared in treasury.gov	1
44	1093	VVB (PAO)	Entity	20Jun2017	Not listed in riskadvisory.com but appeared in treasury.gov	1

Appendix C Welch test on mean differences at the pre-sanction period

Table C.I: Matching characteristics of banks at the pre-sanction level: Results of the two-sided Welch test

	Non-sanctioned banks		Not yet sanctioned banks		Difference
	N obs	Mean	*N* obs	Mean	
Panel 1: Not yet *debt* sanctioned banks vs. matched banks					
Log of total assets	37	4.2	16	5.6	–1.4**
Equity capital / total assets	37	13.7	16	12.1	1.6
Loans to individuals and firms / total assets	37	51.3	16	48.7	2.6
Deposits of individuals and firms / total assets	37	40.5	16	39.4	1.1
Net income (monthly) / total assets	37	0.10	16	0.04	0.06
Net interest income (monthly) / total assets	37	0.37	16	0.32	0.05
Cash & reserves / total assets	37	5.6	16	4.1	1.5
Non-performing loans / total assets	37	4.1	16	6.6	–2.5
Panel 2: Not yet *asset* sanctioned banks vs. matched banks					
Log of total assets	61	2.3	16	2.3	0.0
Equity capital / total assets	61	16.9	16	18.1	–1.2
Loans to individuals and firms / total assets	61	50.1	16	45.1	5.0
Deposits of individuals and firms / total assets	61	62.5	16	59.9	2.6
Net income (monthly) / total assets	61	0.10	16	0.12	–0.02
Net interest income (monthly) / total assets	61	0.37	16	0.34	0.03
Cash & reserves / total assets	61	8.2	16	9.1	–0.9
Non-performing loans / total assets	61	3.8	16	5.6	–1.8

Note: The table reports the results of the Welch test with unequal variances for comparisons of the mean values in treatment and control groups at the pre-treatment period (two years prior to Macrh 2014). The control group is constructed using the bias-adjusted matching estimator of Abadie and Imbens (2011) with 4 number of matches.

***, **, * indicate that an estimated difference is significant at the 1%, 5%, 10% level, respectively.

Appendix D Informational vs. individual effects of financial sanctions: Different maturity

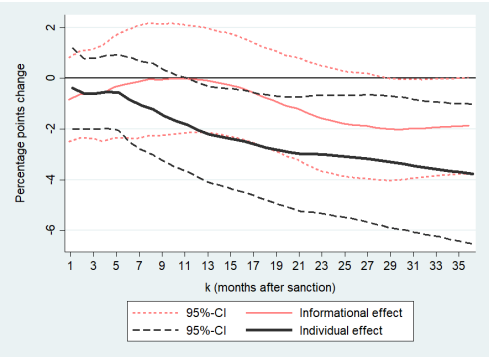
Table D.I: Informational vs. individual effects of sanctions: Different maturity of foreign liabilities

Sanction type:	Debt sanctions			Assets sanctions		
Estimation Window $[-k, k]$	$k = 12$	$k = 24$	$k = 36$	$k = 12$	$k = 24$	$k = 36$
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities with maturity ≥ 3 years, as % of bank total assets						
TREAT×INFO.FIRST	1.050*	1.547*	1.533**	–0.229	–0.575	–0.771*
	(0.621)	(0.865)	(0.736)	(0.354)	(0.387)	(0.426)
TREAT×SANCTION	0.439	1.449	1.085	0.363	0.076	–0.438
	(0.593)	(0.949)	(1.165)	(0.905)	(0.804)	(0.863)
N obs	2,172	3,489	4,646	2,810	4,626	5,899
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.146	0.116	0.110	0.321	0.249	0.200
Panel 2: Dependent variable = Foreign liabilities with maturity $\in [1, 3)$ years, as % of bank total assets						
TREAT×INFO.FIRST	0.714	2.069*	2.512***	0.350	–0.516	–0.840*
	(0.801)	(1.039)	(0.896)	(0.746)	(0.434)	(0.450)
TREAT×SANCTION	–0.877	–1.124	–1.136	–1.491	–0.374	–0.155
	(0.992)	(1.328)	(1.281)	(1.065)	(1.008)	(1.091)
N obs	2,172	3,489	4,646	2,810	4,626	5,899
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.169	0.141	0.145	0.252	0.211	0.162

