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The Economics of Sanctions

From Theory into Practice

ABSTRACT

This paper examines the effectiveness of economic sanctions imposed on Russia, particularly following its 2022 full-scale invasion of Ukraine. Despite the unprecedented scope and scale of these sanctions, their impact on Russia's economy has been mixed, with only moderate contraction reported by official Russian statistics. We combine an empirical assessment of these sanctions with the development of a theoretical framework to better understand the complexities and trade-offs in their application. Sanctions, while a critical tool of economic statecraft, are not a guaranteed solution to end wars or alter a country's behavior. To impose effective costs, we advocate for a comprehensive, technocratic approach with clear, measurable objectives, rather than a piecemeal strategy. The efficacy of sanctions depends on factors such as the target country's size and global integration, the sanctioning coalition's unity, the ability to enforce sanctions, and the economic burden on sanctioning nations. The paper underscores the importance of realistic expectations and careful design of sanctions policy on trade, finance and payment systems.

Keywords: economic statecraft, economic security, geoeconomics, fragmentation

I. Introduction

Economic statecraft, including measures such as blockades and trade suspensions, has seen a resurgence in recent years. This is likely due to a combination of factors: on one hand, the recognition of the limits of hard military power following the wars in Iraq and Afghanistan; on the other hand, the institutional capacity built up during the War on Terror and the realization of the power stemming from the U.S.'s centrality in the global financial system. While the post-Cold War era saw a decline in the use of economic statecraft, concerns over geopolitical tensions, particularly with China and Russia, have revived interest in leveraging economic tools for foreign policy objectives. This shift has led to a reevaluation of multilateral frameworks such as the World Trade Organization and Bretton Woods institutions, with nations increasingly prioritizing economic sovereignty and adopting more assertive stances in international trade and finance. Even the European Union, which traditionally advocated for strict compliance with multilateral rules on global trade and finance, has recently moved toward a more geopolitical approach, reflecting a global trend of balancing economic goals with broader strategic interests.

The concept of economic statecraft encompasses a range of measures much broader than traditional financial sanctions, including export controls and trade embargoes. Since Russia's invasion of Crimea in 2014, sanctions have been a primary tool in the Western coercive diplomacy, leveraging Russia's integration into global financial markets. Although these initial sanctions failed to force Russia to backtrack, they likely contributed to its decision not to advance further in 2014, avoiding the risk of additional financial sanctions for which Russia was unprepared at the time. The 2022 full-scale invasion of Ukraine marked a turning point, with a coalition of countries imposing unprecedented sanctions, including export controls and restrictions in key sectors such as energy. This multi-pronged approach reflects a concerted effort to undermine Russia's ability to pursue the war and communicate a strong disapproval of its actions.

Nonetheless, it is important to clearly distinguish between sanctions "in theory" and sanctions "in practice," with enforcement being the key difference. While sanctions may exist on paper, weak enforcement renders them ineffective. Moreover, "black knights" (Timofeev 2023) have been aiding Russia in circumventing these sanctions, further highlighting the gap between theoretical measures and their practical impact.

The 2022 sanctions on Russia have not been an unequivocal success ("Economic Report of the President" 2023; Demertzis et al. 2022). Firstly, communication about the objectives of the

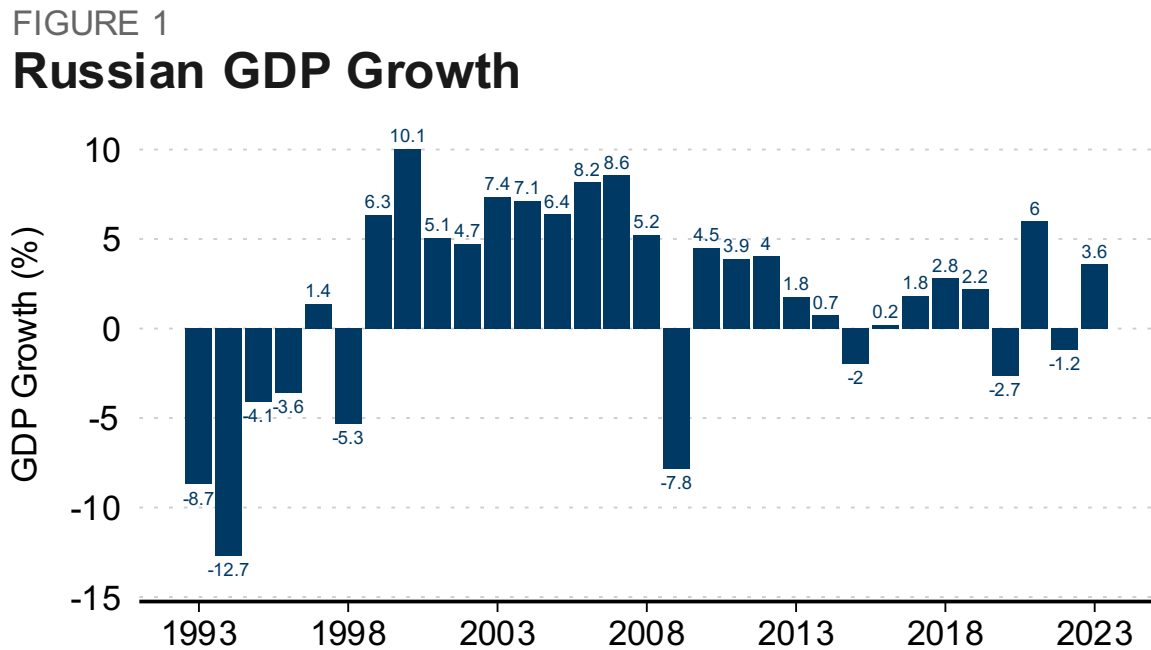
sanctions was unclear both before and after the full-scale invasion in February 2022. On the one hand, it appeared that the authorities tried to pursue multiple objectives at the same time; on the other hand, and likely as a result, government communication to the public regarding the sanctions and the assessment of their outcomes during the early months of the war was inconsistent. Secondly, seeking complete isolation from a large, complex, and globally integrated economy is costly and likely unattainable (Ribakova 2024a). As a result, some governments did not want to pursue such a goal and Russia's oil continued to flow freely to the market. It took coalition governments almost a year to reduce purchases of Russia's oil and gas — and many of their corporations are still actively engaged in trade with Russia. Finally, enforcement struggled since the inception of 2022 sanctions.

Although the Kremlin's upbeat statistics should be approached with great caution, most economists concede that Russia's economy appears to have stabilized, supported by nearly 10 percent of GDP in war-related fiscal stimulus (Ribakova 2024b) and sanction coalition countries' reluctance to stop buying Russian oil and gas completely.

In 2023, the Russian government's statistics agency reported GDP growth of 3.6% following a moderate contraction in 2022 (**Figure 1**). On the other hand, the inflation remains high (**Figure 2**) despite numerous interest rate increases, because the expanding war economy is stretching Russia's resources to their limits (**Figure 3**). Nevertheless, despite the lower-than-hoped for impact of sanctions, Russia still lost close to \$128 billion in export proceeds due to war and sanctions ("Energy Sanctions Impact Summary" 2024), experienced much weaker growth compared with other commodity exporters (**Figure 4**), and is now facing a bleak medium-term outlook (Gorodnichenko, Korhonen, and Ribakova 2024).

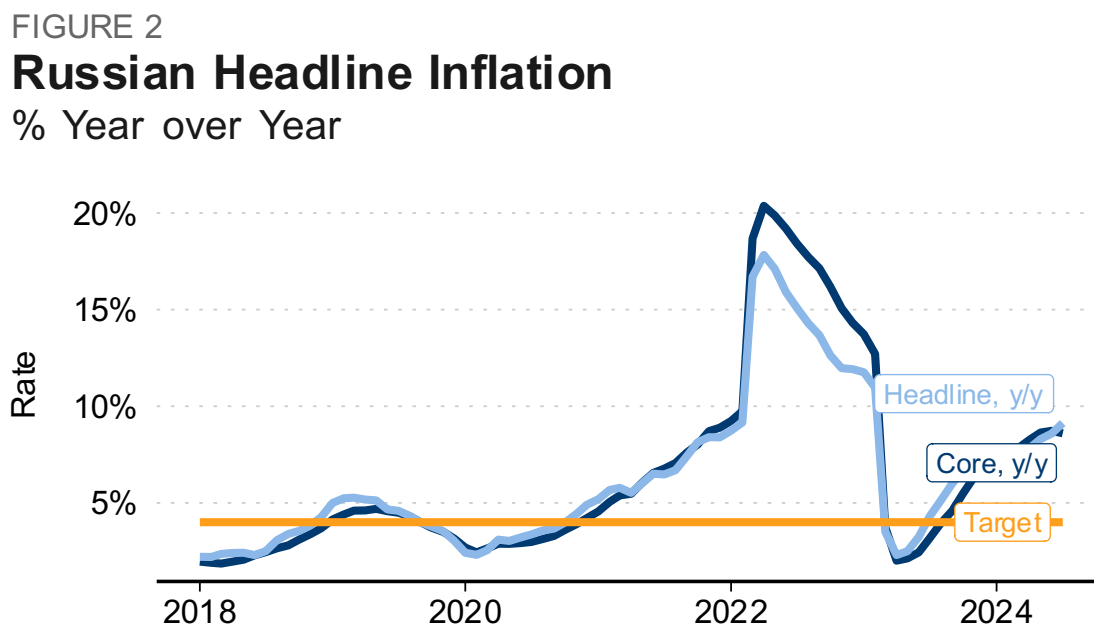
With Russia's war on Ukraine in the third year, it is time to evaluate the effect of sanctions, what worked and what did not, and attempt to put forward an empirical and quantitative framework to analyze sanctions more broadly. We begin, in Section 2, with a brief literature review of both the broad literature on economic statecraft and the more recent literature that emerged in response to the 2022 Russia's invasion of Ukraine and the ensuing sanctions on the Russian economy. We then present, in Section 3, a theoretical framework to evaluating various sanctions—trade, financial, and on payment systems—and their combined effects and costs to the sender. Section 4 lays out the timeline of sanctions imposed on Russian economy since 2014, and Section 5 provides an evaluation of their impact, with conclusions in Section 6.

