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"Crime and Punishment"? How Banks Anticipate and Propagate Global Financial Sanctions*

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Abstract

We study the impacts of global financial sanctions on banks and their corporate borrowers in Russia. Financial sanctions were imposed consecutively between 2014 and 2019, allowing targeted (but not-yet-sanctioned) banks to adapt their international and domestic exposures in advance. Using a staggered difference-in-differences approach with in-advance adaptation to anticipated treatment, we establish that targeted banks immediately reduced their foreign assets and actually *increased* their international borrowings after the first sanction announcement compared to other similar banks. We reveal that the added value of the next sanction announcements was rather limited. Despite considerable outflow of domestic private deposits, the government support prevented disorderly bank failures and resulted in *credit reshuffling*: the banks contracted corporate lending by 4% of GDP and increased household lending by almost the same magnitude, which mostly offset the total economic loss. Further, we introduce a two-stage *treatment diffusion* approach that flexibly addresses potential spillovers of the sanctions to private banks with political connections. Employing unique hand-collected board membership and bank location data, our approach shows that throughout this period, politically-connected banks were not all equally recognized as potential sanction targets. Finally, using syndicated loan data, we establish that the real negative effects of sanctions materialized only when sanctioned firms were borrowing from sanctioned banks. When borrowing from unsanctioned banks, sanctioned firms even gained in terms of employment and investment but still lost in terms of market sales pointing to a misallocation of government support. (JEL: F51, G41, H81, L25.)

Keywords: Staggered policy implementation, Anticipation effects, Treatment diffusion, Banks, International positions, Politically-connected firms, Capital misallocation.

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1 Introduction

Politics affects the banking sector in many ways (Calomiris and Haber, 2014; Delis et al., 2020). For example, governments in various countries direct commercial bank lending to specific sectors (Cole, 2009) or firms (Khwaja and Mian, 2005; Claessens et al., 2008), stimulate lending to small and medium-sized enterprises and local politicians (Koetter and Popov, 2020) and manipulate regulators' decisions on bank closures (Brown and Dinc, 2005; Kang et al., 2015). During the recent COVID-19 pandemic, many governments created emergency loan guarantee schemes that were covering and spurring their banks' lending (Aizenman et al., 2022; Jimenez et al., 2022). In this paper, we turn to another recent and striking episode of political impact, i.e., the global financial sanctions on Russian banks and firms with close ties to their domestic government that commenced in 2014 and were sequentially imposed over a five-year period.[1]

Indeed, following the annexation of the Crimean peninsula by the Russian Federation in early 2014, the US and many other Western countries began imposing sanctions on major banks and non-financial firms linked to the Kremlin to curtail their international operations (Besedes et al., 2017; Ahn and Ludema, 2020; Crozet et al., 2021). A very important but thus far neglected 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 were phased-in over at least half a decade from 2014 to 2019, with different types of restrictive measures being *sequentially* imposed on various entities from the list.

This staggered implementation 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 (because they are also politically connected) and may thus anticipate being sanctioned in the near future. The point is that such targeted banks have time to adapt their international operations before the actual sanctions materialize, and they may indeed want to do so in advance in a fear of asset freezes and to escape fire sales (Shleifer and Vishny, 2011) once the sanctions arrive.[2] Therefore, the use of even the staggered difference-in-differences approach (Baker et al., 2022) to gauge the effects of sanctions may end up in too

[1] We are not able to formally explore the unprecedented sanctions against the Russian banks that were imposed in 2022 in response to Russia's war against Ukraine because the Central Bank of Russia had closed otherwise publicly available access to banks' balance sheet information. Interested readers are referred to Berner et al. (2022) and Cipriani et al. (2023) who deliver a comprehensive summary of these (and other) sanctions. Some preliminary estimates for the early war period are performed by Drott et al. (2022) who study the effects of banning Russian banks from SWIFT using daily transaction data from Bundesbank covering inter-bank deals between Russian and German banks.

[2] In the data section, we present many case studies documenting that different state-connected banks immediately started to adjust their international borrowings, including the issuance of Eurobonds, and foreign asset holdings after observing Crimea's annexation and the very first sanction announcement but before they themselves faced the international restrictions from the West.

conservative, downward-biased estimates due to ignored in-advance adaptations by not-yet-sanctioned banks. What makes the story even more interesting is that the domestic creditors of the targeted banks may also anticipate sanctions being imposed and, having observed the effect of the sanctions on already-sanctioned banks, these creditors may run on not-yet-sanctioned banks. The potentially targeted banks thus have to take such a run into account. Effectively, these possible runs can enlarge the total impact of sanctions without any intention from the side of sanctioning countries. In these circumstances, we may naturally expect that the domestic government will step in to provide financial support to both already- and not-yet-sanctioned banks. These attempts, by contrast, can reduce the overall effect of sanctions.[3]

Henceforth, we refer to the immediate effects of sanctions on already-sanctioned banks as *direct* effects, and we call the in-advance adaptations of the potentially targeted but not-yet-sanctioned banks to anticipated sanctions *informational* effects. We thus ask how potent the informational effects are, compared to the direct effects, and what is the added value of the next sanction announcements conditional on the very first one. We then explore the potential of *treatment diffusion*: we ask whether the news on sanctions can force in-advance adaptation of not only targeted banks from the list but also those banks that are formally private (and thus non-targeted) but have various connections to the government. Finally, we ask how the sanctions propagate from the targeted banks to the balance sheets of borrowing firms which themselves can be sanctioned or not. Put differently, we are interested in what are the real effects of already-imposed and anticipated financial sanctions and how these depend on the government connections of the borrowing firms.

To identify sanctioned banks, we appeal to the official press releases of the US Office of Foreign Asset Control (OFAC) of the Department of the Treasury on the reasons and types of sanctions being imposed on particular entities. We also use the website of Risk Advisory (a leading global risk management consultancy) which provides an aggregated list of sanctioned banks, by sanction types and jurisdictions. From these two sources, one can infer that there are two major types of sanctions, i.e., those affecting only debt and those restricting both debt and assets. The former represents restrictions mainly on the placement of new debt in international markets, whereas the latter imposes restrictions on both new debt and foreign assets holdings of treated banks. Henceforth, for convenience, we label these two types of sanctions as "*debt*" and "*assets*" sanctions, respectively.[4]

By the end of the 2010s, the debt sanctions were imposed on 20 financial entities, including

[3] Nigmatulina (2022) shows that the *government-support channel* was active in the case of non-financial firms in Russia that were targeted by the sanctions. However, the support pouring through this channel led to capital misallocation. In the case of targeted banks, it is not clear *a-priori* whether the banks direct their support from the government to increase lending to sanctioned or non-sanctioned firms or to households, which face a much lower risk of being sanctioned, if any.

[4] According to the US Department of the Treasury, debt sanctions are called "*sectoral*" (SSI) while assets sanctions are titled "*entity*" (or blocking, SDN), see details in Section 2.1.

all state-owned banks (historically the largest banks in Russia, Bircan and De Haas, 2019) and their affiliates. The assets sanctions, in turn, were introduced against 24 other politically influenced financial corporations (either owned by major oligarchs or operating in annexed Crimea). The difference in the size of the two sanctioned groups of banks is remarkable: on the eve of sanctions, the debt-sanctioned banks held a 50% share in the banking system's total assets while asset-sanctioned banks possessed less than 2%. In our analysis, we distinguish the direct and informational effects of debt and asset sanctions to measure the "price of being" either a state- or oligarch-owned financial firm in Russia.

To further reveal the political connections of banks, we create a novel database that contains manually collected *personal-level* data on each member of the board of directors and owners for every state-controlled bank and private bank in Russia. We extract this information from several sources, starting from the nationwide media source banki.ru which provides detailed information on the ownership and management structure of each bank operating in Russia in early 2020 (end of the sample period).[5] We then write a textual code that retrieves the CVs of a given bank's owners and directors from the Web to trace their political connections.[6] Our bank manager-owner database is annual and covers the period from 2013 to 2020.

Using detailed monthly balance sheets of Russian banks and applying an event-study approach, we begin by establishing that in response to the first sanction announcement in March 2014, targeted (but not yet *debt*-sanctioned) Russian banks increased, rather than decreased, their international borrowings over their total liabilities by 2.1 pp in a two-year horizon.[7] As a control group, we use similar never-sanctioned banks with no recognized political connections.[8] Against this background, the banks reduced their international assets over their total assets by 2.3 pp in response to the same first sanction announcement, on average and all else being equal. In contrast, during the same period, the targeted (but not yet *asset*-sanctioned) Russian banks decreased, as one would expect, their international borrowings by 2.4 pp of their total liabilities and likewise reduced their international assets by 2.4 pp of their total assets (all estimates are significant at 1%). These are the main estimates of *the in-advance adaptation effects* in an anticipation of upcoming sanctions.[9]

To explore *the added value effects of the next sanction announcements*, we suggest separating the

[5] We appeal to web-scrapping techniques to recover the content of banki.ru for previous years.

[6] We discuss all the necessary details in Section 4.

[7] This effect is equivalent to 1% of Russia's GDP and is thus large. Clearly, this is an unintended effect of the staggered implementation of sanctions. In Section 3.3.1, we provide a broad discussion on the supply- and demand-side factors behind this striking and unintended effect of sanctions.

[8] We employ the nearest-neighborhood matching estimator of Abadie and Imbens (2011) to construct the control group of banks in the period of 2012–2013, and we fix the composition of the control group throughout our analysis.

[9] We also investigate how these average effects vary across Russia and reveal that they tend to diminish with a distance between a targeted bank's headquarter and Moscow, i.e., the center of political decision-making (the banks located near the Kremlin could have informational advantages over the banks in more distant cities in Russia). However, we also find that this diminishing effect does not work for those banks located in (even remote) oil-extracting regions.

first and all the other such announcements to jointly estimate the informational and direct effects of sanctions in one staggered difference-in-differences equation. Using the same bank balance sheets at the monthly frequency as before, we find that (already) debt-sanctioned banks switched from increasing to significantly reducing their international liabilities, almost offsetting the previous rise, compared to the control group of banks. We also reveal that they did not, however, continue selling their foreign assets in response to the realized sanctions, which means that the banks could have fully adapted to the sanctions in advance. In turn, our estimates indicate that the (already) asset-sanctioned banks continued to significantly shrink their international borrowings, by up to 5 pp of their total liabilities in a three-year horizon, which largely exceeds the corresponding in-advance adaptation effect. However, we find that these banks actually slowed down the reduction of their foreign assets after the sanctions were realized. The estimated rebound in their foreign asset holdings could have reached up to +2.3 pp, compared to the control group. The latter finding implies that the banks could have been too pessimistic regarding the upcoming sanctions and could oversell their foreign asset holdings before being actually asset-sanctioned. We argue that if one would ignore the informational effects and estimate only the direct effects of sanctions, all the estimated effects would be misleadingly lower and mostly insignificant.

Having quantified the sanction-induced changes in the targeted banks' international operations, we then estimate the effects of sanctions on banks' *domestic* liabilities and assets. We show that not yet debt-sanctioned banks encountered a –2 pp outflow of private deposits during the two years after the first sanction announcement (large information effect). All targeted banks faced additional depositors' withdrawals once the sanctions had been imposed—up to –3 and –8 pp of the debt- and asset-sanctioned banks' total liabilities, during the three years after sanction announcements. The government then stepped in and, as our estimates reveal, fully supported the targeted banks, thus preventing their disorderly failure. This *government-support channel* made it possible for the targeted banks to avoid shrinking the overall size of their assets. Accordingly, we establish a *credit reshuffling effect*: the targeted banks reduced the credit to firms by an equivalent of 4.0% of GDP but they raised the credit to households by 4.1% of GDP.[10] The reduction of corporate credit possibly reflects the anticipation of sanctions against Russian firms, which are more likely to appear in the Western governments' sanctions list than Russian households. The unintended effect of the sanction-driven

[10]We aggregate the difference-in-differences (DID) estimates of the informational and direct effects of sanctions using a structural vector autoregressive (SVAR) model of the Russian economy. 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 in international markets. Overall, our micro-level analysis delivers DID estimates of credit reduction caused by sanctions and our SVAR analysis then tracks its aggregated effect in terms of the reduction in GDP.

expansion of private loans (mostly mortgages) is positive for households and may be responsible for improving their perception of the Kremlin's policies during the 2010s (Simonov and Rao, 2022).

We further address the issue of treatment diffusion from targeted (i.e., state) banks to non-targeted (i.e., private) banks after the first sanction announcement. The treatment diffusion is likely to arise in our setting because as our analysis of banks' political connections shows, there are roughly 40 private banks with ties to the Russian government that remained unrecognized by Western countries. We introduce a two-stage treatment diffusion approach to understand how close was the behavior of non-targeted banks to those targeted by the sanctions. The first stage runs a loop of logit regressions at the monthly frequency and delivers the subjectively perceived probabilities of being sanctioned by each bank in the sample in the next few months depending on the share of state-connected persons in the board of managers or owners. The second stage enlarges the treatment group from the baseline analysis with politically-connected private banks whose predicted probabilities of being sanctioned exceeds a convenient threshold.[11] Our baseline estimates of the informational effects of the first sanction announcement become predictably lower when estimated with the two-stage treatment diffusion approach (by 46% on average), but survive statistically.

Finally, using DealScan's syndicated loan data and the borrowing firms' balance sheets at the annual frequency, we quantify *the real effects* of sanctions on the Russian economy.[12] At the loan level, we show that not-yet-sanctioned banks reduced the supply of credit to non-sanctioned firms by 20% and to not-yet-sanctioned firms by 92% (an almost complete stop) within three years of the first sanction announcement in March 2014. Given the loan supply reductions, our further difference-in-differences estimates at the firm-year level indicate that the not-yet-sanctioned firms that had relationships with not-yet-sanctioned banks experienced an average 44% decline in their real characteristics (employment, investment, sales, and others), as cumulatively over 2014–2017. The not-yet-sanctioned firms that *did not* have relationships with not-yet-sanctioned banks enjoyed, by contrast, rising employment and investment by an average of 41%, but their market sales declined by 16%. Though we do not test them directly, we attribute these findings to the government-support channel, through which it is possible to support employment and investment but not to force consumers and other firms to buy the output of sanctioned firms.

Our analysis of banks' adaptation to sanctions delivers several contributions to the literature. First, a substantial number of empirical studies in various fields of economics and finance evaluate the effects of staggered reforms by comparing early and late-treated entities with each other and with

[11] As such, we set the unconditional probability of being sanctioned in the full sample, i.e., 2%.

[12] Though the number of loans in the DealScan database for Russia is relatively small—roughly 310 loans in a window of 2011–2017 centered around the first sanction announcement—it covers roughly 30% of the total amount of the banking system's loans to firms in Russia.

never-treated entities (Baker et al., 2022; Goodman-Bacon, 2021; Sun and Abraham, 2021; Callaway and Sant'Anna, 2021; de Chaisemartin and D'Haultfoeuille, 2020). Our results, however, clearly show that a bulk of the effect may come from an in-advance adaptation of not-yet-treated entities that share similar features with those (at least one) already treated. In-advance adaptation occurs due to anticipation of the treatment in the near future after the first policy announcement.[13] When we account for the in-advance adaptation after the first sanction announcement, the immediate effects of the 'reform' (sanctions, in our case) become much less significant, both statistically and economically. This means that previous studies may have over-estimated the immediate effects of reforms in their settings. A close study in this respect is D'Acunto et al. (2019) which shows that there is a significant peer-punishment effect on unpunished entities. However, in their setting, there is no staggered reform, and the 'unpunished' are not supposed to be on the list of potentially punished entities unless they break a particular rule (wrongdoing in loan guarantees to related parties). In our setting, not-yet-treated entities should be sanctioned anyway—not because they are doing something wrong, but just because they are connected with the (wrongdoing) government.

Second, a growing theoretical literature in econometrics addresses the issue of fuzzy treatment in quasi-experimental designs and claims that a great body of empirical research published in top-ranked journals neglects this issue (de Chaisemartin and D'Haultfoeuille, 2017). We contribute to this field by suggesting a two-stage treatment diffusion approach that identifies those entities (private banks, in our case) that formally should not be treated (i.e., sanctioned), but that behave as though they are expecting the treatment. By measuring political connections at the personal level and showing that this matters for the final outcome of treatment, we contribute to the literature on the value of political connections (Fisman, 2001; Brown and Dinc, 2005; Khwaja and Mian, 2005; Faccio, 2006; Koetter and Popov, 2020). We believe our two-stage approach can be applied in different settings such as tax evasion (Slemrod, 2007; Artavanis et al., 2016) and peer effects in schooling (Duflo et al., 2011), where spillovers from treated to (a part of) control objects are possible (Leung, 2020).

Third, a growing strand of the literature studies the economic effects of sanctions, not only in Russia (Ahn and Ludema, 2020; Crozet and Hinz, 2020; Nigmatulina, 2022; Keerati, 2022; Mamonov and Pestova, 2022) but in other sanctioned countries (Laudati and Pesaran, 2021; Felbermayr et al., 2020; Etkes and Zimring, 2015; Levy, 1999), and for the sanctioning countries themselves (Belin and

[13]There are two related strands of the literature in this case. The first explores the adaptive behavior of economic agents in the presence of regulatory uncertainty. Gissler et al. (2016) show that US banks were reducing mortgage lending between 2011 and 2013 when the regulator (CFPB) was discussing the necessity to raise the debt-to-income cut-off rule to adapt to the forthcoming regulation in advance. The second strand investigates the role of information in the economy and how agents adapt to news (Jaimovich and Rebelo, 2009; Blanchard et al., 2013, among others). By showing that targeted banks adjusted their operations in advance, i.e., after the first sanction announcement but before being actually sanctioned, we provide empirical evidence of the forward-looking behavior of economic agents in anticipation of sanctions.

Hanousek, 2021; Crozet et al., 2021; Efing et al., 2023). While the majority of existing research deals with trade sanctions and delivers analyses at the firm level, we show how the financial sanctions work: how they affect banks and how they propagate from the banks to their borrowers in the real sector of the economy. We establish not only the in-advance adaptation effects of the sanctions on not-yet-treated banks, but also the credit reshuffling effect, the diffusion of treatment on formally private banks with political connections, and the real effects of the financial sanctions against banks on borrowing firms' performance. For example, Ahn and Ludema (2020) show that trade sanctions caused a 33% slump in employment and a 25% reduction of operating revenue of sanctioned non-financial firms in Russia (compared to similar non-sanctioned peers after 2014). Our results, in turn, highlight one of the channels through which these effects could materialize—binding borrowing constraints for firms due to credit reshuffling. In addition to the work of Nigmatulina (2022), who establishes the government-support channel at the level of sanctioned firms in Russia, our results provide evidence of the efficacy of this channel at the bank level. In our case, the channel operates through both directed government deposits and the Central Bank of Russia's loans pouring into the liability side of the targeted banks' balance sheets to substitute for losses in international borrowings and domestic household deposits after runs on the banks. Differently from Keerati (2022) who reasonably claims that "*the short interval between the initial move by the Kremlin to annex Crimea and the first round of sanctions by the United States offered little room for anticipatory reaction by Russian firms*," our event-study analysis delivers clear evidence on strong anticipation effects *after* the first sanction announcement in March 2014 and during the next two years.

Fourth, we add to the literature on market discipline by providing novel evidence on the nature of information vs. panic-based deposit withdrawals (Martinez Peria and Schmukler, 2001; Iyer and Puri, 2012; Karas et al., 2013; He and Manela, 2016, among others). We show that private depositors may begin to punish banks not because of their weak performance or myopic herding behavior, caused by negative news on some other banks in the system, but for their connection to the (wrongdoing) government.

From the policy perspective, our estimates imply that if the imposition of sanctions were not phased-in, the negative effect on Russia could have been much larger (than what we observed), which would be economically inefficient for a country with long-lasting recessions and high dependence on foreign financing. For Western countries, our results indicate that even despite the sequential imposition, the sanctions still had significant effects. The staggered implementation of the global sanction policy and the lack of the threat of secondary sanctions on the international partners of Russian banks and firms allowed for in-advance adaptation by not-yet-sanctioned banks and an opportunity

for sanction evasion, which led to an overall small impact of sanctions on Russia in the 2010s.

The remainder of this paper is structured as follows. Section 2 introduces the main stylized facts on the financial sanctions and targeted banks in Russia. Section 3 presents the main estimation results on the actually sanctioned banks, including the in-advance adaptation effects. Section 4 then enlarges the main results with an analysis of the treatment diffusion to formally private banks with political connections. Section 5 reports estimates of the real effects of the financial sanctions on borrowing firms. Section 6 concludes.

2 Banks and sanctions: stylized facts

2.1 U.S. OFAC and the targets of the financial sanctions across Russia

Differently from the apartheid-related sanctions on South Africa back in the 1980s (Levy, 1999) or more recent cases of Iran in 2006/2012 (Laudati and Pesaran, 2021) or Gaza in the late 2000s (Etkes and Zimring, 2015), in 2014 the West had decided to pursue the strategy of "targeted" sanctions instead of a full embargo on Russia in response to the annexation of Crimea (Ahn and Ludema, 2020).

The US Office of Foreign Assets Control (OFAC) administers economic sanctions, including those against Russia, and specifies the two sanction lists: Specially Designated Nationals (SDN) and Sectoral Sanctions Identifications (SSI). SDN implies the complete prohibition of economic relationships with certain individuals and their businesses, whereas SSI targets specific activities to be forbidden. In mid-2014, OFAC issued four directives shaping the SSI-prohibited activities.[14] We focus here only on the Directive 1 which explicitly targets the financial sector. Specifically, 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.*"

Focusing on the financial sector, the targeted sanctions of the 2010s were prohibiting state-owned or -controlled banks and non-financial firms in Russia from either placing new longer-term debts in Western financial markets (*debt* sanctions under the SSI list) or from any operations with the West, including buying stocks and equities, granting loans to foreign banks, firms, or individuals (*asset* sanctions, SDN).[15] Though not explicitly stated, the borderline between applying a debt- (less

[14] All the technical details, including an overview of the sanctions policy, all the directives, and executive orders, can be found on the website of the US Department of the Treasury, see https://home.treasury.gov/policy-issues/financial-sanctions/sanctions-programs-and-country-information/ukraine-russia-related-sanctions. See also a special alert by ReedSmith devoted to sanctions at https://www.reedsmith.com/en/perspectives/2014/10/overview-of-the-us-and-eu-sanctions-on-russia.

[15] In contrast to the unprecedented 2022 sanctions on Russia for its full-blown war in Ukraine, the sanctions in the 2010s did not prohibit the targeted entities from, e.g., operations in foreign currencies domestically. There was no intention to impose oil and gas embargo/tariffs and take Russian banks off the SWIFT system. The Central Bank of Russia was not under the threat of its international assets being frozen. Because at the moment of writing, there is no bank-level information available for the analysis, we leave this new episode of sanctions for future research.

restrictive) or asset- (more restrictive) sanction lies in whether a targeted bank or firm operates in annexed Crimea and/or is owned or governed by persons the West deems to be responsible for the war in the east of Ukraine, or other offensive activities.[16]

With this information, we are ready to form the treatment group for our analysis. We collect the dates of sanction announcements, types of sanctions, and all other relevant bank-level information from the official OFAC website.[17] The resultant list of debt- and asset-sanctioned banks consists of 44 financial institutions (see Appendix A). 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 Central Bank of Russia's database.

Further, among the 24 banks in the asset sublist, we have (i) 12 banks operating in the Crimean peninsula, (ii) at least 2 banks controlled by the Rotenberg family (a rich oligarch family), and (iii) 10 banks controlled by either local governments or other state-owned entities. Within these 24 banks, we exclude 4 banks because the sanctions were eventually repealed for 2 of them and the other 2 did not disclose their balance sheets. In total, we have 36 banks in the treatment group for our empirical analysis.

The 44 banks targeted by the sanctions are distributed throughout Russia, with their headquarters being located in 9 (of more than 80) regions across Russia and 2 annexed regions within the Crimean peninsula (Figure 1.(a)). Notably, some of these headquarters are located in those regions that are characterized by the largest oil extraction intensities (e.g., Tyumen region, located 2.1 thousand km to the East of Moscow) while the headquarters of the largest targeted banks are located either in Moscow or Saint-Petersburg (0.7 thousand km to the North from Moscow), i.e., the regions that both have zero oil extraction intensities (Figure 1.(b)). We will use this fact as a source of heterogeneity in our empirical design below when exploring the effects of targeted banks' in-advance adaptation to upcoming sanctions.

[16]For example, *Rossiya Bank*, a large privately-held bank owned by one of the richest oligarch families in Russia, the Kovalchiyk family, had operations in Crimea and was also known as "Putin's wallet" for its close ties to the Kremlin (see OFAC's press release on https://home.treasury.gov/news/press-releases/jl23331). Conversely, Sberbank, state-owned and the largest bank in Russia in terms of assets, did not operate in the occupied territories and was not governed by those who could direct the bank's funds to finance the Kremlin's foreign policy (see OFAC's press release on https://home.treasury.gov/news/press-releases/jl2629). Consequently, *Rossiya Bank* encountered asset sanctions while Sberbank faced only debt sanctions.