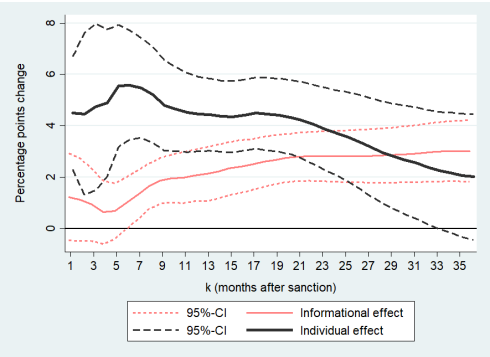
Note: The table reports the DiD estimates of the sanctions effects on foreign assets and liabilities of Russian banks, based on equation (5). Estimation Window is $[-k, k]$ month around the imposition of sanction on the bank "Rossiya" (March 2014) joined with $[-k, k]$ month around the imposition of sanction on a bank j ($j \neq$ bank "Rossiya") from either the debt sanction list or assets sanction list.

***, **, * indicate that a coefficient is significant at the 1%, 5%, 10% level, respectively. Standard errors are clustered at the sanctioned group level and at the level of non-sanctioned banks and appear in the brackets under the estimated coefficients.

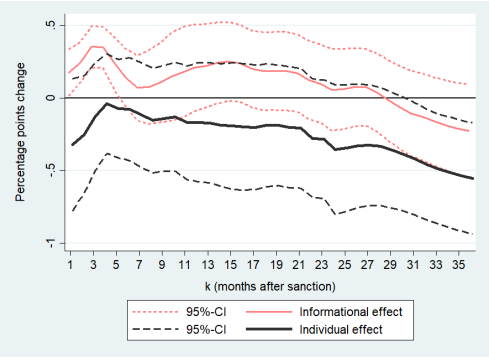
Appendix E The effects of sanctions on other domestic operations of Russian banks



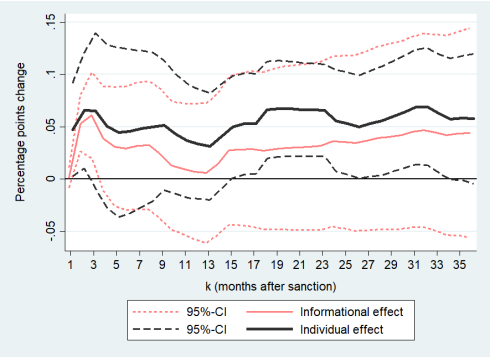
(a) Inter-bank deposits, *type = debt*



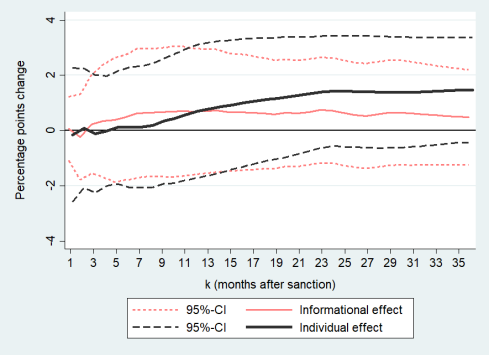
(b) Inter-bank deposits, *type = assets*



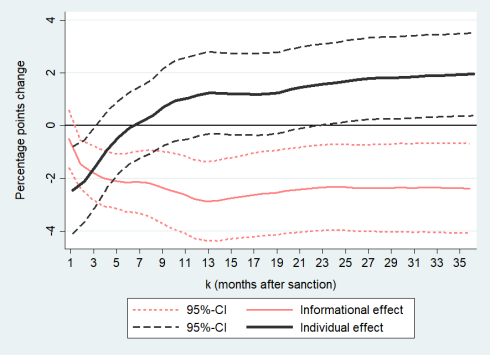
(c) Government deposits, *type = debt*



(d) Government deposits, *type = assets*



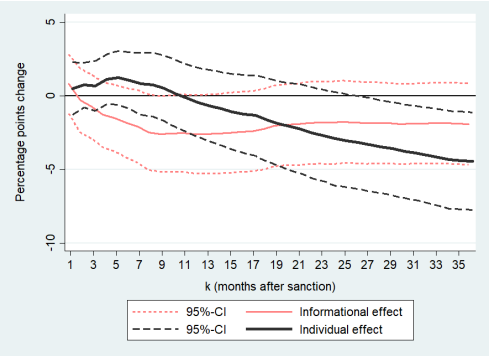
(e) Central Bank deposits, *type = debt*