Figure 1: Russian real GDP growth, in %



Source: IMF World Economic Outlook, KSE Institute

Figure 2: Russian headline inflation, in % year-over-year



Source: Bank of Russia, KSE Institute

Figure 3: Unemployment rate, in %

FIGURE 3

Russian Unemployment Rate

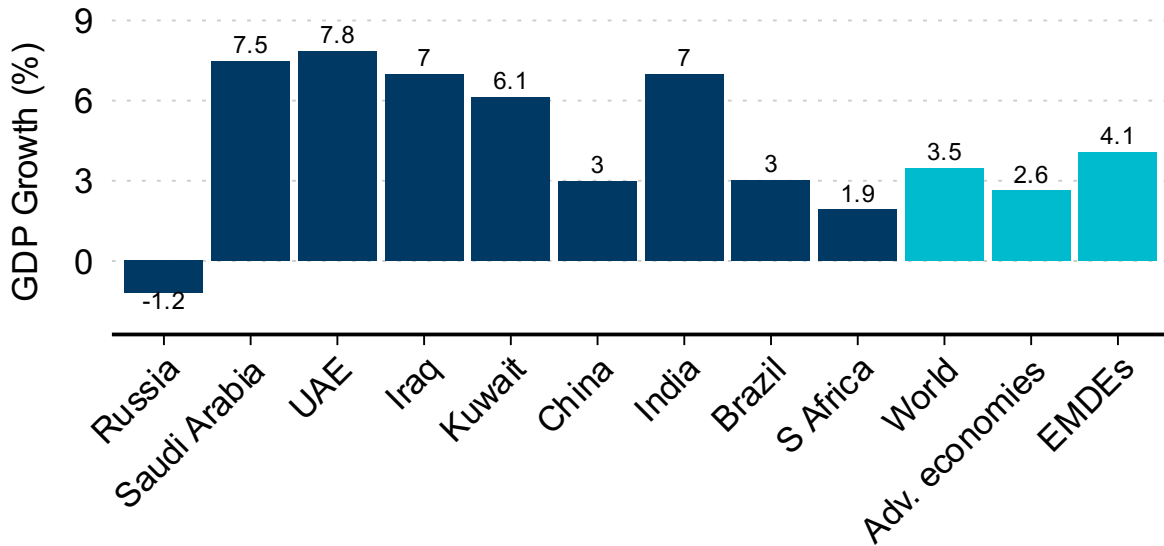


Source: Rosstat, KSE Institute

Figure 4: Real GDP growth in 2022, in %

FIGURE 4

Real GDP Growth in 2022



Source: IMF World Economic Outlook

II. Literature review

The literature on economic statecraft, encompassing the use of economic tools to achieve foreign policy, national security, and military objectives, has recently seen a revival as countries expanded their use of economic statecraft. The most comprehensive case-by-case analysis of sanction episodes to date, together with key policy takeaways, remains "Economic Sanctions Reconsidered, 3rd Edition" by Gary Clyde Hufbauer, Jeffrey J. Schott, Kimberly Ann Elliott, and Barbara Oegg (2009). A classic early text on economic warfare is Olson (1963).

David Baldwin's seminal work, "Economic Statecraft" (2020), lays a comprehensive foundation, explaining the mechanisms and effectiveness of economic instruments in foreign policy. "War by Other Means: Geoeconomics and Statecraft" by Jennifer M. Harris and Robert D. Blackwill (2016) emphasizes the growing importance of geoeconomics as a tool of statecraft in global politics. Juan Zarate's "Treasury's War" (2013) complements this by providing a practical insider perspective on financial warfare post-9/11, underscoring the growing importance of financial instruments in modern statecraft. In addition, Chris Miller's "Chip War" (2022) and Nicholas Mulder's "The Economic Weapon" (2023) expand the discourse by exploring the strategic importance of the semiconductor industry and the historical evolution of sanctions, respectively. See also Harrison (2023).

Agathe Demarais' "Backfire" (2022) further examines the unintended consequences of U.S. sanctions, highlighting how they can reshape global alliances and economic landscapes. Similarly, "Underground Empire" (2023) focuses on the US weaponizing its control of the critical nodes for achieving foreign policy and security objectives, offering a comprehensive analysis of the complexities and implications of economic statecraft. Finally, Saleha Mohsin's "Paper Soldiers" (2024) provides a detailed examination of modern financial sanction.

Regarding Russia's specific case, some several papers and books explore the impact of sanctions on Russia (post-2014 and post-2022). The most important among them include the working paper by Ahn and Ludema (2020) "Measuring Smartness: Understanding the Economic Impact of Targeted Sanctions", which analyzes the economic effects of targeted or "smart sanctions" that aim to minimize harm to the general population and broader economy. Several papers by the Institute of International Finance take stock of Russia's response to 2014 sanctions and its preparedness for the ensuing sanctions. These papers also emphasize the critical importance of enforcement for the effectiveness of sanctions. "Punishing Putin" (Baker 2024) provides a

description of the global response to Russia's full-scale invasion of Ukraine in 2022, with a focus on the sanctions imposed on Vladimir Putin, his inner circle, and Russia's economy.

It is essential to highlight the growing literature on the challenges of enforcing sanctions on Russia. Issues have been raised regarding the ineffectiveness of the oil price cap, including by the authorities themselves (Van Nostrand and Morris 2024), and export controls. The early success of the oil price cap, which reduced Russian oil rents without destabilizing global prices, has since been overshadowed by a lack of enforcement (Hilgenstock et al. 2023). A major challenge to price cap enforcement has been Russia's buildup of a so-called "Shadow Fleet," which is made up of oil tankers that are not owned, managed, or insured by entities that fall under the jurisdiction of the sanctions coalition (Hilgenstock, Hrybanovskii, and Kravtsev 2024). Designations of Shadow Fleet vessels, particularly by the US Treasury Department's Office of Foreign Assets Control (OFAC), have been an effective tool for reducing Russia's ability to disregard the price cap without removing aggregate capacity from the market (Hilgenstock, Kravtsev, and Pavytska 2024). The designation campaign remains limited in scope, however.

Export controls are another area of sanctions where enforcement has been insufficient. Russia still imports—largely through intermediaries like China—crucial components for military production. Room for improvement is most notable in corporate responsibility, where Know-Your-Customer-like regulations could reduce illicit flows through third party intermediaries, as well as in intra-coalition coordination and harmonization, and institution building (Bilousova et al. 2024). Russia's inability to substitute for goods, particularly high-tech electronics, from entities in the sanctioning coalition highlights the further unrealized potential of export controls.

Sanctions on Russia in 2014 and 2022, as well as earlier rounds of sanctions on Iran, have spurred an active quantitative and theoretical literature on the topic. Felbermayr et al. (2019) build a dataset of information on sanctions between 1950-2016 to analyze the effect of sanctions on trade flows and real GDP change (see also Gutmann et al. 2023). Hausmann et al. (2024) provide a criterion for sectoral bans on Russian exports at a detailed industry level. De Souza et al. (2024) examine the most cost-efficient policies for imposing trade sanctions.

Crozet and Hinz (2020) quantify the economic impact of the sanctions imposed on Russia in 2014 using a gravity model, as well as the implied costs to sender countries. Ghironi et al. (2024) use a quantitative model to study macroeconomic and trade impacts of sanctions on financial markets, energy, and differentiated goods for both sender and receiver countries. Kilian et al.

(2024) examines the impact of the 2022 oil embargo and price cap on Russian oil prices using a calibrated model of the global oil market.

Nigmatulina (2023) examines the effects of "smart sanctions" imposed by the US and EU on specific Russian firms and individuals following Russia's annexation of Crimea in 2014, and finds that these firms have increased their operations due to a reallocation of government resources towards them (see also Keerati 2023 and Egorov et al. 2024). Balyuk and Fedyk (2023) examines the decision and its financial consequences for the U.S. firms to exit Russian operations following the 2022 invasion of Ukraine. Mamonov and Pestova (2021) study the effect of the 2014 financial sanctions on the Russian economy. Ndiaye (2024) studies how international boycotts, as a form of consumer activism, differ from government-imposed sanctions and tariffs.

Next section discusses theoretical approaches to modeling sanctions and the related theoretical literature.

III. Theoretical Approach to Modeling Sanctions

This part of the paper summarizes and builds on the earlier theoretical work to outline the main channels of how sanctions work.¹ We distinguish between trade, financial and payment system sanctions. Standard frameworks for evaluating the gains (and losses) from trade and the optimal tariff literature allow to analyze the trade effects of sanctions. Financial sanctions operate by limiting the ability of countries to borrow and finance trade deficits or save and invest in international financial markets, reducing the ability for risk sharing and intertemporal consumption smoothing. Payment system sanctions prevent the use of the international financial infrastructure for transmitting and clearing payments necessary to intermediate international trade. Countries that do not rely on international financing of trade flows and export commodities which can be elastically relocated to different markets, are particularly immune to the effects of sanctions provided many third countries are not part of the sanctioning coalition. Nonetheless, payment system sanctions may result in significant barriers and disrupt trade flows with third countries.

We also outline the mechanisms of how unanticipated financial and trade sanctions, as well as sanctions on payment systems, can trigger financial and currency crises. In conventional macro-

¹ This part of the paper builds on and extends earlier work, including Itskhoki and Mukhin (2023b) "The Economics of International Sanctions" prepared for the 7th Annual Macprudential Conference in Stockholm, Sweden.

trade analysis, payment system sanctions have no effect provided the country has access to elastic spot currency markets. However, this is not the case in the new generation of models with limited elasticity of substitution in the currency market. Empirical evidence suggests that sanctions that restrict payment systems have a substantial bite in practice, and hence highlight the need to work with such frameworks.

Finally, we discuss the important policy issue of the optimal sanctions mix. Throughout our discussion we keep in mind the three key objectives of sanctions is to limit:

1. the production capacity of the economy under sanctions;
2. the financing capacity of the economy and put pressure on the government budget constraint;
3. the production in certain key sectors of the economy, in particular military production and procurement.

These objectives may be achieved by means of a swift turbulence in the financial markets, due to a bank run or a balance-of-payment crisis, or over a longer horizon by tightening budget constraints to source inputs, as well as by curbing productive capacity in certain key sectors or of the economy at large. Since our focus is on the short-to-medium run impact of sanctions, we leave out some additional important dimensions such as sanctions that aim to limit technology transfer and foster skilled emigration (“brain drain”), which are also very relevant in the context of Russia, but their impact has not yet materialized.

In addition, the sanctioning coalition might have in mind two additional dynamic considerations. First, symbolic sanctions without significant economic bite may be used to send a signal of future sanctions to come if the receiver country does not change its course. Such sanctions do not need to have a tangible economic impact but should outline the contours of likely future sanctions used as deterrent. While useful for providing incentives, this strategy also offers time to the sanctioned country to build an economic fortress for when tangible sanctions are imposed, which in retrospect offers an accurate description of the consequences of the post-2014 sanctions on Russia.

Second, the sanctioning coalition may want to use current sanctions as a punishment strategy which is observed by third countries and acts to prevent future deviations. For this to work, sanctions must be so severe as to make such deviations entirely untenable and hence not realized along the observed equilibrium path, which in turn allows the coalition to avoid bearing the costs

of imposing such sanctions. This, of course, requires commitment and resolve on the part of the coalition, otherwise such threats are not credible, in which case deviations do happen along equilibrium path. This view changes the appropriate cost-benefit calculation, as benefits must include the additional—and perhaps much larger—indirect benefits due to incentives they provide for avoiding future conflict.² An intriguing conjecture then is whether the credibility and the economic might of the Western coalition have deteriorated since 1990s, resulting in both the decline of international institutions, such as United Nations and the World Trade Organization, and the reemergence of international conflicts (see Broner et al.2024).

III.A. Trade sanctions

We start the theoretical analysis of sanctions with the baseline framework in international trade. It is natural to assume that a country in full economic autarky is entirely insensitive to international economic sanctions. The most immediate departure from autarky is balanced international trade with a closed capital account. In recent history, even the most rogue regimes did not come close to full economic autarky, and essentially every country in the world participates in some form of international trade, even when isolated from international financial markets. This is sufficient for international economic sanctions to have a clear and measurable impact according to standard trade theory.

We start the analysis from the following key principles of international trade (see, for example, the discussion in Helpman 2011):

1. Trade results in overall welfare gains for both trade partners. This proposition emerges robustly across a variety of modeling frameworks, and the departures from this are generally of a pathological nature.
2. Despite aggregate gains, trade generally results in a distributional conflict. That is, there are winners and losers from trade in each country, but the surplus of winners is usually sufficient to compensate the losers provided income transfers are feasible.

² This is one of the reasons why many European economists, unlike European industrial lobbyists, supported swift and overwhelming sanctions on Russian energy exports immediately after the invasion started in 2023 (see [the open letter by European economists](#) and [this Spiegel oped](#) with an [expanded English version here](#)).