[17]In addition, we cross check the resultant list of sanctioned banks by other sources: specifically, we retrieve the lists of debt- and asset-sanctioned banks from the website of the international consulting company "Risk Advisory." https://www.riskadvisory.com/sanctions/russia-sanctions-list/.

(a) Size of total assets and location of the targeted banks

(b) Oil extraction intensities

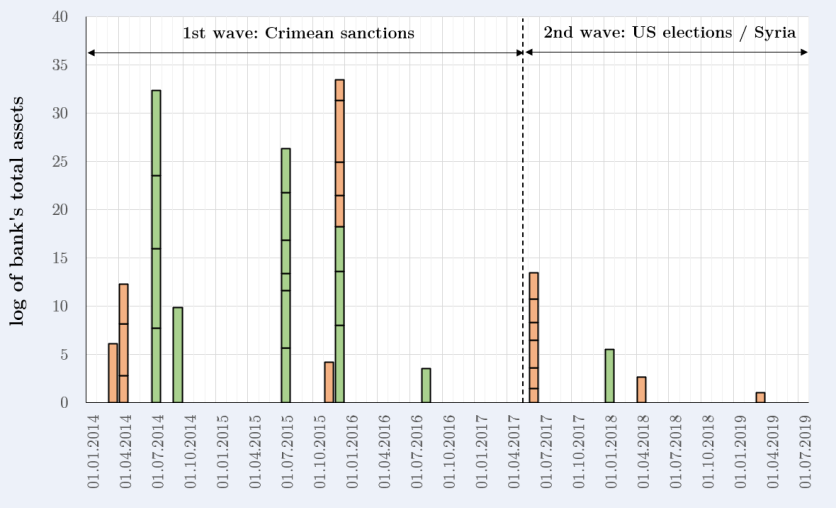
Note: Subfigure (*a*) reports the locations of headquarters of the 44 banks targeted by either debt or asset sanctions and the size of these banks' total assets (in billion Rubles, as of January 2014 on the eve of the first sanctions). Subfigure (*b*) reports regions' oil extraction intensities, as measured by thousand tons per year (in 2007).

Figure 1: Location of the headquarters of the targeted banks and regions' oil extraction intensities across Russia and annexed Crimea

2.2 Timing of the financial sanctions

The 44 targeted banks did not face debt- or asset-type financial sanctions all at once, but sequentially between 2014 and 2019. Within this five-year period, there were 12 sanctions announcements covering these banks: the first 8 announcements during the so-called 'first wave' of sanctions related to Crimea, and the last 4 in the 'second wave' punishing for Russia's support of the dictatorship regime in Syria and electoral interference in the 2016 U.S. presidential elections. As Figure 2 reveals, the major state-owned or connected banks were sanctioned in the first wave in 2014–2015, whereas the second

wave mostly dealt with the subsidiaries of these banks, which are much smaller in size. However, Sberbank—the largest bank in the system—was sanctioned only half a year after the first sanction announcement and some other large banks were sanctioned only in 2015, creating soil for in-advance adaptation of not-yet-treated banks to upcoming sanctions.



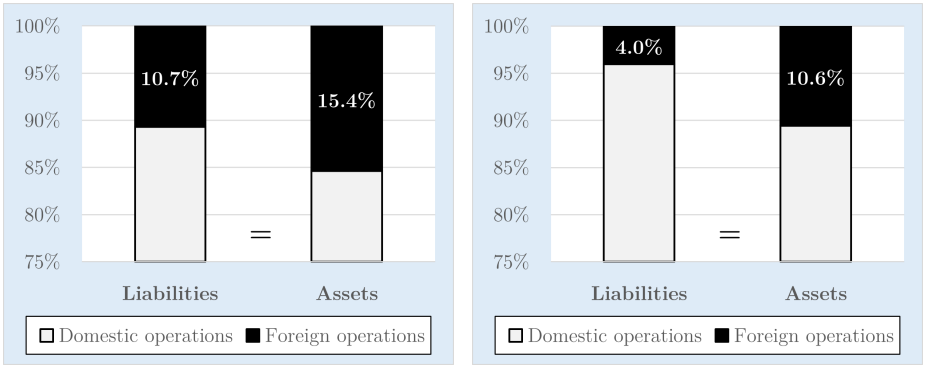
Note: The figure depicts the timeline of the sanction announcements and differences in the size of the targeted banks, as proxied with the log of banks' total assets. There were 12 announcements by the US OFAC/EU between 2014 and 2019. For each announcement, the figure plots a bar that stacks the sizes of each of the targeted banks covered by the announcement at the respective date: *pale red* depicts debt-type sanctions and *pale green* reflects asset-type sanctions. For example, the first sanction announcement in March 2014 affected only one bank, whereas the sanction announcement in December 2015 restricted 7 banks from the list. The sanctions are divided into two waves: the first responds to Russia's annexation of Crimea and the second to Russia's interference in the U.S. presidential elections, cyberattacks and support of the dictatorship in Syria.

Figure 2: Timing of financial sanctions and size of targeted banks

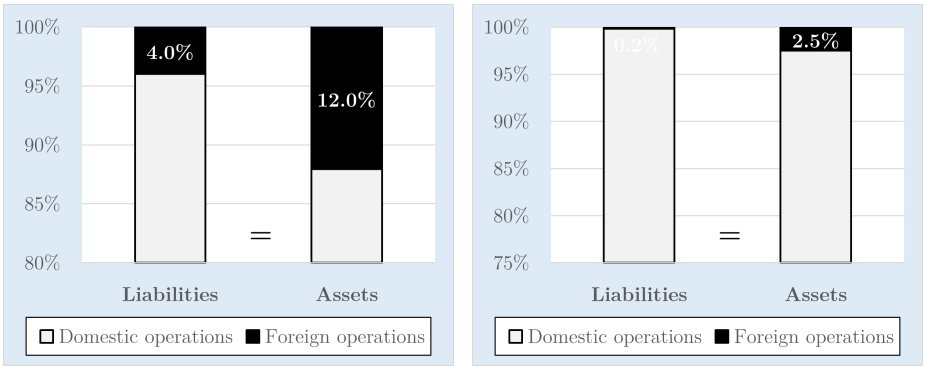
2.3 Aggregated balance sheet of the sanctioned banks

We now illustrate how the aggregated balance sheets of the banks targeted by debt or asset sanctions changed over the (first) five years of the sanction policy. Figure 3.(a) shows that on the eve of the sanctions in January 2014, the 16 (not yet) debt-sanctioned banks relied intensively on international borrowings and held a sizeable portion of their assets abroad: foreign liabilities constituted 11% of their total liabilities and foreign assets equaled 15% of their total assets. As Figure 3.(b) shows, five years later, i.e., in January 2019 when all major targeted banks had already been debt-sanctioned, these numbers dropped to 4% and 11%, respectively. The stock of foreign borrowings had therefore been reduced by much more than the stock of foreign assets, as the OFAC's design of debt sanctions assumes. However, during these five years, the Russian economy encountered a world oil price collapse (in 2014) and entered a local recession (in 2015). A formal analysis is thus needed to isolate the effects of sanctions.

As for the 20 asset-sanctioned banks, Figure 3.(c) shows that they were not very dependent on



(a) Before the *debt* sanctions (b) Five years after the *debt* sanctions



(c) Before the *asset* sanctions (d) Five years after the *asset* sanctions

Note: The figure compares the states of the aggregated balance sheet of banks targeted by debt sanctions (*a, b*) or asset sanctions (*c,d*) in January 2014, i.e., on the eve of the first sanction announcement, and January 2019, five years after the bulk of sanctions had already been imposed. The debt-sanctioned group consists of 16 major state-owned and controlled banks and their subsidiaries across Russia. The asset-sanctioned group comprises 20 state-connected banks either owned by oligarch families with close ties to the Kremlin or operating in the annexed Crimea, or both.

Figure 3: Foreign asset holdings and international borrowings of the targeted banks: before and after the financial sanctions

borrowings abroad even before the sanctions (4% share of their total liabilities) while they were investing intensively in foreign assets (12% share). However, as Figure 3.(d) illustrates, five years later, the asset-sanctioned banks had nearly 0% share of foreign liabilities and only a 2.5% share of foreign assets. Differently from the debt-sanctioned banks, the stock of foreign assets in this case had been reduced by much more than the stock of foreign liabilities, as the design of the OFAC's asset sanctions implies.

Note that even five years after the first sanctions had been imposed, the contributions of foreign operations to the sanctioned banks' aggregated balance sheets were still far from zero. This is because the banks were diversifying their international borrowings and foreign asset holdings geographically across the Western and Eastern parts of the world. Unfortunately, the balance sheet data does not contain this geographical information, and we thus have to keep in mind this limitation in our analysis. Any effect of the sanctions on foreign operations that we will find with this data will likely reflect a mix of the 'true' effect on the Western operations and 'confounding' effect on the Eastern operations

that may or may not be reduced, depending on whether the Eastern partners of the Russian targeted banks fear the secondary sanctions from the West (Efing et al., 2023) and whether and how much their political preferences aligned with the Russian government (Kempf et al., 2022).[18]

Full schedules of the time evolution of the targeted banks' foreign operations are reported in Figure B.I.(a) and Figure B.I.(b) for the debt- and asset-sanctioned banks, respectively (See Appendix B). At the group level, we can already clearly observe changing time trends around the imposition of the first sanction in March 2014 in almost all types of foreign operations. This evidence is in line with an in-advance adaptation of not-yet-sanctioned banks to the upcoming sanctions.

2.4 Case-studies: In-advance adaptation to sanctions?

Figure 4 plots the time evolution of international borrowings and foreign assets of selected banks that ended up either under debt or asset sanctions. For illustration purposes, we select the two largest and/or most interesting cases of banks from each debt- and asset-sanctioned group and investigate their behavior around the imposition of sanctions on the *Rossiya Bank* (vertical *red line*) and/or around the period they themselves faced sanctions (vertical *blue line*).[19] From the debt list we take Sberbank and GazPromBank (which, jointly with VTB (not shown), constitute the top-3 in terms of size); from the asset list—the *Rossiya Bank* itself and one more bank operating in the Crimean Peninsula.

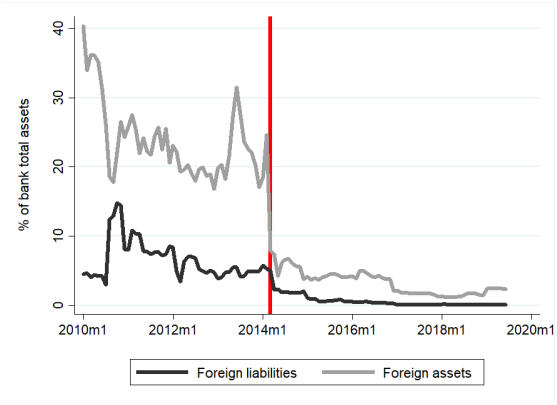
(Not yet) Asset-sanctioned banks. Assets sanctions imposed on the *Rossiya Bank* in March 2014 had an immediate negative effect: the bank dramatically decreased its foreign assets, by 17 pp of total assets (from 25 to 8%) within just one month, and reduced its foreign liabilities, by about 3 pp of total liabilities (from 5 to 2%, Figure 4.(a)). Until 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 potent, effects of the first sanction announcement on its target.[20] Strikingly, the RNCB bank, one of the two other selected asset-sanctioned banks, had also decreased its foreign assets dramatically right after the news on the *Rossiya Bank*—by about 15 pp of total assets, from 17% to 2% within two months of March 2014

[18] The strictly positive international operations of sanctioned banks in the presence of geographical diversification may indicate sanction evasion through third parties. This is consistent with the story of the German banks that evaded sanctions through their subsidiaries in 11 sanctioned countries over the last 20 years (Efing et al., 2023).

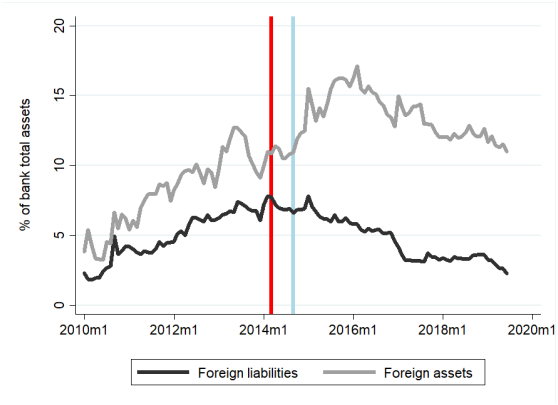
[19] Respective figures for the other sanctioned banks are available from the authors upon request.

[20] Before the sanctions, the *Rossiya Bank* had intensive international operations borrowing funds from financial markets and especially granting loans to foreign banks and foreign non-financial firms and investing in financial instruments. All these became minor after the sanctions in the long run. Another implication of sanctions is that Visa and Mastercard had blocked all credit/debit card operations of the bank's customers. The bank had lost its ability to carry out transactions in foreign currency. However, the Kremlin had fully, and even over-, compensated these restrictions to the bank by increasing direct injections of government deposits to the bank's balance sheet. The Kremlin had also replaced the "Alfa-bank" (the largest private bank in Russia, inside the top-10 banks in terms of assets, never facing sanctions before 2022) with the *Rossiya Bank* as an operator of the wholesale energy market in the country (with annual turnover equaled about 1.5% of GDP).

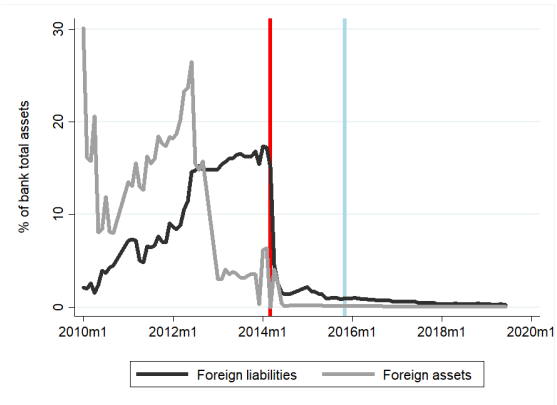
Assets sanctions | **Debt sanctions**



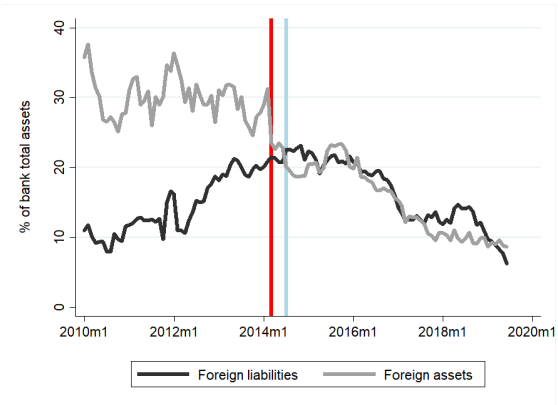
(a) The *Rossiya Bank* (*the first bank under sanctions*)



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



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



(d) Gazprombank (top-3, state-controlled)

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

Figure 4: Selected largest Russian banks: Time evolution of foreign assets and liabilities before and after sanctions

(Figure 4.(c)). But the sanctions against RNCB were only imposed 20 months later, in December 2015. Similarly, RNCB turned to reduce its foreign liabilities well before December 2015—to near zero level.

(Not yet) Debt-sanctioned banks. As the raw data shows, before sanctions on the *Rossiya Bank* in March 2014, Sberbank was steadily increasing its international borrowings (Figure 4.(b)). However, between March and September 2014, when it encountered sanctions, this trend stalled, and soon after September 2014, it began to decline. Notably, the peak level over the whole of 2010s was reached exactly in March 2014—about 7% in terms of total liabilities. By the end of the sample period, this figure fell to no more than 2.5%. Regarding Sberbank's foreign assets, we observe a largely positive

trend that lasted from at least the beginning of the 2010s, i.e., long before the first sanctions in March 2014, until the beginning of 2016, i.e., more than a year after September 2014. Clearly, by design, debt sanctions do not target foreign assets. Finally, we observe that Gazprombank turned to decrease its foreign assets and foreign liabilities twice—first, after the news on the *Rossiya Bank* on March 2014, and second, after it faced sanctions in July 2014 (Figure 4.(d)).

Overall, these cases favor our view that not-yet-sanctioned banks turned to an in-advance adaptation of their international operations after the first sanction announcement. And we observe the same patterns for the other (not yet) sanctioned banks not described here for the sake of space.

Complementary evidence from the Eurobonds data. To partly overcome the drawback of the balance sheet data and zoom in on the targeted banks' foreign operations, we appeal to the https://cbonds.com/ data on bond issuance by Russian banks across the world. From this data, we learn that Russia's Big-4 state-owned banks (Sberbank, VTB, Gazprombank, and the Russian Agricultural Bank) successfully placed eight Eurobond issues between the end of February to July 2014, i.e., the period after Crimea's annexation but before they were actually sanctioned. The banks borrowed 7.3 billion US Dollars at 4.4% (Table 1). Importantly, during the previous five months and during the analogous five months one year before they borrowed only 3.4 and 4.1 billion US Dollars, respectively, at 4.4% and 4.2%. Put differently, the banks borrowed two times more in 2014 but paid the same price as before 2014. It is thus clear that the banks were adapting their international liabilities in advance, i.e., until the opportunity window of cheaper borrowing is closed by the highly likely sanctions, while international investors were still ready to lend.[21] Note also that never-sanctioned banks that were active in international financial markets substantially reduced their demand for foreign borrowings through Eurobonds at the same time. As opposed to not-yet-sanctioned banks, nothing threatened these banks, and they were likely to simply follow the contracted aggregate demand caused by the world oil price collapse and a recession in the Russian economy.

3 The effects of sanctions on actually treated banks

3.1 Bank-level data

We use domestic sources of 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 to the beginning of 2022. Specifically, we cull bank balance sheet information from the so-called Forms 101 and 102, respectively. We do not rely on international sources of bank-level data, i.e., the former Bureau Van

[21] It has been already established in the literature that for the entities from emerging market economies, like Russia, it is cheaper to borrow abroad than borrow domestically due to rising interest rate differentials (Bruno and Shin, 2017).

Table 1: Eurobonds issuance by Russia's targeted and non-targeted banks around Crimea's annexation

	not-yet-sanctioned banks		Never-sanctioned banks	
	Amount, bn USD	Interest rate, %	Amount, bn USD	Interest rate, %
After the Crimea's annexation: Feb.2014 to Jul.2014	7.3	4.4%	0.2	10.2%
Before the Crimea's annexation:				
— Oct.2013 to Feb.2014	3.4	4.4%	2.8	9.4%
— Feb.2013 to Jul.2013	3.4	4.4%	2.8	9.4%

Note: According to the cbonds.com data, the Big-4 state-owned banks—Sberbank, VTB, Gazprombank, and the Russian Agricultural Bank—issued 8 Eurobonds between the end of February to July 2014, i.e., the period after Crimea's annexation and before they were actually sanctioned (*not-yet-sanctioned banks*). As a comparison group, we consider all other banks—privately-held financial institutions—that issued Eurobonds within the same period (*Never sanctioned banks*).

Dijk's Bankscope and current Orbis database, because the domestic data we have access to covers almost all banks over the past two decades and is published in both monthly and quarterly formats.[22] Table C.I in Appendix C reports descriptive statistics on the key bank operations that we explore in this paper in a breakdown by sanction type–debt (SSI), asset (SDN), and unsanctioned—and by the origin of the operations—domestic or foreign.

3.2 Matching: Constructing the control group of never-sanctioned banks

3.2.1 *Methodology of matching*

When the first sanction was imposed in March 2014 the Russian banking system comprised 956 banks. During the next five years, only 44 of them were sanctioned. Approximately 40 banks had state connections but had not been recognized by the West (see details in Section 4). This leaves us with nearly 850 banks as potential candidates to enter the control group for our empirical analysis. However, the sanctioned banks are predominantly very large entities whereas the potential candidates are mostly very small—in both the overall size of their total assets and in their cross-border operations. To overcome this issue we first note that if we simply divide all 850 potential candidates into large and small using a convenient threshold, e.g., a $200th$ position in the ranking of banks by their total assets, then the subsample of large banks will be much more comparable to the sanctioned banks than the subsample of small banks, at least in terms of cross-border operations (see respectively Figures B.II.(a) and B.II.(b) in Appendix B and note how they compare to Figure B.I). This implies that we can find appropriate *matches* for our sanctioned banks among the 200 largest never-sanctioned and not-state-connected banks (that is, truly private banks, either domestic or foreign).

[22]Our paper is not the first to exploit 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.

Given the staggered implementation of sanctions, there are at least two ways to construct the matched sample of banks in our case: by finding matches on the pre-treatment period around the first date when sanctions materialized (March 2014) and by matching around each individual date of sanctions during 2014–2019. We argue that being owned or controlled by the government is exogenous to the date of sanctions only prior to the first sanction announcement—as, after March 2014, not-yet-treated banks could start anticipating sanctions against them because of their ties to the Kremlin, whereas domestic private and foreign-owned banks knew they were likely immune to sanctions. If a state-connected bank anticipates sanctions it may adapt in advance, and thus matching it with truly private banks around the individual date of sanctions rather than on the pre-March 2014 period is subject to a behavioral bias and is likely to end up violating the parallel trend assumption. We, therefore, want to ensure that we find matches only during the pre-March 2014 period when neither state nor private banks in the system could have known about the threat of sanctions.

Importantly, recent literature on staggered difference-in-differences design compares treated objects with not only never-treated ones but also, depending on the date of treatment, 'early-treated' and 'later-treated' counterparts (the so-called 'problematic' $\mathbf{2} \times \mathbf{2}$s, see Goodman-Bacon, 2021; Baker et al., 2022, among others).[23] We argue that if in-advance adaptation works, then there is little sense, if any, in considering 'later-treated' banks as controls for 'early-treated' banks *before* the later treatment arrives—both are likely to behave similarly to each other after the earlier treatment hits (this eliminates one of the two 'problematic' $\mathbf{2} \times \mathbf{2}$s). However, we further argue that if there is any added value in each next sanction announcement, then this added value can be properly captured by exactly considering 'early-treated' banks as controls for the 'later-treated' banks *after* the later treatment is set (the second 'problematic' $\mathbf{2} \times \mathbf{2}$s). Yet, we also argue that this added value can be easily evaluated as a difference between the two effects: the effect of later sanction announcements with respect to never-sanctioned banks and the effect of earlier sanction announcements with respect to *the same* never-sanctioned banks. This implies that we can use the most simple control group—the (large) never-sanctioned, not state-connected banks—and escape unnecessary difficulties that arise from considering either 'later-sanctioned' or 'early-sanctioned' banks as controls to one another. We elaborate more on this issue in Section 3.5 where we formally introduce our version of the staggered difference-in-differences equation.

With these arguments at hand, let us now formalize our chosen approach to bank matching. Suppose that index b reflects a bank from the treatment group $\mathfrak{A}$ with the sanction date t_b, where $b = 1...S$ $(S = 44)$ and $t_b \in [2014, 2019]$. Here, t_1 denotes March 2014, i.e., the first sanction date.

[23] The first 'problematic' $\mathbf{2} \times \mathbf{2}$ considers 'later-treated' objects as controls for 'early-treated' objects *before* the later treatment is imposed. The second 'problematic' $\mathbf{2} \times \mathbf{2}$, in turn, considers 'early-treated' objects as controls for 'later-treated' objects *after* the later treatment is imposed.

For each b we need to find n matches among presumably large never-sanctioned, not state-connected banks $\mathfrak{B}$ at the common pre-treatment period $[t_1 - k, t_1)$, where $n = 1, 2...n^*$ and $k = 1, 2...k^*$. For choosing n^*, we follow the rule of thumb of Abadie and Imbens (2011) and set $n^* = 4$ in our baseline estimations.[24] 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.[25] We also check more narrow and more wide windows to capture the peak effects and reveal when the effects die out. We index matching banks with $j^{(n)}$, where $j = 1, 2...S \times n^*$.

We apply the bias-adjusted near-neighbor matching estimator of Abadie and Imbens (2011) to find matches to sanctioned banks during the pre-treatment period. Following Gropp et al. (2018), we employ the following bank-specific observables $\mathbf{X}_{b,t}$ in the matching procedure: bank size (measured by the log 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 of interest-bearing and other assets. In addition, we include a non-performing loans ratio and cash and other reserves holdings (also as % of bank total assets) to control for (ex-post) 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 shock exposures between different blocks of banks. By a block, we mean a sanctioned bank b with its n_b^* matches. Including time fixed effects is especially important in this light because we have time-varying periods of treatment imposition (Goodman-Bacon, 2021).