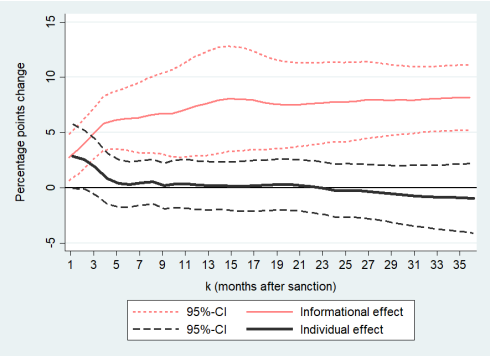
(f) Central Bank, *type = assets*

Note: The figures report the difference-in-differences estimates of the coefficients on $TREAT_i \times SANCTION_{it}$ and $TREAT_i \times INFO.FIRST_t$ in equation (7), with dependent variable FDY_{it} reflecting a bank's funds attracted from either the domestic inter-bank market, from the government or from the Central Bank of Russia (as % of bank total assets). The estimates are obtained by running DiD on expanding window $[-k, k]$, where $k = 1, 2...36$ months after either bank-specific sanction date (individual effects, black lines) or the date of sanctions against the "Bank Rossiya" (informational effects, pale red lines).

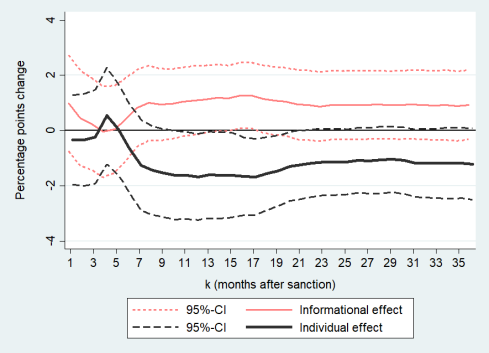
Figure E.I: What happened with other domestic bank liabilities after sanctions? (*by sanction type*)



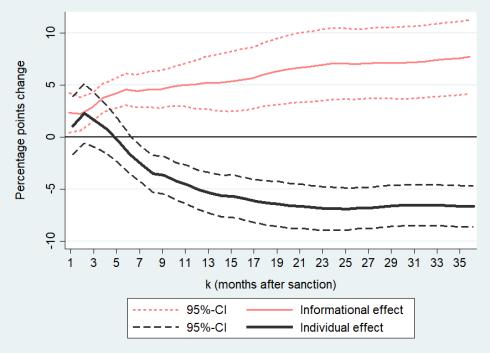
(a) Inter-bank loans, *type = debt*



(b) Inter-bank loans, *type = assets*



(c) Cash and reserves, *type = debt*



(d) Cash and reserves, *type = assets*

Note: The figures report the difference-in-differences estimates of the coefficients on $TREAT_i \times SANCTION_{it}$ and $TREAT_i \times INFO.FIRST_t$ in equation (7), with dependent variable FDY_{it} reflecting either a bank's funds granted to the domestic inter-bank market or a bank's holding of cash and other highly liquid assets (as % of bank total assets). The estimates are obtained by running DiD on expanding window $[-k, k]$, where $k = 1, 2...36$ months after either bank-specific sanction date (individual effects, black lines) or the date of sanctions against the "Bank Rossiya" (informational effects, pale red lines).

Figure E.II: What happened with other domestic bank assets after sanctions? (*by sanction type*)

Appendix F Real effects of financial sanctions: A SVAR-analysis

Methodology. We aggregate the microeconomic effects of sanctions to the macroeconomic level by means of a SVAR model with 5 endogenous variables, namely, output, CPI inflation, risk-free interest rate, composite bank lending rate, and bank loan volumes to the economy, along the lines of Gambetti and Musso (2017). We follow the authors' sign restriction scheme and identify loans supply shock by a set of on-impact restrictions, in which lending rate reacts negatively and loan volumes reacts positively to an expansionary loan supply shock, and output, prices, and risk-free rate adjust upward to the same shock. In order to make sure we deal with loan supply shock, we simultaneously identify three additional shocks — monetary, aggregate demand (AD) and supply (AS).

We make one more step and follow the narrative sign restrictions approach of Antolin-Diaz and Rubio-Ramirez (2018) and specify December 2014 as a period of commonly accepted restrictive monetary policy shock in Russia. During the "black Monday" of December 15, the Central Bank of Russia had raised the key interest rate from 10.5 to 17%, which could trigger loans decline in the economy. We account for this concern.

We then compute impulse responses of all endogenous variables to the identified loan supply shock and, based on that, compute the elasticity of output with respect to loan volumes. This provides us with an output elasticity to credit exactly when a loan supply shock is in place. Sanctions can be viewed as an event underlying negative credit supply shocks.