3. Adjustment to trade shocks, whether positive (like trade liberalizations) or negative (like trade wars and sanctions), is associated with a period of costly transition in which a part of the gains from trade is dissipated or losses are amplified.

Trade sanctions operate via mechanisms #1 and #3, and “smart” trade sanctions are meant to also engage mechanism #2 (see Fajgelbaum et al. 2020).

Welfare costs of sanctions under balanced trade

Arkolakis et al. (2012; henceforth ACR) propose a simple way to quantify welfare gains from trade as:

$$\text{Gain from trade for country } i = 1 - \lambda_i^{1/\varepsilon}, \quad (1)$$

where λ_i is the expenditure share on domestic goods, hence $1-\lambda_i$ is the expenditure share on imports, and ε is the trade elasticity. Formula (1) applies across a number of widely used models of international trade that give rise to a gravity structure of international trade flows, for which there is substantial empirical evidence.³

Intuitively, formula (1) emphasizes two main forces — how much the country trades, $1-\lambda_i$, and how easy it is to substitute the imported goods for domestically produced goods, ε . The effect of a trade shock can be judged by how much it affects the expenditure share on imports:

$$\text{Change in welfare of country } i = -\frac{1}{\varepsilon} d \log \lambda_i. \quad (2)$$

Note how the assumption of trade balance results in the import share being a sufficient statistic for welfare without conditioning on the effect on exports. Also note that formula (2) characterizes simultaneously the effect on welfare, real consumption and real GDP of the country, which may or may not be the main objective of sanctions. Given balanced trade, changes in real consumption also corresponds to changes in the real purchasing power of income. Hence, if monetary policy

³ Gravity equation in international trade predicts that larger countries are connected by larger trade flows and trade flows dissipate with distance between countries. Formally, ACR show that ε corresponds to the trade cost elasticity (which are conventionally linked to the geographical distance and other trade barriers) in the gravity equation after controlling for other economic determinants of trade (such as the size of countries and their trade network). See Head and Mayer (2014) and Costinot and Rodriguez-Clare (2014).

stabilizes the local nominal wages, then it also corresponds to the inverse of consumer price inflation.⁴

Formulas (1) and (2) can be extended to multiple-sector economies and economies with complex input-output linkages (see Costinot and Rodríguez-Clare 2014 and Baqaee and Farhi 2024), emphasizing the ability to substitute various foreign goods and inputs with the domestic ones. The easier it is to substitute to domestic production, the smaller are the gains from trade, or equivalently the smaller are the losses from trade sanctions. Conversely, the presence of certain bottle-neck goods or industries, which are nearly impossible to substitute away from and which are centrally used in the production of other goods, may result in extreme losses from fragmentation (Ossa 2015). Furthermore, a similar characterization of losses from trade applies for sectoral-level outcomes, such as real sectoral output, with the caveat that trade elasticities are likely different at disaggregated levels.

Another important insight is that the change in the aggregate (or sectoral) trade share is largely a sufficient statistic to evaluate the impact of a given trade policy on aggregate welfare (sectoral output). This makes it easy to immediately evaluate the impact of policies from trade data (provided estimates of trade elasticities), which is generally easier to procure than macro data.⁵ Furthermore, substitution across external trade partners that leaves trade shares unchanged, do not change welfare or allocative efficiency. Therefore, it is the aggregate trade share, not bilateral trade shares with specific trade partners, that is generally (but not always) most informative. The ability to substitute goods and input sourcing away from sanctioning coalition to allied and third-world countries grossly limits the effectiveness of sanctions.

In case of Russia, the import share did collapse on impact by nearly 50%, with a corresponding spike in import and consumer price inflation. Perhaps surprisingly, trade has plummeted initially with both sanction-coalition countries and with third countries that never joined the coalition formally or informally. This was, perhaps, the consequence of uncertainty about the likelihood of secondary sanctions that was an effective deterrent early on. However,

⁴ While generally this would not be the optimal monetary policy response, it can approximate the reality where most of the inflation shock comes from the import price inflation due to sanctions, when wages and non-tradable prices change little on impact. In fact, the Russian inflation experience in 2022 is largely due to this mechanism (see **Figure 2**), while Russian inflation that started in mid-2023 reflects other forces, in particular the overheated economy due to the behemoth government war expenditure that climbed towards double digits as a percent of GDP.

⁵ Noteworthy, Russia immediately classified many sources of internal macroeconomic and trade data. Nonetheless, it was still possible to assess international trade with Russia using the data of its trade partners.

trade has rebounded quickly over the ensuing months and was back to the pre-war level within less than a year. This happened largely due to the reallocation of trade flows (including re-routing) from the sanctioning coalition countries to third countries, once trial-and-error showed the lack of both enforcement (leakage) and of an effective secondary sanctions mechanism. According to this metric, sanctions had a major impact early on, which however waned very quickly.⁶

Size of countries

The baseline result (1) has a clear implication about the role of the size of countries, both imposing and receiving sanctions. Historically, a reasonable assumption is that a country under sanctions is small, and hence there are no costs to sender. In general, however, formula (1) clarifies that the costs go both ways and are inversely proportional to country size.⁷ Thus, if the sanctioning coalition is n times larger than the sanctioned country, we should expect that the costs to the coalition are n times smaller. The larger the coalition the smaller the relative cost. Nonetheless, this also emphasizes that the costs to sender are still proportional to the impact of sanctions on the receiving country, suggesting an inherent tradeoff (“no pain, no gain”).

Furthermore, if there are third countries that are not part of the sanctioning coalition and that freely trade with the country under sanctions, this mitigates the impact, provided these countries can effectively substitute, or even re-route, some of the goods produced by the sanctioning coalition.⁸ Thus, cooperation with third countries, or their coercion by means of secondary sanctions, is crucial not to derail the sanctions policy.⁹

Lastly, this analysis can be carried out at the level of individual sectors and products, and then the size of the country in individual industries must be considered as well. Even if a country

⁶ We have limited information about the decline in quality and the increase in costs of the goods that are sourced from alternative suppliers and using indirect trade channels. There are reasons to believe that both effects are present to some extent (see, e.g., Borin et al.2023), in which case sanctions do “throw sand in the gears” of the Russian economy despite import values having recovered to the pre-invasion levels.

⁷ Under trade balance, a country with a larger aggregate expenditure has a proportionally smaller trade share, as a matter of simple accounting.

⁸ Theoretically, this can be captured by a lower elasticity of substitution between the domestic production and imports and a higher elasticity of substitution between imports from the sanctioning coalition and the rest of the world. Indeed, in case of re-routing, this latter elasticity is close to infinite, albeit such substitution is subject to an extra transport cost or an additional markup, and hence not entirely without loss. More generally, this assumption on elasticities is realistic even if we do not take into account re-routing, but consider actual substitution of supply chains to third countries.

⁹ See the related literature on geoeconomics that explores alternative forms of economic coercion besides the optimal tariff (see Clayton et al. 2023).

is small overall but happens to be a large supplier of a certain good that is difficult to substitute away, the cost of sanctions to sender countries can be disproportionately large.

The practical implications in the case of Russia are as follows. While Russia is not a very large country, with the pre-war GDP about one tenth that of European Union (its main trade partner), the trade shares with Europe were nonetheless non-trivial, especially in energy exports, where Russia was the key and difficult-to-substitute supplier. For these reasons, Russia cannot be taken as a small country in the analysis of sanctions. Furthermore, the overall sanctioning coalition did not include large countries such as China, India, South Africa, Brazil, and Turkey. Unlike in the Cold War era, where the West controlled over 75% of GDP of the world, now the share of the Western economies is less than 60%, making unilateral Western sanctions less effective. Any sanctions policy that makes a meaningful dent in the Russian economy cannot be seamless for the European sender countries, and furthermore global cooperation is indispensable.

Equivalence between import and export sanctions

A seminal result in international economics is Lerner (1936) symmetry — namely, the equivalence between an import tariff and an export tax. The implication of this result is that import and export sanctions of a similar magnitude result in the same equilibrium allocation and welfare consequences.¹⁰ Note that this does *not* imply that import and export sanctions are substitutes — in contrast, their effects cumulate until trade is reduced to zero. Only if import sanctions are so severe as to exclude the possibility of buying any foreign goods, now and in the future, then such import sanctions make export sanctions redundant.¹¹

Lerner symmetry logic relies on the long-run trade balance and is ensured by the general-equilibrium adjustment in relative prices that support it. For example, an import tariff reduces imports on impact and shifts demand towards domestic goods. However, this must be accommodated with an increase in the local costs of producing goods (e.g., wages), which in turn

¹⁰ Formally, a uniform import tariff on all traded goods is equivalent to a uniform export tax of the same magnitude. In macroeconomic context, uniform must apply not only to all traded goods and services, but also to all time periods – present, future, and past (i.e., an export tax must be combined with a tax on accumulated net foreign assets; see Farhi et al.2014 and Barbiero et al. 2019).

¹¹ This obvious point requires emphasis given the number of misleading arguments made in the policy debate about the sufficiency of import sanctions early on in 2022, and given that import sanctions were politically cheaper to impose than export sanctions. By import sanctions we mean sanctions on Russian imports (or export controls by the sanctioning coalition) and by export sanctions we mean sanctions (e.g., embargos) on Russian exports.

reduces exports and rebalances international trade. Conversely, an export tax reduces foreign demand for domestic goods and consequently must lower the costs of production (wages) to achieve the same balanced trade outcome, and hence equivalence follows. Often such adjustment happens by means of an exchange rate appreciation or depreciation, which support the same allocation under import and export sanctions, respectively. Thus, an equilibrium exchange rate appreciation is consistent with the situation where import sanctions have a greater impact than export restrictions (Itskhoki and Mukhin 2022). Despite this differential exchange rate movement, the terms of trade of the country under sanctions deteriorate by the same amount and are the conduit of welfare losses from either policy.

Lerner symmetry is a general equivalence result that extends to individual budget constraints. For example, if the purpose of sanctions is to tighten the government budget constraint, it still can be achieved with sanctioning export revenues or imports of goods, irrespectively of who carries out trade (i.e., a government company exporting commodities or a household buying imported goods). Of course, this concerns only the equivalence of equilibrium economic allocations, and not the political feasibility of certain policies which may differ substantially across different policy options. In the context of European policy, sanctioning Russian imports was politically more feasible than limiting or taxing Russian energy exports, and the symmetry logic above was used in part to justify the lacking export restrictions. This logic fails when sanctions policy is not (perceived as) permanent, as we discuss below in Section III.B.

Adjustment to trade shocks

The discussion above emphasizes the role of elasticity of substitution in evaluating the effects of sanctions. Conventional wisdom and available estimates suggest that this elasticity is much lower in the short run than in the long run (see Ruhl 2008, Boehm et al.2023). This is the basis for arguing that sanctions have the largest bite in the short run, especially when they are unanticipated. Pre-announced or anticipated sanctions have smaller bite, offering an opportunity for an early adjustment.¹²

¹² The direct impact of sanctions is further complicated by the ability of countries to trade intertemporally, and in particular by creating stockpiles of most vulnerable inputs (see Kim 2024 for the adjustment by South Korean industries to the anticipated Japanese export controls during the 2019 trade dispute). Even sharp but temporary disruptions to trade flows may have little impact if they can be effectively smoothed out over time. This is particularly relevant for certain industries like military production which are the main target of sanctions.

Furthermore, in cases where pre-announced sanctions on future commodity exports have an immediate effect to raise current commodity prices, the policy can backfire altogether. This was, arguably, in part true in 2022 when the anticipation of sanctions on the Russian energy sector was a contributing factor to the record-high levels of world oil prices, even though the Russian oil supply to the world market never ceased.