Having run a 1:4 matching estimator, we obtain the matched control banks $\widetilde{\mathfrak{B}} \subset \mathfrak{B}$ and apply the Welch test on mean differences between the control and the not-yet-treated banks for each covariate on the pre-treatment period $[t_1 - k, t_1)$. Having ensured that the two groups are comparable before the first sanction announcement, we construct a binary indicator, which we use further in our DID framework to test the informational effect of sanctions:

$$SANCTION_b = \begin{cases} 1 \quad \text{in} \quad [t_1 - k, t_1 + k] \ , & \text{if } b \in \mathfrak{A} \\ 0 \quad \text{in} \quad [t_1 - k, t_1 + k] \ , & \text{if } b \in \widetilde{\mathfrak{B}} \\ ., & \text{if else or } t \notin [t_1 - k, t_1 + k] \end{cases} \tag{1}$$

[24] 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. (2018) follow the same rule of thumb when constructing a matched sample of banks for their analysis.

[25] We repeated the matching exercise with 12 and 36 months as pre-treatment periods before March 2014. All our results remained qualitatively, and even quantitatively, very similar.

where $[t_1 - k, t_1 + k]$ is a squeezed estimation window for our DID regressions (see below).

3.2.2 *Matching estimation results*

The Welch test results appear in Table 2. First, we note that the number of actually matched banks is less than the 1:4 matching procedure implied. This is because of repetitions: the same bank $b \in \widetilde{\mathfrak{B}}$ can be a match for more than one not-yet-treated bank $b \in \mathfrak{A}$. Second, the table indicates 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 before March 2014). Third, 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 includes Sberbank, which is the largest bank in the system and is disproportionately larger than the other banks. It is therefore not possible to fully match the sizes of debt-sanctioned and non-sanctioned banks.

Table 2: Matching characteristics of banks at the pre-sanction level: Results of the two-sided Welch test

	Never-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 during the pre-treatment period (two years prior to March 2014). The control group is constructed using the bias-adjusted matching estimator of Abadie and Imbens (2011) with four matches.

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

3.3 In-advance adaptation to sanctions: How large, and when peaks?

The central question of our study is whether not-yet-treated banks adapted their international operations in advance. We begin exploring the in-advance adaptation phenomenon with an event-study approach at a monthly frequency. This allows us to (*i*) analyze whether there were confounding events during the pre-treatment period before March 2014 or not and (*ii*) reveal the peak magnitudes of the underlying in-advance adaptation effects and establish their timing.

3.3.1 *Event-study approach and estimation results*

Consider the following equation:

$$Y_{b,t} = \alpha_b + \sum_{k=-24,\, k\neq 0}^{k=24} \beta_k \cdot \Big(SANCTION_b \times \mathbf{1}_{\{t=k\}} \Big) + \sum_{k=-24,\, k\neq 0}^{k=24} \gamma_k \cdot \mathbf{1}_{\{t=k\}} + \psi' \mathbf{X}_{b,t} + \varepsilon_{b,t} \qquad (2)$$

where $Y_{b,t}$ is the stock of either international borrowings or foreign assets, as % of total assets, of bank b at month $t \in [t_1 - 24, t_1 + 24]$. α_b is a bank's b fixed effect. $\mathbf{1}_{\{t=k\}}$ is a month t indicator variable. γ_k is a month k fixed effect that captures common macroeconomic shocks for all banks, e.g., declining oil prices and endogenous monetary tightening in the respective months of 2014. $\mathbf{X}_{b,t}$ are bank-specific variables aimed at eliminating any remaining differences between not-yet-treated and control banks in terms of market power, government support, and the role played at the domestic inter-bank market (net lender or net borrower).[26] However, the results survive if we drop $\mathbf{X}_{b,t}$. $\varepsilon_{b,t}$ is the regression error.

We run Equation (2) separately for debt-sanctioned banks (with their matches) and for asset-sanctioned banks (with their respective matches) to account for the differences in the design of sanctions. To address the concern of serial correlation (Bertrand et al., 2004), we cluster standard errors at the level of sanctioned banks, thus allowing for correlation across these banks. We also experiment with clustering within the two sanction types (debt vs. assets), thus allowing correlation within each of the types.

We can formalize the first portion of our hypotheses as follows:

Hypothesis H1 "*No anticipation of punishment before the crime*": $\beta_k = 0$ for $k < 0$, i.e., there is no (statistical) difference between the to-be-treated banks and their control peers in terms of

[26] Clearly, (not yet) debt-sanctioned banks contain the largest banks in the system, which possess (and likely exploit) the most *market power*. We control for that by including (effective) interest rates, as proxied by the ratios of (*i*) interest expenses on private deposits in total private deposits and (*ii*) interest income on loans to households and non-financial firms over respective loans. *Government support* is also important, and we will investigate this issue in greater detail in Section 3.6.1, because, after the first sanction announcement (or even before) the Russian government could start injecting its supportive funds to the liability side of (not yet) sanctioned banks in the forms of direct deposits from the government or loans from the Central Bank of Russia. Such support likely affects the targeted banks' (*i*) willingness to search for substitution of Western foreign borrowings on Eastern financial markets and (*ii*) ability to invest in foreign assets in Eastern jurisdictions to substitute for Western assets. Also *domestic inter-bank market* matters for similar reasons. It is possible that the largest targeted banks obtain disproportionately more government funds and then re-distribute them to other banks using domestic facilities.

international operations before the Annexation of Crimea.

Hypothesis H2 "*Anticipating a punishment after the crime*": $\beta_k \neq 0$ for $k > 0$, i.e., having observed the very first sanction announcement not-yet-treated banks update their subjectively perceived probability of being sanctioned and begin to adapt their international operations, as compared to their matched control banks, in advance of the next sanction announcements.

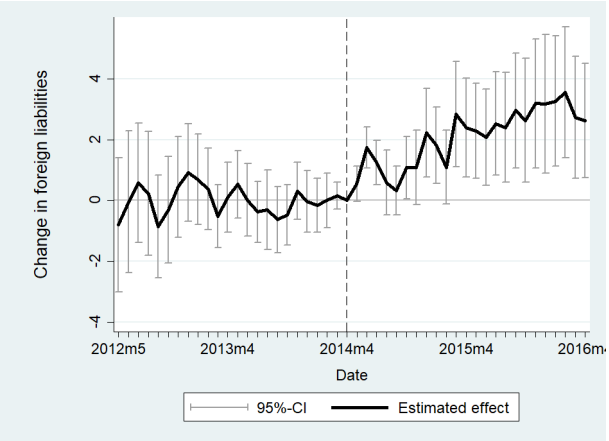
Hypothesis H3 "*Heterogeneous in-advance adaptation*": $\beta^{DS}_{k>0} \neq \beta^{AS}_{k>0}$, i.e., the banks that anticipate debt sanctions (DS) may adapt their international operations differently from the banks that likely face asset sanctions (AS). How differently depends on whether we consider international borrowings or foreign assets. For example, it is clear by definition that anticipation of AS may force banks to sell foreign assets in advance, whereas anticipation of DS may not affect the banks' foreign assets (two different sides of the balance sheet are affected).

Estimation results of Equation (2) are reported in the four subfigures of Figure 5. Subfigures (a) and (b) contain the estimates of β_k coefficients ($k = -24, 23, ..., 24$) along with their corresponding 95% confidence bands for the international borrowings of not yet debt- and not yet assets-sanctioned banks, respectively. Subfigures (c) and (d) do the same for the foreign assets of the same banks.

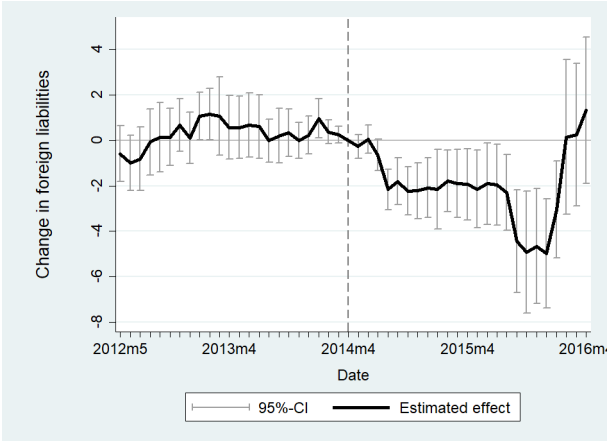
Adaptation of international borrowings (as % of total liabilities). Let us begin with the notion of pre-trends. For both not yet debt- and not yet asset-sanctioned banks, we obtain insignificant estimates of the β_k coefficients before the very first sanction announcement in March 2014, i.e., when k runs from -24 (March 2012) to 0 (February 2014). This eliminates the concerns that there could be significant differences between not-yet-treated and control banks in terms of their international borrowings before Crimea's annexation and favors the parallel trend assumption.[27]

Further, after March 2014, when k runs from 1 to 24 (March 2016), the β_k coefficients turn significant for both groups of banks. Strikingly, for the not yet *debt*-sanctioned banks, the estimates are all positive, and not negative (as one could expect), rising in time, and reaching their peak of +3.8 pp closer to the end of the estimation window (Figure 5.(a)). This means that the not yet debt-sanctioned banks were actually raising, not reducing, their international borrowings after the *Rossiya Bank* was sanctioned, and before they faced bans on placing new debts on Western financial markets (SSI). Conversely, for the not yet *asset*-sanctioned banks, the β_k estimates are significantly negative after March 2014, declining in time, reaching their peak of -5.0 pp at larger ks, but then quickly attenuating towards zero at the end of the estimation window in March 2016 (Figure 5.(b)).

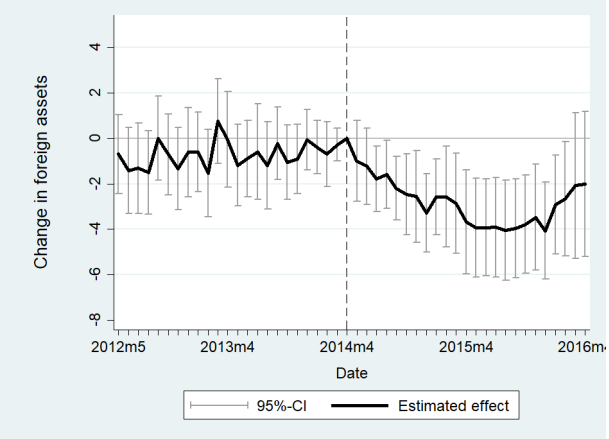
[27] Ex-ante, one could fairly anticipate that the parallel trend assumption does not necessarily hold. This is because of the political crisis that occurred in Ukraine in late 2013 (the so-called "Euromaidan" crisis, see, e.g., https://www.bbc.com/news/world-europe-30131108). The Kremlin could have already started to plan Crimea's annexation then and, anticipating a response from the West in the form of sanctions, the Russian government could instruct the major state-owned banks to adapt their international operations—for example, to sell the foreign assets located in the West. However, this is not the case: our results indicate an absence of any pre-trends in the data.



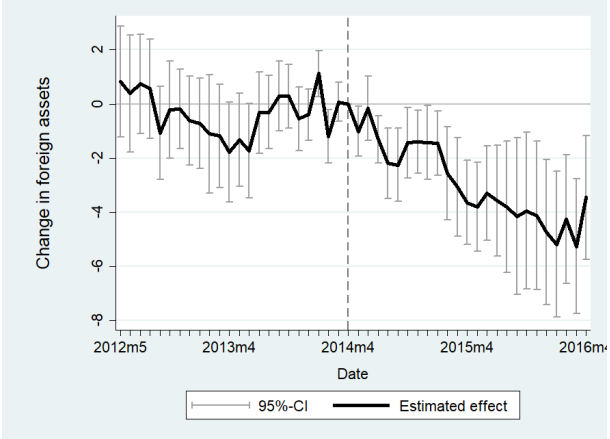
(a) Not yet debt-sanctioned banks: Foreign liabilities, pp of total liabilities



(b) Not yet asset-sanctioned banks: Foreign liabilities, pp of total liabilities



(c) Not yet debt-sanctioned banks: Foreign assets, pp of total assets



(d) Not yet asset-sanctioned banks: Foreign assets, pp of total assets

Note: The figures report the monthly estimates of the coefficient on $TREAT_b \times \mathbf{1}_{\{t=k\}}$ $(k = -24, -23, ..., 24)$, as implied by the event-study equation (2).

Figure 5: The event-study estimates of the anticipation effects of sanctions, *by sanction type*

This implies that these banks were reducing their international borrowings after the first sanction announcement and before they faced fully-blocking restrictions (SDN).

Interpreting the obtained results, we conclude that rising international borrowings by not yet debt-sanctioned banks is an unintended positive effect of the Western sanction policy, because Russia enjoyed a greater inflow of foreign funds after the sanction regime had been adopted. We argue that this unintended effect arises from the staggered implementation of the policy, its design distinguishing debt and asset restrictions, and a favorable combination of supply and demand factors.

From the *demand* side, we know that borrowing abroad is on average cheaper than borrowing domestically for the entities operating in EMEs (Bruno and Shin, 2017).[28] Under the increased

[28]Recall that the largest not yet debt-sanctioned banks substantially increased their borrowings through, e.g., placing Eurobonds during the five months after Crimea's annexation and before they were actually sanctioned in July 2014 (see

political uncertainty, for the borrowing banks it may be very important to maintain their reputation and repay their debts according to the schedule to be able to restore access to new borrowings once the political conflict is resolved. In addition, not yet debt-sanctioned banks could perceive additional international borrowings to be a cushion against potential panic runs that could have been launched by domestic depositors, especially households, after the imposition of sanctions (we explore such effects in Section 3.6.1).

From the *supply* side, foreign (Western) investors were willing to lend to not yet debt-sanctioned banks, and it is highly unlikely that they were unaware of upcoming sanctions against the largest of Russia's state-owned banks.[29] This, in turn, implies that foreign investors did not perceive sanctions to be an obstacle to the borrowing state-owned banks repaying their debts regularly and were convinced enough that the banks will continue repaying even after they are sanctioned.[30]

Differently from not yet debt-sanctioned banks, we argue that if a bank anticipates asset-type sanctions for, e.g., operating in Crimea or being owned by an oligarch family tied to the Kremlin, then the bank may no longer need new international borrowings. The bank likely realizes that it could be difficult, if not impossible (depending on the threat of secondary sanctions), to invest these new funds in foreign assets.

Adaptation of foreign assets (as % of total assets). Let us again begin with the notion of pre-trends. As in the previous cases, we obtain insignificant estimates of the β_k coefficients for all ks before March 2014, indicating an absence of pre-trends in foreign asset holdings of not yet debt- and not yet asset-sanctioned banks. For not yet *debt*-sanctioned banks, we further obtain negative and significant β_k after March 2014, with a peak of -4.0 pp that has been reached in a year (Figure 5.(c)). Apparently, the reason why not yet debt-sanctioned banks could have facilitated sales of their foreign assets is that the banks' foreign assets exceeded their foreign liabilities by up to 5 pp on the eve of the first sanction announcement. Loosing an opportunity for new borrowings, the banks could have attempted to rebalance the currency structure of their assets and liabilities (a natural hedge against the risk of large fluctuation in Ruble's exchange rate).

For not yet *asset*-sanctioned banks, we also obtain negative estimates of β_k after March 2014, peaking at -5.5 pp by the end of the estimation period in March 2016 (Figure 5.(d)). This is expected and implies that the banks anticipated asset sanctions in advance and reduced their positions (for fear of potential asset freezes).

Section 2.4).

[29] Recall again from our Eurobonds data example in Section 2.4 that foreign investors did not require a mark-up for potential sanctions to the coupon rate when they were buying the debt of not yet debt-sanctioned banks.

[30] Recall again that back in the 2010s, as distinctly from the sanction policy in the 2020s, the sanctioned banks in Russia were not banned from the SWIFT system and were still allowed to conduct operations with major Western currencies.

Summary. Not yet debt-sanctioned banks unexpectedly increased their international borrowings ("*borrow while you can*") but turned to reducing their foreign assets after the first sanction announcement in March 2014 and before they faced sanctions. Not yet asset-sanctioned banks, by contrast, began to shrink both international borrowings and foreign asset holdings ("*sell until your assets are frozen*"). Taken separately, these findings favor the **H2** hypothesis on the existence of in-advance adaptation, and if taken together—also the **H3** hypothesis on the heterogeneous effects of in-advance adaptation. The parallel trend assumption holds in all cases, thus supporting the **H1** hypothesis on the absence of confounders before the treatment. Thus, we find that the in-advance adaptation effects of sanctions on not-yet-sanctioned banks clearly exist, possess meaningful magnitudes, and may therefore matter for the overall assessment of the sanctions policy.[31]

3.4 In-advance adaptation to sanctions: The role of banks' geographical locations and regions' oil extraction intensities

3.4.1 *Difference-in-differences approach*

We now examine the cross-sectional heterogeneity of the in-advance adaptation effects of sanctions. For this purpose, we use a conventional difference-in-differences approach.

Consider the following equation:

$$\begin{aligned} Y_{b,t} = \alpha_b + \gamma_t + \beta_1 \cdot \Big(SANCTION_b \times POST.FIRST_t \Big) + \delta \cdot POST.FIRST_t \\ + \psi' \mathbf{X}_{b,t} + \varepsilon_{b,t}, \quad \text{if} \quad t \in [t_1 - k, t_1 + k] \end{aligned} \tag{3}$$

where all notations follow the previous section, γ_t is month FE, t_1 is March 2014, $k = 24$, and the indicator variable separating the timeline on 'before' and 'after' the first sanction announcement is

$$POST.FIRST_t = \begin{cases} 1, & \text{if } b \in \mathfrak{A} \cup \mathfrak{B} \text{ and } t \in [t_1, t_1 + k] \\ 0, & \text{if } b \in \mathfrak{A} \cup \mathfrak{B} \text{ and } t \in [t_1 - k, t_1) \\ ., & \text{if else} \end{cases} \tag{4}$$

Hypotheses **H2**–**H3** from the previous section apply. Our next hypothesis is that the targeted (but not-yet-sanctioned) banks located in Moscow could have an informational advantage over the banks located in remote regions due to their closer proximity to the center of political decision-making.

[31] As a robustness check, we re-run the event-study analysis without Sberbank, VTB, Gazprombank, or the Russian Agricultural Bank because they are disproportionately large and it is difficult to find exact matches for them. All the results remain valid.

Therefore, the degree of the in-advance adaptation effect must depend on the *geographical distance* between the headquarter of a potentially targeted bank and Moscow. To formalize this hypothesis, we extend Equation (3) by adding the triple interaction with the distance to Moscow variable, $Distance_b$ (in thousand km), and all necessary sub-products of the three (not shown to preserve space):

$$\begin{aligned} Y_{b,t} = \alpha_b + \gamma_t &+ \beta_1 \Big(SANCTION_b \times POST.FIRST_t \Big) \\ &+ \beta_2 \Big(SANCTION_b \times POST.FIRST_t \times Distance_b \Big) \\ &+ \psi' \mathbf{X}_{b,t} + \varepsilon_{b,t}, \quad \text{if} \quad t \in [t_1 - k, t_1 + k] \end{aligned} \tag{5}$$

To construct the $Distance_b$ variable, we collect exact addresses with their zip codes of the Kremlin and the headquarters of each bank in our sample and then apply a geo-coder.[32] The hypothesis is:

Hypothesis H4 "*Distance from the political center*": $|\beta_1 + \beta_2 \cdot Distance_b| < |\beta_1|$, i.e., β_2 weakens the average β_1 effect, and the more so the larger the distance between a targeted bank's b headquarter and Moscow where the core political decisions are made.

However, some of the remote regions in Russia may still be very important to the Russian government. Recall from Section 2.1 that the Tyumen region located in Siberia is a leader in oil extraction across all regions in Russia and that some state-connected banks are located there. These banks may provide financial services to the oil companies located in the same region, and from this standpoint be perceived by the Russian government as important as those state banks that are located in Moscow. If so, then the weakening effect of the distance from Moscow should be offset. To test this hypothesis, we include a quadruple interaction with a region's r oil extraction intensity, as measured by million tons in 2007:[33]

$$\begin{aligned} Y_{b,t} = \alpha_b + \gamma_t &+ \beta_1 \Big(SANCTION_b \times POST.FIRST_t \Big) \\ &+ \beta_2 \Big(SANCTION_b \times POST.FIRST_t \times Distance_b \Big) \\ &+ \beta_3 \Big(SANCTION_b \times POST.FIRST_t \times Distance_b \times \ln Oil_{r(b)} \Big) \\ &+ \psi' \mathbf{X}_{b,t} + \varepsilon_{b,t}, \quad \text{if} \quad t \in [t_1 - k, t_1 + k] \end{aligned} \tag{6}$$

[32] See https://geopy.readthedocs.io/en/stable/. Here, we face an obstacle in that the Central Bank of Russia discloses names, registration numbers, and addresses of only those banks that are registered within the Russian Federation at the current date but not before it (see https://www.cbr.ru/banking_sector/credit/FullCoList/, in Russian). We, however, need these addresses back to 2011, i.e., at least three years before the first portion of sanctions was imposed. To overcome this issue, we exploit an Internet archive that allows one to browse the history of any website for a chosen date (in days, see archive.org). With this tool, we gather the necessary data from snapshots of the CBR's website at a monthly frequency from 2011 till 2020.

[33] The annual data on regions' oil extraction intensities shows that these intensities do not vary much across the years. For our purposes, it is enough to employ the regional data for a single year. We choose 2007 because it was the last year when such data was disclosed by the Federal State Statistics Service of the Russian Federation in its regional statistics database, see https://www.gks.ru/bgd/regl/b08_13/IssWWW.exe/Stg/d3/13-27.htm.

where $Oil_{r(b)}$ is oil extraction intensity in the region r where a bank b—not-yet-treated or its matched control peer—has its headquarters. For computational reasons, the value of the $\ln Oil_{r(b)}$ variable is set to zero for non-oil-extraction regions. The underlying hypothesis reads as follows:

Hypothesis H5 "*Oil extraction intensity*": $|\beta_2 + \beta_3 \cdot \ln Oil_{r(b)}| < |\beta_2|$, i.e., β_3 weakens the average β_2 effect, and the more so for regions r with larger oil extraction intensities.

3.4.2 *Baseline estimation results*

Table 3 contains the difference-in-differences estimation results on the in-advance adaptation of not-yet-treated banks to impending sanctions. The first three columns report the results for not yet *debt*-sanctioned banks and the last three columns for not yet *asset*-sanctioned banks. Panel 1 describes by rows how the banks adapted their international borrowings, and Panel 2 does the same for the foreign assets of these banks.

Not yet debt-sanctioned banks. Column 1 of Table 3 reports the estimation results of equation (3). We obtain a positive and highly statistically significant estimate of the coefficient on the $SANCTION_b \times POST.FIRST_t$ variable in Panel 1 and a negative and also highly statistically significant estimate in Panel 2. Quantitatively, the estimates imply that within two years of the first sanction announcement in March 2014, not yet debt-sanctioned banks raised their international borrowings by 2.1 pp and reduced their foreign assets by 2.3 pp of total assets, compared to similar never-sanctioned banks. Note that the magnitudes of these estimates are averages of respective event-study estimates from the previous section. This just confirms the H2 hypothesis.

Column 2 of Table 3 contains the estimation results of equation (5). We obtain negative but insignificant estimates of the coefficients on the $SANCTION_b \times POST.FIRST_t \times Distance_b$ variable in both Panels 1 and 2, meaning that on average, the in-advance adaptation effects revealed in the previous column do not depend on how far from the political center a not yet debt-sanctioned bank is located. This evidence does not support the H4 hypothesis. However, as we discussed above, it could be the case that not all distant-from-Moscow regions are equally important for the federal government.

Indeed, when we distinguish the Russian regions by their oil extraction intensities in column 3, we achieve a more intriguing result when we run equation (6). For international borrowings (Panel 1), we again obtain a negative estimate on the triple interaction variable, but now it appears to be significant (at 5%) and much stronger than in column 2. Note that the estimate on the main double interaction variable almost does not change. Strikingly, we also obtain a positive and significant (at 5%) estimate of the coefficient on the $SANCTION_b \times POST.FIRST_t \times Distance_b \times \ln Oil_{r(b)}$ variable. Jointly, these two estimates indicate that not yet debt-sanctioned banks were raising their international borrowings

Table 3: In-advance adaptation to sanctions, distance to Moscow, and oil extraction intensity: Difference-in-differences estimates on the matched samples of banks

Sanction type:	Not yet debt-sanctioned			Not yet asset-sanctioned		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities, as % of bank total liabilities						
$\text{SANCTION}_b \times \text{POST.FIRST}_t$	2.138***	2.297***	2.637***	–2.354***	–2.723***	–2.944***
	(0.649)	(0.659)	(0.722)	(0.634)	(0.709)	(0.815)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b$		–0.039	–1.280**		0.305	–0.776
		(0.423)	(0.517)		(0.302)	(0.537)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b \times \ln OIL_{r(b)}$			0.126**			0.292**
			(0.057)			(0.115)
N obs	2,241	2,241	2,241	3,148	3,148	3,148
N treated / control banks	14 / 35	14 / 35	14 / 35	16 / 59	16 / 59	16 / 59
R^2_{within}	0.620	0.622	0.626	0.457	0.458	0.465
Mean distance (km): treated / control		284/904			929/1,183	
Mean oil extrac. (mln tons): treated / control			20/10			0.7/10
Panel 2: Dependent variable = Foreign assets, as % of bank total assets						
$\text{SANCTION}_b \times \text{POST.FIRST}_t$	–2.306***	–2.158***	–2.080***	–2.384***	–2.114**	–2.703**
	(0.516)	(0.624)	(0.719)	(0.786)	(0.923)	(1.030)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b$		–0.291	–0.541		–0.195	–0.829*
		(0.440)	(0.619)		(0.366)	(0.429)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b \times \ln OIL_{r(b)}$			0.029			0.056
			(0.072)			(0.089)
N obs	2,241	2,241	2,241	3,105	3,105	3,105
N treated / control banks	14 / 35	14 / 35	14 / 35	16 / 59	16 / 59	16 / 59
R^2_{within}	0.636	0.637	0.637	0.249	0.250	0.261
Mean distance (km): treated / control		284/904			929/1,183	
Mean oil extrac. (mln tons): treated / control			20/10			0.7/10

Note: The table reports the DID estimates of the effects of sanctions on foreign liabilities (*Panel 1*) and foreign assets (*Panel 2*) of Russia's targeted banks, as implied by equation (3). The estimation Window is $k = 24$ months around the imposition of sanctions on the *Rossiya Bank* (March 2014). $SANCTION_b = 1$ if a bank b will ever face sanctions within our sample period. $POST.FIRST_t = 1$ after March 2014 and is aimed at capturing the in-advance adaptation effect. Sanctioned (i.e., treated) and never-sanctioned (i.e., control) banks are 1:4 matched within two years before March 2014. Private banks with political connections are not allowed to enter the control group. Bank FE, Month FE, Bank controls, and all necessary cross-products of the SANCTION, POST.FIRST, DISTANCE, and OIL variables are included but not reported.