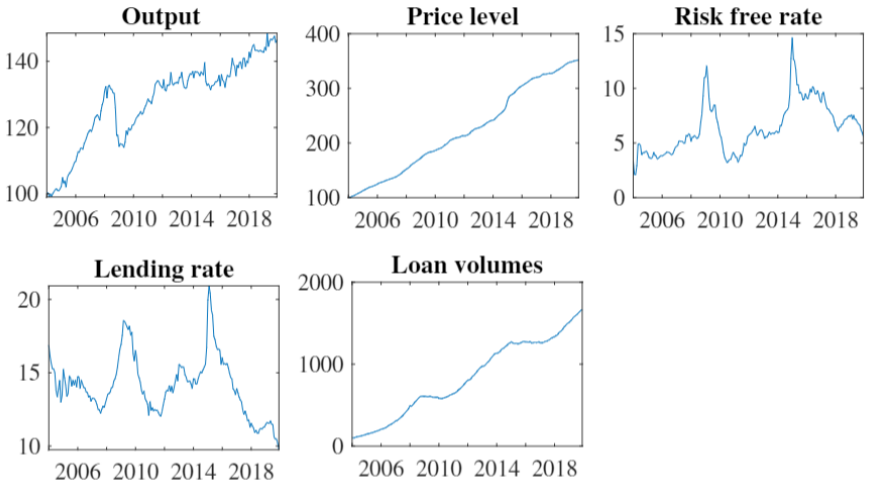
Finally, we apply the estimated elasticity to an aggregated microeconomic estimates of loans decline caused by sanction against banks.

Macroeconomic data for SVAR analysis. In our SVAR model, we use monthly data on output, CPI inflation, risk-free rate, composite lending rate and the volume of loans to households and non-financial firms (see Figure F.I). The data come from the Rosstat and CBR official databases, as discussed in the Introduction.

What can be inferred from the data is that output has grown 1.5 times over the last 15 years, exhibiting strong cyclical features (especially before the global financial crisis of 2007–2009) and clearly slowed down since the recession of 2014–2015. Prices during the same period more than tripled. Loan volumes substantially outpaced the growth of output and prices, having increased by approximately 17 times. This is a typical feature of emerging economies. Risk-free and lending rates vary considerably between 5 to 15% and 10 to 20% per annum, respectively, also exhibiting strong pro-cyclical features.

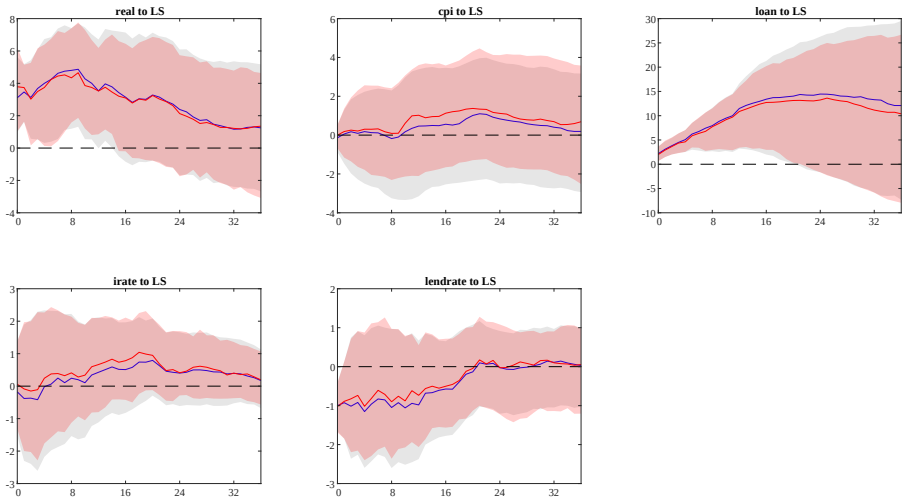
We now briefly introduce the results on the estimated impulse response functions (IRFs).

Impulse response functions. Figure F.II below reports the estimated IRFs to the positive credit supply shock, in which we normalize the lending rate on-impact reaction to –1 percentage points (per annum). What we observe is that output reacts positively (as we defined through the sign restriction scheme) until at least 15th month after the shock, with the on-impact response equaled +3.2 to +3.9 percentage points (under the "SR" and "SR+NSR" schemes, respectively). Loan volumes also react positively until at least 20th month after the shock, so that the on-impact response is +2.1 percentage points (under both schemes). We infer from this two last estimates that the implied on-impact elasticity of output with respect to loan volumes is bounded between 1.52 and 1.86, which is comparable, though larger, with those obtained in Gambetti and Musso (2017) for developed countries.