The experience in 2022 also suggests that significant adjustment can happen swiftly, if the sanctions shock is large and dramatically moves relative prices. This was true for the adjustment of the Russian economy, that by the end of the year has largely relocated the bulk of its energy supply to China and entirely new customers in India and Turkey (offering them large price discounts). Russia also relocated its international import sourcing to China, Turkey and former Soviet countries. But it was equally true for the European economy and its substitution away from Russian energy sources that was largely completed by the end of 2022, with Europe bracing for a major recession in 2022 that did not materialize (see Bachmann et al.2024 and the heated debate that surrounded its circulation in 2022 summarized in Moll et al.2023).

Optimal trade sanctions

The description above is positive, characterizing the impact of trade restrictions and sanctions on the receiver and sender countries. Equally important is the normative question of optimal sanctions which balances the desired goals of sanctions with the associated economic costs to sender countries. Since the effect of trade sanctions is transmitted via the movement in the terms of trade, the normative question of optimal sanctions is closely related to that of the optimal tariff. The optimal tariff is effectively an aggregate monopoly markup on trade flows which is larger the less elastic is the import demand.

Optimal sanctions augment the optimal tariff, imposing proportionately larger trade taxes. Becko (2024) shows that trade sanctions that aim to curb the target country's aggregate production or welfare augment proportionally the optimal tariff that would be imposed unilaterally with the goal of extracting maximum economic surplus. This means that optimal sanctions in this case overshoot and deliver smaller economic surplus to the sender as they additionally serve to curb output of the target country. Alekseev and Lin (2024) study optimal trade sanctions with the goal of curbing foreign output in a subset of sectors to maximize the chance of winning in a geopolitical competition. They show that optimal sanctions in this case augment the optimal tariff by

introducing additional “Pigouvian” taxation of trade flows that are central (in a formal input-output network sense) to the industries in question.¹³

III.B. Financial and payment sanctions

Trade sanctions reduce the amount of trade between countries keeping trade balanced. Financial and payment-system sanctions focus on limiting the ability to finance trade intertemporally, or even within a given period. In the limit of full financial sanctions, the country can only carry out barter transactions, exchanging exports for imports directly, granting the sanctioning coalition the ability to control imports. This is akin to the limitations imposed on the Soviet Union imports during the Cold War era. Since 1980s, trade linkages have grown increasingly complex, making international financing and payments increasingly more important in international trade.

Financial sanctions

The aim of financial sanctions is to curb the ability of *intertemporal* trade — whether borrowing internationally, or using accumulated foreign assets to pay for current imports, or using current export proceeds to buy future imports. The discussion above relied on the idea that all exported revenues can be used to buy imports now or in the future, while financial sanctions disrupt this logic. Sanctioning accumulated financial assets is politically easiest, as it avoids the mutual economic costs of trade sanctions discussed above, but this may carry reputational consequences in the asset markets.

Financial sanctions are most effective when a sanctioned country relies on international financial markets to procure imported inputs. In this case, sanctions can trigger or amplify a sudden stop in financial flows, which in turn creates a disruption in procuring imports and possibly causes a full-scale bank run. This is the case in which international sanctions can have the largest impact by disrupting the functioning of the entire financial system of the target country beyond the direct international trade effects. However, if the country is neither an active net borrower in international markets, nor has a large accumulation of gross foreign asset positions, financial sanctions may

¹³ Becko and O’Connor (2024) model ex ante strategic response to the prospect of future sanctions policies. Bianchi and Sosa-Padilla (2023) study optimal financial sanctions in a model with safe asset provision.

have only limited effects that can be mitigated with financial repression of capital outflows (see Itskhoki and Mukhin 2022).

In case of Russia, which had a sizeable net foreign asset position and little gross foreign debt, financial sanctions were mostly targeting foreign assets. This turned out to be insufficient to trigger a persistent financial crisis, in part because of the large concurrent trade surplus that provided strong currency inflow into the economy and appreciated the ruble. This current account surplus was sufficient to stabilize the financial system even without continued use of financial repression and austerity in expenditures. While the welfare costs from frozen assets and disrupted imports were real, there was no financial strain associated with a typical balance-of-payment crisis. Indeed, this was an unusual situation of temporary abundance of foreign exchange liquidity driven by restricted imports under soaring export revenues from high commodity prices.¹⁴

Violation of Lerner symmetry

Lerner symmetry between import and export sanctions does not apply when sanctions policy is not uniform over time, that is when sanctions are not deemed permanent and/or when there are significant gross foreign asset positions not subject to sanctions (see Itskhoki and Mukhin 2023a). Import sanctions have two distinct effects relative to export restrictions. First, if they are not deemed permanent, they create incentives to delay import purchases, thus limiting the need to borrow to pay for imports in the current period. In other words, they relax the need for austerity as they delay desired expenses.

Second, import sanctions, whether temporary or permanent, result in the currency appreciation (Lorenzoni and Werning 2023). As discussed above, exchange rate appreciation is the mechanism that supports the adjustment towards trade balance when import flows are restricted resulting in a surplus of foreign exchange from exports. The appreciation is not allocative per se when sanctions are uniform over time and when there is no foreign currency debt. However, this is not the case when the sanctioned country either has net foreign debt or relies on foreign-currency financing at home. Exchange rate depreciation increases debt overhang, while appreciation does the opposite, relaxing financial constraints on the economy. As a result, import sanctions can

¹⁴ See Re:Russia report "[Crisis in Abundance: why did the Russian economy fail to collapse and is there a crisis on the horizon?](#)"

backfire by offsetting some of the effects of financial sanctions and helping to avoid a possible financial crisis or a bank run.

Financial crisis

Financial crisis may be the immediate goal of steep and swift financial sanctions, as it is significantly less costly to the sender than long-term trade sanctions. However, certain condition must be satisfied for a financial crisis to materialize as a result of sanctions. The crisis is more likely in a country with:

- i) larger current account and government budget deficits;
- ii) larger external debt;
- iii) greater incidence of dollarization in the domestic economy, especially in domestic borrowing and lending.

Under these circumstances, a combination of financial sanctions with export restriction has the greatest capacity to inflict a bank run and a financial crisis in the economy. In particular, this is the case because such sanctions cut off the currency supply to the economy and hence trigger a currency devaluation which puts additional stress on the financial system that relies on foreign-currency debt.

In the case of Russia, arguably, no condition for a financial crisis was satisfied. The Russian economy was not dollarized, had little external debt, ran current account and budget surpluses, and had significant accumulated foreign exchange reserve — the so-called “economic fortress” Russia. This was, in part, due to the earlier financial sanctions imposed in 2014-15 that cut off Russian government and larger firms from the international financial market. The consequence was that the Bank of Russia could fend off a bank run and prevent a currency crisis by using a range of financial repression measures that were later relaxed. It is, nonetheless, likely true that not imposing a swift embargo on the Russian energy exports was a missed opportunity, which could have significantly limited the ability of the government to curb the bank run and currency crisis that were emerging in the weeks following the invasion.

Payment system sanctions

An understudied area is the role of payment system sanctions.¹⁵ In standard economic models, payment systems are taken for granted, and usually do not affect either trade flows or asset flows. However, in practice payment systems prove to be very important, as their disruption makes trade transaction impossible, even when trade is balanced and does not require intertemporal financing. Furthermore, enforcement of such sanctions via the banking system might be significantly less costly than enforcement of trade sanctions in the corporate sector by shifting the due diligence onto the financial institutions, as we discuss in the next two sections.

A related topic concerns frictions in the use of third-country currencies in settling international transactions when transactions with western currencies are sanctioned. This calls for the development of novel models that focus on the transaction costs associated with clearance of international payments. Tight payment system sanctions bring the outcome closer to a barter equilibrium where trade must be balanced across all trading partners, limiting the scope for gains from international trade.

Current international payment systems are provided and controlled almost exclusively by the United States and its allies, giving the Western coalition a significant leverage in the use of payment system sanctions. An open question is whether this is a durable equilibrium, or we are on the cusp of a shift to a network of more fragmented and less centralized payment systems. If so, to what extent such a shift is an organic development or a direct consequence of weaponization of the Western financial infrastructure for geopolitical goals.

Optimal sanctions mix

The discussion above emphasizes both the equivalence and complementarity in the use of certain international sanctions. Different combinations of financial and trade sanctions can be used to curb international trade flows, as suggested by Lerner symmetry. Nonetheless, from the perspective of financial impact, we can identify clear complementarities. In particular, import sanctions are a poor complement for financial sanctions, as they partially offset the pressure that financial sanctions put on the currency market and alleviate the need for financing of import expenditure. In contrast, export sanctions and financial sanctions complete each other as together

¹⁵ For recent work on payment system sanctions see Livdan et al. (2024). See also Clayton et al.(2024).

they double down on cutting off the supply of currency to the economy, and jointly can trigger a twin currency and balance-of-payment crisis.

To summarize, an optimal sanction mix likely involves a combination of swift and comprehensive financial and payment system sanctions complemented with a broad export embargo and granular well-targeted import restrictions on dual-use goods. Of course, implementing such a coordinated policy requires commitment and political resolve to deal with the economic costs to sender countries. Furthermore, political economy constraints may delay the implementation of such policies or render them infeasible altogether.

In the context of 2022 Russian sanctions, political constraints played the central role. This resulted in a combination of an immediate asset freeze and sanctions on the financial system including the Russian central bank, followed by broad import sanctions (export controls), but without any significant embargo or tax on Russian commodity exports. While this policy had a significant short-run bite in terms of reducing Russian imports, it failed to impose sufficient financial stress on the economy, and thus afforded Russian economy the time to adjust to the new equilibrium under sanctions.

IV. Russia sanctions—objectives, primary instruments, and the timeline

This section of our paper documents the primary instruments of economic statecraft utilized, their objectives, and their timing. Russia has been under sanctions since well before its full-scale invasion of Ukraine in 2022. A coalition of countries, including the US and the EU, has imposed sanctions on Russia for a range of issues ranging from election interference, cyber-crime, use of chemical weapons, and the invasion of Ukraine in 2014 and 2022.

The tools of economic statecraft (for simplicity, we refer to these measures of economic statecraft as “sanctions”) include any form of economic leverage to achieve foreign policy, national security, or defense objectives. The most typical measures include limitations on trade and leveraging other critical dependencies such as financial — the use of the U.S. dollar and US-based financial systems. Yet not only are there almost no studies analyzing the cross-disciplinary effects, but there is also a limited number of studies analyzing the economic and financial impact on target economies (countries being sanctioned) as well as on the sanctioning country (Prusa 2008).

Studying sanctions is particularly challenging due to their numerous, evolving, overlapping, and sometimes contradictory objectives. Even in 2022, these objectives were vague and lacked measurable targets. Commonly stated goals include "regime change," "deterrence" (refer to the forthcoming NATO project paper, November 2024), and "imposing a cost," among others ("Effectiveness of U.S. Sanctions Targeting Russian Companies and Individuals" 2023). In the case of Russia, the objectives eventually settled on reducing Russia's revenues, limiting its ability to continue the war in Ukraine, imposing pain on the Russian economy, and punishing human rights abuses ("U.S. Department of State: Russia"). In summary, we believe that in 2014-15, the likely aim was to alter the regime's cost-benefit analysis of its invasion. By 2022, recognizing that economic pressure alone would not be enough to deter Russia from continuing its war, the U.S. shifted its focus to degrading Russia's ability to win the war.