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

by less if located in the regions farther from Moscow, as Hypothesis H4 implies, but only if these regions were not oil-extracting, as Hypothesis H5 states. For illustration purposes, let us compare the total in-advance adaptation effect for the not yet debt-sanctioned banks located in the Tyumen region (champion in oil extraction, located 2.12 thousand km on the East from Moscow) and Chelyabinsk region (roughly zero oil extraction, located 1.82 thousand km also on the East from Moscow). In the first case, the total effect equals +3.3 pp, whereas in the second case the total effect is just +0.3 pp.[34]

[34]The computations are $2.637-1.280\cdot2.12+0.126\cdot2.12\cdot\ln(323814) = 3.313$ and $2.637-1.280\cdot1.82+0.126\cdot1.82\cdot0 = 0.307$, respectively.

For foreign assets (Panel 2), we still get insignificant estimates of the coefficients on both the triple and quadruple interaction variables, meaning the same not yet debt-sanctioned banks were unlikely to sell more foreign assets in advance if located in remote regions—even if these regions were specializing in oil extraction.

Not yet asset-sanctioned banks. Column 4 of the table reports the estimation results of equation (3). We obtain a negative and highly statistically significant estimate of the coefficient on the $SANCTION_b \times POST.FIRST_t$ variable in Panel 1, where the dependent variable is international borrowings (as % of total liabilities), and we also obtain a negative and highly statistically significant estimate in Panel 2, where the dependent variable is switched to foreign assets (as % of total assets). Quantitatively, the estimates imply that, within two years after the first sanction announcement in March 2014, not yet asset-sanctioned banks reduced their international borrowings by 2.4 pp and decreased their foreign assets by virtually the same 2.4 pp as compared to similar never-sanctioned banks. Note that the magnitudes of these estimates are also averages of respective event-study estimates from the previous section. The H2 hypothesis is thus confirmed.

Column 5 of the table contains the estimation results of equation (5). As it was true in column 2 for international borrowings, we again obtain insignificant estimates of the coefficients on the $SANCTION_b \times POST.FIRST_t \times Distance_b$ variable in both Panels 1 and 2. This indicates that, on average, the in-advance adaptation effects that we found in the previous column are not influenced by the distance between not yet asset-sanctioned banks and the political center. We thus cannot support the H4 hypothesis.

Finally, in Column 6 of the table, we report the estimation results of equation (6). In Panel 1, we still obtain insignificant estimates on the triple interaction with the distance variable, but we also obtain a positive and significant (at 5%) estimate of the coefficient on the $SANCTION_b \times POST.FIRST_t \times Distance_b \times \ln Oil_{r(b)}$ variable. Similarly to not yet debt-sanctioned banks, these results indicate that the not yet asset-sanctioned banks were reducing by less, or even increasing, their international borrowings if located in an oil extracting region and despite being remote from the political center. In our two-region example above, we obtain that a not yet asset-sanctioned bank from the Tyumen region (champion in oil extraction) would even turn to raise its international borrowings after the first sanction announcement—by 3.3 pp, whereas the same bank from the Chelyabinsk region (non-oil-extracting area) would be reducing its international borrowings by 4.4 pp.[35] Therefore, location in an oil extracting region where a bank can enjoy servicing oil exporting operations plays so much important role that can even change the sign of the average effect.The H4 hypothesis is rejected,

[35]The computations are $-2.944-0.776\cdot 2.12+0.292\cdot 2.12\cdot \ln(323814) = 3.265$ and $-2.94-0.7760\cdot 1.82+0.292\cdot 1.82\cdot 0 = -4.356$, respectively.

whereas the H5 hypothesis is not.

In Panel 2 where we switch to the foreign assets as a dependent variable, we obtain a negative and marginally significant coefficient on the triple interaction term but an insignificant estimate for the quadruple interaction term. This means that not yet asset-sanctioned banks were tending to sell their foreign assets after the first sanction announcement more if located farther from the political center and irrespective of whether their regions extract oil or not. Fear of asset freezes can thus be perceived as a function of the distance between the headquarter of a not yet asset-sanctioned bank and the Kremlin. For our two-region example above, the banks located in the Tyumen and Chelyabinsk regions (approximately 2 thousand km from Moscow) are likely to reduce their foreign assets by roughly 4.4 pp of their total assets.[36] Differently from the case of international borrowings, we conclude that the H4 hypothesis is not rejected, whereas the H5 hypothesis is.

As an additional exercise, we run the same regression analysis by first shrinking and then enlarging the estimation window compared to our baseline choice (i.e., ±24 months around March 2014). Table D.I reports the estimation results of equation (6) with the $[t_1 - k, t_1 + k]$ estimation window with $k = 12, 24$ *(baseline)*, 36 months and $t_1 =$ *March 2014* (see Appendix D). We can observe that the effects discussed in this section reach their peaks under the $k = 24$ case. This also corresponds to the fact that most of the largest banks were sanctioned within 2 years after March 2014 (recall Figure 2 with the timing of the sanction impositions).

As another additional exercise, we disaggregate total international borrowings by maturity (below 1 year (*short-run*), between 1 and 3 years (*medium-run*), and above 3 years (*long-run*) and show that not yet debt-sanctioned banks were raising exactly the long-run borrowings after the first sanction announcement, but less so if located farther from Moscow, see Columns 1–3 of Table D.II in Appendix D. Not yet asset-sanctioned banks were instead reducing their international borrowings across all maturities, and even more so if located farther from Moscow, see columns 4–6 of the table.

3.5 Further sanction announcements: Any added value?

3.5.1 *Staggered difference-in-differences with in-advance adaptation*

Having explored the potential and heterogeneity of in-advance adaptation effects, we now analyze whether there is any added value of further sanction announcements in terms of targeted banks' international operations. Accordingly, we suggest an extension of the staggered difference-in-differences design (Baker et al., 2022), in which we explicitly separate the first sanction announcement producing the in-advance adaptation effects and all the other announcements, which may (or may not) possess

[36] The computation is $-2.703 - 0.829 \cdot 2 = -4.361$.

an added value. That is, we do not pool all the sanction announcements together—from the first to last, as a common design of the staggered DID would otherwise suggest.

Following the discussion on how to properly choose a control group in the presence of in-advance adaptation effects in Section 3.2.1 we now illustrate more formally the ideas behind our extended version of the staggered DID design. For simplicity, assume that we have only two sanction announcements—the first takes place at t_1 (early treatment) and the second at t_2 (late treatment), as depicted in Figure 6. Consider a stock variable $Y_{b,t}$ that is measured at the bank's b and month t level and is targeted by sanctions (for concreteness, suppose this is foreign assets, which have to fall after the asset sanctions). Suppose we have a plausible control group composed of never-treated banks. Suppose $\beta_{ET} < 0$ is the effect of the first sanction announcement on the early-treated banks (i.e., the sanctions reduce the stock of foreign asset holdings). Suppose also the later-treated banks start to adapt their $Y_{b,t}$ inbetween t_1 and t_2, as our results in the previous sections indicate, and the in-advance adaptation effect is β_{LT}.[37] We want to understand whether the later-treated banks will further reduce their $Y_{b,t}$ in response to the second sanction announcement after t_2. In this environment we have the following three outcomes with respect to the in-advance adaptation effect:

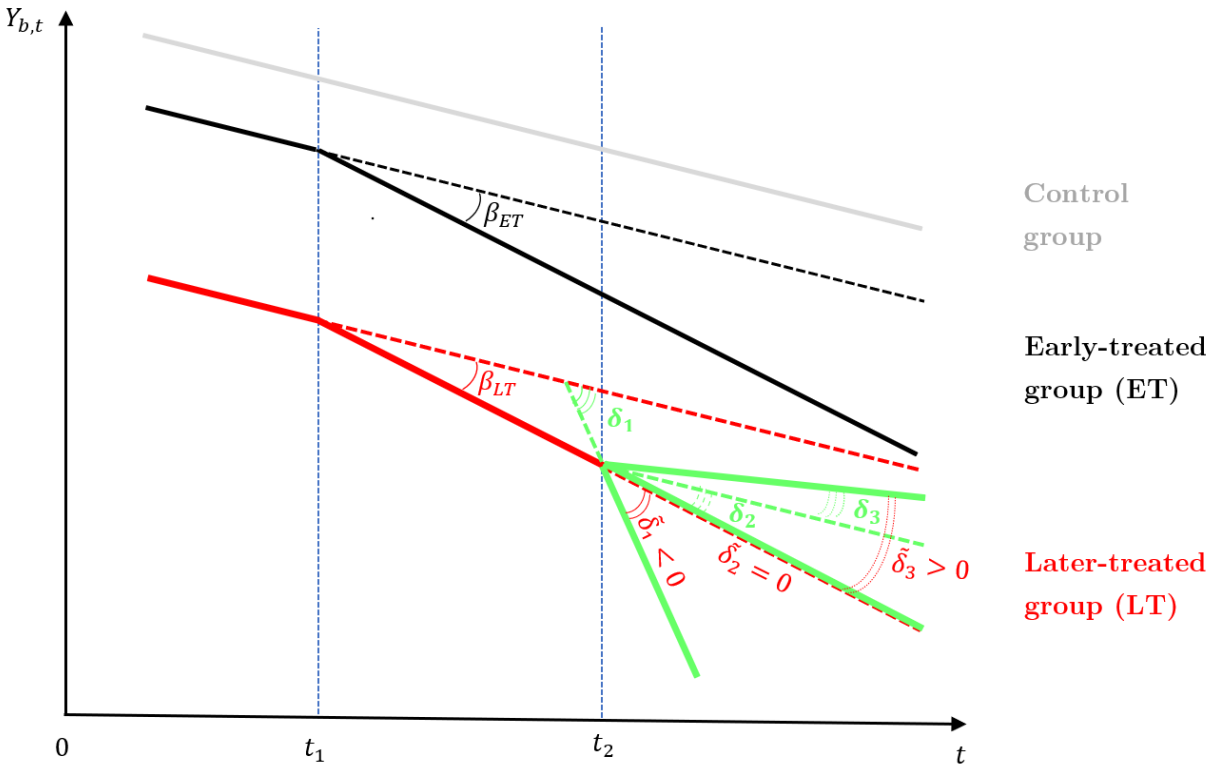
1. *Further deterioration* of $Y_{b,t}$. In this case, the later sanction announcement has a positive value (later-treated banks continue selling their foreign assets, forcibly). Graphically, this means that the slope of the line reflecting the time evolution of $Y_{b,t}$ of the later-treated banks turns steeper after t_2 as compared to in between t_1 and t_2. We mark this added value effect as $\widetilde{\delta}_1 < 0$.

2. *No changes* in $Y_{b,t}$. In this case, the later sanction announcement has no added value with respect to the in-advance adaptation, i.e., the slope of the line remains the same, and thus $\widetilde{\delta}_2 = 0$.

3. *Partial rebound* of $Y_{b,t}$. In this case, the later treatment has a negative added value (later-treated banks slow down the selling of their foreign assets). The slope of the line turns flatter, and thus $\widetilde{\delta}_3 > 0$.

In the first case, a positive added value of the later treatment appears because the later-treated banks did not fully adapt their $Y_{b,t}$'s in advance, i.e., between t_1 and t_2. The later treatment is harsher than expected. In the second case, the later-treated banks do not change their $Y_{b,t}$ because they have fully adapted in advance. This could be possible if there are no changes in the design of sanctions, and thus banks can fully predict the strength of the upcoming punishment. In the third case, the later treatment turns out to be milder than expected, and banks reduce the speed of their $Y_{b,t}$'s contraction.

[37] Presumably, $\beta_{LT} \leq \beta_{ET}$ because the later-treated banks were not-yet-sanctioned and thus could be less responsive. But this is not crucial for understanding the added value effects of further sanction announcements.



Note: The figure reports three potential outcomes of further sanction announcements: positive, no, and negative added value. $Y_{b,t}$ is a variable of interest at bank b and month t level (suppose foreign assets, for concreteness). Suppose that staggered implementation of the sanctions policy boils down to the two announcements: at t_1 (*early-treated*) and t_2 (*later-treated*). *Grey line* stands for the (matched) control group of similar never-sanctioned banks, *Black lines* depict potential outcomes for the early-treated banks, and *Red & green lines* mark potential outcomes for the later-treated banks, with *solid* red line reflecting an in-advance adaptation after t_1 and before t_2, red *dashed* lines reflecting either no in-advance adaptations before t_2 or no later-treatment effect after t_2, and green *solid* lines reflecting three potential outcomes for the added values of the later treatment: (1) further deterioration of $Y_{b,t}$, (2) no effect, and (3) partial rebound. β_{ET} is the effect of the first treatment on early-treated banks and β_{LT} is the effect of the same first treatment on later-treated banks (i.e., the in-advance adaptation effect). $\widetilde{\delta}_\jmath$ measures the added value of the later treatment with respect to the in-advance adaptation effect in outcome $\jmath$ ($\jmath = 1, 2, 3$). However, if the control group is composed of never-treated banks, $\widetilde{\delta}_\jmath$ is not feasible. Instead, $\delta_\jmath$ is feasible being an estimate of the later-treatment effect on the later-treated banks with respect to the control group, which is composed of never-treated banks. By construction, $\widetilde{\delta}_\jmath = \delta_\jmath - \beta_{LT}$.

Figure 6: Potential outcomes of sanction announcements: Generic cases

Note that $\widetilde{\delta}_\jmath$ ($\jmath = 1, 2, 3$) is not feasible in terms of DID estimate if the control group is only composed of never-treated banks. What is feasible is $\delta_\jmath$, which measures the effect of the later treatment on the later-treated banks vis-a-vis the banks from the control group. However, by construction (and as long as the treatment is not diffused on the control banks from the treated banks), we can recover $\widetilde{\delta}_\jmath$ as $\widetilde{\delta}_\jmath = \delta_\jmath - \beta_{LT}$.

Empirical implementation. To test for the added value effects of further sanction announcements with respect to the first sanction announcement we begin by building an indicator variable, which equals 1 for each later-sanctioned bank $b = 2...S \in \mathfrak{A}$ and its matches from $\mathfrak{B}$ after the imposition of sanctions at t_b, equals 0 for the same banks at the respective pre-treatment period, and is empty for

all other cases:

$$POST.NEXT_{b,t} = \begin{cases} 1, & \text{if } b \in \mathfrak{A} \cup \mathfrak{B} \text{ and } t \in [t_b, t_b + k] \\ 0, & \text{if } b \in \mathfrak{A} \cup \mathfrak{B} \text{ and } t \in [t_b - k, t_b) \\ ., & \text{if else} \end{cases} \tag{7}$$

The DID regression (3) from the previous section modifies to:

$$\begin{aligned} Y_{b,t} = \alpha_b + \gamma_t + \beta\Big(SANCTION_b \times POST.FIRST_t\Big) \\ + \delta\Big(SANCTION_b \times POST.NEXT_{b,t}\Big) + \psi' \mathbf{X}_{b,t} + \varepsilon_{b,t} \text{ if } t \in [t_b - k, t_b + k] \end{aligned} \tag{8}$$

Using Equation (8) we can test the following hypothesis:

Hypothesis H6 "*No added value of further sanction announcements*": $\widetilde{\delta} = \delta - \beta = 0$, i.e., the full effect of sanctions is absorbed by in-advance adaptation. Alternatives are either $\widetilde{\delta} < 0$ (further deterioration) or $\widetilde{\delta} > 0$ (partial rebound).

3.5.2 *Staggered estimation results with in-advance adaptation*

The estimations results of equation (8) appear in Table 4 below. The structure of the table remains the same as in the previous section, i.e., by rows in Panel 1 the dependent variable is foreign liabilities (as % of total liabilities), and in Panel 2 foreign assets (as % of total assets); columns 1–3 are for debt sanctions and columns 4–6 for asset sanctions. However, what changes is that now in columns 1 to 3 we consecutively expand estimation window $[t_b - k, t_b + k]$ by increasing parameter k: from 12 months in column 1 to 24 months in column 2 and to 36 months in column 3. The same applies to columns 4 to 6. This allows us to trace the time evolution of the estimated in-advance adaptation and added value effects.

Debt sanctions. As can be observed in Columns 1–3 in Panel 1, we obtain (i) positive and statistically significant (at 5%) coefficient on the interaction of the treatment variable and the indicator of the first sanction announcement, i.e., $SANCTION_b \times POST.FIRST_t$, and (ii) insignificant coefficient on the interaction of the same treatment variable and the indicator of the actual sanction introduction, i.e., $SANCTION_b \times POST.NEXT_{b,t}$. Strikingly, these estimates suggest that the banks that started to raise more international borrowings before being debt-sanctioned ($\widehat{\beta} > 0$) reduced them by almost *the same magnitude* once sanctioned ($\widehat{\delta} = -\widehat{\beta}$ because $\widehat{\delta} = 0$, statistically). In this case, the added value of further sanction announcement—by up to –3.8 pp in three years—is just the elimination of excessive borrowings observed after the first sanction announcement, but nothing more. The sanctions

Table 4: Added value of further sanction announcements: Staggered difference-in-differences estimates on matched samples

Sanction type:	Debt sanctions			Assets sanctions		
Estimation Window $[t_b - k, t_b + k]$	$k = 12$	$k = 24$	$k = 36$	$k = 12$	$k = 24$	$k = 36$
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities, as % of bank total liabilities						
β SANCTION$_b$ × POST.FIRST$_t$	2.205**	3.530**	3.959**	–0.397	–0.056	0.409
	(1.051)	(1.371)	(1.579)	(0.843)	(0.847)	(1.005)
δ SANCTION$_b$ × POST.NEXT$_{b,t}$	0.548	0.345	0.155	–3.789***	–4.176***	–4.519***
	(0.860)	(1.069)	(1.222)	(0.676)	(1.026)	(1.283)
Added value of next sanction announcements:						
$\widetilde{\delta} = \delta - \beta$	*–1.657**	*–3.185***	*–3.804***	*–3.392****	*–4.119****	*–4.927****
	(0.990)	*(1.412)*	*(1.549)*	*(0.640)*	*(1.230)*	*(1.642)*
N obs	2,130	3,411	4,549	2,884	4,719	6,040
R^2_{within}	0.335	0.361	0.330	0.240	0.263	0.249
Panel 2: Dependent variable = Foreign assets, as % of bank total assets						
β SANCTION$_b$ × POST.FIRST$_t$	–0.612	–0.503	–0.846	–1.411	–1.978**	–2.411***
	(1.221)	(1.438)	(1.451)	(1.042)	(0.864)	(0.869)
δ SANCTION$_b$ × POST.NEXT$_{b,t}$	0.284	0.830	0.958	–0.561	0.096	–0.085
	(0.854)	(1.184)	(1.224)	(0.949)	(0.838)	(0.833)
Added value of next sanction announcements:						
$\widetilde{\delta} = \delta - \beta$	*0.896*	*1.332*	*1.804*	*0.849*	*2.074***	*2.325***
	(1.308)	*(1.782)*	*(1.911)*	*(0.952)*	*(0.985)*	*(1.001)*
N obs	2,130	3,411	4,549	2,884	4,719	6,040
R^2_{within}	0.189	0.193	0.214	0.152	0.132	0.146

Note: The table reports the staggered DID estimates of the effects of sanctions on foreign liabilities (*Panel 1*) and foreign assets (*Panel 2*) of Russia's targeted banks, as implied by equation (8). The estimation Window is $[t_b - k, t_b + k]$ months around the imposition of sanctions on each of the 44 sanctioned banks b, starting from the *Rossiya Bank* in March 2014. $SANCTION_b = 1$ if a bank b will ever face sanctions within our sample period. $POST.FIRST_t = 1$ after March 2014 and is aimed at capturing the in-advance adaptation effect. $POST.NEXT_{b,t} = 1$ after every next sanction announcement against each bank b after the *Rossiya Bank* (i.e., $b = 2, 3...44$) and is aimed at absorbing the added value of such announcements, if any. Sanctioned (i.e., treated) and never-sanctioned (i.e., control) banks are 1:4 matched within two years before March 2014. Private banks with political connections are not allowed to enter the control group. Bank FE, Month FE, Bank controls, and all necessary subcomponents of the two cross-product variables are included but not reported.

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

could not force the (already) debt-sanctioned banks to shrink their foreign liabilities faster. We also find that the added value effect grows in time—but this likely mirrors the increasing trend in the estimated in-advance adaptation effect. Turning to Panel 2 across the same Columns 1 to 3 and considering the international assets of debt-sanctioned banks, we conclude that neither the informational nor direct effects are significant.[38] This means that on average debt-sanctioned banks were barely

[38]Recall that in the previous section the estimate of the in-advance adaptation effect was negative and significant in this case, whereas now it lost its significance. This is likely because before we had a fixed estimation window $[t_1 - 24, t_1 + 24]$ months where t_1 is March 2014, whereas now we have an expanding estimation window which accommodates *all* t_b's. Therefore, the numbers of observations differ in these two cases, and thus the models are not directly comparable in the quantitative sense. Combining the earlier and current estimates, we can conclude that, while *not yet* debt-sanctioned, the banks first reduced their foreign asset holdings, but, after each updating of their knowledge regarding how the debt sanctions work, they apparently slowed down the sales of foreign assets. This pattern is very much consistent with

nervous about possible asset freezes by Western countries, which is consistent with the design of the debt sanctions.

Asset sanctions. The estimates for the asset-sanctioned banks are rather different. As can be inferred from Columns 4–6 in Panel 1, we lose the significance of the in-advance adaptation effects pertaining to the international borrowings of not yet asset-sanctioned banks. But we gain negative and highly statistically significant estimates of the added value effects in this case, which are also growing in time. This implies that on a larger time horizon, these banks started to reduce their international borrowings more extensively only when they were actually sanctioned. The added value of further sanction announcements is thus very large—reaching up to –5 pp of total liabilities. This is because the in-advance adaptation effects were insignificant and, once asset-sanctioned, the banks were forced to turn to substantially reducing their borrowings from abroad. Finally, moving to Panel 2 across the same Columns 4–6 and considering foreign asset holdings as the dependent variable, we obtain negative and significant estimates of the in-advance adaptation effects β and insignificant estimates of the coefficient δ on the $SANCTION_b \times POST.NEXT_{b,t}$ variable. Taken together, this means that the added value of further sanction announcements is negative in the sense that after the sanctions were imposed, the (already) asset-sanctioned banks turned to slow down the selling of their foreign assets instead of accelerating it. The rebound could have reached up to +2.3 pp. This finding indicates that before being asset-sanctioned the banks could have been too pessimistic regarding the upcoming sanctions and were overselling their foreign asset holdings; once sanctioned, the banks could have stopped overselling.[39]

Overall, we conclude that the effects of sanctions were very much heterogeneous in terms of (i) the sanction type (debt vs. assets) and (ii) the timing (announcement vs. actual imposition).[40] If one would apply a staggered difference-in-differences design (Baker et al., 2022) without separating the in-advance adaptation effects from the effects of later sanction announcements, then one would misleadingly *under*-estimate the effect of sanctions on the international borrowings of debt-sanctioned banks and on the foreign assets of asset-sanctioned banks. The in-advance adaptation effects matter, and having them with the added value effects within the same regression model provides a flexible approach to disaggregate the early- and later-treatment effects in the presence of staggered implemen-

respective event-study estimates (see Figure 5.c), and therefore, in a larger time span, it could be the case that the in-advance adaptation effect is blurred.