Note: The figures show the data inputs to our SVAR-analysis, in levels. Base indices are normalized to 100 as of January 2004. Interest rates are in percents. *Output* reflects the index of basic economic activities. *Price level* corresponds to the consumer price index. *Loan volumes* stand for the amount of bank loans outstanding. *Risk free rate* is short term government bond yields, which proxies policy rate. *Lending rate* is a weighted average of the lending rates on loans of different maturities.

Figure F.I: Time evolution of selected real and financial characteristics of the Russian economy



Note: The figures present the estimated impulse response functions (IRFs) to identified credit supply (CS) shocks in the 5-variables SVAR with either one or two sign restriction schemes imposed. The first one (SR) follows the sign restriction scheme used to identify credit supply shocks in Gambetti and Musso (2017). The second one (NSR), the narrative sign restrictions, as introduced by Antolin-Diaz and Rubio-Ramirez (2018), implies considering December 2014 as a period of negative (restrictive) monetary policy shock in the Russian economy. The blue line indicates the case in which only SR is considered. The red line represents the case in which both SR and NSR are in place. The confidence bands are defined as the range bounded by the 16^{th} and 84^{th} percentiles of distribution constructed from the successful draws from the posterior. X-axis shows the months after the CS shock. IRFs are normalized so that the lending rate react by –1 percentage point on impact. Finally, the IRFs for output, CPI, and loan volumes are cumulative, i.e. represent the effects of shocks on the sum of one-month log-differences from period -1 to t, i.e. $log(y_t) - log(y_{-1})$.

Figure F.II: Impulse response functions to the identified credit supply shock (CS)

Appendix G Informational vs. individual effects of financial sanctions: robustness checks

Table G.I: Informational vs. individual effects of sanctions: The three alternatives for difference-in-differences design

Sanction type:	Debt sanctions			Assets sanctions		
Alternatives	1 (baseline)	2	3	1 (baseline)	2	3
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities, as % of bank total assets						
TREAT×INFO.FIRST	3.535***	4.061***	3.188**	–1.051	–1.519	0.398
	(1.232)	(1.128)	(1.256)	(1.177)	(0.968)	(1.271)
TREAT×SANCTION	–0.549	–0.817	–0.860	–3.097***	–2.771***	–4.168***
	(1.182)	(1.149)	(1.213)	(1.119)	(0.967)	(0.981)
N obs	3,246	2,657	4,503	4,376	3,511	5,452
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.363	0.317	0.345	0.277	0.296	0.229
Panel 2: Dependent variable = Foreign assets, as % of bank total assets						
TREAT×INFO.FIRST	0.052	–0.370	–0.717	–0.561	–0.248	–0.693
	(1.151)	(1.173)	(1.129)	(0.911)	(0.729)	(0.880)
TREAT×SANCTION	–0.792	–0.426	0.970	–3.672**	–4.266***	–1.873*
	(1.076)	(0.987)	(1.293)	(1.659)	(1.330)	(0.956)
N obs	3,246	2,657	4,503	4,376	3,511	5,452
N treated / control banks	16 / 39	16 / 39	16 / 39	17 / 59	17 / 59	17 / 59
R^2_{within}	0.180	0.155	0.231	0.157	0.116	0.105

Note: The table reports the DiD estimates of the sanctions effects on foreign assets and liabilities of Russian banks, based on equation (5). Estimation Window is either (i) $[-k, k]$ month around the imposition of sanction on the bank "Rossiya" (March 2014) joined with $[-k, k]$ month around the imposition of sanction on a bank j ($j \neq$ bank "Rossiya") from either the debt sanction list or assets sanction list (*alternative = 1*), (ii) $[-24, 24]$ month around the imposition of sanction on the bank "Rossiya" (March 2014) (*alternative = 2*), or (iii) [*March* 2012, *June* 2019] (*alternative = 3*). Sanctioned and non-sanctioned bank groups are matched within 1 year prior to March 2014. Bank FEs, month FEs, and the full set of bank-specific controls are included but not reported.

***, **, * indicate that a coefficient is significant at the 1%, 5%, 10% level, respectively. Standard errors are clustered at the sanctioned group level and at the level of non-sanctioned banks and appear in the brackets under the estimated coefficients.