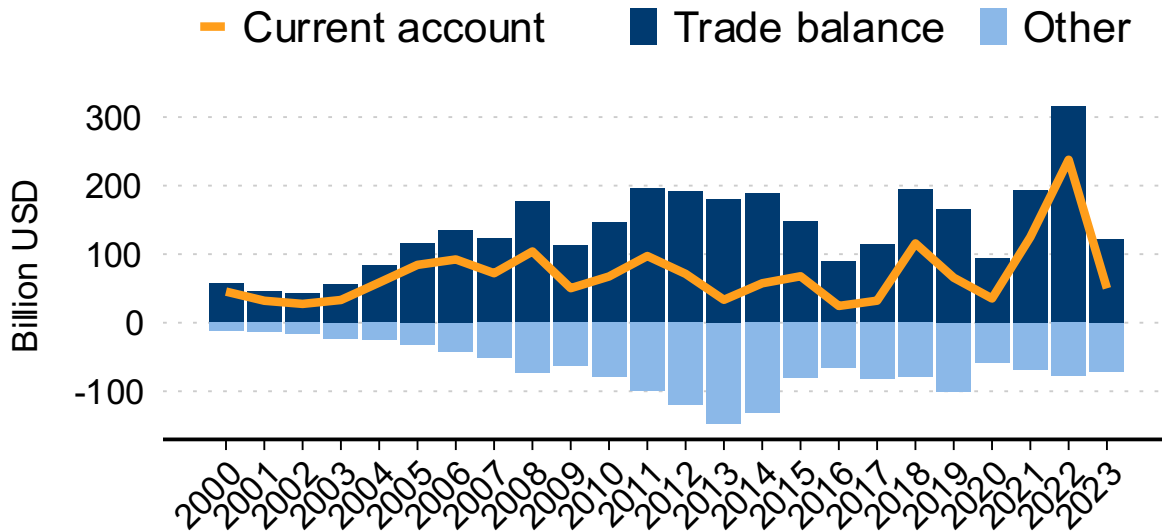
Russia's 2022 case stands out due to its size and degree of integration into global markets (Ribakova 2024a) compared to the earlier cases of Iran, North Korea, and Venezuela. Russia has been under sanctions since 2014; however, the scale and ambition of sanctions at the time were more limited.

While Russia is frequently cited as the most sanctioned country globally based on the number of sanctions (Scarpino and Trainer 2024; Donovan, Nikoladze, and Murphy 2022), economic indicators such as trade impact suggest otherwise for 2022 (see **Figure 5**). Despite the high number of sanctions, Russia's current account surplus increased in that year. If anything, Russia experienced a positive terms of trade shock of an extraordinary magnitude. While the scale of the 2014 sanctions was more limited, one consequence was that by January 2022, Russia was already less globally integrated than it had been in January 2014. Along with the preparatory work by Russian authorities to brace for future sanctions since 2014, this helped insulate the country from the impact of the 2022 sanctions. The actual economic impact, including how much the trade balance was compressed during 2022-2024, reveals that the net effect of these sanctions might not be as significant as the number and variety of imposed sanctions would suggest. Thus, while the count of sanctions is high, the tangible impact on Russia's economy is less clear.

Figure 5: Current Account of Russia

FIGURE 5

Current Account and Components



Source: Bank of Russia

We find that dynamics over time matter, an area that has so far attracted little attention in the literature. It might be best to approach sanction effects as non-linear. Initially, if the shock is significant enough, sanctions can impose immediate costs on the target country. However, the target country inevitably finds workarounds, and the immediate effect of sanctions wanes. While the US Treasury has a doctrine of "sanctions maintenance" — it aims to ratchet up sanctions continuously (and close loopholes) so that the sanctions will have the same economic impact over time, — this does not appear to work as well in practice (Stubbs and Zengerle 2018). Over time, sanctions continue to weigh on the economic prospects of the sanctioned country, but the time horizon may be beyond the scope of politicians, especially if the country entered the crisis with strong buffers. In the worst-case scenario, by applying cautious sanctions spread over time, this produces a counterproductive effect of "vaccinating" a country against the impact of sanctions.

IV.A. Russia 2022—the timeline of events

Modern Russia has been under significant macroeconomic sanctions since 2014.¹⁶ Sanctions on Russia can be divided into three phases. The first phase occurred after Russia annexed Crimea and the onset of the Russia-sponsored war in Eastern Ukraine. In March 2014, the United States imposed sectoral sanctions on entities in the Russian economy's financial, energy, and defense sectors by adding them to the Treasury Department's Sectoral Sanctions Identifications (SSI) List under Executive Orders.¹⁷ These sectoral sanctions, among other measures, prohibit U.S. persons from participating in the issuance of new debt securities with maturities above specified thresholds. Most of these sanctions focused on the financial sector (Welt et al. 2022). In addition, the US and the EU imposed export controls with a narrower aim of restricting Russia's access to sensitive technologies and goods, particularly in the energy, defense, and high-tech sectors. The objective of the hard-hitting financial sanctions was to inflict sufficient pain on the Russian economy to bring Russian authorities back to the negotiation table and induce it to pull back from Ukraine. At the time, the US administration was not ready to provide direct military aid to Ukraine and believed that Russia's desire to maintain links to global financial markets would induce a behavior change.

In retrospect, better lessons should have been drawn from the 2014 experience of sanctioning Russia. The key point is that when sanctions aimed to induce behavioral change, their impact was less about the immediate pain they inflicted—which was still significant—and more about the signal they sent regarding potential future measures. Although the U.S. and its allies did not seize the central bank's assets or expel Russian banks from SWIFT in 2014, they made it clear that incremental Russian military advances would be met with a steady escalation of sanctions. By 2022, the objective shifted from influencing behavior to degrading Russia's war-fighting capability. In retrospect, it is evident that there was no reason not to have imposed all possible decisive measures against Russia from the outset once Russia launched the full-scale invasion in February 2022.¹⁸

¹⁶ For a historical overview of sanctions imposed on the Soviet Union and Russia before 2014, refer to “Effectiveness of U.S. Sanctions Targeting Russian Companies and Individuals” (2023).

¹⁷ Including Executive orders 13660, 13661, 13662, and 13685.

¹⁸ The 2014 sanctions bought 8 years of time to prepare for the 2022 war. Russia used this time to build an economic fortress to withstand the economic pressures of the war and ensuing sanctions. Whether the US and the EU have put this time to a good use to prepare for the escalation of the conflict is more doubtful. To the contrary, the European reliance on Russian energy exports, if anything, has only increased during this period.

The second phase of sanctions on Russia, spanning from 2015 to 2021, involved largely unilateral and somewhat haphazard actions by the U.S. Since 2015-2016 the US sanctions were imposed on Russia for election interference and malign cyber activities. In August 2017, Congress codified existing executive sanctions and introduced new ones through the Countering America's Adversaries Through Sanctions Act (CAATSA), targeting cybersecurity, crude oil projects, financial institutions, and defense sectors and penalizing those evading these measures. In April 2018, sanctions on Russian oligarchs and companies like Rusal disrupted global aluminum markets until lifted after ownership changes. Following the Skripal poisoning, the U.S. imposed sanctions under the Chemical and Biological Weapons Control and Warfare Elimination Act, including a significant 2019 ban on U.S. financial institutions from participating in non-Ruble-denominated Russian sovereign debt issuance. The National Defense Authorization Acts for FY2020 and FY2021 targeted companies involved in Nord Stream 2 and TurkStream pipelines, expanding sanctions to cover pipelaying facilitation. In April 2021, the Biden administration, under Executive Order 14024, further restricted U.S. financial institutions from engaging in the primary market for Russian government bonds, extending the scope to the OFZ market.

The third phase of sanctions began with Russia's full-scale invasion of Ukraine on February 24, 2022, prompting the international community to impose extensive sanctions. Most of the original set of sanctions were *financial sector sanctions*, focused on denying Russia access to global financial markets and architecture. In the days leading up to the invasion, the U.S. targeted sovereign debt markets, financial institutions, and Kremlin elites. On February 23, the U.S. sanctioned the Nord Stream 2 pipeline operator after Germany suspended its certification. By February 24, the U.S., EU, and G7 imposed broader sanctions restricting Russia's access to major currencies, freezing assets of additional banks, and imposing export controls. On February 26, further measures included removing several Russian banks from SWIFT, freezing the Bank of Russia's assets, and imposing sanctions on the Bank of Russia. Additional sanctions on Russian banks, corporations, and institutions were imposed as the years progressed; however, many Russian banks still maintain access to global services today (Hilgenstock, Ribakova, and Wolff 2023) and some of the incremental financial sanctions seem more likely to insulate the Russian financial industry against shocks rather than create them. On one hand, it is important to maintain constant pressure, as Russia and its allies often find workarounds to sanctions. On the other hand, failing to sanction all malign actors simultaneously allows Russia to adapt more easily. For

instance, in the case of the financial industry, if the primary concern is energy trade, one bank—such as Gazprombank—could be left to handle such transactions, while all other banks are sanctioned and excluded from the SWIFT system.

The expansion of *export controls* is another important part of the third phase of sanctions following Russia's 2022 full-scale invasion of Ukraine. Starting in 2014, U.S. export controls concentrated on "choke point" technologies—items that Russia could not theoretically obtain from countries not participating in the sanctions. Preventing transshipment through third countries posed a significant enforcement challenge. Technology exports to Russia now largely require a license. Even before Russia's 2022 invasion of Ukraine, export controls limited supplies to Russia's military-industrial complex, barring U.S. manufacturers from exporting items under the EAR to Russian defense firms and prohibited exporting munitions. In 2018, the BIS added Russian entities linked to the oil and gas industry to its Entity List, necessitating U.S. companies to obtain export licenses.

In response to Russia's full-scale invasion of Ukraine in 2022, the U.S. imposed broader country-wide restrictions (Kilcrease 2022), denying licenses for lower-level technologies with potential military applications, including those critical to Russia's energy sector, and expanded export restrictions targeting semiconductors, computers, telecommunications and information security equipment, lasers, and sensors. These controls aimed to cripple Russia's defense, aerospace, and maritime sectors by denying access to critical technologies, thus weakening its industrial base and strategic capabilities.

The Foreign-Direct Product Rules further restricted Russia's ability to source these materials from third-party nations. These export controls extend extraterritorially via the foreign direct product rule, affecting items made abroad using U.S. tools or software, particularly in chip manufacturing, and applying stringent rules to designated Russian military entities.

BIS also imposed stringent controls on aviation-related exports to Russia and Belarus, including licensing requirements for aircraft and parts made in the U.S. or containing significant U.S. components. On March 4, 2022, BIS tightened export controls on Russia's strategic industries, particularly oil refining, and sanctioned 91 entities supporting Russian military activities.

Subsequent executive orders and regulatory updates throughout 2022 expanded these controls to include luxury goods, dollar-denominated banknotes, services, and a wide range of commercial and industrial equipment. BIS also added numerous Russian entities to the Entity List,

culminating in a broad ban on items useful in chemical and biological weapon production and quantum computing technology by September 2022.