[39] This type of behavior is aligned with diagnostic beliefs (Bordalo et al., 2018), which arise in the presence of uncertainty regarding who next and when will be sanctioned. An alternative possibility is that the banks could have appealed to evading sanctions through foreign subsidiaries—a channel similar to that explored by Efing et al. (2023) for the German banks—does not apply here because the Russian asset-sanctioned banks did not operate abroad.

[40] As we show in Appendix E, the pooling of debt- and asset-sanctioned banks in one treatment group confounds the baseline effects. Specifically, it attenuates both the in-advance adaptation effects and the added value effects of the next sanction announcements.

tation of a policy.

3.6 From international to domestic operations of targeted banks: unintended effects of sanctions?

3.6.1 *Domestic liabilities: depositor runs mitigated by the government support?*

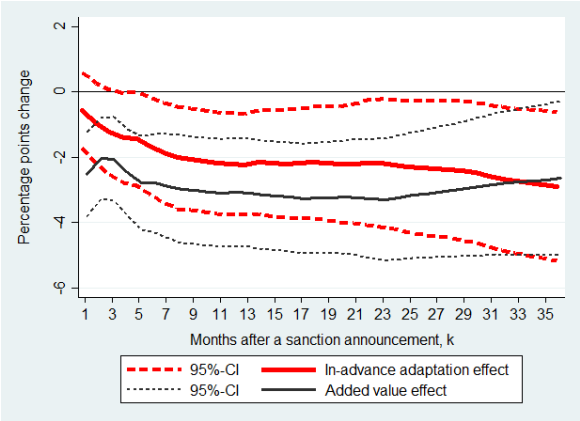
In this section, we consider (i) private deposits, corporate deposits, and deposits attracted from the inter-bank market as those funds originating from *non-government sources* and (ii) government deposits and loans obtained from the Central Bank of Russia (CBR) as those from *government sources*. One may expect that all types of private depositors could launch a panic, withdrawing their funds from not-yet-treated banks in response to sanctions, while the government could step in and substitute for these funds to prevent disordered failures.

We run a series of the staggered DID regressions with in-advance adaptation effects, as implied by equation (8), by performing estimates on *expanding* estimation windows $[t_b - k, t_b + k]$, where $k = 1, 2...36$ months after either the date of sanctions against the *Rossiya Bank* or a bank-specific sanction date. We expand the estimation window to make sure that we do not omit the effects of sanctions. This is important because domestic operations of state-connected banks were not targeted by the sanctions, and it is not clear whether—and for how long—domestic operations reacted to the compositional changes in the banks' balance sheets caused by the sanctions.

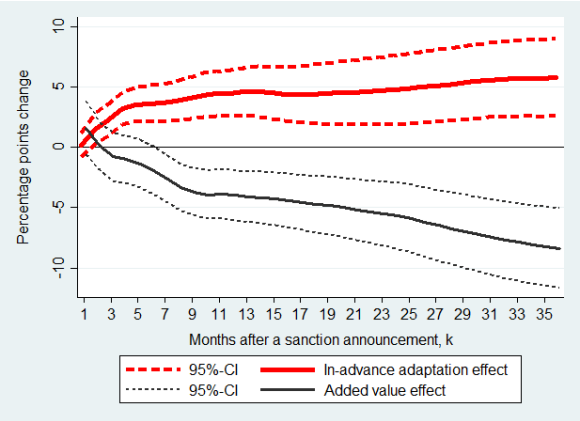
We report the estimated coefficients β_k and δ_k on $SANCTION_b \times POST.FIRST_t$ and $SANCTION_b \times POST.NEXT_{b,t}$, respectively, for each k in Figure 7. Recall that β_k reflects the in-advance adaptation effect and δ_k stands for the added-value effects. The figure reports the results for deposits that are attracted from households (upper panel) and non-financial firms (lower panel).

Household deposits. For not yet debt-sanctioned banks, we obtain negative and significant estimates of β_k and negative and significant estimates of δ_k, both reaching their troughs at –3 pp of the banks' total liabilities (see Figure 7.a). Assuming the supply-side forces (depositor panic), the estimation results thus suggest that households were already responsive to the informational effects of sanctions (even when the news pertained to state-connected banks that did not hold their savings). This might seem surprising because we could imagine a lack of attention and/or expertise from households in predicting who is going to be the next sanctioned bank. However, recall that these are the largest banks in the system, with a share of the deposits market exceeding 50%. In this sense, our finding is hardly surprising.

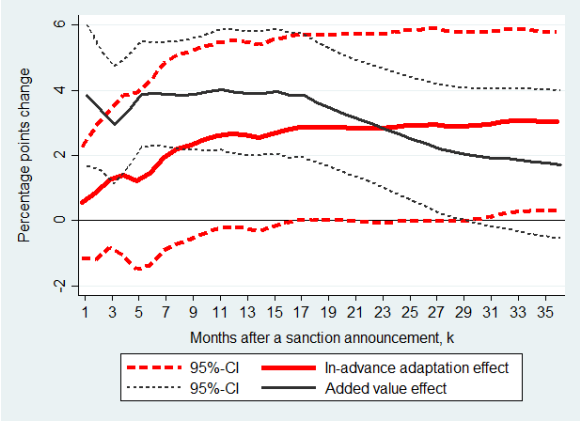
In the case of not yet asset-sanctioned banks, we obtain positive, not negative, and statistically significant estimates of β_k peaking at +5 pp of the group's total liabilities, and we get negative, as



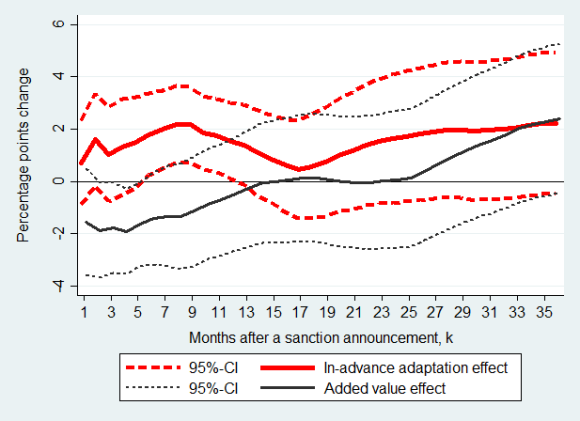
(a) Household deposits, *debt*-sanctioned banks



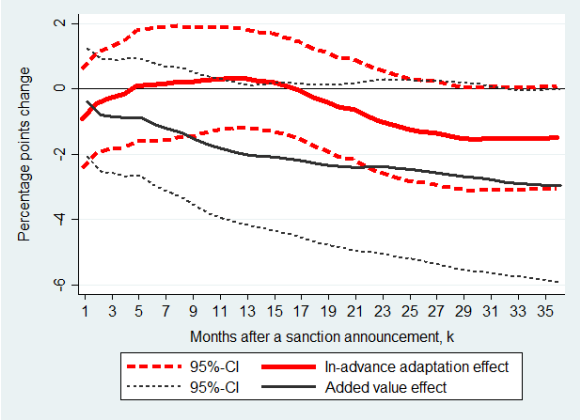
(b) Household deposits, *asset*-sanctioned banks



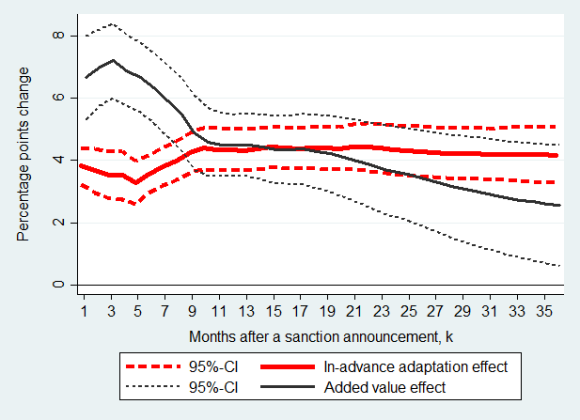
(c) Firm deposits, *debt*-sanctioned banks



(d) Firm deposits, *asset*-sanctioned banks



(e) Inter-bank deposits, *debt*-sanctioned banks



(f) Inter-bank deposits, *asset-sanctioned banks*

Note: The figures report the staggered difference-in-differences estimates of the coefficients on $SANCTION_b \times POST.FIRST_t$ and $SANCTION_b \times POST.NEXT_{b,t}$ in equation (8), with the dependent variable reflecting either household, non-financial firm, or inter-bank deposits (as % of bank total liabilities). The estimates are obtained by running the staggered DID with in-advance adaptation on the expanding window $[t_b - k, t_b + k]$, where $k = 1, 2...36$ months after either bank-specific sanction date (added value effects, black lines) or the date of sanctions against the *Rossiya Bank* (in-advance adaptation effects, red lines).

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

expected, and also significant estimates of δ_k peaking at –8 pp, see Figure 7.b). First, the unexpectedly positive in-advance adaptation effects obtained here may indicate that not yet asset-sanctioned banks were trying to accumulate additional funds from households in domestic markets (demand-driven factor) before they were sanctioned and had to reduce their international borrowings. These banks, differently from their debt-sanctioned peers, were much smaller, and thus households could have been less attentive regarding the prospects of these banks and were ready to lend them their savings.

Deposits of non-financial firms. We further obtain positive and significant estimates of β_k for not yet debt-sanctioned banks, peaking at +3 pp (three years after March 2014), and also positive and significant estimates of β_k for not yet asset-sanctioned banks, peaking at +2 pp within a year of March 2014 (see Figures 7.c,d, respectively). We could expect that differently from households, firms are more likely to be better informed regarding upcoming sanctions and could thus have launched *information*-based withdrawals of their funds from banks (a precautionary motive). However, our results highlight a different mechanism that could potentially materialize: indirect government support through large state-owned firms, which could have been ordered to increase their deposits at certain not-yet-sanctioned banks.

When it comes to the added value of the next sanction announcements, δ_k, we obtain a positive and significant estimate for already debt-sanctioned banks (+4 pp of total liabilities, within a year of the announcements) but a negative and significant estimate for already asset-sanctioned banks (–2 pp, within half a year of the announcements). For the asset-sanctioned banks, the sanction-driven reduction of non-financial firms' deposits could have been forced by the firms themselves.

Inter-bank deposits. Another portion of heterogeneous responses comes from inter-bank deposits. For debt-sanctioned banks, we obtain negative but insignificant estimates of β_k and negative and marginally significant estimates of δ_k, peaking at –3 pp by the end of the third year after the sanction announcements. For asset-sanctioned banks, the results are different: we obtain positive and significant estimates of both β_k and δ_k, with the former peaking at +4 pp of total liabilities in three years after March 2014 and the latter peaking at +7 pp in the quarter after the bank-specific sanction announcement dates. Taken together, these results indicate that debt-sanctioned banks could encounter inter-bank runs after being sanctioned, whereas asset-sanctioned banks enjoyed an increasing flow of wholesale funds. Recall, however, that the debt-sanctioned banks are the largest banks in the system and, despite also opting for borrowings from the inter-bank market, are recognized as the major re-distributors of the liquidity from the Central Bank of Russia to the rest of the banking system. Therefore, we may suggest an indirect government support interpretation in the case of asset-sanctioned banks.

(Direct) Government support. Regarding the (other) sources of government-provided funds that could have been appealed to by the sanctioned banks, we again reveal substantially different patterns across debt and asset-sanctioned banks. First, our DID estimates imply that (not yet) debt-sanctioned banks obtained government support in the form of municipal- or federal-state deposits (increase by up to +0.5 pp of total liabilities) and loans from the Central Bank of Russia (+2.0 pp, see Figure F.I.a,c in Appendix F). Conversely, (not yet) asset-sanctioned banks effectively obtained nothing from the government. Direct state deposits had been increased by a negligible amount (+0.15 pp). The loans from the Central Bank of Russia first had been reduced (before the sanctions) and then increased (after the sanctions) by virtually the same amounts (±2 pp), see Figure F.I.b,d).

Quantitatively, by bringing together all the estimation results obtained in the previous sections and here, we can conclude that the targeted banks were over-supported by the government. Our computations show that, in response to all sanction packages, debt-sanctioned banks managed to raise the total size of their liabilities by 0.6 pp and asset-sanctioned banks—by another 3.7 pp.[41]

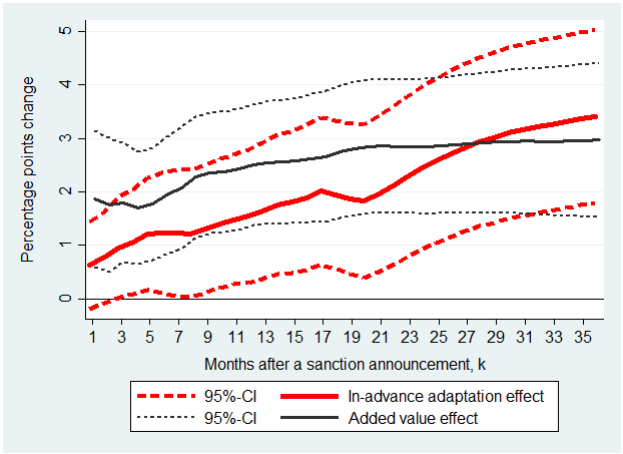
Overall, we find that runs on sanctioned banks were substantial. However, the government stepped in and—either directly (through federal or municipal deposits or the loans from the Central Bank of Russia) or indirectly (through the inter-bank market or funding through state firms)—supported, or even *over*-supported, the targeted banks, thus preventing their disorderly failure. Clearly, the sanctions had forced the Russian economy to mobilize financial resources and direct them to targeted banks. Unexpectedly, this mobilization had fully offset the intended negative effects of sanctions. In this situation, we can expect that the targeted banks can in principle expand loan supply to the economy. And this is what we investigate in the next section.

3.6.2 *Domestic assets: the credit re-shuffling effect*

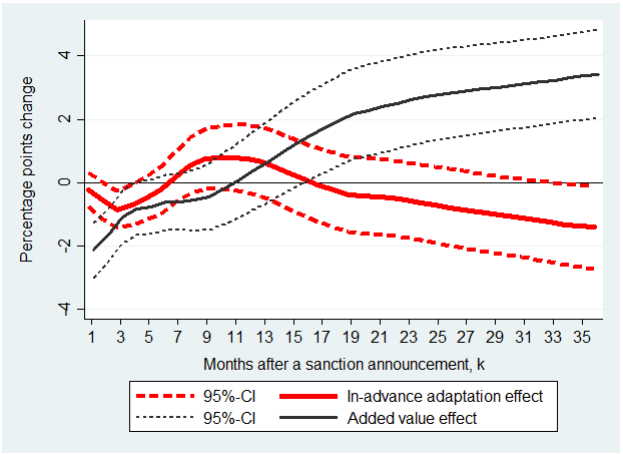
How did sanctioned banks adjust their domestic lending in response to the sanction-driven changes in their liabilities? We report the estimation results for domestic lending in Figure 8 below.

The estimates suggest that (not yet) debt-sanctioned banks could have decreased their loans to non-financial firms by 2 pp of their total assets, as a matter of in-advance adaptation, and by another 3.2 pp, as a result of the direct effects of sanctions (Figure 8.c). The estimates further indicate that the same banks increased loans to individuals by up to 3.5 pp of their total assets, as after March 2014 and before being actually sanctioned, and by another 2.9 pp once sanctioned (Figure 8.a). As

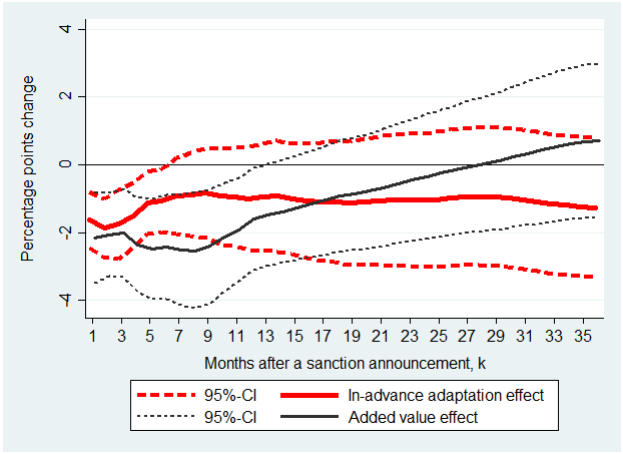
[41]The computations are (in pp): (i) for *debt*-sanctioned banks, +0.2 (i.e., +4.0 – 3.8, international borrowings) – 6.0 (i.e, –3.0 + (–3.0), households) + 7.0 (i.e., 3.0 + 4.0, non-financial firms) – 3 (inter-bank deposits) + 0.4 (direct government deposits) + 2.0 (loans from the CBR) = +0.6, and (ii) for *asset*-sanctioned banks, –4.5 (i.e., +0.4 – 4.9, international borrowings) – 3.0 (i.e, +5.0 + (–8.0), households) + 0.0 (i.e., –2.0 + 2.0, non-financial firms) + 11.0 (i.e., 4 + 7, inter-bank deposits) + 0.2 (direct government deposits) + 0.0 (i.e., –2.0 + 2.0, loans from the CBR) = +3.7.



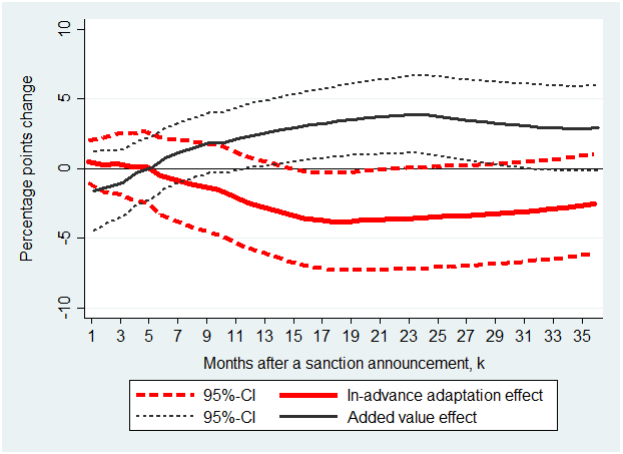
(a) Household loans, *debt*-sanctioned banks



(b) Household loans, *asset*-sanctioned banks



(c) Non-financial firm loans, *debt*-sanctioned banks



(d) Non-financial firm loans, *asset*-sanctioned banks

Note: The figures report the staggered difference-in-differences estimates of the coefficients on $SANCTION_b \times POST.FIRST_t$ and $SANCTION_b \times POST.NEXT_{b,t}$ in equation (8), with the dependent variable reflecting the stock of bank credit to either households or non-financial firms (as % of bank total assets). The estimates are obtained by running the staggered DID with in-advance adaptation on the expanding window $[t_b - k, t_b + k]$, where $k = 1, 2...36$ months after either bank-specific sanction date (added value effects, black lines) or the date of sanctions against the *Rossiya Bank* (in-advance adaptation effects, red lines).

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

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 4.0 pp, as a matter of in-advance adaptation, though a further recovery by virtually the same 4.0 pp after being actually sanctioned (Figure 8.d). Loans to households were unlikely to be in-advance adapted but they increased substantially, by 4 pp of total assets, as a result of the direct effects of sanctions (Figure 8.b). Effectively, the asset-sanctioned banks were even able to increase their lending intensity after the sanctions.

Overall, the most striking result is that both (not yet) debt- and asset-sanctioned banks began to re-shuffle 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 their loan portfolios from a rising risk of sanctions against Russian firms *per se*. Firms themselves could face sanctions and stop repaying their debts, whereas households (at least, those not from the SDN list) were free of such "sudden" constraints. As a result, 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 previous studies (Ahn and Ludema, 2020; Crozet et al., 2021) who revealed the sanctions did indeed have a negative effect on Russian firms.

Regarding other domestic assets, the DID results indicate that debt-sanctioned banks reduced their inter-bank exposures in response to the direct effects of sanctions (Figure F.II.a), whereas asset-sanctioned banks effectively increased such exposures—by about 7.0 pp as a means of in-advance adaptation but then partially reduced the exposures—by roughly 4.0 pp shortly after the sanction announcements (see Figure F.II.b). Finally, we find that (not yet) debt-sanctioned banks did not create additional cash & reserves buffers as a matter of in-advance adaptation to upcoming sanctions (Figure F.II.c), whereas not yet asset-sanctioned banks did so in a similar situation—they increased the ratio of cash and reserves to total assets by up to 8.0 pp (Figure F.II.d). However, when sanctions hit, the already debt- and already asset-sanctioned banks both had to reduce their exposures at the inter-bank market (by up to –3.2 and –4.0 pp, respectively) and spend cash and reserves (in amounts of 1.5 and 7.0 pp, respectively), presumably to manage the deposit runs. In Appendix G, we describe the DID estimation results on what happened to the (effective) interest rates of the targeted banks.

3.7 Macroeconomic effects: back-of-the-envelope calculations

We now analyze the aggregate implications of the just discussed staggered DID estimates of the effects of sanctions on the largest Russian banks. We appeal to structural vector autoregressive models (SVAR) with sign restrictions, which allow us to identify credit supply shocks and their effects on the real economy, at the aggregated level. We follow Gambetti and Musso (2017) in the 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 H. Given the estimated impulse response functions from our SVAR model, we can 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 in-advance adaptation and added value effects of sanctions on loans. Let us start with loans to non-financial firms. As we reported in Section 3.6.2, the

in-advance adaptation effects of sanctions on (not yet) debt- and asset-sanctioned banks peaked at –2 and –4 pp, respectively. The average distance, at which the in-advance adaptation 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 other portions of sanctions were introduced. During these 21 months, the average volume of total assets of the debt-sanctioned banks equals 2,604 billion Rubles and of the asset-sanctioned banks equals just 85 billion Rubles.[42] 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 in-advance adaptation effect of sanctions as –833 and –58 billion Rubles, respectively for the debt- and asset-sanctioned banks.[43] Now, apply the elasticity of output (GDP) with respect to loan volumes estimated from our SVAR-analysis (1.52) and obtain that the in-advance adaptation effect of sanctions could have caused a decline of the Russian economy's GDP (i) by –1.5 pp because of credit reductions by (not yet) debt-sanctioned banks and (ii) –0.2 pp because of loan reductions by (not yet) asset-sanctioned banks (averages for 2014–2015), amounting to –1.7 pp in total. This result implies that the very first announcement of sanctions in March 2014 had a rather moderate though noticeable negative effect on the Russian GDP through reductions of loans to non-financial firms.

Differently from the existing research on sanctions, we can disaggregate the effects of sanctions on those channeling through firms vs. those through households. And the in-advance adaptation effect through households was positive, not negative. Computed similarly, we obtain that Russian GDP in 2014–2015 could have risen by additional 2.3 pp because of credit re-shuffling—that is, through rising lending to households initiated by (not yet) debt-sanctioned banks. These positive effects overweigh the negative ones by 0.5 pp in terms of GDP after the in-advance adaptation effects of sanctions.

Further, the direct effects of sanctions appear to be also large compared to the just described in-advance adaptation one. Average volumes of assets during respective periods had increased to 3,137 and 160 billion Rubles for the debt- and asset-sanctioned banks, respectively. Applying the same logic as above, we can estimate that debt-sanctioned could have decreased corporate loans by 1,606 billion Rubles whereas the asset-sanctioned banks could have compensated for this decline by only 109 billion Rubles. Through the estimated elasticity of GDP to loan volumes during the periods of credit supply shocks, these figures imply the Russian GDP could have fallen by 2.5 pp over 2015–2017 as the result of corporate credit reduction by the debt-sanctioned banks and recovered by only 0.2 pp due to expanded corporate credit by asset-sanctioned banks. Finally, the Russian GDP could have

[42]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 US dollars, respectively.

[43]These are computed as $-0.020 \times 16 \times 2,604$ and $-0.04 \times 17 \times 85$.

increased over the same period by 1.8 and 0.2 pp 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 pp after the direct effects of sanctions materialized.

Overall, this macroeconometric exercise indicates that the sanctions against the largest Russian banks could have a large negative (in-advance adaptation and direct) effect on the Russian economy through declined bank lending to non-financial firms (–4.0 pp of GDP) but, at the same time, almost equally positive (in-advance adaptation and direct) effect through expanded lending to households (+4.1 pp of GDP). These numbers can shed more light on why previous research reveals no disruptive effects of the Western sanctions against Russia (Dreger et al., 2016; Ahn and Ludema, 2020).

4 Treatment diffusion to non-targeted banks

4.1 The idea

One may have a concern that the Western countries did not recognize all state-connected banks in Russia, especially those indirectly controlled by the Russian government.[44] If some banks were left unrecognized, then our baseline estimates of the in-advance adaptation effects of sanctions can be biased upward due to omitted *treatment diffusion*, i.e., due to possible adaptation of international operations by the unrecognized banks.[45]

We suggest the following mechanism of treatment diffusion. The probability of being sanctioned subjectively perceived by not yet recognized banks crucially depends on the share of *government-connected persons* on the board of directors/owners of such banks: the greater the share, the higher the subjective probability, the larger the in-advance adaptation of international operations. This is because a greater share of government-connected persons makes it easier for Western countries to recognize a bank as state-controlled and sanction it.