Appendix H Informational vs. individual effects of financial sanctions: pooling sanctions types

Table H.I: Informational vs. individual effects of sanctions: Difference-in-differences estimates on a pooled sample of debt and assets sanctions

Sanction type:	Debt + assets sanctions		
Estimation Window $[-k, k]$	$k = 12$	$k = 24$	$k = 36$
	(1)	(2)	(3)
Panel 1: Dependent variable = Foreign liabilities, as % of bank total assets			
TREAT×INFO.FIRST	0.018	0.650	1.360
	(0.603)	(0.870)	(0.991)
TREAT×SANCTION	–1.571*	–1.049	–1.881*
	(0.933)	(0.918)	(0.952)
Bank FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes
Bank control variables	Yes	Yes	Yes
N obs	4,523	7,622	10,142
N treated / control banks	33 / 97	33 / 97	33 / 97
R^2_{within}	0.260	0.262	0.271
Panel 2: Dependent variable = Foreign assets, as % of bank total assets			
TREAT×INFO.FIRST	–0.432	–0.531	–0.778
	(0.740)	(0.676)	(0.659)
TREAT×SANCTION	–2.962**	–1.883**	–1.767**
	(1.236)	(0.899)	(0.777)
Bank FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes
Bank control variables	Yes	Yes	Yes
N obs	4,523	7,622	10,142
N treated / control banks	33 / 97	33 / 97	33 / 97
R^2_{within}	0.156	0.122	0.124

Note: The table reports the DiD estimates of the sanctions effects on foreign assets and liabilities of Russian banks, based on equation (5). Estimation Window is $[-k, k]$ month around the imposition of sanction on the bank "Rossiya" (March 2014) joined with $[-k, k]$ month around the imposition of sanction on a bank j ($j \neq$ bank "Rossiya") from either the debt sanction list or assets sanction list. Sanctioned and non-sanctioned bank groups are matched within 1 year prior to March 2014.

***, **, * indicate that a coefficient is significant at the 1%, 5%, 10% level, respectively. Standard errors are clustered at the sanctioned group level and at the level of non-sanctioned banks and appear in the brackets under the estimated coefficients.

Appendix I Primary effects of sanctions based on alternative matching procedure

Table I.I: Debt vs. assets sanctions: informational and direct effects on foreign assets and liabilities

Estimation Window $[-k, k]$	$k = 12$				$k = 24$			
Dependent variable	Foreign liabilities		Foreign assets		Foreign liabilities		Foreign assets	
Sanction type	Debt	Assets	Debt	Assets	Debt	Assets	Debt	Assets
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TREAT×INFO.FIRST	2.206***	2.537***	–0.576	–4.428***	0.113	–0.580	–2.233***	–3.882***
	(0.779)	(0.741)	(1.029)	(1.327)	(0.668)	(0.620)	(0.614)	(1.083)
TREAT×SANCTION	–0.974	–3.149***	–1.987**	–2.044***	–0.438	–1.474***	–1.645**	–1.999*
	(0.629)	(0.351)	(0.758)	(0.685)	(0.940)	(0.451)	(0.694)	(1.182)
N obs	1,306	1,773	1,306	1,773	2,500	3,292	2,500	3,292
N treated / control banks	32 / 95	32 / 95	32 / 95	32 / 95	32 / 95	32 / 95	32 / 95	32 / 95
R^2_{within}	0.285	0.095	0.204	0.224	0.304	0.071	0.186	0.111

Note: The table runs DiD regressions for the debt- and for the asset-sanctioned banks and their respective matches where matches are obtained using the alternative matching procedure (i.e., we match around *individual* date of sanctions, not around March 2014). All estimated regressions contain the full and identical set of bank-specific control variables, bank FEs and month FEs (not reported to preserve space).

***, **, * indicate that a coefficient is significant at the 1%, 5%, 10% level, respectively. Standard errors are clustered at the sanctioned group level and at the level of non-sanctioned banks and appear in the brackets under the estimated coefficients.

The estimation results provide a mixed evidence regarding the existence of heterogeneity in the effects of sanctions on debt- vs. asset-sanctioned banks.

First, consider foreign liabilities and individual effects of sanctions. The estimates indicate that respective coefficients for debt-sanctioned banks are insignificant in both short- and long run, whereas those for the asset-sanctioned banks are always negative and statistically significant at least at 5%. This evidence clearly supports the H3 "*heterogeneous sanction effects*" hypothesis in case of individual effects of international restrictions. If we then analyze the informational component estimates, we will observe that, in the short run, both debt- and asset-sanctioned banks tend to increase their international borrowings ("borrow-while-possible", as we already discussed it before), and standard tests show that respective coefficients (significant at 1%) are statistically the same. In longer horizons, at $k = 24$ both effects become statistically insignificant, thus implying that the informational effects of sanctions could have attenuated in a two years horizon. At $k = 36$ the estimates imply marginally significant effects, but we suppose it could reflect the treated banks' adjustments rather than the effect of sanctions, and thus we do not interpret these lasts portion of estimates. Regarding the informational effect of sanctions, we therefore have no support for the H3 hypothesis.