Most of the *restrictions on Russia's exports*, particularly energy exports, did not come into force until 2023 (Hilgenstock et al. 2023). While some countries, particularly the US and the UK, imposed an embargo on Russian oil shortly after February 2022, the European Union was the most significant buyer of Russia's energy. In June 2022, the European Union implemented its sixth sanctions, introducing a complete ban on imports of Russian seaborne crude oil, effective from December 5, 2022, and a ban on all oil products starting February 5, 2023. While these sanctions were the most significant energy-related measures introduced so far, there was concern about a provision that would ban EU operators from transporting, insuring, or financing the transport of Russian crude oil starting December 5, 2022. Given the pivotal role of Western shipping companies and maritime insurers, there was fear among the U.S. government and other coalition countries that this could lead to a drastic reduction in Russian crude oil supply, exacerbating the impact of the war on global energy markets.¹⁹

Meanwhile, Ukraine's allies aimed to limit Russian revenue from oil and gas exports. To address these concerns, the G7/EU established a price cap mechanism for Russian crude oil and oil products, which allowed Western companies to continue their involvement in Russian exports as long as prices remained below a specified level. The cap was set at \$60 per barrel for crude oil, effective from the embargo's start on December 5, 2022. For oil products, the cap was introduced on February 5, 2023, with a \$45 per barrel limit for products trading at a discount to crude oil, such as fuel oil, and a \$100 per barrel limit for products trading at a premium, such as diesel.

Sanctions targeting Russia's gas exports have included several strategic measures to diminish its energy revenues and reduce dependency on Russian gas. The European Union has imposed bans on importing Russian natural gas, with a planned phase-out of supplies. Additionally, sanctions have affected key infrastructure projects, such as the Nord Stream pipelines, and restricted investments and technology transfers critical to gas development. Financial restrictions on entities within the gas sector further limited their access to international financial systems and capital. Collectively, these sanctions were designed to undermine Russia's energy sector and economic stability. A recently company-commissioned report concluded that

¹⁹ To anticipate our discussion of the results of the policy, one area where sanctions were remarkably successful is at ensuring a constant flow of Russian oil to the world market.

sanctions badly hurt Gazprom (Seddon, Cook, and Stognei 2024). In addition to oil and gas, Russia faces sanctions on coal exports and certain metals. These restrictions are intended to reduce Russia's revenue from these products. The coalition of countries opposing Russia's war on Ukraine has been cautious to avoid sanctioning Russia's exports of food and fertilizers, in order to prevent adverse humanitarian consequences.

It is important to note the reason why it took so long for the coalition of countries to act. Until recent cases of Russia and China, the concept of cost-to-sender (Hufbauer et al. 2009)—the cost to the country imposing sanctions—has been largely forgotten as it has been small. In the case of Russia, the "cost-to-sender" factor has been an important consideration for policymakers. During 2014-15, the EU at times focused more on debating how to distribute the costs equally than on the impact on Russia. The EU also drew a red line on sanctioning the energy sector at the time. More recently, it has been the United States that has resisted any measures likely to drive up international energy prices. Disconnecting from Russian energy for Europe or a spike in global oil markets for the US could have significantly impacted the sanctioning economies (Moll, Schularick, and Zachmann 2023).

The final stage of 2022 sanctions was the so-called *self-sanctioning* ("Leave Russia"). Many companies voluntarily announced that they would either divest fully or scale back their operations in Russia. The departure of foreign businesses from the Russian market highlights a complex interplay of economic, ethical, and bureaucratic factors. In most cases, company actions are not merely responses to immediate pressures but are part of carefully considered strategies that affect the overall dynamics of foreign business presence in Russia and their global exposure. Economic factors include the potential financial losses and the logistics of unwinding operations. Ethical considerations often revolve around maintaining corporate social responsibility and adhering to international sanctions. Bureaucratic hurdles encompass navigating Russian regulatory requirements and potential governmental pushback (Onopriienko et al. 2023). In many cases, the decision proved profitable (Balyuk and Fedyk 2023). However, many companies that stay continue to lobby via respective business associations to reduce pressure on Russia (for example, against freezing of foreign reserves) or participate in working groups to foster Russia's economic development.

The timeline provides some clues as to why the sanctions on Russia had less impact than many had hoped for. First, the initial round of sanctions focused on the financial sector, aiming to

drive Russia into a financial crisis that would spiral into an economic one. However, many of the 2022 measures, aside from the freeze on the Bank of Russia's reserve assets, were anticipated by Russian authorities, allowing them to mitigate the impact and plan response scenarios. Second, the gradual approach by the United States and the EU to sanctioning Russia's energy exports, which fully took effect only in 2023, created a highly favorable external environment with surging commodity prices, leading to record-breaking export earnings and substantial budget revenues in 2022. Finally, the "Fortress Russia" (Ribakova et al. 2020) strategy before the invasion, including robust macroeconomic buffers, low government debt, significant reserves (some currently immobilized), and a well-funded sovereign wealth fund, along with prudent fiscal policies, the Central Bank of Russia's credible inflation-targeting regime and development of domestic payments infrastructure to reduce reliance on SWIFT and VISA/Mastercard, also helped cushion the impact of sanctions.

As a result, Russian authorities were able to increase government spending, provide sufficient liquidity to banks to prevent spillovers into the real economy through the credit channel, and stabilize the ruble exchange rate via capital controls and financial repression. However, the economy and financial system's resilience in the face of international sanctions should not obscure the fact that Russia's underlying economic vulnerabilities persist and could re-emerge quickly. In the following section, we provide an empirical assessment of the sanctions' impact on Russia's economy.

V. Impact of Sanctions—an Empirical Assessment

In this section of the paper, we present key empirical evidence regarding the effectiveness of sanctions. We connect these empirical findings to our theoretical model and explore potential avenues for future research. We argue that the critical characteristics of a country—such as its size, integration into global markets, and control over key network nodes like raw materials, infrastructure, and exports—play a significant role. Additionally, we emphasize that enforcement dynamics over time are crucial, which has received limited attention in the literature.

Had comprehensive sanctions been imposed and effectively enforced immediately after Russia's full-scale invasion of Ukraine, it is plausible that we would have seen a collapse of Russian markets, an economic and financial crisis, and a significantly reduced policy space to address these challenges. While it is difficult to speculate with certainty, losing oil and gas

revenues, along with access to critical components in 2022, would likely have made Russia's war effort far more difficult to sustain.

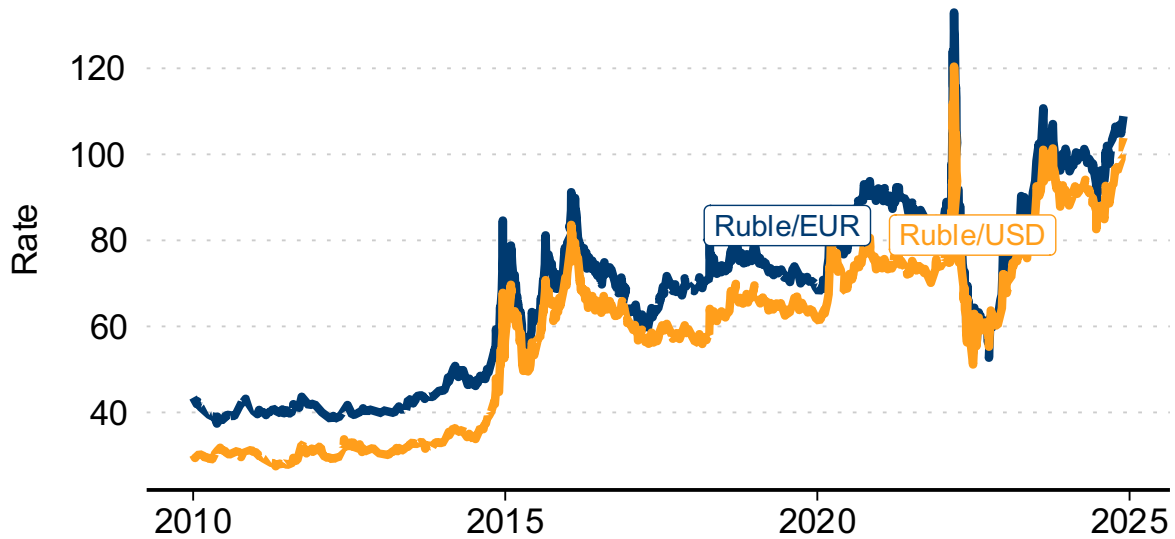
V.A. Russia 2022—financial sanctions

While Russia had time to prepare for possible financial sanctions, as described in the timeline section, the immediate impact was severe. Markets collapsed, the ruble came under severe pressure (see **Figure 6**), and banks faced severe bank runs requiring substantial liquidity support by the central bank (**Figure 7**). However, not all of the initial capital flight and sharp tightening in financial conditions following the SWIFT exclusion and the freezing of the Bank of Russia's reserves in the West can be attributed to sanctions. Some of it may have been caused by Russian households panicking in the face of uncertainty—like many others, most did not expect Russia to invade a neighboring country. In reality, it is nearly impossible to distinguish between the direct effects of sanctions and the market panic caused by the sudden worsening of economic prospects due to the war.

During the peak of the crisis, when the demand for cash and foreign currency surged, even Russia's largest state-controlled bank's—Sberbank—branches and ATMs faced unprecedented runs. Foreign-owned banks were reportedly unable to fulfill their clients' requests for foreign exchange conversion and withdrawals. Banking system shifted to an unprecedented liquidity deficit vis-à-vis the Bank of Russia (CBR). Interbank market fragmentation increased, and while many banks still depend on liquidity support from the Bank of Russia, others have accumulated deposits with the CBR rather than circulating them in the interbank market, likely due to ongoing uncertainty. On the foreign exchange front, CBR's FX market turnover hit a historical low, suggesting limited access to foreign currency.

Figure 6: Ruble exchange rate, in ruble per unit

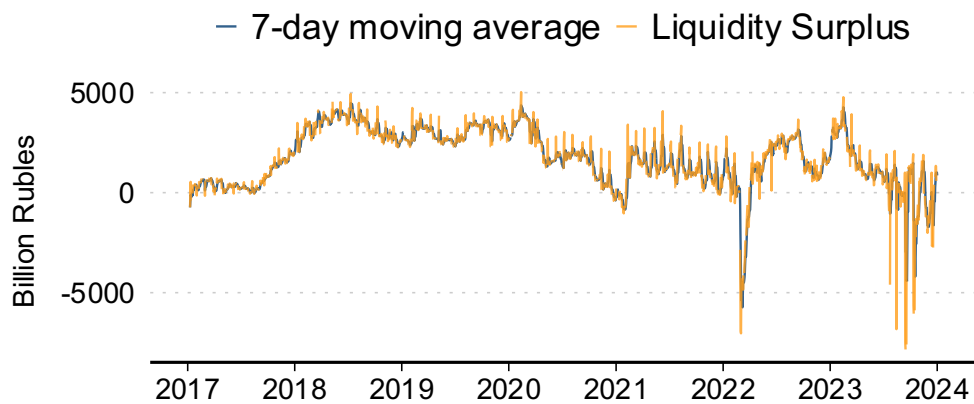
FIGURE 6
Ruble Exchange Rate



Source: Bank of Russia

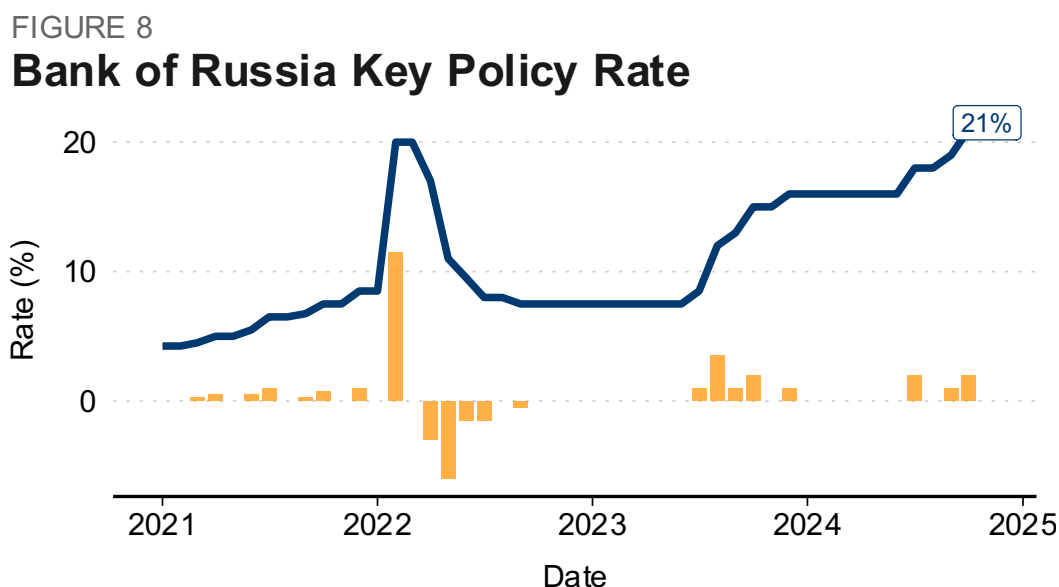
Figure 7: Structural liquidity surplus of the banking system, in ruble billion