To facilitate the search of unrecognized banks, we follow Karas and Vernikov (2019), who provide a comprehensive hand-collected database on the ownership structure of all 3,176 banks that were operating in the Russian banking system over the last three decades. Focusing on the 2014–2020 period using this database we find that a total of 55 state-owned and controlled banks in Russia, of which only 20 were actually (debt) sanctioned. The other 35 banks were untouched by the West. In

[44] Recall that among the 20 debt-sanctioned banks, 15 were sanctioned because they were subsidiaries of either the "*Big-4*" state-owned banks or the development bank VEB.

[45] Though we cannot test it directly with the data at hand, it is clear that the unrecognized banks, if any, might be used to evade sanctions. These banks could, if necessary, borrow from abroad and transfer these funds to the already-sanctioned banks through the domestic inter-bank market. Likewise, the unrecognized banks could buy the foreign asset holdings of the already-sanctioned banks and thus effectively keep the government control over those.

Appendix I, we analyze the balance sheets of those banks and compare them to those of the sanctioned banks. The key outcome of the comparison is that the unrecognized banks are in between the debt- and asset-sanctioned banks in terms of size, have similar portions of foreign borrowings and international assets before March 2014, and they reduced those after March 2014.

4.2 Construction of the government share variable

For each bank b from the subgroup of the 33 eventually-sanctioned banks and the 35 unrecognized state-controlled banks, we first access bank b's official website and download annual reports for each year $t \geq t^* = 2014$, where possible, up to 2019. Further, we extract information on the composition of the board of directors in the respective year from the annual reports. We gather name, surname, date of birth, and career-path information, where possible, for each person p entering the board of directors of the bank b at year t. Of course, we face large variations in the degree of such data disclosure, ranging from no disclosure at all (8 banks out of the 35 unrecognized banks) to at least names and surnames being disclosed (all actually-sanctioned banks and $35 - 8 = 27$ 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 use publicly available sources: the search through either the nationwide database on the Russian banks,[46] the database on managers employed in the Russian companies, more broadly,[47] or the search over the rest of the Web. Third, with this rich information aggregated from various sources, we construct the government share variable, $Gov.Share_{b,t}$. For this purpose, we attribute a person p from bank b's board of directors/owners to that 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[48]) entity;

2. is at t, or was before t, either a local or federal minister or deputy/senator from the ruling party ("Edinaya Rossiya");

3. represents at t an oligarch family with close ties to the Kremlin (e.g., Kovalchuk, Rotenberg).

Below in Table 5 we report a description of the constructed $Gov.Share_{b,t}$ variable. We were successful to gather the necessary data on government-connected persons in half of the 17 asset-sanctioned banks; 15 of the 16 debt-sanctioned banks, and 27 of the 35 unrecognized banks. We obtain that *on average*,

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

the 27 unrecognized banks are in between the asset- and debt-sanctioned banks in terms of the share of government-connected persons on the board of directors/owners. The mean value of the $Gov.Share_{b,t}$ variable for them equals roughly 54%, which is 26 pp larger than in the asset-sanctioned banks but 30 pp 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 analysis.

Table 5: Summary statistics on the $Gov.Share_{b,t}$ variable across the subgroups of treated and diffused banks

	Obs*	Mean	SD	Min	Max
	(1)	(2)	(3)	(4)	(5)
Treated & Not state	8 / 17	26.4	9.7	17	50
Treated & State	15 / 16	83.5	15.4	25	100
Not treated & State	27 / 35	53.9	25.7	8	100

Note: "Treated" stands for actually sanctioned banks. "Not treated" denotes potentially 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 $Gov.Share_{b,t}$ variable.

4.3 Treatment diffusion: A two-stage approach

4.3.1 *The first stage*

In the first stage, we predict a subjectively perceived probability of being sanctioned based on the variation in the $Gov.Share_{b,t}$ variable using a logit regression framework at the monthly frequency. Since we are working with subjective perceptions of sanctions, we further hypothesize that such perceptions depend crucially on the distance to Moscow, a variable that earlier proved its relevance in determining the heterogeneity of the in-advance adaptation effect of sanctions. The resulting logit specification reads as:

$$Pr\{Sanctioned_{b,t} = 1 \mid \mathbf{X}_{b,t}\} = \tag{9}$$
$$= \Lambda\Big(\beta_1 Gov.Share_{b,t} + \beta_2\Big(Gov.Share_{b,t} \times Distance_b\Big) + \phi' \mathbf{X}_{b,t}\Big)$$

where $Sanctioned_{b,t}$ is an indicator variable that equals 1 if a bank b was sanctioned at t or before, and 0 if not. $X_{b,t}$ are observables that encompass the government shares in the boards of directors of each bank b, its distance to Moscow, and other bank-specific controls. For the latter, we consider (i) the structure of international operations, proxied by the difference between foreign assets and foreign liabilities, relative to bank b's total assets (TA); (ii) the structure of domestic operations, measured by the difference between individuals' deposits and loans, % of TA; (iii) annual growth of the bank's

b TA; (iv) the quality of bank b's loan portfolio, measured by NPLs ratio to TA; (v) the role played by bank b's in the domestic inter-bank market, measured by the difference between loans issued and deposits attracted there, % of TA; and (vi) profitability of bank's b TA, measured by a monthly ROA indicator. Finally, $\Lambda(\cdot)$ is the logistic distribution.

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 (9), which in turn allows us to flexibly account for the changing nature of bank adaptation to negative news on upcoming sanctions. Importantly, we consider two versions of the $Sanctioned_{b,t}$ variable: one for *debt-* and the other for *asset*-sanctioned banks; that is, we run two parallel loops of cross-sectional logit regressions. This is crucial in the second stage, when it is necessary to assume which of the two types of sanctions a not-yet-treated bank can encounter.

Table 6 reports a part of the estimation results pertaining to the peaks of sanction imposition during the first wave (2014, Panel 1) and the second wave (2017, Panel 2).[49] In columns (1)–(3) we report the results for the full subsample, composed of debt- and asset-sanctioned banks, while columns (4)–(6) show the results for the debt-sanctioned banks and columns (7)–(9) for the asset-sanctioned banks.

Several outcomes emerge from the estimation results of the first stage. *First*, and most importantly, our constructed $Gov.Share_{b,t}$ variable is informative in predicting the imposition of sanctions and captures a differential impact on debt- and asset-sanctioned banks. Specifically, the estimated coefficients on the $Gov.Share_{b,t}$ variable are always highly statistically significant for the debt-sanctioned banks and never—for the asset-sanctioned banks.[50] *Second*, mixing the two types of sanctions (in columns (1)–(3)) deteriorates the precision of estimated coefficients on $Gov.Share_{b,t}$, which is true for the first wave of sanctions (Panel 1) but not true for the second (Panel 2). *Third*, we find that the greater the distance to Moscow is, the larger is the effect of $Gov.Share_{b,t}$ 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 to the presence of government-connected persons on their board of directors when assessing the likelihood of sanctions than banks located near the Kremlin. During the second wave of sanctions, this heterogeneous effect disappears, which possibly indicates that the informational asymmetry regarding the upcoming sanctions had vanished, and banks, no matter where they were located, started to treat the signals of sanctions equally when negative news occurred.[51]

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

[50] 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.

[51] We also considered a binary version of the $Gov.Share_{b,t}$ variable: 1 if the share of government-connected persons

Table 6: 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

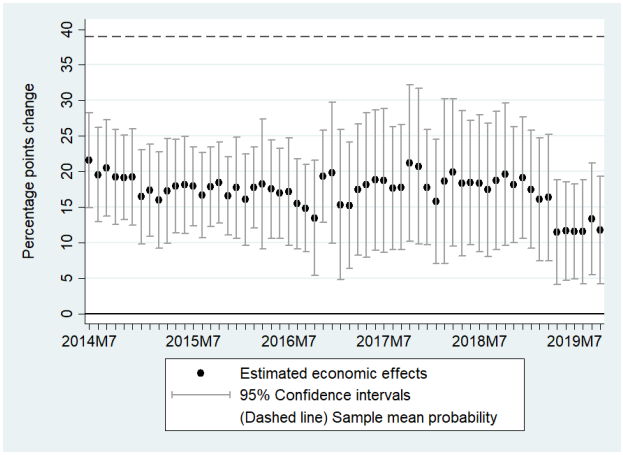
Note: ***, **, * indicate that a coefficient is significant at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the bank level and appear in brackets under the estimated coefficients.

To understand the economic significance of possessing government-connected persons on the board of directors, we compute the product of the marginal effect of the $Gov.Share_{b,t}$ on $Pr\{Sanctioned_{b,t} = 1 \mid X_{b,t}\}$ and a one standard deviation of the $Gov.Share_{b,t}$ variable. We do this for each month t after we estimate the respective logit model in the loop. Because the regressors contain the interaction of $Gov.Share_{b,t}$ and the distance to Moscow, we set the $Distance_b$ variable at its sample mean for concreteness.[52] The resultant economic effects of $Gov.Share_{b,t}$ are plotted in Figure 9.(a) for debt sanctions and Figure 9.(b) for asset sanctions. Our results suggest that an increase in the share of government-connected persons on the board of directors by one standard deviation significantly raises the probability of being debt-sanctioned by 10 to 22%, depending on the month, whereas the effects are mostly insignificant for asset sanctions. Interestingly, these economic effects exceed those pertaining

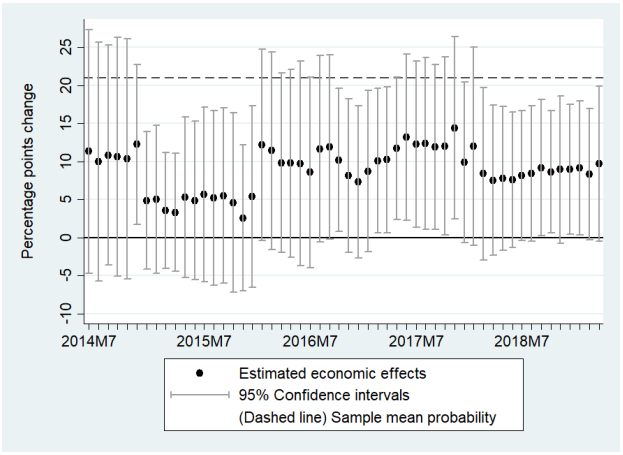
in the bank's b board of directors is strictly greater than zero at time t, and 0 if else. The logit estimations produce qualitatively the same results (available upon request).

[52]We demean our variables before running regressions by subtracting the 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 can therefore interpret our results to be those relevant for the banks located *outside* the city of Moscow in the Western part of Russia.

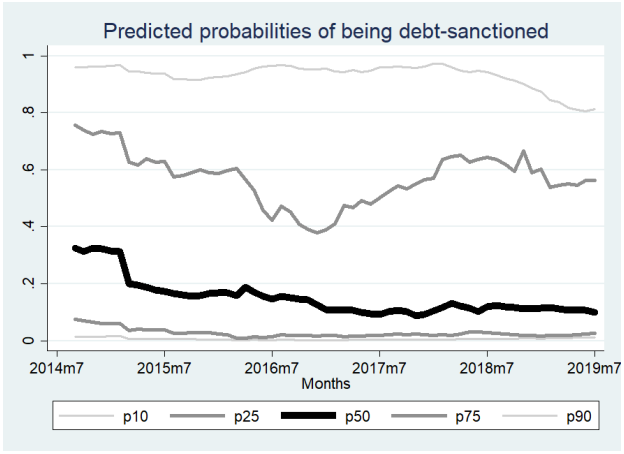
to the same banks' overall size, as measured with the log of total assets, and foreign asset position (see Appendix J). Overall, the effects are meaningful, given that the unconditional probability of being debt-sanctioned in the combined subsample of debt-sanctioned and diffused banks is roughly 40%.[53]



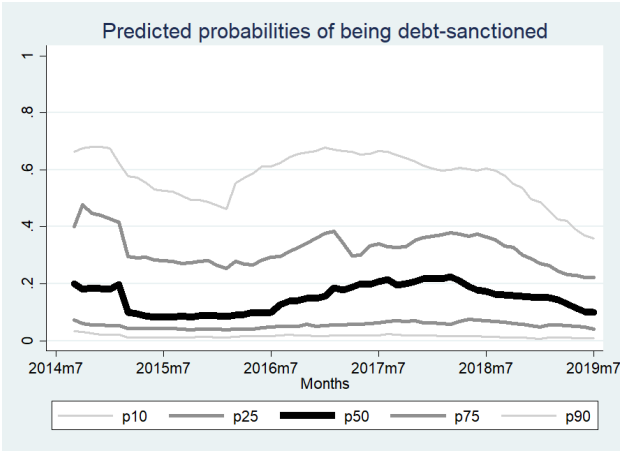
(a) Debt sanctions: Economic effects of $Gov.Share_{b,t}$ on $Pr\{Sanctioned_{b,t} = 1 \mid X_{b,t}\}$



(b) Asset sanctions: Economic effects of $Gov.Share_{b,t}$ on $Pr\{Sanctioned_{b,t} = 1 \mid X_{b,t}\}$



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



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

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. The economic effect is computed as the product of the marginal effect of the $Gov.Share_{b,t}$ on $Pr\{Sanctioned_{b,t} = 1 \mid X_{b,t}\}$ and a one standard deviation of the $Gov.Share_{b,t}$ variable. "p10" to "p90" are respectively 10 to 90%-tiles.

Figure 9: Post-estimation after the logit models of the probability of being sanctioned: economic effects and predictions

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., $\widehat{Pr}\{Sanctioned_{b,t} = 1 \mid X_{b,t}\}$ for the debt- and asset-sanctioned banks, see Figure 9.(c)–(d). In the case of debt sanctions, we find that the median predicted probability centers around 15-20% and that the variation is rather large, from nearly 0% to 100%. For the asset-sanctioned banks, the median estimated probability is very

[53] In the full sample of Russian banks, the analog is 1.2% (with a standard deviation being 11 pp).

similar, but the variation is narrower across the months. Having the predicted probabilities of being sanctioned, we are now ready to describe the second stage of our approach.

4.3.2 *The second stage*

In the second stage, we then run almost the same difference-in-differences regressions as before, except now we *extend* the treatment group (recall that the control group remains fixed, and that it does not contain politically-connected private banks). Specifically, we include a bank b in the extended treatment group if the bank b ever faced sanctions within the sample period *or* $\widehat{Pr}\{Sanctioned_{b,t} = 1 \mid X_{b,t}\} \geq \overline{Pr}$, where $\overline{Pr} = 0.02$ is set at the unconditional probability of being sanctioned in the sample. For convenience, we refer to bank b as either actually sanctioned (S), diffused (D), or never-sanctioned matched (NSM) bank. The underlying indicator variable $TREAT.DIFFUSION_b = 1$ if $b \in S$ or $b \in D$, and 0 if $b \in NSM$. The second-stage regression then reads as:

$$Y_{b,t} = \alpha_b + \gamma_t + \beta_1 \Big(TREAT.DIFFUSION_b \times INFO.FIRST_t \Big) \tag{10}$$
$$+ \xi' \mathbf{X}_{b,t} + \varepsilon_{it}, \text{ if } t \in [t_1 - k, t_1 + k]$$

where t_1 is March 2014 (the first sanction announcement), and the rest of the variables are as before.

The estimation results from the second stage appear in Table 7. First, we obtain a positive and significant (at 5%) coefficient on the $SANCTION.DIFFUS_b \times POST.FIRST_t$ variable in Column 1 and Panel 1, as in the baseline exercise. Moreover, quantitatively, the magnitudes of the estimates for the diffused banks are very close to the actually treated banks—about a 2 pp increase in international borrowings after the first sanction announcement. As can be inferred from Column 3 and Panel 1, adding the diffused banks to the treatment group leads to a slightly lower but still significant estimate of the in-advance adaptation effects of sanctions on the not yet debt-sanctioned banks.

Second, as can be further inferred from Column 4 and Panel 2, we also obtain a negative and significant (at 5%) estimate of the coefficient on the $SANCTION.DIFFUS_b \times POST.FIRST_t$ variable, also as in the main exercise above. In this case, the effect on the diffused banks is substantially lower than on the actually asset-sanctioned banks. Further, if we add these diffused banks to our initial treatment group, we still obtain a negative and highly significant coefficient (as in the main exercise).

Third, if we were to ignore the first stage and feed all private banks with political connections to the extended treatment group, we would lose two of the four important outcomes compared to the truly two-stage approach: one on foreign assets and the other on foreign liabilities (see Appendix L). This is because there are too many banks that are not only less responsive but also responsive in *opposite* directions compared to the actually treated or highly likely treated (diffused) banks.

Table 7: Treatment diffusion in international operations:
the estimation results from the second stage

Sanction type:	Debt sanctions			Assets sanctions		
Treatment:	Diffused	Actual	Actual + Diffused	Diffused	Actual	Actual + Diffused
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities, as % of bank total liabilities						
SANCTION.DIFFUS$_b$ × POST.FIRST$_t$	1.960**	2.138***	1.270**	0.315	–2.354***	–0.473
	(0.545)	(0.649)	(0.890)	(0.336)	(0.634)	(0.390)
N obs	2,707	2,241	4,400	2,569	3,148	4,863
N treated / control banks	13 / 54	14 / 35	27 / 100	13 / 53	16 / 59	29 / 99
R^2_{within}	0.547	0.620	0.457	0.305	0.457	0.261
Panel 2: Dependent variable = Foreign assets, as % of bank total assets						
SANCTION.DIFFUSE$_b$ × POST.FIRST$_t$	–0.721	–2.306***	–0.911*	–1.444**	–2.384***	–2.366***
	(0.682)	(0.516)	(0.554)	(0.646)	(0.786)	(0.580)
N obs	2,707	2,241	4,400	2,540	3,105	4,767
N treated / control banks	13 / 54	14 / 35	27 / 100	13 / 53	16 / 59	29 / 99
R^2_{within}	0.382	0.636	0.426	0.273	0.249	0.229

Note: The table reports the 2^{nd}-stage treatment diffusion DID estimates of the effects of sanctions on foreign liabilities (*Panel 1*) and foreign assets (*Panel 2*) of Russia's targeted banks, as implied by equation (10), against the background of the baseline DID estimates obtained when ignoring diffusion (columns 3 and 5). The estimation window is $k = 24$ months around the imposition of sanctions on the *Rossiya Bank* (March 2014). $SANCTION.DIFFUS_b = 1$ if a bank b either will ever face sanctions within our sample period (*actually treated*) or never faced sanctions but has a high probability of being sanctioned due to political connections (*diffused*). $POST.FIRST_t = 1$ after March 2014 and is aimed at capturing the in-advance adaptation effect. Actually sanctioned and/or diffused (i.e., treated) and never-sanctioned (i.e., control) banks are 1:4 matched within two years prior to March 2014. Diffused banks are not allowed to enter the control group. Bank FE, Month FE, Bank controls, and all necessary cross-products of the SANCTION.DIFFUS and POST.FIRST variables are included but not reported.

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

5 Transmission of sanctions from banks to firms: evidence from syndicated loan data

5.1 Supply of syndicated loans before and after sanctions

We now appeal to the syndicated loan deals data to answer the question of how the financial sanctions were transmitted from the targeted banks to their borrowers. Of course, a clear limitation of this analysis is that it covers only a small portion of all loans in Russia in terms of quantity. However, in terms of the volume of loans, our analysis may be rather instructive.

Indeed, using the cbonds.com data source, we reveal that there were only 126 syndicated loans issued to Russian non-financial firms by the syndicates that contained at least one Russian bank, sanctioned or not, during the three years before and the three years after March 2014, i.e., between 2011 and 2017. We intentionally limit the time window to reduce confounding effects of other events that could have occurred at the same time. These loans were issued jointly by 135 banks in total

(Russian and foreign), of which 48 are Russian banks and the rest are foreign. Among the 48 Russian banks, 11 were eventually sanctioned ($SANCTION_b = 1$). The sum of the amounts of all these loans, deflated by CPI (March 2014=100%), is equivalent to 30% of the total corporate loans in the Russian banking system.

From the borrowers' side, these 126 syndicated loans were demanded by 59 large firms in Russia, of which 16 faced sanctions from the West or Ukraine at some point ($SANCTION_f = 1$). The firms operated in 16 different industries of the economy.

With this data at hand, we specify the following difference-in-differences regression to quantify the supply-side effects of sanctions on the volume of loans:

$$\begin{aligned}\ln(Loan_{b(s),f,t}) = \; & \beta_1 \cdot \Big(SANCTION_b \times POST.FIRST_t\Big) \\ & + \beta_2 \cdot \Big(SANCTION_b \times POST.NEXT_{b,t}\Big) \\ & + \beta_3 \cdot \Big(SANCTION_f \times POST.FIRST_t\Big) \\ & + \beta_4 \cdot \Big(SANCTION_f \times POST.NEXT_{f,t}\Big) \\ & + \beta_5 \cdot \Big(SANCTION_b \times POST.FIRST_t \times SANCTION_f\Big) \\ & + \beta_6 \cdot \Big(SANCTION_b \times POST.NEXT_{b,t} \times SANCTION_f\Big) \\ & + \alpha_{b(g)} + \alpha_{i(f)\times t} + Controls_{b(s),f,t} + \varepsilon_{b(s),f,t}\end{aligned} \tag{11}$$

where $Loan_{b(s),f,t}$ is the amount of loan that bank b in syndicate s provides to firm f when the contract is signed. In the absence of actual weights within the syndicates, equal weights are assumed. We split all firms on those being sanctioned or not ($SANCTION_f = 0$ or 1) to directly test the hypothesis that banks reduced the loans to not-yet-sanctioned firms. $\alpha_{b(g)}$ is the fixed effect of group g ($g = 1, 2...10$) which bank b belongs to. We cannot include a bank b's fixed effect due to a limited number of observations. We consider 12 bank groups: 10 decile groups (in terms of assets), with the top-3 banks being excluded from the 10^{th} group, and 2 more groups composed of VTB and Gazprombank (11^{th} group) and Sberbank (12^{th} group) to account for their disproportionately larger size than other banks in the 10^{th} group. These fixed effects intend to capture unobserved heterogeneity across banks in terms of their ability to establish relationships with borrowers and bargain loan contract conditions. In turn, $\alpha_{i(f)\times t}$ is the product of the fixed effect of industry i, to which firm f belongs, and the fixed effect of the month t when the loan deal was signed. These fixed effects capture the demand-driven factors determining the size of loans at the industry level. Similarly to the bank group fixed effects, we have to use firm group fixed effects instead of firm fixed effects because of data limitations. We thus

effectively assume that industry- and firm-level demand for loans are identical. This is our limitation. $Controls_{b(s),f,t}$ include the log of the loan maturity, and bank-specific characteristics reflecting bank equity capital to total assets ratio (leverage), non-performing loans ratio (ability to extend new loans), net position in foreign operations (assets net of liabilities, to control for direction of bank loans), term deposits with a maturity of three and more years in total deposits (funding stability). $\varepsilon_{b(s),f,t}$ is regression error.

Estimation results of equation (11) appear in Table 8. First, regarding the *sanctioned banks–non-sanctioned firms* relationship ($SANCTION_b = 1$ and $SANCTION_f = 0$), we obtain negative and significant coefficients in columns 1 and 2 for the US/EU sanctions and negative insignificant coefficients in columns 3 and 4 for the Ukrainian sanctions. Notably, the significant effects in columns 1 and 2 hold only when we compare before and after March 2014 ($POST.FIRST_t = 1$) but not before and after individual bank sanction dates ($POST.NEXT_{b,t} = 1$). Taken together, these estimates mean that not-yet-sanctioned banks reduced by 20% ($exp\{-0.227\} - 1$) the supply of loans to those firms that never faced even US/EU sanctions afterward (private firms). When the banks faced their sanctions, they were not reducing the supply of loans anymore: everything was adapted in advance.

Second, regarding the *never-sanctioned banks-sanctioned firms* relationship (when $SANCTION_b = 0$ and $SANCTION_f = 1$), we obtain negative and significant coefficients in columns 1 and 2 for the US/EU sanctions and insignificant coefficients in columns 3 and 4 for the Ukrainian sanctions. This again holds only in the case of before and after March 2014 ($POST.FIRST_t = 1$). After the firms face sanctions, there are nearly zero new deals in the market, and the model fails to estimate the coefficient if $POST.NEXT_{f,t} = 1$. These estimates imply that banks halted syndicated loans to those firms that have not yet faced US/EU sanctions (state-owned and -controlled entities). Anticipation matters. Reduction of the supply equals 87% ($exp\{-2.062\} - 1$).

Finally, as for the *sanctioned banks-sanctioned firms* relationship (when $SANCTION_b = 1$ and $SANCTION_f = 1$), the model fails to estimate any coefficient and we obtain no estimates of the effects of sanctions. This is because of a too small number of new deals in respective pairs, as we already encountered above.