Second, consider now foreign assets and individual effects of sanctions. The estimates suggest that both debt- and asset-sanctioned banks were homogeneously decreasing their foreign assets in short- and long-run periods in response to the international restrictions imposed against them. Respective coefficients are all but one negative and significant at least at 5%. This is not supportive of the H4 hypothesis thus. If we then consider the estimates of informational effects, we will observe that, in the short run, the coefficient for debt-

sanctioned banks is insignificant whereas for the asset-sanctioned banks it is negative and highly significant. Thus, the informational effect of sanctions on the foreign assets holding of Russian financial organizations was mainly channeled through the (not yet treated) asset-sanctioned banks, at least in the short run. This evidence supports the H3 hypothesis. In the long run, the estimates suggest that the informational effects of sanctions on foreign assets were negative and significant for both (not yet treated) debt- and asset-sanctioned banks, thus not supporting the H3 hypothesis.

Overall, our estimates suggest that the international operations of debt- and asset-sanctioned banks could differently react to sanctions, but it depends on the horizon used for estimates.

Appendix J Placebo for the alternative estimates of the primary effects of sanctions

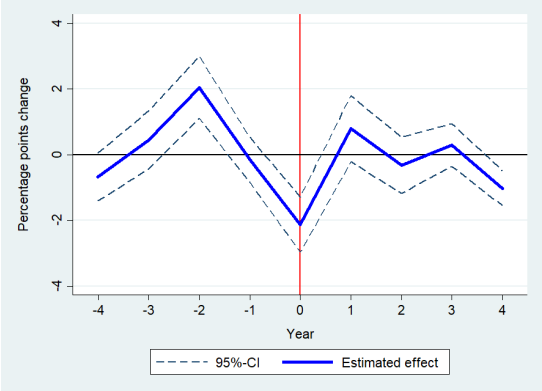
We perform a placebo exercise in which we artificially move back each individual sanction date by 1, 2, 3, and 4 years before the sanction date took place. To fully mimic the time structure of sanction imposition and account for the informational effect of sanctions, in each of the four cases we also move back the sanction date of the first bank punished by sanctions, i.e., the "Bank Rossiya". In each of the four cases, we run the difference-in-differences regression, as implied by equation (7) but with time indices adjusted according to our current exercise. In addition, we make a symmetric counterfactual exercise by moving the sanction dates forward by the same 1, 2, 3, and 4 years, again accounting for the information effects. Finally, we plot the estimated coefficients on $TREAT_i \times SANCTION_{it}$ in Figure J.II below. The upper panel reports the placebo estimates for the whole sample of sanctions banks, the middle panel does it for debt- and the lower panel for asset-sanctioned banks. We set $k = 12$ in all placebo regressions.

The placebo estimation results indicate that we can interpret the *direct* effects of sanctions on foreign assets and liabilities as causal only in case of asset-sanctioned banks, whereas for debt-sanctioned banks the previously obtained relationships may be just correlations. However, the story is much more complicated than it looks from the first sight. Specifically, consider now the debt-sanctioned banks in greater detail, and recall we are measuring the individual effects, not informational. Our placebo results indicate that these banks could had started (i) to increase their international borrowings two years prior their own sanctions arrive and (ii) to sell their international assets one year prior to sanctions. Recall also that the average distance between the imposition of sanctions on the "Bank Rossiya" and on other banks equals 21 months. It almost covers the two years period at which the just discussed suspicious positive placebo coefficient on foreign liabilities was obtained, and it fully covers the one year period at which the just discussed suspicious coefficient on foreign assets was revealed. Given the body of our empirical results from the main text, we think these placebo results for debt-sanctioned banks are not suspicious but most likely are an another indication of the "borrow-while-permitted" and "sell-while-possible" logic. Overall, we still cannot claim the coefficients at point 0 (i.e., the baseline estimates) reflect causality, but it is no doubt that they are in line with the general results of this paper.