FIGURE 7
Structural Liquidity Surplus of the Banking System



Source: Bank of Russia

Figure 8: Bank of Russia key policy rate, in % and % changes (bars)



Source: Bank of Russia

The Bank of Russia responded quickly to sanctions by more than doubling its policy rate from 9.5% to 20% on February 28, offering targeted liquidity support to the banking sector, and implementing strict capital controls. In the initial phase of the crisis, the CBR intervened in the market to stabilize the ruble, which had come under significant pressure, but had to halt these efforts following the reserve asset freeze and the U.S. imposed sanctions on the Central Bank of Russia, as confirmed by Governor Nabiullina at the emergency policy meeting. Despite these measures, the central bank lost \$38.8 billion in reserves from February 18 to March 25, reducing total reserves to \$604 billion (including about \$300 billion in frozen assets). This amount likely encompasses FX refinancing to local banks and losses from valuation effects. Additionally, Russian authorities temporarily shut down the domestic stock market and limited the number of ruble trading sessions.

Although sanctions have constrained the CBR’s reserve operations, a historically high current account surplus in 2022—\$238 billion—enabled Russia to recover the "lost" reserves relatively quickly (Ribakova, Hilgenstock, and Wolff 2023). While Russia’s current account fell in 2023 due to energy sanctions, it remained in a surplus of \$50 billion in 2023.²⁰

²⁰ To put the magnitude of these numbers into perspective, the Russian pre-war GDP was around \$1.85 trillion, Russia’s annual imports were around \$300 billion, and the Ukrainian pre-war GDP was around \$200 billion.

Yet, by April 2022, it became clear that the markets were stabilizing, allowing the CBR to start removing some of the restrictions and cut rates (**Figure 8**) (Ribakova and Hilgenstock 2022). Russia's financial system pivoted to higher use of the Renminbi, reliance on domestic settlement and messaging systems, and digital currencies. The banks' structural liquidity deficit with the Bank of Russia fell sharply and turned into a surplus (**Figure 9**). By 2022-2024, rapid credit expansion became a new problem as Russia's economy pivoted to war production, supported by strong fiscal stimulus.

Russia was successful in stabilizing its economy due to a combination of factors. Firstly, it continued to benefit from a significant inflow of foreign exchange, driven by ongoing energy exports and higher prices throughout 2022. Secondly, the government implemented decisive policy measures, including capital controls, aggressive interest rate hikes, and regulatory forbearance. Additionally, the Bank of Russia's preparedness since 2014—evident in its enhanced policy toolkit, which included crisis management and emergency lending facilities, as well as a credible inflation targeting regime—played a crucial role in stabilizing the economy.

V.B. Russia 2022—impact on trade

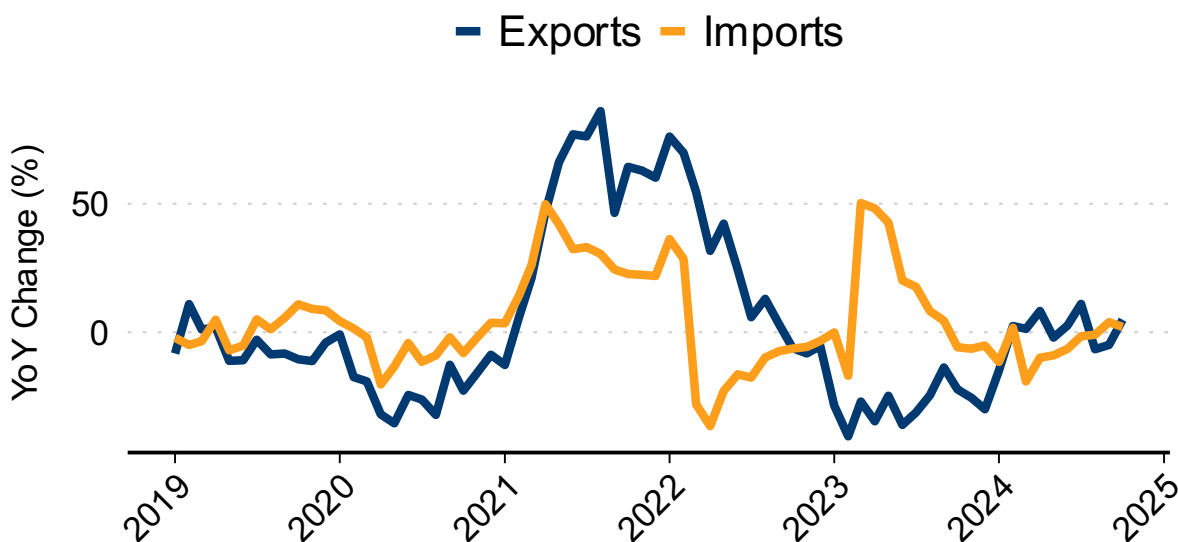
In 2022, Russia achieved its highest-ever current account surplus, amounting to \$238 billion. While an outsized current account surplus is a natural outcome of the sanctions imposed on Russia in 2022—resulting from increased Russian exports and blocked imports—and does not necessarily indicate economic health, it has enabled Russia to accumulate resources to sustain its war effort. The current account surplus was over double that of the same period in 2021 and also more than twice the previous record. The surplus was largely driven by soaring commodity prices and a significant import reduction, especially in the initial phase following the full-scale invasion as Russia struggled to access certain products due to export controls and self-sanctioning by companies (**Figure 9**). However, by autumn 2022, Russia's import volumes began to improve and stabilized largely by the end of 2022. Roughly at the same time, limitations on Russia's exports (oil embargo and price cap) came into force, beginning to erode export revenues.

Russia's annual expenditure on the war in Ukraine is around \$150 billion, comparable with Russia's total revenues from oil exports.

Figure 9: Change in exports and imports, in % year-over-year

FIGURE 9

Change in Exports and Imports



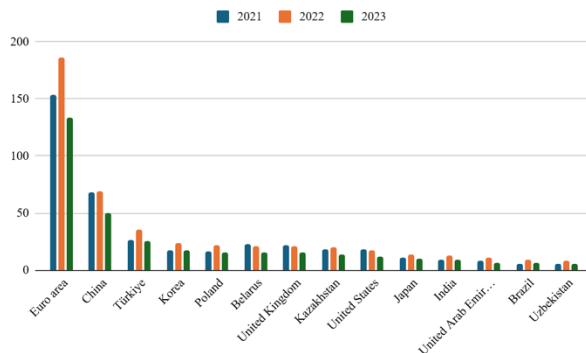
Source: Bank of Russia

The combination of import and export control measures, as described above, has also resulted in a dramatic redirection of Russia's trade (

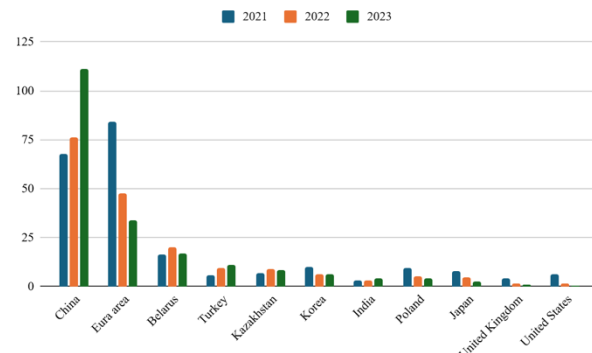
Figure 10). China is now Russia's largest trade partner in Russia's imports. China and India have also replaced the EU as Russia's most significant energy importers (Figure 11). This is particularly important for Russia's oil exports, as it has successfully built a shadow fleet that allows it to bypass the oil price cap. Over 90% of Russia's crude oil is now shipped without G7 intermediation (Hilgenstock, Hrybanovskii, and Kravtsev, 2024). While China has increased its imports of Russian oil, India has emerged as the most significant beneficiary, largely due to the "refining exemption" or the so-called "refining loophole." This loophole permits refineries outside Russia to refine Russian oil and ship it globally, including to coalition countries opposing Russia's war in Ukraine. The refining exemption was designed with the assumption that Russia's oil would be sold under the price cap, and profits from refining would be diverted away from Russia. However, this has proven ineffective, as Russia partially owns refineries around the world.