5.2 Borrowing firms' performance before and after sanctions

Having established that sanctioned banks reduced the supply of (syndicated) loans to both sanctioned and non-sanctioned firms, we now explore whether this reduction negatively impacted the firms' performance. We consider the following four characteristics at the firm-year level: firm size, as proxied with the total assets, investment, employment (number of workers), and total revenue, with deflating

Table 8: The effects of sanctions on the supply of syndicated loans: Difference-in-differences estimates

	US + EU sanctions		Ukrainian sanctions	
	Info + Direct	Info + Direct + Controls	Info + Direct	Info + Direct + Controls
	(1)	(2)	(3)	(4)
$\text{SANCTION}_b \times \text{POST.FIRST}_t$	–0.227**	–0.235**	–0.019	–0.017
	(0.091)	(0.116)	(0.053)	(0.068)
$\text{SANCTION}_b \times \text{POST.NEXT}_{b,t}$	–0.015	–0.011	–0.221	–0.242
	(0.074)	(0.091)	(0.165)	(0.164)
$\text{SANCTION}_f \times \text{POST.FIRST}_t$	–2.062***	–2.065**	–0.207	–0.205
	(0.391)	(0.384)	(0.639)	(0.631)
$\text{SANCTION}_f \times \text{POST.NEXT}_{b,t}$	*n/a*	*n/a*	0.230	0.286*
			(0.156)	(0.162)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{SANCTION}_f$	*n/a*	*n/a*	*n/a*	*n/a*
$\text{SANCTION}_b \times \text{POST.NEXT}_{b,t} \times \text{SANCTION}_f$	*n/a*	*n/a*	*n/a*	*n/a*
Bank control variables		Yes		Yes
log of loan $\text{maturity}_{b(s),f,t}$	2.028***	2.031***	2.028***	2.030***
	(0.622)	(0.626)	(0.630)	(0.634)
Industry × Month FE	Yes	Yes	Yes	Yes
Bank group FE	Yes	Yes	Yes	Yes
N obs	335	330	335	330
R^2	0.832	0.831	0.832	0.831

Note: The table reports the DiD estimates of the effects of sanctions on the log of syndicated loans issued by targeted, as compared to non-targeted, Russian banks. The estimation window is $[-36, 36]$ months around the imposition of sanction on the first targeted bank in Russia (March 2014). The data sample covers 126 syndicated loans issued to Russian firms by syndicates that contain at least one Russian bank, sanctioned or not; 135 banks in total (Russian and foreign), of which 48 are Russian banks and 11 are the banks that were eventually sanctioned ($SANCTION_b = 1$). The volumes of loans are deflated by CPI (March 2014=100%). The total volume of the 126 syndicated loans covers roughly 20% of the total loans in the Russian banking system. In the absence of actual weights within the syndicates, equal weights are assumed.

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

by CPI and taking logs where appropriate. Again, we restrict the sample to the 2011–2017 period. Description of the firm-level data and summary statistics are reported in Table K.I (see Appendix K).

We specify the following difference-in-differences equation to understand how the reduced supply of loans affected firms depending on whether they had relationships with sanctioned banks or not:

$$\begin{aligned} \ln Y_{f,t} = \alpha_f + \gamma_t &+ \beta_1 \cdot \Big(RELATIONSHIP_{f,b} \times POST.FIRST_t \Big) \\ &+ \beta_2 \cdot \Big(POST.FIRST_t \times SANCTION_f \Big) \\ &+ \beta_3 \cdot \Big(RELATIONSHIP_{f,b} \times POST.FIRST_t \times SANCTION_f \Big) \\ &+ Controls_{f,t-1} + \varepsilon_{f,t} \end{aligned} \tag{12}$$

where $RELATIONSHIP_{f,b}$ is a binary variable that equals 1 if firm f had a relationship with a syndicate that contained at least one ever-sanctioned bank. $Controls_{f,t-1}$ include the lagged dependent variables in the respective equation. Other notations remain the same.

Estimation results of equation (12) are reported in Table 9. First, we obtain no significant estimates of the β_1 coefficient across columns 1 to 4. This means that, despite having relationships with sanctioned banks before March 2014, never-sanctioned firms did not experience negative effects on their assets, investment, employment, or total revenue after March 2014 as compared to the never-sanctioned firms that did not have relationships with sanctioned banks.

Second, strikingly, we obtain positive estimates of the β_2 coefficient on the $POST.FIRST_t \times SANCTION_f$ variable in columns 1–3 and a negative one in column 4. This implies that sanctioned firms that did not have relationships with sanctioned banks before 2014 enjoy rising size of assets, expand employment, and increase investment after March 2014 as compared to the sanctioned firms that did have relationships with sanctioned banks. The average increase of the three characteristics reaches 41%. However, rising assets, employment, and investment did not result in a greater total revenue; instead, the firms were suffering from declining market sales—and the decline equals –16%.

And third, we obtain negative, as one would expect, and significant estimates of the β_3 coefficient on the $RELATIONSHIP_{f,b} \times POST.FIRST_t \times SANCTION_f$ variable consistently across columns 1 to 4. The underlying decline is huge being bounded between –52 to –35% over the course of 2014–2017. This indicates that, if sanctioned firms had relationships with sanctioned banks before March 2014, they experience a sharp contraction in their key characteristics.

Our results are consistent with the government-support channel of the targeted firms that led to capital misallocation that has been recently established by Nigmatulina (2022). Key firm characteristics such as investment and employment could have been supported but this never resulted in the growing market performance of the firms. In addition, our results also point to rather differential support by the government. Apparently, the government preferred to support sanctioned firms disproportionately more if they did not have relationships with sanctioned banks. Those firms that did have such relationships suffered much more.

6 Conclusion

Financial sanctions against the largest Russian banks were imposed at different time points between 2014 and 2019, leaving room for not-yet-sanctioned banks to *anticipate punishment* and prepare in advance. Our estimates indicate that these effects of sanctions did exist and pushed banks to adjust their foreign and domestic assets and liabilities in advance, i.e., before the sanctions hit. We then

Table 9: The effects of sanctions on firms that obtain syndicated loans: Difference-in-differences estimates

Dependent variable:		Firm size	Invest	Employ	Revenue
		(1)	(2)	(3)	(4)
β_1	$\text{RELATIONSHIP}_{f,b} \times \text{POST.FIRST}_t$	–0.059	0.217	–0.132	–0.092
		(0.143)	(0.153)	(0.264)	(0.159)
β_2	$\text{POST.FIRST}_t \times \text{SANCTION}_f$	0.142**	0.398*	0.463**	–0.184*
		(0.065)	(0.208)	(0.233)	(0.104)
β_3	$\text{RELATIONSHIP}_{f,b} \times \text{POST.FIRST}_t \times \text{SANCTION}_f$	–0.428**	–0.540**	–0.741**	–0.672***
		(0.204)	(0.264)	(0.352)	(0.193)
Firm controls (lag = 1 year)		Yes	Yes	Yes	Yes
Firm FE		Yes	Yes	Yes	Yes
Year FE		Yes	Yes	Yes	Yes
N obs		433	389	328	408
R^2_{within}		0.480	0.056	0.519	0.460

Note: The table reports the DiD estimates of the effects of sanctions on firms that obtain loans from syndicates with at least one targeted bank as compared to firms whose syndicates had no targeted Russian banks. The estimation window is $[-3, 3]$ years around the imposition of sanctions on the first bank targeted in Russia (2014). The data sample covers 59 firms' syndicated loans issued to a Russian firm by a syndicate that contains at least one Russian bank, sanctioned or not. *Firm size* is the log of a firm's total assets, *Invest* is the annual growth rate of a firm's fixed assets (as a proxy for investment), *Employ* is the log of the number of workers employed, and *Revenue* is the log of the total revenue of a firm.

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

document how these primary effects of sanctions, i.e., effects on international operations, lead to secondary effects, i.e., effects on domestic assets and liabilities. We also document a treatment-diffusion effect on unrecognized state-controlled banks in Russia and propose an extension to the difference-in-differences approach that can capture this diffusion. We believe our treatment-diffusion approach could be applied in many empirical settings, either with fuzzy treatments or in which some untreated agents have non-trivial exposures to the treated agents and could thus behave similarly.

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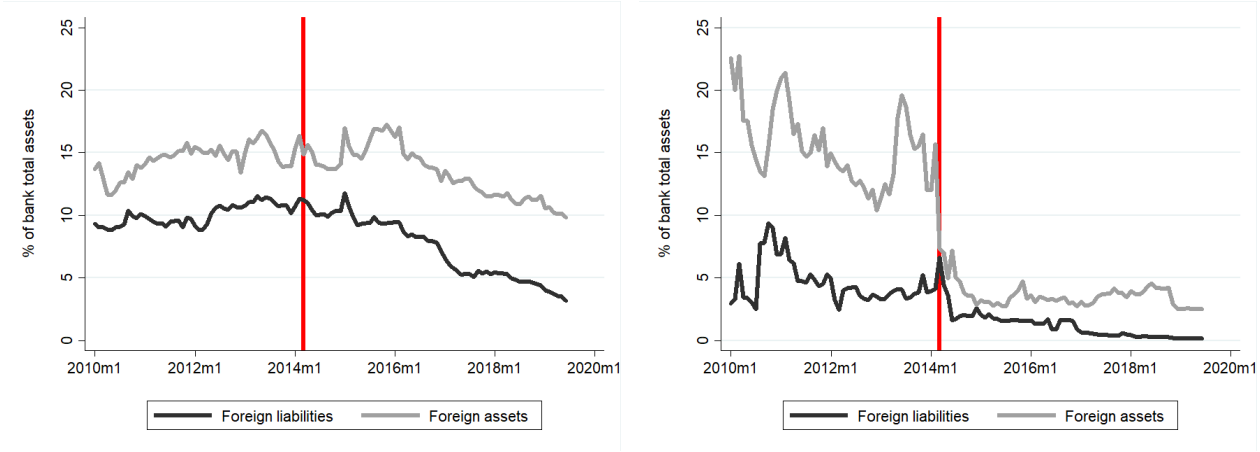
Appendix A The list of debt- and asset-sanctioned banks

#	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

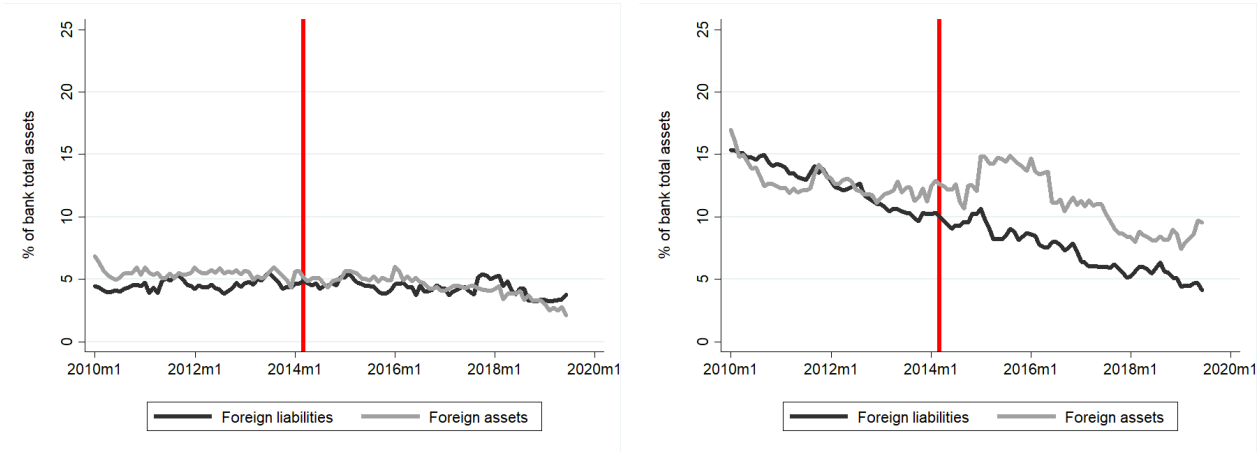
Appendix B Foreign operations of targeted and non-targeted banks



(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 banks that eventually faced debt sanctions (*a*) or assets sanctions (*b*). The red vertical red line marks March 2014—the month in which financial sanctions against Russian banks were imposed for the first time (the *Rossiya Bank*).

Figure B.I: International operations of debt- and asset-sanctioned banks, % of total assets



(a) Never-sanctioned banks outside top-200 (b) Never-sanctioned banks inside top-200

Note: The figures report foreign liabilities (black line) and foreign assets (grey line), as % of respective total assets of banks that had never been sanctioned and either entered the top-200 bank rating in terms of asset size (*a*) or remained outside the top-200 (*b*). The red vertical red line marks March 2014—the month in which financial sanctions against Russian banks were imposed for the first time (on the *Rossiya Bank*).

Figure B.II: International operations of large and small never-sanctioned banks, % of total assets

Appendix C Bank-level data: description

Table C.I reports descriptive statistics on the key bank operations. By columns, we present means, medians, and standard deviations for the 16 debt-sanctioned banks, 20 asset-sanctioned banks, and all the rest more than 900 unsanctioned 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 C.I: Descriptive statistics
(*at the bank-month level, from 2009M1 to 2019M6*)

Sanction type:	Debt (SSI)			Assets (SDN)			Unsanctioned		
	Mean	p50	SD	Mean	p50	SD	Mean	p50	SD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel 1: International operations, 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 operations: 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 operations: 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: Monthly expenses & returns, as % of bank total assets (*) or respective liability (**)									
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: Other variables, 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

Analysis of the descriptive statistics across the three groups of banks in the 2010s shows that, on average, debt-sanctioned banks are those most dependent on foreign liabilities and most engaged in foreign asset purchases compared to the other two types of banks in Russia. As shares in total assets, both operations are approximately twice as large as those in the asset-sanctioned and unsanctioned group 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 international borrowings 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 account for only 5.6% jointly. A 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 the direction of credit, being much more specialized in 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 fewer assets in cash and reserves than the assets- and non-sanctioned banks (see Panel 3).

What concerns expenses and returns, debt-sanctioned banks pay much lower wages to their 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 the 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 those politically motivated (for the rest), thus demanding loans at lower 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 that the NPLs of both groups of sanctioned banks are higher, not lower, than in 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 (La Porta et al., 2002; Khwaja and Mian, 2005).

Appendix D In-advance adaptation to sanctions: Estimation results at different horizons

Table D.I: In-advance adaptation effects of sanctions, distance to Moscow, and oil extraction: 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 liabilities						
$\text{SANCTION}_b \times \text{POST.FIRST}_t$	1.046**	2.637***	1.865**	–1.557***	–2.944***	–2.560*
	(0.412)	(0.722)	(0.791)	(0.425)	(0.815)	(1.437)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b$	–0.515	–1.280**	–0.230	–0.310	–0.776	–0.502
	(0.364)	(0.517)	(0.653)	(0.278)	(0.537)	(0.831)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b \times \ln OIL_{r(b)}$	0.063	0.126**	0.067	0.040	0.292**	0.223**
	(0.047)	(0.057)	(0.086)	(0.056)	(0.115)	(0.110)
N obs	1,165	2,241	2,827	1,642	3,148	4,580
N treated / control banks	14 / 35	14 / 35	14 / 35	16 / 59	16 / 59	16 / 59
R^2_{within}	0.569	0.623	0.610	0.355	0.465	0.451
Mean distance (km): treated / control	284	/	904	929	/	1,183
Mean oil extrac. (mln tons): treated / control	20	/	10	0.7	/	10
Panel 2: Dependent variable = Foreign assets, as % of bank total assets						
$\text{SANCTION}_b \times \text{POST.FIRST}_t$	–1.470**	–2.080***	–1.607	–1.243**	–2.703**	–2.727**
	(0.714)	(0.719)	(1.044)	(0.608)	(1.030)	(1.294)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b$	–0.555	–0.541	–2.445**	–0.695**	–0.829*	–1.074*
	(0.544)	(0.619)	(0.971)	(0.324)	(0.429)	(0.610)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b \times \ln OIL_{r(b)}$	–0.015	0.029	0.140	–0.018	0.056	0.147
	(0.095)	(0.072)	(0.089)	(0.086)	(0.089)	(0.094)
N obs	1,165	2,241	2,827	1,640	3,105	3,864
N treated / control banks	14 / 35	14 / 35	14 / 35	16 / 59	16 / 59	16 / 59
R^2_{within}	0.678	0.637	0.582	0.330	0.261	0.238
Mean distance (km): treated / control	284	/	904	929	/	1,183
Mean oil extrac. (mln tons): treated / control	20	/	10	0.7	/	10

Note: The table reports the DID estimates of the effects of sanctions on foreign liabilities (*Panel 1*) and foreign assets (*Panel 2*) of Russia's targeted banks, as implied by equation (3). The estimation Window is $k = 24$ months around the imposition of sanctions on the *Rossiya Bank* (March 2014). Sanctioned (i.e., treated) and never-sanctioned (i.e., control) banks are 1:4 matched within two years prior to March 2014. Private banks with political connections are not allowed to enter the control group. Bank FE, Month FE, Bank controls, and All necessary cross-products of the TREAT, POST.FIRST, DISTANCE, and OIL variables are included but not reported.

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

Table D.II: In-advance adaptation to sanctions: Maturity disaggregation of foreign liabilities

Sanction type:	Debt sanctions			Assets sanctions		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities with maturity ≥ 3 years, as % of bank total liabilities						
$\text{SANCTION}_b \times \text{POST.FIRST}_t$	0.694*	1.368***	1.645***	–1.701***	–1.633***	–1.819***
	(0.350)	(0.489)	(0.501)	(0.620)	(0.598)	(0.619)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b$		–1.448***	–1.543***		–0.070	–0.780**
		(0.522)	(0.445)		(0.131)	(0.359)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b \times \ln OIL_{r(b)}$			–0.038			0.164
			(0.0504)			(0.103)
N obs	2,241	2,657	2,241	3,148	3,148	4,148
N treated / control banks	14 / 35	14 / 35	14 / 35	16 / 59	16 / 59	16 / 59
R^2_{within}	0.503	0.516	0.522	0.414	0.414	0.420
Panel 2: Dependent variable = Foreign liabilities with maturity $\in [1, 3)$ years, as % of bank total assets						
$\text{SANCTION}_b \times \text{POST.FIRST}_t$	0.391	0.677	0.836	–1.769***	–1.998***	–2.134***
	(0.355)	(0.464)	(0.503)	(0.638)	(0.602)	(0.641)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b$		–0.400	–0.320		0.144	–0.644*
		(0.504)	(0.514)		(0.168)	(0.370)
$\text{SANCTION}_b \times \text{POST.FIRST}_t \times \text{DISTANCE}_b \times \ln OIL_{r(b)}$			–0.067			0.174*
			(0.056)			(0.101)
N obs	2,241	2,657	2,241	3,148	3,148	4,148
N treated / control banks	14 / 35	14 / 35	14 / 35	16 / 59	16 / 59	16 / 59
R^2_{within}	0.588	0.592	0.597	0.412	0.414	0.421

Note: The table reports the DID estimates of the effects of sanctions on foreign liabilities with a maturity of 3 years and more (*Panel 1*) and foreign liabilities with a maturity between 1 and 3 years (*Panel 2*) of targeted Russian banks, as implied by equation (3). The estimation window is $k = 24$ months around the imposition of sanctions on the *Rossiya Bank* (March 2014). Sanctioned (i.e., treated) and never-sanctioned (i.e., control) banks are 1:4 matched within two years prior to March 2014. Private banks with political connections are not allowed to enter the control group. Bank FE, Month FE, Bank controls, and all necessary cross-products of the TREAT, POST.FIRST, DISTANCE, and OIL variables are included but not reported.

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

Appendix E In-advance adaptation vs. added value effects of financial sanctions: pooling sanction types

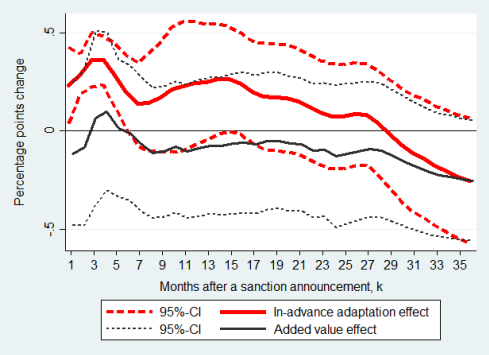
Table E.I: In-advance adaptation vs. added value effects of sanctions: Difference-in-differences estimates on a pooled sample of debt and assets sanctions

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			
$\text{SANCTION}_b \times \text{POST.FIRST}_t$	0.018	0.650	1.360
	(0.603)	(0.870)	(0.991)
$\text{SANCTION}_b \times \text{POST.NEXT}_{b,t}$	–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			
$\text{SANCTION}_b \times \text{POST.FIRST}_t$	–0.432	–0.531	–0.778
	(0.740)	(0.676)	(0.659)
$\text{SANCTION}_b \times \text{POST.NEXT}_{b,t}$	–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

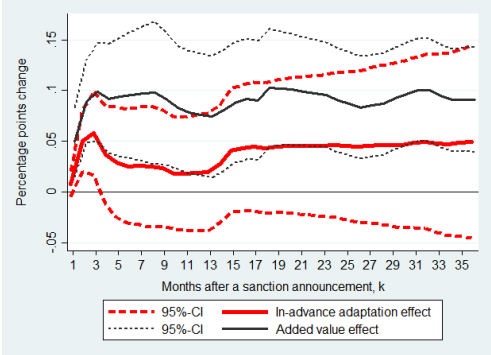
Note: The table reports the DID estimated effects of sanctions on international assets and foreign borrowings of Russian banks, as implied by Equation (3). The estimation Window is $[-k, k]$ month around the imposition of sanction on the *Rossiya Bank* (March 2014) joined with $[-k, k]$ month around 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 two years prior to March 2014.

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

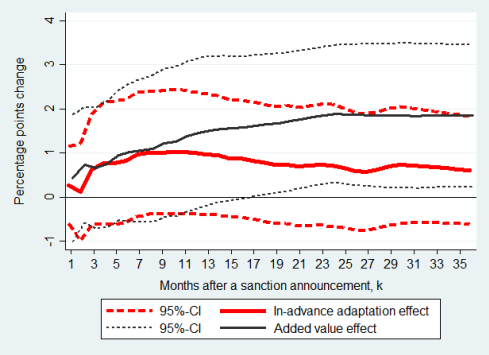
Appendix F The effects of sanctions on other domestic operations of Russian banks



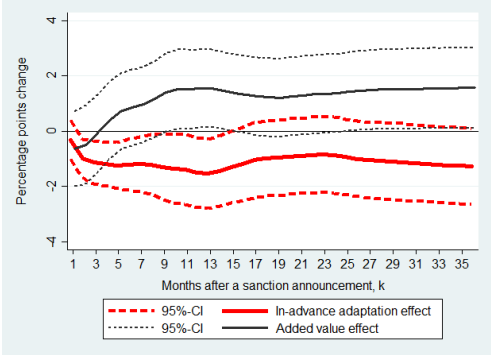
(a) Government deposits, *debt*-sanctioned banks



(b) Government deposits, *asset*-sanctioned banks



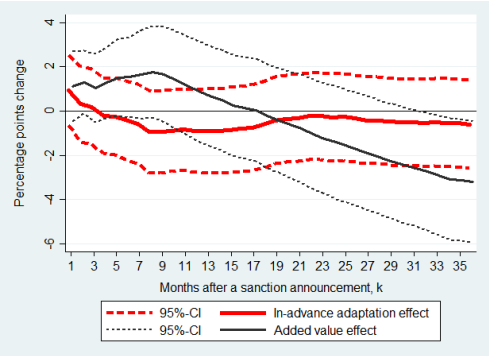
(c) Central Bank deposits, *debt*-sanctioned banks



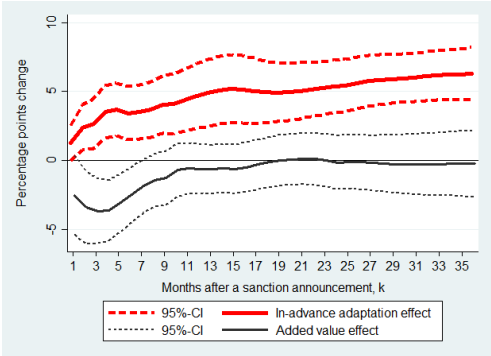
(d) Central Bank, *asset*-sanctioned banks

Note: The figures report the staggered difference-in-differences estimates of the coefficients on $SANCTION_b \times POST.FIRST_t$ and $SANCTION_b \times POST.NEXT_{b,t}$ in equation (8), with the dependent variable reflecting either government deposits or loans from the Central Bank of Russia (as % of bank total liabilities). The estimates are obtained by running the staggered DID with in-advance adaptation on the expanding window $[t_b - k, t_b + k]$, where $k = 1, 2...36$ months after either bank-specific sanction date (added value effects, black lines) or the date of sanctions against the *Rossiya Bank* (in-advance adaptation effects, red lines).