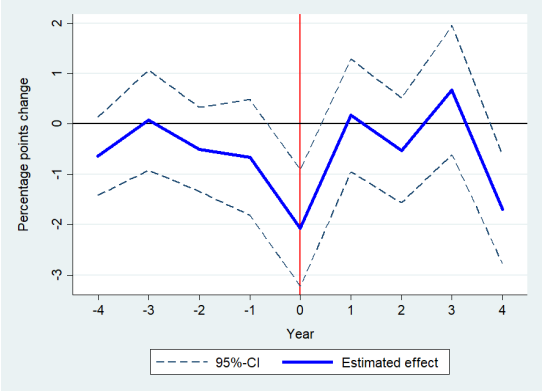
Further, consider now asset-sanctioned banks. In this case, for both foreign assets and foreign liabilities our placebo results imply insignificant coefficients at 4, 3, 2, and 1 years prior to the imposition of individual sanctions, thus suggesting that the negative and significant coefficients at point 0 (i.e., the baseline estimates) may indeed be causal.

On average (i.e., without separation on sanction types), the foreign liabilities regressions still indicates that positive effect could have taken place 2 years prior to the sanctions (the reflection of "borrow-while-permitted"), whereas for the foreign assets regressions no such effects detected and all estimates prior point 0 are insignificant.

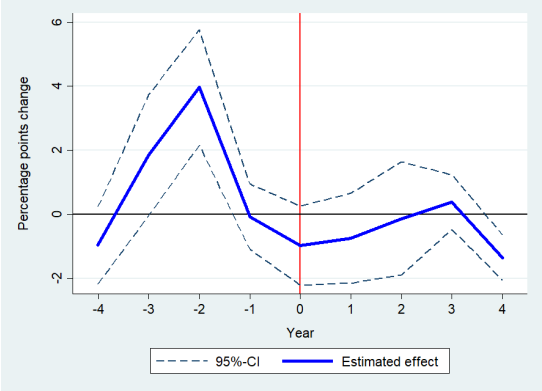
(a) Foreign liabilities, *on average*



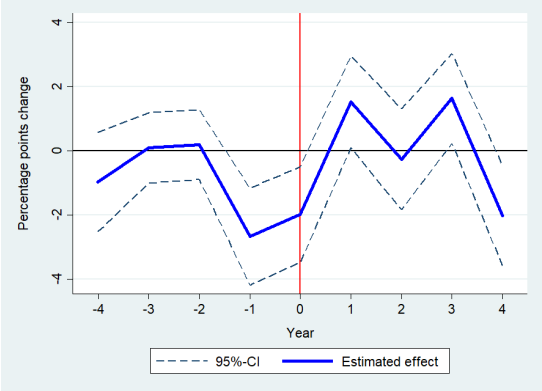
(b) Foreign assets, *on average*



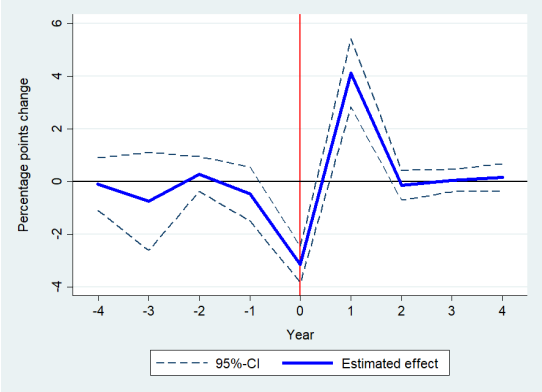
(c) Foreign liabilities, *type = debt*



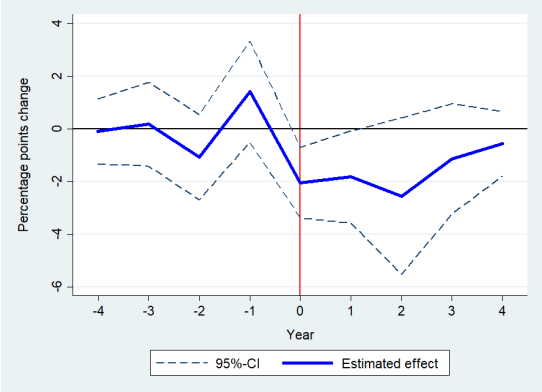
(d) Foreign assets, *type = debt*



(e) Foreign liabilities, *type = assets*



(f) Foreign assets, *type = assets*



Note: The figures report the placebo difference-in-differences estimates of the coefficient on $TREAT_i \times SANCTION_{it}$, as implied by equation (7) but with properly adjusted time indices.

Table J.II: Placebo estimates of the individual effect of sanctions on foreign assets and liabilities, *on average and by sanction type*