Figure 10: Russia external trade by partner, in \$ billion

Exports

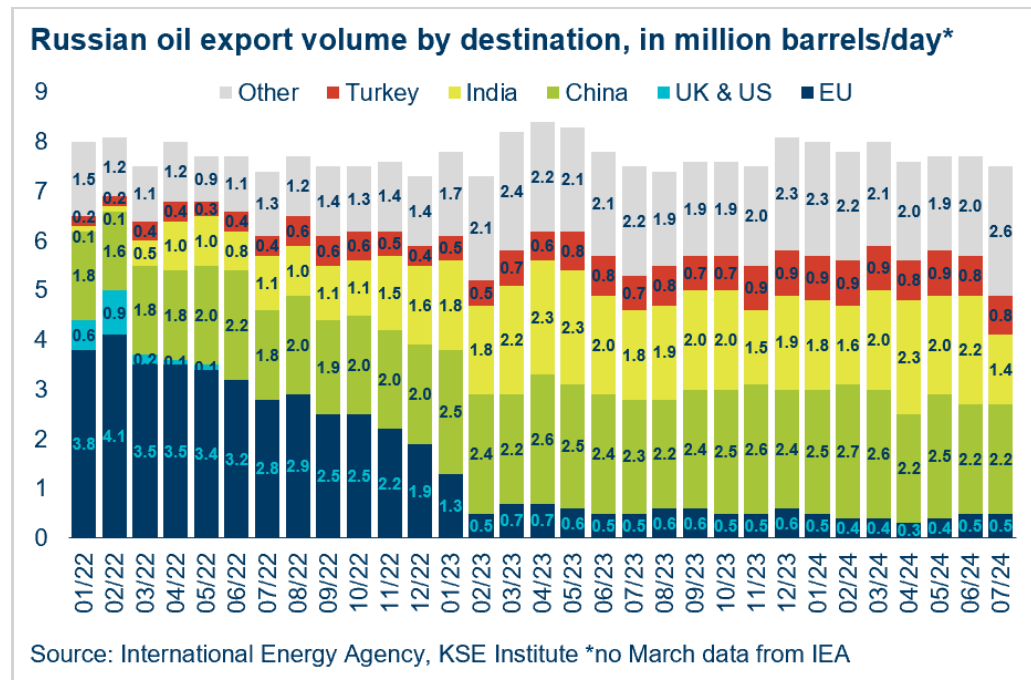


Imports



Source: International Monetary Fund

Figure 11: Russia oil export volume by destination, in million barrels/day



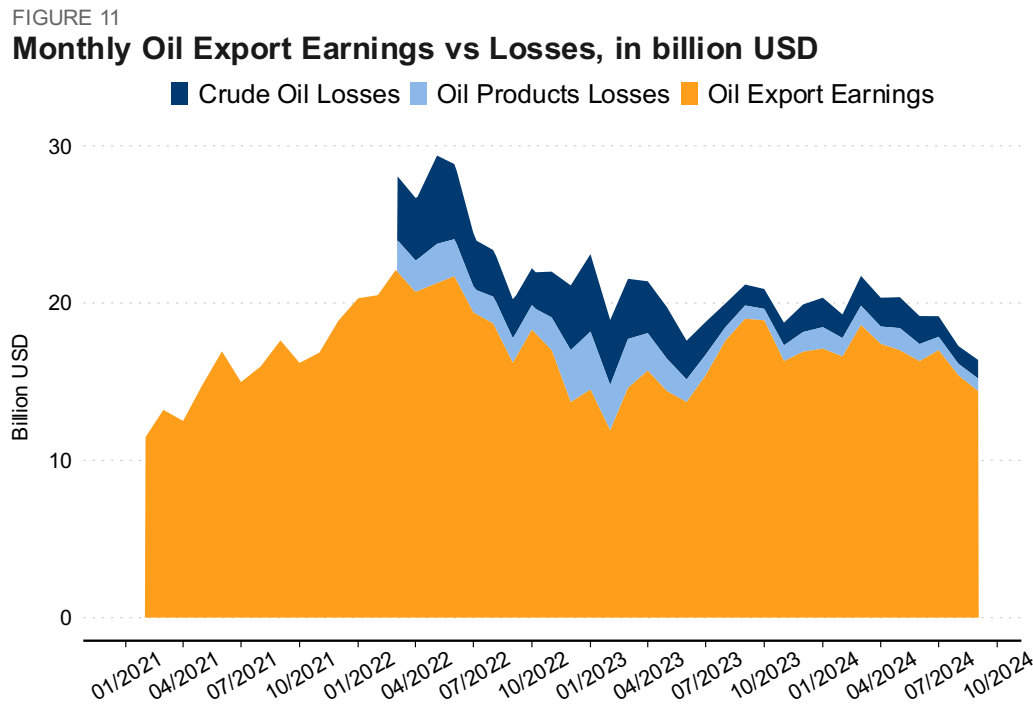
Due to logistical challenges, Russia has been unable to redirect gas from the EU to other markets. Over the past three years, Russia’s pipeline deliveries to the EU have decreased by 127 bcm, while LNG exports have only increased by 5 bcm. Meanwhile, exports to China have risen by just 17 bcm, and negotiations over the Power of Siberia 2 pipeline appear to have stalled.

Many of the dual-use goods sanctioned by the U.S., EU, and other countries against Russia's war on Ukraine find their way to Russia via China ("U.S. Technology Fueling Russia's War in Ukraine: How and Why" 2024). Russia remains critically dependent on Western technology, with 70-90% of its military components sourced from the US, the EU, and other coalition countries. To continue accessing these components, Russia relies on a network of unscrupulous distributors and companies that pose as end-users in third countries and then redirect the flow of goods to Russia. The fact that Western companies have not been compelled to invest in thorough due diligence processes makes it easier for these diversions to go unnoticed and underreported to authorities. Countries such as China, UAE, Turkey, Kazakhstan and other former-Soviet countries have benefited greatly from this trade diversion. For example, in 2022-23, Turkey emerged as one of the key exporters of chips to Russia, after China, despite not being a producer itself.

While we have seen a reduction in Russia's export earnings due to war and sanctions, extensive oil price cap attestation fraud, Russia's expanding shadow fleet, and higher commodity prices mean that Russia's compliance with the oil price cap recently has been minimal. The discount on Russian oil has decreased from its peak of \$30 per barrel to \$10 per barrel. As a result, Russia's current account surplus is expected to exceed \$60 billion in 2024, up from \$50 billion in 2023. While the oil price cap and the EU embargo caused Russia to lose an estimated \$85 billion since December 2022, the impact has been much lower in recent months (**Figure 11**).

Almost simultaneously with financial sanctions, a coalition of countries imposed export controls to Russia. These controls, alongside the private sector "self-sanctioning," caused Russia's imports to fall dramatically. However, as time passed, Russia found workarounds, with many products finding their way to Russia via third countries, be it the EU (Borin et al. 2023) or the US components, technology, and equipment ("Export Controls: A Key G-7 Tool to Halt Russia's War" 2024). To curb circumvention, the US, the EU, the UK, and some of their allies have joined forces to strengthen enforcement. This included streamlining procedures, creating high-priority lists of goods critical for Russian military production—"battlefield goods"—and finding ways to target third countries, whether through threats of secondary sanctions or by leveraging entire trade relationships (**Figure 13**).

Figure 112: Lost oil export earnings due to war and sanctions, in \$ billion



Source: IEA, KSE Institute

Source: Author's estimates, Kyiv School of Economics

Nonetheless, the flow of the “battlefield goods” to Russia via third countries continued, albeit at higher prices. China plays a critical role in this trade diversion (**Figure 14**). While China currently lacks the necessary technology to produce substitutes for Western goods, it has become a key player in facilitating the re-routing of these goods to Russia and other destinations. At present, China functions primarily as a transshipment hub, acting as an intermediary rather than replacing Western products with its own. By leveraging its extensive manufacturing network and logistical infrastructure, China helps divert goods that would otherwise be restricted by sanctions, enabling them to reach their intended markets, including Russia. However, until China can develop or acquire the advanced technology required to manufacture its own high-tech alternatives, it will likely continue to serve this intermediary role in the global supply chain.

Figure 123: Russian imports of “battlefield goods”, in \$ million ²¹

FIGURE 12

Russian Imports of “Battlefield Goods”



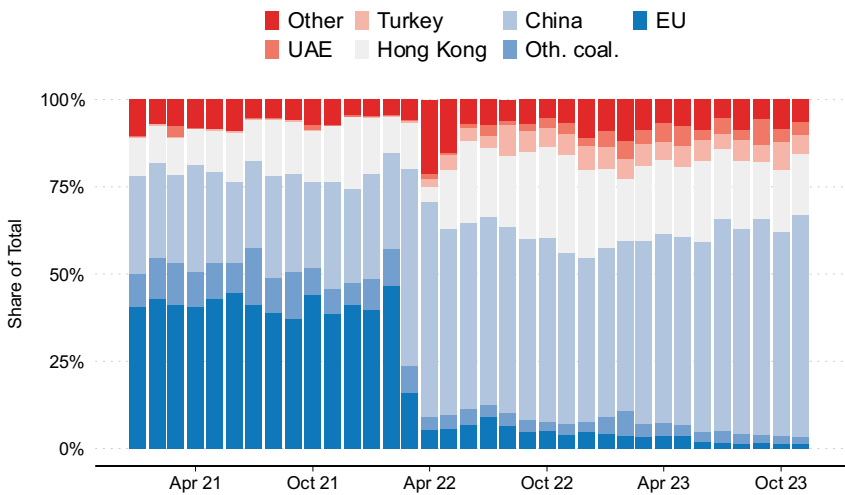
Source: KSE Institute

Figure 13: Russian imports of “battlefield goods” by country of dispatch, in % of total

FIGURE 13

Russian Imports of “Battlefield Goods”

By Country of Dispatch, % of Total



Source: KSE Institute

²¹ See the Common High Priority List of six-digit HS codes published by the U.S. Department of Commerce’s Bureau of Industry and Security in coordination with the European Union, Japan, and the United Kingdom (“Russia Export Controls – List of Common High-Priority Items” 2024).

Starting in 2023, the focus of sanctions shifted towards improving enforcement and leveraging the financial sector to ensure compliance through innovative measures such as the oil price cap and export controls (Hilgenstock 2023, 2024). A pivotal moment in this effort was the December 2023 executive order issued by President Biden, which played a crucial role in strengthening the sanctions regime. Initially, the mere threat of sanctions and the uncertainty surrounding the regime were sufficient to compel companies and countries to sever ties with Russia. However, over time, Russia discovered workarounds as “black knights” emerged and the perceived risk of non-compliance diminished. Consequently, the renewed threat of secondary sanctions in the financial and payment systems became essential in maintaining pressure and ensuring adherence to the sanctions framework.

VI. Conclusion

Sanctions are an important tool in the arsenal of economic statecraft, but they are not a magic wand for resolving geopolitical conflicts. Our analysis reveals that while sanctions can be impactful, their success often hinges on the clarity of their objectives and the robustness of their enforcement. Furthermore, sanctions are likely more effective when implemented decisively and comprehensively, rather than through a piecemeal approach, which allows the target country to adapt gradually. It is crucial to acknowledge that unrealistic or conflicting goals can undermine the effectiveness of sanctions, especially when enforcement is inadequate. This nuanced understanding highlights that sanctions are not inherently ineffective but must be tailored to achieve specific, attainable objectives to maximize their impact.

The sanctions imposed on Russia following its 2022 full-scale invasion as well as those imposed since 2014 provide important lessons in this regard. On one hand, sanctions did impose substantial costs on Russia. However, their design, particularly in 2022—allowing energy exports to continue due to Russia’s integration into global commodity markets and concerns about cost to the sender—limited their overall effectiveness. Additionally, the timing of the sanctions, with a gradual rather than immediate imposition, and the leakages caused by insufficient enforcement and the lucrative nature of Russia's exports further diluted their impact. Finally, 2014 sanctions and the subsequent policy debate on the escalation ladder gave Russia a forewarning on what to prepare for next.

The involvement of “black knights”, nations like China, Turkey and UAE, which helped Russia find ways to circumvent the sanctions, demonstrates the complexity of maintaining a unified and effective sanctions regime. This emphasizes the tradeoff between open-ended sanctions, with vague terms and enforcement, versus sanctions with clear objectives, enforcement, and conditions for removal. The former may be effective to send a signal and contain future escalation of the conflict. Such sanctions may backfire in an all-out conflict, where clear structure of sanctions and firm commitment to enforce them with secondary sanctions on third countries become most effective.

Moreover, the scale of Russia’s economy and its substantial share in global commodity markets made sanctions particularly challenging. Russia’s size and economic leverage meant that sanctions resembled a decoupling process, which had more symmetrical impacts on both sides. This scenario suggests that smaller countries might experience more pronounced deterrent effects from similar sanctions, while larger, economically integrated nations might find ways to mitigate their impact.

The ultimate question remains whether sanctions could have caused a change in the course of Russia’s war on Ukraine. Had the West imposed decisive sanctions and enforced them already in 2022, would we see a more significant result? Furthermore, once deterrence failed and Russia invaded Ukraine in 2022, did the West blunder by not throwing all that it had at Russia? Given "Fortress Russia" preparations, the country size, and its relationships with circumventing countries, it is debatable whether sanctions alone could have put an end to the war. Sanctions are only one tool among many that must be used in settling international conflicts. The effectiveness of sanctions in other contexts, such as North Korea, Iran, Cuba, and Venezuela, suggests that while they may not always lead to immediate regime change or major policy shifts, they still play crucial role in containment.

The experience with sanctions against Russia provides important insights for refining future policies. It is essential to differentiate between sanctions "in theory" and "in practice," with a focus on enforcement and strategic clarity. By addressing these aspects, policymakers can enhance the effectiveness of sanctions and better leverage them as a tool of foreign policy.

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