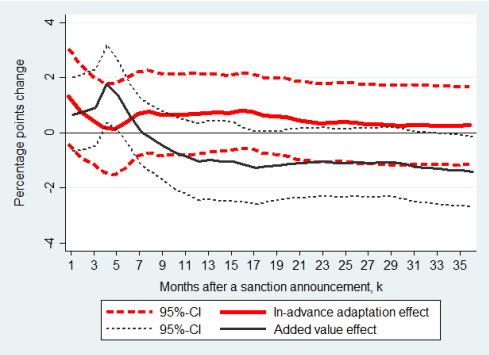
Figure F.I: What happened with other domestic bank liabilities after sanctions? (*by sanction type*)



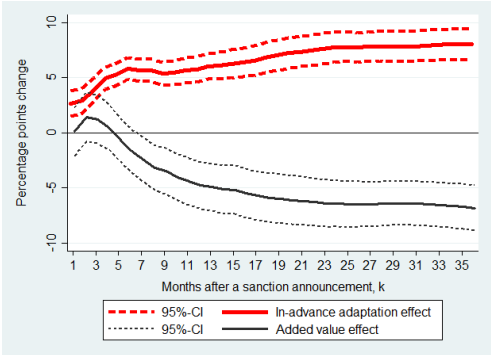
(a) Inter-bank loans, *debt*-sanctioned banks



(b) Inter-bank loans, *asset*-sanctioned banks



(c) Cash and reserves, *debt*-sanctioned banks



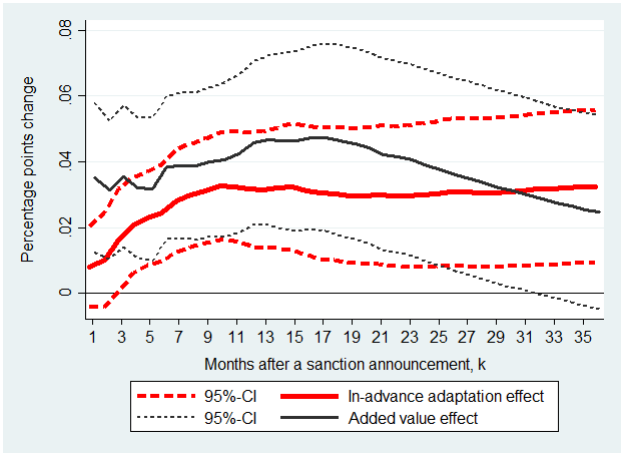
(d) Cash and reserves, *asset*-sanctioned banks

Note: The figures report the staggered difference-in-differences estimates of the coefficients on $SANCTION_b \times POST.FIRST_t$ and $SANCTION_b \times POST.NEXT_{b,t}$ in equation (8), with the dependent variable reflecting either the loans granted through the inter-bank market or banks' holdings of cash and reserves (as % of bank total assets). The estimates are obtained by running the staggered DID with in-advance adaptation on the expanding window $[t_b - k, t_b + k]$, where $k = 1, 2...36$ months after either bank-specific sanction date (added value effects, black lines) or the date of sanctions against the *Rossiya Bank* (in-advance adaptation effects, red lines).

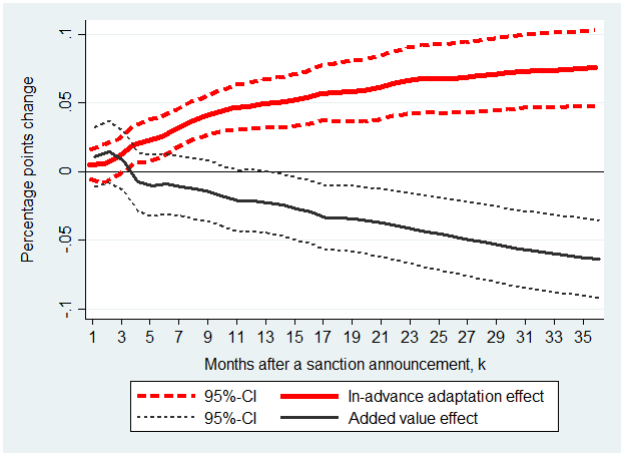
Figure F.II: What happened with other domestic bank assets after sanctions? (*by sanction type*)

Appendix G *(Effective) interest rates: pay more on deposits, return less on loans?*

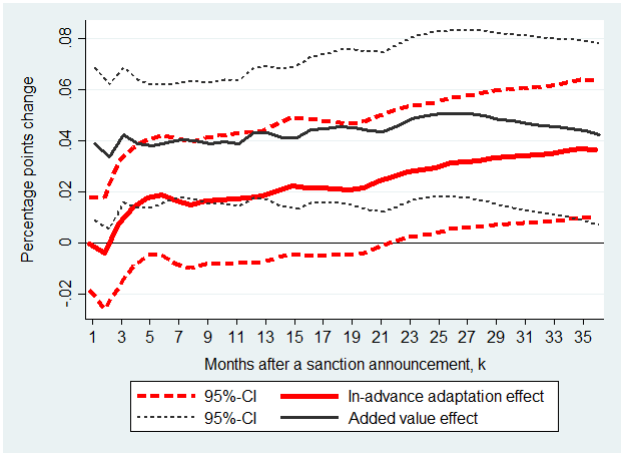
We now consider changes in the prices of bank assets and liabilities, as measured by effective interest rates, after the banks had to adapt to upcoming sanctions and deal with the existing sanctions. The estimation results appear in Figure G.I below.



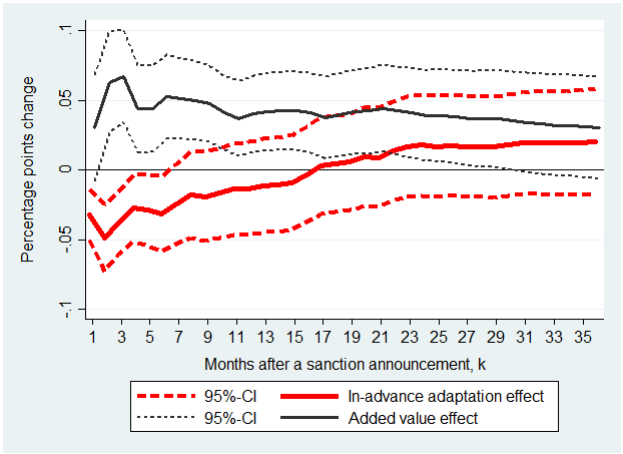
(a) Average funding rate, *debt*-sanctioned banks



(b) Average funding rate, *asset*-sanctioned banks



(c) Average return rate, *debt*-sanctioned banks



(d) Average return rate, *asset*-sanctioned banks

Note: The figures report the staggered difference-in-differences estimates of the coefficients on $SANCTION_b \times POST.FIRST_t$ and $SANCTION_b \times POST.NEXT_{b,t}$ in equation (8), with the dependent variable reflecting either the average funding rate (monthly, as % of total liabilities) or average return rate (monthly, as % of total assets). The estimates are obtained by running the staggered DID with in-advance adaptation on the expanding window $[t_b - k, t_b + k]$, where $k = 1, 2...36$ months after either bank-specific sanction date (added value effects, black lines) or the date of sanctions against the *Rossiya Bank* (in-advance adaptation effects, red lines).

Figure G.I: The effects of sanctions on effective interest rates, *by sanction type*

First, for the average funding rate, the estimated in-advance adaptation effects imply that not yet debt-sanctioned banks were forced to significantly increase the interest rate offered on household deposits and other sources of funds (see Figure G.I.a), presumably to cope with the depositors' run on the banks. After the sanctions hit, the already debt-sanctioned banks had to significantly raise their average funding rate again, likely because of another wave of depositors' withdrawals, as we found in the previous sections. Therefore, the supply-side effects are indeed more likely than the demand-side.

Conversely, for asset-sanctioned banks we obtain evidence favoring demand-side factors: before the sanctions, the banks raised their interest rates on deposits simultaneously with raising the volume of deposits attracted from customers (see Figure G.I.b). After the sanctions, the already asset-sanctioned banks reduced their interest rates and faced an outflow of deposits.

Second, for the average return rate on the banks' assets, we find that in most cases, the targeted banks were able to grow profits from lending to firms and households and owning other assets they were allowed to keep on their balance sheets (see Figures G.I.c,d). On the one hand, increased lending to households, which we established in the previous sections, could have been rewarded by growing returns. On the other hand, declining lending to firms could have negatively contributed to the returns. But the overall effect is positive for both debt- and asset-sanctioned banks, as our results here indicate.

Appendix H SVAR-analysis

Methodology. We aggregate the microeconomic effects of sanctions obtained using the difference-in-differences approach to the macroeconomic level by means of the 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 loan supply shock by a set of on-impact restrictions, in which the lending rate reacts negatively and loan volumes react 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).

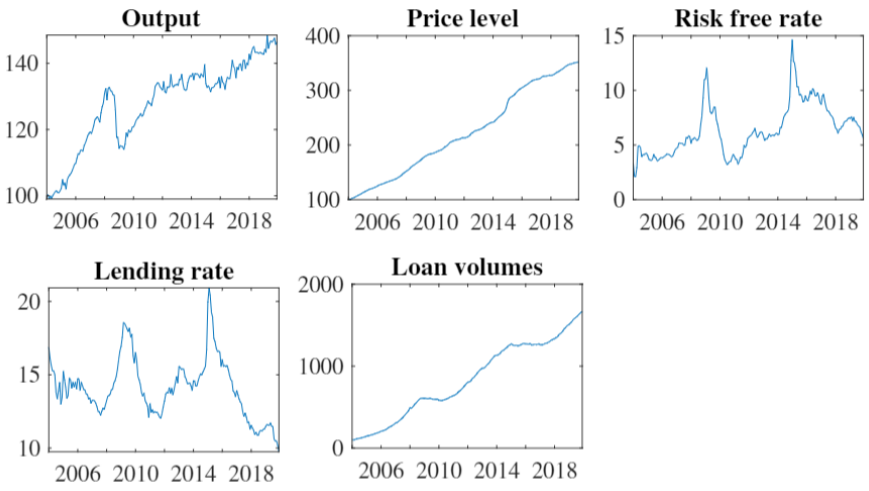
We make one more step and follow the narrative sign restrictions approach of Antolin-Diaz and Rubio-Ramirez (2018) and specify December 2014 as a period of commonly accepted restrictive monetary policy shock in Russia. During the "black Monday" of December 15, the Central Bank of Russia raised the key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

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 H.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.

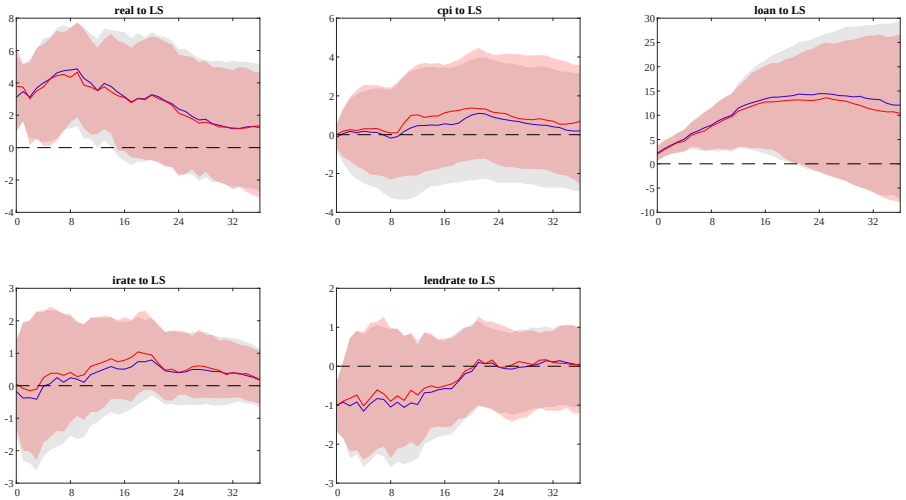
We now briefly introduce the estimation results on the impulse response functions (IRFs).

Impulse response functions. Figure H.II below reports the estimated IRFs to the positive credit supply shock, in which we normalize the lending rate on-impact reaction to –1 pp (per annum). What we observe is that output reacts positively (as we defined through the sign restriction scheme) until at least the 15th month after the shock, with the on-impact response equaled +3.2 to +3.9 pp (under the "SR" and "SR+NSR" schemes, respectively). Loan volumes also react positively until at least the 20th month after the shock, so that the on-impact response is +2.1 pp (under both schemes). We infer from these 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 per cents. *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 the policy rate. *Lending rate* is a weighted average of the lending rates on loans of different maturities.

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



Note: The figures present the estimated impulse response functions (IRFs) to the credit supply (CS) shocks identified in the 5-variables SVAR with either one or two sign restriction schemes imposed. The first (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. The X-axis shows the months after the CS shock. IRFs are normalized so that the lending rate reacts by –1 pp on impact. Finally, the IRFs for output, CPI, and loan volumes are cumulative, i.e., they 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 H.II: Impulse response functions to the identified credit supply shock (CS)

Appendix I The state-controlled banks unrecognized by the West

What is the profile of these 35 state-connected banks unrecognized by the West 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 44 sanctioned banks. The 16 banks that are at 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 $33 - 16 = 17$ banks that are actually treated but are *not* in the Karas and Vernikov (2019) list are predominantly asset-sanctioned banks. We thus have three subgroups of banks: (i) 17 asset-, (ii) 16 debt-sanctioned banks, and (iii) 35 uncovered banks to which we refer as *potentially 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 I.I below.

Table I.I: Summary of treated and potentially diffused banks

	Treated & Not state (N=17)			Treated & State (N=16)			Not treated & State (N=35)		
	$t \leq t^*$	$t > t^*$	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	1,313	2,924	1,611	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

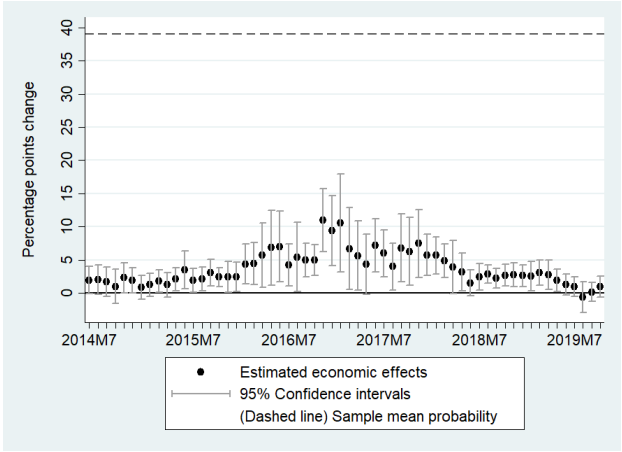
Note: $t^* = \textit{March 2014}$, the date of the first sanction announcement. TA is measured in billion Rubles. "Treated" stands for actually sanctioned banks. "Not treated" denotes potentially diffused banks. "State" implies a bank is in the Karas and Vernikov (2019) list of state-controlled banks.

The descriptive data presented in Table I.I clearly shows why it is important to account for treatment diffusion. First, we observe that the defined 35 potentially diffused banks (columns (7)–(9)) are *larger* in terms of total assets than the 17 asset-sanctioned banks (columns (1)–(3)). This eliminates the concern that these banks are too small to pay attention to. Of course, they are much smaller than the 16 debt-sanctioned banks (columns (4)–(6)). Second, the 35 potentially diffused banks have non-trivial portions of international operations on their balance sheets, which are comparable to those of the 17 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.[54] Finally, we also observe that these 35 potentially 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,[55] 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.

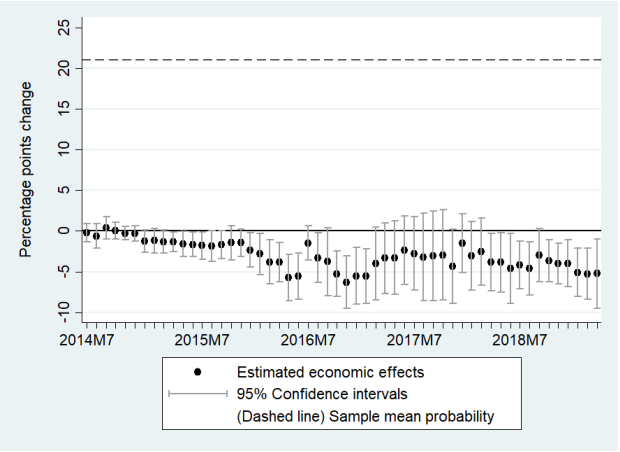
[54] But this is likely to be again a reflection of their lower size compared to the "Big-4" (i.e., lower size — less diversified activities).

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

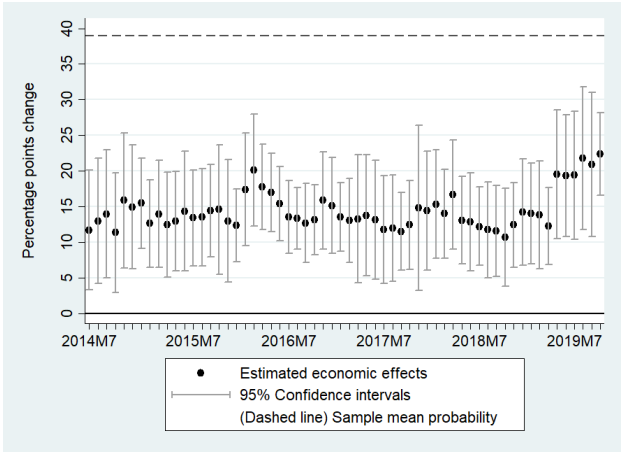
Appendix J Bank size and foreign assets exposures as predictors of upcoming sanctions



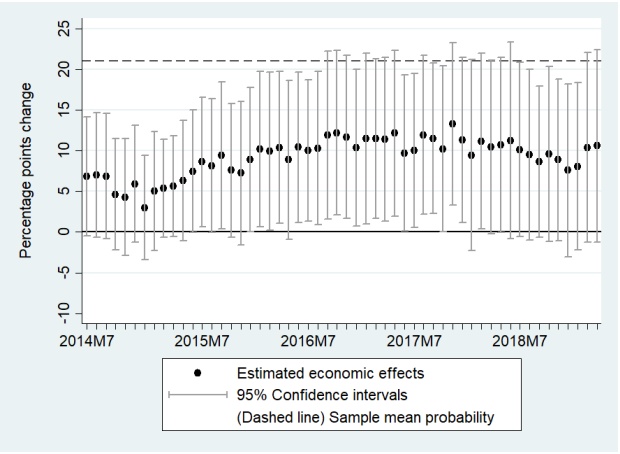
(a) Debt sanctions: Economic effects of $Foreign.Asset_{b,t}$ on $Pr\{Sanctioned_{b,t} = 1 \mid X_{b,t}\}$



(b) Asset sanctions: Economic effects of $Foreign.Asset_{b,t}$ on $Pr\{Sanctioned_{b,t} = 1 \mid X_{b,t}\}$



(c) Debt sanctions: Economic effects of $Bank.Size_{b,t}$ on $Pr\{Sanctioned_{b,t} = 1 \mid X_{b,t}\}$



(d) Asset sanctions: Economic effects of $Bank.Size_{b,t}$ on $Pr\{Sanctioned_{b,t} = 1 \mid X_{b,t}\}$

Note: The figures report the estimated economic effects of banks' holdings of foreign assets and bank size on the probability of being debt (a,c) or asset (b,d) sanctioned. The economic effect is computed as the product of the marginal effect of one of the two variables on $Pr\{Sanctioned_{b,t} = 1 \mid X_{b,t}\}$ and one standard deviation of respective variable. The marginal effects are computed after running the logit models of the probability of being sanctioned, as implied by equation (9). "p10" to "p90" are respectively 10 to 90%-tiles.

Figure J.I: Economic effects of foreign asset holdings and bank size

Appendix K The sample of non-financial firms borrowing from the syndicated loan market in Russia

We retrieve firm-level data from the SPARK-Interfax database for the 2011 to 2017 period.[56] We require firms to simultaneously have non-missing non-negative values on total assets, total revenue, capital, number of employees and wages, and bank and non-bank borrowed funds. In addition, we only leave in the sample firms that operated for at least three consecutive years. The final sample comprises 7,460 large and small firms, resulting in roughly 40,000 firm–year observations.[57] The firms operate in as many as 16 different sectors of the Russian economy (two-digit classification) ranging from natural resources extraction to IT. The table below contains all necessary descriptive statistics at the firm level.

Table K.I: Descriptive statistics at the firm level, 2011–2017

	Obs	Mean	SD	Min	Max
	(1)	(2)	(3)	(4)	(5)
log of real total assets	493	4.1	2.5	–9.1	10.2
Real fixed assets' growth rate	389	0.2	0.7	–0.9	5.0
log of the number of workers	415	–0.4	2.4	–6.9	5.6
log of real total revenue	466	3.0	2.7	–8.0	11.0
Whether operates after March 2014	531	0.67	0.47	0	1
Whether has relationship with sanctioned bank	531	0.71	0.45	0	1
Whether firm is sanctioned	531	0.07	0.25	0	1

[56] See https://spark-interfax.com/.

[57] The initial sample consists of roughly 300,000 firms. The substantial decline in the number of firms is caused by many missing values on the employees' and wages' data in the firms' balance sheets and the requirement to work for at least three years in a raw.

Appendix L Additional results on treatment diffusion

Table L.I: Treatment diffusion in international operations: the estimation results using all politically-connected banks

Sanction type:	Debt sanctions			Assets sanctions		
Treatment:	Diffused	Actual	Actual + Diffused	Diffused	Actual	Actual + Diffused
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Dependent variable = Foreign liabilities, as % of bank total liabilities						
SANCTION.DIFFUS$_b$ × POST.FIRST$_t$	1.309***	2.138***	1.230***	0.953***	–2.354***	0.355
	(0.404)	(0.649)	(0.348)	(0.342)	(0.634)	(0.315)
N obs	6,254	2,241	7,690	6,431	3,148	8,837
N treated / control banks	36 / 115	14 / 35	50 / 133	36 / 115	16 / 59	52 / 161
R^2_{within}	0.281	0.620	0.255	0.113	0.457	0.119
Panel 2: Dependent variable = Foreign assets, as % of bank total assets						
SANCTION.DIFFUSE$_b$ × POST.FIRST$_t$	–0.732*	–2.306***	–0.694	–0.416	–2.384***	–0.937**
	(0.393)	(0.516)	(0.442)	(0.441)	(0.786)	(0.430)
N obs	6,254	2,241	7,690	6,337	3,105	8,676
N treated / control banks	36 / 115	14 / 35	50 / 133	36 / 115	16 / 59	52 / 160
R^2_{within}	0.292	0.636	0.312	0.144	0.249	0.146

Note: The table reports the treatment diffusion DID estimates of the effects of sanctions on foreign liabilities (*Panel 1*) and foreign assets (*Panel 2*) of Russia's targeted banks, as implied by equation (10), against the background of the baseline DID estimates obtained when ignoring diffusion (columns 3 and 5). The estimation Window is $k = 24$ months around the imposition of sanctions on the *Rossiya Bank* (March 2014). $SANCTION.DIFFUS_b = 1$ if a bank b either will ever face sanctions within our sample period (*actually treated*) or never faced sanctions but has recognizable political connections, small or large (*diffused*). The 1^{st} stage does not apply in this case because we use all politically-connected banks, i.e., not only those with high connections. $POST.FIRST_t = 1$ after March 2014 and is aimed at capturing the in-advance adaptation effect. Actually sanctioned and/or diffused (i.e., treated) and never-sanctioned (i.e., control) banks are 1:4 matched within two years prior to March 2014. Diffused banks are not allowed to enter the control group. Bank FE, Month FE, Bank controls, and All necessary cross-products of the SANCTION.DIFFUS and POST.FIRST variables are included but not reported.

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

Abstrakt

Studujeme dopad globálních finančních sankcí na banky a jejich korporátní dlužníky v Rusku. Finanční sankce byly uvalovány postupně v letech 2014 až 2019, což umožnilo cílovým (ale dosud nepostihnutým) bankám předem přizpůsobit své mezinárodní a domácí postavení. Pomocí přístupu „staggered difference-in-difference“ s předběžným přizpůsobením očekávanému treatmentu jsme zjistili, že cílové banky okamžitě snížily svá zahraniční aktiva a ve skutečnosti zvýšily své mezinárodní půjčky po prvním oznámení sankcí ve srovnání s jinými podobnými bankami. Odhalujeme, že přidaná hodnota dalších oznámení o sankcích byla spíše omezená. Navzdory značnému odlivu domácích soukromých vkladů vládní podpora zabránila neuspořádanému krachu bank a vedla k přeskupení úvěrů: banky snížily úvěry podnikům o 4% HDP a zvýšily úvěry domácnostem téměř ve stejném rozsahu, což většinou kompenzovalo celkovou ekonomickou ztrátu. Dále zavádíme dvoustupňový přístup difúze treatmentu, který flexibilně řeší potenciální přelévání sankcí na soukromé banky s politickými vazbami. Náš přístup, který využívá unikátní ručně sbírané údaje o členství v představenstvu a poloze bank, ukazuje, že během tohoto období nebyly všechny politicky propojené banky stejně chápány jako potenciální sankční cíle. A konečně, pomocí údajů o syndikovaných půjčkách jsme zjistili, že skutečné negativní účinky sankcí se projevily pouze tehdy, když si sankcionované firmy půjčovaly od sankcionovaných bank. Když si sankcionované firmy půjčovaly od nesankcionovaných bank, dokonce získaly na zaměstnanosti a investicích, ale přesto ztratily na tržních tržbách, což svědčí o nesprávném přidělení vládní podpory.

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